

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

Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK				
1S	EA	5	JOB INFORMATION SIGN FOR _____				
1X	SY	2,000	CLEARING AND GRUBBING FOR _____				
2	CY	400	UNCLASSIFIED EXCAVATION FOR _____				
3	CY	400	TRENCH, CULVERT AND BRIDGE EXCAVATION FOR _____				
4A	SY	200	CEMENT CONCRETE BREAKING (PAVEMENT) FOR _____				
4B	CY	50	CEMENT CONCRETE BREAKING (STRUCTURES) FOR _____				
4PX	LF	20	REMOVAL OF EXISTING PIPE FOR _____				
5A	CY	30	EMBANKMENT IN PLACE FOR _____				
5B	CY	50	BORROW FILL FOR _____				
5C	CY	100	SELECTED FILL FOR _____				

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ITEM NUMBER	UNIT	QTY.					
5D	CY	50	SELECTED GRANULAR FILL FOR _____				
6	CYM	50	TRUCKING FOR _____				
7	SY	1,000	PREPARING FINE GRADE FOR _____				
8X	SY	100	TRIMMING SHOULDERS AND SLOPES FOR _____				
9	CY	200	TOPSOIL FOR _____				
9R	CY	50	TOPSOIL (REHANDLED) FOR _____				
10A	SF	500	TEMPORARY SHEETING AND BRACING FOR _____				
10A-1	SF	500	EXCAVATION PROTECTION SYSTEM FOR _____				
10B	SF	100	TEMPORARY SHEETING AND BRACING ORDERED LEFT IN PLACE FOR _____				

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ITEM NUMBER	UNIT	QTY.					
10C-1	SF	100	PERMANENT CORRUGATED METAL SHEETING AND BRACING FOR _____				
10C-2	SF	100	PERMANENT STEEL SHEET PILING AND BRACING FOR _____				
10C-2X	SF	100	STEEL SHEET PILING AND BRACING FOR _____				
10C-3	SF	100	PERMANENT TIMBER SHEET PILING AND BRACING FOR _____				
12A-4-12	LF	100	REINFORCED CONCRETE PIPE CLASS IV, 12 INCH DIAMETER FOR _____				
12A-4-15	LF	100	REINFORCED CONCRETE PIPE CLASS IV, 15 INCH DIAMETER FOR _____				
12A-4-18	LF	200	REINFORCED CONCRETE PIPE CLASS IV, 18 INCH DIAMETER FOR _____				
12A-4-24	LF	200	REINFORCED CONCRETE PIPE CLASS IV, 24 INCH DIAMETER FOR _____				
12A-4-30	LF	50	REINFORCED CONCRETE PIPE CLASS IV, 30 INCH DIAMETER FOR _____				

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ITEM NUMBER	UNIT	QTY.					
12A-4-36	LF	30	REINFORCED CONCRETE PIPE CLASS IV, 36 INCH DIAMETER FOR _____				
12A-4-42	LF	20	REINFORCED CONCRETE PIPE CLASS IV, 42 INCH DIAMETER FOR _____				
12A-4-48	LF	20	REINFORCED CONCRETE PIPE CLASS IV, 48 INCH DIAMETER FOR _____				
12B-12	EA	2	REINFORCED CONCRETE PIPE END SECTION - 12" DIAMETER FOR _____				
12B-15	EA	2	REINFORCED CONCRETE PIPE END SECTION - 15" DIAMETER FOR _____				
12B-18	EA	2	REINFORCED CONCRETE PIPE END SECTION - 18" DIAMETER FOR _____				
12B-24	EA	2	REINFORCED CONCRETE PIPE END SECTION - 24" DIAMETER FOR _____				
12B-30	EA	2	REINFORCED CONCRETE PIPE END SECTION - 30" DIAMETER FOR _____				
12B-36	EA	2	REINFORCED CONCRETE PIPE END SECTION - 36" DIAMETER FOR _____				
12B-42	EA	2	REINFORCED CONCRETE PIPE END SECTION - 42" DIAMETER FOR _____				

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ITEM NUMBER	UNIT	QTY.					
12B-48	EA	2	REINFORCED CONCRETE PIPE END SECTION - 48" DIAMETER FOR _____				
12C-14X23	LF	20	14" X 23" REINFORCED ELLIPTICAL CONCRETE PIPE FOR _____				
12C-19X30	LF	20	19" X 30" REINFORCED ELLIPTICAL CONCRETE PIPE FOR _____				
12C-22X34	LF	10	22" X 34" REINFORCED ELLIPTICAL CONCRETE PIPE FOR _____				
12C-24X38	LF	10	24" X 38" REINFORCED ELLIPTICAL CONCRETE PIPE FOR _____				
12C-29X45	LF	10	29" X 45" REINFORCED ELLIPTICAL CONCRETE PIPE FOR _____				
12D-12	LF	20	PERFORATED REINFORCED CONCRETE PIPE - 12" DIAMETER FOR _____				
12D-15	LF	20	PERFORATED REINFORCED CONCRETE PIPE - 15" DIAMETER FOR _____				
12D-18	LF	20	PERFORATED REINFORCED CONCRETE PIPE - 18" DIAMETER FOR _____				
12D-24	LF	20	PERFORATED REINFORCED CONCRETE PIPE - 24" DIAMETER FOR _____				

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ITEM NUMBER	UNIT	QTY.				
12D-30	LF	20	PERFORATED REINFORCED CONCRETE PIPE - 30" DIAMETER FOR _____			
12DIP-6	LF	50	DUCTILE IRON CULVERT PIPE 6 INCH DIAMETER FOR _____			
12DIP-12	LF	100	DUCTILE IRON CULVERT PIPE 12 INCH DIAMETER FOR _____			
12DIP-14	LF	50	DUCTILE IRON CULVERT PIPE 14 INCH DIAMETER FOR _____			
12DIP-16	LF	50	DUCTILE IRON CULVERT PIPE 16 INCH DIAMETER FOR _____			
12DIP-18	LF	20	DUCTILE IRON CULVERT PIPE 18 INCH DIAMETER FOR _____			
12DIP-24	LF	20	DUCTILE IRON CULVERT PIPE 24 INCH DIAMETER FOR _____			
12DIP-30	LF	20	DUCTILE IRON CULVERT PIPE 30 INCH DIAMETER FOR _____			
12F-12	LF	10	12" ROUND CORRUGATED METAL PIPE (SMOOTH FLOW) FOR _____			
12F-15	LF	10	15" ROUND CORRUGATED METAL PIPE (SMOOTH FLOW) FOR _____			

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ITEM NUMBER	UNIT	QTY.				
12F-18	LF	10	18" ROUND CORRUGATED METAL PIPE (SMOOTH FLOW) FOR _____			
12F-24	LF	10	24" ROUND CORRUGATED METAL PIPE (SMOOTH FLOW) FOR _____			
12F-30	LF	10	30" ROUND CORRUGATED METAL PIPE (SMOOTH FLOW) FOR _____			
12G	LF	50	RELAYING PIPE FOR _____			
12H	LF	1,000	CLEANING EXISTING DRAINAGE SYSTEM FOR _____			
12HP	LF	200	CLEANING EXISTING CULVERTS AND ASSOCIATED STORM DRAINAGE PIPE FOR _____			
12P-12	LF	20	SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 12" FOR _____			
12P-15	LF	20	SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 15" FOR _____			
12P-18	LF	20	SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 18" FOR _____			

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ITEM NUMBER	UNIT	QTY.					
12P-24	LF	20	SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 24" FOR _____				
12P-36	LF	20	SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 36" FOR _____				
12S40-6	LF	20	SCHEDULE 40 PVC SANITARY SEWER PIPE - 6" DIAMETER FOR _____				
12S40-8	LF	40	SCHEDULE 40 PVC SANITARY SEWER PIPE - 8" DIAMETER FOR _____				
12UP-4X	LF	20	4" DIAMETER CORRUGATED POLYETHYLENE UNDERDRAIN PIPE FOR _____				
12UP-6X	LF	20	6" DIAMETER CORRUGATED POLYETHYLENE UNDERDRAIN PIPE FOR _____				
12UP-8X	LF	20	8" DIAMETER CORRUGATED POLYETHYLENE UNDERDRAIN PIPE FOR _____				
12UP-10X	LF	20	10" DIAMETER CORRUGATED POLYETHYLENE UNDERDRAIN PIPE FOR _____				
12UP-12X	LF	20	12" DIAMETER CORRUGATED POLYETHYLENE UNDERDRAIN PIPE FOR _____				

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ITEM NUMBER	UNIT	QTY.				
13A	CY	80	CATCH BASINS FOR _____			
13B	CY	80	MANHOLES FOR _____			
13BP-4	LF	20	PRECAST MANHOLES - 4' DIAMETER FOR _____			
13BP-5	LF	20	PRECAST MANHOLES - 5' DIAMETER FOR _____			
13BP-6	LF	20	PRECAST MANHOLES - 6' DIAMETER FOR _____			
13BX-4	EA	1	TREATMENT STRUCTURE - 4' DIAMETER FOR _____			
13BX-6	EA	1	TREATMENT STRUCTURE - 6' DIAMETER FOR _____			
13BX-8	EA	1	TREATMENT STRUCTURE - 8' DIAMETER FOR _____			
13BX-10	EA	1	TREATMENT STRUCTURE - 10' DIAMETER FOR _____			
13BX-12	EA	1	TREATMENT STRUCTURE - 12' DIAMETER FOR _____			

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ITEM NUMBER	UNIT	QTY.					
13C	EA	5	AREA DRAIN FOR _____				
14	EA	50	CONNECTIONS TO EXISTING DRAINAGE FACILITIES FOR _____				
15A	EA	5	ALTERING CATCH BASINS FOR _____				
15X	EA	30	REHABILITATE CATCH BASIN FOR _____				
16A	EA	5	ALTERING BRICK MANHOLES (CORBEL TOP WITH FRAME HEAD) FOR _____				
16B	EA	5	ALTERING BRICK MANHOLES (SLAB TOP WITH FRAME HEAD) FOR _____				
16C	EA	5	ALTERING BRICK MANHOLES (SLAB TOP WITH RING HEAD) FOR _____				
16SS-1	EA	5	CHANGE ELEVATIONS OF SANITARY SEWER MANHOLES (MINOR ADJUSTMENT) FOR _____				
16SS-2	EA	5	CHANGE ELEVATIONS OF SANITARY SEWER MANHOLES (MAJOR ADJUSTMENT) FOR _____				

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ITEM NUMBER	UNIT	QTY.				
16SS-3	EA	5	CHANGE ELEVATIONS OF DRAINAGE MANHOLES AND DROP INLETS (MINOR ADJUSTMENT) FOR _____			
16SS-4	EA	5	CHANGE ELEVATIONS OF DRAINAGE MANHOLES AND DROP INLETS (MAJOR ADJUSTMENT) FOR _____			
16XMH	EA	5	ADJUSTING MANHOLES (EXTENSIONS) FOR _____			
17A	CY	150	CLASS A CONCRETE FOR STRUCTURES FOR _____			
17D	CY	100	CLASS D CONCRETE FOR STRUCTURES FOR _____			
17DP	CY	20	CLASS DP CONCRETE FOR STRUCTURES FOR _____			
17E	CY	20	CLASS E CONCRETE FOR STRUCTURES FOR _____			
17F	CY	100	CLASS F / HIGH EARLY STRENGTH CONCRETE FOR _____			
17H	CY	10	CLASS H CONCRETE FOR STRUCTURES (PUMPED) FOR _____			

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ITEM NUMBER	UNIT	QTY.					
17HP	CY	10	CLASS HP CONCRETE FOR STRUCTURES (PUMPED) FOR_____				
17M	CY	10	CLASS A CONCRETE FOR STRUCTURES (MONOLITHIC BRIDGE SLABS WITH INTEGRAL WEARING SURFACES) FOR_____				
17PPCC	CY	50	PERVIOUS PORTLAND CEMENT CONCRETE FOR_____				
19	CY	50	SCREENED GRAVEL, LOOSE MEASURE FOR_____				
20	CY	50	BROKEN STONE, LOOSE MEASURE FOR_____				
21	CY	50	LIMESTONE SCREENING FOR_____				
22C-2	TON	400	BASE COURSE ASPHALT CONCRETE, TYPE DENSE BASE FOR_____				
23	CY	30	CONCRETE FOUNDATION FOR PAVEMENT FOR_____				
24	CY	50	CEMENT CONCRETE PAVEMENT FOR_____				

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ITEM NUMBER	UNIT	QTY.				
24V	CY	50	CONCRETE VALLEY GUTTER FOR_____			
25	CY	5	CEMENT CONCRETE PAVEMENT (BRIDGE SLAB WEARING COURSE) FOR_____			
26	LF	500	CONCRETE CURB FOR_____			
26CG	LF	200	MONOLITHIC CONCRETE CURB AND GUTTER FOR_____			
26CW	LF	30	CONCRETE CURB WALL FOR_____			
26F	LF	30	CONCRETE CURB - TYPE FLUSH FOR_____			
26PL	LF	30	CURB FOR PARKING LOT FOR_____			
26S	LF	30	CONCRETE CURB (SPECIAL) FOR_____			
26SP-C	LF	30	CONCRETE CURB - TYPE C FOR_____			

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ITEM NUMBER	UNIT	QTY.				
27	SF	1,000	CEMENT CONCRETE SIDEWALK FOR_____			
27DW	SF	100	DETECTABLE WARNING SURFACE FOR_____			
27M	LF	50	CONCRETE MOWING STRIP - 16" WIDE FOR_____			
27MS	LF	50	CONCRETE MOWING STRIP - >16" - 36" WIDE FOR_____			
27SP	SF	50	CEMENT CONCRETE PAVEMENT (STRUCTURE PARKS) FOR_____			
28	SF	50	CEMENT CONCRETE DRIVEWAYS AND DRIVEWAY APRONS FOR_____			
29	SF	50	DRIVEWAY RESTORATION FOR_____			
30	SY	100	METAL REINFORCEMENT FOR CONCRETE PAVEMENT FOR_____			
31	LF	50	TRANSVERSE JOINT SUPPORTS FOR_____			

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ITEM NUMBER	UNIT	QTY.					
32A	EA	50	LONGITUDINAL JOINT TIES (PAVEMENT) FOR _____				
32B	EA	50	LONGITUDINAL JOINT TIES (CURB) FOR _____				
32X	EA	100	JOINT TIES (GROUT TYPE) FOR _____				
32X-1	EA	100	LOAD TRANSFER DEVICE FOR CEMENT CONCRETE PAVEMENT REPAIRS FOR _____				
33	LB	200	BAR REINFORCEMENT FOR STRUCTURES FOR _____				
33X	LB	150	EPOXY COATED BAR REINFORCEMENT FOR STRUCTURES FOR _____				
34	LB	2,000	MISCELLANEOUS METALS FOR _____				
35	LF	30	RESETTING GUIDE RAILING FOR _____				
35T	LF	30	TIMBER GUIDE RAIL FOR _____				

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ITEM NUMBER	UNIT	QTY.					
36C	TON	400	ASPHALT CONCRETE T & L COURSE - TYPE 1A (TOP & BINDER) FOR _____				
36CX	TON	400	ASPHALT CONCRETE TRUING AND LEVELING COURSE TYPE 1A (FOR CRACKS IN ASPHALT PAVEMENT) FOR _____				
36D	TON	400	ASPHALT CONCRETE, TYPE 1A (TOP & BINDER) FOR _____				
36DRAR	TON	600	RUT AVOIDANCE ASPHALT TYPE 1A TOP RA RESURFACING FOR _____				
36E	TON	50	ASPHALT CONCRETE TYPE 1AC FOR _____				
36PAP	TON	50	PERVIOUS ASPHALT PAVEMENT FOR _____				
36T	TON	50	TEMPORARY PAVEMENT FOR _____				
37	SF	50	BRICK PAVERS ON BITUMINOUS SETTING BED FOR _____				
37C	SF	20	BRICK PAVERS ON CEMENT CONCRETE SETTING BED FOR _____				

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ITEM NUMBER	UNIT	QTY.				
39-4	SF	20	PAVING STONES ON AGGREGATE BASE - 4" THICK FOR_____			
39-8	SF	20	PAVING STONES ON AGGREGATE BASE - 8" THICK FOR_____			
40-4	SF	20	NEW STONE BLOCK PAVEMENT ON AGGREGATE BASE - 4" THICK FOR_____			
40-8	SF	20	NEW STONE BLOCK PAVEMENT ON AGGREGATE BASE - 8" THICK FOR_____			
40R	SF	20	RESET EXISTING STONE BLOCK PAVEMENT FOR_____			
40RP	EA	30	RELOCATING TRAFFIC SIGNS FOR_____			
42-1	LF	40	CONCRETE MEDIAN BARRIER FOR_____			
42-2	EA	5	CONCRETE MEDIAN BARRIER END SENTION FOR_____			
42-3	LF	40	HALF SECTION CONCRETE BARRIER FOR_____			

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ITEM NUMBER	UNIT	QTY.					
42-4	EA	5	HALF SECTION CONCRETE BARRIER END SECTION FOR _____				
57	LF	50	MODIFY EXISTING ROOF DRAINS FOR _____				
58A	LF	50	SAW CUTTING ESXISTING NON-ROADWAY ASPHALT FOR _____				
58RPC	LF	500	SAW CUTTING EXISITNG ROADWAY PAVEMENT AND CONCRETE FOR _____				
59	EA	2	RELOCATE WATER BOXES COMPLETE FOR _____				
60	EA	2	ALTER WATER SERVICE CONNECTIONS FOR _____				
60A	EA	2	ADJUST WATER SERVICE BOX ELEVATIONS FOR _____				
60B	EA	2	RELOCATE CURB COCK AND WATER SERVICE BOXES FOR _____				
61	EA	2	RELOCATE WATER METER PIT, COMPLETE FOR _____				
61S	LF	100	RELOCATE WATER MAINS, COMPLETE FOR _____				

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ITEM NUMBER	UNIT	QTY.					
62	EA	2	RELOCATE BURIED ELECTRIC SERVICE CONNECTION FOR_____				
63	LF	30	ALTER SANITARY SEWER HOUSE SERVICE CONNECTION FOR_____				
63A	EA	5	ADJUST SANITARY SEWER CLEANOUTS FOR_____				
63SS	LF	20	EXTENSION OF SANITARY SEWER HOUSE CONNECTIONS FOR_____				
63SS-3	LF	20	ALTER EXISTING SANITARY SEWER SERVICE CONNECTION UNDER WIDENED ROAD AREAS FOR_____				
64	LF	100	RESET EXISTING FENCE FOR_____				
65A	LF	50	TRANSPLANTING EXISTING HEDGE FOR_____				
65B	EA	10	TRANSPLANTING EXISTING TREES AND SHRUBS FOR_____				
66A	CY	5	RECONSTRUCT EXISTING MASONRY STEPS FOR_____				

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ITEM NUMBER	UNIT	QTY.				
66B	BF	40	RECONSTRUCT EXISTING TIMBER STEPS FOR_____			
68	LF	20	UNTREATED TIMBER TEST PILES FOR_____			
69	LF	20	TREATED TIMBER TEST PILES FOR_____			
70	LF	20	PRECAST CONCRETE TEST PILES FOR_____			
71	LF	20	STEEL BEARING TEST PILES FOR_____			
72	LF	20	UNTREATED TIMBER PILES FOR_____			
73	LF	50	TREATED TIMBER PILES FOR_____			
74	LF	50	PRECAST CONCRETE PILES FOR_____			
75	LF	50	STEEL BEARING PILES FOR_____			

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ITEM NUMBER	UNIT	QTY.				
76	LF	50	CAST-IN-PLACE CONCRETE PILES FOR_____			
77	LF	50	TUBULAR CAST-IN-PLACE CONCRETE PILES FOR_____			
79UP	SF	100	UNIT PAVERS FOR_____			
81	LB	500	STRUCTURAL STEEL FOR_____			
82	FT	50	SHEAR CONNECTORS FOR_____			
83	LB	200	SPIRAL BAR SHEAR CONNECTORS FOR_____			
84	EA	50	STUD SHEAR CONNECTORS FOR_____			
95	LF	50	METAL PROTECTION PLATE FOR CURBS FOR_____			
96	CY	100	DRY RIP-RAP FOR_____			

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ITEM NUMBER	UNIT	QTY.					
96S	CY	100	DRY RIP-RAP (SMALL) FOR _____				
97	CY	50	GROUTED RIP-RAP FOR _____				
99-8X	LF	50	PRECAST CONCRETE LEACHING BASIN - 8' DIAMETER FOR _____				
99-10X	LF	50	PRECAST CONCRETE LEACHING BASIN - 10' DIAMETER FOR _____				
100	LF	20	PRECAST CONCRETE DIFFUSION WELL - 10' DIAMETER FOR _____				
102D	DAY	80	FLASHING ARROW BOARD FOR _____				
102PVMS	DAY	80	PORTABLE VARIABLE MESSAGE SIGN FOR _____				
102X*	DAY	150	WORK ZONE TRAFFIC CONTROL (DAY) FOR <u>ONE THOUSAND TWO HUNDRED DOLLARS AND ZERO CENTS</u> DOLLARS CENTS	\$1,200	00	\$180,000	00
102Y*	NIGHT	30	WORK ZONE TRAFFIC CONTROL (NIGHT) FOR <u>ONE THOUSAND FIVE HUNDRED DOLLARS AND ZERO CENTS</u> DOLLARS CENTS	\$1,500	00	\$45,000	00

*Force Bid

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ITEM NUMBER	UNIT	QTY.					
103	EA	2	BALLFIELD PLAYERS BENCH SYSTEM FOR _____				
104PA-4X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 4' HIGH (TOP AND BOTTOM TENSION WIRE) FOR _____				
104PA-6X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 6' HIGH (TOP AND BOTTOM TENSION WIRE) FOR _____				
104PA-8X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 8' HIGH (TOP AND BOTTOM TENSION WIRE) FOR _____				
104PA-10X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 10' HIGH (TOP AND BOTTOM TENSION WIRE) FOR _____				
104PA-12X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 12' HIGH (TOP AND BOTTOM TENSION WIRE) FOR _____				
104PB-4X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 4' HIGH (TOP RAIL AND BOTTOM TENSION WIRE) FOR _____				
104PB-6X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 6' HIGH (TOP RAIL AND BOTTOM TENSION WIRE) FOR _____				

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104PB-8X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 8' HIGH (TOP RAIL AND BOTTOM TENSION WIRE) FOR _____			
104PB-10X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 10' HIGH (TOP RAIL AND BOTTOM TENSION WIRE) FOR _____			
104PB-12X	LF	20	POLYOLEFIN COATED CHAIN LINK FENCING 12' HIGH (TOP RAIL AND BOTTOM TENSION WIRE) FOR _____			
104PC-4-1X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 4' HIGH 1" MESH (TOP AND BOTTOM RAILS) FOR _____			
104PC-4X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 4' HIGH (TOP AND BOTTOM RAILS) FOR _____			
104PC-6X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 6' HIGH (TOP AND BOTTOM RAILS) FOR _____			
104PC-8X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 8' HIGH (TOP AND BOTTOM RAILS) FOR _____			

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ITEM NUMBER	UNIT	QTY.				
104PC-10X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 10' HIGH (TOP AND BOTTOM RAILS) FOR _____			
104PC-12X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 12' HIGH (TOP AND BOTTOM RAILS) FOR _____			
104PD-6X	LF	50	POLYOLEFIN COATED CHAIN LINK FENCING 6' HIGH WITH CONCRETE CURB FOR _____			
104R-4	LF	50	RENOVATE 4' CHAIN LINK FENCE FOR _____			
104R-4-1	LF	50	RENOVATE 4' CHAIN LINK FENCE - 1" MESH FOR _____			
104R-6	LF	50	RENOVATE 6' CHAIN LINK FENCE FOR _____			
104R-8	LF	50	RENOVATE 8' CHAIN LINK FENCE FOR _____			
104R-10	LF	50	RENOVATE 10' CHAIN LINK FENCE FOR _____			
104R-12	LF	50	RENOVATE 12' CHAIN LINK FENCE FOR _____			

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ITEM NUMBER	UNIT	QTY.				
104R-B	SF	50	RENOVATE CHAIN LINK FENCE BACKSTOPS FOR_____			
104RR-4	EA	20	REMOVE AND REPLACE 4' HIGH CHAIN LINK FENCE POSTS FOR_____			
104RR-6	EA	20	REMOVE AND REPLACE 6' HIGH CHAIN LINK FENCE POSTS FOR_____			
104RR-8	EA	10	REMOVE AND REPLACE 8' HIGH CHAIN LINK FENCE POSTS FOR_____			
104RR-10	EA	10	REMOVE AND REPLACE 10' HIGH CHAIN LINK FENCE POSTS FOR_____			
104RR-12	EA	10	REMOVE AND REPLACE 12' HIGH CHAIN LINK FENCE POSTS FOR_____			
104RR-R	LF	50	REMOVE AND REPLACE CHAIN LINK FENCE RAILS FOR_____			
104VCE-BB	SF	50	VINYL-CLAD BACKSTOP - BASEBALL FOR_____			
104VCE-SB	SF	50	VINYL-CLAD BACKSTOP - SOFTBALL / LITTLE LEAGUE FOR_____			

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ITEM NUMBER	UNIT	QTY.					
104XR	LF	60	MIDDLE RAIL, BRACE RAIL TOP RAIL AND BOTTOM RAIL FOR _____				
104XSB	SF	50	REMOVE EXISTING BACKSTOP FOR _____				
104XSF	SF	500	REMOVE EXISTING FENCE FOR _____				
105-2	LF	20	TWO (2) RAIL, SPLIT RAIL FENCE FOR _____				
105-3	LF	20	THREE (3) RAIL, SPLIT RAIL FENCE FOR _____				
105SFS-4	LF	20	4' STOCKADE FENCE FOR _____				
105SFS-6	LF	20	6' STOCKADE FENCE FOR _____				
105SFS-8	LF	20	8' STOCKADE FENCE FOR _____				
106VC-CG	SF	100	16' - 22' WIDE VINYL CLAD CHAIN LINK CANTILEVER SLIDE GATES (6' TO 8' HIGH) FOR _____				

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ITEM NUMBER	UNIT	QTY.				
106P	LF	100	POST PAINTING FOR _____			
106P-DG	SF	100	POLYOLEFIN COATED CHAIN LINK DOUBLE GATE FOR _____			
106P-SG	SF	100	POLYOLEFIN COATED CHAIN LINK SINGLE GATE FOR _____			
106SVBG	LF	50	SELF-SWING VEHICLE BARRIER GATES FOR _____			
107	LF	1,000	CLEANING, FILLING & SEALING EXISTING JOINTS & CRACKS IN ASPHALT PAVEMENT FOR _____			
110	CF	20	MASONRY PIPE PLUGS FOR _____			
111	SY	500	REMOVAL AND REPLACEMENT OF PAVEMENT FOR _____			
111M	SY	50	COLD PLANING AND REMOVAL AND REPLACEMENT OF PAVEMENT FOR _____			
111P	SY	50	REMOVAL AND REPLACEMENT OF EXISTING PATHWAYS FOR _____			

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ITEM NUMBER	UNIT	QTY.				
112	EA	20	ADJUSTING MANHOLES FOR _____			
113	EA	20	ADJUSTMENT OF SURFACE INLETS FOR _____			
114	EA	20	ADJUSTMENT OF WATER VALVE BOX ELEVATIONS FOR _____			
115	LF	200	BUTT JOINTS FOR _____			
116A	SY	500	PROFILING AND REMOVAL OF ASPHALT PAVEMENT (PAVING BY CONTRACTOR WILL FOLLOW UNDER RESPECTIVE ITEMS) FOR _____			
116AM	SY	500	PROFILING AND REMOVAL OF ASPHALT PAVEMENT (PAVING BY OTHERS WILL FOLLOW) FOR _____			
116C	SY	100	PROFILING AND REMOVAL OF CONCRETE PAVEMENT FOR _____			
117	LF	20	TEMPORARY FENCE - 4' HIGH FOR _____			
117T-6	LF	50	TEMPORARY FENCE - 6' HIGH FOR _____			

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ITEM NUMBER	UNIT	QTY.				
117T-8	LF	20	TEMPORARY FENCE - 8' HIGH FOR_____			
117TP-6	LF	50	TEMPORARY FENCE WITH PRIVACY SCREENING - 6' HIGH FOR_____			
117TP-8	LF	20	TEMPORARY FENCE WITH PRIVACY SCREENING - 8' HIGH FOR_____			
118	CY	50	GABION AND REVET MATTRESSES FOR_____			
119	CY	10	ROCK EXCAVATION FOR_____			
120	EA	10	RELOCATION AND REATTACHMENT OF EXISTING LIGHTING UNITS FOR_____			
121	CY	100	DRY BOUND BASE COURSE FOR_____			
122	EA	30	TEST HOLES FOR_____			
125	OZ	10	CHEMICAL ADMIXTURE FOR CONCRETE FOR_____			

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ITEM NUMBER	UNIT	QTY.				
126A	LF	50	NEW STONE BLOCK CURB FOR_____			
126B	LF	10	RESET EXISTING STONE BLOCK CURB FOR_____			
127	EA	2	RELOCATING EXISTING HYDRANT FOR_____			
128	SY	50	FURNISHING AND APPLYING SOIL STERILANT FOR_____			
129	CY	100	CEMENT CONCRETE FOR PAVEMENT REPAIRS FOR_____			
132	EA	50	PLOWABLE RAISED REFLECTORIZED PAVEMENT MARKERS FOR_____			
133	LF	50	CLEAN & FILL JOINTS AND CRACKS FOR_____			
133A	LF	50	CLEANING AND RESEALING OF LONGITUDINAL JOINTS IN PORTLAND CEMENT CONCRETE PAVEMENT FOR_____			
133B	LF	50	SEALING OF TRANSVERSE JOINTS IN CEMENT CONCRETE PAVEMENT FOR_____			

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ITEM NUMBER	UNIT	QTY.					
134	LF	50	SAWING AND SEALING BITUMINOUS CONCRETE OVERLAYS FOR _____				
136S	DAY	30	SURVEY STAKEOUT (PER DAY) FOR _____				
137	LF	50	REMOVE EXISTING TRAFFIC MARKINGS FOR _____				
138	SY	50	ASPHALT JOINT REPAIR FOR _____				
139	SY	50	SAW CUTTING LONGITUDINAL OR TRANSVERSE GROOVES IN EXISTING ROADWAY PAVEMENT FOR _____				
140	LF	100	TEMPORARY PAVEMENT DELINEATION FOR _____				
141	LF	200	SILT FENCE FOR _____				
141A	LF	100	HAY BALES / STRAW BALES FOR _____				
141B	EA	30	SILT PROTECTION FOR SURFACE INLET DRAINAGE STRUCTURES FOR _____				

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ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK				
141C	EA	30	SILT PROTECTION FOR CURB INLET DRAINAGE STRUCTURES FOR_____				
142CLK	LF	50	CAULKING FOR STRUCTURAL STEEL PAINTING FOR_____				
143	LF	50	EPOXY INJECTION OF STRUCTURES FOR_____				
144	SY	50	BRIDGE DECK WATERPROOFING MEMBRANE FOR_____				
150	LF	50	BOX BEAM GUIDE RAILING FOR_____				
151	LF	50	BOX BEAM MEDIAN BARRIER FOR_____				
152	EA	5	BOX BEAM GUIDE RAIL END ASSEMBLY FOR_____				
153A	EA	2	BOX BEAM MEDIAN BARRIER END ASSEMBLY - TYPE A FOR_____				
153B	EA	2	BOX BEAM MEDIAN BARRIER END ASSEMBLY - TYPE B FOR_____				

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ITEM NUMBER	UNIT	QTY.					
158A	SF	500	GEOTEXTILE CLOTH FOR_____				
158B	SY	300	SOIL STABILIZATION FABRIC FOR_____				
172	SY	50	COURT PREPARATION FOR COLOR COATING FOR_____				
173	SY	50	COLOR COATING FOR_____				
174	LF	100	PAINTED LINES FOR_____				
175	SY	500	STABILIZED MIXED-IN-PLACE RECYCLED BASE COURSE FOR_____				
175AE	GAL	2,000	ASPHALT EMULSION FOR_____				
176	SY	500	MILLED-IN-PLACE RECYCLED BASE COURSE FOR_____				
178W	LF	500	PAVEMENT MARKINGS, PAINTING & STRIPING (WHITE) FOR_____				

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ITEM NUMBER	UNIT	QTY.					
178Y	LF	500	PAVEMENT MARKINGS, PAINTING & STRIPING (YELLOW) FOR _____				
179A	LF	50	STEEL EDGING FOR _____				
179B	LF	50	RESET EXISTING STEEL EDGING FOR _____				
180	LF	20	TRENCH DRAIN FOR _____				
185A	LF	10	RELOCATE RESIDENTIAL SPRINKLER SYSTEM FOR _____				
185B	LF	10	RELOCATE COMMERCIAL SPRINKLER SYSTEM FOR _____				
185N	LF	10	NEW SPRINKLER SYSTEM FOR _____				
200	LF	200	HEAVY POST, PLASTIC AND SYNTHETIC BLOCKED OUT GALVANIZED CORRUGATED STEEL BEAM GUIDE RAILING FOR _____				
201	LF	200	HEAVY POST, PLASTIC AND SYNTHETIC BLOCKED OUT GALVANIZED CORRUGATED STEEL BEAM MEDIAN BARRIER FOR _____				

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ITEM NUMBER	UNIT	QTY.				
202	EA	20	ANCHORAGE UNITS FOR HEAVY POST BLOCKED CORRUGATED BEAM GUIDE RAILING FOR DRIVEWAYS FOR _____			
202.19	CY	5	REMOVAL OF SUBSTRUCTURES FOR _____			
203	EA	1	ANCHORAGE UNITS FOR HEAVY POST BLOCKED CORRUGATED BEAM GUIDE RAILING FOR HIGHWAYS FOR _____			
204	EA	1	ANCHORAGE UNITS FOR HEAVY POST BLOCKED OUT CORRUGATED BEAM MEDIAN BARRIER FOR _____			
204.01	CY	30	FLOWABLE FILL - CONTROLLED LOW STRENGTH MATERIAL (CLSM) FOR _____			
205	EA	1	HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING CONNECTION TO TWO RAIL STEEL BRIDGE RAILING FOR _____			
206	EA	3	HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING CONNECTION TO THREE RAIL TUBULAR STEEL BRIDGE RAILING FOR _____			
207	EA	2	HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING CONNECTION TO WALLS (TRAILING ENDS) FOR _____			

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ITEM NUMBER	UNIT	QTY.				
208	LF	20	RECONSTRUCTION OF HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING FOR _____			
209	LF	20	RECONSTRUCTION OF MEDIAN BARRIER FOR _____			
210E	EA	2	ET-2000 ENERGY ABSORBING SAFETY END TREATMENT FOR _____			
210.3411	LF	20	REMOVAL AND DISPOSAL OF CAULKING ACM (BV14) FOR _____			
216	LF	20	REMOVAL OF EXISTING GUIDE RAIL FOR _____			
220	LF	20	CORRUGATED BEAM GUIDE RAILING FOR _____			
221	EA	2	ANCHORAGE UNITS FOR CORRUGATED BEAM GUIDE RAILING FOR _____			
222	EA	2	ANCHORAGE UNITS FOR CORRUGATED BEAM GUIDE RAILING (DRIVEWAY) FOR _____			
360	EA	5	PRUNING EXISTING DECIDUOUS TREES FOR _____			

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ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK				
361A	EA	75	PLANTING TREES AND SHRUBS - DECIDUOUS MAJOR FOR_____				
361B	EA	75	PLANTING TREES AND SHRUBS - DECIDUOUS MINOR FOR_____				
361C	EA	5	PLANTING TREES AND SHRUBS - DECIDUOUS SHRUBS FOR_____				
361D	EA	5	PLANTING TREES AND SHRUBS - EVERGREEN TREES FOR_____				
361E	EA	5	PLANTING TREES AND SHRUBS - EVERGREEN SHRUBS UPRIGHT FOR_____				
361F	EA	5	PLANTING TREES AND SHRUBS - EVERGREEN SHRUBS SPREADING FOR_____				
362	CY	10	TRIPLE SHREDDED MULCH FOR_____				
363	SY	100	GRASS SEEDING FOR_____				
364-A	EA	5	TREE PRUNING - A - (<6" CALIPER) FOR_____				

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ITEM NUMBER	UNIT	QTY.					
364-B	EA	5	TREE PRUNING - B - (6" - <12" CALIPER) FOR_____				
364-C	EA	5	TREE PRUNING - C - (12" - <24" CALIPER) FOR_____				
364-D	EA	5	TREE PRUNING - D - (24" - <36" CALIPER) FOR_____				
364-E	EA	5	TREE PRUNING - E - (36" - <48" CALIPER) FOR_____				
364-F	EA	5	TREE PRUNING - F - (>48" CALIPER) FOR_____				
365	SF	100	SODDING FOR_____				
367	ACRE	100	HYDRO-SEEDING FOR_____				
368	SY	400	TOPSOIL AND GRASS SEED FOR_____				
370	EA	10	MYCORRHIZAL FUNGI INOCULANT (3 OUNCE PACKET) FOR_____				

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ITEM NUMBER	UNIT	QTY.				
371	PER BALE	10	PEAT MOSS FOR_____			
372A	EA	10	TREE REMOVAL - A - (<6" CALIPER) FOR_____			
372B	EA	10	TREE REMOVAL - B - (6" - <12" CALIPER) FOR_____			
372C	EA	10	TREE REMOVAL - C - (12" - <24" CALIPER) FOR_____			
372D	EA	10	TREE REMOVAL - D - (24" - <36" CALIPER) FOR_____			
372E	EA	10	TREE REMOVAL - E - (36" - <48" CALIPER) FOR_____			
372F	EA	10	TREE REMOVAL - F - (>48" CALIPER) FOR_____			
373A	EA	5	STUMP REMOVAL - A - (4" - <6" CALIPER) FOR_____			
373B	EA	5	STUMP REMOVAL - B - (6" - <12" CALIPER) FOR_____			

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ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK				
373C	EA	5	STUMP REMOVAL - C - (12" - <24" CALIPER) FOR_____				
373D	EA	5	STUMP REMOVAL - D - (24" - <36" CALIPER) FOR_____				
373E	EA	5	STUMP REMOVAL - E - (36" - <48" CALIPER) FOR_____				
373F	EA	5	STUMP REMOVAL - F - (>48" CALIPER) FOR_____				
374A	EA	5	STUMP GRINDING - A - (4" - <6" CALIPER) FOR_____				
374B	EA	5	STUMP GRINDING - B - (6" - <12" CALIPER) FOR_____				
374C	EA	5	STUMP GRINDING - C - (12" - <24" CALIPER) FOR_____				
374D	EA	5	STUMP GRINDING - D - (24" - <36" CALIPER) FOR_____				
374E	EA	5	STUMP GRINDING - E - (36" - <48" CALIPER) FOR_____				

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ITEM NUMBER	UNIT	QTY.				
374F	EA	5	STUMP GRINDING - F - (>48" CALIPER) FOR_____			
378	LF	10	MECHANICAL BARRIER ROOT CONTROL SYSTEM - 24" DEPTH FOR_____			
411-A1	EA	2	FURNISH AND INSTALL CONCRETE FOUNDATION, TYPE A1 FOR_____			
412G	EA	2	FURNISH AND INSTALL A PUSHBUTTON POST ASSEMBLY FOR_____			
412P-8	EA	2	FURNISH & INSTALL 8 FOOT ALUMINUM SIGNAL POST FOR_____			
412P-10	EA	2	FURNISH & INSTALL 10 FOOT ALUMINUM SIGNAL POST FOR_____			
412P-12	EA	2	FURNISH & INSTALL 12 FOOT ALUMINUM SIGNAL POST FOR_____			
415-2	LF	100	FURNISH & INSTALL 2 - CONDUCTOR, #14 CABLE ON SPAN WIRE, IN CONDUIT OR RACEWAY FOR_____			
415-3	LF	100	FURNISH & INSTALL 3 - CONDUCTOR, #14 CABLE ON SPAN WIRE, IN CONDUIT OR RACEWAY FOR_____			

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ITEM NUMBER	UNIT	QTY.				
415-5	LF	100	FURNISH & INSTALL 5 - CONDUCTOR, #14 CABLE ON SPAN WIRE, IN CONDUIT OR RACEWAY FOR_____			
415-7	LF	100	FURNISH & INSTALL 7 - CONDUCTOR, #14 CABLE ON SPAN WIRE, IN CONDUIT OR RACEWAY FOR_____			
419-075	LF	50	FURNISH & INSTALL 3/4" DIAMETER STEEL CONDUIT FOR_____			
419S-1	LF	200	FURNISH & INSTALL 1-1/4" (1.25") DIAMETER STEEL CONDUIT FOR_____			
419S-2	LF	100	FURNISH & INSTALL 2" DIAMETER STEEL CONDUIT FOR_____			
419S-3	LF	50	FURNISH & INSTALL 3" DIAMETER STEEL CONDUIT FOR_____			
420-1	EA	5	FURNISH & INSTALL STANDARD PULLBOX FOR_____			
420-3	EA	2	FURNISH & INSTALL SPLIT PULLBOX FOR_____			
420R	EA	5	REGRADE PULLBOX FRAME AND COVER FOR_____			

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ITEM NUMBER	UNIT	QTY.				
422L	LF	500	FURNISH AND INSTALL LOOP WIRE FOR_____			
422LS	LS	100	FURNISH AND INSTALL LOOP SAW CUT FOR_____			
424-4	EA	5	REMOVE ANY POST FOR_____			
424-8	EA	5	REMOVE PEDESTRIAN STATION (POST, FOUNDATION AND PUSHBUTTON) FOR_____			
424-11A	EA	5	REMOVE SIGNAL FACE (VEHICLE) FOR_____			
424-11B	EA	5	REMOVE SIGNAL FACE (PEDESTRIAN) FOR_____			
424-14	LF	200	REMOVE CABLE FOR_____			
424-21	EA	5	REMOVE SINGLE LANE MAGNETIC DETECTOR FOR_____			
424-22	EA	5	REMOVE SINGLE LANE MAGNETIC HOUSING FOR_____			

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ITEM NUMBER	UNIT	QTY.				
424-23	EA	5	ABANDON FOUNDATION FOR_____			
424-24	EA	5	REMOVE AUXILIARY POLE FOR_____			
424-25	EA	10	REMOVE PULLBOX FOR_____			
424-26	EA	5	REMOVE MULTI - LANE MAGNETIC VEHICLE DETECTOR FOR_____			
424-27	EA	5	REMOVE PUSHBUTTON & SIGN ASSEMBLY FOR_____			
426L	EA	5	FURNISH & INSTALL AN L.E.D. COUNTDOWN PEDESTRIAN SIGNAL FOR_____			
427-2	EA	5	FURNISH & INSTALL A PUSHBUTTON & SIGN ASSEMBLY FOR_____			
450	EA	50	FURNISH AND INSTALL POST MOUNTED SIGNS FOR_____			
451	EA	30	FURNISH AND INSTALL POST MOUNTED HANDICAP PARKING SIGNS FOR_____			

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ITEM NUMBER	UNIT	QTY.					
502	SF	10	HIGHWAY SEALING AND SURFACE COATING (LATEX) FOR _____				
502A	LF	200	2" I.D. PVC ELECTRICAL CONDUIT FOR _____				
502B	LF	150	3" I.D. PVC ELECTRICAL CONDUIT FOR _____				
502C	LF	100	4" I.D. PVC ELECTRICAL CONDUIT FOR _____				
502J	CF	10	ELECTRICAL JUNCTION BOXES FOR _____				
511	BAGS	10	PNEUMATICALLY PLACED CONCRETE FOR _____				
512	SF	20	REPAIRING STRUCTURAL SLABS FOR _____				
513	CY	20	SAND BAGS IN PLACE FOR _____				

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ITEM NUMBER	UNIT	QTY.				
514	GAL	5	EPOXY PROTECTIVE COATING FOR_____			
515	LF	50	SAWCUTTING GROOVES IN EXISTING ASPHALT OR CONCRETE PAVEMENT FOR_____			
516	LB	50	LIME CEMENT PAVEMENT GROUTING FOR_____			
517	EA	10	DRILLING HOLES FOR LIME CEMENT GROUTING FOR_____			
522	EA	20	TRIANGULAR GUIDE RAIL DELINEATOR FOR_____			
525A	LF	200	FULL DEPTH PAVEMENT CLEANING AND RESEALING OF TRANSVERSE JOINTS IN PORTLAND CEMENT CONCRETE PAVEMENT (0' - <1,000') FOR_____			
525B	LF	200	FULL DEPTH PAVEMENT CLEANING AND RESEALING OF TRANSVERSE JOINTS IN PORTLAND CEMENT CONCRETE PAVEMENT (1,000' - <5,000') FOR_____			
525C	LF	200	FULL DEPTH PAVEMENT CLEANING AND RESEALING OF TRANSVERSE JOINTS IN PORTLAND CEMENT CONCRETE PAVEMENT (5,000' - <10,000') FOR_____			

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ITEM NUMBER	UNIT	QTY.					
525D	LF	200	FULL DEPTH PAVEMENT CLEANING AND RESEALING OF TRANSVERSE JOINTS IN PORTLAND CEMENT CONCRETE PAVEMENT (10,000' & OVER) FOR _____				
540	EA	20	STEEL BOLLARDS FOR _____				
556.03	EA	20	STUD SHEAR CONNECTORS FOR BRIDGES FOR _____				
557.01012403	SY	5	ACCELERATED SUPERSTRUCTURE CONCRETE 24 HOURS FOR STRUCTURAL SLAB BRIDGE DECK, FRICTION TYPE 1 FOR _____				
557.2001	SY	5	STRUCTURAL APPROACH SLAB WITH INTEGRAL WEARING SURFACE, BOTTOM FORMWORK REQUIRED- TYPE I FRICTION FOR _____				
558.02	SY	40	LONGITUDINAL SAWCUT GROOVING OF STRUCTURAL SLAB SURFACE FOR _____				
559.02	SF	40	PROTECTIVE SEALING OF NEW STRUCTURAL CONCRETE FOR _____				
559.03	SF	40	PROTECTIVE SEALING OF EXISTING STRUCTURAL CONCRETE AND EXISTING BRIDGE DECKS FOR _____				

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ITEM NUMBER	UNIT	QTY.				
559.04	SF	40	PROTECTIVE SEALING OF CONCRETE WITH COATING TYPE PROTECTIVE SEALER FOR _____			
559.90010011	SY	50	ANTI - GRAFFITI PROTECTION COATING FOR _____			
560.08	LF	50	TUCK POINTING FOR _____			
560.16010008	LF	5	REMOVE, STORE AND RESET EXISTING STONE COPING FOR _____			
560.18000008	LF	30	REMOVE AND REPLACE CAULK IN STONE MASONRY EXPANSION JOINTS FOR _____			
560.18100011	SF	5	REMOVE AND RESET STONE MASONRY FOR _____			
564.20010008	LB	200	HOT DIP GALVANIZING OF STRUCTURAL STEEL FOR _____			
564.75010004	EA	2	STRUCTURAL STEEL REPAIR, TYPE I FOR _____			
564.75020004	EA	2	STRUCTURAL STEEL REPAIR, TYPE II FOR _____			

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ITEM NUMBER	UNIT	QTY.				
564.75030004	EA	2	STRUCTURAL STEEL REPAIR, TYPE III FOR_____			
564.75040004	EA	2	STRUCTURAL STEEL REPAIR, TYPE IV FOR_____			
565.2023	EA	2	TYPE E.B. FIXED BEARING (112 TO 168KN) FOR_____			
565.2033	EA	2	TYPE E.B. FIXED EXPANSION BEARING (112 TO 168KN) FOR_____			
565.43020015	EA	2	BRIDGE BEARING RESTORATION TYPE I FOR_____			
568.51	LF	5	STEEL BRIDGE RAILING (FOUR RAIL) FOR_____			
568.70	LF	5	TRANSITION BRIDGE RAILING FOR_____			
571.03	LB	200	DISPOSAL OF HAZARDOUS PAINT REMOVAL WASTE CONTAINING LEAD FOR_____			
574.020001	SF	50	STRUCTURAL STEEL PAINTING: OVERCOATING FOR_____			

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ITEM NUMBER	UNIT	QTY.				
574.030001	SF	50	STRUCTURAL STEEL PAINTING: LOCALIZED FOR_____			
580.01	CY	5	REMOVAL OF STRUCTURAL CONCRETE FOR_____			
580.04	SF	200	REMOVAL OF CONCRETE APPROACH SLAB FOR_____			
585.01	EA	1	STRUCTURAL LIFTING OPERATION TYPE A FOR_____			
586.0201	EA	1	DRILLING AND GROUTING BOLTS OR REINFORCEMENT BARS FOR_____			
589.01	LB	500	REMOVAL OF EXISTING STEEL FOR_____			
594.01	CF	50	TIMBER AND LUMBER FOR_____			
594.02	CF	50	STRESS GRADED TIMBER AND LUMBER FOR_____			
594.03	CF	100	TREATED TIMBER AND LUMBER FOR_____			

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

Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.				
685.07200110	LF	500	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200210	EA	50	WHITE EPOXY REFLECTORIZED PAVEMENT LETTERS - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200310	EA	50	WHITE EPOXY REFLECTORIZED PAVEMENT SYMBOLS - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200410	LF	250	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS CROSS HATCHING (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200510	LF	250	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS SPECIAL MARKINGS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200610	LF	500	YELLOW EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200710	LF	500	YELLOW EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS CROSS HATCHING (WET NIGHT VISIBILITY SPHERES) FOR _____			

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Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.				
685.07200810	EA	20	WHITE EPOXY REFLECTORIZED MARKINGS YEILD LINE SYMBOLS SMALL - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.07200910	EA	20	WHITE EPOXY REFLECTORIZED MARKINGS YEILD LINE SYMBOLS LARGE - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR _____			
685.072001NA	LF	500	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT STRIPES - 20 MILS (TRIPLE DROP) FOR _____			
685.072002NA	EA	50	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT LETTERS - 20 MILS (TRIPLE DROP) FOR _____			
685.072003NA	EA	50	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT SYMBOLS - 20 MILS (TRIPLE DROP) FOR _____			
685.072004NA	LF	300	HIGHLY REFLECTORIZED WHITE EPOXY CROSS HATCHING - 20 MILS (TRIPLE DROP) FOR _____			
685.072005NA	LF	300	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT STRIPES (SPECIAL MARKINGS) - 20 MILS (TRIPLE DROP) FOR _____			

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

Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.					
685.072006NA	LF	500	HIGHLY REFLECTORIZED YELLOW EPOXY PAVEMENT STRIPES - 20 MILS (TRIPLE DROP) FOR _____				
685.072007NA	LF	500	HIGHLY REFLECTORIZED YELLOW EPOXY PAVEMENT STRIPES - (CROSS HATCHING) - 20 MILS (TRIPLE DROP) FOR _____				
685.072008NA	EA	20	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT YIELD LINE SYMBOLS - SMALL - (TRIPLE DROP) FOR _____				
685.072009NA	EA	20	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT YIELD LINE SYMBOLS - LARGE - (TRIPLE DROP) FOR _____				
711	EA	1	OUTDOOR ELECTRONIC MULTI-SPORT SCOREBOARDS FOR _____				
712	EA	1	OUTDOOR ELECTRONIC BASEBALL SCOREBOARDS FOR _____				
713	SET (PR)	2	INTEGRATED FOOTBALL AND SOCCER GOALS SETS - ONE PAIR FOR _____				

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

Department of Public Works Nassau County, N.Y.
Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.					
714	SET (PR)	2	LACROSSE GOALS - ONE PAIR FOR_____				
715	CY	30	INSTALLATION OF CLAY SURFACE AREAS FOR_____				
716	SET	2	PITCHERS MOUND AND BASE SETS FOR_____				
717	EA	4	ALUMINUM PLAYERS BENCHES FOR_____				
718	PR	2	FOUL POLES - ONE PAIR FOR_____				
719	LF	50	FENCE GUARD FOR_____				
720	SET	2	TENNIS NET & POST NETS FOR_____				

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Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.				
721	SF	50	WIND SCREENS FOR_____			
722	SET (PR)	2	BASKETBALL BACKSTOPS SYSTEM - ONE PAIR FOR_____			
723	SF	50	ORNAMENTAL STEEL PICKET FENCE (4'-0" - 8'-0" HIGH) FOR_____			
724	SF	50	4'-0" WIDE SINGLE SWING ORNAMENTAL STEEL PICKET GATES (4'-0" TO 8'-0" HIGH) FOR_____			
725	SF	50	10'-0" WIDE DOUBLE SWING ORNAMENTAL STEEL PICKET GATES (4'-0" TO 8'-0" HIGH) FOR_____			
726	SF	100	ORNAMENTAL STEEL PICKET CANTILEVER SLIDE GATES IN 4' TO 8' HEIGHTS (16'-0" TO 22'-0" WIDE) FOR_____			
727	SF	100	STRAIGHT PICKET PVC FENCE (4'-0" TO 6'-0" HIGH) FOR_____			
728	SF	50	4'-0" WIDE SINGLE SWING STRAIGHT PICKET PVC GATES (4'-0" TO 6'-0" HIGH) FOR_____			

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Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.					
729	SF	50	10'-0" WIDE DOUBLE SWING STRAIGHT PICKET PVC GATES (4'-0" TO 6'-0" HIGH) FOR _____				
730	SF	100	STRAIGHT SOLID PANEL PVC FENCE (4'-0" TO 8'-0" HIGH) FOR _____				
731	SF	50	4'-0" WIDE SINGLE SWING STRAIGHT SOLID PANEL PVC GATES (4'-0" - 8'-0" HIGH) FOR _____				
732	SF	50	10'-0" WIDE DOUBLE SWING STRAIGHT SOLID PANEL PVC GATES (4'-0" - 8'-0" HIGH) FOR _____				
733	EA	2	35 FOOT HIGH ALUMINUM FLAGPOLE - INTERNAL HALYARD FOR _____				
734	EA	2	PARK LIGHTING FOR _____				
735	EA	2	BARRIER FREE WATER FOUNTAINS FOR _____				
736	EA	2	PARK BENCHES WITH BACKS FOR _____				

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Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.				
737	EA	2	PARK PICNIC TABLES WITHOUT BACKS FOR _____			
738	EA	2	PARK RECEPTACLES FOR _____			
744*	LS	1	FORCE ACCOUNT WORK FOR <u>ONE HUNDRED THOUSAND DOLLARS AND ZERO CENTS</u> DOLLARS CENTS	\$100,000	00	\$100,000 00
751	SF	300	SYNTHETIC TURF FIELD WITH UNDERDRAIN FOR _____			
752	SF	300	UPGRADE TO COLOR INFILL FOR _____			
753	LF	50	SPORTS FIELD STRIPING FOR _____			
754	SF	100	CUSTOM LOGOS, NUMBERS AND LETTERING FOR _____			
755	SF	200	HEAVY DUTY NON-INFILL BATTING CAGE TURF FOR _____			

*Force Bid

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Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.					
756	SF	200	SYNTHETIC TURF REPAIR FOR _____				
756A	LF	200	SYNTHETIC TURF SEAM REPAIR FOR _____				
757	LF	400	6" X 6" RECYCLED PLASTIC LUMBER PERIMETER EDGE NAILER FOR _____				
758	EA	5	G-MAX TESTING FOR _____				
759	SF	100	ANTIMICROBIAL TREATMENT FOR _____				
760	SF	100	MAINTENANCE FOR TURF FIELDS INSTALLED UNDER THIS CONTRACT FOR _____				
761	SF	100	MAINTENANCE FOR TURF FIELDS INSTALLED BY OTHERS FOR _____				
762	LB	100	INTEGRAL COLOR PIGMENT FOR CEMENT CONCRETE FOR _____				

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Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.					
763	SF	500	IMPRINTING ON CEMENT CONCRETE PAVEMENT OR SIDEWALK FOR _____				
764	SF	200	COLORED AND IMPRINTED ASPHALT FOR _____				
765	EA	5	FURNISH & INSTALL CONCRETE PARKING BUMPER FOR _____				
766	SF	150	RETAINING WALL SYSTEM FOR _____				
767	LF	50	FURNISH, INSTALL & MAINTAIN TURBIDITY CURTAIN FOR _____				
768	LF	50	FURNISH AND INSTALL ARMORLESS BRIDGE JOINT SYSTEM FOR _____				
769A	EA	1	TYPE "A" CATCH BASIN INSERT - FILTER TYPE (COMBINATION INLET) FOR _____				
769B	EA	1	TYPE "B" CATCH BASIN INSERT - FILTER TYPE (CURB INLET ONLY) FOR _____				
770A	EA	1	TYPE "A" CATCH BASIN INSERT - SEDIMENT CONTROL TYPE (COMBINATION INLET) FOR _____				

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

Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H66302-REQ1

ITEM NUMBER	UNIT	QTY.				
770B	EA	1	TYPE "B" CATCH BASIN INSERT - SEDIMENT CONTROL TYPE (CURB INLET ONLY) FOR _____			
771A	EA	1	TYPE "A" CATCH BASIN INSERT - SEDIMENT CONTROL TYPE WITH PATHOGEN FILTRATION (COMBINATION INLET) FOR _____			
771B	EA	1	TYPE "B" CATCH BASIN INSERT - SEDIMENT CONTROL TYPE WITH PATHOGEN FILTRATION (CURB INLET ONLY) FOR _____			
_____ _____						

**2027 GENERAL REQUIREMENTS CONTRACT
NASSAU COUNTY, NEW YORK
CONTRACT NO. H66302-REQ1**

SPECIAL CONDITIONS

1. Referring to Notice of Award, Agreement section, Page 340, Article XXV, 'Contractor's Maintenance/Guarantee' – the provision shall apply except "one year from the date of final acceptance of the Contract." should be read "one year from the date of final acceptance of each Work Order."
2. Variation from Normal Bidding Procedure
 - a) The contract shall terminate upon reaching either, the contract CAP or the time limit of thirty-six (36) months from the contract execution, whichever comes first, unless an extension is granted at the discretion of the Commissioner. The County may grant an extension of time to permit the Contractor to complete open or incomplete Work Orders. However, no additional Work Orders will be issued unless an extension of contract as stated in Article XXVI, Schedule of Requirements, Section A, No. 1.
 - b) The quantities given are based on average weighted units with the exceptions of those items which are on a lump sum basis. All bid prices are to be based upon these average weighted units. The sum total of all the unit prices will determine the low bid; and the subsequent award of this contract.
 - c) The Bidder is further advised that the County may use only one item of work or may use some quantities of all the contract items in each Work Order. Quantities are provided for bid comparison purposes. Actual quantities may be less, more or none.
 - d) All Force Bids are fixed cost items and therefore the Contractor must bid the price as stated for all force bid items.

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**2027 GENERAL REQUIREMENTS CONTRACT
NASSAU COUNTY, NEW YORK**

CONTRACT NO. H66302-REQ1

GENERAL NOTES

All work included in this contract shall be in accordance with the following Nassau County Standard Specifications and Drawings, if they apply, or modified and amended in the Contract Specifications and Drawings.

- a) County of Nassau, Department of Public Works, 2009 Standard Specifications for Civil Engineering and Site Development Construction, or latest edition.
- b) County of Nassau, Department of Public Works, Traffic Engineering, Traffic Signal Specifications and Standard Drawings, November 1998 and Addenda, or latest edition.
- c) County of Nassau, Department of Public Works, Latest Standard Specifications and Details for the Construction of Sanitary Sewers 2003 or latest edition.
- d) New York State Department of Transportation Standard Specifications 2008 and Addenda or latest edition.

Note: Compliance with Law

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

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

Special Note

When required by the County to provide prices for force account work the contractor shall provide the requested prices including a detailed breakdown of said prices within two (2) weeks of the date of initial receipt of the request.

The intention of this contract is that all emergency repair work shall be done in a responsible and timely manner. Failure to comply with such request will be considered a violation of the contract.

1. The contractor shall provide a work schedule within one (1) week for a scheduled location upon receipt of a work order issued by the Commissioner, unless deemed an emergency by the County at which time the contractor shall be expected to start work as soon as a verbal or written authorization to proceed is provided by the County. A site location plan or sketch of the work to be done may be provided if deemed necessary by the County. The Contractor shall notify the County 48 hours prior to the start of any work order.
2. The Contractor shall maintain and protect traffic within the limits of and for the duration of the contract (work order) as necessary in accordance with the plans and specifications and as directed by the Engineer.
3. Restrictions of Work in Roadway - Perpendicular to the curb line, no more than ten (10) feet of pavement is to be open at any one time. No work will be permitted before 9 AM or after 4PM, Monday through Friday unless written authorization is granted by the County. During these periods and at all times when work is not in progress, all openings in the roadway shall be covered with pinned steel plates or temporary pavement to safely permit traffic to cross over the excavation.
4. The Contractor will be responsible at all times for the safety of the general public, and for the protection of persons who may for any reason enter within the limits of his work.
5. The Contractor shall employ flagmen when deemed necessary by the Engineer and shall erect proper warning signs and necessary barricades to protect the general public and to warn them of changes caused by the progression of this contract (work order). The contractor is responsible for work zone safety as per OSHA requirements.
6. The Contractor shall notify the local police, fire department, volunteer-ambulance corps, school district, hospitals, utilities and all municipalities within the proximity of the work order limits, prior to the start of work, as to the conditions prevailing on the construction site.
7. The Contractor must provide safe and uninterrupted two-way traffic over the roads under construction at all times, unless a detour plan is provided and approved by the County.

8. Lighted Barricades, Flashing Warning Lights and Signs
 - a) Must be serviced a minimum of twice each week.
 - b) Must be checked and maintained by the Contractor each day, including weekends and holidays.
 - c) Must be secured or weighted in such a manner as to prevent them from blowing over under windy conditions.
 - d) Must be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices.
9. No direct payment shall be made for the above items of work, but the cost shall be included in the price bid for Item 102X, Work Zone Traffic Control (Day) & Item 102Y, Work Zone Traffic Control (Night).
10. Conformance to the following notes with respect to the American with Disabilities Act Curb Ramps is required.
 - All curb ramps installed shall be in compliance with the ADA, PROWAG, NCDPW, and NYSDOT standards.
 - Contractor shall verify the placement of all new ramp configurations prior to installation. Contractor must give 48 hours (2 business days) notification for NCDPW approval.
 - A NCDPW inspector must be present during the installation of any curb ramp.
 - It is recommended that a smart level tool (or equivalent) is used to check the slopes on all form work prior to the placement of concrete.
 - NCDPW Civil Engineering Design Unit must be notified in writing of all work done to curb ramps to update the transition plan inventory.

NOTE: The contractor will be required to maintain safe pathways for pedestrians during the entire time the contract is in effect, including all periods of work shutdown. This may involve mowing of grass, removal of snow and ice, and any other interruptions interfering with their safe travel through the construction zone. Failure of the contractor to insure safe pedestrian passage as determined by County staff, or from pedestrian complaints in the work zone will result in a fine of \$500.00 a day. This fine will be deducted from any monies owed the contractor.

11. The Contractor must submit to the Engineer a schedule of work order locations at which he will be working and a tentative schedule of dates that he intends to be at said locations. All work will be done during a normal eight (8) hour day, Monday through Friday. If the Contractor chooses to work beyond the normal work hours, the Contractor will be responsible for reimbursing the

County for the additional cost, including benefits costs, of any County employees and/or County representatives working for the County that work these over time hours.

Note: If work is done under a County declared emergency condition, this provision will not apply.

12. The Contractor will not be allowed to commence more than three (3) work orders at any one time. If the County issues a written declaration of an emergency a fourth work order may be started prior to one of the three in progress work orders being 100% complete. However at no time will more than four Work Orders be in progress.
13. Payment for the work performed under each Work Order, shall be made upon the completion and acceptance by the County. However, final payment will not be made until all punch list work is completed to the satisfaction of the Engineer.
14. Where construction mark-out is performed by County forces, the Contractor shall supply cans of white spray paint, as necessary to permit the mark-out. These cans shall be compatible to the Fox Valley System, "Easy Marker" or equivalent.
15. All weather and temperature requirements specified by the Manufacturers for materials used must be adhered to.
16. Where there are fire hydrants situated along a section of roadway where plowable raised reflectorized pavement markers are to be installed, blue double faced markers shall be installed in addition to the normal white and yellow markers in line with the hydrant (as required).
17. No separate cost for mobilization and demobilization will be paid. Cost shall be included in applicable unit price bids.
18. Pavement Restoration
 - a) Stone Base Pavement
 - (1) Longitudinal Openings
 - (a) The pavement over the trench shall be cut back a minimum of 6 inches on both sides of the trench to insure an even edge.
 - (b) If the remaining longitudinal strip is less than 3 feet on one side, the total width of the cutback, trench and side strip must be replaced
 - (2) Transverse Openings
 - (a) The Pavement over the trench shall be cut back a minimum of 6 inches on both sides of the trench to insure an even edge.
 - (c) Asphalt plant mix, dense base or concrete, shall be used for the replacement of the stone base pavement removed.

b) Concrete Base and Finished Concrete Pavement

(1) Longitudinal Openings

- (a) The entire panel width must be removed and replaced. Ends of panel to be saw cut if not at a transverse joint.
- (b) In no case shall any portion of the existing panel that is less than 6 feet from a transverse joint be left in place.
- (c) When concrete base panels with macadam overlays are to be removed, the Black Top shall be cut back a minimum of 6 inches onto the adjacent panels to provide a smooth vertical edge on the Black Top.

(2) Transverse Openings

- (a) Transverse openings shall be saw cut 90 degrees to the longitudinal joints.
- (b) Pavement replacement to be a minimum of 2 feet on both sides of the trench, and a total minimum of 6 feet wide.
- (c) In no case shall any portion of the existing panel that is less than 6 feet in length from a transverse joint be left in place.
- (d) Where openings are skewed across the pavement the concrete replacement must be carried straight across each panel and not staggered. No portion of the existing panel that is less than 6 feet from a transverse joint should be left in place.

- 19. The contractor shall ensure that the "Longitudinal Joints" in the top course correspond with the edges of the proposed traffic lanes, or are located within one (1) foot of the pavement markings. Longitudinal joints in the travel lanes wheel path shall be avoided. The crown of the roadway will *not be relocated for any reason*. Joint arrangements will require approval by the Engineer. The contractor must submit a detailed mat layout three (3) working days prior to any paving operations.
- 20. Item 36CX in this contract shall be used to fill all joints and cracks greater than one-inch (1") in the existing pavement as outlined in Nassau County Standard Specifications Item 107.
- 21. Truing and Leveling will only be used when shown on the plans or as directed by the Engineer. The contractor will not be paid for Item 36C unless directed by the Engineer. If this Item is directed to be installed separately other than the top course installation payment will be made under Item 36C, otherwise payment will be made under Item 36D.

22. If ROW at any intersection is not shown in the Construction Plans to mill and repave, paving limits will be the flow line or determined by the Engineer in Charge. Also, the Engineer in charge will determine if a topographic survey must be performed to establish a proper flow line.
23. All work performed under this contract shall be in compliance with Appendix EE, "Equal Employment Opportunities for Minorities and Women". As part of the "Detailed MBE/WBE Utilization Plan" the contractor shall provide documentation that a good faith effort was made to meet the intended goals. Also, all work performed under this contract shall include SDVOB goal of 2% or Good Faith Effort.
24. Procedure to Ensure Worker Safety Work Zone safety was addressed in the contract documents. In addition, the County and contractor will discuss Work Zone safety issues at the pre-construction meeting. The contractor shall provide a safety plan (including subcontractors). The County Project Manager/Consultant R.E will ensure that the contractor has on site at all times at least one person skilled in safety and health procedures familiar with State and Federal safety and health regulations, whose responsibility it will be to monitor methods and procedures. NCDPW will review and approve prime contractor's Health & Safety plan as per NYSDOT Specification 107-05.

It is the Contractor's responsibility to only have on site for the particular contract those workers who successfully completed the OSHA 10-hour construction safety course, and to have each of the worker's certificates of completion with the project records, available for review by NCDPW.

The Health & Safety Plan must be approved by NCDPW prior to the start of contract work. The Prime contractor will keep NCDPW informed as to their safety meeting schedule. Include with the schedule (whether it is monthly or weekly etc.) any meeting minutes, as well as sign-in sheets as part of the project file/records.

25. Maintenance of Traffic

- a) Please see Special Specifications Item 102X -Work Zone Traffic Control (Day) and Item 102Y Work Zone Traffic Control (Night).
- b) The Contractor, at his option and at no additional cost may install the pavement marking during night-time hours with prior approval by the Engineer. County pavement marking inspection staff will be provided 3 working days to inspect and approve the pavement marking layout before the permanent installation occurs.

26. Utilities

- a) The Contractor is directed to notify all utilities well in advance of beginning work, to allow them to mark-out their facilities.
- b) The Contractor is directed to notify all privately-owned utilities well in advance of beginning

work, to allow them time to adjust their manholes and other castings.

- c) The Contractor will see to it that utility valve boxes and manholes are always readily accessible. The Contractor will not store materials over them, and should it become necessary to cover the valves and manholes with soil, will devise a method for finding them quickly and assist the Utility Company to uncover them. Further, the boxes will be uncovered during non-working hours.
- d) Prior to the award of contract, the Contractor will be required to submit a list, certified by National Grid, of his key personnel who have taken the National Grid Safety Course together with a statement that sufficiently trained personnel will be available on the job site at all times.
- e) Mechanical excavation will not be permitted within two feet (2') on either side of any utility or house service so marked by the utility company. Hand digging will be required to expose the utility pipe. All provisions of 16 NYCRR Part 753 shall apply.
- f) Prior to backfilling, a National Grid representative will inspect all gas facilities, and any damaged pipe will be repaired by the utility company. The Contractor's attention is called to existing PSE&G overhead lines. The Contractor is warned to keep all equipment and personnel a minimum of ten feet (10') from any conductor. The Contractor shall fully cooperate with PSE&G and comply with its requirements for safe operations.
- g) The Contractor's attention is called to the fact that there are utilities, both publicly and privately owned, that are within the contract area. The owners of privately-owned utilities may be relocating parts of their existing plants to conform to the new lines and grades of this project. The Contractor shall cooperate with the various agencies carrying out the work, which must be coordinated with the work of this contract.
- h) Existing structures, utilities and facilities, either shown or not shown on the plans, above or below the ground, may not have been located accurately. The Contractor shall determine the locations and elevations of pertinent structures, utilities and facilities, before new installations are started so that there will be no interference with the progression of the work. Any conflict between existing structures, utilities and facilities and the new items of work shall be ascertained by the Contractor prior to commencing any work under the respective items and called to the attention of the Engineer. It is the responsibility of the contractor to protect and maintain utilities or utility structures while working "in proximity". No additional payment will be made for this purpose except for the test holes, Item 122.
- i) Grades and locations of new installations may be changed by the Engineer, if necessary, to prevent conflict with existing installations. Therefore, the Contractor shall locate all existing installations accurately, both as to line and grade before new items of work are started.

- j) If the above procedure is not followed by the Contractor and new work has to be removed and replaced, or there is a delay, all the cost will be borne by the Contractor, and the County will only pay for the amount of the items in place at the completion of the work.
 - k) The Contractor shall exercise extreme care in the performance of any operation, in the vicinity of the existing or relocated cable pipelines. No such operations shall take place without proper PSE&G personnel on hand. All excavation in the immediate vicinity of these lines shall be done by hand, with such application as to ensure that the pipe shall not be punctured or the coating disrupted. In the event that any length of cable pipeline is exposed, it shall be supported and protected to the satisfaction of PSE&G inspection personnel. No blind sheeting shall be driven in the proximity of the existing electric cable pipes before first exposing these cable pipes by hand.
 - l) The Contractor should inspect the utility companies' plans to ascertain the location of the underground work and locations of crossings of sewer and drainage work. The Contractor shall coordinate his work with the work being done by the utility companies. It is anticipated that job meetings will be held at various times to aid in coordination of the work.
 - m) Payment for locating utilities will be made only under Item 122, Test Holes.
27. Protection of Facilities - The Contractor shall protect all new work done under this contract from possible injury for the duration of the Contract. He shall be responsible for the repair or replacement, to the satisfaction of the Engineer, of any material, structure, or property on or adjacent to the site and damaged by him or his employees through the construction and demolition operations up to the time of acceptance by the County.
28. Drainage Installations - The Contractor shall plan his work and progress so that at all times either the new or the existing drainage facilities will function to carry off liquids so that no damage or inconvenience will result.
29. Clean-Up
- a) Prior to final acceptance of the work under this Contract, the Contractor shall clean the pipe, manholes and catch basins where construction was undertaken, of accumulated dirt, sand or other materials which have washed into them. No direct payment shall be made for the aforementioned work; but shall be included in the prices bid for the various items of the Contract.
 - b) The Contractor will be required to restore to original condition all areas, outside the work limits, that are disturbed by him during the life of this contract.
 - c) No separate payment will be made for any of this clean-up and restoration work, but the cost thereof shall be included in the unit prices bid for various items.
30. Test Cylinders - The Contractor will provide a place for concrete test cylinders close enough to the work so that the cylinders share the same curing conditions. The Contractor will protect these cylinders for the three days they will be left on the job site.

31. Construction in State of New York Rights of Way

- a) Permits - A permit shall be obtained by the Contractor from the State of New York for all work within State rights of way. He shall pay for all costs of obtaining this permit including costs of State inspection. A copy of said permit shall be forwarded to the County prior to start of work.
- b) General - Acceptance of all work within State rights of way shall be subject to the inspection and approval of the Regional Director, Region 10, State of New York Department of Transportation.
- c) Payment - No separate or additional payment will be made for conforming to the various requirements of the State of New York Department of Transportation but the cost thereof will be deemed included in the appropriate Contract Items without regard to differences in materials, thicknesses and types of pavements and methods of construction, temporary construction or maintenance of traffic.

32. Construction in the City of New York Rights of Way

- a) Permits - Shall be obtained by the Contractor from the City of New York for all work within City rights-of-way. He shall pay for all costs of obtaining such permits including costs of City inspection.
- b) General - Acceptance of all work within City rights of way shall be subject to the inspection and approval of the Transportation Administration Administrator, Office of Construction Coordination, 40 Worth Street, New York, N.Y. 10013.
- c) Payment - No separate or additional payment will be made for conforming to the various requirements of the City of New York Transportation Administration but the cost thereof will be deemed included in the appropriate Contract Items without regard to differences in materials, thickness and types of pavements and methods of construction, temporary construction or maintenance of traffic.

33. Contractor shall provide one (1) cell phone under this item, so that County's Engineer may maintain contact with inspection forces. It must be a smart phone (type to be approved by the Engineer) with a minimum 256 GB storage capacity along with a mobile charger and a hard protective cover. No work may begin until the phone is provided, and service is activated. The smart phone service shall be maintained for the duration of the contract. The phone shall be replaced at no additional cost to the County if damaged or lost, otherwise cease the operation.

34. The contractor when submitting shop drawings for approval must specify the work order number and location that said shop drawings will be used on.

35. Erosion and Sediment Control: The contractor shall assume responsibility for the temporary control of soil and water pollution that could potentially result from construction activities and shall be in accordance with Federal, State and Local regulations, as well as the Contract specifications and directions of the County representatives. All necessary precautions shall be

taken to prevent contamination of waters and surrounding areas by slit, sediments, fuels, solvents, lubricants, epoxy coating, wet concrete, concrete leachate, washings from concrete equipment or any other pollutant associated with drilling and construction procedures. Specific reference is made to the New York State Department of Environmental Conservation's "Guidelines for Urban Erosion and Sediment Control", along with any subsequent updates. Associated costs for erosion and sediment control, inspection and maintenance of the same as mentioned above, including any permits required, shall be included in the unit prices for individual items.

36. When ordered, all concrete supplied for Items 26, 27 and 28 will include an admixture such as will assure compressive strength cores of 2500 PSI in 48 hours. The admixture will be added to the concrete at a rate recommended by the supplier. The cost of the admixture will be included under Items 26, 27 & 28.
37. The contractor shall have a full time Supervisor, fluent in English on the project at all times.
38. No Asphalt top course will be allowed to be placed after December 1st (unless approved by the Commissioner and as long as other conditions are met) or if the receiving surface temperature is equal to or below 45 Degrees Fahrenheit, or if the receiving surface is not completely dry for any reason.
39. All layout of traffic pavement markings must be completed immediately after paving and prior to opening the newly paved surface to traffic. The cost of all layouts of traffic pavement markings shall be included in the various items of the Contract.
40. The Contractor must contact the Resident Engineer or the Nassau County Project Manager, within 48 to 72 hours prior to final pavement marking placement. On all roadways resurfaced under this contract, epoxy reflectorized pavement markings shall be placed within 3 business days of final paving except highly reflectorized epoxy pavement marking (triple drop). A \$1,000.00 per day penalty will be deducted from the various asphalt items after 3 business days until the epoxy is placed.
41. The Contractor must notify the Resident Engineer or Jeff Lindgren of the Nassau County Traffic Management Section prior to any lane closures by calling (516) 571-6998, by email jlindgren@nassaucountyny.gov, or TrafficHelp@nassaucountyny.gov; two (2) of the three (3) forms of contact must be used to ensure contact has been made.

The contractor must submit any lane closure to Nassau County Traffic Management website:
<https://apps.nassaucountyny.gov/trafficmanagement/closureform.php>

42. Any existing traffic signal post, pole, mast arm shaft, or strain pole affected by the installation of handicap ramps or change in grade must be height adjusted to bring the base plate to match new grades, including removing the pole/post and adjusting the anchor nuts, and reinstallation of the pole and equipment. Existing raincap is to be removed and new one installed as per Nassau County traffic signal foundation item specifications. All signal head heights must be checked before any pole height is adjusted so that they continue to meet signal head height requirements.

All traffic signal pushbuttons need to be adjusted in height to be ADA compliant, if affected by the ramp installation which includes changes in grade from existing and meet the Nassau County traffic signal specifications.

All traffic signals shall be placed on recall mode prior to any milling or asphalt paving.

The contractor must notify the Resident Engineer and Frank DeLucia of the Nassau County Traffic Signal Operations Unit by calling (516) 572-0465, ext. 20958 or by email fdelucia@nassaucountyny.gov prior to any work involving alteration of traffic signal equipment or infrastructure including placing traffic signals within the work area on recall if required and return them to the existing operation once all work is completed. A Nassau County Traffic Signal inspector must be present upon the completion of this work.

The contractor must notify the Resident Engineer or Nassau County Project Manager and coordinate with Nassau County Traffic Signal Operations Unit all required traffic loop installations. A Nassau County Traffic Signal inspector must be present for this work.

43. The contractor is to notify all privately owned utilities at least 5 business days before starting work to permit the utility time to adjust their facilities.
44. The contractor will also be required to adjust all municipality owned drains, sewers, and/or water - manholes, surface inlets, and/or meter pits, under Item 16X-Adjusting Manholes, and Water Valves under Item 114 - Adjustment of Water Valve Box Elevations.

The contractor must notify all water districts and/or municipality owned water companies of any water valves that cannot be opened so that they can be adjusted prior to resurfacing the roadways. Any complaints that the County receives for manholes and/or water valves not raised will be referred to the contractor to rectify at no cost to the County of Nassau.

If any water valve and/or gas valve box tops are milled off, complete replacement of the valve box top section will be required at no cost to the County of Nassau.

45. Under Item 116A a depth of 1" – 2" is required. Any depth greater than 2" and/or as ordered by the Engineer shall be prorated for payment. On a completely milled roadway, temporary 4" wide traffic lines shall be painted directly after the milling has been completed. The cost shall be included in Item 102X or 102Y.
46. Survey Stakeout - Survey work shall be paid for under Survey Stakeout (Item 136S) only when done with prior written approval of the project manager. When the work is completed in less than an 8 hour shift the payment will be prorated for the actual time required. Survey work done to determine the contractors' payment will not be paid for under this item.

47. Sanitary Sewer Notes

- a) The Contractor shall notify the Water/Wastewater Engineering a minimum of two (2) working days prior to work involving any sanitary sewer facilities. Notification is to be made by calling (516) 571-6841.
- b) All work shall be in accordance with NCDPW Standard Specifications and Details for the Construction of Sanitary Sewers 2003 or latest edition. All work must be performed in the presence of a Nassau County inspector.
- c) All sanitary sewer house connections and laterals shall be located prior to any excavation by Contractor.
- d) The Horizontal/Vertical separation of sewer and drainage pipe or water main/services shall meet or exceed the requirements outlined in the RECOMMENDED STANDARDS FOR SEWAGE WORKS (Ten States Standards), latest edition.
- e) Where sanitary or house connection sewers cross over a drainage trench area, the sewer shall be replaced with Ductile Iron extending a minimum of five (5) feet each side of crossing to undisturbed soil. The same replacement shall apply for sewers under a drainage trench area within twelve (12) inches clearance, bottom of drain to top of sewer.
- f) All pipes, manholes and appurtenances shall have the County approval stamp thereon or written certification acceptable to the County, before the material can be installed.
- g) Where it is necessary to raise sanitary sewer manhole castings to grade for repaving, fixed frame castings must be raised either by adjusting the height of the brick masonry or using an approved insert (metal inserts are not permitted). Adjustable frame type manholes may be raised by adding up to a maximum of two, one-inch (1") adjustment rings to achieve final grade.
- h) All non-adjustable Nassau County sewer manhole castings will be replaced with new adjustable manhole castings under Item 34 - Miscellaneous Metals and installed under Item 16X - Altering Brick Manholes. The cost of painting the new adjustable manhole castings with two coats of asphaltum paint shall be included in the various items of the contract.

No inserts are to be used. Manholes must be physically raised, except Adjustable Frame type. No payment will be made for manholes that are not set to proper grade. Where sanitary sewer manholes are of the adjustable frame type, a maximum of two (2) one inch adjustment rings will be allowed to bring casting to finished grade.

The contractor must inspect all Village-owned manhole castings at least one week prior to start of work and should any damaged castings be found to exist, the Contractor shall contact the Village and request a replacement casting to be furnished for the Contractor to install. All work shall be included under Item 16X - Altering Brick Manholes.

- i) The Contractor shall comply with all OSHA requirements for entry into a confined space whenever it is necessary for a Contractor's employee to enter a Nassau County sanitary sewer manhole. The minimum requirements the Contractor must comply with are:
 - i. Contractor issued "ENTRY PERMIT";
 - ii. Confined space entry monitor to test for toxic, explosive and oxygen deficient atmosphere;
 - iii. Confined space rescue and retrieval equipment.

The Contractor will not be permitted to work in a Nassau County sanitary sewer manhole, unless he complies with all applicable OSHA requirements.

- j) The Minimum/ Maximum height limits for brickwork for new manholes are (4) four inches and (16) sixteen inches, respectively. Adjustments to chimney height to meet the limits shall be by altering the precast manhole barrel. Additional requirements are:
 - A. Only concrete bricks will be used for brickwork
 - B. The manhole frame is to be set in Portland cement concrete. Brick mortar will not be permitted.
 - C. The manhole covers must be at Finished Street Grade. Warping or feathering of the pavement to meet improperly set manholes will not be permitted.
 - D. The manholes and covers must be clean and free from all road paving materials and debris prior to painting the castings.

48. Nassau County Drainage Manholes

All Nassau County drainage manhole frames and castings raised under Item 16X, shall be replaced with new adjustable two part manhole frame and casting including new cover. No adjustment rings will be allowed in these castings. They should be raised to the proposed roadway grade. Payment for these new frames, covers, and castings shall be made under Item 34 - Miscellaneous Metals. If any debris is found by the contractor's carelessness in raising the drainage manholes it must be cleaned out immediately.

- 49. The contractor will be required to remove all existing plowable reflectorized pavement markers prior to the paving operation. Payment for the removal of existing plowable markers will be included in the cost of the various bid items. The voids left from the removal of the plowable

markers will immediately be filled with Asphalt Cement, Type 1A, which will be paid for under Item 36D/36DRAR.

50. The contractor will be required to remove the following traffic markings just prior to the paving operations: crosswalks, arrows, and stop lines. Payment for removing these traffic markings will be included in the cost under Item 36D/36DRAR. Non paving areas (side streets) traffic pavement markings shall be removed under Item 137.
51. The contractor will be required to handout notices to the local homeowners and businesses affected by the milling and paving operations a minimum of 24 hours prior to work starting.

The contractor must set up portable variable message signs at the limits of the job site three (3) days prior to the start of milling and/or paving, giving the start dates and work hours. Payment shall be made under Item 102PVMS – Portable Variable Message Sign.

52. When the final yield factor is not within the tolerances specified of the County worksheets for Item 36D/36DRAR, plus the leveling used in Item 36D/36DRAR, maximum payment of asphalt in those items shall be shown below:

Percent over Engineer's Estimate: Maximum Payment

5 to 10 Percent	95 percent of the total asphalt material delivered to the Project
11 to 20 Percent	90 percent of the total asphalt material delivered to the Project
21 to 25 Percent and Over	85 percent of the total asphalt material delivered to the Project

53. GA-GC -Asphalt Quality Control at Asphalt Plants – if ten (10) Nassau County DPW Lab samples fail due to low AC content and/or 15 gradation samples fail, the approved job mix formula, one (1) percent for each infraction of asphalt concrete produced from that plant will be deducted from the total for Item 36DRAR - Rut Avoidance Asphalt Type 1A.
54. The Contractor is required to coordinate his work with Public Agencies and Private Utility companies to avoid conflicts and to arrange for castings and appurtenances which are to be adjusted by others in advance of performing any final pavement overlay work. The contractor is required to obtain approval for limits of proposed pavement milling and overlay work, sidewalk ramp type and layout of proposed pavement markings from a County representative prior to performing any proposed work.
55. The costs for tack coat and the sealing of joints shall be included in the price bid for item 36D.

56. The Contractor shall maintain a safe work environment for workers and the public at all times and shall comply with all applicable safety regulations, including the proper use of required Personal Protective Equipment (PPE) and safe work practices. Failure to maintain proper PPE or safe worksite conditions, as determined by County staff, will result in a fine of **\$500.00 per day**. This fine will be deducted from any monies owed to the Contractor.
57. The full payment for the placement of the asphalt top layer including item 36D/36DRAR shall be included in the price bid for item 111. No separate or additional payment will be made for this work.

**2027 GENERAL REQUIREMENTS CONTRACT
NASSAU COUNTY, NEW YORK**

CONTRACT NO. H66302-REQ1

SPECIAL PROVISIONS

1. Past History

To assist you in the bid process, we have reviewed the County's recent past history of expenditures for the nature of the work being bid herein. Our records have indicated that an average amount in excess of \$12,000,000.00 worth of work has been accomplished under the past few contracts. It is understood and agreed, however, that this allocated amount may be amended if budgetary allowances in said sums are not voted on and approved by the Nassau County Legislature for the County fiscal years in which said payments are to be made. Be advised that this figure is provided for your guidance only and is not to be interpreted as an indication that any specific dollar amount of work is contemplated through the establishment of the contract being bid at this time.

Addenda Notes and Modification to the Nassau County Specifications

NOTE: Where a standard Nassau County item has been modified for use under this agreement for payment purposes all the provisions of the standard item will apply unless indicated otherwise herein.

**2027 GENERAL REQUIREMENTS CONTRACT
NASSAU COUNTY, NEW YORK**

CONTRACT NO. H66302-REQ1

SPECIAL SPECIFICATIONS

The General Construction Payment Item Specifications as per Nassau County Department of Public Works 2009 Standard Specifications and Detail Sheets for Civil Engineering and Site Development Construction – as amended by the current additions and modifications thereto.

NO TEXT ON THIS PAGE

ITEM 1X - CLEARING AND GRUBBING

The requirements for Item 1 of Nassau County 2009 Standard Specifications shall apply with the following modifications:

C. Method of Measurement.

The quantity to be paid for under this item will be the number of square yards of clearing and grubbing provided in accordance with the Plans and Specifications as determined by the Engineer.

D. Basis of Payment.

The price bid per square yard for this item shall include the cost of furnishing all labor, material and equipment necessary to complete the work satisfactorily.

ITEM 4PX - REMOVAL OF EXISTING PIPE

A. Description.

1. Under this Item, the Contractor shall expose, remove and dispose of existing pipe or parts thereof as shown on the Plans and/or directed by the Engineer.

B. Materials and Methods.

1. After the existing pipe has been removed, the resultant excavation shall be backfilled and compacted in accordance with the requirements of Items 3A and 3B - Trench, Culvert and Bridge Excavation as specified herein.

C. Method of Measurement.

1. The quantity to be paid for under this Item shall be the actual number of linear feet of pipe removed and disposed of, regardless of size or type, in accordance with the Specifications, Work Orders and/or as directed by the Engineer.

D. Basis of Payment.

1. The unit price bid per linear foot for this Item shall include the cost of furnishing all labor, materials, tools, equipment and incidentals including excavation, temporary sheeting and bracing and backfill necessary to satisfactorily complete the work.

ITEM 8X – TRIMMING SHOULDERS AND SLOPES

The requirements for Item 8 of Nassau County 2009 Standard Specifications shall apply with the following modifications:

A. Method of Measurement and Payment

Measurement and payment under this item will be made on a Square Yard basis.

ITEM 12HP - CLEANING EXISTING CULVERTS AND ASSOCIATED STORM DRAINAGE PIPE

A. Description.

Under this Item the Contractor shall clean and maintain existing culverts and associated storm drains piping as indicated on the Plans and/or as directed by the Engineer.

B. Method.

1. All existing culverts and associated storm drains piping shall be cleaned and kept free from obstructions and sediment for the duration of this Project. Upon completion and final acceptance of the Project, these facilities shall be left clean and free-flowing to the satisfaction of the Engineer.
2. The Contractor shall provide necessary protection against damage to the existing culverts and pipes and any damage caused by his operations, in the judgment of the Engineer, shall be repaired at the Contractor's own expense.

C. Method of Measurement.

1. The quantity to be paid for will be the number of linear feet of culverts and associated storm drainage pipe actually cleaned and maintained, measured from the outside of end structures and through intermediate structures.
2. All new pipe installed under this contract are excluded from payment under this item. Cleaning and maintenance of these facilities is provided for elsewhere in the Proposal.

D. Basis of Payment.

1. The price bid per linear foot shall cover the cost of all labor, material and equipment necessary to clean, protect and maintain the drainage system to the satisfaction of the Engineer. This cost includes but is not limited to the proper legal disposal of the excavated material.

**ITEM 12S40-8 – SCHEDULE 40 POLYVINYL CHLORIDE (PVC) SANITARY
SEWER PIPE - 8” Dia.**

Standard Specifications for Item 12S40-6 shall apply except the pipe size will be 8” instead of 6”.

DRAINAGE PIPES – ITEMS 12XX

12A-4-12 - 12" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-15 - 15" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-18 - 18" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-24 - 24" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-30 - 30" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-36 - 36" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-42 - 42" REINFORCED CONCRETE PIPE, CLASS IV
12A-4-48 - 48" REINFORCED CONCRETE PIPE, CLASS IV
12B-12 - REINFORCED CONCRETE PIPE END SECTION - 12" DIAMETER
12B-15 - REINFORCED CONCRETE PIPE END SECTION - 15" DIAMETER
12B-18 - REINFORCED CONCRETE PIPE END SECTION - 18" DIAMETER
12B-24 - REINFORCED CONCRETE PIPE END SECTION - 24" DIAMETER
12B-30 - REINFORCED CONCRETE PIPE END SECTION - 30" DIAMETER
12B-36 - 36" REINFORCED CONCRETE PIPE END SECTIONS
12B-42 - 42" REINFORCED CONCRETE PIPE END SECTIONS
12B-48 - 48" REINFORCED CONCRETE PIPE END SECTIONS
12C-14X23 - 14"X23" REINFORCED ELLIPTICAL CONCRETE PIPE
12C-19X30 - 19"X30" REINFORCED ELLIPTICAL CONCRETE PIPE
12C-22X34 - 22"X34" REINFORCED ELLIPTICAL CONCRETE PIPE
12C-24X38 - 24"X38" REINFORCED ELLIPTICAL CONCRETE PIPE
12C-29X45 - 29"X45" REINFORCED ELLIPTICAL CONCRETE PIPE
12D-12 - PERFORATED REINFORCED CONCRETE PIPE - 12" DIAMETER
12D-15 - PERFORATED REINFORCED CONCRETE PIPE - 15" DIAMETER
12D-18 - PERFORATED REINFORCED CONCRETE PIPE - 18" DIAMETER
12D-24 - PERFORATED REINFORCED CONCRETE PIPE - 24" DIAMETER
12D-30 - PERFORATED REINFORCED CONCRETE PIPE - 30" DIAMETER
12DIP-6 - DUCTILE IRON CULVERT PIPE - 6" DIAMETER
12DIP-12 - DUCTILE IRON CULVERT PIPE - 12" DIAMETER
12DIP-14 - DUCTILE IRON CULVERT PIPE - 14" DIAMETER
12DIP-16 - DUCTILE IRON CULVERT PIPE - 16" DIAMETER
12DIP-18 - DUCTILE IRON CULVERT PIPE - 18" DIAMETER
12DIP-24 - DUCTILE IRON CULVERT PIPE - 24" DIAMETER
12DIP-30 - DUCTILE IRON CULVERT PIPE - 30" DIAMETER
12P-12 - SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 12"
DIAMETER
12P-15 - SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 15"
DIAMETER
12P-18 - SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 18"
DIAMETER
12P-24 - SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 24"
DIAMETER

**12P-36 - SMOOTH INTERIOR CORRUGATED POLYETHYLENE DRAINAGE PIPE - 36"
DIAMETER**

12UP-4X - CORRUGATED POLYETHYLENE UNDERDRAIN PIPE - 4" DIAMETER

12UP-6X - CORRUGATED POLYETHYLENE UNDERDRAIN PIPE - 6" DIAMETER

12UP-8X - CORRUGATED POLYETHYLENE UNDERDRAIN PIPE - 8" DIAMETER

12UP-10X - CORRUGATED POLYETHYLENE UNDERDRAIN PIPE - 10" DIAMETER

12UP-12X - CORRUGATED POLYETHYLENE UNDERDRAIN PIPE - 12" DIAMETER

A. Description.

All requirements of the above listed items from Nassau County 2009 Standard Specifications shall apply except for change in pipe sizes.

ITEM 13BX-4 – TREATMENT STRUCTURE, 4' DIAMETER

ITEM 13BX-6 – TREATMENT STRUCTURE, 6' DIAMETER

ITEM 13BX-8 – TREATMENT STRUCTURE, 8' DIAMETER

ITEM 13BX-10 – TREATMENT STRUCTURE, 10' DIAMETER

ITEM 13BX-12 – TREATMENT STRUCTURE, 12' DIAMETER

The applicable specifications for Item 13B – Manholes applies with the following modifications and or additions.

A. Description.

1. Under this item the Contractor shall furnish and install storm water treatment structures of the sizes and types at the locations indicated on the construction drawings. The storm water treatment structure and its appurtenances shall be a self-contained system incorporating an induced vortex to separate solids from liquids in the storm water flow. The system shall be self-activating with fluid flow driven by gravity force without the use of mechanical parts or external power requirements.
2. The storm water treatment device must be approved by the New York State Department of Environmental Conservation (NYSDEC). The Contractor shall provide the Engineer with the manufacturer's written certification indicating the structures supplied to the project meet all conditions of and are NYSDEC approved.

B. Materials.

1. The storm water treatment system shall be the "Downstream Defender" as designed by Hydo International, 94 Hutchins Drive, Portland, Maine 04102, 207- 756-6200, Fax 207-756-6212, or approved equal.
 - a. The storm water treatment system shall be supplied by a manufacturer regularly engaged in such work who has furnished similar installation in successful and continuous operation for a minimum period five years.
 - b. Performance data and references shall be made available to the Engineer upon request for use in determining conformance to the storm water treatment system design criteria and performance requirements required in this specification.
2. The treatment structure shall consist of a reinforced precast concrete hollow, cylindrical vessel with internal components.
 - a. The internal components to be supplied shall include the center shaft and cone, dip plate, benching skirt, floatables lid and component support frame. These components shall be composed of polypropylene material. The component support frame members and all metal parts shall be Type 304 stainless steel. All components shall be designed to withstand all normal loadings associated with fabrication, shipping, site installation and normal operation of the equipment. The component support frame shall withstand a live load of 500 lbs.

- b. The hollow cylindrical vessel shall be a precast concrete structure manufactured with 4,000 psi (at 28 days cure time) concrete. The structure shall be steel reinforced for H-20 loading. Shiplap joints to be sealed with one inch butyl rubber sealant. Slab tops shall be suitably reinforced and provided with manhole openings and covers as required. The cast iron manhole frames and covers shall be sized as per the manufacturer's drawings. The masonry fixing bolts shall be Type 304 stainless steel.

C. Submittals. As a minimum and to the satisfaction of the Engineer, the Contractor shall provide the following:

1. General arrangement and dimensional drawings of the storm water treatment system.
2. Plan and profile drawings of the storm water treatment system as part of the storm water drainage system. The profile drawing shall indicate the top of water level both upstream and downstream of the storm water treatment system at the design flow conditions.
3. Handling, storage and installations instructions.
4. Operation and maintenance instructions.

D. Equipment Performance, Design Criteria and Installation.

1. The storm water treatment unit shall adhere to the hydraulic parameters listed below and provide the efficiencies and storage capacities as follows.
2. Performance objectives — the treatment chamber must be capable for treating a maximum flow at least equal to the peak treatment flow listed below:

a. Item 13BX-4 — 4' Diameter Treatment Structure

- | | |
|---|-------------------|
| 1) Peak treatment flow | 3 cubic feet/sec. |
| 2) Vessel diameter | 4 feet |
| 3) Maximum inlet pipe diameter | 12 inches |
| 4) Maximum overflow pipe diameter | 12 inches |
| 5) Predicted head loss at peak treatment capacity
(head loss as defined as the difference between static water level at the inlet to the "Downstream Defender" to the free water surface in the overflow pipe assuming a free discharge) | 8 inches |
| 6) Sediment storage capacity | 0.70 cubic yards |
| 7) Oil storage capacity | 70 gallons |

b. Item 13BX-6 — 6' Diameter Treatment Structure

- | | |
|-----------------------------------|-------------------|
| 1) Peak treatment flow | 8 cubic feet/sec. |
| 2) Vessel diameter | 6 feet |
| 3) Maximum inlet pipe diameter | 18 inches |
| 4) Maximum overflow pipe diameter | 18 inches |

- 5) Predicted head loss at peak treatment capacity 8 inches
(head loss as defined as the difference between static water level at the inlet to the "Downstream Defender" to the free water surface in the overflow pipe assuming a free discharge)
- 6) Sediment storage capacity 2.10 cubic yards
- 7) Oil storage capacity 230 gallons

c. Item 13BX-8 — 8' Diameter Treatment Structure

- 1) Peak treatment flow 15 cubic feet/sec.
- 2) Vessel diameter 8 feet
- 3) Maximum inlet pipe diameter 24 inches
- 4) Maximum overflow pipe diameter 24 inches
- 5) Predicted head loss at peak treatment capacity 8 inches
(head loss as defined as the difference between static water level at the inlet to the "Downstream Defender" to the free water surface in the overflow pipe assuming a free discharge)
- 6) Sediment storage capacity 4.65 cubic yards
- 7) Oil storage capacity 525 gallons

d. Item 13BX-10 — 10' Diameter Treatment Structure

- 1) Peak treatment flow 25 cubic feet/sec.
- 2) Vessel diameter 10 feet
- 3) Maximum inlet pipe diameter 30 inches
- 4) Maximum overflow pipe diameter 30 inches
- 5) Predicted head loss at peak treatment capacity 10 inches
(head loss as defined as the difference between static water level at the inlet to the "Downstream Defender" to the free water surface in the overflow pipe assuming a free discharge)
- 6) Sediment storage capacity 8.70 cubic yards
- 7) Oil storage capacity 1,050 gallons

e. Item 13BX-12 — 12' Diameter Treatment Structure

- 1) Peak treatment flow 38 cubic feet/sec.
- 2) Vessel diameter 12 feet
- 3) Maximum inlet pipe diameter 36 inches
- 4) Maximum overflow pipe diameter 36 inches
- 5) Predicted head loss at peak treatment capacity 17 inches
(head loss as defined as the difference between static water level at the inlet to the "Downstream Defender" to the free water surface in the overflow pipe assuming a free discharge)
- 6) Sediment storage capacity 14.70 cubic yards
- 7) Oil storage capacity 1,770 gallons

3. The storm water treatment system shall be a hollow cylindrical vessel with internal components and a tangential inlet to induce a vortex flow pattern that will accumulate and store settle-able solids in a sediment storage facility that is isolated from the treatment flow path. The sediment storage facility shall be beneath the vortex chamber to prevent re-entrainment of captured sediment and reduction in treatment capacity.
4. Each storm water treatment unit shall utilize a submerged inlet to prevent the re- entrainment of trapped floating contaminants without raising the water surface inside the tank.
5. The storm water treatment system shall have a floatables trap that is separate from the treated effluent discharge area to prevent re-entrainment of captured floatables during surcharge conditions.
6. The useable sediment and oil storage capacities shall not be less than the volumes listed above. The useable sediment storage capacity shall not cause a reduction in the volume of the treatment chamber capacity. The useable oil storage capacity shall not encroach upon the useable sediment storage capacity.
7. Access cover shall be provided for the sediment and floatable contaminant storage areas to facilitate maintenance.
8. Installation.
 - a. Each treatment structure shall be factory assembled ready for connection to the proposed inlet and outlet drainage pipes.
 - b. The treatment structure shall be installed in its final position in accordance with the requirements of Item 13B and the manufacturer's recommendations.

E. Method of Measurement.

1. The quantity to be paid for under this item will be the number of treatment structures under the respective item numbers designated for the respective structure diameter sizes complete in accordance with the contract documents and orders of the Engineer.

F. Basis of Payment.

1. The unit price bid per each shall include all labor, equipment, materials, and incidentals necessary to satisfactorily complete the work.

ITEM 15A – ALTERING AND REBUILDING THE TOP OF EXISTING DRAINAGE STRUCTURES

All provisions of NCDPW Item 15 shall apply, except as modified herein.

1. Description. Under this item, the Contractor shall alter and/or rebuild the top of existing drainage structures, including catch basins, manholes, and similar structures, to conform to the proposed lines and grades shown on the Plans or as directed by the Engineer.

The work shall consist of removing and rebuilding the upper portion and/or top slab of existing drainage structures as needed to achieve the proposed elevations or due to the deteriorated existing condition. The Contractor shall furnish and install all required new material as necessary, including frame and ring castings, covers, and curb inlet castings to complete the alterations as ordered by the Engineer.

3. Construction Details. The Contractor shall demolish or remove and dispose of the top slab, the frame or ring casting, and the curb inlet castings unless, in the judgment of the Engineer, it is practicable to salvage any or all of the castings for reuse. Salvaged castings to be reset shall be cleaned of all foreign materials.

4. Method of Measurement. The number of catch basins, manholes, and similar structures to be paid for under this item will be the number altered in accordance with the Plans and the Standard Structure Sheets, as specified herein, and as ordered by the Engineer.

ITEM 16XMH - ADJUSTING MANHOLES - EXTENSIONS

A. Description.

1. Under this Item, the Contractor shall furnish and install prefabricated adjustment rings for manholes. The extensions shall elevate and support the manhole covers at the proper grade without the necessity of removing the original manhole casting when the street is resurfaced. On adjustable Nassau County sewer manholes the extensions shall elevate and support the manhole inner frame to the proper grade when the street is resurfaced.

B. Materials.

1. The adjustment rings shall consist of one of the following types unless otherwise approved by the Engineer. Prefabricated adjustment rings for manholes will be accepted on the basis of inspection and approval by the Engineer. At the Contractor's option, he may use one of the following type of adjustment rings:
 - a. Type III - Single height filler ring unit for Nassau County Adjustable Sewer Manhole Frames & Covers, Type III Units: This type ring shall have a minimum width of 3/4" and height as specified for their surfacing, made of steel conforming to AISI C1020 HRS. All joints shall be welded to comply with the standards set forth by the AWS. The ring shall be painted with rust inhibitor paint. The depth of the filler ring shall not exceed three (3") inches.

C. Construction Details.

1. Prior to ordering the adjustment rings the Contractor shall determine the exact diameter of each manhole casting and thickness of each manhole cover so a proper manhole ring is ordered. Prior to the placement of the surface course the Contractor shall install adjustable rings for manholes. The adjustment ring shall be placed so the manhole cover will not protrude above the finished surface of the pavement. When adjustment rings having incremental height adjustment are installed and the increment cannot produce a height which will result in the cover being flush with the pavement surface they shall be installed so the cover is no more than one increment below the finished grade of the pavement.
2. To assure a firm and secure fit with the adjustment ring, the seat of the existing manhole casting shall be free of all foreign material at the time of the installation. The entire assembly shall be set on the seat of the existing manhole casting and the locking bolts shall be tightened evenly, expanding the unit for a tight fit against the existing manhole casting. The manhole cover shall then be set upon the seat of the adjustment ring. All rings shall be protected from displacement caused by traffic maintained on the roadway or equipment used in the paving operation.
3. The Contractor shall have the option of removing and resetting the existing manhole casting to the required grade where shown on the Plans or approved by the Engineer. If the Contractor chooses the above method, all the provisions of the appropriate Item 16 Series shall apply.

- a. Type III - Single height Filler Ring. The standard Nassau County adjustable sewer manhole frame filler ring (one piece), shall have an outside Diameter of 26 1/16". The Contractor shall verify and determine the exact inside diameter of the outer frame so the proper size filler ring can be ordered. Prior to the placement of the surface course, the Contractor shall install the filler ring by removing the inner frame of the manhole and placing the filler ring on the seat of the outer frame.
- b. To assure a firm and secure fit with the Filler Ring, the seat of the outer manhole frame shall be free of all foreign material at the time of the installation. The entire assembly of the manhole inner frame and cover shall be set into the manhole outer frame. All frames and covers shall be protected from displacement caused by traffic maintained on the roadway or equipment used in the paving operation. The new roadway surface shall be reasonably flush with the top of the existing manhole.

D. Method of Measurement.

1. This work shall be measured by the number of prefabricated adjustment rings furnished and installed.

E. Basis of Payment.

1. The unit price bid for each adjustment ring and/or filler ring shall include the cost of all material, labor, and equipment necessary to satisfactorily install the Adjustment Rings and/or Filler Rings. If the Contractor elects to reset the existing casting, the costs of this work and all work involved in the removal and replacement of existing disturbed pavement shall be included in the price bid for the adjustment rings.

ITEM 17PPCC – PERVIOUS PORTLAND CEMENT CONCRETE

A. DESCRIPTION:

Furnish and place non-reinforced pervious Portland cement concrete in accordance with the plans and specifications. Common applications include, but not limited to, parking lots, shoulders, bicycle paths, sidewalks and driveways.

B. MATERIALS:

Pervious Portland cement concrete shall be manufactured in accordance with the requirements of NYSDOT Standard Specifications, Section 501-2, with the following modifications:

Design a pervious Portland cement concrete mixture as specified in this document. Produce a homogeneous mixture of cement, pozzolan (fly ash or GGBFS), coarse aggregate, set retarding water reducing admixture, water reducing admixture, viscosity modifying admixture (VMA) and water.

Coarse aggregate gradation shall meet the requirements of size 1 or 1A in table 703-4 of the NYSDOT Standard Specifications, Section 703-AGGREGATES. Aggregate/cement ratio shall be in the range of 4:1 to 4.5:1.

Use Type I, II or I/II cement. Cementitious content shall be a minimum of 520 lb/yd³ for size 1 aggregate, and a minimum of 580 lb/ yd³ for size 1A aggregate. Water/cementitious ratio shall be in the range of 0.27 – 0.34.

At least one (1) week prior to placement of the test panel, provide the Regional Materials Engineer with the following:

1. List of all materials and source numbers.
2. Proposed mix design batch weights, including design unit weight.
3. Proposed production facility and location.

C. CONSTRUCTION DETAILS:

All the provisions of NYSDOT Standard Specifications, Section 501-3 shall apply with the following modifications:

The Contractor shall provide a minimum of one National Ready Mix Concrete Association (NRMCA) Certified Pervious Concrete Technician at the placement site.

Mix the concrete in approved transit mix trucks. Load trucks to a maximum of 80% of the rated mixer capacity.

Thoroughly wet the entire subbase surface for a minimum of 2 hours immediately prior to placement. Remove all standing water prior to placement.

The NRMCA Certified Technician shall check each truck for uniformity during discharge. Mix water shall be such that the cement paste displays a “wet metallic sheen” without

causing the paste to flow from the aggregate. Additions of water to the mix, as directed by the Certified Technician, shall be followed by 20 mixing revolutions.

The concrete shall be deposited as close to its final position as practicable and such that fresh concrete enters the mass of previously placed concrete. The practice of discharging onto subbase and pulling or shoveling to final placement is not allowed.

Unless otherwise approved by the Engineer in writing, the Contractor shall provide mechanical equipment of either slipform or form riding with a following compactive unit that will provide a minimum of 10 psi vertical force. The pervious concrete pavement will be placed to the required cross section and shall not deviate more than $\pm \frac{1}{4}$ inch in 10 feet from profile grade.

Preferred method of strike off and compaction is the use of a form riding roller screed (i.e. NRMCA "One step method"). If allowed by the Engineer, the NRMCA "two step method" may be employed. If the two step method is used, strike off the concrete to approximately $\frac{3}{8}$ in. to $\frac{3}{4}$ in. above the forms to allow for compaction. After strike off, compact the concrete to the height of the forms. Compaction shall be accomplished by rolling over the concrete with a steel roller, compacting the concrete to the height of the forms. Concrete shall be covered with minimum 6 mil plastic prior to rolling to prevent aggregate pull outs. Compaction shall be completed within 15 minutes of placement. Edges near forms shall be compacted using a 1 ft. by 1 ft. steel tamp, a float, or other similar device to prevent raveling of the edges. If vibration, internal or surface applied, is used, it shall be shut immediately when forward progress is halted for any reason.

After mechanical or other approved strike-off and compaction operation, no other finishing operation will be allowed.

The Contractor will be restricted to pavement placement widths of a maximum of fifteen (15') feet unless the Contractor can demonstrate competence to provide pavement placement widths greater than the maximum specified, to the satisfaction of the Engineer.

Curing procedures shall begin within 15 minutes after placement. The pavement surface shall be covered with polyethylene curing covers meeting NYSDOT Standard Specifications, Section 711-04, or other pre-approved covering material. Overlap curing covers a minimum of 18 inches. Prior to covering, a fog or light mist shall be sprayed above the surface. The cover shall overlap all exposed edges and shall be fully secured throughout the curing period (without using dirt) to prevent dislocation due to winds or adjacent traffic conditions. The polyethylene covering shall remain on the surface for the full duration of the cure time. Supply form insulating materials when the air temperature is expected to fall below 40°F at any time during the curing period.

Cure Time:

- a. Minimum of 7 days.
- b. No truck traffic shall be allowed for 10 days (no passenger car/light trucks for 7 days).

Jointing: Control (contraction) joints shall be installed at maximum 20-foot intervals. They shall be installed at a depth of least 1/4 the thickness of the pavement. It is recommended that these joints be installed in the plastic concrete with a rolling joint tool. Saw cut joints, if used, should be installed as soon as the pavement has hardened sufficiently to prevent raveling and uncontrolled cracking (normally immediately after curing). Transverse construction joints shall be installed whenever placing is suspended a sufficient length of time that concrete may begin to harden. In order to assure aggregate bond at construction joints, a bonding agent suitable for bonding fresh concrete shall be brushed, rolled, or sprayed on the existing pavement surface edge. Isolation (expansion) joints will not be used except when pavement is abutting slabs or other adjoining structures.

Testing, Inspection, and Acceptance

- I. Test panel(s): At least one week prior to use, the Contractor shall place, joint, and cure a test panel, a minimum of 100 sq. ft. at the required project thickness, designed in-place unit weight, and finish. The test panel will be constructed at a location designated by the Engineer and will remain in place for the duration of the project to be used as a reference for acceptance of the pavement surface.
 1. Satisfactory performance of the test panels will be determined by:
 - i. Void Structure: 15% minimum; 25% maximum as per ASTM C1688.
 - ii. Unit weight (Density): Unit weight shall be within 5 lb/ft³ of the design unit weight as per ASTM C1688.
 - iii. Infiltration Rate: Infiltration rate shall be a minimum of 100 in./hr as per ASTM C1701. Perform this test after 7 day cure.
 - iv. Compacted Thickness: Core the test panel at a minimum of 7 days and determine the compacted thickness as per ASTM C42. Compacted thickness shall be within 1/4" of the specified thickness.
 2. If the test panel does not meet performance criteria, it shall be removed and redone at the Contractor's expense, and the failed test panel disposed of in an appropriate manner.
 3. The test panel will not be incorporated into the work, and will be removed when ordered by the Engineer.
- II. Testing:

During production, the following shall be conducted at the Contractor's expense:

 1. A minimum of one test for each day's placement of pervious concrete in accordance with ASTM C 1688 to verify unit weight and percent void content. Unit weight shall be within 5 lb/ft³ of the design unit weight.
 2. In a slipform paving operation, determine plastic thickness according to NYSDOT Standard Specifications, Section 502- 3.08. Perform this test at the frequency indicated in the NYSDOT Standard Specifications, Section 502-3.08, but at a minimum of twice per day. Fixed form thickness shall be determined by measuring from grade to top of forms prior to paving. Thickness shall be within 1/4" of the specified thickness.

3. Infiltration Rate: Test as per ASTM C1701 after 7 day cure at a minimum of three locations chosen by the Engineer. Infiltration rate shall be a minimum of 100 in./hr.

Should any of these test results fall outside of the specified limits, the concrete shall be removed, replaced, and retested at no additional cost.

IV. METHOD OF MEASUREMENT:

This work will be measured as the number of cubic yards of pervious Portland cement concrete satisfactorily furnished and installed in accordance with the plans, specifications, and orders of the Engineer.

V. BASIS OF PAYMENT:

The unit price bid per cubic yard shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work, including preparing the subbase, saw cutting, and providing a test panel(s), except that any necessary excavation and subbase course will be paid for under their appropriate items.

ITEM 26S - CONCRETE CURB (SPECIAL)

A. Description.

1. Under these Items the Contractor shall cast-in-place concrete curb of various types to match existing and/or conform to those types listed above as shown on the Plans, appropriate Standard Detail Sheets, or as ordered by the Engineer.

B. Materials.

1. The concrete placed under this item for conventionally formed curb shall be Class A, and for machine-formed curb, Class J, and shall conform in all respects to the requirements of PART THREE, SECTION A. The details of concrete materials permitted in this Item are shown in Table 1, "Concrete Mixtures" in Article 2 of Section A. Bar reinforcement shall conform to the requirements of M17.
2. Class F High Early Strength concrete or Class C concrete may be substituted for Class A concrete, if such substitution is approved by the Engineer. Class F concrete shall meet the requirements of Item 17F, and Class C concrete shall meet the requirements of Item 17C. No substitution may be made for Class J concrete.

C. Construction Details.

1. The concrete curb shall be cast in place in sections approximately 20' long and provision made at each joint for expansion of 1/4". Where joint supports are used between curb and reinforced concrete pavement or concrete foundation course, construction joints shall be located at approximately 20' intervals and/or opposite each joint in the pavement. Expansion joints 3/4" in thickness shall be located opposite each pavement expansion joint. Expansion joints 1/2" in thickness shall be installed in the curb at the beginning and end of all curb returns, all sharp curves, at each side of drainage structures or castings, at each side of driveway curb cuts and between curb and sidewalk or other abutting structures.
2. Expansion joint filler shall be pre-molded bituminous material conforming to M32. It shall be cut to fit the cross-section of the curb and shall be accurately installed and firmly secured in position.
3. All forms shall be set true to line and grade and held rigidly in position. They shall be either of metal or of acceptable planed and matched lumber, and shall be of such construction as to allow for inspection for grade and alignment and that will produce a smooth surface on the finished curb.
4. The concrete shall be compacted by means of an approved immersion type, mechanical vibrator of a size and weight sufficient to vibrate the entire concrete mass thoroughly without damaging or misaligning the forms. The vibrator shall be introduced into the concrete at one foot intervals for a period not to exceed two seconds for each immersion. When directed the concrete shall be compacted by working or spading by hand along the faces of the rear and front forms or pavement edge for the full depth. All compacting shall be performed while the concrete is in a plastic state and shall be to such extent as will secure a dense mass with even and uniform surfaces free from aggregate pockets or honeycomb.
5. The back forms shall be left in place at least 24 hours or until the concrete has set sufficiently so that, in the judgment of the Engineer, they can be removed without injury to

the curb. After the concrete has attained its initial set, the face forms shall be removed and the exposed faces of the curb shall be immediately tooled, rubbed down and finished to a smooth, true and uniform surface as directed but no plastering will be permitted. For this work, only skilled finishers shall be employed. All joints shall be retooled for the full depth subsequent to the completion of the facing work.

6. At the Contractor's option, either M34 quilted covers, M34A polyethylene coated burlap blankets, M34B polyethylene curing covers or M34C waterproof paper blankets shall be used in curing concrete curb. Other methods of curing may be used only if so indicated on the Plans, in the Itemized Proposal or permitted in writing by the Engineer.
7. The Contractor shall protect the curb, keep it in true alignment and first class condition until the completion of the contract. Any curb which is damaged at any time previous to the final acceptance of the work or which is unsatisfactory shall be removed and replaced with acceptable curb at the Contractor's own expense.

D. Method of Measurement.

1. The quantity to be paid for under this item will be the number of linear feet of curb placed in accordance with the Plans, Specifications and orders of the Engineer.

E. Basis of Payment.

1. The price bid per linear foot shall include the cost of furnishing all labor, materials and equipment necessary to complete the work satisfactorily, including bar reinforcement and all grading including removal of existing curb unless otherwise shown on the Plans or in the Proposal.
2. Payment will be made at the unit price bid regardless of any approved substitution for the classes of concrete.

ITEM 27MS - CONCRETE MOWING STRIP > 16" - 36" WIDE

The Standard Specifications for Item 27 shall apply with the following modifications:

A. Description.

1. Under this Item the Contractor shall construct a one course cement concrete mower strip with properly prepared sub-grade where and to the lines, grades, and details indicated on the plans in accordance with the specifications and/or orders of the Engineer.
2. The Contractor shall restore six (6") inches of grass area on either side of the mower strip in accordance with Item 368 - Topsoil and Grass Seeding. Payment shall be made under Item 27MS.

B. Method of Measurement.

The quantity to be paid for under this Item shall be the number of linear feet of cement concrete mowing strip measured in place and completed in accordance with the Plans and Specifications.

C. Basis of Payment.

The unit price bid per linear foot for this Item shall include the cost of all labor, materials, tools and incidentals necessary to satisfactorily complete the required work, including but not limited to mowing strip installation and grass area restoration.

ITEM 33X – EPOXY COATED BAR REINFORCEMENT FOR STRUCTURES

A. Description

1. The work under this item shall conform to the applicable requirements of Item 33 - Bar Reinforcement of the Nassau County Standard Specifications, except as modified by the plans and/or by the specifications, as stated herein.

B. Materials

1. Reinforcement.
 - a) This shall meet the requirements of ASTM A615 Grade 60.
2. Epoxy Coating Material.
 - a) The epoxy coating material shall be an organic, powdered epoxy resin that is applied by the electrostatic method. The epoxy coating materials shall be approved by the County.
3. Patching Material.
 - a) Patching or repair materials shall be supplied by the epoxy coating manufacturer. The patching material shall be compatible with the epoxy coating, inert in concrete, and shall be suitable for use in making field repairs.
4. Coating Application.
5. Surface Preparation.
 - a) The surface of bars to be coated shall be blast cleaned in accordance with the Steel Structures Painting Council – Surface Preparation Specifications No. 10 (SSPC-SP10), Near White Blast Cleaning. After blasting, the cleaned surface of the bar shall be defined by SSPC-Vis1, Pictorial Standards ASa 2- 1/2, BSa 2-1/2, or CSa 2-1/2, as applicable.
6. Coating Application.
 - a) The powdered epoxy resin coating shall be electro-statically applied in accordance with the recommendations of the coating manufacturer. The epoxy coating may be applied before or after fabrication of the reinforcing bars.
7. Coating Thickness.
 - a) The epoxy coating shall be applied as a smooth, uniform coat. After curing, the coating thickness shall be 7 plus/minus 2 mils. Coating thickness shall be controlled by taking measurements on a representative number of bars from each production lot. Coating thickness measurements shall be conducted by the method outlined in ASTM G12.
8. Continuity of Coating
 - a) The coating shall be checked visually after cure for continuity. It shall be free from holes, voids, contamination, cracks and damaged areas.
 - b) The coating shall not have more than two holes (pinholes not visible to the naked eye) in any linear foot of the coated bar. A hole detector shall be used, in accordance with

manufacturer's instructions, to check the coating for holes.

9. Coating Cure

- a) The coating applicator shall check each production lot to determine that the entire production lot of coated bars is in a fully-cured condition.

10. Flexibility of Coating

- a) The flexibility of the coating shall be evaluated on a representative number of bars selected from each production lot. The coated bar shall be bent 120 degrees (after rebound) around a 6-inch diameter mandrel. The bend shall be done at a uniform rate and may take up to one minute to complete. The test specimens shall be at the thermal equilibrium between 20 and 30 degrees C (68-85 degrees F) at the time of testing.
- b) No cracking of the coating shall be visible to the naked eye on the outside radius of the bent bar.

11. Plant Inspection

- a) The County reserves the right to have its authorized representative to observe the preparation, coating and testing of the reinforcement bars.
- b) The representative shall have free access to the plant and any work done when access has been denied shall be automatically rejected.

C. Construction Details

1. Shop Repair of Coated Bars

- a) Epoxy coated reinforcement bars which do not meet the requirements for Coating Thickness, Continuity of Coating, Coating Cure or Flexibility of Coating shall not be repaired.
- b) Reinforcement bars with these defects shall be replaced or alternately, stripped of epoxy coating, re-cleaned and recoated in accordance with the requirements of this specification.
- c) Coating breaks due to fabrication and handling shall be repaired with patching material if the defective area is greater than the cross-sectional area of the reinforcement bar. Defects which are smaller than the cross-sectional area need not be repaired.
- d) The repair of coating breaks shall be limited to bars on which the total of the defective coating bar does not exceed 5 percent of the surface area of the reinforcement bar. Bars with greater than 5 percent damage shall be replaced or alternately, stripped of epoxy coating, re-cleaned and recoated in accordance with this specification.

2. Handling

- a) All systems for coated bars shall have padded contact areas for the bars, wherever possible. All building bands shall be padded and all bundles shall be lifted with a strong back, multiple supports or a platform bridge so as to prevent bar to bar abrasion from sags in the bar bundle. The bars or bundles shall not be dropped or dragged.

D. Method of Measurement

The quantity to be paid for under this item is the number of pounds of bar reinforcement exclusive of chairs, fastenings and supports, that is incorporated in the work as shown on the Plans or as ordered by the Engineer. The weight of bar reinforcement will be computed by utilizing the unit weight for each size bar given in the "Table of Standard Weights". If the Engineer allows the substitution of larger bars than have specified, or splices not shown on the Plans or specifically ordered by him, payment will be only for weight of steel which would have been required if the specified size and length of bar had been used.

E. Basis of Payment

The unit price bid, per pound, for this item shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. The cost of furnishing and placing chairs, fastenings and supports shall be included in the unit price bid for this item.

ITEM 35T - TIMBER GUIDE RAIL

A. Description.

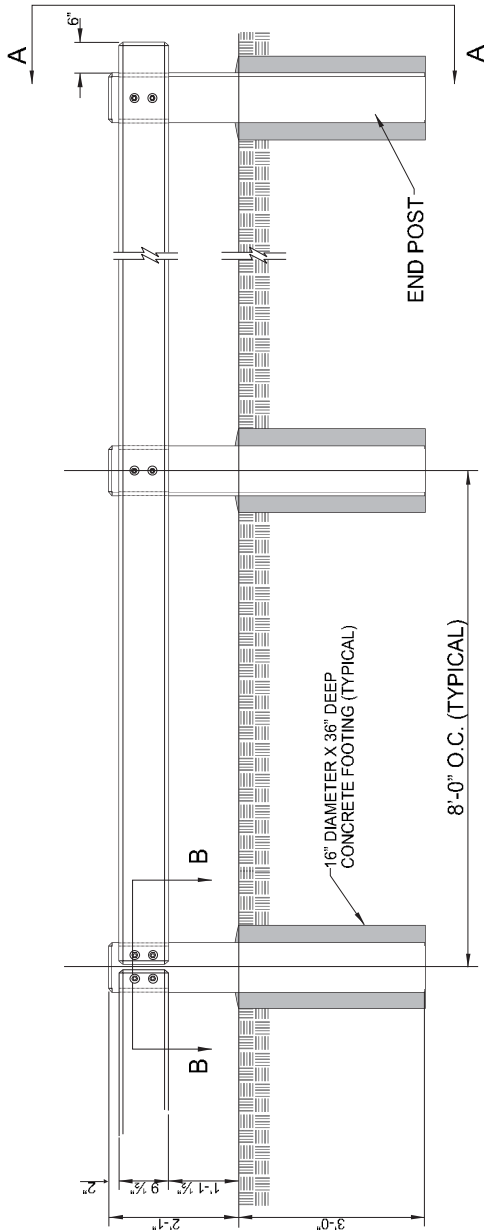
Under this item the Contractor shall furnish and install Timber Guide Rail at the location(s) indicated on the Plans and in accordance with the Specifications and appropriate Standard Detail Sheet and as directed by the Engineer.

B. Materials and Construction Details.

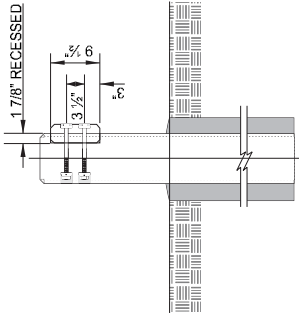
1. Lumber shall be of the size and type shown on the plans. Rails and posts shall be dried after treatment and shall not have over 15% moisture content or not over 19% air-dried. Lumber shall be Southern Yellow Pine No. 1 Dense SR (1500 F) and grade stamped.
2. All lumber shall be straight, smooth and free of splinters. Where exposed, all lumber shall have an eased edge and straight edges.
3. The lumber shall be subject to inspection and approval by the Engineer after arrival on the site.
4. All lumber used shall be treated with ACQ - Ammoniacal Copper Quaternary produced in accordance with ACQ Preserve Standard ACQ 01-02 and the appropriate AWWA Standard (Category UC1, UC2, UC3A, UC3B, UC4A, UC4B, U1 AND T1). The ACQ retention rate shall be a minimum of 0.60 lbs/cf.
5. Concrete for footings shall conform to Class A concrete 1-2-4 mix as specified in Item 17A, but payment shall be made under this item. Footings shall be cast rough in the ground and pitched above grade to shed water. The cost of excavation and backfilling for footings shall be paid for under this item.
6. The Contractor shall install the Timber Guide Rail in accordance with the Plans, Specifications and direction of the Engineer.

C. Measurement and Payment.

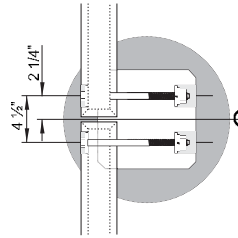
1. The quantity to be paid for under this item shall be the actual linear feet of Timber Guide Rail furnished and installed as indicated on the Plans, as required by the Specifications or where directed by the Engineer.
2. The unit prices bid for Timber Guide Rail under this item shall include the cost of all labor, tools, materials, equipment and other incidentals required to satisfactorily complete the required work as indicated on the Plans, as required by the Specifications or where directed by the Engineer.



FRONT ELEVATION



SECTION
A - A



SECTION
B - B

TIMBER GUIDE RAIL

POSTS:	SHALL BE 10" x 10" No. 1 COMMON DENSE DOUGLAS FIR OR SOUTHERN YELLOW PINE SET IN 16" DIAMETER x 36" DEEP 3,000 PSI CONCRETE FOOTINGS
RAILS:	SHALL BE 4" x 10" No. 1 COMMON DENSE DOUGLAS FIR OR SOUTHERN YELLOW PINE
BEVELING:	BEVEL ALL EXPOSED SURFACES SHALL BE BEVELED WITH 1" CHAMFERS
COUNTERSINKING:	ALL RAILS AND POSTS SHALL BE COUNTERSUNK WITH 2" DIA. HOLES TO RECEIVE THE ATTACHING BOLT ASSEMBLIES TO PROVIDE FOR A FLUSH INSTALLATION
TREATMENT:	ALL POSTS AND RAILS SHALL BE TREATED WITH ACQ - AMMONIACAL COPPER QUATERNARY PRODUCED IN ACCORDANCE WITH ACQ PRESERVE STANDARD ACQ 01-02 AND THE APPROPRIATE AWPA STANDARD (CATEGORY UC1, UCC2, UC3a, UC3b, UC4a, UC4b, U1 and T1). THE ACQ RETENTION RATE SHALL BE A MINIMUM OF 0.40 LBS/CF
HARDWARE:	EACH RAIL SHALL BE FASTENED TO A POST USING THE FOLLOWING HOT DIPPED GALVANIZED STEEL BOLT ASSEMBLY: 1 - 5/8" DIA. x 10" LONG BOLT WITH HEX HEAD AND NUT, 2 - 2" x 5/32" FLAT WASHERS & 1 - 13/64" LOCK WASHER
BOLTING:	TWO BOLT ASSEMBLIES ARE REQUIRED AT EACH POST, EXCEPT THAT FOUR BOLT ASSEMBLIES

SCALE: 1/2" = 1'-0"

DATE: 10/27/09

NASSAU COUNTY

**ITEM 36CX – ASPHALT CONCRETE TRUING AND LEVELING COURSE TYPE 1A
(FOR CRACKS IN ASPHALT PAVEMENT)**

All provisions of Item 36C, “Asphalt Concrete Truing and Leveling Course Type 1A” shall apply with the following modifications and/or additions:

A. Description

This item will be utilized to fill all joints and cracks greater than one-inch (1”) in the existing pavement, as outlined in Item 107, Cleaning, Filling & Sealing Existing Joints & Cracks in Asphalt Pavement.

ITEM 36PAP — PERVIOUS ASPHALT PAVEMENT

PART 1— GENERAL

1.1 DESCRIPTION

- A. This section includes the following:
1. Subgrade preparation.
 2. Installation of infiltration beds.
 3. Porous bituminous base course and paving.
 4. Geomembrane and filter fabrics
 5. Metal edge and edge stone

1.2 SYSTEM DESCRIPTION

- A. Provide porous pavement according to the materials, workmanship, and other applicable requirements of the standard specifications of the state or of authorities having jurisdiction.

1.3 SUBMITTALS

- A. Product Data: Submit a list of materials proposed for work under this Section including the name and address of the materials producer and the location from which the materials are to be obtained.

- B. Material Certificates: Certificates signed by the materials producer and the paving subcontractor, stating that materials meet or exceed the specified requirements.

- C. Samples:

1. Coarse aggregates for choker course in labeled plastic bag.
2. Coarse aggregate for infiltration bed in labeled plastic bag.
3. Non-woven geotextile 12x12" square.

- D. Product Analysis:

1. Sieve analysis for infiltration bed coarse aggregate.
2. Sieve analysis for choker course.
3. Asphalt Mix: The asphalt mixing plant shall certify the aggregate mix. The certification letter from the mixing plant will include the following:
 - a. Abrasion loss factor.
 - b. Polymer additive.
 - c. Binder drain down.
 - d. Tensile strength ratio.
 - e. Resistance to stripping by water.
 - f. Asphalt content in the mix.
4. Polymer Additive: The polymer-modified asphalt supplier shall supply a certification letter before the mix is placed on the project. The certification letter from the supplier will include the following:
 - a. Type of elastomeric polymer used to modify the asphalt.
 - b. Information on the storage and stability of the polymer modified asphalt.

- c. Recommended mixing and compaction temperatures.
- d. A statement saying that the polymer modified asphalt will comply with these specifications.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.
- B. **Manufacturer Qualifications:** Contractor will engage a firm experienced in manufacturing porous asphalt similar to that indicated for this Project and with a record of successful in-service performance.
 - 1. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the DOT of the state in which the Project is located.
- C. **Pre-installation Conference:** Conduct conference at project site to review methods and procedures related to porous paving including, but not limited to, the following:
 - 1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture porous asphalt.
 - 2. Review condition of substrate and preparatory work performed by other trades.
 - 3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - 4. Review and finalize construction schedule for paving and related work. Verify availability of materials, paving Installer's personnel, and equipment required to execute the work without delays.
 - 5. Review inspection and testing requirements, governing regulations, and proposed installation procedures.
 - 6. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
- D. **Field Quality Control:**
 - 1. The full permeability of the pavement surface shall be tested by application of clean water at the rate of at least 5 gpm over the surface, using a hose or other distribution devise. Water used for the test shall be clean, free of suspended solids and deleterious liquids and will be provided at no extra cost to the Owner. All applied water shall infiltrate directly without puddle formation or surface runoff, and shall be observed by the Engineer and Owner.
 - 2. **Testing and Inspection:** Employ at Contractor's expense an inspection firm acceptable to the Engineer and Owner to perform soil inspection services, staking and layout control, and testing and inspection of site grading and pavement work. Inspection and list of tests shall be reviewed and approved in writing by the Engineer prior to starting construction. All test reports must be signed by a licensed Engineer.
 - 3. Test in-place base and surface course for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable work as directed by the Owner.
 - 4. **Surface Smoothness:** Test finished surface for smoothness and even drainage, using a ten-foot to centerline of paved area. Surface will not be accepted if gaps or ridges exceed 3/16 of an inch.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in clean, dry, protected location and within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Protection of Existing Improvements:

- 1. Protect adjacent work from splashing of paving materials. Remove all stains from exposed surfaces of paving, structures, and grounds. Remove all waste and spillage.
- 2. Do not damage or disturb existing improvements or vegetation. Provide suitable protection where required before starting work and maintain protection throughout the course of the work.
- 3. Restore damaged improvements, including existing paving on or adjacent to the site that has been damaged as a result of construction work, to their original condition or repair as directed to the satisfaction of the Owner, and authority having jurisdiction at no additional cost.

B. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:

- 1. Porous bituminous paving mixtures: Minimum ambient temperature is 55 degrees Fahrenheit.
- 2. Pavement Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient temperature of 40 degrees F for oil-based materials, 50 degrees F for water-based materials, and not exceeding 95 degrees F.

1.7 REFERENCES

- A. Annual Book of ASTM Standards, 1997 or latest edition; American Society for Testing and Materials, Philadelphia, PA.
- B. Standard Specifications, latest edition; New York State Department of Transportation.
- C. Standards of the American Association of State Highway and Transportation Officials (AASHTO), 1998 or latest edition.

PART 2-PRODUCTS

2.1 MATERIALS

A. Coarse Aggregate for Infiltration Beds:

- 1. All aggregates within infiltration beds shall meet the following:
 - a. Maximum Wash Loss of 0.5%.
 - b. Minimum Durability Index of 35.
 - c. Maximum Abrasion of 10% for 100 revolutions and maximum of 50% for 500 revolutions.

2. Unless otherwise approved by the Engineer, coarse aggregate for the groundwater infiltration beds shall be crushed, washed, uniformly graded stone clean and free of fines with the following

U.S. Standard Sieve Size	Percent Passing
2-1/2" (61 mm)	100
2" (50 mm)	90-100
1-1/2" (37.5 mm)	35-70
1" (25 mm)	0-15
1/2" (12.5 mm)	0-5

3. If the above gradation cannot be met, the following gradation (AASHTO size number 5) is acceptable with approval of the Engineer and a minimum void space of 40% after compaction.

U.S. Standard Sieve Size	Percent Passing
1-1/2" (37.5 mm)	100
1" (25 mm)	90-100
3/4" (19. mm)	20-55
1/2" (12.5 mm)	0-10
3/8" (9.5 mm)	0-5

B. Choker Base Course:

1. Aggregate for the choker base course shall be crushed, washed, stone clean and free of fines with the following gradation (AASHTO size number 57):

U.S. Standard Sieve Size	Percent Passing
1-1/2" (37.5 mm)	100
1" (25 mm)	95-100
1/2" (12.5 mm)	25-60
4 (4.75 mm)	0-10
8 (2.36 mm)	0-5

C. Non-woven geotextile shall be Mirafi 160N, or approved equal with the following characteristics:

1. Grab Tensile Strength: 1601bs (0.71 kN); ASTM D 4632,
2. Tear Strength: 60 lbs (0.27 kN); ASTM D 4533.
3. Puncture Resistance: 95 lbs (0.42 kN); ASTM D 4833.
4. Water Flow Rate: 110 gpm per sq. ft. (4477 Us per sq. m); ASTM D 4491.
5. Apparent Opening Size: 70 US Sieve size (0.212 mm); ASTM D 4751.
 - a. Permittivity 1.4 sec-1; ASTM 4491

D. Porous Bituminous Asphalt:

1. Bituminous surface course for porous paving shall be two and one-half (2.5) inches thick with a bituminous mix of 5.5% to 6% by weight dry aggregate. In accordance with ASTM D6390, drain down of the binder shall be no greater than 0.3%. If more absorptive aggregates, such as limestone, are used in the mix then the amount of bitumen is to be based

on the testing procedures outlined in the National Asphalt Pavement Association's Information Series 131 - "Porous Asphalt Pavements" (2003) or NYSDOT equivalent.

2. Use neat asphalt binder modified with an elastomeric polymer to produce a binder meeting the requirements of PG 76-22. The elastomeric polymer shall be styrene-butadiene-styrene (SBS), or approved equal, applied at a rate of 3% by total weight of the binder. The composite materials shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified asphalt binder shall be heat and storage stable.
3. Aggregate in the asphalt mix shall be minimum 90% crushed material and have a gradation of:

U.S. Standard Sieve Size	Percent Passing
1/2" (12.5 mm)	100
3/8" (9.5 mm)	92-98
4 (4.75 mm)	32-38
8 (2.36 mm)	12-18
16 (1.18 mm)	7-13
30 (600 nth)	0-5
200 (75 Om)	0-3

4. Add hydrated lime at a dosage rate of 1.0% by weight of the total dry aggregate to mixes containing granite. Hydrated lime shall meet the requirements of ASTM C 977. The additive must be able to prevent the separation of the asphalt binder from the aggregate and achieve a required tensile strength ratio (TSR) of at least 80% on the asphalt mix.

The asphaltic mix shall be tested for its resistance to stripping by water in accordance with ASTM D-3625. If the estimated coating area is not above 95 percent, anti-stripping agents shall be added to the asphalt.

- E. Metal Edge — 1/4" x 5" commercial grade stainless steel metal edge with anchor stake 32" on center.
- F. Geomembrane — 30 mil HDPE
- G. Edge Stone — shall be #2 washed gravel — 3/4" to 1 1/2" stone size.

PART 3 — EXECUTION

3.1 INSTALLATION

- A. Infiltration Beds:
 1. Owner shall be notified at least 24 hours prior to all infiltration bed and porous paving work.
 2. Subgrade Preparation:
 - a. The subgrade bed bottom shall be benched and back pitched in accordance with the plan details.
 - b. Existing subgrade under bed areas shall NOT be compacted or subject to excessive construction equipment traffic prior to geotextile and stone bed placement.
 - c. Where erosion of subgrade has caused accumulation of fine materials and/or surface ponding, this material shall be removed with light equipment and the underlying soils scarified to a minimum depth of 6 inches with a york rake or equivalent and light tractor.

- d. Bring subgrade of stone infiltration bed to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction before the placing of stone.
- e. Install geomembrane where pervious pavement will abut standard asphalt pavements
- 3. Infiltration Bed Installation:
 - a. Upon completion of subgrade work, the Engineer shall be notified and shall inspect at his/her discretion before proceeding with infiltration bed installation.
 - b. Geotextile and infiltration bed aggregate shall be placed immediately after approval of subgrade preparation. Any accumulation of debris or sediment which has taken place after approval of subgrade shall be removed prior to installation of geotextile at no extra cost to the Owner.
 - c. Place geotextile in accordance with manufacturer's standards and recommendations. Adjacent strips of geotextile shall overlap a minimum of sixteen inches (16"). Secure geotextile at least four feet (45 outside of bed and take steps necessary to prevent runoff or sediment from entering the storage bed.
 - d. Install coarse aggregate in 8-inch maximum lifts. Lightly compact each layer with equipment, keeping equipment movement over storage bed subgrades to a minimum. Install aggregate to grades indicated on the drawings.
 - e. Install equalizer pipe and observation well. Install equalizer pipe at lowest elevation of lowest bench. Observation well location shall be determined in the field and cap shall be set flush with finished grade.
 - C. Install choker base course (see Materials section) aggregate evenly over surface of stone bed, sufficient to allow placement of pavement, and notify Engineer for approval. Choker base course shall be sufficient to allow for even placement of asphalt but no thicker than 1-inch in depth.
 - g. Following placement of bed aggregate, the geotextile shall be folded back along all bed edges to protect from sediment washout along bed edges. At least a four-foot edge strip shall be used to protect beds from adjacent bare soil. This edge strip shall remain in place until all bare soils contiguous to beds are stabilized and vegetated. In addition, take any other necessary steps to prevent sediment from washing into beds during site development. When the site is fully stabilized with vegetation, temporary sediment control devices shall be removed.

B. Porous Bituminous Asphalt:

- 1. Transporting Material:
 - a. Transporting of mix to the site shall be in vehicles with smooth, clean dump beds that have been sprayed with a non-petroleum release agent.
 - b. The mix shall be covered during transport to control cooling.
- 2. Porous bituminous asphalt shall not be stored in excess of 90 minutes before placement.
- 3. Asphalt Placement:
 - a. The porous bituminous surface course shall be laid in one lift directly over the storage bed and stone base course to a 2.5-inch finished thickness.
 - b. The laying temperature of the bituminous mix shall be between 300 degrees Fahrenheit and 350 degrees Fahrenheit (based on the recommendations of the asphalt supplier).
 - c. Installation shall take place when ambient temperatures are 55 degrees Fahrenheit or above, when measured in the shade away from artificial heat.
 - d. The use of a remixing material transfer device between the trucks and the paver is highly recommended to eliminate cold lumps in the mix.

- e. The polymer-modified asphalt is difficult to rake. A well-heated screed should be used to minimize the need for raking.
 - f. Compaction of the surface course shall take place when the surface is cool enough to resist a 10-ton roller. One or two passes are required for proper compaction. More rolling could cause a reduction in the surface porosity which is unacceptable.
- 4. After final rolling, no vehicular traffic of any kind shall be permitted on the surface until cooling and hardening has taken place, and in no case within the first 48 hours. Provide barriers as necessary at no extra cost to the Owner to prevent vehicular use; remove at the discretion of the Engineer. Work shall be done expertly throughout, without staining or injury to other work.
 - 5. Transition to adjacent pavements shall be merged neatly with flush, clean line. Contractor shall install edge gravel where shown on the plans Metal edging shall be used where indicated on the plans. Metal edge and gravel shall be flush with top of asphalt to allow excess flow to run into swale. Finished paving shall be even, without pockets, and graded to elevations shown on drawing.
 - 6. Porous pavement beds shall not be used for equipment or materials storage during construction, and under no circumstances shall vehicles be allowed to deposit soil on paved porous surfaces.
 - 7. Repair of Damaged Paving:
 - a. Any existing paving on or adjacent to the site that has been damaged as a result of construction work shall be repaired to the satisfaction of the Owner without additional cost to the Owner.
 - 8. Grade Control:
 - a. Establish and maintain required lines and elevations. The Engineer shall be notified for review and approval of final stake lines for the work before construction work is to begin. Finished surfaces shall be true to grade and even, free of roller marks and free of low spots to form puddles. All areas must drain.
 - b. If, in the opinion of the Owner, based upon reports of the testing service and inspection, the quality of the work is below the standards which have been specified, additional work and testing will be required until satisfactory results are obtained.

PART 4 - MEASUREMENT

- 4 Method of Measurement. The quantity to be paid for under this item shall be the number of square yards of pervious asphalt installed complete, measured in place, acceptably completed in accordance with the Plans and Specifications.

PART 5 - PAYMENT

- 5 Basis of Payment. The unit price bid for this item shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the entire work including subgrade preparation, fine grading, infiltration beds, porous bituminous paving, geotextiles, geomembrane, metal edge and edge stone in accordance with the Plans and Specifications.

ITEM 37C- BRICK PAVERS ON CEMENT CONCRETE SETTING BED

A. Description.

1. Under this Item the Contractor shall furnish and install brick paving on cement concrete setting bed, in accordance with the Plans, Specifications and directions of the Engineer.

B. Materials.

1. All materials and methods of construction shall conform to the applicable sections of PARTS TWO AND THREE of these Specifications and as modified and further specified in the following paragraphs.
2. Brick Pavers.
 - a. All materials and methods of construction shall conform to the applicable sections of the Standard Specifications, and as modified and further specified herein.
 - b. The new paving stones shall be a Nicolock Pavers or approved equal. The stones are to be 2 3/8" thick, with the sizes as shown on the plans and/or as ordered by the Engineer. They are to be manufactured from extruded fireclay or shale and shall be fired to produce a dense paver with an average absorption of less than 4% (in a 24-hour cold water absorption test). They shall have an average compressive strength of not less than 10,500 pounds per square inch for any five pavers tested. The pavers must be capable of withstanding at least the equivalent of 1,200 cycles of freeze-thaw conditions. The permissible tolerance for individual pavers shall conform to ASTM Designation C 902-79a.
3. Sand Leveling Bed.
 - a. Sand for the leveling course shall be sound, sharp, washed, natural sand or crushed stone complying with gradation requirements of ASTM C 33 for fine aggregate.
4. Cement Concrete Setting Bed for Brick Paver.
 - a. Concrete shall conform to the requirements specified for Item 27 - Cement Concrete Sidewalk, but will be paid for under the cost of this Item.
5. **Construction Details.**
 - a. A concrete slab shall be laid in one course, 3 inches thick, or as shown on the Plans. The concrete shall be worked and floated so as to produce a rough broom finish with a uniform surface. Two (2") inch long expansion/drainage joints shall be placed at twenty (20') foot intervals to the full depth and width of the concrete slab and filled with 1/4" pea gravel. Twenty-four (24") inch wide geotextile shall be placed over this joint, between the pea gravel and sandlayer.
 - b. Twenty-four (24") inch wide geotextile shall be installed between the concrete base and sand layer from 1" below the top of the back face of curb.

- c. A sand Leveling Course shall be constructed with a minimum thickness of one half (½") inch with a maximum thickness of one (1") inch. Brick pavers shall be installed hand tight, being careful not to disturb leveling base.
- d. In areas where the pavers are not bordered by curb or sidewalk, an edge restraint shall be installed for confinement. The paver edge will conform to the requirements of Item 179D – Aluminum Paver Edge, with cost included under the item 37C.
- e. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500-to 5000 lbf compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator.
- f. Grout: After setting brick, the voids are to be swept full of cement with color additive dry grout.
- g. Samples. The Contractor will be required to submit four samples of the brick before starting work for approval by the Engineer. Samples shall be labeled with the name of the contract, title, and number, contractor, manufacturer and grade. The samples shall show the full range in color, texture and other physical qualities. Bricks used on the work shall conform to the approved samples. The brick shall be a high quality paving brick which shall be free from blisters, spalls, clinkers, and other defects.
- h. Brick Patterns .The Contractor shall submit shop drawings showing proposed brick patterns for the Engineer's approval.

C. Method of Measurement.

- 1. The quantity of pavers to be paid for will be the total number of square feet of paved surface furnished and installed in accordance with the plans, specifications and directions of the Engineer.

D. Basis of Payment.

- 1. The unit price bid per square foot of brick paving shall include the cost of furnishing all labor, materials, and equipment, including excavation, backfilling, final grading, cement concrete setting bed, sand, brick pavers, pavers edge and all incidentals necessary to complete the work.

ITEM 40RP - RELOCATING TRAFFIC SIGNS

The Standard Specifications for Item 27 shall apply with the following modifications:

A. Description.

1. This work shall consist of furnishing labor, materials, equipment and appliances necessary to perform and complete all work involved in relocating, in kind, an existing sign in accordance with the plans, specifications and as directed by the Engineer.

B. Materials.

1. The contractor may reuse as many of the original components as possible and as approved by the Engineer. If it becomes necessary to supply new components, they shall be of equal quality to the original components.
2. Concrete for footings, when required, shall be in accordance with the requirements of NCDPW Specifications Section A, "Portland Cement Concrete, General Specifications" and shall be Class "A" Concrete

C. Construction Details

1. The Contractor shall inspect the sign to be relocated to determine the materials, equipment and appliances necessary to effect the relocation. The Contractor shall submit shop drawings for approval, showing all dimensions, details of construction, design criteria and relationship to adjoining work, where same requires cutting and fitting, and other work required for a complete relocation. Use an accredited erection crew experienced in erecting signs.
2. Protect materials during relocation to preclude any damage. The Contractor shall replace, at his own expense, any components damaged during relocation.
3. Electrical connections, when required, shall be under the direction of a licensed electrician and in accordance with the current electrical codes.
4. Existing concrete sign footings shall be cut to a depth of 18 inches below the existing ground and covered with suitable-material, or as directed by the Engineer.
5. Any areas, site elements or services disturbed during the relocation process shall be restored to their original condition.

D. Method of Measurement

1. Payment will be made for EACH sign relocated in accordance with these specifications and the orders of the Engineer.

E. Basis of Payment.

1. The unit price bid each for this Item shall include the cost of all labor, materials, tools and incidentals necessary to satisfactorily complete the required work.

ITEM 60A - ADJUST WATER SERVICE BOX ELEVATIONS

A. Description.

1. Under this Item the Contractor shall raise or lower the grade of the existing water service boxes that are necessitated by a change in grade between the existing grade and the new street grade at the location(s) indicated on the Plans, as required by the Specifications, or as directed by the Engineer.

B. Materials and Methods.

1. The "General Requirements for Modifications to Existing Water Service Facilities", which is included under Item 59, shall apply in addition to the requirements of this Item.
2. Water service boxes and other appurtenances shall conform to the latest standard practice and to the specifications and standards of the local Water District.

C. Method of Measurement.

1. The quantity to be paid for under this Item shall be the actual number of water service boxes reset to the new grade.

D. Measurement of Payment.

1. The unit price bid for under this Item shall include the cost of all labor, materials, equipment and incidentals necessary to satisfactorily complete the work.

ITEM 60B - RELOCATE CURB COCK AND WATER SERVICE BOXES

A. Description.

1. Under this Item the Contractor shall relocate existing curb cocks and water service boxes and furnish and install new pipe and fittings as required between the water main and the service shutoff that are necessitated by change in line and grade at the location(s) indicated on the Plans, as required by the Specifications, or as directed by the Engineer.

B. Materials and Methods.

1. The "General Requirements for Modifications to Existing Water Service Facilities", which is included under Item 59, shall apply in addition to the requirements of this Item.
2. Curb cocks, water service boxes and other appurtenances shall conform to the latest standard practice and to the specifications and standards of the local Water District having jurisdiction.

C. Method of Measurement.

1. The quantity to be paid for under this Item shall be the actual number of curb cock and water service boxes reset to the new grade.

D. Measurement of Payment.

1. The unit price bid for under this Item shall include the cost of all labor, materials, equipment and incidentals necessary to satisfactorily complete the work.

ITEM 63A - ADJUST SANITARY SEWER CLEANOUTS

A. Description.

1. Under this Item the Contractor shall raise or lower the grade of existing sanitary sewer cleanouts that are necessitated by a change in grade between the existing grade and the new street grade at the location(s) indicated on the Plans, as required by the Specifications, or as directed by the Engineer.
2. The Contractor shall obtain all required permits, releases and other authorization required from Nassau County.

B. Materials and Methods.

1. The work under this part of this Item shall conform to the requirements of the Nassau County Department of Public Works, Division of Sewers.
2. The Contractor shall obtain all required permits, releases and other authorization required from Nassau County.

C. Method of Measurement.

1. The quantity to be paid for under this Item shall be the actual number of sanitary sewer cleanouts reset to the new grade.

D. Measurement of Payment.

1. The unit price bid for under this Item shall include the cost of all necessary excavation and backfill and the furnishing and installation of all materials necessary to set the clean-out to the new finished grade, all in accordance with requirements of Nassau County.

ITEM 79UP - UNIT PAVERS

A. Description.

1. Work under this Item shall consist of unit pavers at locations shown on the Plans or as directed by the Engineer.

B. Materials.

1. Concrete Bedding.
 - a. Concrete shall conform to the requirements specified for Item 27 - Cement Concrete Sidewalk and be five (5") inches thick.
2. Unit Pavers.
 - a. Solid paving units, ASTM C 936, made from normal-weight aggregates in sizes and shapes indicated. Pavers shall be 4"x 8"x 2.5" HOLLAND PAVING STONE – COLOR RED by Nicolock or approved equal as per specifications. Color shall be full depth.
 - b. The Contractor shall submit two samples of unit pavers for approval as to color, texture, finish and dimensions prior to delivery and installation. After approval, the samples shall be used as a standard for all unit pavers incorporated into the work.
3. Aggregate Setting Bed Materials.
 - a. Sand for leveling course shall be sound, sharp, washed, natural sand or crushed stone complying with gradation requirements of ASTM C 33 for fine aggregate.

C. Construction Details.

1. A concrete slab shall be laid in one course, or as directed by the Engineer, or as shown on the plan. The concrete shall be worked and floated so as to produce a rough broom finish with a uniform surface. Two inch long expansion/drainage joints shall be placed at 20 foot intervals to the full depth and width of the concrete slab and filled with 0.25" pea gravel. A 24 inch wide geotextile shall be placed over this joint, between the pea gravel and sand layer.
2. A 24 inch wide geotextile shall be installed between the concrete base and sand layer from 1" below the top of the back face of curb.
3. A sand Leveling Course shall be constructed with a minimum thickness of ½ inch with a maximum thickness of 1 inch. Unit pavers shall be installed hand tight, being careful not to disturb leveling base. In areas where the pavers are not bordered by curb or sidewalk, an edge restraint shall be installed for confinement and shall be 2"x 3"x 7.5ft Rigid Model No. 29285 by Bric-Edg™ or approved equal.
4. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000 lbf compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator.
5. GENERAL. Unit pavers area shall be constructed in strict accordance with the lines and grades shown on the Plans or as directed by the Engineer. All work shall be first class and performed by experience tradesmen. All unit pavers shall be free of defects in size, shape

and material. The Contractor shall cut out and remove from the site any unacceptable pavers. Pavers incorporated in the work shall conform to the approved samples in all respects. Pavers requiring cutting shall be cut by approved motor driven saws to neat, straight lines and planes.

D. Method of Measurement.

1. The quantity of unit pavers to be paid for under this item will be the number of square feet of exposed surface measured in its final position.

E. Basis of Payment.

1. The unit price bid per square foot shall include the cost of preparing subgrade, cutting when required, edge restraint and furnishing all labor, materials and equipment and incidentals as necessary to complete the work.
2. The cost of the concrete bedding shall be paid under Item 27 - Cement Concrete Sidewalk.

ITEM 96S – DRY RIP-RAP (SMALL)

The requirements for Item 96 of Nassau County 2009 Standard Specifications shall apply with the following modifications:

2. Materials.

Dry Rip-Rap shall consist of durable field or quarry stone or where permitted by the Engineer selected rubble concrete masonry removed under other item of the contract. The stone shall be shaped as nearly as practicable in the form of a right rectangular prism. The concrete sections shall have a surface area of approximately 1 square foot. At least 50% of the stones shall weigh in excess of 100 pounds and the remainder of the stones shall weigh from 30 to 100 pounds each. One dimension of each of the stones furnished shall be the thickness of the rip-rap as shown on the plans, and the stones shall be so laid that this dimension is perpendicular to the prepared bed. Where rubble concrete is used the thickness requirement may be modified but the total thickness of the concrete and stone bed shall conform to the thickness on the plan.

ITEM 98X – COFFERDAMS

The requirements for Item 98 of Nassau County 2009 Standard Specifications shall apply with the following modifications:

2. Materials. Cofferdams may also be constructed of water filled bags such as *AquaDam* or approved equal.

4. Method of Measurement. The quantity of cofferdams to be paid for under this item will be the number square feet of cofferdams installed.

5. Basis of Payment: The unit price bid per square foot of cofferdam for this item shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work.

ITEM 99-8X- PRECAST CONCRETE LEACHING BASIN - 8' DIAMETER

ITEM 99-10X- PRECAST CONCRETE LEACHING BASIN - 10' DIAMETER

The requirements for Items 99-8 and 99-10 of Nassau County *2009* Standard Specifications shall apply with the following modifications:

5. Basis for Payment. The unit price bid per linear foot for this item shall include the cost of furnishing all labor, materials, tools, equipment, and incidentals necessary to satisfactorily complete the required work. This includes, but is not limited to, all excavation and backfill; geotextile fabric; gravel or stone (in accordance with Item 19 specifications); temporary sheeting; reinforcement and concrete block necessary and metal shoe reinforcement with all required fastenings.

Metal frames, rings, grates, covers, and step irons furnished and installed as part of the work will be paid for separately under Item 34, "Miscellaneous Metals."

ITEM 102X –WORK ZONE TRAFFIC CONTROL (Day)

All requirements for Item 102 shall apply, with the following modifications:

A. Description

Work Zone Traffic Control (Day) shall be applicable on a per work order basis for construction operations performed during day time and/or for work zone traffic control devices that remain in place during non-work hours. No work shall commence until all appropriate traffic devices have been placed and functioning.

If in the judgment of the Engineer, traffic is not properly and adequately maintained, no payment will be made to the contractor for those days/nights. The price bid shall include the cost of furnishing all labor, materials, tools, and equipment necessary to satisfactorily complete the required work.

B. Method of Measurement and Payment

Measurement and payment under this item shall be made on a per day (24 hour) Basis.

ITEM 102Y -WORK ZONE TRAFFIC CONTROL (Night)

All requirements for Item 102X shall apply, with the following modifications:

A. Description

This item shall be applicable for construction operations performed at night. During night time construction operations, the contractor shall supply portable lights (light towers) and equipment in order to satisfactorily light up the work area per latest edition of Manual on Uniform Traffic Control Devices (MUTCD) standards and/or A.O.B.E.

B. Method of Measurement and Payment

Measurement and payment under this item shall be made on a per night basis when construction operations are performed at night. There shall be no additional payment for furnishing and placing portable lights and/or nighttime labor wage differential and the additional cost shall be deemed included in the bid price for this item.

ITEM 104PA-4X – POLYOLEFIN COATED CHAIN LINK FENCING 4’ HIGH (TOP & BOTTOM TENSION WIRE)
ITEM 104PA-6X – POLYOLEFIN COATED CHAIN LINK FENCING 6’ HIGH (TOP & BOTTOM TENSION WIRE)
ITEM 104PA-8X – POLYOLEFIN COATED CHAIN LINK FENCING 8’ HIGH (TOP & BOTTOM TENSION WIRE)
ITEM 104PA-10X – POLYOLEFIN COATED CHAIN LINK FENCING 10’ HIGH (TOP & BOTTOM TENSION WIRE)
ITEM 104PA-12X – POLYOLEFIN COATED CHAIN LINK FENCING 12’ HIGH (TOP & BOTTOM TENSION WIRE)
ITEM 104PB-4X – POLYOLEFIN COATED CHAIN LINK FENCING 4’ HIGH (TOP RAIL & BOTTOM TENSION WIRE)
ITEM 104PB-6X – POLYOLEFIN COATED CHAIN LINK FENCING 6’ HIGH (TOP RAIL & BOTTOM TENSION WIRE)
ITEM 104PB-8X – POLYOLEFIN COATED CHAIN LINK FENCING 8’ HIGH (TOP RAIL & BOTTOM TENSION WIRE)
ITEM 104PB-10X – POLYOLEFIN COATED CHAIN LINK FENCING 10’ HIGH (TOP RAIL & BOTTOM TENSION WIRE)
ITEM 104PB-12X – POLYOLEFIN COATED CHAIN LINK FENCING 12’ HIGH (TOP RAIL & BOTTOM TENSION WIRE)
ITEM 104PC-4X – POLYOLEFIN COATED CHAIN LINK FENCING 4’ HIGH (TOP & BOTTOM RAILS)
ITEM 104PC-4-1X – POLYOLEFIN COATED CHAIN LINK FENCING 4’ HIGH 1” MESH (TOP & BOTTOM RAILS)
ITEM 104PC-6X – POLYOLEFIN COATED CHAIN LINK FENCING 6’ HIGH (TOP & BOTTOM RAILS)
ITEM 104PC-8X – POLYOLEFIN COATED CHAIN LINK FENCING 8’ HIGH (TOP & BOTTOM RAILS)
ITEM 104PC-10X – POLYOLEFIN COATED CHAIN LINK FENCING 10’ HIGH (TOP & BOTTOM RAILS)
ITEM 104PC-12X – POLYOLEFIN COATED CHAIN LINK FENCING 12’ HIGH (TOP & BOTTOM RAILS)
ITEM 104PD-6X – POLYOLEFIN COATED CHAIN LINK FENCING 6’ HIGH W/CONC CURB

A. Description.

1. All requirements of items 104PA-4 through 104PD-6 shall apply from 2009 Nassau County Standard Specifications except for tie wires spacing. The fabric shall be secured to all corner, gate and terminal posts with stretchers or tension bars fastened to posts and galvanized steel bands at 12 inch intervals with all terminal adjustments completely housed. The fabric shall be fastened to the line posts and braces with tie wires spaced not more than 12 inches on center. It shall be attached to the tension wire by means of 9 gauge polyolefin coated rings spaced at intervals of 2 feet and it shall be attached to the top, mid and bottom rails by means of the tie wires spaced at intervals of 12 inches.

ITEM 104R-4-1 - RENOVATE 4' CHAIN LINK FENCE - 1" MESH

All provisions of Item 104R-4 shall apply except the fabric for fence Item 104R-4-1 shall be one (1") inch mesh.

ITEM 104VCE- BB - VINYL CLAD BACKSTOP - BASEBALL

ITEM 104VCE- SB - VINYL CLAD BACKSTOP - SOFTBALL/LITTLE LEAGUE

A. Description.

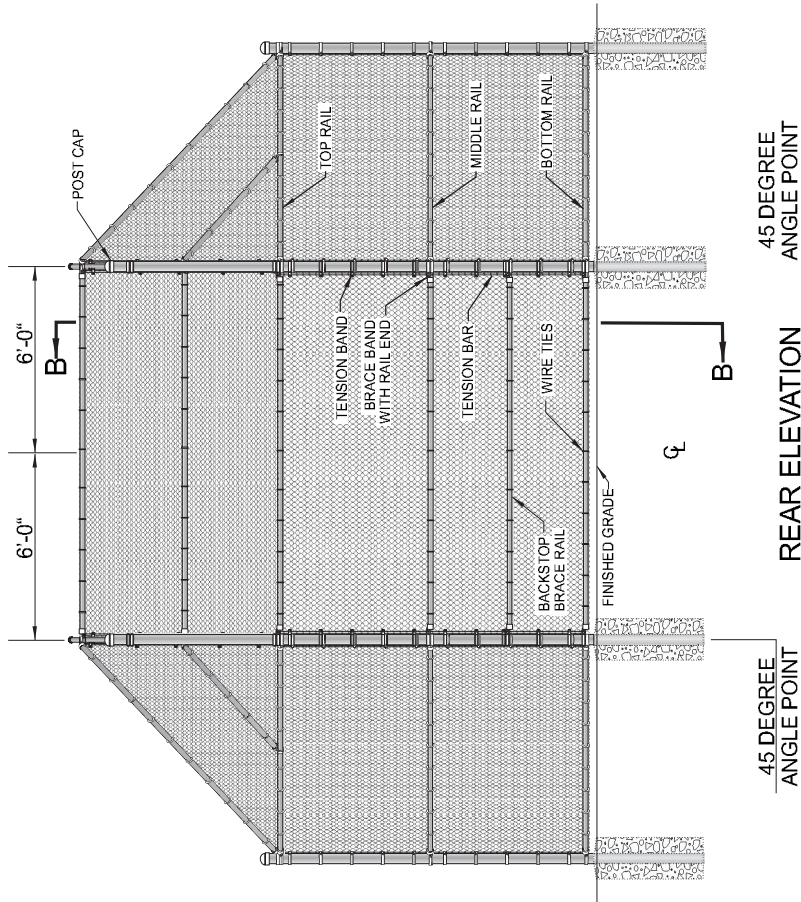
1. Under these Items the Contractor shall furnish and install Softball/Little League and/or Baseball Backstops in accordance with the Plans, Standard Detailed Sheets, fence manufacturer's specifications, and as directed by the Engineer. The work shall also include excavation, footings and installation of the backstops.

B. Materials.

1. The backstops shall be per the Plans or an approved equal. All posts, rails, fabric, braces, tension bands and ties shall be black vinyl clad.
2. The fabric on the side and rear panels of the backstop shall be vinyl clad, 6 gauge core wire - 2" mesh. The fabric on the top panel shall be vinyl clad, 9 gauge core wire - 2" mesh. All fabric specifications except for cores shall conform to Item 104P - vinyl clad Chain Link Fencing, but shall be paid for under these Items.
3. The 3" and 4" O.D. vertical posts shall be set plumb in 16" diameter x 48" deep concrete footings. The concrete shall be cast rough in the ground around the posts. All concrete footings shall conform to the requirements of Item 17A - Class A Concrete, but paid as part of the cost for this Item. When required, the 16" wide concrete mowing strip shall conform to the requirements of and be paid for under Item 27MS - Concrete Mowing Strip. The fence fabric and bolts are to be installed smooth side towards the playing area.

C. Measurement and Payment.

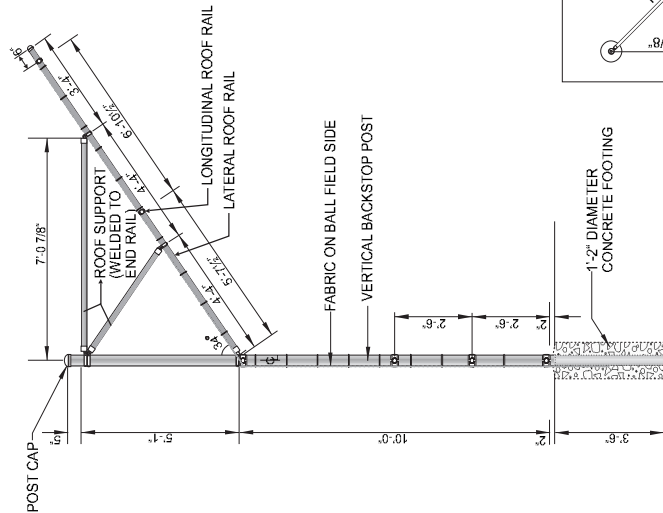
1. The quantity to be paid for under this Item shall be the number of square feet of backstops furnished and installed and shall include all materials, equipment and labor required to complete the baseball backstop including but not limited to backstop fencing, excavation and backfill. When required, the cost of the concrete mowing strip will be included under Item 27MS.



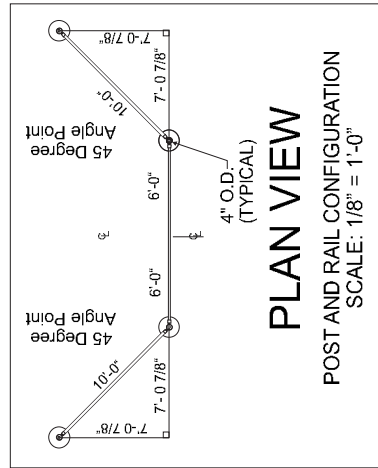
NOTE: ROOF TO ACCEPT 12" WIDE FABRIC ABOVE THE LONGITUDINAL AND LATERAL BRACING. THE DRAWING DEPICTS THE FABRIC BELOW THE BRACING TO SIMPLIFY VIEWING.

10'-0" x 12'-0" x 10'-0" HIGH - GALVANIZED OR VINYL SYSTEM

CHAIN LINK FABRIC:	SHALL BE 2" MESH, 9 GAUGE CORE (6 GAUGE FINISH) EXTRUDED & BONDED VINYL COATED CHAIN LINK FABRIC IN ACCORDANCE WITH ASTM F688, CLASS 2a OR 2" MESH, 9 GAUGE 1.2 OZ GALVANIZED, CLASS 1 CHAIN LINK FABRIC IN ACCORDANCE WITH ASTM A 392 WITH KNUCKLED TOP AND BOTTOM SELVAGES
REAR BACKSTOP POST:	4" O.D., 9.11 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE SET IN 14" DIAMETER x 42" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 12'-0" O.C.
WING BACKSTOP POST:	4" O.D., 9.11 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE SET IN 14" DIAMETER x 42" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 10'-0" O.C.
TOP/MID/BOTTOM RAILS:	1 5/8" O.D., 2.27 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE
BACKSTOP BRACE RAILS:	2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE
LONGITUDINAL ROOF RAILS:	2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE
LATERAL ROOF RAILS:	9 GAUGE VINYL COATED ALUMINUM WIRE TIES IN ACCORDANCE WITH ASTM F 626 AT 12" O.C.
TIE WIRES:	VINYL COATED PRESSED STEEL OR CAST IRON AND HOT DIPPED GALVANIZED WITH 1.2 OZ. OF ZINC PER SF IN ACCORDANCE WITH ASTM F626
FITTINGS AND ACCESSORIES:	

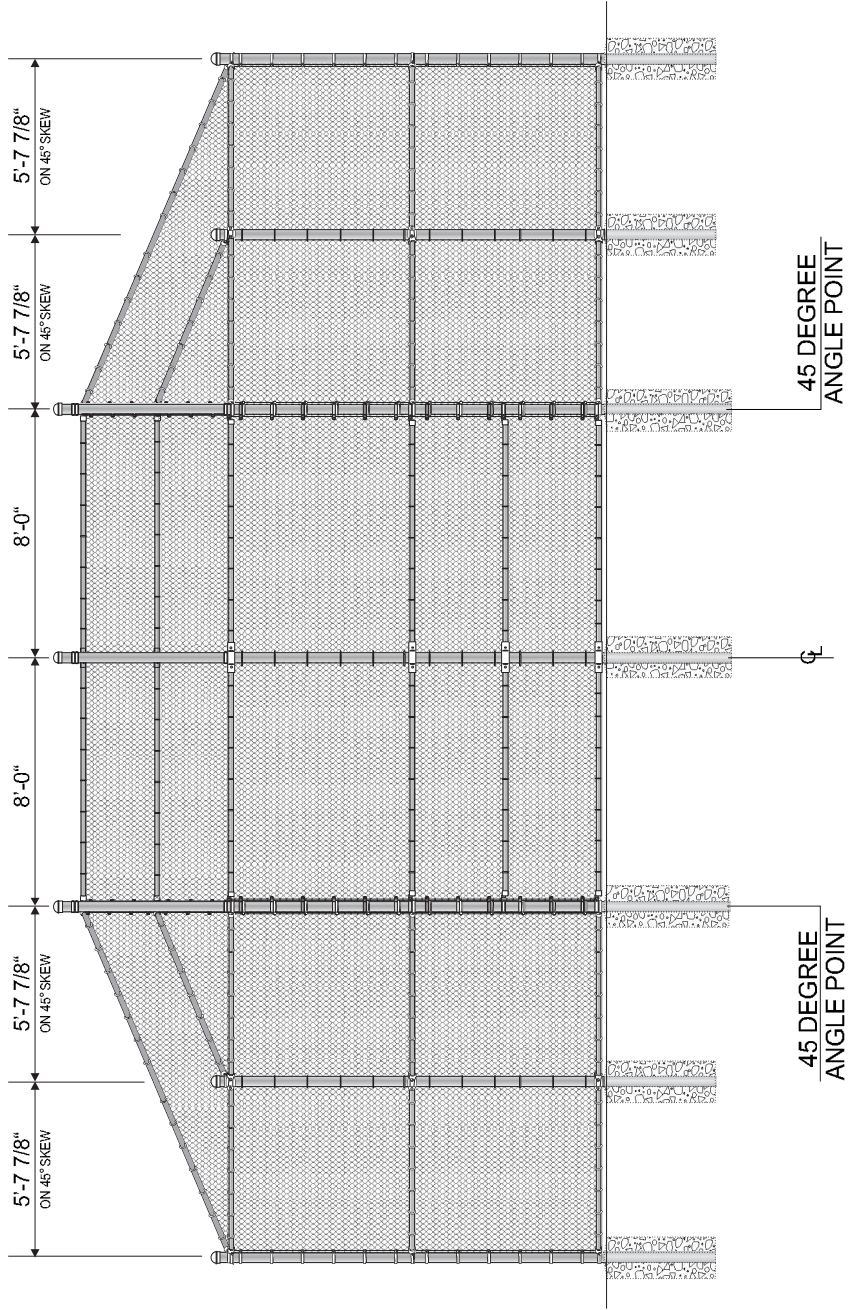


SECTION B - B



SCALE: 1/4" = 1'-0"

NASSAU COUNTY



45 DEGREE
ANGLE POINT

45 DEGREE
ANGLE POINT

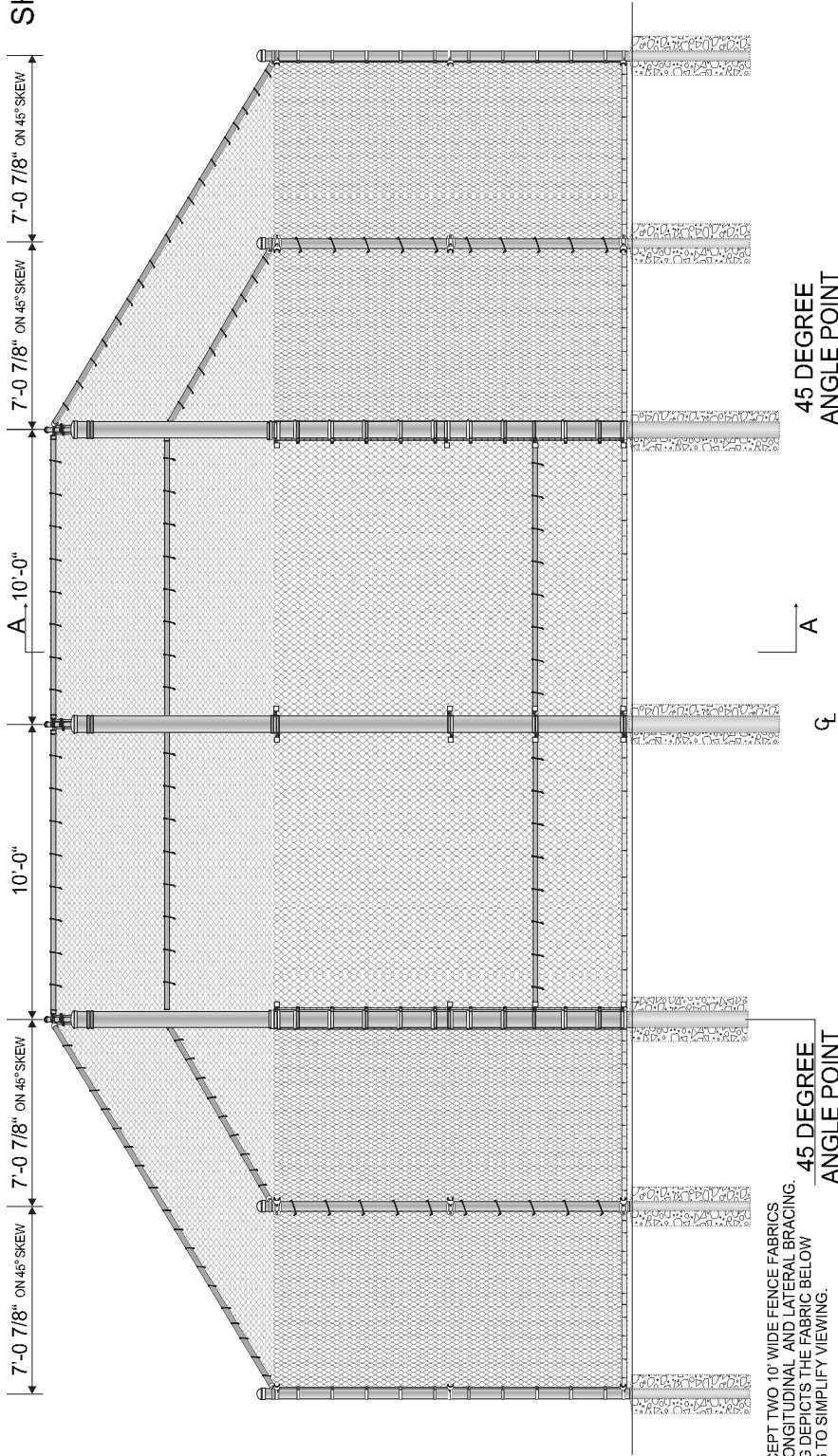
16'-0" x 16'-0" x 16'-0" x 12'-0" HIGH - GALVANIZED OR VINYL SYSTEM

CHAIN LINK FABRIC:	SHALL BE 2" MESH, 9 GAUGE CORE (6 GAUGE FINISH) EXTRUDED & BONDED VINYL COATED CHAIN LINK FABRIC IN ACCORDANCE WITH ASTM F668, CLASS 2a OR 2" MESH, 9 GAUGE 1.2 OZ GALVANIZED, CLASS 1 CHAIN LINK FABRIC IN ACCORDANCE WITH ASTM A 392 WITH KNUCKLED TOP AND BOTTOM SELVAGES
REAR BACKSTOP POST:	4" O.D., 9.11 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE SET IN 14" DIAMETER x 48" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 8'-0" O.C.
WING BACKSTOP POST:	4" O.D., 9.11 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE SET IN 14" DIAMETER x 48" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 8'-0" O.C.
TOP/MID/BOTTOM RAILS:	1 5/8" O.D., 2.27 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE
BACKSTOP BRACE RAILS:	2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE
LONGITUDINAL ROOF RAILS:	2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE
LATERAL ROOF RAILS:	9 GAUGE VINYL COATED ALUMINUM WIRE TIES IN ACCORDANCE WITH ASTM F 626 AT 12" O.C.
TIE WIRES:	VINYL COATED PRESSED STEEL OR CAST IRON AND HOT DIPPED GALVANIZED WITH 1.2 OZ. OF ZINC PER SF IN ACCORDANCE WITH ASTM F626
FITTINGS AND ACCESSORIES:	

NOTE ROOF TO ACCEPT 12" WIDE FABRIC ABOVE THE LONGITUDINAL AND LATERAL BRACING. THE DRAWING DEPICTS THE FABRIC BELOW THE BRACING TO SIMPLIFY VIEWING.

SCALE: 1/4" = 1'-0"

NASSAU COUNTY



NOTE: ROOF TO ACCEPT TWO 10' WIDE FENCE FABRICS ABOVE THE LONGITUDINAL AND LATERAL BRACING. THE DRAWING DEPICTS THE FABRIC BELOW THE BRACING TO SIMPLIFY VIEWING.

45 DEGREE
ANGLE POINT

45 DEGREE
ANGLE POINT

20'-0" x 20'-0" x 20'-0" x 12'-0" HIGH - GALVANIZED OR VINYL SYSTEM

CHAIN LINK FABRIC:

SHALL BE 2" MESH, 9 GAUGE CORE (6 GAUGE FINISH) EXTRUDED & BONDED VINYL COATED CHAIN LINK FABRIC IN ACCORDANCE WITH ASTM F688, CLASS 2a OR 2" MESH, 9 GAUGE 1.2 OZ GALVANIZED, CLASS 1 CHAIN LINK FABRIC IN ACCORDANCE WITH ASTM A 392 WITH KNUCKLED TOP AND BOTTOM SELVAGES

REAR BACKSTOP POST:

6 5/8" O.D., 18.97 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE SET IN 16" DIAMETER x 60" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 10'-0" O.C.

WING BACKSTOP POST:

4" O.D., 9.11 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE SET IN 16" DIAMETER x 48" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 10'-0" O.C.

TOP/MID/BOTTOM RAILS:

1 5/8" O.D., 2.27 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE

BACKSTOP BRACE RAILS:

2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE

LONGITUDINAL ROOF RAILS:

2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE

LATERAL ROOF RAILS:

2" O.D., 2.72 LBS PER LF - VINYL COATED SCHEDULE 40 STEEL PIPE

TIE WIRES:

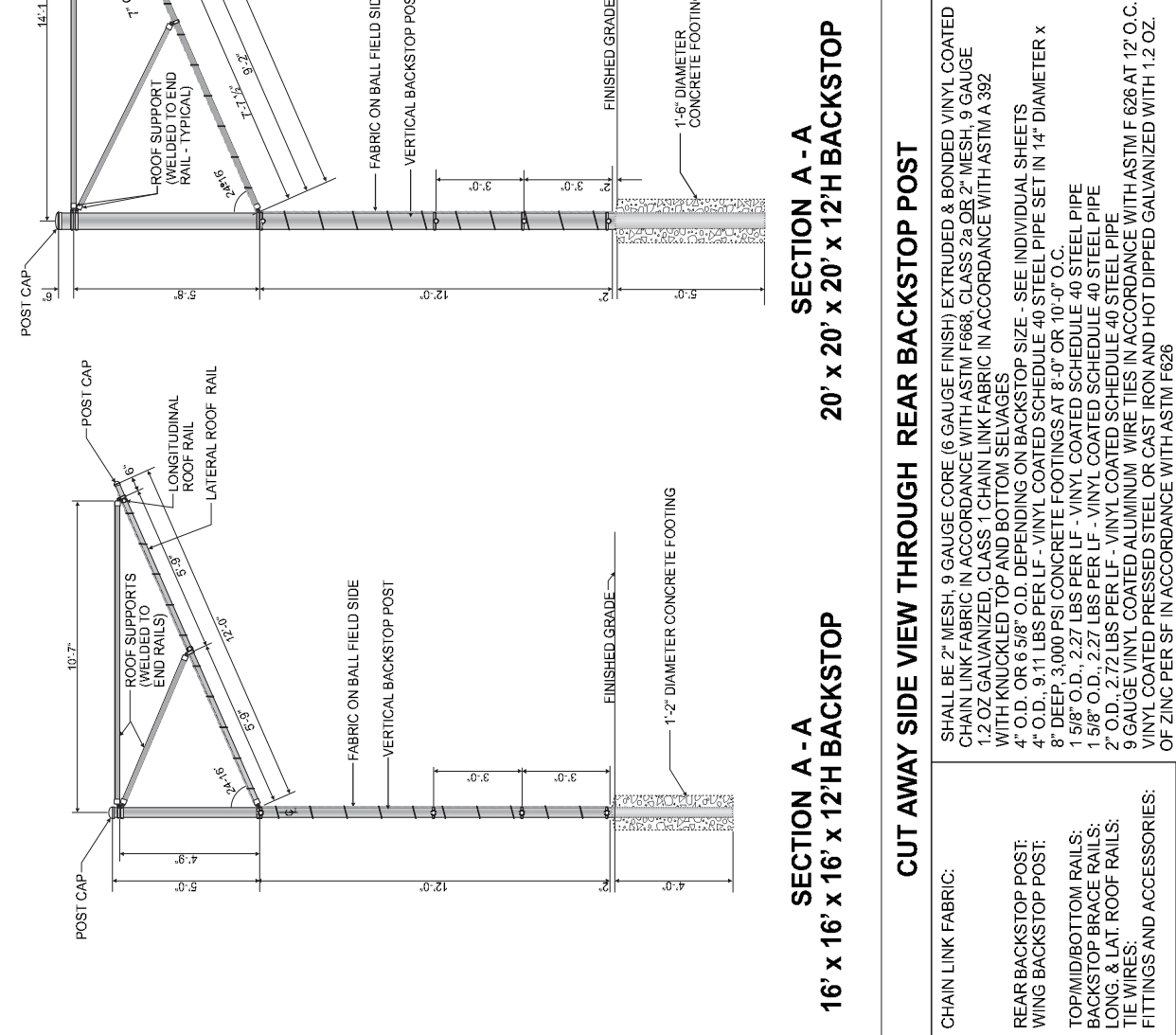
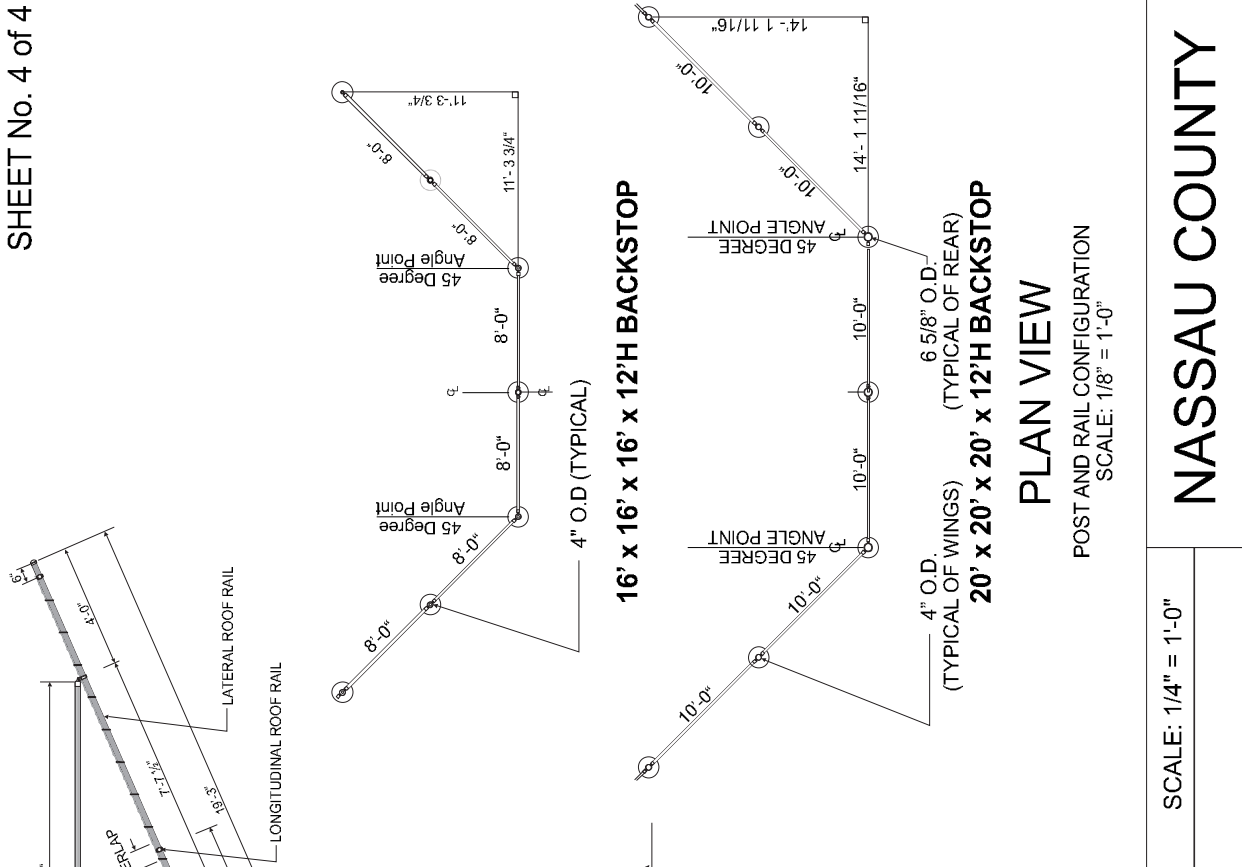
9 GAUGE VINYL COATED ALUMINUM WIRE TIES IN ACCORDANCE WITH ASTM F 626 AT 12" O.C.

FITTINGS AND ACCESSORIES:

VINYL COATED PRESSED STEEL OR CAST IRON AND HOT DIPPED GALVANIZED WITH 1.2 OZ. OF ZINC PER SF IN ACCORDANCE WITH ASTM F626

SCALE: 1/4" = 1'-0"

NASSAU COUNTY



ITEM 104XSB - REMOVE EXISTING BACKSTOP

A. Description.

1. Under this item the Contractor shall remove and dispose of the existing backstops including the removal and disposal of chain link fabric, fence, posts, rails, braces, hood, concrete footings, mowing strips, curbs and other appurtenances of the backstop.

B. Measurement and Payment.

1. The quantity of removed existing backstop to be paid for under this Item shall be the number of square feet of backstops and hoods which have been removed and disposed of satisfactorily in accordance with the Plans, Specifications and directions of the Engineer.
2. The price bid shall include all labor, materials, equipment and performance of all operations and work necessary to complete the removal of the existing backstop.

ITEM 104XR – MIDDLE RAIL, BRACE RAIL TOP RAIL AND BOTTOM RAIL

All requirements of applicable Chain Link Fence Items (104 Series) shall apply, with the following modifications:

A. Description.

1. Under these Items the Contractor shall furnish and install an additional middle rail, brace rail top rail and/or bottom rail where shown on the Plans or directed by the Engineer, in accordance with the Standard Detail Sheets and the requirements stated herein.
2. Middle rail, brace rail top rail and bottom rail shall terminate at each line post using a boulevard clamp and each corner, gate and terminal post using a brace band and rail end connector or end rail clamp.

B. Measurement and Payment

1. The quantity to be paid for under this Item shall be the total number of linear feet of middle rail, brace rail top rail and/or bottom rail measured in final position furnished and installed in accordance with these Specifications.
2. The unit price bid per linear foot for this Item shall include the cost of all labor, tools, materials, equipment and other incidentals.

ITEM 104XSF - REMOVE EXISTING FENCE

A. Description.

1. Under this Item the Contractor shall remove and dispose of the existing fence including the removal and disposal of chain link fence fabric, stockade fence, posts, top-rails, braces, gates, concrete footings, mowing strips, and other appurtenances of the fence.

B. Measurement and Payment.

1. The quantity of removed existing fence to be paid for under this Item shall be the number of square feet of fence which have been removed and disposed of satisfactorily in accordance with the Plans, Specifications and directions of the Engineer.
2. For payment purposes, gates shall be added to the square footage of removed fence.
3. The price bid shall include all labor, materials, equipment and performance of all operations and work necessary to complete the removal of the existing fence and gate.

ITEM 105SFS-4 - 4' STOCKADE FENCE

ITEM 105SFS-6 - 6' STOCKADE FENCE

ITEM 105SFS-8 - 8' STOCKADE FENCE

A. Description.

1. Under this Item, the Contractor shall install a stockade fence as shown on the Plans and or as directed by the Engineer.

B. Materials.

1. All fence materials described herein shall be as manufactured by Master Halco, Inc. 4000 W. Metropolitan Drive, Suite 400 Orange, CA 92868, Phone (800) 229-5615 Fax (714) 385-0107, or approved equal.
2. The wood shall be new cedar, 1" x 3" fence pickets, new cedar 2" x 3" fence rails and new spruce 1" x 4" post covers.
3. The 8' x 3-1/2" x 1-3/4" 11 gauge [0.120" thick galvanized steel posts as shown on the Plans shall be roll formed steel shapes complying with ASTM A 653 having a 50,000 psi yield strength and G90 zinc coating of 0.90 oz/ft² and weigh 2.64 plf with punch thru holes: 13/64" Dia. 1" OC. at both flanges. Galvanizing shall take place individually after drilling to ensure maximum corrosion protection. Posts are to be given a 4 stage "Power Wash" pre-treatment process that cleans and prepares the galvanized surface to assure complete adhesion of the finish coat. All metal are then to be given a polyester resin based power coating applied by the electrostatic spray process, to a thickness 2.5 mils and then baked in a 4500 F metal temperature oven for 20 minutes. Steel Post shall be warranted that they are free from defects in material and workmanship for a period of 15 years from the date of near completion.
4. The 10"/12" diameter 36" deep concrete footings shall be cast rough in the ground around the posts. All concrete footings shall conform to the requirements for Item 17A - Class A Concrete, but the cost will be included under this Item.
5. The 6'/8' stockade fence shall meet a minimum 70 MPH wind load when constructed with posts every 8', with 10"/12" diameter concrete footings set 36" deep in the ground, in reference to 1994 Uniform Building Code for Exposure "B". Any later building code that has been issued since 1994 shall govern.

C. Construction Details.

1. The stockade fence shall be constructed where indicated on the Plans, as shown on the appropriate Standard Detail Sheet. All excavation and backfill shall conform to the requirements of PART III, SECTION D.
2. A hole shall be drilled in firm, undisturbed or compacted soil. Excavation shall be deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. The post bottom shall be set 24" below surface when in firm, undisturbed soil, and concrete placed around the post in a continuous pour.

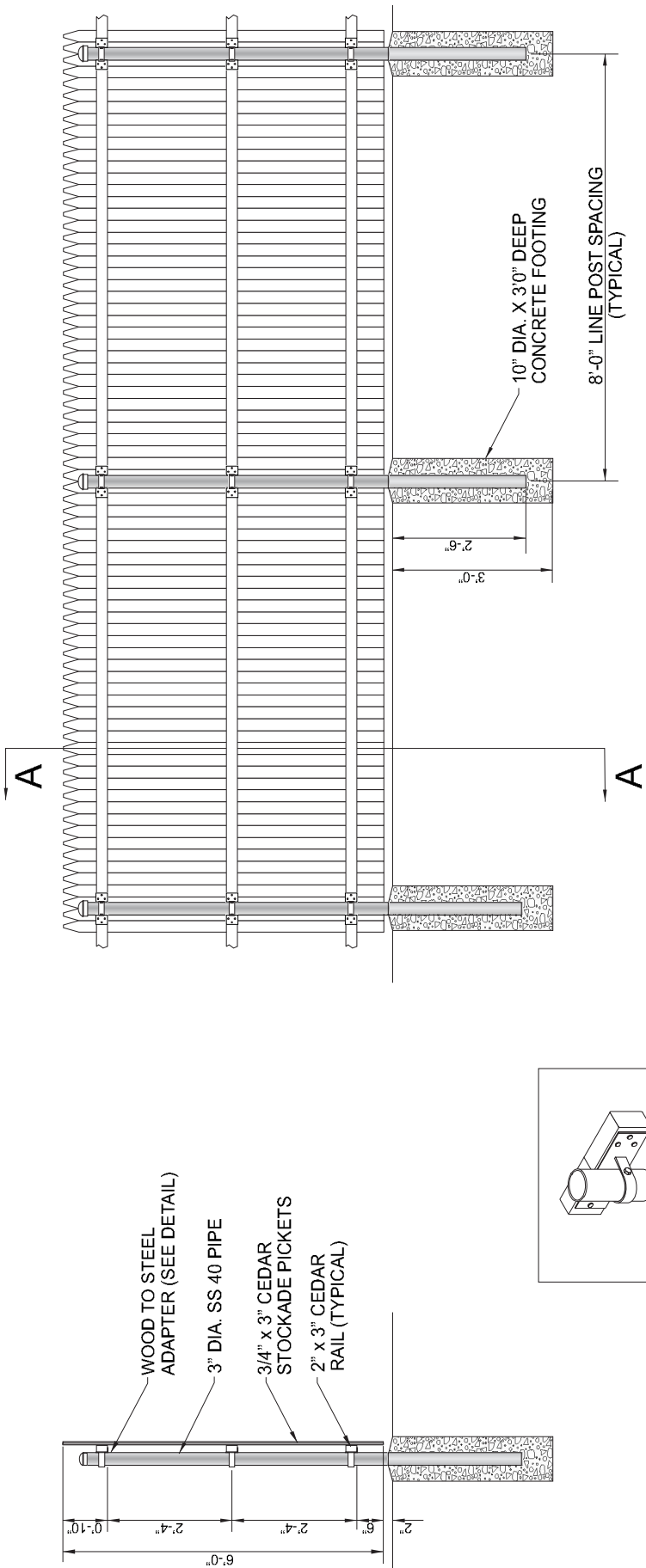
3. Trowel finishing shall be performed around posts and the concrete surfaces shall be sloped to direct water away from posts.
4. Each post shall be checked for vertical and top alignment, and maintained in position during the placement and finishing operation.
5. Concealment board shall be placed as shown on the appropriate Standard Detail Sheet over installed posts.

D. Method of Measurement.

1. The quantity to be paid for under this Item shall be the number of linear feet of 6'x8' stockade fence measured in place and accepted in accordance with the Plans and Specifications.

E. Basis of Payment.

1. The bid price per linear foot shall include the cost of all labor, materials, equipment and other incidentals required to complete the work as specified or indicated, including but not limited to stockade fencing, galvanized steel posts, concrete footing, all hardware, post caps, excavation and backfilling.
2. It is not anticipated but possible that loose soils could be encountered when placing footings at some locations which will require footings deeper than 30". There will be no additional payment for this additional work and/or concrete furnishing.

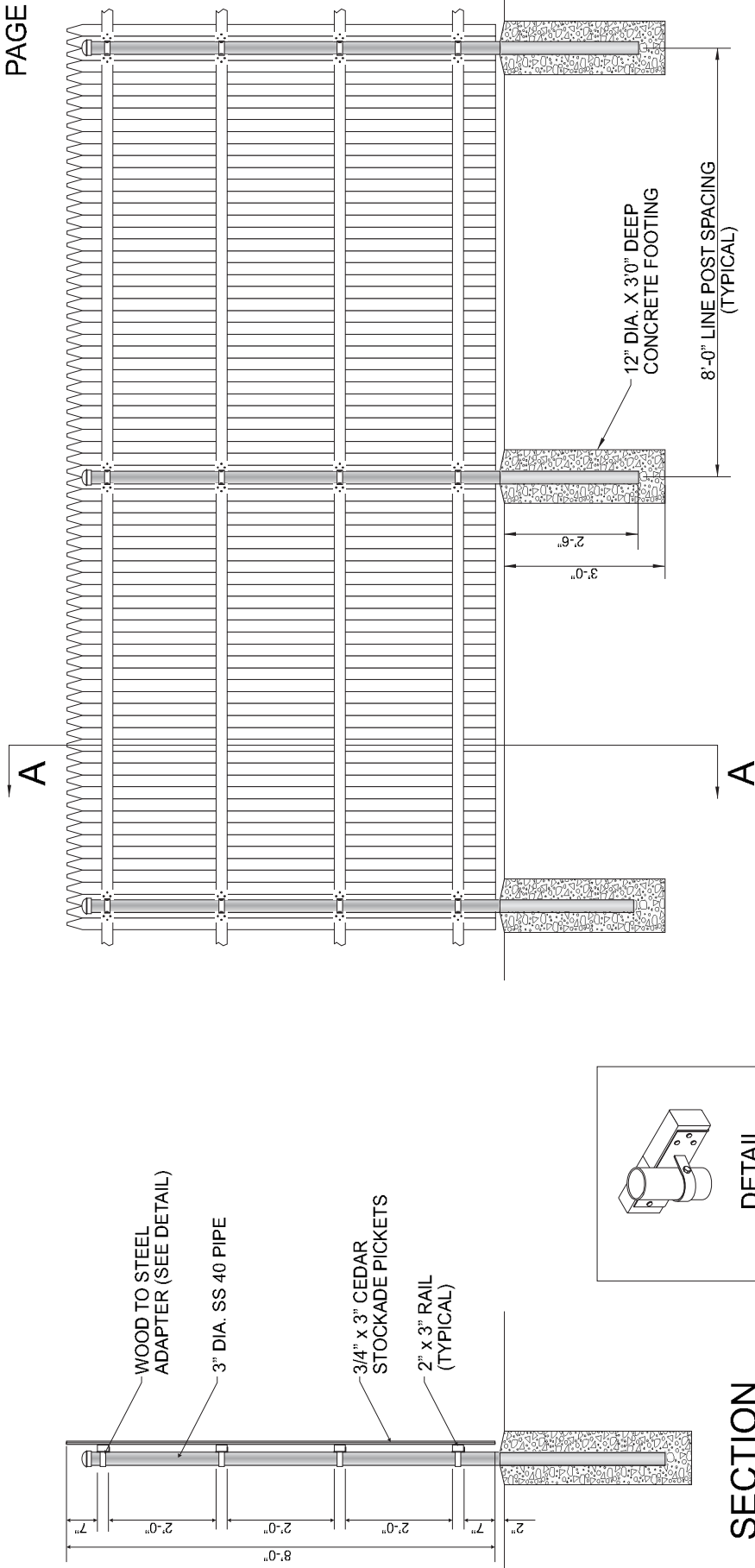


6'-0" HIGH CEDAR STOCKADE FENCE

PANEL MATERIAL: LINE POSTS:	3/4" x 3" No. 1 STK GRADE CEDAR BOARDS 2 7/8" O.D. - 4.64 LBS PER LF - SS 40 STEEL PIPE AS MANUFACTURED BY ALLIED TUBE & CONDUIT SET IN 10" DIAMETER x 36" DEEP 3,000 PSI CONCRETE FOOTINGS AT 8'-0" O.C. AND VARIABLE
TOP/MIDDLE/BOTTOM RAILS: WOOD TO STEEL ADAPTERS: FITTINGS AND ACCESSORIES:	2" x 3" No. 1 STK GRADE CEDAR FASTENED USING 9 - #8 x 1 1/2" EPOXY COATED SCREWS PRESSED STEEL AND HOT DIPPED GALVANIZED WITH 1.2 OZ. OF ZINC PER SF IN ACCORDANCE WITH ASTM F626

SCALE: 1/2" = 1'-0"
DATE: 10/27/09

NASSAU COUNTY



SECTION
A - A

8'-0" HIGH CEDAR STOCKADE FENCE

PANEL MATERIAL: LINE POSTS:	3/4" x 3" No. 1 STK GRADE CEDAR BOARDS 2 7/8" O.D., 4.64 LBS PER LF - SS 40 STEEL PIPE AS MANUFACTURED BY ALLIED TUBE & CONDUIT SET IN 12" DIAMETER x 36" DEEP 3,000 PSI CONCRETE FOOTINGS AT 8'-0" O.C. AND VARIABLE
TOP/MIDDLE/BOTTOM RAILS: WOOD TO STEEL ADAPTERS: FITTINGS AND ACCESSORIES:	2" x 3" No. 1 STK GRADE CEDAR FASTENED USING 12 - #8 x 1 1/2" EPOXY COATED SCREWS PRESSED STEEL AND HOT DIPPED GALVANIZED WITH 1.2 OZ. OF ZINC PER SF IN ACCORDANCE WITH ASTM F626

SCALE: 1/2" = 1'-0"
DATE: 10/27/09

NASSAU COUNTY

ITEM 106P - POST PAINTING

A. Description.

1. Under this Item the Contractor shall paint existing fence post type structures of various diameters, and/or sizes including but not limited to fence posts, basketball backstop posts, bollard posts, etc. The posts to be painted shall be where determined by the Engineer.

B. Materials and Methods.

- C. The specified paints shall be as manufactured by The Sherwin-Williams Co., 6216 34th Ave., Woodside, NY 11377, (718) 426-8813, or approved equal.

D. Painting of Posts shall be painted as follows:

1. Prior to painting, the surface shall be prepared by removing grease, oil, loose paint, rust, dirt and other foreign substances to assure sound bonding of the new paint.
2. Recommended manufacturers drying times before recoating shall be strictly adhered to. Paint adhesion shall be 100% retention in accordance with ASTM D3359, classification SB and shall perform in accordance with ASTM G-53.
3. After the framework has been cleaned and prepared, it shall be painted with a Water Base Urethane System Gloss Finish by Sherwin Williams Company or approved equal with standard colors selected by the Engineer as follows:
 - a. First Coat: Sherwin Williams Pro-Cryl Universal Acrylic Primer B66-310 Series 2.0 - 4.0 mils dry per coat.
 - b. Second and Third Coat: Sherwin Williams Centurion WB Urethane, B65-700 series 2-3 mils dry per coat.
 - c. All paints shall be applied when ambient air temperature is 50°F and rising and surfaces to be painted are moisture free. No painting will be allowed below the minimum ambient air temperature.
 - d. In addition, no painting will be allowed below the temperature at which moisture will condense on surfaces.
 - e. All coats shall be applied evenly. The cost of painting shall be included in the price bid for the contract item for fencing.

E. Method of Measurement.

1. The quantity to be paid for under this Item shall be the adjusted linear feet of posts painted based on the surface area of a 4" O.D. post painted all in accordance with the Plans, the Specifications and orders of the Engineer.

2. The following table provides the relevant multipliers:

SIZE	O.D.	MULTIPLIE
2"	1.90"	0.226
2 1/2"	2.375"	0.353
3"	2.875"	0.517
3 1/2"	3.5"	0.766
4"	4.0"	1.000
6 5/8"	6.625"	2.743
8 5/8"	8.625"	4.649

3. For example, the linear feet to be paid for a 10' long x 8 5/8" O.D. post would be calculated as the Actual Length of the Painted Post (LF) x Multiplier:

$$\text{Payment LF} = 10 \times 4.649 = 46.5 \text{ LF}$$

4. The Payment Multiplier for a flat post would be calculated using its surface area (SF) divided by the surface area of a 4" O.D. post, which is 1.745 SF and multiplied by its length.

F. Basis of Payment.

1. The unit price per each post to be painted shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work.

ITEM 106SVBG - SELF-SWING VEHICLE BARRIER GATES

A. Description.

1. Under this Item the Contractor shall furnish and install double self-swing barrier gates and all necessary accessories as specified herein in accordance with the details shown on the Plans and the requirements of Item 106VBG.
2. Double self-swing barrier gates shall be located as determined by the Engineer.

B. Materials and Workmanship.

1. Gate Posts. Gate posts shall be 4" O.D. Class B, Steel Tubing sleeved over 3 1/2" O.D. Class B Steel Tubing. Class A, Schedule 40 Pipe cannot be sleeved.
2. Two 1" long x 4" O.D. Class B, Steel Tubing collars shall be welded to the 3 1/2" O.D. Class B Steel Tubing sleeve to:
 - a. Establish adequate ground clearance at the bottom of the frame and
 - b. Lock the 4" O.D. Class B, Steel Tubing pivot pipe onto the 3 1/2" O.D. Class B Steel Tubing sleeve, so that it cannot be easily removed.
3. Gate Frames. Gate frames and braces shall be 2" Class B, Steel Tubing. All comers shall be securely welded. The frames shall be properly braced to prevent sagging.
4. Post caps shall be provided for the Gate Post and the exterior vertical gate frames.
5. A chain shall be welded on each gate frame to provide a means of securing the gate. Gate stops (hold backs) shall be provided.

C. Footings. All gate posts shall be set plumb in concrete piers of the depths and sizes shown. The concrete shall be Item 17A, Class A concrete 1-2-4 mix, but payment shall be under this item. Footings shall be cast rough in the ground and pitched above grade to shed water. The costs associated with excavation and backfilling for the footings will be paid for under this Item.

D. Shop Drawings and Testing.

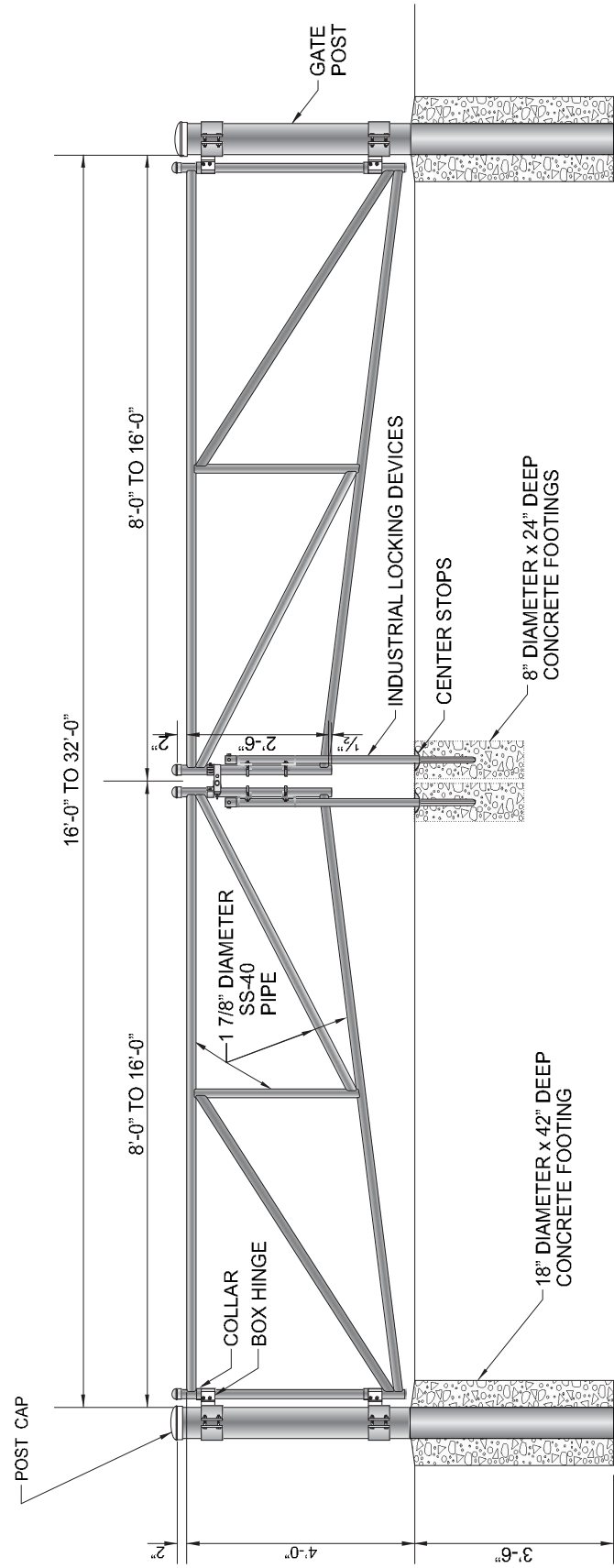
1. Prior to ordering any gates, the Contractor shall submit to the Engineer for approval shop drawings (three more than to be returned) of the proposed gate installation showing complete details of material sizes, shapes and heights, proposed methods of fastening and complete details of all hardware to be used.
2. The Contractor shall submit for testing any material or components deemed necessary by the Engineer. Any material ordered by the Contractor prior to obtaining approval and which shall later be found unsatisfactory on the basis of test results shall be replaced by him with satisfactory materials at no additional cost to the County.

E. Method of Measurement.

1. The quantity to be paid for under this item shall be the linear feet of double barrier gates measured from the center line of the two 4" fence posts supporting the gates, furnished and installed in final position complete and in a manner that will insure ease of operation of the gate, all in accordance with the Plans, the specifications and orders of the Engineer.

F. Basis of Payment.

1. The unit price bid per each double barrier gate shall include the cost of furnishing all labor, materials, concrete, tools, equipment, Shop Drawings and incidentals necessary to satisfactorily complete the required.



16'-0" TO 32'-0" x 4'-0" HIGH DOUBLE SWING BARRIER GATE

GATE POSTS FOR 16' TO 24':	6 5/8" O.D., 18.97 LBS PER LF - HOT DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE SET IN 18" DIAMETER x 42" DEEP, 3,000 PSI CONCRETE FOOTINGS
GATE POSTS FOR 25' TO 32':	8 5/8" O.D., 28.55 LBS PER LF - HOT DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE SET IN 24" DIAMETER x 42" DEEP, 3,000 PSI CONCRETE FOOTINGS
GATE FRAME & BRACES:	1 7/8" O.D., 2.28 LBS PER LF SS 40 GALVANIZED STEEL PIPE AS MANUFACTURED BY ALLIED TUBE AND CONDUIT
COLLAR:	2 3/8" O.D., 3.12 LBS PER LF SS 40 GALVANIZED STEEL PIPE AS MANUFACTURED BY ALLIED TUBE AND CONDUIT WELDED TO VERTICAL GATE FRAME AS A HINGE STOP
GATE POST CAP:	PRESSED STEEL HOT DIPPED GALVANIZED WITH 1.2 OZ. OF ZINC PER SF IN ACCORDANCE WITH ASTM F626

- NOTES:** 1) AN APPROVED LOCKING DEVICE SHALL BE PROVIDED FOR EACH GATE LEAF; AND
2) TWO ADDITIONAL FOOTINGS SHALL BE PROVIDED TO HOLD THE GATES IN THE OPEN POSITION.

SCALE: 1/2" = 1'-0"
DATE: 10/27/09

NASSAU COUNTY

**ITEM 106VC-CG - VINYL CLAD ALUMINUM FRAME CANTILEVER SLIDE GATES
WITH VINYL CLAD CHAIN LINK FABRIC (6'-0" TO 8'-0" HIGH
AND 16'-0" to 24'-0" WIDE)**

A. Description.

1. Under this Item the Contractor shall furnish and install fully 6'-0" to 8'-0" High and 16'-0" to 24'-0" Wide Vinyl Clad Aluminum Frame Cantilever Slide Gates with Vinyl Clad Chain Link Fabric gates complete with all necessary accessories as specified herein and the labor and supervision for installing the gates in conjunction with the vinyl clad chain link fence all in accordance with the Plans, approved Detail Sheet.
2. The gates shall be located generally where shown on the Plans with the exact location to be determined by the Engineer.

B. Materials and Construction Details.

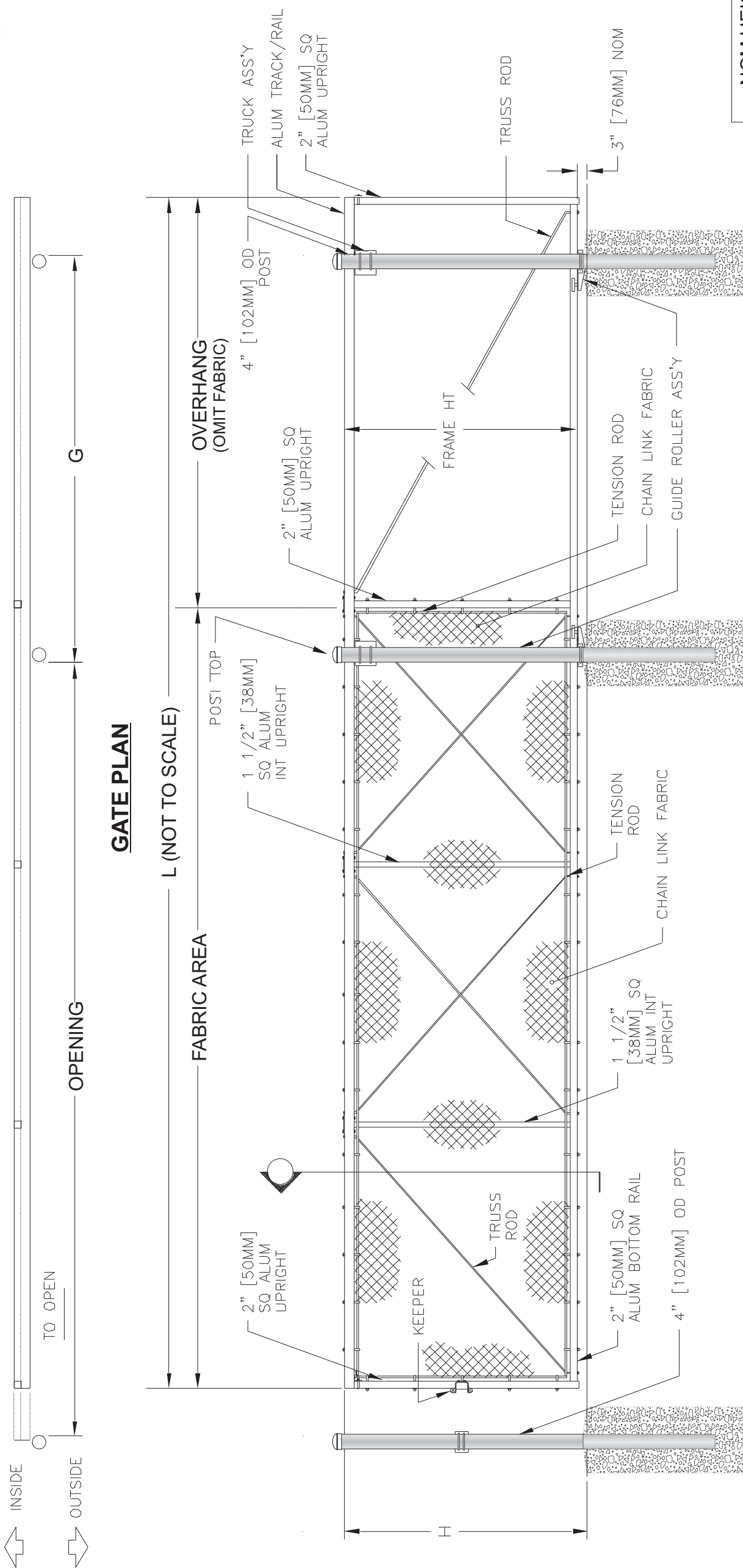
1. **Manufacturer.** All fence materials described herein shall be as manufactured by Master Halco, Inc. 4000 W. Metropolitan Drive, Suite 400 Orange, CA 92868, Phone (800) 229-5615 Fax (714) 385-0107, or approved equal.
2. **Gate Frames.** Fabricate chain link cantilever slide gates in accordance with ASTM F1184, Type II, Class 2, using 2" square aluminum members, ASTM B 221, alloy and temper 6063-T6, weighing 0.94 lbs/ft. Weld members together forming rigid one-piece frame integral with top track. These members shall be vinyl clad.
3. **Internal Uprights.** 2" x 2" aluminum members welded in gate frames, at 8'-0" on center subdividing frame into panels. These members shall be vinyl clad.
4. **Chain Link Fence Fabric.**
 - a. Gate fabric shall conform to the requirements of the fabric used in the adjacent fence installation.
 - b. Install fabric with galvanized bolts and tension bars at all 4 sides. Attach to gate frame at not more than 15" on center.
5. **Bracing.** Provide diagonal adjustable length truss rods, or 3/8 inch galvanized steel, in each panel of gate frames. These members shall be vinyl clad.
6. **Top Track/Rail.** Enclosed, combination one-piece track and rail, aluminum extrusion with weight of 3.72 lbs/ft. Track to withstand reaction load of 2,000 lbs.
7. **Truck Assembly.** Swivel type, zinc die cast, with four (4) sealed lubricant ball bearing rollers, 2" in diameter by 9/16" in width, and two (2) side rolling wheels to ensure truck alignment in track. Mount trucks on post brackets using 7/8" diameter ball bolts with 1/2" shank. Design truck assembly to withstand same reaction load as track. These members shall not be vinyl clad.
8. **Gate Hangers, Latches, Brackets, Guide Assemblies and Stops.** Malleable iron or steel, galvanized after fabrication. Provide positive latch with provisions for padlocking. These members shall not be vinyl clad.
9. **Bottom Guide Wheel Assemblies.** Each assembly shall consist of two 4" diameter rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame

plumb and in proper alignment. Attach one assembly to each guide post. These members shall not be vinyl clad.

10. **Gate Post.** Galvanized steel 4" O.D. Schedule 40 pipe, ASTM F 1083, weighing 9.11 lbs/ft. provide one (1) latch post and two (2) support posts for single slide gates and four (4) support post for double slide gates. The gate post shall be vinyl clad.
11. **Concrete Set Gate Post.** Drill holes in firm, undisturbed or compacted soil. Holes shall have a diameter of four times greater than outside dimension of post, and depths approximately 6" deeper than the post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for post with heavy lateral loads. Set post bottom 42" below surface when in firm, undisturbed soil. Place concrete around post in a continuous pour, tamp for consolidation. Trowel finish around post and slope to direct water away from post. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
12. **Install Gate In Accordance With Manufacturer's Instructions.** -

C. Measurement and Payment.

1. The quantity to be paid for under this item shall be the total number of square feet of vinyl clad cantilever slide gates furnished and installed in accordance with these specifications.
2. The unit price bid per square foot shall include the cost of all labor, materials, tools, equipment, and other incidentals required to furnish and install vinyl clad cantilever slide gates, gate post, stops, locking devices, guide rollers truck assemblies, locks, concrete, shop drawings and miscellaneous materials required for a complete installation.



GATE ELEVATION - (3) BAYS SHOWN

SEE SHEET #2 FOR DETAILS & SECTIONS

NOTES:

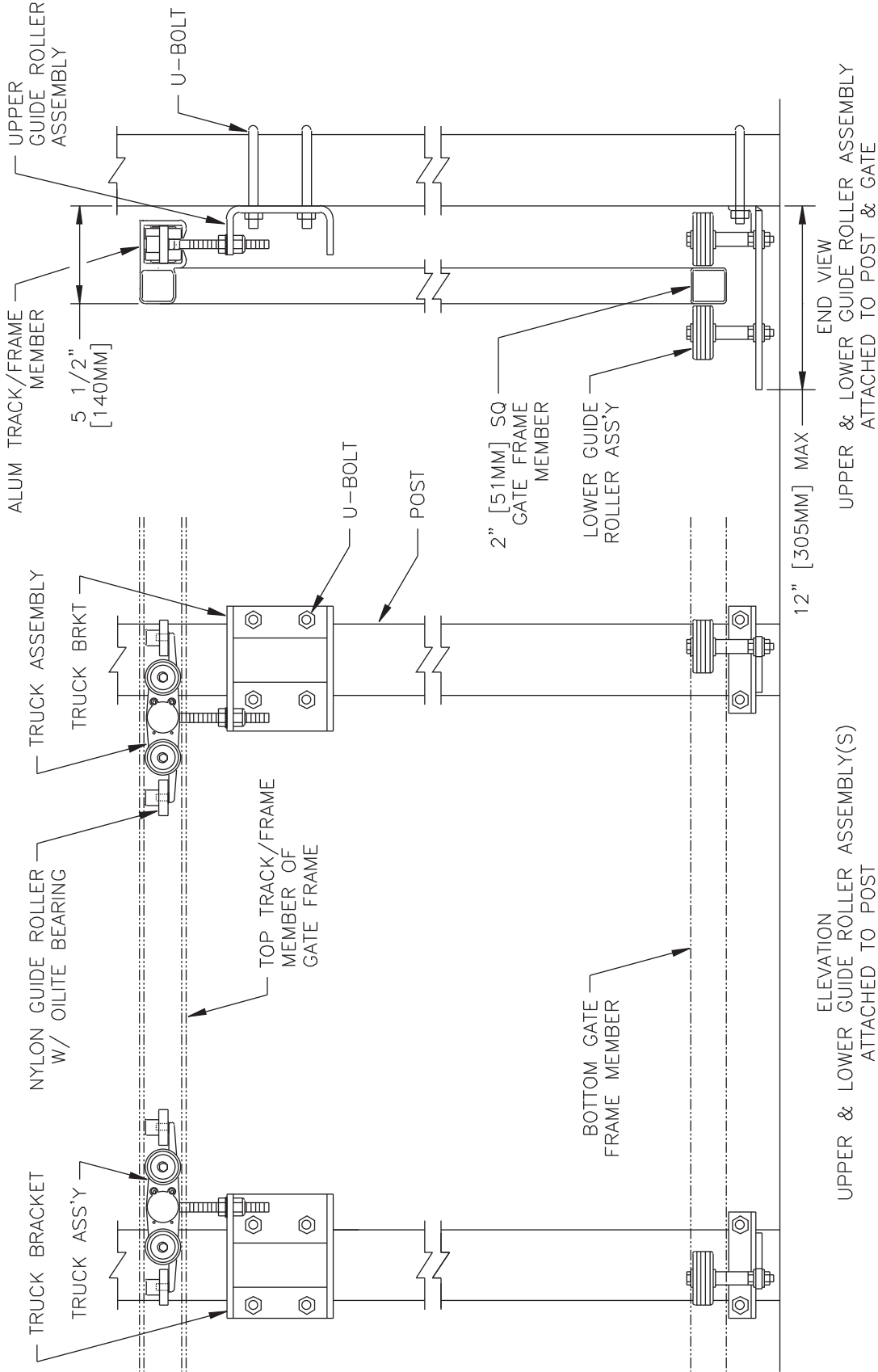
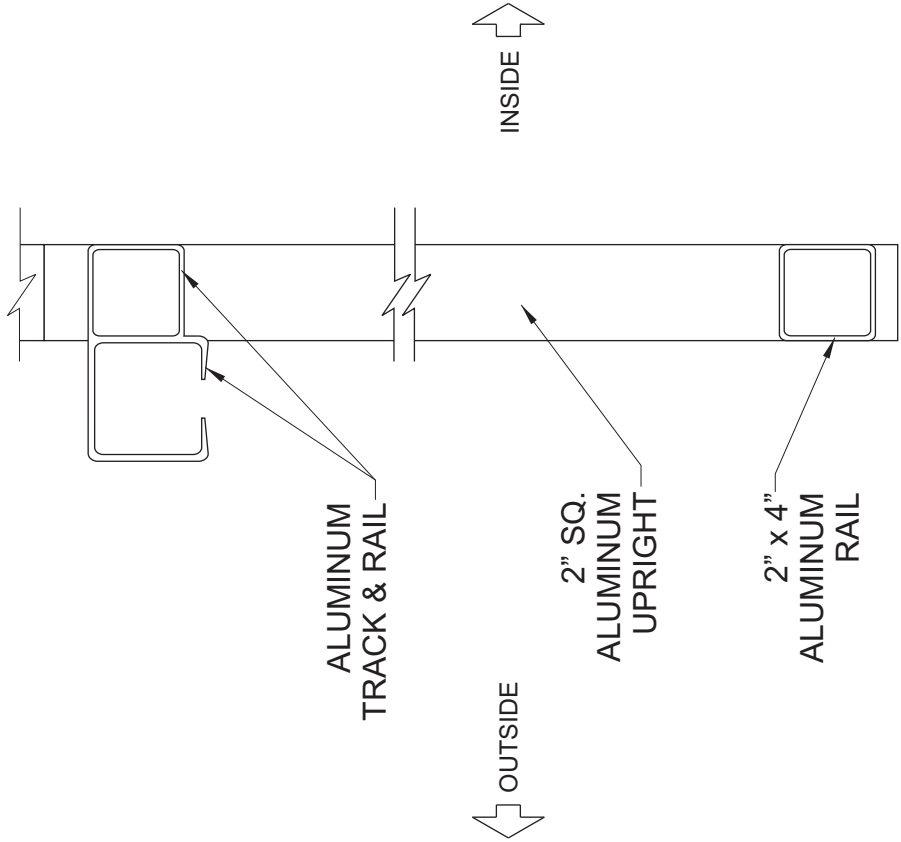
1. METRIC DIMENSIONS ARE NOMINAL EQUIVALENTS TO U.S. DIMENSIONS.
2. SPECIFICATIONS SHOWN CAN BE CHANGED BY MASTER-HALCO ONLY.
3. GATES MAY BE MANUALLY OR ELECTRICALLY OPERATED. HARDWARE WILL VARY FOR ELECTRICALLY OPERATED GATES.

NOM HEIGHT (H)
6'-0" [1829MM]
7'-0" [2134MM]
8'-0" [2438MM]

OPENING	16'-0" [4877MM] THROUGH 22'-0" [6706MM]
---------	---

M I W  Ornamental Picket COPYRIGHT©2000 MASTER-HALCO, INC. ALL RIGHTS RESERVED. MONUMENTAL IRON WORKS SINGLE CANTILEVERED SLIDING GATE NASSAU COUNTY BY: JRR DATE: 08-18-95 DWG: 6-8100					
			REV: D	LAYER: 1	SHEET: 1
			REV DATE: 05-10-00	SCALE: 3/8" = 1'-0"	

OPENING	LENGTH (L)	GATE POSTS (G)	BAYS	OVERHANG
I/S POST FACE TO I/S POST FACE	O/S DIM OF GATE LEAF	O/S POST FACE TO O/S POST FACE	NUMBER OF BAYS WITH PICKETS	NUMBER OF BAYS W/O PICKETS
16'-0" [4877MM]	26'-3" [8001MM]	10'-0" [3048MM]	(2) TWO	(1) ONE
17'-0" [5182MM]	27'-3" [8306MM]	10'-0" [3048MM]	(3) THREE	(1) ONE
18'-0" [5486MM]	28'-3" [8611MM]	10'-0" [3048MM]	(3) THREE	(1) ONE
19'-0" [5791MM]	29'-3" [8915MM]	10'-0" [3048MM]	(3) THREE	(1) ONE
20'-0" [6096MM]	30'-3" [9220MM]	10'-0" [3048MM]	(3) THREE	(1) ONE
21'-0" [6401MM]	31'-3" [9525MM]	10'-0" [3048MM]	(3) THREE	(1) ONE
22'-0" [6706MM]	32'-3" [9830MM]	10'-0" [3048MM]	(3) THREE	(1) ONE



M I W Ornamental Picket	COPYRIGHT©2000 MASTER-HALCO, INC. ALL RIGHTS RESERVED. MONUMENTAL IRON WORKS	SINGLE CANTILEVERED SLIDING GATE		BY: JRR	DWG: 6-8100	
				DATE: 08-18-95		
				REV: D	LAYER: 1	SHEET: 2
				REV DATE: 05-10-00	SCALE: VARIES	
		NASSAU COUNTY				

**ITEM 116AM – PROFILING AND REMOVAL OF ASPHALT
(PAVING BY OTHERS WILL FOLLOW)**

Under this Item, the Contractor shall remove and dispose of existing asphalt surface pavement as out lined in Item 116A of the Nassau County 2009 Standard Specifications with the stipulation that the paving of the road will be performed by others.

ITEM 117T-6 - TEMPORARY FENCE - 6' HIGH

ITEM 117T-8 - TEMPORARY FENCE - 8' HIGH

A. Description.

1. Under these Items the Contractor shall furnish and install Six (6') Foot and/or Eight (8') Foot High Temporary Fence in accordance with the Plans, Specifications or directed by the Engineer.

B. Construction Details.

1. Fabric.

- a. All chain link fence fabric shall be 2" mesh, 9 gauge galvanized steel chain link fabric in accordance with ASTM F 668. Zinc coated steel wire shall have a minimum core wire break strength of 1,290 psi. Fabric selvages shall be knuckled top and bottom. The zinc coating shall be a minimum 1.20 oz. per square foot.

2. Line Posts.

- a. Line Posts shall be 2" diameter and manufactured to the following specifications:
 - 1) **Class A, Schedule 40 Pipe.** Posts shall be standard weight Schedule 40 Pipe, manufactured in accordance with ASTM F 1083.
 - 2) **Class B, Steel Tubing.** Posts shall be manufactured by one of the following methods with the steel conforming to ASTM A569M or ASTM A607 with a minimum yield strength of 50,000 psi:
 - a) Furnace butt welded, continuous welded
 - b) Cold rolled and electric resistance welded
 - c) Seamless
 - b. Line posts shall be set at maximum of 10'-0' on centers.
 - c. Posts shall be driven a minimum of 24" into the ground.
 - d. Post Ties: Post tie spacing shall be 14" on centers and within 6" from the top and bottom of the fabric as herein specified.
 - e. Each Line Post shall be fitted with a properly fastened steel cap.
3. **Fittings.** All fittings shall be hot dipped galvanized in accordance with ASTM F 626.
 4. An allowance of ten (10) linear feet will be added for each Terminal Post - end, corner, angle, pull and gate post and will be complete with knee bracing and all of the necessary hardware components.
 5. Method – all provisions as per Item 117 shall apply.

C. Measurement and Payment.

1. The quantity to be paid for under these Items shall be the total number of linear feet of Six (6') Foot and/or Eight (8') Foot High Temporary Fence measured in final position furnished and installed.
2. The unit price bid per linear foot for these Items shall include the cost of all labor, tools, materials, equipment and other incidentals necessary to satisfactorily erect, maintain and remove the fence as directed by the Engineer.

ITEM 117TP-6 - TEMPORARY FENCE WITH PRIVACY SCREENING - 6' HIGH
ITEM 117TP-8 - TEMPORARY FENCE WITH PRIVACY SCREENING - 8' HIGH

A. Description.

1. Under these Items the Contractor shall furnish and install Six (6') Foot and/or Eight (8') Foot High Temporary Fence With Privacy Screening Fence in accordance with the Plans, Specifications or directed by the Engineer.

B. Construction Details.

1. Fabric.

- a All chain link fence fabric shall be 2" mesh, 9 gauge galvanized steel chain link fabric in accordance with ASTM F 668. Zinc coated steel wire shall have a minimum core wire break strength of 1,290 psi. Fabric selvages shall be knuckled top and bottom. The zinc coating shall be a minimum 1.20 oz. per square foot.

2. Line Posts.

- a Line Posts shall be 2 1/2" diameter and manufactured to the following specifications:
 - 1) **Class A, Schedule 40 Pipe.** Posts shall be standard weight Schedule 40 Pipe, manufactured in accordance with ASTM F 1083.
 - 2) **Class B, Steel Tubing.** Posts shall be manufactured by one of the following methods with the steel conforming to ASTM A569M or ASTM A607 with a minimum yield strength of 50,000 psi:
 - a) Furnace butt welded, continuous welded
 - b) Cold rolled and electric resistance welded
 - c) Seamless
- b. Line posts shall be set at maximum of 8'-0' on centers.
- c. Posts shall be driven a minimum of 36" into the ground.
- d. Post Ties: Post tie spacing shall be 14" on centers and within 6" from the top and bottom of the fabric as herein specified.
- e. Each Line Post shall be fitted with a properly fastened steel cap.

3. Fittings.

- a All fittings shall be hot dipped galvanized in accordance with ASTM F 626.

4. Privacy Screen.

- a Material.
 - 1) Fiber Content: 100% high density polyethylene
 - 2) Construction: 85-90% knit Raschel weighing 3.8 lbs. per 100 sf
 - 3) Colors: black or green
- b. Fasten tie-raps at 12" on centers along entire perimeter of fabric roll.
5. An allowance of ten (10) linear feet will be added for each Terminal Post- end, corner, angle, pull and gate post and will be complete with knee bracing and all of the necessary hardware components.
6. Method – All provisions for Item 117 shall apply.

C. Measurement and Payment.

1. The quantity to be paid for under these Items shall be the total number of linear feet of Six (6') Foot and/or Eight (8') Foot High Temporary Fence With Privacy Screening measured in final position furnished and installed in accordance with the Plans, Specifications or directed by the Engineer.
2. The unit price bid per linear foot for these Items shall include the cost of all labor, tools, materials, equipment and other incidentals necessary to satisfactorily erect, maintain and remove the fence as directed by the Engineer.

ITEM 136S - SURVEY STAKEOUT (PER DAY)

A. Description.

1. Under this Item the Contractor shall do all necessary surveying required to construct all elements of the Project as shown on the Plans and Specifications and as ordered by the Engineer. This shall include, but shall not be limited to, stakeout, layout and elevations for the highway, structures and forms as shown and required, consistent with the current practices of the County and shall be performed by competently qualified personnel acceptable to the Commissioner of Public Works.

B. Materials.

1. All instruments, equipment, stakes and any other material necessary to perform the work satisfactorily, shall be provided by the Contractor. All stakes used shall be of a type approved by the Engineer. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times.

C. Construction Details.

1. The Contractor shall trim trees, brush and other interfering objects, not inconsistent with the Plans, from survey lines in advance of all survey work to permit accurate and unimpeded work by the Contractor's stakeout survey crews and the County's cross-section survey crews.
2. The exact position of all work shall be established from control points, baseline transit points or other points of similar nature which are shown on the Plans and/or modified by the Engineer. Any error, apparent discrepancy or absence in or of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.
3. The Contractor shall place two offset stakes or references at each centerline or theoretical grade line control point (PC, PT, and/or Angle Point), henceforth called centerline, and at such intermediate locations as the Engineer may direct. From computations and measurements made by the Contractor, these stakes shall be clearly and legibly marked with the correct centerline station and offset distance so as to permit the establishment of the exact centerline location during construction. If markings become faded or blurred for any reason, the markings shall be restored by the Contractor and at the request of the Engineer.
4. The Contractor shall locate and place all cut, fill, slope, fine grade or other stakes and points, as the Engineer may direct for the proper progress of the work. All control points shall be properly guarded and flagged for easy identification.
5. Drainage structures shall be staked out by the Contractor at the locations and elevations shown on the Plans or specified by the Engineer. All required Rights-of-Way and easement limits shall be established, staked and referenced by the Contractor concurrent with the construction stakeout survey. Rights-of-Way and easement limits shall be staked by or under the direction of a Licensed Land Surveyor or exempt Professional Engineer approved by the Commissioner of Public Works. The Contractor shall supply proof to the Engineer that such work is being performed by or supervised by a Licensed Land Surveyor or exempt Professional Engineer.

6. The Contractor shall be responsible for the accuracy of the work of this Item and shall maintain all reference points, stakes, etc. throughout the life of the contract. Damaged or destroyed points, bench marks or stakes, or any reference points made inaccessible by the progress of the construction shall be replaced or transferred by the Contractor. Any of the above points that may be destroyed or damaged shall be transferred by the Contractor before such damage or destruction occurs. All control points shall be referenced by ties to acceptable objects and recorded. Any alterations or revisions in the ties shall be so noted and the information furnished to the Engineer immediately. All stakeout survey work shall be referenced to the centerline shown on the Plans.
7. All computations necessary to establish the exact position of the work from control points, shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be neatly made. Such computations, survey notes and other records shall be made available to the Engineer upon request and shall become the property of the County and delivered to the Engineer not later than the date of acceptance of the contract.
8. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor. Any necessary correction to the work shall be made immediately by the Contractor at no cost to the County. Such checking by the Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of his work.
9. The Contractor will not be permitted to take preconstruction and/or final cross-sections to be used for payment purposes.
10. During the progress of the construction work, the Contractor will be required to furnish all of the surveying and stakeout incidental to the proper location by line and grade for each phase of the work. For paving and any other operation requiring extreme accuracy, the Contractor will re-stake with pins or other acceptable hubs located directly adjacent to the work at a spacing directed by the Engineer. Fills required to pave intermediate courses of asphalt shall be painted on the existing pavement, all dimensions referring to finished grade.
11. Any existing stakes, iron pins, survey monuments or other markers defining current or existing property lines that may be disturbed during construction shall be properly tied into fixed reference points before being disturbed and accurately reset in their proper position upon completion of the work.
12. Upon the completion of construction, after all possibility of disturbance is past, the Contractor shall reestablish, layout and retie the centerline control points with a minimum of four ties per control point, as permanently as possible with drill holes and wings in concrete curbs and sidewalks and PK nails in asphalt pavement to the satisfaction of the Engineer. The contractor shall supply a drawing of each of the above noted control points, including, but not limited to: Station, type of point (PK nail, drill hole excreta), coordinates in the same system used by the County on the project plans, and 4 ties, with the distance measured and recorded to 0.01, to the described tie points. Survey notes signed and stamped by a New York State Licensed Land Surveyor showing the station and description of the control points, and the location and description of the ties shall be furnished to the Engineer, in a drawing size to be agreed to before final submittal.

D. Method of Measurement and Basis of Payment.

1. The price bid for this item will be made on a daily (8hrs/day) basis and shall include the cost of furnishing all labor, equipment, instruments, materials and other incidentals necessary to satisfactorily complete the required project including, but not limited to, surveying, stakeout and retie of the control points. Daily unit price rate shall be prorated for less than 8 hrs of survey work in a day, as determined by the Engineer.

ITEM 150 - BOX BEAM GUIDE RAILING
ITEM 151 - BOX BEAM MEDIAN BARRIER

A. Description.

1. Under this item, the Contractor shall furnish and install galvanized steel box beam guide railing and median barrier in accordance with the plans, specifications and as ordered by the Engineer.

B. Materials.

1. Rails.

- a. Rails shall be cold-formed welded and seamless structural tubing. Posts shall be American Standard Beam Section. The posts, splice tongues and plates shall conform to ASTM A36, Structural Steel. The rails shall conform to ASTM A500, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes, Grade B, except as modified below.
- b. All rail shall be tested in accordance with ASTM E436 - Standard Method for Drop-weight tear tests of Ferritic steels; except as modified below.
- c. The tests shall be done after all galvanizing and associated operations have been performed on the rail. The testing shall be conducted at a temperature of -18 Degrees C. without removing the galvanizing, on 2" X 9" specimens supported to achieve a 7" span.
- d. The percent shear area will be determined by testing nine (9) specimens, three (3) from each of three (3) sides not containing a weld. The shear areas of the three specimens from the side with the lowest average shear area shall be disregarded and the final average based on the remaining six specimens. If the average percent shear area falls below 50, the material represented by these tests shall be rejected.
- e. To facilitate acceptance and rejection of material the manufacturer of the structural shape shall, before galvanizing, identify the product with the steel heat number, or some number which is traceable to the heat number, and his own unique identification code. The identification method shall be such that it can be read after the structural shape is galvanized. The identification information shall be placed on the structural shape at intervals not to exceed four feet.
- f. No mill transverse welds will be permitted on the rail sections. Longitudinal welds shall be made by the resistance, gas shielded arc, submerged arc or plasma arc welded process; shall be sound, free from defects, and shall not be repaired. The welded joint, in cold-formed welded rail, shall have a minimum tensile strength specified for the railing when tested according to the tensile strap test of test of ASTM Method E8. Fabrication welding shall comply with the requirements set forth under "welding" in the N.Y.S. Steel Construction Manual.
- g. Rails shall be galvanized in accordance with 719-01 of the N.Y.S. Specifications Type I, Galvanized Coatings and Repair Methods. Slots and round holes may be Subsequently drilled, punched, burned, or cut and re-galvanized according to the paragraph below on "Re-galvanizing Iron and Steel Using a Flame Sprayed Coating System". This repair procedure shall also apply to curved rail sections and splice plates as required.
- h. Re-galvanizing Iron and Steel Using a Flame Sprayed Coated System
 - 1) Those areas to be sand blasted shall be blasted with silica sand or crushed garnet of such gradation that sand shall be mesh size 20 to 40 with a minimum of 40%

retained on a 30 mesh screen (U.S. Standard Sieve series). Pressure of not less than 75 psi shall be maintained at the blast generator.

- 2) A sample steel plate shall be blasted until the surface cannot be further cleaned or roughened. This plate shall be used for visual comparison and any areas that do not meet this standard as to roughness or cleanliness shall be re-blasted.
- 3) The wire used in spraying shall be 15 gauge 1/8" or 3/16" diameter, zinc 99.0% purity. Air pressure at the Air Control Unit shall be 60 psi and there shall be no more than 35 feet of 3/8" I.D. hose between the Air Control Unit and the gun.
- 4) The metal coating shall be applied at a minimum thickness of .0045". At least one coating shall be applied within 4 hours of blasting and the surface must be completely coated within 8 hours of blasting.
- 5) The specified thickness of coating shall be applied in multiple layers and in no case shall less than two passes be made over every part of the surface.

2. Posts.

- a. The posts, splice tongues, plates and all hardware shall be fabricated and ready for assembly before galvanizing. The posts, splice tongues and plates shall be galvanized in accordance with 719-01, of the N.Y.S. Specifications, Type I, Galvanized Coatings and Repair Methods. Hardware shall be galvanized in accordance with 719-01 of the N.Y.S. Specifications Type II, Galvanized Coatings and Repair Methods.

3. Bolts.

- a. Bolts and nuts shall conform to ANSI B 18.2.1 and B 18.2.2, and washers shall conform to ANSI B 18.22.1.

C. Construction Details.

1. Posts and rails shall be erected in the position and manner indicated on the plans as ordered by the Engineer.
 - a. Rail sections shall be at least 18'-0" in length, and rail splices shall be a minimum of 18" from the centerline of any beam slot.
 - b. Necessary precautions shall be taken by the Contractor that all utilities and structures are safeguarded against damage. Damage incurred shall be satisfactorily repaired by the Contractor at no expense to the County.
 - c. Box-beam barrier shall be continuous at all entrance walks. Where a post location fails within the limits of a concrete walk, the concrete shall be neatly removed as directed by the Engineer and legally disposed of. The area shall then be restored to conform to the adjoining area.
 - d. Unpaved Shoulders - Posts shall be driven in all cases where driving is feasible. The driving shall be accomplished with approved methods and equipment that will leave the posts in their final position, free of any distortion, burring or any other damage.

D. Method of Measurement.

1. The quantity of guide railing or median barrier measured for payment will be the number linear feet measured along the axis of the railing and between its extreme outer limits as shown on the plans and/or Standard Sheets or as directed by the Engineer. If shop curved guide railing or median barrier is specifically called for in the Contract Plans and Proposal, the quantity of guide railing or median barrier shall be the number of linear feet measured

ITEM 152 - BOX BEAM GUIDE RAIL END ASSEMBLY
ITEM 153 - BOX BEAM MEDIAN BARRIER END ASSEMBLY-TYPE A OR B

A. Description.

Under this item, the Contractor shall furnish and place galvanized steel box beam guide rail and median barrier end assemblies in accordance with the Plans, Specifications, the Standard Sheet and as ordered by the Engineer.

B. Materials.

All material shall conform to the material requirements of Item 150 and shall consist of the box beam, accessory hardware, complete deadman in place, the necessary excavation and backfill, all as detailed on the Plans and/or Standard Sheet.

C. Construction Details.

End assemblies shall be installed as shown on the Plans and/or the Standard Sheet and as ordered by the Engineer.

D. Method of Measurement.

The quantity of end assembly units to be paid for will be the actual number of units installed in accordance with the Plans, Standard Sheets and/or as directed by the Engineer.

E. Basis of Payment.

The unit price bid for each end assembly unit shall include the cost of furnishing all labor, materials and equipment necessary to complete the work including the necessary concrete, excavation and backfill.

ITEM 185N - NEW SPRINKLER SYSTEM

A. Description.

1. Under this Item the Contractor shall furnish and install new underground sprinkler systems in accordance with the Specifications, as shown on the Plans or as directed by the Engineer.

B. Materials.

1. Pipe and Pipe Fittings.
 - a. Main Line and Lateral Pipe. Provide Schedule 40 PVC pipe complying with ASTM D 1785 for Schedule 40 pipe and ASTM D 1784 for PVC compounds in 20-foot lengths, free of holes, foreign material, blisters, wrinkles or dents.
 - b. PVC Fittings. Schedule 40 PVC socket fitting, Type 1, Cell Classification 12454-B, complying with ASTM D 2466, D 2467, and D 1784.
 - c. Threaded Nipples: Schedule 80 PVC pipe.
 - d. Risers. Schedule 40 galvanized steel pipe, unless otherwise indicated.
 - e. Cleaner, Primer, and Solvent Cements.
 - 1) Cleaner. Uni-Weld 7300 cleaner or approved substitute.
 - 2) Primer. Uni-Weld 8700 Hi-Etch purple primer, ASTM F656, or an approved substitute.
 - 3) Solvent Cements. Uni-Weld 2200 clear, light viscosity type, for lateral lines, Uni-Weld 1700 gray, heavy duty viscosity type, for lateral lines larger than 2-1/2" diameter, and Uni-Weld 6700 for clear, light viscosity type for Flex/PVC connections or approved substitute.
 - f. Sealing Tapes and Pastes.
 - 1) Threaded Connections between PVC and Metal Pipe: Rectorseal No. 100 virgin heavy duty sealing paste, Plastojoint Stick as manufactured by Lake Chemical Company, or Teflon tape.
 - 2) Metal to Metal Connection: Rectorseal No. 5 slow dry, soft set pipe thread compound.
 - 3) PVC to PVC Connections: Teflon tape.
 - 4) Plastic Irrigation Head or Plastic Valve to Pipe Connections: Teflon tape.
 - g. Pipe Lubricant. As provided by pipe manufacturer for "O" ring gasket and pipe spigot ends. If not provided, use I.P.S. Weld-On No. 787 gasket lubricant as manufactured by Industrial Polychemical Service.
 - h. Flexible Nipples. COBRA CONNECTOR, U.S. Patent #5,039,011 & 5,221,114, with 1/2" Nominal I.P.S. heavy wall flexible hose, as manufactured by F. P. Parker Manufacturing Co. Inc., 230-A Coney Island Dr., Sparks, Nevada, 89431, (702) 358-7900 or (510) 657-1641, Fax (800) 372-6272, or approved substitute. Material is available from Neumark Inc., Albuquerque, New Mexico.
 - i. Sleeves. Schedule 40 PVC when under Contractor installed or removed and replaced pavement, Schedule 40 steel for sleeves under existing pavement to remain.

2. Valve Boxes. Provide and install standard green colored valve boxes with covers as manufactured by Carson or approved equal. Valve boxes shall be sized to allow room for testing, manual operation, calibration, removal and maintenance of equipment.
3. Automatic Zone Valves.
 - 1) Provide valves with a manual bleed screw on the bonnet and bleed ports protected with built-in filter. Provide valve which may be installed at any angle and has a flow control and manual shutoff.
 - 2) Material: Noncorrosive.
 - 3) Operation: Open and close smoothly with low pressure loss.
 - 4) Solenoid: 24 volts A.C. 60 Hz, energy consumption not exceeding 6 watts.
 - 5) Identification: Clearly tag with legible permanent brass waterproof label indicating the controller zone number.
4. Manual Valves. Brass angle valves with brass cross handles.
5. Controllers. Provide and install Mini-Clik Freeze Sensor, Model 401 as manufactured by Glen-Hilton Products Inc., P.O. Box 31614, Richmond, Virginia 23294, (804)264-0055
6. Wire.
 - a. UL approved for direct burial, type UF, rated for 600 volts, PVC insulated.
 - b. Minimum Wire Size: No. 16 AWG.
 - c. Common Wire: Plastic coated, white color.
 - d. Control Wire: Insulated, single-strand copper designed for 24 to 50 volts, plastic coated, red color or copper strand meeting or exceeding ASTM B3.
7. Wire Splicing Materials. Provide watertight splices using Spears #300 connectors and #100 glue, 3M brand, DBY connectors, or approved substitute.
8. Provide and install tap and backflow preventer in accordance with the requirements of the local water authority having jurisdiction.
9. Pop-Up Spray Heads. Provide Rain Bird Sprinkler Mfg. Corp. or approved substitute. Fixed pattern, with screw-type flow adjustment, stainless steel retraction spring, and PRS module, if required. Include a serviceable screen on the spray heads to prevent foreign materials from entering the sprinkler. Set flow adjustment to ensure even coverage and to avoid overspray.
10. Automatic Drain Valves. Provide King Technology, Inc. automatic drain valve or approved substitute. Corrosion resistant PVC plastic with 1/2 inch male pipe threaded connections. The valve shall open when pressure in the line decreases to 9 psi and seal again when pressure increases to 10 psi. Provide a screen on both inlet and outlet. Install automatic valves only on laterals of average pipe size 1 1/2 inch or less. Install at low points and at 100 feet on center in the laterals.
11. Pressure Regulator

C. Construction Requirements.

1. Provide a diagrammatic drawing, which is indicative of the work to be installed.
2. Utilities. Verify the locations and sizes of stubouts for water sources indicated on drawings as the source of water supply to the underground irrigation system. Prior to

excavation, determine the locations of all newly constructed and existing cables, conduits, sewers, water lines, and other underground utilities. Do not damage or disturb underground utilities.

3. Trenching. Excavate straight and true with bottom uniformly sloped to low points.
4. Minimum Cover. Provide following minimum cover over top of installed piping:
 - a. Main Lines: 18" minimum.
 - b. Lateral Lines: 12" minimum.
 - c. Piping under pavement: 24" minimum
 - d. Sleeves: 18" minimum
5. Backfill. Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1" diameter. Place acceptable backfill material in 6" lifts, compacting each lift and flush with water to settle trench except under pavement.
6. Staking. Stake all trench, sprinkler head and valve locations.
7. Sleeved Crossings. Sleeve pipe and wiring under sidewalks, roadways, parking lots, or through walls. Provide sleeves a minimum of one inch in diameter greater than the pipe or wire bundle to be sleeved.
8. Existing Lawns. Where trenching is required across existing lawns, uniformly cut strips of sod 6 inches wider than trench. Remove sod in rolls of suitable size for handling and keep moistened until replanted.
9. Irrigation Line Slope. The minimum pitch of irrigation lines to automatic drain valves shall be 3 inches in 100 feet.

D. Installation.

1. General. Install material and equipment in accordance with manufacturer's recommendations, Uniform Plumbing Code and ASTM 2774. Install the work to avoid conflicts between underground irrigation installation, existing utilities, planting and other existing features.
2. Pipe.
 - a. Provide connections between plastic pipe and metal valves or steel pipe with screw fitting, using plastic male adapters with the specified pipe sealant applied to male threads. Connect screwed connections with light wrench pressure. Do not screw steel pipe into plastic fittings except at head risers.
 - b. Apply cleaner and solvent in accordance with ASTM D 2855
 - c. Rest the full length of each pipe section solidly on the pipe bed with recesses excavated to accommodate bells and joints.
 - d. Thoroughly clean the interior of pipe and remove rocks, gravel, soil, and other objects prior to assembly. At the end of a work period, cap open ends on installed pipe to keep out foreign matter.
 - e. Provide 4 inches minimum horizontal clearance between lines in the same trench.
 - f. Sterilize piping up to backflow preventer.
 - g. Provide for expansion/contraction of piping in accordance with manufacturer's recommendations.

3. **Controllers.** Install controllers as required. Make power connections. Mount and wire the controllers in accordance with manufacturer's approved procedures. Install freeze sensor in accordance with manufacturer's recommendations.
4. **Sprinkler Heads.** Install sprinkler heads at grade unless otherwise indicated. Install sprinkler heads with a minimum of 4 inches and a maximum of 6 inches clearance from curbs, walks, driveways, etc. and a minimum of 12 inches and a maximum of 18 inches from buildings and walls. Install heads in vertical position, hand backfilled and compacted to near original density.
5. **Valves and Valve Boxes.** Cover automatic and manual control valves with valve boxes and set top of boxes at grade. Install automatic valves according to manufacturer's recommendations and as shown. Set Pressure Regulating Module to 45 PSI or as directed by Engineer. Wire each valve to a separate station on the controller. Clearly tag each valve with a legible, permanent, waterproof tag indicating the controller zone number
 - a. **Control Wiring.** Install control wires in same trenches as irrigation main lines and laterals whenever practical. Snake wires in the trench to allow for displacement of the wire during backfilling. Securely tape wires running in the same trench together at 10-foot intervals. Place wiring bundles to one side of piping (east of north/south lines and north of east/west lines) at a maximum of 3 inches from piping. If wiring is not in the same trench as piping or is under paving, install in Schedule 40 PVC piping and provide 18 inches minimum cover.
 - b. **Splices.** Minimize wire splices. Where splices are required, use common splice boxes located in valve boxes. Provide a slack-wire loop at each valve with enough slack so that wire splices can be extended 24 inches above ground level to facilitate testing and trouble shooting.
 - c. **Codes and Other Electrical Information.** Install 115 volt AC wiring in accordance with requirements of the National Electrical Code and the manufacturer's electrical specifications. Provide electrical service to controllers consisting of one black and one white wire in rigid conduit. Connect electrically-operated devices and metal enclosures to ground, in accordance with manufacturer's recommendations.
 - d. **Automatic Drain Valves.** Install automatic drain valves on lateral lines only, at low points, 100 foot o.c.; install one cubic foot of gravel, with filter fabric completely surrounding gravel at each drain valve. Install automatic drain valves 3 inches below top of gravel. Install a 2-inch diameter Class 200 PVC pipe vertically above drain valve. Do not connect to pipe. Install with slip cap (not solvent welded), with 1/2-inch diameter hole. Install top of pipe flush with gravel.
 - e. **Backflow Preventer:** Install as detailed and in conformance with the Uniform Plumbing Code.
 - f. **Thrust Block.** On lines over 2 inches in diameter, install concrete thrust blocks at tees, bends, and pipe ends.

E. Field Quality Control.

1. **Hydrostatic Test.** Test water piping and valves, before backfilling trenches, to a hydrostatic pressure of not less than 100 psi and/or as directed by the Engineer. Piping may be tested in sections to expedite work. Remove and repair piping, connections, valves which do not pass hydrostatic testing.

2. Operational Testing. Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads adjusted to final position.
 - a. Demonstrate to the Engineer that system meets coverage requirements and that automatic controls function properly.
 - b. Coverage requirements are based on operation of one circuit at a time.

F. Method of Measurement.

1. The quantity to be paid for under this Item shall be the actual number of linear feet of piping furnished and installed in the new underground sprinkler system in accordance with the Specifications, as shown on the Plans or as directed by the Engineer and approved after satisfactory testing.

G. Basis of Payment.

1. The unit price bid for this Item shall include all labor, materials, tools, equipment and incidentals, including excavation, fine grading, backfill, testing and other necessary work required to satisfactorily complete the new underground sprinkler system.

ITEM 200 - HEAVY POST, PLASTIC AND SYNTHETIC BLOCKED OUT GALVANIZED CORRUGATED STEEL BEAM GUIDE RAILING

ITEM 201 - HEAVY POST, PLASTIC AND SYNTHETIC BLOCKED OUT GALVANIZED CORRUGATED STEEL BEAM MEDIAN BARRIER

A. Description.

1. Under this Item the Contract shall furnish and install heavy steel post, plastic and synthetic blocked out galvanized steel beam guide railing as shown on the Plans in accordance with the Specifications and/or ordered by the Engineer.

B. Construction Details.

1. General. Posts and railing shall be erected in the position and manner indicated on the Plans and Standard Sheets and in a manner approved by the Engineer.
2. Posts shall be driven unless otherwise specified by the Engineer. The driving shall be accomplished with approved equipment and methods that will leave the posts in their final position, free of any distortion, burring or other damage.
3. When posts are driven through asphalt concrete or a bituminous treated material, the Contractor shall take care to prevent damage to the paved or treated areas. Large holes and voids caused by driving the posts shall be filled and compacted with a bituminous treated material or asphalt concrete similar to that damaged. The small area adjacent to the post disturbed during installation or where gaps exist at the post after pavement repairs shall be sealed with a bituminous material approved by the Engineer, at no cost to the County.

C. Materials.

1. Beams, Posts, Sections and Accessory Hardware.
 - a. Beams and terminal sections shall be fabricated as shown on the plans. When beams and terminal sections are galvanized by the hot-dip method in accordance with ASTM A123, they shall be blanked to the proper shape, fabricated and ready for assembly before galvanizing. No punching, drilling, cutting or welding will be permitted after galvanizing. Bolt holes in the beam at the post bolt and elsewhere as necessary shall be enlarged or slotted to permit expansion and contraction and to facilitate erection. The beams shall be straight unless otherwise required by the plans or specifications and of uniform section. The edges shall be rolled to eliminate sharp edges.
 - b. Beams and terminal sections shall be made from 12 gauge or heavier sheet. Beams, terminal sections, SL and SH posts shall be rolled from new billet open hearth, electric furnace or basic oxygen steel. All connections or splices shall be made with flat, round-headed galvanized bolts and galvanized nuts conforming to ASTM Designation A307 and as shown on the plans.
 - c. Strength. The minimum yield point and elongation of steel used in the manufacture of beam and terminal sections shall be 50,000 psi and 12% in 2" gage length respectively.
 - d. Galvanizing.
 - e. Beams and terminal sections shall be galvanized in accordance with ASTM A 123. Bolts, nuts and washers shall be galvanized in accordance with ASTM A 153.
 - 1) As an alternative to ASTM123 galvanizing beam guide rail and terminal sections may be galvanized by a process or system of continuous galvanizing substantially in

conformance with ASTM A525 except the minimum check limits for the weight of coating as determined by the triple post and single spot tests shall be 4.0 and 3.0 ounces per square foot respectively (total amount both sides of sheet).

- 2) All the requirements for beam and terminal sections as stated herein shall apply to this continuous galvanizing method except sampling, shop inspection and test procedures shall be as directed by the Laboratory.
2. The posts shall be as detailed on the Standard Structure Sheet for guide railing.
 - a. SL Posts shall conform to ASTM A 245, Grade C.
 - b. SH Posts shall conform to ASTM A36.
 - c. WF and I Beam Posts shall conform to ASTM A36
 - d. The above posts shall be galvanized in accordance with ASTM A 123.
 - e. No posts shall be installed without the prior approval of the Chief Engineer.
3. Hardware. All post connection bolts shall be in conformance with ASTM A 307 and details shown on the plans and shall be galvanized in accordance with ASTM A 153.
4. Plastic and Synthetic Block-Outs. The plastic and synthetic material block-outs are used to provide a uniform offset distance from the corrugated beam rail to the heavy post. The block-out shall have the same general dimensions as detailed in the Department Standard Sheets. The block-out shall not contain excessive voids that would compromise its physical strength. The material shall be designated for outdoor exposure and shall include chemical additives to resist UV degradation. If the product contains recycled materials, they shall be environmentally friendly and non-hazardous. Blocks shall contain no materials that will negatively affect their field performance, such as materials that absorb moisture.
5. Certification. When shop inspection is not provided, each shipment of guide rail to a project site shall be accompanied by a certificate of chemical analysis and physical tests for the heat of base metal used in fabricating beams, SL and SH posts and terminal sections as well as a certificate of compliance with the galvanizing requirements of this specification.

D. Method of Measurement.

1. The quantity of heavy steel post, plastic and synthetic blocked out galvanized steel beam guide railing to be paid for under this Item shall be the number of linear feet center to center of end posts furnished and installed in accordance with these specifications, the plans and the orders of the Engineer.
2. An allowance of 4 linear feet will be paid for each end terminal section.
3. Where curved beam type guide railing is specifically called for on the plans or ordered in writing by the Engineer and no special item for such curved beam type guide railing is included in the contract proposal, the quantity of guide railing to be paid for will be as described above plus an additional allowance of 33-1/3% of the curved lengths measured along the horizontal center line of "valley" of the beam. Curved Beam Type Guide Railing is defined as that which will require shop working to attain the required curvature. Railing curved by springing in the field is not to be considered as Curved Beam Type Guide Railing.

E. Basis of Payment.

1. The unit price bid per linear foot shall include the cost of all labor, equipment and material necessary to satisfactorily complete the work, including all costs to attain the required curvature. Payment for guide rail shall include the unit price bid and the measured quantity multiplied by the payment factor for various typical post spacing and lengths listed below.

PAYMENT FACTORS FOR POST SPACING

Post Spacing	Post Length	Payment Factor
6'-3"	5'-6"	1.0
6'-3"	7'-0"	1.3
3'-1 1/2"	5'-6"	1.8
3'-1 1/2"	7'-0"	2.3
1'-6"	7'-0"	3.3

4. Salvage of Marketable Timber. In the interest of conservation, the Contractor shall make every effort possible to salvage marketable timber produced as a result of clearing operations, provided the amount of timber is great enough to make the hauling practical. In general, marketable timber is construed to mean logs 8 to 16 feet in length, plus appropriate trimming allowance, having a diameter inside the bark, at the small end, of approximately 10 inches. In the event that the Contractor is not successful in salvaging marketable timber, the Contractor shall advise the Engineer, in writing, of the efforts to salvage and indicate the reason why the timber could not be salvaged.

Any wood that is cut up in firewood lengths or other marketable lengths may be neatly piled adjacent to the right-of-way in an area provided by the Contractor for periods in excess of one week but shall be removed prior to completion of the contract.

201-4 METHOD OF MEASUREMENT

201-4.01 Per Acre. Payment for Clearing and Grubbing will be made at the unit price bid per acre computed to the nearest one tenth acre.

201-4.02 Per Lump Sum. Payment for Clearing and Grubbing will be made on a lump sum basis for work satisfactorily completed. Monthly payments will be made in proportion to the amount of work done as determined by the Engineer.

201-4.03 Borrow Areas. Borrow pits or other pit areas from which material is secured shall not be included for measurement of clearing and grubbing.

201-5 BASIS OF PAYMENT.

201-5.01 Clearing and Grubbing. Payment will be made at the contract price to furnish all materials, labor and equipment necessary to satisfactorily complete the work as specified. No separate payment will be made for any excavation, backfill or earth cover necessary to complete the work of disposal outside the embankment area nor for the work in handling, storing, rehandling and hauling of disposable material within or outside the right-of-way.

Payment will be made under:

Item No.	Item	Pay Unit
201.6	Clearing and Grubbing	Lump Sum
201.7	Clearing and Grubbing	Acre

SECTION 202 - DEMOLITION OF BUILDINGS AND STRUCTURES

(Last Revised September, 2016)

202-1 DESCRIPTION. This work shall consist of the demolition, removal and disposal of existing buildings; and the demolition, removal and disposal of existing bridge structures, removal and disposal of steel supported and concrete superstructure supported structural slabs (with and without shear connectors), in accordance with the contract documents, or as directed by the Engineer.

202-2 MATERIALS. Not specified.

202-3 CONSTRUCTION DETAILS

202-3.01 General. The Contractor shall conduct all demolition and removal operations in accordance with the contract documents and local building codes. The Contractor shall repair or replace in kind sidewalks, curbs, roadway and other materials designated to remain in place which are damaged as a result of the work at no additional cost to the State.

Where a falling hazard of 6 feet or more above a lower level exists to workers, each worker shall be protected from falling by fall arrest systems, or guardrail systems to a height of approximately 42 inches, or by covering openings. All floor or deck openings not used as material drops shall be covered over with materials substantial enough to support the weight of any loads which may be imposed upon them. Such materials shall be properly secured to prevent accidental movement.

When excavation is required, the Contractor shall provide protection for the public in accordance with §107-0SK. *Open Excavations and Trenches*. The Contractor shall make provisions to control dust resulting from demolition operations by wetting the work area and debris or other appropriate measures.

A. Demolition Plan. Prior to any demolition or removal operations, the Contractor shall conduct an engineering survey, performed by a competent person, of the building, bridge, or other structure to determine its condition and the possibility of collapse of any portion, in accordance with 29 CFR 1926 Subpart T. Bridge data inspection reports will be made available by the Department, where available. Adjacent buildings or structures within 100 feet of the building or structure shall be included in the survey. If the Demolition Plan is required to be sealed by a Professional Engineer, the engineering survey shall be conducted under the direction of a Professional Engineer.

The Demolition Plan for the demolition, removal, or dismantling of a bridge structure longer than 20 feet shall be prepared, checked, and sealed by a Professional Engineer experienced in the design, construction, or demolition of such structures.

The Demolition Plan for a building, other than ordinary wood frame construction of 2-1/2 stories or less shall be prepared, checked, and sealed by a Professional Engineer or an Architect experienced in building design, construction, or demolition. The Demolition Plan for the demolition of ordinary wood frame construction buildings of 2-1/2 stories or less need not be prepared by a Professional Engineer.

The Demolition Plan for the removal of steel supported structural slabs, Type B, shall be prepared, checked, and sealed by a Professional Engineer, in accordance with §202-3.07.

The Demolition Plan for the removal of steel supported structural slabs – Type A, and concrete superstructure supported concrete slabs need not be prepared by a Professional Engineer.

Demolition Plans that are required to be prepared by a Professional Engineer or an Architect shall be submitted to the Engineer 30 calendar days prior to the start of demolition. Unless otherwise noted, all other Demolition Plans shall be submitted to the Engineer 14 calendar days prior to the start of demolition.

The Engineer may return the Demolition Plan if it does not adequately identify and address obvious safety and other identified conditions. The Engineer's failure to return any Demolition for additional studies and recommendations shall not relieve the Contractor from the obligation of preparing an adequate Demolition Plan and conducting adequate engineering surveys that safeguard workers and the public.

When the Demolition Plan is required to be prepared by a Professional Engineer, the Professional Engineer shall prepare the following, as appropriate. When the Demolition Plan is not required to be prepared by a Professional Engineer, the Contractor shall prepare the following, as appropriate:

1. A plan of the work area including roadways, support structures, railroad tracks, canals or streams, both underground utilities and overhead utility lines, and any other information pertinent to demolition.
2. A description and catalog cuts of the type, size, and weight of cranes, heavy equipment, and trucks to be used.
3. A plan of the location of cranes, heavy equipment, and trucks.
4. Identification of components analyzed, with reference to controlling specifications or codes.

5. Identification of strength of materials (or allowable stresses) related to means and methods, within calculations or drawings.
6. Girder stability analysis, including non-composite girder analysis with dead load and equipment loads.
7. Current condition of superstructure and substructure. Indicate whether it is based on site visit and date, or latest inspection report and date.
8. Section loss of all components (including components in the load path), where applicable, both within calculations and on demolition drawings. State whether section loss is assumed percentage based on inspection report and date, or measured section loss based upon field inspection and date.
9. Demolition sequences (including deck removal), with a narrative description. Calculations associated with the Demolition Plan shall be included for each stage. Include saw cut locations.
10. Clear statement of critical assumptions, with guidance on contingency steps if conditions do not match assumptions.
11. The locations and details of supporting members, framing and foundation, etc., necessary to accomplish the partial demolition of a building.
12. Measures necessary to prevent a partial building demolition from affecting adjacent property.

The following shall be identified in the Demolition Plan, but need not be prepared by a Professional Engineer:

13. The locations and details of signs, barricades, curbing, and decking used to cover over holes in the flooring of a building.
14. Details of water diversion plans necessary for the proposed means and methods. Identify environmental ground and environmental water protection requirements, including location specific information.
15. Description of plans to contain and collect paint waste generated from subsequent cutting operations, or reference to other submittals.
16. Sequence of operations, including Work Zone Traffic Control requirements such as lane closures, required to perform the work.
17. Means and methods to control dust from being objectionable to nearby residents or potentially hazardous to workers.
18. Description of plans for abatement of all identified and impacted asbestos-containing materials.

B. Monitoring. A competent person is defined in 29 CFR 1926, Subpart C as someone who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are or will be unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. If the Demolition Plan is required to be sealed by a Professional Engineer per conditions stated herein, then the monitoring performed by a competent person shall be under the direction of a Professional Engineer.

The competent person shall monitor the on-going structural condition of surveyed buildings and structures prior to and during demolition, by observing them for the presence of excessive vibrations; by measuring and recording the width, extent, and progression of cracks; by measuring and recording the plumbness and integrity of structural elements and bracing; and by making other observations as necessary. If these assessments indicate that potential for collapse of a structure or building exists, the competent person shall undertake measures to ensure safety. If these assessments indicate that the work is causing damage to or degradation of structural condition of a structure or building that is to remain or be relocated, the competent person shall undertake measures to prevent additional damage or degradation from occurring and, as directed by the Engineer, shall undertake measures necessary to reverse the degradation or repair the damage.

During the periods that personnel are required to work on, in, or around a building or structure to be demolished or relocated which is in a damaged or deteriorated condition by fire, flood, explosion, weather, or other cause, its elements shall be adequately braced to prevent collapse.

The findings of monitoring assessments shall be promptly provided to the preparer of the Demolition Plan and to the Engineer, if the Demolition Plan has already been submitted.

C. Utility Facilities. The Contractor shall protect existing utility facilities during demolition, or if necessary, they shall be temporarily relocated prior to start of demolition work.

Before any structure or building served with or having utility facilities thereon is demolished, all utility services shall be shut off, capped, or otherwise made safe and controlled outside the building or off the structure, before the general demolition work is started. All severed sewer lines or drains emanating from the building or structure shall be capped or otherwise tightly sealed to prevent the entry of foreign materials into the main sewer or drain.

All electric circuits in any work area that is or may become wet or humid during the work shall be shut down and locked out. If electrical power is required, temporary circuits may be brought into the work area, provided such circuits are ground fault protected.

D. Paint Removal. Prior to beginning any paint removal operations, deposits of bird droppings and loosely adhered paint shall be removed by hand via shoveling or scraping.

The Contractor shall comply with the provisions of 29 CFR 1926.62 when working on steel structures coated with lead-based paint. The Contractor shall comply with all applicable regulations controlling the release of lead into the environment. In enclosed spaces, the Contractor shall remove paint for a minimum distance of 4 inches on each side of the centerline of cut, bolt row, or weld, or protect workers with air-line respirators in accordance with the requirements of 29 CFR 1926.354(c). Demolition Plans shall reference special project specific worker safety and health concerns, and protective measures shall be detailed in the Safety and Health Plan.

Prior to beginning any steel removal operations, paint shall be removed for a minimum distance of 4 inches on each side of the centerline of cut, bolt row, or weld using vacuum-shrouded paint removal equipment that removes paint, collects and contains the removed paint material, does not permit release of visible dust or debris, and does not vaporize paint into the atmosphere. Following paint removal work, loose paint material not contained by the paint removal equipment shall be collected by vacuums equipped with high efficiency particulate (HEPA) filters. Disposal of paint waste shall be performed in accordance with Section 57.1 *Disposal of Paint Removal Waste*.

In cases where the Contractor can clearly demonstrate that alternative work practices and engineering controls comply with applicable OSHA regulations associated with worker safety and health and applicable USEPA regulations associated with public and environmental protection, exception to the paint removal requirement may be granted by the Department as part of the Demolition Plan review and approval. Demolition Plans that propose the use of hydraulic shears without prior paint removal shall include Environmental Ground Protection and/or Environmental Water Protection in order to minimize potential impacts to the environment and/or the public. Demolition Plans that propose the use of torch cutting without prior paint removal shall include adequate containment and/or engineering controls to minimize potential impacts to the environment and/or the public. The Contractor shall ensure proper respiratory protection for exposures via initial personal monitoring. Interim protection of the workers, as defined by OSHA, shall be provided until exposures are determined. Local exhaust ventilation shall be used during periods of wind stagnation. Workers shall stand upwind from activity and ensure no downwind impacts to other, non-protected individuals, including the public. Torch cutting will not be approved in close proximity to sensitive public receptors, such as schools, pedestrian pathways, or buildings.

E. Disposal of Materials. All materials removed under this work, abandoned equipment, and fixtures of any kind remaining on any site after it is released to the Contractor are the property of the Contractor and, except for material other than those of a hazardous nature and materials incorporated into the work, shall be removed and disposed of in accordance with §107-10 *Managing Surplus Material and Waste*.

F. Hazardous Material. The Contractor shall remove and dispose of, or otherwise remediate, asbestos, hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous materials in the building or on the property and will be paid separately.

The Contractor shall remove, or otherwise remediate, asbestos materials or other hazardous materials on each structure or building before demolition work begins. If it is not feasible to remediate hazardous materials from a building due to lack of structural integrity, or other unsafe conditions, the Contractor shall obtain a regulatory variance as applicable, and perform controlled demolition in accordance with applicable federal and state regulations.

202-3.02 Disposal of Buildings. The Contractor shall demolish buildings designated for disposal and released to the Contractor 30 days or more before the contract completion date in accordance with the contract documents. The Contractor shall demolish buildings on site without the use of explosives, unless approved by the Deputy Chief Engineer (Construction).

Any proposal to allow such building or any portion thereof to remain standing at the site, or to be relocated to another site, will be referred to the Regional Director for approval and shall be accomplished under terms and conditions established by the State.

A. Unauthorized Entry. The Contractor shall inspect all buildings released for demolition and shall prevent unauthorized entry to these buildings by boarding up or otherwise blocking potential entrances. If material blocking entrances is removed, the Contractor shall, after determining the building to be vacant, replace the removed material in such a manner as to keep the buildings from being re-entered.

B. Pedestrian Access. The Contractor shall maintain and keep safely passable and free from debris, snow and ice, all public walkways adjacent to the properties on which buildings to be demolished are located.

Active entrances to two or more story buildings and active walkways within 8 feet of two or more story buildings being demolished shall be completely protected for a minimum of 8 feet from the face of the building by sidewalk sheds, canopies or other means. Protection shall extend a minimum of 1 foot beyond each side of the building entrances, openings or walkways. Protection shall be designed by a Professional Engineer, and be capable of sustaining a load of 150 psf. No canopy or shed shall be designed to deflect falling material into an area where they could cause harm or injury to person or property.

For single story buildings, these requirements may be waived if the work may be satisfactorily and safely completed without protection.

C. Removal of Salvaged Materials. The Contractor shall remove all salvaged materials from the site. The Contractor shall not hold any sales, public or private, of salvaged equipment or material within the right of way. The Department does not guarantee the number of fixtures, quantity or quality of equipment or any other material of value existing in the building to be present upon its release to the Contractor.

D. Rodent, Insect, and Wildlife Control. The Contractor shall exterminate rodents and insects in each building so infested, in accordance with the requirements of the City, County or the NYS Department of Health. The Contractor or Subcontractor performing the extermination work shall have at least 5 years experience. If the building or structure to be demolished is inhabited by wildlife, the NYS Department of Environmental Conservation or the local animal control officer shall be contacted and given the opportunity to remove such wildlife before extermination or demolition operations are commenced. If inhabited by domesticated animals, the local animal control officer shall be given the opportunity to arrange for their removal.

Bait shall be placed at least 13 calendar days but not more than 30 calendar days before demolition is started, or at such other times as required by the City or County Health Department. Insects shall be controlled by spraying or fumigating. The Contractor shall seal the building if necessary for the treatment to be effective or to prevent migration of insect, pest, or vermin. Demolition work shall not proceed until the extermination is completed.

If extermination is being conducted because it was ordered by the City, County, or NYS Department of Health, the Contractor shall notify that office that the extermination has been completed and shall obtain their written concurrence that the extermination work was satisfactorily completed.

E. Demolition of Buildings. Unless mechanically demolished from the exterior, the demolition of multi-story buildings of more than 2-112 stories shall be accomplished story by story without accumulating rubble on the floors of the partially demolished structure. Signs warning of the hazard and of falling materials shall be posted at each level. Glass that will create a hazard if fragmented shall be removed.

If mechanical demolition is used, no worker shall be permitted at any location onto which debris may fall or which may become unstable or collapse as a result of the demolition operations. Only the minimum number of workers necessary for the performance of the work shall be permitted in those locations at other times until such time as the operations are complete and the debris has been removed.

If debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with substantial barricades nominally a minimum of 42 inches high, and placed not less than 6 feet back from the projected edge of the opening above. If a hole is used by machines as a material drop, substantial timber or other curbing shall be securely anchored around the hole. The barricades, but not the curbing, may be moved aside temporarily during periods that the machines are actually using the hole. Barricades shall be promptly restored to their proper locations when the machines have ceased dropping material down the hole. Demolition work and workers shall not be permitted in lower areas until debris handling ceases above.

F. Partial Demolition of Buildings. If the work involved consists of demolishing only a portion of a building, the Contractor shall cooperate with the owner(s) of the remaining portion so that inconvenience is minimized.

The Contractor shall close the open portions of the buildings being partially demolished with construction similar to the remainder of the building and shall install supporting members, framing, and foundations to support the remaining structure in accordance with the Demolition Plan. Construction necessary to close the open portions shall meet the local building codes. Structural supports shall be of similar materials as the existing supporting members to which they frame or with which they share load or shall be compatible with them. The Contractor may use salvaged lumber for sheathing provided that such lumber is sound and suitable. The Contractor shall use new timber and lumber for all other purposes.

G. Demolition of Party Wall Structures. If the demolition of one or more units of a group of party wall structures leaves a wall or walls exposed, in accordance with the contract documents, the Contractor shall comply with the following:

1. Furring, plaster, chimneys to be removed, projecting parts, and the like shall be removed.
2. The roof shall be properly flashed, repaired, or otherwise treated to prevent leaks.
3. Walls shall be left in a presentable and sound weatherproof condition compatible in appearance with the remaining building and in conformance with local building codes.
4. Walls shall be made self-supporting, safe and weatherproof with construction similar to or consistent with the remaining building. Supports and bracing shall be installed in accordance with the contract documents.

5. Shoring necessary to prevent damage to adjacent property shall be placed on solid foundation in accordance with the contract documents.

H. Demolition of Foundations. After demolition of the structure, the Contractor shall remove the foundation walls to the depth of the lowest cellar floor, break up any cellar floor, remove any walkways or other materials, backfill the hole and grade the site; unless the removal would endanger adjacent utility facilities or infrastructure. If the hole is not backfilled promptly, it shall be protected with substantial fencing and signs in accordance with § 107-05 *Restricted Areas*.

I. Domestic Sewage Facilities. Septic tanks, leaching basins, cesspools and other similar facilities associated with buildings being demolished or those that will be abandoned shall be pumped free of seepage or sewage, removed, and the resulting hole shall be backfilled in lifts of compacted suitable material. The facilities may be collapsed in place after pumping instead of removal. Septage recovered from the pumping operation shall be handled, transported, and disposed of in accordance with 6 NYCRR Part 364.

J. Basement Petroleum Storage Tanks. Aboveground petroleum storage tanks associated with buildings being demolished shall be emptied, cleaned, and removed. Petroleum storage tanks with a capacity greater than 1100 gallons that are regulated by NYSDEC, or are regulated by other local codes, and require closure, shall be emptied, cleaned, and closed in accordance with 6 NYCRR Part 619.3, and closure will be paid for under Section 629 *Petroleum Storage Tank Closure*. Any waste products removed from the tanks or generated during tank cleaning/removal operations shall be disposed of in accordance with §107-10 *Managing Surplus Material and Waste*.

202-3.03 Relocation of Buildings. The Contractor shall relocate buildings, to sites designated by the owner and approved by the Department, in accordance with the contract documents. Sites to which the buildings are to be moved will be furnished without cost to the Contractor.

A. Site Preparation. The Contractor shall construct all necessary foundations and cellar floors for the relocated building to meet applicable local building codes but not less than equivalent in construction to the existing features. The Contractor shall grade the new site, construct necessary driveways and sidewalks, topsoil and/or seed the area and perform other incidentally required items of work to prepare the site in accordance with the contract documents.

B. Moving Buildings. The Contractor shall conduct a precondition survey to establish current condition prior to the move, using written and photographic measures. The Contractor shall move the building safely and in a manner so as to cause the least possible damage to the building and the least possible interference with or inconvenience to its occupant(s). The Contractor shall arrange for any temporary rerouting of overhead lines or relocating guide wires and for the clearance of other obstructions. The Contractor shall repair any damage that may occur to the building, pavement and other features as a result of the move.

C. Restoration of Service Connections. The Contractor shall restore necessary gas, electrical, sanitary, water supply and other service connections at the building's final location, at least equivalent in construction to the existing connections, so as to cause the least possible disruption in accordance with the requirements of the Utilities and local building codes, and will be paid separately.

D. Restoration Work. The Contractor shall restore exterior portions of the building, including steps, porches, railings, and other appurtenances, to as good and serviceable condition, as existed prior to its relocation, in accordance with local building codes. Any property damaged or destroyed during the execution of the work shall be repaired or replaced at no additional cost to the State.

E. Demolition of Existing Foundations. The Contractor shall demolish the existing foundation of any relocated building, including those relocated by the owner in accordance with §202-3.02H *Demolition of Foundations*.

202-3.04 Dismantling and Storage of Superstructures. The Contractor shall dismantle and store existing superstructures in accordance with the contract documents. A superstructure is defined as that part of a structure above, supported by, and including the bearings. The Contractor shall carefully remove concrete, paving material and other materials from the existing superstructures so as to prevent damage to superstructures to be stored. The parts of superstructure designated to be stored shall be protected, and stored on site or at the locations designated. All stored members shall be adequately match-marked in order to facilitate reassembly. Any parts of the superstructure designated for storage or to remain which are damaged during the course of the operation or during storage shall be repaired or replaced at no additional cost to the State.

202-3.05 Removal of Superstructures. The Contractor shall demolish and remove existing superstructures at the site in accordance with the contract documents. A superstructure is defined as that part of a structure above, supported by, and including the bearings. The removal of steel supported structural slabs where the supporting structural steel is to remain shall be performed in accordance with §202-3.07 *Removal of Steel Supported Structural Slabs*. The Contractor shall obtain the approval of the Deputy Chief Engineer, Structures (DCES) for any proposal to allow such structure or any portion thereof to remain standing on the site or to be relocated to another site.

The Contractor shall designate all areas that could become subject to collapse or that could become unstable as a result of demolition activity as non-access areas, and clearly identify them. The public, workers and equipment with operators shall remain outside these designated non-access areas at all times during demolition operations or at any time the area is subject to potential superstructure collapse.

202-3.06 Removal of Substructures. The Contractor shall demolish and remove existing substructures in accordance with the contract documents. A substructure is defined as that part of a structure below the superstructure, such as abutments, piers, and wingwalls. The Contractor shall comply with the appropriate construction details specified in Section 203 *Excavation and Embankment*. Excavations shall be dewatered and kept free from water, snow and ice as necessary. If excavation protection is necessary to protect structures or other improvements, or if the alternatives of laying back slopes or benching are not available, the support system shall be as indicated in the contract documents.

Sheeting or piling shown in the contract documents which is integral with the substructure and is designated to remain in place shall be cut off at the elevations shown. If indicated in the contract documents, existing sheeting or piling shall be extracted. The Contractor may, with the permission of the Engineer, extract sheeting or piling not shown to be extracted or designated to remain in place rather than cutting it off at the elevations shown on the plans, at no additional cost to the State.

Resulting holes shall be backfilled with suitable material placed in lifts and compacted, and the area regraded.

202-3.07 Removal of Steel Supported Structural Slabs. The Contractor shall remove steel supported structural slabs in accordance with the contract documents. All concrete and other materials carried by the supporting steel members of the superstructure shall be removed unless the plans specifically indicate removal under another item or that the material is to remain in place. Prior to beginning removal operations, the Contractor shall mark the location of the existing primary structural steel members on the surface of the slab. Prior to beginning any sawcutting of the structural slab in order to facilitate removal, the Contractor shall mark the edges of existing structural steel members in contact with the bottom of the slab on the slab surface, or make other adequate provisions approved by the Engineer to prevent damage to the underlying structural steel.

The Contractor shall protect existing structural steel while removing steel supported structural slabs. Nicks or gouges in existing structural steel to remain caused by demolition operations shall be reviewed by the DCES and the Contractor shall repair those damages in accordance with the Steel Construction Manual (SCM) and the direction of the DCES.

All unpainted structural steel surfaces exposed by concrete removal, against which new concrete will be subsequently placed, shall be cleaned sufficiently to ensure proper bond between the steel and concrete.

A. Removal of Steel Supported Structural Slabs with Shear Connectors. The Contractor shall remove all existing spiral shear connectors, so that the remaining cut surface is a maximum 3/4 inch from the surface of the structural steel. Spirals shall be cut in such a manner that the structural steel to remain is not damaged.

The Contractor shall retain existing shear studs undamaged. Existing shear studs removed or damaged during removal of structural slabs, shall be replaced by the Contractor in accordance with the provisions of the SCM, Section 7, Part C *Stud Welding*, at no additional cost to the State.

The Demolition Plan for the removal of steel supported structural slabs with shear connectors shall be either of two types, as described below:

1. Removal of Steel Supported Structural Slab (with shear connectors)-

Type A. Under this type, the Demolition Plan for the structural slab removal need not be sealed by a Professional Engineer.

2. Removal of Steel Supported Structural Slab (with shear connectors)-

Type B. Under this type, due to the increased risks of structural instability in this type of removal, the Demolition Plan for the structural slab removal shall be prepared, sealed, and checked by a Professional Engineer.

B. Removal of Steel Supported Structural Slabs without Shear Connectors.

The Contractor shall remove steel supported structural slabs in accordance with the contract documents. Installation of new shear studs, if required, will be paid for separately.

The Demolition Plan for the removal of steel supported structural slabs without shear connectors shall be either of two types, as described below:

1. Removal of Steel Supported Structural Slab (without shear connectors)-

Type A. Under this type, the Demolition Plan for the structural slab removal need not be sealed by a Professional Engineer.

2. Removal of Steel Supported Structural Slab (without shear connectors)-

Type B. Under this type, due to the increased risks of structural instability in this type of removal, the Demolition Plan for the structural slab removal shall be prepared, sealed, and checked by a Professional Engineer.

202-3.08 Removal of Concrete Superstructure Supported Concrete Slabs. Concrete slabs shall be removed to expose the tops of the prestressed concrete beams and diaphragms while retaining the tie-in bar reinforcement, which is precast into the prestressed concrete beam and diaphragms. All other reinforcement and wire mesh shall be removed. The concrete slab shall be removed with chipping hammers not exceeding 40 lbs. in weight with the bit removed. The Contractor shall exercise care during the execution of the work to avoid damaging or loosening material that is to remain. If the Contractor's operations result in damage to concrete that is to remain, the Contractor shall stop work and make immediate corrections at no additional cost to the State. Any damage caused by the Contractor's operations to material that is to remain shall be repaired or replaced. If the concrete superstructure to remain is cut, or otherwise damaged by Contractor operations, the Contractor shall stop work immediately until a repair procedure is approved by the DCES.

The Contractor may request in writing to the DCES, to mill the top of the deck to a maximum depth of 2 inches, or until the top mat of reinforcing is exposed, whichever is less. The request shall include the specifications for the piece of equipment to be utilized.

A. Removal of Concrete Superstructure Supported Concrete Slab with Shear Connectors. The Contractor shall remove concrete superstructure supported concrete slabs in accordance with the contract documents in such a way that the shear connectors to remain are undamaged. Any damage caused by Contractor operations to shear connectors to remain shall be replaced by a method approved by the DCES at no additional cost to the State.

B. Removal of Concrete Superstructure Supported Concrete Slab without Shear Connectors. The Contractor shall remove the concrete superstructure supported concrete slab in accordance with the contract documents.

202-4 METHOD OF MEASUREMENT

202-4.01 General. Vacant.

202-4.02 Disposal of Buildings. The work under disposal of buildings will be measured for payment on a lump sum basis for a specific building.

202-4.03 Relocation of Buildings. The work under relocation of buildings will be measured for payment on a lump sum basis for a specific building.

202-4.04 Dismantling and Storage of Superstructures. The work under dismantling and storage of superstructures will be measured for payment on a lump sum basis for a specific superstructure.

202-4.05 Removal of Superstructures. The work under removal of superstructures will be measured for payment on a lump sum basis for a specific superstructure.

202-4.06 Removal of Substructures . The quantity of removal of substructures to be measured for payment will be in cubic yards measured to the nearest whole cubic yard, computed from the payment lines.

202-4.07 Removal of Steel Supported Structural Slab. The quantity to be measured for payment will be in square feet of structural slab removed, measured to the nearest whole square foot. Measurements will not make any deductions for openings.

202-4.08 Removal of Concrete Superstructure Supported Concrete Slab. The quantity to be measured for payment will be in square feet of structural slab removed, measured to the nearest whole square foot.

202-5 BASIS OF PAYMENT

202-5.01 General. Vacant.

202-5.02 Disposal of Buildings. The lump sum price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work. Progress payments will be made monthly in proportion to the amount of work completed.

Suitable or select material obtained from other than the demolition site and used to fill foundation holes, and surface restoration will be paid for separately. Water used for dust control or compaction will be paid for separately if a contract pay item for water is included in the contract. Closure of basement petroleum storage tanks will be paid for separately if regulations require the tank to be closed. The cost of asbestos removal, abatement, and disposal will be paid for separately.

The cost of extermination shall be included in the lump sum price bid if the contract documents indicate that extermination work is required, otherwise it will be considered extra work.

202-5.03 Relocation of Buildings. The lump sum price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work, including excavation necessary at the old or the new building site and water used for dust control or compaction if a contract pay item for water is not included in the original contract bid documents. Extermination shall be included in the lump sum price bid if the original contract bid documents indicate that extermination work is required. Progress payments will be made monthly in proportion to the amount of work completed.

If a property owner, upon agreement with the Department, removes the building, the Contractor will be paid 20% of the bid price for demolition of the existing foundation, walks and other facilities.

Suitable or select material obtained from other than the demolition site and used to fill foundation holes, and surface restoration will be paid for separately.

The work of reconnecting and providing services for the relocated building at its new site will be paid for separately.

202-5.04.Dismantling and Storage of Superstructures . The lump sum price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work . Progress payments will be made in proportion to the amount of work completed. The cost of paint waste disposal will be paid for separately.

202-5.05. Removal of Superstructures . The lump sum price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work. Progress payments will be made in proportion to the amount of work completed. The cost of paint waste disposal will be paid for separately.

202-5.06 Removal of Substructures. The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work. Excavation and excavation protection required to access portions of the substructure for removal will be paid for separately.

Material obtained from other than the demolition site and used to fill substructure holes and surface restoration will be paid for separately. Water used for dust control or compaction will be paid for separately if a contract pay item for water is included in the contract. The cost of asbestos removal, abatement, and disposal will be paid for separately.

202-5.07 Removal of Steel Supported Structural Slabs. The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including any sawcutting performed in order to facilitate removal.

202-5.08 Removal of Concrete Superstructure Supported Concrete Slabs. The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including any sawcutting performed in order to facilitate removal. No additional payment will be made for removals, repairs or replacements made necessary due to the Contractor's operations.

Payment will be made under:

Item No.	Item	Pay Unit
202.0 1nnnn	Disposal of Buildings	Lump Sum
202.03nnnn	Relocating Buildings	Lump Sum
202.11nnnn	Dismantling and Storing Existing Superstructures	Lump Sum
202.12nnnn	Removing Existing Superstructures	Lump Sum
202.19	Removal of Substructures	Cubic Yard
202.2201	Removal of Steel Supported Structural Slabs (with shear connectors) -Type A	Square Foot
202.2202	Removal of Steel Supported Structural Slabs (with shear connectors) -Type B	Square Foot
202.230 1	Removal of Steel Supported Structural Slabs (without shear connectors) -Type A	Square Foot
202.2302	Removal of Steel Supported Structural Slabs (without shear connectors) -Type B	Square Foot
202.24	Removal of Concrete Superstructure Supported Concrete Slabs (with shear connectors)	Square Foot
202.25	Removal of Concrete Superstructure Supported Concrete Slabs (without shear connectors)	Square Foot

NOTE: nnnn denotes serialized pay item for each building or structure.

SECTION 203- EXCAVATION AND EMBANKMENT

<Last Revised January 2019)

203-1 DESCRIPTION. This work shall consist of excavation, disposal, placement and compaction of all materials that are not provided for under another section of these Specifications, and shall be executed in conformance with payment lines, grades, thicknesses and typical sections specified in the contract documents.

203-1.01 Definitions.

A. Unclassified Excavation. Unclassified excavation shall consist of the excavation and disposal of all materials, of any description, encountered in the course of construction, unless otherwise specified in the contract. Estimated limits and descriptions of subsurface deposits and formations which may be shown in the contract documents are supplied as a part of Base Line Data.

B. Embankment. The embankment is the portion of a fill section situated between the embankment foundation and the subgrade surface, excluding any material placed under another section of these specifications.

C. Embankment Foundation. The embankment foundation is the surface upon which an embankment is constructed after all work required under §203-3.03A. *Embankment Foundation* has been completed.

D. Subgrade Surface. The subgrade surface is the surface of the road section upon which the select materials and/or subbase are placed.

E. Subgrade Area. The subgrade area is that portion of an embankment situated above either of the following, but excluding any material placed under another section of these specifications.

ITEM 202 - ANCHORAGE UNITS FOR HEAVY POST BLOCKED OUT CORRUGATED BEAM GUIDE RAILING FOR DRIVEWAYS

ITEM 203 - ANCHORAGE UNITS FOR HEAVY POST BLOCKED OUT CORRUGATED BEAM GUIDE RAILING FOR HIGHWAYS

CORRUGATED BEAM GUIDE RAILING FOR HIGHWAYS

ITEM 204 - ANCHORAGE UNITS FOR HEAVY POST BLOCKED OUT CORRUGATED BEAM MEDIAN BARRIER

A. Description.

Under this item the Contractor shall furnish and install anchorage units for heavy post blocked out corrugated beam guide railing in accordance with the Plans, Specifications and as ordered by the Engineer.

B. Materials.

The materials shall conform to the material requirements of Item 35BO, Heavy Post, Plastic and Synthetic Block-Out Galvanized Corrugated Steel Beam Guide Railing, M6 Structural Steel, M17 Bar Reinforcement for Cement Concrete. Concrete shall meet the requirements of Class A Concrete for structures. All steel shall be galvanized in accordance with ASTM A 123.

C. Construction Details.

1. WF Beam Posts shall be driven, unless otherwise specified by the Engineer, by approved methods and equipment that will leave the posts in their final position, free of any distortion, burring or other damage.
2. When posts for guide railing are to be driven through asphalt or adjacent to a stabilized shoulder course, extreme care shall be taken to prevent damage to the paved or shoulder course. Large holes and voids caused by driving the posts shall be filled and compacted with a bituminous treated material or asphalt concrete similar to that damaged. The small area adjacent to the post disturbed during installation or where gaps exist at the post after pavement repairs shall be sealed with a bituminous material approved by the Engineer, at no cost to the County.

D. Method of Measurement.

1. Anchorage units will be measured by the actual number of anchorage units installed in accordance with the Plans, Specifications or as directed by the Engineer

E. Basis of Payment.

1. The unit price bid for each anchorage unit shall include the cost of furnishing all labor, materials, equipment and incidentals as necessary to satisfactorily complete the work.

ITEM 204 - FLOWABLE FILL

204-1 DESCRIPTION. The work shall consist of mixing and placing flowable fill at the locations shown in the contract documents.

204-1.01. Controlled Low Strength Material. Controlled Low Strength Material (CLSM) is an acceptable alternative to compacted soil backfill in confined spaces. CLSM consists of cement, water and, at the Contractor's option, fly ash, aggregate or chemical admixtures in any proportions such that the final product meets the strength and flow consistency requirements included in the specification. The mix is proportioned to be self-leveling and does not require compaction. It is much lower in strength than concrete, making future excavation possible.

204-1.02. Lightweight Concrete Fill. Lightweight Concrete Fill is an engineered geotechnical material with a unique strength / density relationship which can be used to reduce loads on soft foundation soils, buried structures, or against retaining walls. Lightweight Concrete Fill consists of a Portland cement matrix containing uniformly distributed, non-interconnected air voids introduced by a foaming agent. The flowability and cementitious properties provide a product that is self-leveling and does not require compaction.

204-2 MATERIALS.

204-2.01 Controlled Low Strength Material. Provide backfill material meeting the requirements for CLSM as stated in §733-01 *Flowable Fill*.

204-2.02 Lightweight Concrete Fill. Provide backfill material meeting the requirements for Lightweight Concrete Fill as stated in §733-01 *Flowable Fill*.

204-3 CONSTRUCTION DETAILS.

204-3.01 Controlled Low Strength Material.

A. CLSM Submittal. Submit to the Engineer (1) a mix design, with certified test results supplied by a qualified independent testing laboratory for the CLSM verifying the unconfined compressive strength meets the requirements of the specification, and (2) the methods of installation to be employed. Include in the CLSM placement sequence, a procedure to account for subsidence during the settling and curing process.

B. CLSM Production. Mix the materials at a stationary mixing plant which is either a continuous or a batch type plant. A batch is defined as the amount of material that can be mixed at one time. Design the mix of materials to accurate proportions, either by volume or by weight, so that when the materials are incorporated in the mix a thorough and uniform mix will result.

If the CLSM can be placed within 30 minutes of the end of mixing, then open haul units may be used for transport. If it cannot be placed within 30 minutes after the end of mixing, it must be transported by a rotating drum unit capable of 2-6 rpm.

For work involving quantities of CLSM less than 2.5 yd³, the Contractor may use a small portable mixer. Provide a mixer capable of mixing CLSM that has the specified unconfined compressive strength and flow consistency. Mix all components so as to produce a uniform product.

C. CLSM Placement - General. Do not place CLSM that is frozen, or place CLSM on frozen ground. Do not expose CLSM to freezing temperatures until after it has gained its requisite strength, abiding by the *Provisions for Curing in Cold Weather in Section 555 Structural Concrete*.

If the CLSM is to be placed via pumps, the placement sequence shall be such that the equipment is able to access the entire volume to be filled without separating the mixture.

Keep CLSM encapsulated with soil or protected by other means so as to prevent erosion and environmental degradation.

D. CLSM Placement – at Structures, Culverts, Pipes, Conduits and Direct Burial Cables. Place the CLSM in accordance with the installation details shown on the Standard Sheet.

When placing CLSM for pipe backfill, discharge the material onto the top and at the center of the pipe.

Do not place CLSM in contact with aluminum pipe, including connections, fixtures, etc., unless the aluminum has been thoroughly coated with Zinc Chromate Primer, *§708-04 Zinc Chromate Primer*, or an equivalent alternative as approved by the Materials Bureau.

Do not place CLSM containing fly ash in direct contact with cast iron or ductile iron pipes, fittings or appurtenances.

In situations where CLSM is used as backfill around pipe, take precautions to counteract the pipe's buoyancy.

E. CLSM – QA Testing. The Department maintains a Quality Assurance (QA) program for CLSM. The Department will sample and test specimens of the CLSM during placement to compare its properties to the specification requirements and verifying the spread diameter and unconfined compressive strength of the in-place material. The QA program provides oversight of the Contractors Quality Control (QC) process, to reveal changes which may occur in the approved mix design.

Several scenarios may develop as a result of the QA testing

1. The properties are shown to meet the requirements of the specification for the type(s) identified in the contract documents. No action will be taken.
2. The properties are shown to be outside the requirements of the specification for the type(s) identified in the contract documents.
 - a) If the results are within an acceptable margin as determined by the Department through an independent analysis of the site-specific conditions, the material may remain in-place contingent upon an agreed credit. If a credit cannot be agreed upon, the scenario reverts to 2.b.
 - b) If the results are not within an acceptable margin as determined by the Department through an independent analysis of the site-specific conditions, the entire lift (and all overlying lifts) of material will be removed and replaced at the Contractor's expense.

204-3.02 Lightweight Concrete Fill.

A. Lightweight Concrete Fill Submittal. Submit to the Engineer (1) a mix design, with certified test results supplied by a qualified independent testing laboratory for the Lightweight Concrete Fill verifying the wet cast density and unconfined compressive strength meets the requirements of the specification for the type(s) identified in the contract documents, and (2) the methods of installation to be employed.

B. Lightweight Concrete Fill Production. Generate foam in accordance with the manufacturer's recommendations for inclusion into the mix.

Mix the materials at a stationary mixing plant which is either a continuous or a batch type plant. A batch is defined as the amount of material that can be mixed at one time. Design the mix of materials to accurate proportions, either by volume or by weight, so that when the materials are incorporated in the mix, a thorough and uniform mix will result.

Locate equipment such that the mixed product is capable of being pumped into place properly.

C. Lightweight Concrete Fill - Placement. A representative of the supplier of the foaming agent shall be on site during the initial placement and at such times as requested by the Engineer to advise the Contractor on his operation. The lightweight concrete fill shall be placed in lifts not to exceed 24 in. unless otherwise approved by the Engineer. Subsequent lifts shall be placed only after a minimum 12 hour waiting period has been observed.

At the end of each pour, exposed surfaces shall be roughened with a stiff broom or scored with a tool. The Lightweight Concrete Fill shall be placed on supporting surfaces which have been cleaned of loose debris, sand, dust, or other foreign materials to the satisfaction of the Engineer.

Do not place Lightweight Concrete Fill that is frozen or place Lightweight Concrete Fill on frozen ground. Do not expose Lightweight Concrete Fill to freezing temperatures until after it has gained its requisite strength, abiding by the Provisions for Curing in Cold Weather in Section 555 Structural Concrete.

D. Lightweight Concrete Fill – QA Testing. The Department maintains a Quality Assurance (QA) program for Lightweight Concrete Fill. The Department will sample and test specimens of the Lightweight Concrete Fill material during placement to compare its properties to the specification requirements and verifying the wet cast density and unconfined compressive strength of the in-place material. The QA program provides oversight of the Contractors Quality Control (QC) process, to reveal changes which may occur in the approved mix design.

Several scenarios may develop as a result of the QA testing

1. The properties are shown to meet the requirements of the specification for the type(s) identified in the contract documents. No action will be taken.
2. The properties are shown to be outside the requirements of the specification for the type(s) identified in the contract documents.

- a) If the results are within an acceptable margin as determined by the Department through an independent analysis of the site-specific conditions, the material may remain in-place contingent upon an agreed credit. If a credit cannot be agreed upon, the scenario reverts to 2.b.
- b) If the results are not within an acceptable margin as determined by the Department through an independent analysis of the site-specific conditions, the entire lift (and all overlying lifts) of material will be removed and replaced at the Contractor's expense.

204-4 METHOD OF MEASUREMENT.

204-4.01. Controlled Low Strength Material. CLSM will be measured for payment in cubic yards measured to the nearest 0.1 cubic yard computed from the payment lines shown on the contract documents.

A deduction will be made for pipes (based on nominal diameters) and other features when the combined cross-sectional area exceeds 1 ft².

No additional quantity shall be measured for payment to make up losses due to foundation settlement, compaction, erosion or any other cause.

Cross sectioning, for the purpose of determining quantities for payment, will be employed only where payment lines are not shown on the contract documents or Standard Sheets, and cannot be reasonably established by the Engineer.

204-4.02. Lightweight Concrete Fill. Lightweight Concrete Fill will be measured for payment in cubic yards measured to the nearest 0.1 cubic yard computed from the payment lines shown on the contract documents.

204-5 BASIS OF PAYMENT.

204-5.01 Controlled Low Strength Material. The unit price bid shall include the costs of all labor, material, and equipment necessary to satisfactorily complete the work.

204-5.02. Lightweight Concrete Fill. The unit bid price shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work.

Payment will be made under:

Item No.	Item	Pay Unit
204.01	Controlled Low Strength Material (CLSM)	Cubic Yard
204.02	Controlled Low Strength Material (CLSM) (No Fly Ash)	Cubic Yard
204.03	Lightweight Concrete Fill (Type A)	Cubic Yard
204.04	Lightweight Concrete Fill (Type B)	Cubic Yard

**ITEM 205 - HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE
RAILING CONNECTION TO TWO RAIL STEEL BRIDGE
RAILING**

A. Description.

1. The Contractor shall furnish and install components for connecting galvanized heavy post blocked-out corrugated beam guide railing to existing two rail steel bridge railing at the locations indicated on the Contract Plans.
2. The performance of this work will require the removal of a portion of the existing railing.

B. Materials.

1. All material furnished for the steel bridge rail end assembly shall conform to the requirements stated on the plans.
2. All remaining material shall conform to the requirements of Items 200 and 201, except that the posts, back-up plates, offset beams, soil plates, channels and hardware shall be as detailed on the plans.
3. The offset beams and channels for the guide rail shall conform to ASTM A36. End sections and back-up plates shall conform to the requirements for corrugated rails.
4. Bolts, nuts, and washers for attaching guide rail to bridge rail extension, offset beams to posts, and rails to offset beams shall conform to ASTM A325 and shall be galvanized according to ASTM A153.

C. Construction Details

1. All requirements of Items 200 and 201 shall apply in addition to the following: The Contractor shall exercise care in attaching the guide rail to the existing railing so as not to damage the rails, posts, joints or splices. Any damage due to the Contractor's operation shall be repaired or replaced as ordered by the Engineer at no expense to the County in accordance with Item B6B, Steel Bridge Railing.

D. Method of Measurement.

1. Guide railing connections to bridge railing shall be measured by the number installed.

E. Basis of Payment.

1. The unit price bid for each guide railing connection shall include the cost of all labor, materials and equipment necessary to complete the work.

**ITEM 206 - HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING
CONNECTION TO THREE RAIL TUBULAR STEEL BRIDGE RAILING**

A. Description.

1. The Contractor shall furnish and install a galvanized heavy post blocked-out corrugated beam guide railing to existing three rail tubular steel bridge railing at the locations indicated on the Contract Plans. The performance of this work will require the removal of a portion of the existing railing.

B. Materials.

1. All materials furnished shall conform to the requirements of Items 200 and 201, except that the posts, back-up plates, offset beams, soil plates, channels and hardware shall be as detailed on the plans.
2. The offset beams and channels shall conform to ASTM A36. The back-up plates shall conform to the requirements for corrugated rails.
3. Bolts, nuts and washers for rail splices shall conform to Items 200 and 201. U-Bolts, nuts, and washers shall conform to ASTM 307, shall be galvanized. All other bolts, nuts and washers, shall meet the requirements of ASTM A325 and shall be galvanized according to ASTM A 153.

C. Construction Details

1. All requirements of Items 200 and 201 shall apply in addition to the following:
2. The Contractor shall exercise care in attaching the guide rail to the existing railing so as not to damage the rails, posts, joints or splices. Any damage due to the Contractor's operation shall be repaired or replaced as ordered by the Engineer at no expense to the County in accordance with Item 86B.

D. Method of Measurement.

1. Guide railing connecting to bridge railing shall be measured by the number of linear feet measured along the axis of the guide railing and between its extreme outer limits as shown on the plans.

E. Basis of Payment.

1. The unit price bid per linear foot shall include the cost of all labor materials and equipment necessary to complete the work.

ITEM 207 - HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING CONNECTION TO WALLS (TRAILING ENDS)

A. Description.

1. The Contractor shall furnish and install all components for connecting trailing ends of heavy post blocked-out corrugated beam guide railing to walls in accordance with the plans, specifications, and as ordered by the Engineer.

B. Materials.

1. All materials furnished shall conform to the requirements of Items 200 and 201 except that the posts, back-up plates, offset beams, soil plates, base plates, channels, expansion anchors, anchor bolts, and hardware shall be as detailed on the plans.
2. The offset beams and channels shall conform to ASTM A36. The back-up plates shall conform to the requirements for the corrugated rails.
3. Bolts, nuts, and washers for attaching offset beams to posts, and rails to offset beams, shall conform to ASTM A325 and shall be galvanized in accordance with requirements of ASTM A153.
4. Anchor bolts and grout for anchor bolts shall conform to the requirements of Items 200 and 201.
5. When the posts are required to be encased in concrete, the concrete shall meet the requirements specified for Class A concrete in Item 17.

C. Construction Details

1. All the requirements of Items 200 and 201 shall apply except for the following:
2. Holes for the expansion anchors shall be carefully drilled. Any damage caused to the wall shall be repaired by the Contractor to the satisfaction of the Engineer.

D. Method of Measurement.

1. Guide railing connections shall be measured by the number furnished and installed in accordance with the plans, specifications and as directed by the Engineer.

E. Basis of Payment.

1. The unit price bid for each guide railing connection shall include the cost of all labor, materials, and equipment necessary to complete the work as well as any repairs to existing facilities made necessary by the Contractor's operations.

ITEM 208 - RECONSTRUCTION OF HEAVY POST BLOCKED-OUT CORRUGATED GUIDE RAILING

ITEM 209 - RECONSTRUCTION OF MEDIAN BARRIER

A. Description.

1. Under this Item the contractor shall remove, store, reconstruct and reinstall guide railing or median barrier of the type(s) existing on the contract site where and as shown on the plans in accordance with the specifications and/or ordered by the Engineer.

B. Materials.

1. The guide railing or median barrier on which the work is to performed under this Item shall be that existing on the site. It shall be galvanized corrugated steel beam guide railing (as specified under Item 200 & 201 of this contract).
2. The existing guide railing designated to be reconstructed shall be carefully dismantled and the posts removed if necessary. All posts, rails, hardware and other railing parts which are in satisfactory condition acceptable to the Engineer for incorporation in the repaired guide rail shall be salvaged. All other members or parts of the railing that are determined to be in unsatisfactory condition and not acceptable to the Engineer shall be removed from the site.
3. The Contractor shall furnish all such new railing parts or members to replace the damaged discarded materials in sufficient quantity as necessary to restore the guide rail/median barrier complete in its original state and position.
4. All materials furnished shall be new, equal in all respects in quality, type and kind to railing members as specified under Items 200 & 201 of the contract.
5. All salvaged material re-used shall be cleansed and free of dirt, rust, scale or other foreign material.
6. All railing members damaged or loosened by the contractor as a result of his work under this Item shall be repaired, tightened or replaced as directed by the Engineer, at the contractor's expense.
7. The contractor shall reset posts as necessary and install the railing and other railing parts or members as required to complete the installation and establish the guide rail/median barrier to its initial line and grade. All fastening hardware (splice bolts, attachment bolts etc.) shall be reinstalled or replaced as necessary and tightened to the appropriate torque limits

C. Maintenance and Protection of Traffic.

1. Proper precautions shall be taken to protect and maintain traffic at all times according to standards set forth in the New York State Manual of Traffic Control Devices. Repairs shall generally be made within one working day. In no case shall gaps or disconnected sections of rail with un-protected ends be allowed overnight once repair work has been started.

D. Method of Measurement.

1. The quantity to be paid for under this Item shall be the number of linear feet reconstructed, as measured from center to center between posts complete in final position.

E. Basis of Payment.

1. The unit price bid for this item shall include the cost of furnishing all labor, materials, tools, equipment, and incidentals necessary to satisfactorily complete the work including all new materials furnished as required to replace materials discarded, damaged or as otherwise directed by the Engineer.

ITEM 210E - ET-2000 ENERGY ABSORBING SAFETY END TREATMENT

A. Description.

1. This item shall govern for the furnishing and installation of the ET-2000 guiderail end treatment, or equal (based on equivalent crash-tests results and equivalent site=space requirements) at the locations shown in the plans. After installation, the end treatments shall remain intact and redirect traffic face vehicular impacts and flatten the rail elements to attenuate end-on vehicular impacts within normally expected ranges. The ET-2000 was tested on flat terrain and is recommended on slopes. The ET-2000 end treatment is a patented product and may be obtained from Syro Steel Company, 1170 North State Street, Girard, Ohio 44420. (216) 245- 4373.

B. Materials.

1. All materials shall be new. The ET-2000 terminal shall be capable of flattening the guiderail to a depth of approximately 1 inch and bend it approximately 180 degrees away from the impacting vehicle. This unit shall be supported by two leg supports attached to the bottom and have two rubber pads on its face. This unit shall be attached to a 6" X 8" wood post by two 3/8" X 5" lag screws. The post shall be installed in a galvanized steel tube 8" X 6" X 3/16" X 4' 6" long with a 1'6" X 2'0" soil plate attached to the tube. A breakaway-cable assembly shall be anchored to the guiderail as shown in the plans. Other post and foundation tube assemblies in the system will be of similar size. Post 1 through 4 must be set in the steel foundation tubes. The breakaway posts at locations 5, 6, 7 and 8, may be installed if shown in the plans as option "B" without foundation tubes.
2. The guiderail elements shall be 25 feet continuous 12 gauge sections as specified in AASHTO M-180. Timber posts shall meet the requirements for materials as specified in AASHTO M-168 and preserved as specified in AASHTO M-133.

C. Construction.

1. Guiderail Extruder Terminal ET-2000 shall be fabricated and installed in accordance with the details shown in the plans so as to provide an end treatment which will remain intact and redirect traffic face vehicular impacts and flatten the rail element to attenuate end-on vehicular impacts within normally-expected ranges.
2. Further information regarding assembly and installation of the ET-2000 Energy Absorbing Safety End Treatment may be obtained from Syro Steel Company.
3. Damaged end treatments shall be repaired and replaced immediately. The repair or replacement will be at the contractor's expense.

D. Method of Measurement.

1. This item will be measured as each ET-2000 installation is in place as shown on the plans.

E. Basis of Payment.

1. The work performed and the materials furnished under this item, will be paid for at the unit price bid for ET-2000 which shall be full compensation for all labor, equipment, tools, incidentals, and services, and for furnishing all materials necessary to complete the work described in this item, including wood posts and blocks, steel tubes, guiderail, cable anchoring system, guiderail extruder and incidentals.

All provisions of Item 210E shall apply with the exception of the following:

1. Entire end treatments shall not be installed, but shall be delivered to Nassau County Department of Public Works' Maintenance Garage in Hicksville. If particular parts are required then payment for these parts shall be made under Item 506.

209.110604	Check Dam (Ditch Bottom Width > 1 0') Stone-Permanent	Each
209.13	Silt Fence-Temporary	Foot
209.1401nn	Sediment Trap, Earth Berm-Temporary	Each
209.1402nn	Sediment Trap, Sand Bag-Temporary	Each
209.1403nn	Sediment Trap, Ditch Dam-Temporary	Each
209.1501	Turbidity Curtain-Temporary	Foot
209.160103	Pipe Slope Drain, 12" -Temporary	Each
209.160105	Pipe Slope Drain, 18" -Temporary	Each
209.160106	Pipe Slope Drain, 24" -Temporary	Each
209.1701	Drainage Structure Inlet Protection, Silt Fence-Temporary	Foot
209.1702	Drainage Structure Inlet Protection, Gravel Bag-Temporary	Cubic Yard
209.1703	Drainage Structure Inlet Protection, Prefabricated-Temporary	Foot
209.1704	Drainage Structure Inlet Protection, Concrete Block-Temporary	Foot
209.1705	Drainage Structure Inlet Protection, Excavated-Temporary	Foot
209.1801	Rolled Erosion Control Product, Class I Type A, Short Term	Square Yard
209.1802	Rolled Erosion Control Product, Class I Type B, Short Term	Square Yard
209.1803	Rolled Erosion Control Product, Class I Type C, Short Term	Square Yard
209.1901	Rolled Erosion Control Product, Class II Type A, Intermediate	Square Yard
209.190201	Rolled Erosion Control Product, Class II Type B, Intermediate	Square Yard
209.190301	Rolled Erosion Control Product, Class II Type C, Intermediate	Square Yard
209.1904	Rolled Erosion Control Product, Class II Type D, Intermediate	Square Yard
209.200101	Turf Reinforcement Mats, Class III Type A, Permanent	Square Yard
209.200201	Turf Reinforcement Mats, Class III Type B, Permanent	Square Yard
209.200301	Turf Reinforcement Mats, Class III Type C, Permanent	Square Yard
209.200401	Turf Reinforcement Mats, Class III Type D, Permanent	Square Yard
209.2101	Soil Stabilizers, Class IV Type A	Square Yard
209.2102	Soil Stabilizers, Class IV Type B	Square Yard
209.2103	Soil Stabilizers, Class IV Type C	Square Yard
209.22	Construction Entrance/Exit	Square Yard
209.2301	Sediment Filter Log, 12"	Foot
209.2302	Sediment Filter Log, 18" to 20"	Foot
209.2303	Sediment Filter Log, 24"	Foot

NOTE: nn denotes serialized pay item. These items will be paid for within established size groups.

SECTION 210- REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING MATERIAL (BUILDINGS, BRIDGES AND HIGHWAYS)

210-1 DESCRIPTION. This work shall consist of removal and disposal of asbestos- containing material (ACM) from locations designated in the Contract Documents and/or where directed by the Engineer. Additional contract-specific requirements may be found on the plans or in the proposal in a Special Note entitled "Asbestos Remediation Supplemental Requirements."

210-2 MATERIALS. All materials used in the performance of the work shall comply with all applicable regulatory standards. Respirators and filters shall comply with NIOSH and MSHA standards. HEPA filtration systems shall comply with ANSI Z9.2-79.

210-3 CONSTRUCTION DETAILS. Prior to beginning any work under this item, the Contractor shall supply the Engineer with proof that the firm performing the work has a valid asbestos handling license; that its insurance coverage whether provided by the Contractor or the Asbestos Subcontractor, is

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consistent with §107-06 Insurance and includes an asbestos-specific, occurrence-type policy with no deductible or sunset clause; that its project supervisor is a NYSDOL certified asbestos project supervisor; that all employees engaged in the work are properly certified and have current physical examinations and respirator fit tests; and that the proper notification of work beginning on the asbestos project has been given to the New York State Department of Labor (NYSDOL) and the United States Environmental Protection Agency (USEPA). The Contractor shall schedule a coordination meeting between the Asbestos Subcontractor and the Department contracted Asbestos Project Monitor to be held at least two (2) weeks before the start of any asbestos abatement work. The meeting shall be held at the Engineer's Field Office unless otherwise approved by the Engineer.

The Contractor shall remove and dispose of ACMs in accordance with 12 NYCRR 56 or, if indicated, an approved variance thereof promulgated by the New York State Department of Labor (NYSDOL); the National Emission Standards for Hazardous Air Pollutants (NESHAP), promulgated by the United States Environmental Protection Agency (USEPA); and the Occupational Safety and Health Administration (OSHA). In the event of a conflict between these specification requirements and laws, rules and regulations of Federal, State, or local agencies, the more restrictive shall apply.

ACM shall be disposed of in accordance with 40 CFR Part 61 and all other requirements and laws, rules, and regulations of applicable Federal, State, or local agencies. Disposal sites which accept ACM for disposal shall be permitted by the New York State Department of Environmental Conservation (NYSDEC). If disposed of out-of-state, the rules, regulations, and laws of that state shall apply.

After the work is completed, the Contractor shall provide the Engineer with two copies of Daily Logs, Visitor Logs, Final Visual Inspection Logs and OSHA Air Monitoring records. The Contractor shall also provide the Engineer with a written certification that the material was disposed of in an approved waste disposal site. For friable waste this certification shall be in the form of a Waste Shipment Record. For non-friable waste this certification shall include the name and address of the waste disposal site or sites used.

210-4 METHOD OF MEASUREMENT. The quantity of ACM to be measured for payment will be determined by one of the following methods:

210-4.01 Square Foot. The quantity to be measured will be the area, measured to the nearest 0.1 square foot, of asbestos-containing material removed and disposed of.

210-4.02 Foot. The quantity to be measured will be the length, measured to the nearest 0.1 foot, of asbestos-containing material removed and disposed of.

210-4.03 Lump Sum. The quantity will be measured for payment on a lump sum basis.

210-4.04 Fixed Price Lump Sum. The lump sum shown in the itemized proposal for this item will be considered the price bid even though payment will be made for the work performed. Should the amount shown be altered, the altered figures will be disregarded and the original price will be used to determine the total contract bid amount. Payments will be based on one or both of the following:

A. Agreed Price. An Agreed Price will be based on a cost analysis submitted by the Contractor and agreed to by the State prior to performing the work. The submittal shall include a detailed estimate from the licensed asbestos removal contractor for the cost of the removal and disposal.

B. Force Account. A separate Force Account will be maintained for the total asbestos removal work performed on each building, structure, or highway included in the work.

210-5 BASIS OF PAYMENT. Payment for the work under this specification shall include all labor, materials, equipment, and asbestos-related fees and insurances necessary to satisfactorily complete the work.

Payment shall not include Work Zone Traffic Control devices outside the regulated asbestos work area.

210-5.01 Square Foot, Foot, or Lump Sum Bid Items. Payment for 75% of the completed quantity will be made upon the Project Monitor's written concurrence with the Contractor's certification as to the following: that the building, structure, and/or highway is visually free of asbestos; that the removal of the asbestos containing material was performed as required; that the final clearance air monitoring results meet the acceptable level specified in 12 NYCRR 56; and, that the building(s), bridge(s), and/or highway(s) are certified by the asbestos Contractor to be available for normal demolition.

The remainder of the payment for completed work will be made upon receipt by the Engineer of a certified statement from the disposal facility, signed by an official thereof, that the asbestos-containing material has been accepted and disposed of in accordance with all applicable laws, codes, rules, and regulations.

210-5.02 Fixed Price Lump Sum. The fixed price lump sum published in the proposal is an amount estimated by the State to be adequate to complete the work. Payments under this work will be made by Force Account or by Agreed Price, or by a combination thereof.

Payment for 75% of the Agreed Price or Force Account charges will be made upon the Project Monitor's written concurrence with the Contractor's certification that the building, structure, and/or highway is visually free of asbestos; the removal of the asbestos containing material was performed as required; that the final clearance air monitoring results meet the acceptable level specified in 12 NYCRR 56; and, that the building(s), bridge(s), and/or highway(s) are certified by the asbestos Contractor to be available for subsequent demolition and/or construction.

The remainder of the payment for completed work will be made upon receipt by the Engineer of a written certification that the ACM was disposed of in an approved waste disposal site.

Asbestos-specific insurance premiums will be reimbursed as the actual and identifiable cost of the portion of the premium attributable to the work performed under the Fixed Price Lump Sum Item. No overhead or profit will be allowed on asbestos specific insurance premiums.

Payment will be made under:

Item No.	Item	Pay Unit
Roofing (Buildings)		
210.1002	Removal and Disposal of Roofing ACM	Square Foot
210.1003	Removal and Disposal of Roofing ACM	Lump Sum
210.1004	Removal and Disposal of Roofing ACM	Fixed Price Lump Sum
Siding (Buildings)		
210.1102	Removal and Disposal of Siding ACM	Square Foot
210.1103	Removal and Disposal of Siding ACM	Lump Sum
210.1104	Removal and Disposal of Siding ACM	Fixed Price Lump Sum
Window Caulking and/or Glazing (Buildings)		
210.1201	Removal and Disposal of Caulk/Glazing ACM	Foot

210.1203	Removal and Disposal of Caulk/Glazing ACM	Lump Sum
210.1204	Removal and Disposal of Caulk/Glazing ACM	Fixed Price Lump Sum

Flooring/Mastic (Buildings)

210.1302	Removal and Disposal of Flooring/Mastic ACM	Square Foot
2 10.1303	Removal and Disposal of Flooring/Mastic ACM	Lump Sum
210.1304	Removal and Disposal of Flooring/Mastic ACM	Fixed Price Lump Sum

Ceilings (Buildings)

2 10.1402	Removal and Disposal of Ceiling ACM	Square Foot
210.1403	Removal and Disposal of Ceiling ACM	Lump Sum
210.1404	Removal and Disposal of Ceiling ACM	Fixed Price Lump Sum

Thermal System Insulation (Buildings)

210.1501	Removal and Disposal of Thermal System Insulation ACM	Foot
2 10.1502	Removal and Disposal of Thermal System Insulation ACM	Square Foot
2 10.1503	Removal and Disposal of Thermal System Insulation ACM	Lump Sum
210.1504	Removal and Disposal of Thermal System Insulation ACM	Fixed Price Lump Sum

Miscellaneous (Buildings)

210.2901XX	Removal and Disposal of Miscellaneous ACM	Foot
210.2902XX	Removal and Disposal of Miscellaneous ACM	Square Foot
210.2903XX	Removal and Disposal of Miscellaneous ACM	Lump Sum
2 10.2904XX	Removal and Disposal of Miscellaneous ACM	Fixed Price Lump Sum

Concrete Encased Pipe (Bridges & Highways)

210.3001	Removal and Disposal of Concrete-Encased Pipe ACM	Foot
2 10.3003	Removal and Disposal of Concrete-Encased Pipe ACM	Lump Sum
210.3004	Removal and Disposal of Concrete-Encased Pipe ACM	Fixed Price Lump Sum
210.3011	Removal and Disposal of Concrete-Encased Pipe ACM (BV 14)	Foot
210.3013	Removal and Disposal of Concrete-Encased Pipe ACM (BV 14)	Lump Sum
210.30 14	Removal and Disposal of Concrete-Encased Pipe ACM (BVI4)	Fixed Price Lump Sum

Underground Pipe (Bridges & Highways)

210.3101	Removal and Disposal of Underground Pipe ACM	Foot
2 10.3103	Removal and Disposal of Underground Pipe ACM	Lump Sum
210.3104	Removal and Disposal of Underground Pipe ACM	Fixed Price Lump Sum
2 10.311 1	Removal and Disposal of Underground Pipe ACM (BY 14)	Foot
210.3113	Removal and Disposal of Underground Pipe ACM (BV14)	Lump Sum
210.3114	Removal and Disposal of Underground Pipe ACM (BV14)	Fixed Price Lump Sum

Suspended Pipe (Bridges & Highways)

2 10.3201	Removal and Disposal of Suspended Pipe ACM	Foot
2 10.3203	Removal and Disposal of Suspended Pipe ACM	Lump Sum

210.3204	Removal and Disposal of Suspended Pipe ACM	Fixed Price Lump Sum
210.3211	Removal and Disposal of Suspended Pipe ACM (BY 14)	Foot
210.3213	Removal and Disposal of Suspended Pipe ACM (BY 14)	Lump Sum
210.3214	Removal and Disposal of Suspended Pipe ACM (BY14)	Fixed Price Lump Sum

Bond Breaker/Filler (Bridges & Highways)

210.3302	Removal and Disposal of Bond Breaker/Filler ACM	Square Foot
210.3303	Removal and Disposal of Bond Breaker/Filler ACM	Lump Sum
210.3304	Removal and Disposal of Bond Breaker/Filler ACM	Fixed Price Lump Sum
210.3312	Removal and Disposal of Bond Breaker/Filler ACM (BY 14)	Square Foot
210.3313	Removal and Disposal of Bond Breaker/Filler ACM (BV14)	Lump Sum
210.3314	Removal and Disposal of Bond Breaker/Filler ACM (BY 14)	Fixed Price Lump Sum

Caulking (Bridges & Highways)

210.3401	Removal and Disposal of Caulking ACM	Foot
210.3403	Removal and Disposal of Caulking ACM	Lump Sum
210.3404	Removal and Disposal of Caulking ACM	Fixed Price Lump Sum
210.3411	Removal and Disposal of Caulking ACM (BV14)	Foot
210.3413	Removal and Disposal of Caulking ACM (BV14)	Lump Sum
210.3414	Removal and Disposal of Caulking ACM (BV14)	Fixed Price Lump Sum

Miscellaneous (Bridges & Highways)

210.4801XX	Removal and Disposal of Miscellaneous ACM	Foot
210.4802XX	Removal and Disposal of Miscellaneous ACM	Square Foot
210.4803XX	Removal and Disposal of Miscellaneous ACM	Lump Sum
210.4804XX	Removal and Disposal of Miscellaneous ACM	Fixed Price Lump Sum
210.4811XX	Removal and Disposal of Miscellaneous ACM (BY14)	Foot
210.4812XX	Removal and Disposal of Miscellaneous A CM (BY14)	Square Foot
210.4813XX	Removal and Disposal of Miscellaneous ACM (BY 14)	Lump Sum
210.4814XX	Removal and Disposal of Miscellaneous ACM (BY14)	Fixed Price Lump Sum

Item Number Codes

210.xxyzXX

where xx equals Category

10-28 Buildings, 29 Miscellaneous (Buildings)

30-47 Bridges and Highways, 48 Miscellaneous (Bridges and Highways)

where y equals BV

1-9 In order of listing within the category, 0 No BV

where z equals payment Method

1=Foot, 2=Square Foot, 3=Lump Sum, 4=Fixed Price Lump Sum

where XX denotes serialization (applicable to only miscellaneous items)

SECTION 211 - INTERNALLY STABILIZED CUT STRUCTURES

ITEM 216 - REMOVAL OF EXISTING GUIDE RAIL

A. Description.

1. Under this item the Contractor shall remove existing guide rail where and as shown on the plans and/or as ordered by the Engineer.

B. Removal Details.

1. The Contractor shall remove the existing guide rail, posts, bolts, nuts, washers, and concrete bootings, etc., and deliver to a designated County maintenance garage or dispose of as ordered by the Engineer.

C. Method of Measurement.

1. The quantity to be paid for under this item will be the number of lineal feet measured prior to the removal of the existing guide rail.

D. Basis of Payment.

1. The price bid per linear foot of removal shall include the cost of all labor, equipment, tools, storage delivery and/or disposal of the guide railing including the filling in of any voids.

ITEM 220 - CORRUGATED BEAM GUIDE RAILING

A. Description.

1. The Contractor shall furnish and install galvanized corrugated steel beam guide railing and median barrier posts, soil plates, base plates and hardware in accordance with the plans, specifications, and as ordered by the Engineer.

B. Materials.

1. The posts, soil plates, base plates, anchor bolts; and hardware shall be as detailed on the plans.
2. Corrugated beams, terminal sections and all hardware shall be fabricated as shown on the plans. Bolt holes in the beam at the post hole and elsewhere, as necessary, shall be enlarged or slotted to permit expansion and contraction and to facilitate erection. The beams shall be straight, unless otherwise required by the plans or specifications, and of uniform section. The edges shall be rolled to eliminate sharp edges.
3. Beams and terminal sections shall be made from 12 gage or heavier sheet and rolled from new billet open hearth, electric furnace or basic oxygen steel. The minimum yield point and elongation of the steel used in the beam and terminal sections shall be 50,000 psi and 12% in 2" gauge length respectively. They shall be galvanized in accordance with the requirements of ASTM A123.
4. Posts and soil plates shall conform to ASTM A36 and the backup plates shall conform to the requirements for the corrugated rails. They shall be galvanized in accordance with the requirements of ASTM A123.
5. Anchor bolts shall be fabricated from A449 steel having a minimum yield point of 50,000 psi (50ksi). All anchor bolts shall be hot-dipped galvanized, in accordance with the requirements of ASTM A153.
6. Splices shall be made with flat, roundheaded, grippable, galvanized bolts, nuts and washers conforming to ASTM A307, ASA E18.2, galvanized in accordance with anchor bolts above.
7. When posts are required to be encased in concrete; the concrete shall meet the requirements specified for Class A concrete in Item 17.
8. Epoxy polysulfid grout shall be a two-component, flexible, polysulfide modified epoxy grout containing inert mineral filler. This material is used for bonding fresh concrete to hardened concrete in both vertical and horizontal planes; grouting studs, etc. into hardened concrete; and making epoxy mortar for the repair of minor damaged areas or hardened concrete. This material should not be used when the temperature is below 50 degrees F.
9. The two-component epoxy system shall have a maximum ratio of epoxy resin to polysulfid polymer of 2:1 by weight (Min. 1 3/4:1). In addition, the ratio of epoxy resin to curing agent shall be 11:1 by weight (Max. 12:1, Min. 10:1). The fine inert mineral filler when incorporated into the carrying component(s) shall be nonsettling.

10. The epoxy resin shall consist of an unmodified epoxy resin and may contain a portion of fine inert mineral filler. It shall not contain solvents or reactive diluents. The epoxy resin shall be the condensation product of the reaction of bisphenol A with epichlorohydrin, shall be translucent, and shall have the following physical characteristics.

Specific Value			
Property	Min.	Max.	Test Method
Color, Hellige	0	5	ASTM D1544
Epoxide Equivalent	180	200	ASTM D1652

11. The polysulfied polymer shall consist of a blend of a low viscosity polysulfied polymer, a tertiary amine catalyst and shall include a fine inert mineral filler. The component shall not contain solvents or diluents.

- a. The polysulfide polymer flexibilizer shall be a dichloroethyl formal polysulfide in the 1000-Molecular weight range having the following characteristics:

Specific Value			
Property	Min.	Max.	Test Method
Color, Hellige	9	12	ASTM D1544
Sulfur Content %	36	40	ASTM D129
Shelf Life	6 mos.	--	-----

12. When the two components are mixed in accordance with the manufacturer's instructions, the mixture shall have the following physical characteristics:

Specific Value			
Property	Min.	Max.	Test Method
Pot life at 77 Deg. F, min. Initial viscosity @ 77 Deg. F, poises	30		-----
Spray application	20	200	
Other applications	20	400	
Track free time @ 77 Deg. F, Hrs.	2	---	-----
Degree of temporary gelation, depth, in.	1/8		-----
Ash content, %	---	---	ASTM D482
Volatiles, %	0	4	ASTM D1259

13. The grout when mixed according to the manufacturer's instructions, shall harden into a solid having the following physical characteristics:

Property	Min.	Max.	Test Method
Compressive Shear	400	---	Interim Fed.
Double Strength, psi			Spec MMM-B-00350 (Army CE) Paragraph 4.5.4
Beam Break Test, lbs.	800		

C. Construction Details.

1. Posts, railing, median barriers and end assemblies shall be erected in the position and manner indicated on the Standard Sheets and in a manner approved by the Engineer. Necessary precautions shall be taken by the contractor that all utilities and structures are safe-guarded against damage. Any damage incurred during guide rail or median barrier systems installation shall be satisfactorily repaired by the contractor at no expense to the County.
2. Posts shall be driven unless otherwise specified by the Engineer. The driving shall be accomplished with approved equipment and methods that will leave the posts in their final position, free of any distortion, burring or other damage. When posts are driven through asphalt concrete or a bituminous treated material, the Contractor shall take care to prevent damage to the paved or treated areas. Large holes and voids caused by driving the posts shall be filled and compacted with a bituminous treated material or asphalt concrete similar to that damaged. The small area adjacent to the post after pavement repairs shall be sealed with a bituminous material approved by the Engineer.
3. As an alternate to driving posts on unpaved medians and where site conditions are such that driving is not possible, the Contractor shall carefully excavate for all post holes. Post holes and post foundation structures shall be backfilled and backfilled material compacted in accordance with Part 3, Section D, Paragraph j, County of Nassau Standard Specifications.
4. On structures and paved medians, base plates for posts shall be anchored as shown on the plans and as specified by the Engineer. Where drilling and grouting is required, the Contractor shall take care to prevent damage to the concrete, asphalt or other paved surfaces. The proposed construction method and equipment for drilling and grouting of holes shall be submitted to the Engineer for approval before drilling and grouting operations begin.
5. All posts shall be aligned to a tolerance of 1/4 inch for plumb and grade line.
6. The Contractor shall conduct all operations in a safe and prudent manner and shall provide, deploy and maintain traffic control devices and measures, i.e., signs, barricades, cones, flagmen, etc. as necessary according to standards set forth in the New York State Manual of Uniform Traffic Control Devices, as shown on the plans, or as directed by the Engineer.

D. Method of Measurement.

1. The quantity of guide railing or median barrier measured for payment will be the number of linear feet measured along the axis of the railing and between its extreme outer limits as shown on the plans and/or Standard Sheets or as directed by the Engineer. If shop curved guide railing or median barrier is specifically called for in the Contract Plans and Proposal, the quantity of guide railing or median barrier shall be the number of linear feet measured along the axis of the curved railing between the points of beginning of curvature as defined by the Engineer. If the railing is anchored to a structure instead of an anchorage unit or end assembly unit, the railing will be measured up to the structure.
2. Where shop curved beam guide railing or median barrier is specifically called for on the Contract Plans or as ordered in writing by the Engineer and no provision for such curved beam railing is included in the contract proposal, the quantity of railing measured for payment will be as described above plus an additional allowance of 33 1/3 percent of the curved lengths at a factor of 1.0 measured along the horizontal centerline of the beam.

E. Basis of Payment.

1. The unit price bid per linear foot for the above work shall include the cost of all labor, equipment and material necessary to complete the work.
2. When posts are driven through Asphalt Concrete or Bituminous treated material, any repairs to damaged paved or treated areas shall be at the Contractor's expense.
3. The following payment factors shall be used for Item 220:

Post Spacing	Payment Factor
12' – 6"	1.0
6' – 3"	1.4
4' – 2"	1.6
3' – 1 1/2"	1.9

4. The cost of installing posts by other means than driving, including hand excavation, shall be included in the unit price bid per linear foot.
5. The cost of test holes, as called for on the plans or as directed by the Engineer, shall be included in the unit price bid for this item.

NOTE: Under these items the Contractor will be paid under the following schedule on each Work Order:

(0 – 100 ft.)	Installed
(101 – 200 ft.)	Installed
(201 – 300 ft.)	Installed
(301 ft. & over)	Installed

ITEM 221 - ANCHORAGE UNITS FOR CORRUGATED BEAM GUIDE RAILING
ITEM 222 - ANCHORAGE UNITS FOR CORRUGATED BEAM GUIDE RAILING
(DRIVEWAY)

A. Description.

1. The Contractor shall furnish and install galvanized corrugated steel beam guide railing anchorage units and median barrier anchorage units as shown on the plans, in accordance with the specifications, and as ordered by the Engineer.

B. Materials.

1. All materials furnished shall conform to the requirements of Item 220 except that the anchors, posts, mounting brackets, back-up plates, anchor rods, and hardware shall be as detailed on the plans.
2. The anchorage unit for driveways shall include the special shop curved rail.
3. Bolts, nuts, and washers for attaching mounting brackets to post and rails to mounting brackets, shall conform to ASTM A325 and shall be galvanized according to ASTM A153.
4. Concrete for the anchor shall meet the requirements specified for Class A concrete in Item 17.

C. Construction Details.

1. All of the requirements of Items 220 shall apply in addition to the following:
2. The anchors for guide rail shall be as noted on the plans and/or as ordered by the Engineer either flat top or slanted top according to slope conditions at the particular installation site. The anchors for median barrier shall be flat top with provision for fastening both rails as shown on the specification plans. The anchors may be either precast or formed and poured in place. Backfilling shall be according to Part III, Section D, Paragraph N, Nassau County Standard Specifications except that the horizontal layers may be 18 inches thick. Where anchors are placed within the limits of a concrete sidewalk, the concrete shall be carefully removed as directed by the engineer and legally disposed of. After completion of the installation, the area shall then be restored to conform to the adjoining area, or as ordered by the Engineer.
3. In the event of unusual field conditions, the Engineer may require an anchorage unit of different size and shape than that shown on the specification plans.

D. Method of Measurement.

1. Anchorage units shall be measured by the number furnished and installed in accordance with the plans, specifications, and as directed by the Engineer.

E. Basis of Payment.

1. The unit price shall be as designated "Pay Limit anchorage unit" on the plans. The unit price bid for each anchorage unit shall include the cost of all labor, materials as shown on the plans, and equipment necessary to complete the work including: rails, posts, brackets; anchor rods, hardware, reinforcing bars, concrete excavation and backfill and forms if

necessary.

2. The cost of test holes, as called for on the plans or as directed by the Engineer, shall be included in the unit price bid for this item.

ITEM 502 - HIGHWAY SEALING AND SURFACE COATING (LATEX)

A. Scope

This specification covers the materials and construction procedures for sealing shrinkage cracks and spelling in roadways and sidewalks, and providing a surface coating to prevent further deterioration. To accomplish these goals, a latex admixture shall be used in mortars and concrete.

B. Materials

The material used to surface coat the roadways and sidewalks is a 42% solids, organic polymer latex admixture (sika latex or equal). A white milky mixture it contains air-detraining agents.

C. Mixing

The mixes to be used should be mixed in the following proportions:

a. Mortar

Cement - 94 lb., (one bag) 7 Type II or Type III
Sand 3 1/4 cubic ft.
Latex 4 gal.
Water - as required

b. Concrete

Cement - 94 lb. (one bag) Type II or Type III
Sand - 2 % cu. ft.
Crushed stone or gravel, % in. max. size - 2 cu. ft.
Latex - 4 gal.
Water-as required

c. With mixer running, add materials in the following order:

- (1) Latex
- (2) Aggregate
- (3) Cement
- (4) Water as required

D. Construction Procedure

- a. All surfaces to be coated must be cleaned free of dust, laitance, scale, oil, grease, curing compounds, impregnations, waxes, foreign particles, painted lines, and disintegrated material, by sandblasting or using mechanical abrasion methods. Particular care must be used to ensure that cracks are free of any substance that may prevent sealing or a successful bond between the surface coating and the concrete.
- b. At time of placement, substrate should be damp with no free standing water. Place mortar or concrete in area to be resurfaced, and brush into surface with a

stiff bristled broom. Care should be exercised to see that mortar is brushed into surface at all edges. Before scrub coat has a chance to dry, additional mortar or concrete should be placed and struck off to a smooth even surface. The latex mortar should then be screed, bull floated and/or troweled. Over finishing should be avoided.

- c. As soon as the finish is placed and to avoid any damage, area should be cured with damp burlap or white-pigmented polyethylene film. Curing should continue for 24 hours.
- d. Under normal temperature conditions, area may be opened to foot traffic after 24 hours; to light traffic after 2-4 days' and to heavy traffic after 3-5 days.
- e. Latex-modified Portland-cement mixtures are more difficult to finish than non-modified mixtures. A hard, steel trowel finish is almost impossible to achieve. Avoid overworking or over finishing surface. Do not use air entraining cements with latex.

E. Basis of Payment.

- a. Sealing and surface coating shall be paid on a square foot basis. The price bid shall include the cost of furnishing all labor, materials, tools and equipment necessary to satisfactorily complete the required work in accordance with the specifications and/or as directed by the Engineer.
- b. No additional payment will be made for cleaning the existing pavement or sidewalk, but the cost shall be included in the square foot paid for the sealing and surface coating.
- c. The Contractor shall conform to the requirements of Items 102X (DAY) or 102Y (NIGHT) – Work Zone Traffic Control. A minimum of one lane of traffic in each direction shall be maintained at all times. The cost of Work Zone Traffic Control shall be paid for under Items 102X or 102Y.

ITEM 502A - 2" INSIDE DIAMETER PVC ELECTRICAL CONDUIT

ITEM 502B - 3" INSIDE DIAMETER PVC ELECTRICAL CONDUIT

ITEM 502C - 4" INSIDE DIAMETER PVC ELECTRICAL CONDUIT

A. Description.

1. Under this Item the Contractor shall furnish and install polyvinyl chloride (PVC) electrical conduit in unpaved areas, under driveway aprons, sidewalk ramps, sidewalks and other locations shown on the Plans, in accordance with the Specifications and/or as directed by the Engineer.

B. Materials.

1. All PVC electrical conduits shall have a minimum cover of eighteen (18") inches.
2. Conduit ends shall extend a minimum of two (2') feet beyond the edge of the driveway apron or sidewalk unless otherwise directed by the Engineer.
3. All PVC couplings shall be secured with approved PVC cement. All open ends shall be capped without gluing to provide for subsequent removal. Joints shall be kept to a minimum.
4. All materials and methods of installation shall conform to the requirements of the latest edition of the National Electrical Code and Municipal Codes.

C. Method of Measurement.

1. The quantity to be paid for under this Item shall be the number of linear feet of PVC electrical conduit having the inside diameter specified above furnished and installed at locations shown on the Plans, in accordance with the Specifications and/or as directed by the Engineer.

D. Basis of Payment.

1. The unit price bid shall include the cost of furnishing all labor, materials, equipment and any other incidentals necessary to complete the work, except as hereafter noted:
2. The cost for removal of the driveway aprons and sidewalks, when required, shall be paid for under the appropriate item for removal.
3. The cost for excavation, compaction, backfill/restoration required for the installation of this Item shall be included in this Item.

ITEM 502J - ELECTRICAL JUNCTION BOXES

A. Description.

1. Under this Item the Contractor shall furnish and install electrical junction boxes complete with all necessary covers, conduits, duct and hardware at locations shown on the Plans, in accordance with the Specifications and/or as directed by the Engineer.

B. Materials.

1. The polymer concrete boxes shall be stackable, shall have bolted covers and their sizes shall be determined on an as needed basis and agreed to by the Engineer.
2. The polymer concrete material shall be an aggregate consisting of sand and gravel bound together with a polymer and reinforced with continuous woven glass strands. Minimum mechanical strength properties of the material shall be: 11,000 psi compressive, 1700 psi tensile and 7500 psi flexural.
3. The material shall meet minimum acceptance criteria for chemical resistance, accelerated service exposure, simulated sunlight exposure, water absorption, flexural properties and flammability in accordance with ASTM D543, D756, D1501, D560, D790 and D635 respectively.
4. Light vehicular traffic design shall be based on a 5000 pound load over a ten-inch by ten-inch (10"×10") area. Light vehicular design shall be provided.
5. The bottom of the box shall be open "footed."
6. A standard "ELECTRIC" logo shall be displayed on the box cover. A minimum two and three-eighth-inch (2 3/8") hex head stainless steel cover bolts and inserts shall be provided.
7. The ground rod shall be five-eighth-inch ($\frac{5}{8}$ ") diameter, eight feet (8') long solid steel core with copper jacket. The ground rod clamp shall be one piece bronze with hex head screw. Both rod and clamps shall conform to UL Standard 467 "Electrical Grounding and Bonding Equipment."
8. Sealant for duct, conduit and the box cover shall be a putty-like compound which is non-hardening, non-oxidizing and non-corrosive. It shall seal against the entrance of water, and shall have a service temperature range at minus 30°F to 200°F. It shall be clean, non-poisonous and non-injurious to human skin.
9. All materials and methods of installation shall conform to the requirements of the latest edition of the National Electrical Code and Municipal Codes.

C. Construction Methods.

1. Conduits and duct shall be installed before the boxes are set in place.
2. The boxes shall be set plumb and secure with the top above grade so that water will not drain into the boxes. Backfilling shall be done with sufficient care that no part of the junction box, conduit or duct will be displaced or moved out of alignment.
3. Backfill material shall be placed in six-inch (6") layers and compacted to a density comparable to the adjacent disturbed material.

4. Junction boxes shall be located as shown on the Plans, in accordance with the Specifications and/or as directed by the Engineer. Relocation will be acceptable for better routing of conduit and duct and to minimize drainage problems, if so directed by the Engineer. Junction boxes are neither designed nor intended for use where they would be subjected to roadway traffic loadings such as in useable shoulders or pavements.
5. The bottom of the box shall not rest directly on conduits, ducts or cables.
6. The top of the box shall be on the same grade as the surrounding area except it shall be raised a minimum of three (3") inches to allow the backfill materials to be sloped to prevent surface runoff from entering the box.
7. A ground rod shall be installed as indicated on the plans with bonding jumpers, etc. as required. Ends of conduit and duct shall be stubbed up vertical as near the top of the box as practical and shall be sealed. Wiring shall be arranged so that it will not lie in the bottom of the box.
8. Sealant shall be placed between the cover and box to prevent surface runoff from entering the top of the box.

D. Methods of Measurement.

1. The quantity to be paid for under this Item shall be the total number of cubic feet of electrical junction boxes furnished and installed in accordance with the Specifications and/or as directed by the Engineer

E. Basis of Payment.

1. The unit price bid for furnishing and installing electrical junction boxes shall include the cost of furnishing all labor, material and equipment necessary to complete the work, including but not limited to the necessary excavation, compaction, backfill/restoration required for the installation of the electrical junction boxes.

ITEM 510 - BRIDGE DECK WATERPROOFING MEMBRANE

1. Description.

Under this item the contractor shall clean the existing concrete pavement and furnish and place a heavy-duty membrane fabric for waterproofing of the structural bridge deck at the designated locations shown on the plan or as directed by the engineer.

2. Materials.

- a. The material shall be a waterproof membrane incorporating a high strength heat resistant mesh embedded in a layer of self-adhesive rubberized asphalt. The material shall be supplied in rolls interwound with a special release paper which protects the adhesive surface.
- b. The fabric shall be stored in a dry protected place. The rolls shall not be stored on end.
- c. The membrane shall be heavy-duty bituthene as supplied by Grace Construction Products' or an approved equal.

3. Construction Procedure.

a. SURFACE PREPARATION

- (1) Surfaces shall be free of voids, spalled areas and loose aggregate with no visible protrusions. The surfaces shall be thoroughly cleaned of all contaminants (oil, grease, etc). Defects in the surface shall be corrected as ordered by the engineer.
- (2) All surfaces shall be allowed to dry thoroughly following a rain or fog. Immediately before priming, the surface shall be thoroughly cleaned to remove dust, loose stones, and debris by vacuuming or blowing with compressed air.

- b. PRIMING - All concrete surfaces must be primed with bituthene primer at a coverage of 250 and 350 sq. ft. per gallon, depending on surface porosity. Apply bituthene primer with a lambswool roller. Primer should dry one hour or until tack free. To avoid pickup of excess dirt, prime only the area which is expected to be covered in a working day.

Areas not covered with membrane within 24 hours shall be reprimed. If excess dust covers primed areas, it shall be removed by blowing with compressed air. Primer dries to a gray color.

- c. TEMPERATURE - Heavy-duty bituthene should be applied at deck and air temperatures above 40 degrees F and in fair weather.

d. SLAB DRAINAGE AND JOINTS

- (1) Proper pitch shall be provided to gutters and drains. Heavy-duty bituthene shall be laid from the low point to the high point with the membrane overlapped in shingle fashion. Weep holes or drainage openings shall be provided at the structural deck level to drain water which penetrates the asphalt concrete and accumulates on the membrane.
- (2) Over non-working joints or cracks greater than 3/16" wide, an 8" reinforcing strip of heavy-duty bituthene must be applied before placing the full coverage membrane.
- (3) Heavy-duty bituthene should be terminated at expansion joints and the termination edges sealed with bituthene mastic. At steel expansion dams, heavy-duty bituthene should be terminated on the concrete deck and a fillet of bituthene mastic shall be used to insure a tight seal.

e. PLACEMENT OF MEMBRANE

- (1) Heavy-duty bituthene shall be applied by removing the release sheet as the membrane is unrolled with the tacky surface in contact with the primed structural deck. The membrane shall be laid in the direction of paving to assure that the end laps shall be staggered. Edges and ends of the membrane shall be overlapped a minimum of 2-1/2".
- (2) The membrane shall be laid carefully to assure uniform laps and to minimize wrinkles and fishmouths. Immediately after placement, the entire membrane shall be thoroughly rolled to ensure uniform contact with the structural deck. Rolling shall be done as soon as possible after placement of the membrane in order to minimize blisters.

f. CURBS AND TERMINATION EDGES

- (1) Curb flashing (as shown on plans) shall be applied to a point just below the height of the asphalt concrete overlay and a minimum of 6" on the deck. The first full sheet shall then be placed as close as possible to the curb. Irregularities shall be covered with an epoxy mortar, or a troweled application of bituthene mastic which is allowed to dry for a minimum of one day before applying the membrane. A fillet shall be provided at the curbs to avoid a sharp break at these points. The fillet material shall be well adhered to the deck and curb. All termination points at curbs, expansion joints or deck ends shall be carefully rolled. On curbs, pressure shall be applied to the membrane with a smooth metal or hardwood tool. This shall be done carefully to assure tight contact.
- (2) All terminations shall be then sealed with a troweled application of mastic, 1/2" to 1" wide and 1/8" thick.
- (3) Areas around drains shall be double covered with heavy-duty bituthene flashing pieces and shall be applied under the full membrane to minimize damage.

g. PAVING

- (1) The asphalt concrete temperature at time of placement shall be between 250 degrees F and 300 degrees F. Paving shall not be, started following rain, until the membrane surface is completely dry. Traffic shall not be permitted on the membrane prior to paving. Except for asphalt placing equipment, sudden stops or sharp turns shall be avoided by the compaction rollers.
- (2) To avoid damage to the membrane, the asphalt concrete overlay shall be placed within three days after placement of heavy-duty bituthene. Prior to paving, tears and inadequately lapped -seams shall be prepared by patching with heavy-duty bituthene. All fishmouths shall be slit and the flaps overlapped and then repaired with a patch. Blisters shall also be punctured and repaired.

4. Basis of Payment.

- a. The placement of the membrane shall be paid on a square yard basis. The price bid shall include the cost of furnishing all labor, materials, tools and equipment necessary to satisfactorily complete the required work in accordance with the specifications and/or as directed by the engineer.
- b. No additional payment will be made for cleaning of the concrete pavement or the placement of the primer, but the cost shall be included in the square yard price bid for the installation of the membrane system. The placement of asphalt concrete and the repair of the concrete structural deck shall be paid for under the appropriate items.

ITEM 511 - PNEUMATICALLY PLACED CONCRETE

1. Description

Under this item the Contractor shall remove loose and deteriorated concrete and rebuild the damaged concrete surfaces by placing pneumatically projected concrete at designated locations shown on the plan or as directed by the engineer.

2. Materials.

- a. Cement shall be Portland Cement Type II A.
- b. Sand shall be clean, sharp and reasonably free from clay, loam and silt. The term "dry" as applied to sand, designates a normal moisture content of from 3% to 5%. All particles shall pass a 3/8" sieve.
- c. Water shall be fresh, clean and free from injurious amounts of oils, acids, alkali or organic matter.

3. Reinforcement.

- a. Wire mesh shall conform to the Standard Specifications for Welded Steel Wire Fabric or Concrete Reinforcement (A.S.T.M. Designation: A 185) of the American Society for Testing & Materials. Wire mesh shall be 2" X 2"-#12 X #12 galvanized welded wire fabric. Wire sizes are expressed as gauge numbers of the United States Steel Wire Gauge. The galvanized coating shall be capable of successfully withstanding an eight-dip Preece Test conducted in accordance with the Standard Method of Test for Uniformity of Coating by the Preece Test (A.S.T.M. Designation: A239) of the American Society for Testing and Materials. Wire mesh sheets shall be side lapped at least one and one-half meshes and all laps shall be firmly tied together with wire at intervals not to exceed 18" along the lap.
- b. Wire mesh shall be fastened to the existing concrete with 1/4" diameter expansion bolts or powder-actuated fastenings spaced a maximum of 24" center to center in each direction. Wire mesh shall be tied to existing steel reinforcing, with wire ties spaced a maximum of 4 inches on center, where necessary.
- c. Where the chipped area or surface is more than two (2) or more inches in depth, and the existing reinforcement is in poor conditions as determined by the Engineer or there is no reinforcement, galvanized wire fabric and mechanical concrete anchors shall be used as a bond between existing and new concrete.
- d. Minimum clearance between the wire fabric and the surface of the old concrete and minimum cover over the fabric shall be 3/4". The fabric shall be carefully bent and shaped so as to follow closely the contours of the area to be repaired. Care shall be exercised not to peel off the galvanizing of the fabric while bending.
- e. The full area of wire mesh shall be held firmly in position by means of sixteen (16) gauge or eighteen (18) gauge galvanized wire ties.
- f. In places where the depth of the section removed exceeds three (3) inches over an appreciable area, two (2) or more layers of fabric shall be used.

4. Surface Preparation.

- a. Disintegrated and Spalled Concrete shall be removed by chipping with pneumatic hammers and chisels to sound concrete. All cracks and cavities shall be chipped to such formation that their sides are approximately perpendicular to the exposed surface forming a mechanical shoulder for at least two (2) inches in depth. All existing concrete shall be cleaned by flushing or scouring with water and compressed air jets to assure removal of all loose particles. The air pressure at the nozzle shall not be less than 50 pounds and the water pressure shall be 20 pounds greater.
- b. Corrosion: corroded and rusted reinforcing steel shall be cleaned by sandblasting to insure positive bond of the pneumatically placed mortar reinforcing steel.
- c. Bond: to insure perfect bond, the newly chipped and sand-blasted surface shall be thoroughly moistened with water, not less than one hour prior to application of the mortar. In no instance shall the mortar be applied in an area where free running water exists.

5. Proportioning.

Mortar shall be mixed in the proportion of one (1) sack of Portland Cement to 3 cubic feet of sand, volumetrically batch measured.

6. Mixing.

- a. Mortar shall be thoroughly mixed in a dry state either by hand or in a mechanical mixer before placing in the hopper of the cement gun or other apparatus.
- b. Water shall not be added to the mix after mixing or before using the cement gun.
- c. Material that has been mixed forty-five (45) minutes without being used shall be discarded.
- d. Remixing or Tempering shall not be permitted.

7. Application.

- a. Temperature Below 32 Degrees F.- Mortar shall not be placed on a frozen surface nor during freezing weather. Mortar shall not be placed when it is anticipated that the temperature during the following twenty-four (24) hours will drop below thirty-two (32) degrees Fahrenheit.
- b. Sequence of Application may be from bottom to top or vice-versa if rebound is properly removed.
- c. Corners Shall be filled first, "shooting" shall be from an angle as near perpendicular to the surface as practicable, with the nozzle held approximately three (3) feet from the work (except in confined control). If the flow of material at the nozzle is not uniform, and slugs, sand spots, or wet "sloughs" result, the nozzle man shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.

8. Suspension.

Work shall be suspended if:

- a. High Wind separates the cement from the sand at the nozzle.
- b. Temperature approaches freezing temperature and the mortar cannot be protected.
- c. Rain or other than very light sprinkles would wash out the mortar.
- d. Time Interval between successive layers in sloping, vertical or overhanging work must be sufficient to allow initial, but not final, set to develop. At the time the initial set is developing the surface shall be cleaned to remove the thin film of laitance in order to provide for a perfect bond with succeeding application.
- e. Construction Joints or day's work joints shall be sloped off to a thin clean, regular edge, preferably at a forty-five (45) degree slope. Before placing the adjoining work, the sloped portion and adjacent work shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.

9. Surface Finish.

- a. Nozzlemen shall bring the mortar to an even plane and to well-formed corners by working up to ground wires or other guides, using somewhat lower placing velocity than normal.
- b. Screeding- after the body coat has been placed, the surface shall be trued with a thin edge screed to remove high areas and expose low areas. Low areas shall be properly filled with mortar to insure a true flat surface.
- c. Final Finish- after surface has been trued the entire surface shall have a broom finish.

10. Curing.

The curing compound shall be antisol clear, as manufactured by Sika Chemical Company or an approved equal.

11. Adjacent Surface Protection.

Appearance: during progress of the work, where appearance is important, adjacent areas or grounds which may be permanently discolored, stained, or otherwise damaged by dust and rebound, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing, or washing, as the surroundings permit.

12. Equipment.

- a. Cement Gun: the pneumatic mixing and delivering equipment shall be of sufficient capacity and the lower chamber shall deliver material to the delivery hose continuously during the upper chamber recharging period.

- b. Gaskets: in the equipment shall be kept in good condition, to avoid reduced' pressure and consequent reduced velocity of material during the charging periods. The interior of the drums, feed gearing and valves shall be cleaned at regular intervals (at least once very 8 hour shift).
- c. Hose & Nozzle: the maximum length of material hose for the application of the mortar shall be approximately one-hundred (100) feet although it shall be permissible to use as much as five-hundred (500) feet of material hose if the supply nozzle pressures are increased to maintain proper velocity. The following nozzle pressures shall be determined by the type of work involved.
- d. Pressures
 - (1) For Rough or Heavy Work: nozzle pressures of fifty (50) to sixty (60) pounds.
 - (2) For High Lifts or long hose to insure against clogging, pressures of seventy (70) to seventy-five (75) pounds.
- e. Air Compressor: Any standard type of compressor shall be satisfactory if it is of sufficient capacity to provide, without interruption, the pressures and volume of air necessary for the longest hose delivery. The air compressor capacity determinations shall include allowances made for the air consumed in blowing rebound, cleaning reinforcing and for incidental uses. Compressor equipment shall be of such capacity so as to insure air pressures at the special mixer capable of producing the following material velocities.
- f. Velocities
 - (1) 375 to 500 feet per second using three-fourth (3/4) inch or one (1) inch nozzles.
 - (2) 425 to 550 feet per second using one one-half (1-1/2) inch nozzle. Nozzles shall be of the "Pre-Mixing" type, with perforated water-feed ring inside the nozzle to direct an even distribution of water through the material at the place of application.
- g. Water Pump: Water pressure shall be maintained at approximately twenty (20) pounds higher than the highest air pressure required for placing. Both air and water pressure shall be uniformly steady (non-pulsating).

13. Qualifications & Duties of Contractors, Sub-Contractors & Working Personnel

- a. The Contractor or the Sub-Contractor for this work shall have sufficient experience in this type of work and be able to show project satisfactorily completed.
- b. The Contractor or Sub-Contractor shall do this work only with competent operators.

14. Contractors Daily Log & Record of Cement Used.

- a. The Contractor shall make available to the Engineer a daily log defining the location and extent of each day's shooting operation.
- b. A daily count of full bags of cement at the start and full bags of cement at the end of each day's shooting, as well as empty bags at the end of each day's shooting, will be verified by the Engineer.

15. Method of Measurement.

The quantity to be paid for under this item shall be the number of bags of cement used.

16. Basis of Payment.

The unit price bid per bag of cement for this item shall include the cost of furnishing all materials, labor, equipment and other incidentals necessary to perform this item, including but not necessarily limited to sand blasting, reinforcing steel and/or mesh, sand, cement, mixers, nozzles, curing compound, protection to structures and restoration of all areas damaged during the construction. The final product shall be satisfactory to the Engineer.

ITEM 512 – REPAIRING STRUCTURAL SLABS

A. Description.

1. Under this item the Contractor shall repair structural slabs by the use of a quick- setting concrete repair material as shown on the plan or as directed by the Engineer. To perform this work it will be necessary to remove all deteriorated or unsound concrete to a depth of at least 1/2 inch, sand blast all surfaces which will be in contact with the concrete repair material, vacuum clean the excavation and place and finish the concrete repair material. It will be required to saw cut areas to be repaired to provide vertical edges for new repair.

B. Materials.

1. The quick-setting concrete repair material used as part of the work shall be one of the following or an approved equal:
2. Duracal Gypsum Cement manufactured by United States Gypsum Company of Chicago, Illinois.
3. Pike Patch #1 manufactured by Preco Chemical Company of Plainview, New York.
4. Thoro System Road Patch manufactured by Standard Dry Wall Products of Miami, Florida.
5. At least one (1) week prior to starting the work, the Contractor shall supply the Engineer with two (2) copies of the manufacturer's literature for the concrete repair material(s) which he elects to use.

C. Equipment.

1. All equipment used for this work shall be subject to approval by the Engineer. The following requirements shall also apply:
2. Pneumatic Hammers heavier than the nominal 25- pound class shall not be used.
3. Sand Blasting Equipment shall be capable of removing chips of partially-loosened concrete and of removing rust from reinforcing scale.
4. Vacuum Cleaning Equipment shall be capable of all debris from the sand blasting operation.

D. Construction Details

1. The completed work shall have no depressions or projections greater than 1/4" measured from a straight-edge placed across the repair area. Where the surface deviations exceed 1/4", the repaired pavement shall be removed and replaced to the satisfaction of the Engineer: Where necessary, a minimum of 1" peripheral clearance around the upper reinforcing bar of the top reinforcing mat will be required.
2. The Engineer shall be the sole determiner of what constitutes deteriorated concrete.
3. Reinforcing steel and any miscellaneous metals encountered shall be cleaned of injurious rust.
4. No. 40 Boiler Slag Grit or No. 2 Sand Blast Sand shall be used for blast cleaning.
5. Debris from the sand blasting operation shall be removed by vacuum cleaning.

6. The concrete repair material shall be mixed in strict accordance with the manufacturer's literature.
7. Particular care shall be taken to ensure that thorough consolidation is attained at the edges.
8. The concrete repair material shall be cured in strict accordance with the manufacturer's literature or as directed by the Engineer.
9. Traffic shall be restricted from the repaired area until the required curing period can be obtained.

E. Method of Measurement.

1. The quantity to be paid for under this item will be the number of square feet of concrete repair material placed in accordance with the specifications.

F. Basis of Payment.

1. The unit price bid per square foot shall include the cost of furnishing all labor, materials and equipment to perform this work including but not necessarily limited to chipping, sand blasting, saw cutting, vacuuming and placing concrete repair material. The final product shall be satisfactory to the Engineer.

ITEM 513 - SAND BAGS IN PLACE

1. Description.

Under this item the Contractor shall furnish and place bagged sand around structures, in and around stream beds or at any location deemed necessary as shown on the plans or ordered by the Engineer where it is necessary to divert or stem the flow of water.

2. Materials.

Sand shall be of any grade but shall not contain gravel, stone, clay, loam or any deleterious lumpy material. The sand shall be placed in heavy cloth or burlap bags (plastic will not be allowed), each bag having not less than one cubic foot capacity.

3. Construction Details.

Bags of sand shall be placed where shown on the plans and shall provide a thickness not less than that shown or ordered by the Engineer.

4. Method of Measurement.

The quantity of bagged sand to be paid for under this item shall be the amount of bagged sand placed, measured in cubic yard in its final position within payment limit either shown on the plans or as directed by the Engineer.

5. Basis of Payment.

The unit price bid per cubic yard shall include the cost of furnishing all labor, materials and equipment necessary to complete the work.

ITEM 514 - EPOXY PROTECTIVE COATING

1. Description.

Under this item the contractor shall clean, furnish and place an epoxy protective coating on the exposed concrete or steel surfaces of bridges where indicated on the plans or where ordered by the engineer.

2. Material.

The protective coating for use under this item shall be a two component, solvent free, 100% solids epoxy based system duralkote as manufactured by Dural International Corporation, 95 Brook Avenue, Deer Park, New York, 11729 or an approved equal.

3. Method.

- a. Preparation of surface - Concrete or steel surfaces shall be thoroughly cleaned of any dust, dirt, grease, oil or other objectionable Materials by sandblasting or power tool cleaning.
- b. Mixing. The two parts of the epoxy coating system are furnished in separate containers - It is essential that the entire contents of both containers be thoroughly blended together. A paddle attached to a W electric drill with a rated speed not to exceed 550 RPM is recommended for mixing. For batches of less than one gallon, thorough hand stirring would be allowed.
- c. Application - Material furnished under this item shall be applied in air temperatures above 40.degrees F. Dural Kote or an approved equal can be applied to a damp surface. However, freestanding water should be avoided.
- d. Application shall be by brush or roller - Two different colored coats shall be applied on concrete. The 'first coat shall be gray or an approved equal. The second coat shall be tan or an approved equal and shall be applied after the first coat is thoroughly dry, the entire surface of the concrete shall be adequately covered and all pores filled. The total finished dry thickness shall be approximately 12 - 15 mils. on steel work. The color and thickness shall be as ordered by the engineer.
- e. Caution in handling of the Epoxy Resin components cannot be over emphasized. It is recommended that the workers wear protective clothing, gloves and goggles. Do not get epoxy or resin on the skin or eyes and avoid breathing the vapors.

4. Method of Measurement.

The quantity to be paid for under this item will be the actual number of gallons of epoxy material properly mixed and incorporated in the completed work.

5. Basis of Payment.

The unit price bid shall include the cost of furnishing all labor, materials, tools, scaffolding and equipment necessary to prepare the surfaces and apply the surface coating in accordance with the plans or as directed by the engineer.

ITEM 515 - SAWCUTTING GROOVES IN EXISTING ASPHALT OR CONCRETE PAVEMENT

A. Description.

Under this item the Contractor shall cut grooves in existing pavement to conform with the details as shown on the contract plans and/or as directed by the Engineer.

B. Method.

The Contractor shall broom the pavement surface prior to saw-cutting the grooves. He shall keep the roadway clean and free from all residue and debris that may occur from his operation. Upon completion and final acceptance of the contract, all grooves shall be clean and free from any materials washed into them to the satisfaction of the Engineer.

C. Method of Measurement.

The quantity to be paid for under this item will be the number of linear feet of actual grooves sawcut in the existing asphalt or concrete pavement.

D. Basis of Payment.

The unit price shall include the cost of furnishing all labor, equipment and material necessary to satisfactorily complete the work.

ITEM 516 – LIME CEMENT PAVEMENT GROUTING

1. Work Included:

Under this item the Contractor shall prepare and place a mixture of limestone and cement in amounts sufficient to fill the existing voids in the subgrade where indicated on the plans and/or as ordered by the Engineer. Voids will be filled without modifying the existing grade of the pavement.

2. Materials:

The limestone-cement slurry formula shall consist of the following materials and approximate proportions as directed by the Engineer:

One (1) bag of type 2 Portland Cement
Five (5) bags of ground limestone (75# to 100# per bag)
Ten (10) to fifteen (15) gallons of water

Water reducer shall be added to the above water at the rate recommended by the manufacturer.

Based upon field conditions and characteristics of the materials, equipment and traffic, the above proportions may be modified by the Engineer. These modifications may include the addition of air entraining agents meeting the following requirements:

- a. Bleeding - The bleeding of concrete made with the admixture under test shall not exceed that of concrete made with the reference admixture by more than 2 percentage points, the bleeding being computed as a percentage of the net amount of mixing water in each concrete. The net mixing water is the water in excess of that present as absorbed water in the aggregate.
- b. Time of Setting - The initial time of setting of concrete containing the admixture under test shall not deviate from that of the concrete made with the reference admixture by more than +/- 1 hour and 15 minutes.
- c. Compressive Strength - The compressive strength of concrete containing the admixture under test shall be not less than 90 percent of that of similar concrete containing the reference admixture at 48 hours, 7 days, and 28 days.
- d. Resistance to Freezing and Thawing - The hardened concrete containing the admixture under test shall not exceed a weight loss of 4.0 percent in 25 cycles in a 10 percent NaCl solution.
- e. Length Change - The length change on drying of concrete containing the admixture under test shall not be greater than 120 percent of that of similar concrete containing the reference admixture. The specimens shall be moist cured for 14 days followed by 14 days of air drying. Length changes shall be based on initial measurements taken at the time of removal of the specimens from the molds and final measurements shall be taken at the end of the 14 days of air drying.

The materials used in the limestone-cement mix shall conform to the following requirements:

- (1) Portland Cement shall meet the requirements of Section B-M1.
- (2) Ground Limestone shall contain a minimum of 90 percent of calcium and magnesium carbonates. The gradation shall meet the following requirements:

100%	shall pass the	#40	mesh sieve
94%-100%	shall pass the	#60	mesh sieve
B0%-90%	shall pass the	#100	mesh sieve
20%-60%	shall pass the	#200	mesh sieve

The limestone shall be dry and free of caking.

- (3) The water reducer shall meet the following requirements:

The water-reducing admixtures shall reduce the quantity of mixing water required to produce concrete of a given consistency, and retard the setting of concrete. Concrete containing this admixture shall conform to the following requirements:

- (a) Water-Reducing Admixtures - The water-reducing admixtures shall reduce the quantity of mixing water required to produce concrete of a given consistency. Concrete containing this admixture shall meet the following requirements of the water-reducing and retarding admixtures above except that the time of setting of the concrete containing the admixture under test shall not deviate from that of similar concrete without the admixture under test used as a reference by more than +/-1 hour and 15 minutes.
- (b) Water Reduction - The mixing water required for concrete containing the admixture under test shall be reduced at least 5.0 percent when compared to that of the reference concrete without the admixture under test.
- (c) Time of Setting - The initial set time of the concrete containing the admixture under test shall be increased by at least 50 percent when compared to that of the reference concrete without the admixture under test.
- (d) Compressive Strength - The compressive strength of the concrete containing the admixture under test when compared to concrete without the admixture under test, shall be equal or greater at 48 hours, 7 days, and 28 days.
- (e) Resistance to Freezing and Thawing The hardened concrete containing the admixture under test shall not exceed a weight loss of 4.0 percent, in 25 cycles in a 10% NaCl solution.
- (f) Length Change. The length change on drying of concrete containing the admixture under test shall not be greater than 135 percent of that of similar concrete used as a reference. The specimens shall be moist cured for 14 days followed by 14 days of air drying. Length changes shall be based on initial measurements taken at the time of removal of the specimens from the molds and final measurements shall be taken at the end of the 14 days of air drying.

- (4) Material for filling drilled holes shall meet the following requirements:

This product shall be of high strength and have fast setting characteristics. Compressive strength shall be a minimum of 2000 psi after 1 day and 5000 psi after 28 days. The material shall be able to withstand 25 cycles of freeze-thaw (10% NaCl) with a maximum loss of 4 percent. There shall be a minimal amount of expansion or shrinkage such that a special bonding agent is not necessary. The material shall exhibit no appreciable heat of hydration.

The color of the repair after it cures will be of substantially the same color as the item being repaired.

3. Execution:

The Contractor will arrange his operation such that successive drilling and grouting operations will progress within a time period that will insure the proper maintenance of traffic. The pressure distributor shall be approved by the Engineer and shall be capable of pumping the mixture at sufficient pressure over the required distances and through the drilled holes into the voids beneath the slabs. Pumping shall continue until the mixture emerges along the edge of the pavement or breaks through the shoulder. To prevent distortion of the slab, pumping shall be immediately discontinued if the slab begins to rise before the mixture is observed at the edges of the pavement and, if so directed, additional holes shall be drilled before pumping is resumed. Pumping shall also be discontinued if the mixture begins to leak on the pavement surface through a joint or crack. When the mixture appears in an unfilled hole or holes in the immediate pumping area, said hole or holes shall be plugged with a tapered softwood plug.

When the voids within an area have been completely filled, the pumping shall be discontinued and the hose nozzle allowed to remain in the hole for approximately thirty seconds before being withdrawn. Immediately following removal of the nozzle a softwood plug shall be driven into the hole and allowed to remain until the mixture has set. The softwood plugs shall be maintained flush with the top of the pavement until such time as the Engineer directs that the plugs be removed. Following the removal of the plug, all spillage and leakage around the hole and adjacent area shall be removed. The holes shall then be filled to the pavement surface with Concrete Repair Material.

Short trenches, extending slightly below the bottom of the pavement shall be dug at the end of joints or cracks where mud or water is encountered. Compressed air shall be used to remove the mud or water from beneath the pavement by forcing it out through the trenches.

At depressed joints, designated by the Engineer-in-charge, pumping will be discontinued at least ten feet from the end of the high side of a joint. Undersealing will be resumed beginning within ten feet from the joint on the low side and pumping until the void area has been filled to the proper maximum. Operation will then be resumed in the area on the high side of the joint as previously described.

No lime-cement mixture shall be placed when the subgrade is frozen. The quantity of material pumped into each hole shall be determined by the Engineer.

4. Measurement Payment:

This work will be measured by the number of pounds of limestone furnished and placed as shown on the plans or directed by the Engineer. The unit price bid per pound of limestone furnished and placed will include the cost of furnishing wood plugs, cement, limestone, water, labor and equipment necessary to prepare and, place the lime-cement mix and seal the holes. Drilling holes will be paid for under a separate item.

ITEM 517 - DRILLING SUBSEALING HOLES FOR LIME-CEMENT PAVEMENT GROUTING

1. Work Included:

Under this work the Contractor shall drill holes through the existing cement concrete pavement for the undersealing of. The pavement with lime-cement pavement grouting at locations shown on the plans or as designated by the Engineer.

2. Material:

Not required.

3. Execution:

The hole diameter shall be between 2 1/4" and 2 5/8" diameter or of a diameter compatible with the installation of the lime-cement pavement grouting as determined by the Engineer or as recommended by the equipment manufacturer of the equipment used for placing the lime-cement mixture.

Holes shall be placed longitudinally at a spacing of 5' c to c and three rows of holes shall be placed in each slab. The middle row shall be located on the centerline of the slab and the other two rows approximately 2' in from the outer edges of the slabs. Holes shall be placed in a triangular pattern and the layout staggered in adjacent lanes so that as near as possible they would be about the same distance apart, or lay in circular patterns about each other. The hole pattern may be varied if shown on the plans or as ordered by the Engineer.

4. Measurement and Payment:

The number of holes to be paid for under this work will be the number of holes drilled in accordance with the plans and specifications or as directed by the Engineer. The unit price bid per each hole shall include the cost of all labor, materials, and equipment necessary for proper completion of the work.

ITEM 522 - TRIANGULAR GUIDE RAIL DELINEATOR

A. Description:

1. This item is to be used on Corrugated Beam Guide Rail, Heavy Post Blocked-Out Corrugated Beam Guide Rail, and Heavy Post Blocked-Out Corrugated Beam Median Barriers. The Triangular (trapezoid) shaped galvanized steel bracket delineator faced with reflective sheeting are placed within the depressed portion of the corrugated beam guide rail visible to vehicles.
2. Specifications are as follows: Triangular shaped slotted bracket - 12 gauge galvanized steel - approximately 5" X 2 3/4"

B. Material:

1. Reflective Material shall be Hi-Intensity Grade Sheeting.
2. Colors:
 - a) **Front/Back:** White/Yellow, White/Red, Yellow/Red, White/Blank, and Yellow/Blank as specified on the plans or ordered by Engineer.
 - b) **Size:** Top - 5", Bottom - 2 3/4", Height - 2 1/4" Effective Reflex Area approximately 8 square inches.

C. Construction Details:

1. The appropriate color, galvanized steel triangular guide rail delineator should be placed within the center of the depressed portion of the corrugated beam guide rail utilizing the existing 5/8" X 1 %" hex head steel full body bolt. The delineator bracket will be bolted between the flat plate washer and the front of the guide rail in accordance with the manufacturer's specifications and as directed by the Engineer.

D. Method of Measurement:

1. The quantity to be paid for under this item shall be the actual number of triangular guide rail delineators furnished and installed in accordance with the plans, specifications and as directed by the engineer.

E. Basis of Payment:

1. The unit price per each bid for this Item shall include all materials, labor, tools, equipment and incidentals necessary to complete the required work.

**ITEM 525 (A, B, C, D) - FULL DEPTH PAVEMENT CLEANING AND RESEALING
OF TRANSVERSE JOINTS IN PORTLAND
CEMENT CONCRETE PAVEMENT**

1. Description:

This work shall consist of cleaning and sealing transverse joints in existing concrete pavement at locations shown on the plans or as ordered by the Engineer.

2. Materials:

The sealant shall be an improved rubberized asphalt meeting the requirements of Federal Specification SS-S-1401B: Sealing Compound, Hot Applied, for Concrete and Asphalt Pavements. The sealant shall be accepted on the basis of the manufacturer's certifications that it conforms to the requirements of Federal Specification SS-S-1401B.

The joint sealant shall be packaged in sealed containers. Each container shall be clearly marked with the name and address of the manufacturer, the trade name of the sealant, specification number, manufacturer's batch or lot number, date of manufacture, quantity in container, recommended pouring temperature, safe heating temperature (the highest temperature to which the sealing compound can be heated and still conform to the requirements of the specification), and application instruction.

3. Construction Details:

All pavement repairs called for on the plans must be completed, as specified in the appropriate item(s), prior to commencement of the sealing operation.

Pavement joints shall be prepared to a depth as detailed on the plans or as ordered by the Engineer. In all cases, preparation shall entail removal of all existing joint material, incompressibles, foreign materials and debris with a plow, router, wire brush, concrete saw, or other suitable tool approved by the Engineer and designed for the purpose of neatly cleaning pavement joints. During preparation of joints, care shall be taken so as not to damage the subgrade, curbs, shoulder load transfer devices at the joint, nor any pavement surfaces including repaired areas, joint sidewalls and adjacent lanes. Any damage shall be repaired as ordered by the Engineer at no cost to the County.

After the joint has been prepared as specified above, both faces of the joint shall be thoroughly cleaned by either sand blasting, or high pressure water blasting, to the depth of the bottom of the proposed sealer or as ordered by the Engineer. Immediately prior to the sealing, the joint shall be blown with a compressed air stream of at least 100 p.s.i.g., measured at the source, in order to remove all remaining dirt, sand and loose material and to provide dry joint surfaces prior to sealing. The Contractor is required, at all times while cleaning and/or blowing joints, to provide protection by means of screening to prevent damage to or interference with traffic in adjacent lanes. This method of screening is to be submitted to the Engineer for his approval prior to starting the operation.

The air compressors used for the purpose described above must be equipped with traps capable of removing moisture and oil from the air. Work shall be stopped when and if it is found that there is oil or moisture in the compressed air. Work shall not resume until suitable adjustments are made and the air stream is found to be free of such contaminants.

Under no conditions will the Contractor be permitted to place the sealant if there is dust, moisture, oil, or any foreign material on that portion of the concrete which is to receive the backup material or joint sealant.

Joint sealant material shall be heated in a kettle or melter constructed as a double boiler, with the space between the inner and outer shells filled with oil or other heat-transfer medium. Positive temperature control, mechanical agitation, and recirculation pumps shall be provided. Direct heating must not be used. Heating must be performed in strict accordance with the manufacturer's recommendations and the kettle or melter used shall be of a type approved by the material manufacturer. Reheating shall not be permitted unless permitted by the manufacturer.

The unit shall be provided with two separate thermometers; one of which to indicate the temperature of the heat-transfer medium and the other to indicate the temperature of the joint sealing material in the hopper.

Before any joint sealing operations shall commence, the Engineer will inspect the joint sealing apparatus to ascertain the presence of and the working condition of the thermometers. Under no conditions or circumstances will the Engineer permit any joint sealing if the thermometers are found to be defective or missing.

The temperature of the sealant at placement shall be the recommended pouring temperature. The allowable variance from the recommended pouring temperature shall be 10 degrees +.

The Contractor shall be responsible for a safe and efficient means and method by which the Engineer will be able to accurately measure the temperature of the sealant, as it is discharged from the applicator wand. The means and method used must be submitted to the Engineer for his approval before the commencement of joint sealing operations.

The Contractor shall provide the Engineer with two (18" stem) thermometers, in addition to the two thermometers on the machine and a surface thermometer for pavement temperature measurements. The temperature range of the thermometers shall be such that the range is sufficient to meet the requirements of this specification.

If heat losses of sufficient magnitude are incurred as the sealant passes through the discharge hose and applicator wand to make it impossible to maintain sealant discharge pouring temperatures within the specified range of this specification, the Contractor shall provide the discharge hose and applicator wand with a means of controlling the temperature loss. Any method to be used shall be approved by the Engineer.

Under no circumstances shall the temperature of the sealant in the hopper be brought tip to a temperature exceeding the Safe Heating Temperature of the sealant.

A copy of the manufacturer's recommendations pertaining to the heating and application of the material shall be submitted to the Engineer prior to the commencement of work, and these recommendations shall be adhered to and followed by the Contractor, with such exceptions as this specification may require.

The applicator wand shall be returned to the machine and the material recirculated immediately upon the completion of each joint sealing.

At no time shall the sealant remain in the discharge hoses and applicator wand in a non-

circulating condition for a period of time exceeding 15 seconds.

The backup material/bondbreaker shall be stitched cotton piping cord. The diameter shall be such that when placed in the joint, it will; support the sealant at its proper depth, allowing the sealant to achieve the desired shape; prevent the sealant from leaking around and underneath it; and allow the sealant to deform freely when the joint expands and contracts.

The pavement at the joints to be sealed, shall be surface dry as judged by the Engineer. The temperature of the pavement shall not be less than 40 degrees F. as the sealer is poured. Similarly, the air temperature shall not be less than 40 degrees F. nor more than 75 degrees F. as the sealer is poured. Backup material shall be placed and joints shall be poured in a neat workmanlike manner and in accordance with the dimensions as detailed on the plans or as ordered by the Engineer. Care shall be taken not to overfill the joint space. Joint areas improperly sealed to the extent that the backup material and/or the sealant do not fall within the tolerances shown on the plans shall be resealed. The sealer and backup material shall be removed for the full lane width, the joint shall again be prepared and sealed in accordance with this specification.

This extra work shall be done by the Contractor at no additional cost to the County.

Prior to allowing traffic on the traffic lane, all sand and debris from the sandblasting and cleaning operations shall be removed from the pavement.

4. Method of Measurement:

This work will be measured by the number of linear feet of joints sealed.

5. Basis of Payment:

The unit price bid per linear foot shall include the cost of furnishing all labor, equipment, and materials as necessary to complete the work' as specified or as ordered by the Engineer. Damaged areas shall be repaired by the Contractor at no cost to the County.

The cost of resealing defective work shall be at the Contractor's expense and no additional payment will be made.

Note: Under these Items the Contractor will be paid under the following schedule for each Work Order

525A	(0' - <1000')	Installed
525B	(1000' – <5000')	Installed
525C	(5000' - <10,000')	Installed
525D	(10,000' & over)	Installed

ITEM 540 - STEEL BOLLARDS

A. Description.

1. Under this item, the contractor shall furnish and install steel bollards in strict accordance with the approved manufacturer's printed directions utilizing the proper anchorage and attachments as designated by the manufacturer at the locations shown on the drawings or as directed by the Engineer.

B. Materials.

1. The contractor shall submit complete and accurate shop drawings, catalog cuts, details or illustrated literature for the Engineer's approval. No installation shall be made prior to approval of the Engineer.

C. Installation.

1. Steel Bollards shall be installed in accordance with the plans and specifications, manufacturer's recommendations, and as directed by the Engineer. No installation shall begin until shop drawings, catalog cuts, details or illustrated literature are submitted and approved by the Engineer.

D. Submittals.

1. Product Data: Shop drawings, catalog cuts, details, illustrated literature, specifications and installation instructions.

E. Method of Measurement.

1. The quantity to be measured for payment shall be the number of steel bollards installed in their entirety.

F. Basis for Payment.

1. The unit price bid per steel bollard shall include the cost of furnishing all labor, material, and equipment necessary to satisfactorily complete the work, to the acceptance of the Engineer.

ITEM 556.03 - STUD SHEAR CONNECTORS FOR BRIDGES

556-1 DESCRIPTION. The work will consist of furnishing and placing reinforcing steel for concrete structures, or stud shear connectors, in accordance with the contract documents, and in a manner satisfactory to the Engineer.

Reinforcing steel for concrete structures may be uncoated, epoxy-coated, galvanized, or stainless steel, as indicated in the contract documents.

556-2 MATERIALS. Materials for this work shall meet the requirements of the following subsections of Section 700-Materials and Manufacturing:

Uncoated Bar Reinforcement, Grade 60	709-01
Wire Fabric for Concrete Reinforcement	709-02
Epoxy-Coated Bar Reinforcement	709-04
Stud Shear Connectors	709-05
Epoxy-Coated Wire Fabric Reinforcement	709-08
Mechanical Connectors for Reinforcing Bar Splices	709-10
Galvanized Bar Reinforcement	709-11
Stainless Steel Bar Reinforcement	709-13
Uncoated Bar Reinforcement, Grade 75	709-14
Grouted Reinforcing Bar Splice Sleeves	709-15

556-2.01 Devices for Supporting and Tying Reinforcement. Chairs, tie wires, and other devices used to support, position, or fasten the reinforcement shall be made of or coated with, a dielectric (electrically insulating) material. Stainless steel chairs without polyethylene tips and meeting the requirements of ASTM A493, AISI Type 430, may also be used. The specific hardware that the Contractor proposes to use shall be approved by the Engineer.

When forms are to be removed in their entirety, uncoated steel chairs equipped with snug-fitting, high-density, polyethylene tips which provide 1/4 inch clearance between the metal and any exposed surface may be used, except that uncoated steel chairs shall not be used in contact with stainless steel.

556-3 CONSTRUCTION DETAILS

556-3.01 General

A. Ordering. Prior to ordering reinforcing steel, the Contractor shall carefully check all bar lists, and assume full responsibility for their accuracy. No change in the bar list shall be made by the Contractor unless approved by the DCES. If no bar list is provided in the Plans, then §557-3.17 No Bar List Provided shall apply.

B. Handling and Storage

- 1. Epoxy-Coated Reinforcing Steel.** All epoxy-coated reinforcement shall be stored above ground on wood or padded supports. Epoxy-coated reinforcement stored on-site shall be protected from sunlight and moisture using opaque waterproof covers. Covers shall be placed in a manner that will permit constant air circulation so as to minimize the formation of condensation on the epoxy-coated surface. All equipment for handling epoxy-coated steel shall have padded contact areas. All bundling

bands shall be padded and all bundles shall be lifted with a strong back, multiple supports, or a platform bridge so as to prevent steel-to-steel abrasion from sags in the bundle. Steel shall not be dropped or dragged. Care shall be taken at all times to prevent damage to the epoxy coating.

Steel that is partially embedded in concrete shall have the exposed sections protected with opaque waterproof covers prior to any winter shutdown of a project.

2. **Galvanized Bar Reinforcement.** All galvanized bar reinforcement shall be stored above ground on wood or padded supports and arranged so that rainwater drains off the bars.

3. **Stainless Steel Bar Reinforcement.** Stainless Steel Bar Reinforcement shall be stored separately and shall be handled using tools that are not used on carbon steel.

C. **Placing and Fastening Reinforcing Steel.** Prior to placing reinforcement, all grease, dirt, mortar, and any other foreign substances shall be removed.

Loose rust and loose millscale on uncoated reinforcement shall be removed by wire brushing. Steel reinforcement shall be placed in the position indicated in the contract documents and within the allowable tolerances specified. Before concrete is placed, all reinforcement shall be securely fastened and supported with approved chairs or other approved devices.

D. **Inspection.** Concrete shall not be placed until the reinforcing steel is inspected, placement of the steel meets applicable tolerances, and permission for placing concrete is granted by the Engineer. All concrete placed in violation of this provision will be rejected and removed.

556-3.02 Steel Fabric Reinforcement.

A. **Field Repair of Coatings.** Field repair will not be required on areas of minor damage. Minor damage is defined as any defect or break in the coating less than 1/4 x 1/4 inch. The maximum number of unrepaired minor damaged areas shall not exceed an average of six (6) per foot of wire.

Reinforcing fabric having coating damage exceeding the above criteria shall be rejected and immediately removed from the work site.

B. **Placement.** Steel fabric reinforcement shall be placed as shown in the contract documents. Unless otherwise noted in the contract documents, steel fabric reinforcement shall be overlapped a minimum of the distance between adjacent wires in the panel. Overlapping panels of steel fabric reinforcement shall be wired together to ensure that the location and overlap of the mesh panels is maintained during concrete placement.

556-3.03 Bar Reinforcement

A. **Field-Bending.** The bar reinforcement shall be bent to the shapes shown in the contract documents. Unless shown otherwise in the contract documents or below, the radii of bends, measured to the inside face of the bend, shall be greater than, or equal to, three times the diameter of the bar. Bends in stirrups shall be greater than, or equal to, the diameter of the bar.

1. **Uncoated Bar Reinforcement.** When bars are heated for field-bending they shall not be heated to a temperature higher than that producing a dark cherry-red color. Only competent personnel shall be employed and proper equipment provided for cutting and bending.

2. Epoxy - Coated Bar Reinforcement. The alternatives of shop bending or field-bending of epoxy-coated bar reinforcement will be at the option of the Contractor. Field-bending shall be done by cold methods only.

Field-bending operations will be allowed only when ambient and bar temperatures are 40°F or greater. When lower temperatures prevail, the Contractor may supply, for field-bending operations, a fully enclosed space that is heated. Direct heating of the bars shall not be permitted.

Epoxy coatings damaged by field-bending work shall be evaluated and repaired or replaced, in accordance with the requirements of §556-3.03 B.1 Epoxy-Coated Bar Reinforcement.

3. Galvanized Bar Reinforcement. The galvanized bar reinforcement shall be shop bent before galvanizing. Up to 5% of the mass of bars may be field bent to replace missing, damaged, or incorrectly fabricated bars. Field-bending shall be done by cold methods only. When bending galvanized bar reinforcement size 7 and greater, the minimum bend radius measured to the inside face of the bend shall be increased to 4.5 times the bar diameter. For bars numbered 14 and 18, increase the bend radius to 5.5 times the bar diameter.

Field-bending operations will be allowed only when ambient and bar temperatures are 40°F or greater. When lower temperatures prevail the Contractor may supply, for field-bending operations, a fully enclosed space that is heated. Direct heating of the bars shall not be permitted.

The ends of bars cut after galvanizing shall be coated with zinc repair material following the procedures of §719-01, Galvanized Coatings and Repair Methods except that repair materials containing aluminum shall not be permitted.

Galvanizing damaged by field-bending work shall be evaluated and repaired, or replaced, in accordance with the requirements of §556-3.03 B.2 Galvanized Bar Reinforcement.

4. Stainless Steel Bar Reinforcement. The stainless steel bar reinforcement shall be shop bent or field bent as shown in the contract documents. When shop bending is required, up to 5% of the mass of bars may be field bent to replace missing, damaged, or incorrectly fabricated bars. Field-bending shall be done by cold methods only

B. Field Repair of Coatings

1. Epoxy-Coated Bar Reinforcement. The Contractor will be required to field repair damaged areas of the bar coating, and to replace bars exhibiting severely damaged coatings. The material used for field repair shall be that supplied by the coating applicator.

Field repair will be required on all areas of major damage. Major damage is defined as any defect or break in the epoxy coating 1/4 x 1/4 inch or greater. The total number of all major damaged areas which have been repaired with patching material shall not exceed five (5) in any 10 foot length of bar.

Field repair will not be required on areas of minor damage. Minor damage is defined as any defect or break in the coating less than 1/4 x 1/4 inch. The maximum number of unrepaired minor damaged areas shall not exceed an average of six (6) per foot on any individual bar.

A reinforcing bar having coating damage determined by the Engineer to exceed the above criteria shall be rejected and immediately removed from the work site. All such bars shall be replaced, in kind, by the Contractor at no additional cost to the State.

2. Galvanized Bar Reinforcement. The Contractor shall field repair damaged areas of the bar coating, and replace bars exhibiting severely damaged coatings. Severe damage is defined as more than five (5) 1/4 x 1/4 inch or larger areas in a 10 foot length. The material and procedures used for field repair shall meet the requirements of §719-01, Galvanized Coatings and Repair Methods, except that repair materials containing aluminum shall not be permitted.

C. *Splices.* Splices will be permitted only where shown in the contract documents. Should the Contractor desire to splice bars at locations other than those shown in the contract documents, written permission to do so shall first be obtained from the DCES. Such permitted splices shall be well distributed or located at points of low tensile stress. Splices shall not be permitted unless a minimum of 2 inches can be provided between the splice and the nearest adjacent bar.

Splices for bar sizes No. 11 or smaller, shall be made by means of a mechanical connector or by placing the bars in contact and wiring them together for the full length of the splice. Splices for bars larger than No. 11 shall be made by use of a mechanical connector unless welding is specifically required by the contract documents. Mechanical connectors shall be installed in accordance with the manufacturer's written requirements. Mechanical connectors for stainless steel shall be stainless. Welding stainless steel will not be permitted unless the proposed welding technique is submitted to and approved by the DCES.

Arc-welded splices shall be made and will be inspected in accordance with the provisions of the SCM.

Prior to welding of epoxy-coated reinforcing bars, the epoxy coating shall be removed for the length to be welded plus 6 inches on each side of the weld. After welding, the spliced area shall be cleaned in accordance with SSPC - Surface Preparation Specification No. 6 (SSPC-SP6), Commercial Blast Cleaning. The surface shall be blast cleaned to SSPC-SP6 Commercial Blast Cleaning standard.

Photographs in SSPC-VIS 1, Guide And Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning, for B SP6, C SP6, D SP6, G1 SP6, G2 SP6, or G3 SP6, can be used as a guide to identify the desired cleaning, depending on the initial condition of the steel. However, the written standard for SP6 will be the primary means to determine conformance with blast-cleaning requirements. The photographs shall not be used as a substitute for the written standards. A compatible epoxy repair material supplied by the coating applicator shall be applied to the spliced area and overlap the original coating by 6 inches. The epoxy repair material shall be applied the same day as the cleaning.

Prior to welding galvanized bar reinforcement, the zinc coating shall be removed for the length of the weld plus 2 inches on each side of the weld. Cleaning shall be the same criteria as for epoxy-coated reinforcing. Coating repair shall be in accordance with the requirements of §556-3.03 B.2 Galvanized Bar Reinforcement.

D. *Placement in Structural Slabs.* Bar supports shall be spaced no farther apart than 4 feet center-to-center, nor shall any bar support be closer than 6 inches from the edge of any future concrete surface. Bridge slab bar reinforcement shall be placed in accordance with the following tolerances:

Vertical $\pm 1/4$ inch

Horizontal $\pm 1/2$ inch

The structural slab bar reinforcement mats (top and bottom) shall be securely connected together. This connection shall be accomplished by wiring or other means approved by the Engineer. Connections shall be placed no farther apart than 4 feet on center. The bar supports may be utilized for this purpose. Connecting devices shall neither deflect the bar reinforcement nor interfere with the smooth flow of concrete. Stainless steel reinforcement shall not be in direct contact with uncoated steel reinforcement, nor with galvanized reinforcement. This does not apply to stainless steel wires and ties.

Immediately prior to placement of concrete, the Engineer will verify that the reinforcing steel is positioned within the above-stated tolerances.

Subsequent to placement of concrete, the Engineer will verify, at random, that the vertical clear distance from the top of the structural slab to the top mat of main reinforcing, as shown in the contract documents, is correct within a tolerance of plus or minus $1/2$ inch. If the allowable tolerance is

exceeded, the Engineer will reject the work and so advise the Contractor and the DCES, in writing, stating the deficiencies upon which the rejection is based. The DCES will review the nature and extent of the deficiencies and shall designate one or more of the following alternatives:

1. The affected concrete placement shall be removed and replaced in whole or in part.
2. The Contractor shall provide special corrective measures as directed by the DCES.
3. The concrete placement shall be accepted without corrective action.

556-3.04 Stud Shear Connectors for Bridges. Stud shear connectors shall be shop or field welded to the structural steel members at the locations indicated in the contract documents. This work shall be done in accordance with the provisions of the SCM.

a. METHOD OF MEASUREMENT

556-4.01 Steel Fabric Reinforcement. The quantity of steel fabric reinforcement satisfactorily installed will be measured for payment as the number of square yards of overall surface area of the deck or structure shown on the contract documents, not including clear distance to the edges, measured to the nearest whole square yard. No subtractions will be made for holes smaller than one-half of a square yard, and no additional payment will be made for overlaps.

556-4.02 Bar Reinforcement. These will be measured as the number of pounds of steel bars placed. The weight of bar reinforcing will be computed by the Engineer utilizing the unit mass for each size bar as given in Table 556-1. No allowance will be made for the weight of any coating on the bars.

TABLE 556-1 UNIT WEIGHT OF DEFORMED BARS											
Bar Number	3	4	5	6	7	8	9	10	11	14	18
Weight (lb/ft)	0.376	0.668	1.043	1.502	2.044	2.670	3.400	4.303	5.313	7.650	13.60

NOTE. Bar Numbers are bar sizes in numbers of eighths of an inch.

556-4.03 Stud Shear Connectors for Bridges. Stud Shear Connectors will be measured as each connector placed.

556-5 BASIS OF PAYMENT

556-5.01 Steel Fabric Reinforcement. The unit price bid per square yard will include the cost of all labor, materials, and equipment necessary to complete the work. The removal of the concrete placement and its subsequent replacement, or other corrective work which the Contractor is directed to perform, shall be accomplished at no additional cost to the State. No additional payment will be made for the replacement of defective fabric or the replacement of fabric with defective coatings.

556-5.02 Bar Reinforcement. The unit price bid per pound shall include the cost of all labor, materials, and equipment necessary to complete the work. The unit price shall also include the cost of chairs, supports, fastenings, connections, and splices not specifically shown in the contract documents. If the Engineer permits the substitution of larger bars than those specified, or the DCES permits splices not shown in the contract documents, payment will be made only for the amount of steel which would have been required if the specified size and length had been used. No additional payment will be made for enclosures constructed for bending of bars or for replacement of defective bars or for replacement of bars with defective coatings.

556-5.03 Stud Shear Connectors for Bridges. The unit price bid per stud shall include the cost of all labor, materials, and equipment necessary to complete the work. If the use of any stud shear connector requires payment of a royalty to the manufacturer, the royalty shall be included in the unit price bid for this work.

Payment will be made under:

Item No.	Item	Pay Unit
556.0101	Uncoated Steel Fabric Reinforcement for Structures	Square Yard
556.0102	Epoxy-Coated Steel Fabric Reinforcement	Square Yard
556.0201	Uncoated Bar Reinforcement for Concrete Structures	Pound
556.0202	Epoxy-Coated Bar Reinforcement for Structures	Pound
556.0203	Galvanized Bar Reinforcement for Structures	Pound
556.0205	Stainless Steel Bar Reinforcement for Structures	Pound
556.03	Stud Shear Connectors for Bridges	Each

SECTION 557 - SUPERSTRUCTURE SLABS, SIDEWALKS ON BRIDGES, AND STRUCTURAL APPROACH SLABS

(Last Revised May, 2019)

557-1 DESCRIPTION. The work shall consist of placing high performance (Class HP) concrete to construct superstructure slabs, sidewalks, safety walks, and structural approach slabs, as required by the contract documents.

557-2 MATERIALS

557-2.01 General. The materials used for superstructure slabs, sidewalks on bridges, and structural approach slabs shall meet the material requirements of the following subsections:

Structural concrete materials	555-2.01
Reinforcing steel	556-2
Prestressed concrete form units	718-05
Permanent Corrugated Metal Forms for Bridge Slabs	736-01

557-2.02 Concrete. This shall meet the material requirements for Class HP in accordance with §501. Unless otherwise directed by the Engineer, all concrete shall contain a water-reducing and retarding admixture, meeting the requirements of §711-08. The quantity of the admixture shall be sufficient to achieve the minimum retardation consistent with placing conditions to keep the entire placement plastic (either one continuous placement or all sections of a sequence placement). The dosage rate used shall be determined by the Contractor in accordance with the manufacturer's recommendation and in concurrence with the Regional Materials Engineer. The dosage shall remain consistent for the duration of the concrete placement except for minor adjustments to meet changing environmental conditions.

557-2.03 HPIC Concrete This shall meet the requirements of **557-2.02 HP Concrete** with the following modifications:

1. The maximum w/c ratio is 0.40. Do not include absorbed moisture of the light weight fine aggregate as part of the w/c ratio calculation.
2. Substitute lightweight fine aggregate, meeting the requirements of AASHTO M 195, for 30% (by volume) of standard fine aggregate.

The Regional Materials Engineer, or his representative, will approve the batch weights prior to use. Use these values to manufacture all internally cured high performance concrete and periodically correct the batch weights to account for changes in the fine aggregate fineness modulus and aggregate moisture contents.

557-3 CONSTRUCTION DETAILS

557-3.01 Concrete Manufacturing and Transportation. The requirements of §501-3 shall apply.

A. For HPIC additional requirements follow:

1. Construct lightweight fine aggregate stockpile(s) at the production facility so as to maintain uniform moisture throughout the pile. Using a sprinkler system approved by the Materials Engineer. Continuously and uniformly sprinkle the stockpile(s) with water for a minimum of 48 hours, or until the "Absorbed Moisture content" of the aggregate in the stockpile is at least 15% by weight as determined by Test Method NY 703-19E (<https://www.dot.ny.gov/divisions/engineering/technical-services/materials-bureau/forms->

[manuals](#)). If a steady rain of comparable intensity occurs, turn off the sprinkler system at the direction of the Materials Engineer, until the rain ceases. At the end of the wetting period, or after the rain ceases, allow stockpiles to drain for 12 to 15 hours immediately prior to use, unless otherwise directed by the Materials Engineer.

2. The moisture content of the lightweight fine aggregate must be determined immediately prior to batching, using Test Method NY 703-19E. If the supplied mix design is based on “oven dry” weight of lightweight fine aggregate, a corresponding adjusted weight must be supplied to account for the actual absorbed moisture content, so that the mix design entered in to the automated batching system is based on SSD weight. After the adjusted mix design is entered into batching system, additional adjustments must be made to the fine aggregate and water quantities to account for the “surface” moisture of the fine aggregates.
3. The lightweight fine aggregate, at the time of batching must be at least 15% absorbed moisture content. Batch the lightweight fine aggregate first, then routinely batch the fine aggregate, coarse aggregate, admixtures, cement, pozzolan, Microsilica, and remaining mixing water and mix completely.

557-3.02 Falsework. The requirements of §555-3.02 shall apply.

557-3.03 Forms. Unless otherwise noted the contractor may use any of the following forming systems to form the underside of the superstructure slabs:

A. Removable Forms. The requirements of §555-3.03A shall apply.

B. Permanent Corrugated Metal Forms for Superstructure Slabs. Where permanent metal forms are employed, the following construction procedures shall apply.

Care and protection shall be given the metal form sheets, supports, and accessory items during handling, shipping, and storage. During loading, hoisting, and unloading operations, extra precaution and care shall be taken to prevent damage to ends, corners, and edges of the form sheets, supports, and accessory items. If the form units and accessories are to be stored prior to installation, they shall not be placed in contact with the ground and the material shall be adequately covered or protected to keep it dry.

Form supports shall be placed in direct contact with the flange of a stringer or floor beam. All attachments shall be made by permissible welds, bolts, clips, or other approved means. The welding of form supports to steel not considered weldable or to portions of flanges subject to tensile stresses shall not be permitted. Welding shall be in accordance with the provisions of the New York State Steel Construction Manual (SCM) except that 1/8 inch fillet welds will be permitted. All welding shall be performed by a welder certified under the SCM.

Form sheets shall not be permitted to rest directly on the flanges. They shall be securely fastened to form supports by self-tapping screws and shall have a minimum bearing length of 1 inch at each end. Transverse construction joints shall be located at the bottom of a flute and 1/4 inch weep holes shall be field drilled at not less than 1 foot on centers along the line of the joint.

Screed rail and pouring runway supports shall not be located directly on the form sheets, form supports, or reinforcing steel. No loose sheets or miscellaneous hardware shall be left on the structural slab at the end of the work day. Metal forms shall not be used where longitudinal slab construction joints are located between stringers, nor shall they be used on the fascia overhang.

The corrugated metal sheets shall be fabricated for the placement sequence used with the joints between sections of sheet overlapped or securely fastened to eliminate differential deflections between sections. Any exposed form metal where galvanizing has been damaged, shall be cleaned and repaired as provided for in §719-01, Galvanized Coatings and Repair Methods.

C. Prestressed Concrete Form Units. The applicable requirements of §555-3.03A and the Prestressed Concrete Construction Manual shall apply.

Form supports shall be placed in direct contact with the flange of the stringer. All attachments shall be made by permissible welds, bolts, or other means approved by the Engineer. The welding of form supports to steel not considered weldable, or to portions of flanges subject to tensile stresses will not be permitted. Welds and welding shall be in accordance with those portions of the SCM concerned with fillet weld design, fillet weld details, general workmanship and technique, except that 1/8 inch fillet welds will be permitted. All welding shall be performed by a welder certified under the SCM.

D. Restrictions. The following restrictions shall apply to all forms.

1. Fascia overhangs shall be formed with removable forms to provide a flat concrete surface.
2. A bay, constructed in stages such that a longitudinal joint is required, shall only be formed with removable forms.
3. A haunch which rests upon an end diaphragm shall only be formed with removable or permanent corrugated metal forms.
4. Prestressed concrete form units shall not be used where the design span is less than 5 feet nor greater than 11 feet. The design span is equal to the beam spacing minus one-half the top flange width.
5. Prestressed concrete form units may be restricted at the ends of some skewed spans. Refer to the contract documents for details.
6. Prestressed concrete form units shall not be used on prestressed concrete box beam superstructures unless specifically allowed by the contract documents.

557-3.04 Placing and Fastening Reinforcing Steel. Immediately prior to placement of concrete, the Engineer will verify that the reinforcing steel is positioned within required tolerances. If the allowable tolerances are exceeded, the Contractor shall correct the position of the reinforcing steel before placing concrete. All reinforcing steel and chairs shall be anchored to prevent uplift.

A. Permanent Corrugated Metal Forms or Removable Forms. Except for prestressed concrete form units the requirements of §556-3.01 and §556-3.03 shall apply.

B. Prestressed Concrete Form Units. The requirements of §556-3.01 and §556-3.03 shall apply. The top reinforcing steel mat shall be securely connected to the forms and the stud shear connectors. Connections shall be placed no farther apart than 4 feet on center. Connections to the forms may be made to the form-lifting devices, reinforcing steel projecting from the forms, or devices in the form supplied for this purpose. Hold-down devices shot into the form will not be permitted. Connections shall neither deflect the reinforcing steel nor interfere with the smooth flow of concrete.

557-3.05 Handling and Placing Concrete. The requirements of §555- 3.04 Handling and Placing Concrete shall apply. A Preplacement Meeting is required to be held at least one week prior to the start of any concrete placement for superstructure slabs. Meeting participants besides the Contractor and Engineer should include materials suppliers, subcontractors, Regional Materials Engineer, Regional Safety Officer, and others as deemed appropriate. Participants will review all aspects of the proposed placement including, but not limited to, the following:
Equipment proposed for use and for backup.

- Planned workforce, assigned tasks of each designated position, and experience and expertise.
- Proposed construction techniques and crew experience.

- Safety considerations.
- Concrete mix design.
- Admixtures and technical data; dosage rates will be approved by the Regional Materials Engineer.
- Proposed placement rate, curing and loading schedules.
- Curing practices to be employed as well as the workforce designated to the curing process.
- Delivery/conveyance equipment, including deck finishing machine setup and operation.
- Traffic control.

For placements proposed between October 1st and April 1st the Preplacement Meeting should additionally review cold weather concreting operations including, but not limited to, the following:

- Expected environmental conditions at time of placement and during curing
- Proposed curing methods to maintain acceptable curing temperature

No concrete shall be placed until all aspects of the proposed placement are approved by the Engineer. A written report of the preplacement meeting will be established by the Engineer. Modifications shall be submitted in writing to the Engineer for approval. Further, for placements between October 1 and April 1st, no concrete shall be placed until all aspects of the proposed placement are approved by the Regional Construction Engineer.

Before concrete slabs are placed on steel spans, all permanent field connections shall be completed unless otherwise noted on the contract plans, and all temporary supports and mechanisms used in steel erection shall be removed.

No concrete shall be placed until all the provisions of §555-3.04A. Placement Limitations are met, environmental conditions are deemed favorable, and satisfactory means to mitigate adverse environmental conditions exist. Favorable environmental conditions are defined as an expected weather forecast suitable for concrete placement during the entire placement duration, the evaporation rate not to exceed 0.25 lb/sf-hr, and acceptable curing temperatures expected for the duration of the curing period.

The Contractor shall provide any necessary means to mitigate adverse weather conditions and curing temperatures. Failure to maintain acceptable environmental conditions will result in the concrete placement being stopped and a bulkhead put in place.

The Contractor shall take the necessary measurements and calculate the theoretical evaporation rate. The measurements for air temperature, relative humidity, and wind speed shall be taken as near as possible to the final placement location of the concrete.

Concrete temperature will be taken from the same sample used for slump and air content tests. These measurements will be taken prior to commencement of concrete placement. If, in the Engineer's opinion, significant changes occur in atmospheric conditions, additional atmospheric measurements and calculations by the Contractor will be required. The Contractor shall supply all instruments necessary to make the required calculations. All instruments shall be approved by the Engineer, as being in good working order. The Contractor's measurements and calculations will be subject to the Engineer's approval. To determine the evaporation rate, apply the values taken for relative humidity, plastic concrete temperature, air temperature, and wind velocity to Figure 557-1 Structural Concrete Evaporation Rate.

The placing of concrete for any bridge slab shall be continuous between joints. Conveyance of concrete shall meet the requirements of §555-3.04B.

Vibrating of concrete shall be in accordance with §555-3.04E except the number of vibrators required shall be one for every 40 cy of concrete placed per hour, with a minimum of two vibrators in use at all times, and equally spaced across the placement front. One additional vibrator shall be available for use as a backup.

557-3.06 Cold Joints. "Cold Jointing," the bonding of fresh concrete to set concrete, shall be done where indicated in the contract documents, or where approved by the DCES.

A. Horizontal Joints. Within 24 hours of the start of the placement, the hardened concrete shall have laitance and dirt removed by a high-pressure water wash. The high-pressure water wash shall be sufficiently strong to remove any laitance and dirt, but not damage the reinforcement or reinforcement coating. The pressure wash equipment shall be capable of providing pressure of 3000 to 5000 psi.

After pressure washing, the concrete shall be continuously wetted for a minimum of 12 hours immediately prior to deck placement. Before placing fresh concrete, all standing water shall be removed with oil-free compressed air. The surface shall be protected from drying to maintain a clean, saturated surface dry condition when placing the new concrete.

If the tops of precast/prestressed elements have been sealed with a penetrating sealer, pressure wash the tops a maximum of 2 hours prior to concrete placement. The requirement for prewetting is waived.

B. Construction Joints. The requirements of § 555-3.06 A. shall apply. Construction joints shall be placed only where shown in the contract documents or where permitted by the DCES.

In the event an ongoing placement is delayed excessively, the establishment of a bulkhead shall be required.

557-3.07 Finishing Integral Wearing Surfaces on Superstructure Slabs. Machine finishing shall be used throughout all superstructure concrete placement operations with the exception of areas which are inaccessible to finishing machines.

Machine finishing shall be accomplished with an approved power-driven, one-operation (strike-off and finishing) machine. The finishing machine shall have a strike-off auger set 1/4 to 1/2 inch above the finished surface, a power-driven roller or oscillating type screed, and a pan float.

Finishing machines shall be equipped with adjustable strike-off and finishing screeds, the bottom surfaces of which shall be adjusted to produce the required contour of the finished surface. Machines shall be kept in true adjustment. Machines out of adjustment shall not be used until proper adjustments have been made and the adjustments have been approved by the Engineer.

The specific method and equipment that the Contractor proposes to use for finishing will be supplied during the Preplacement Meeting and will be subject to approval by the Engineer based on the above listed requirements.

Finishing machine rail supports shall be accurately set and of substantial construction so that the finished deck surface will conform to the profile and transverse sections shown in the contract documents. Finishing machine rail supports shall be placed and adjusted to properly provide for the deflection of forms, falsework, and structural supporting members which will occur during the placement of the concrete. Finishing machine rail supports shall not be attached by welding to portions of flanges subject to tensile stresses. The finishing machine rail supports shall be spaced at a maximum of 2 feet on center. During stage construction, the support system shall be on the stage being placed.

Where the deck surface falls outside the fascia stringer flange, the finishing machine rail supports shall be placed on the forms. The forms shall be designed to take these loads through the use of outriggers or some other approved means.

Prior to commencing concreting operations, the finishing machine shall be given a test run over the full length of the superstructure segment to be paved, with the finishing machine adjusted to its finishing position. While operating the finishing machine during this test, the finishing machine rails shall be checked for deflection and proper adjustment, the cover on slab reinforcement measured, and the controlling dimensions of slab reinforcement and forms checked. All necessary corrections shall be made and verified by the Engineer before concreting is begun.

A sufficient amount of concrete equal to the finishing machine capacity shall be supplied at all times.

After the concrete has been placed, spread, and consolidated to provide a uniformly dense structural slab, the surface shall be struck off immediately by a single passage of the transverse finishing machine.

The finishing machine shall carry sufficient concrete in front of the screed to fill low and porous places. This operation shall be done only once and shall produce a uniformly consolidated dense smooth surface of the required contour. The passage of the strike-off auger shall provide a concrete surface slightly above grade so that after settlement, if any, and the disappearance of excess water from the surface, the passage of the finishing screed will result in a uniform surface at the required grade and contour over its entire area, and provide the required cover over reinforcing.

In areas which are inaccessible to finishing machines, use of approved manual vibratory equipped power screeds may be used, with written approval of the DCES.

Hand finishing shall be allowed only in areas inaccessible to finishing machines or manually driven vibratory-equipped power screeds. Hand finishing shall be performed in the same sequence and manner as machine finishing, unless otherwise permitted by the Engineer. Hand finishing shall be performed in such a manner as to produce a concrete surface with quality and uniformity identical to that produced by the finishing machine. Hand screeds or bullfloats shall be magnesium and 10 inches, or more, in width. Care shall be taken not to overwork the concrete surface during any finishing operation.

In the event the placement is delayed as a result of equipment breakdowns or delivery problems, all concrete in place shall be protected from evaporation by covering the surface with wet burlap, curing blankets, or plastic sheets. Excessive delays shall require the establishment of a bulkhead and the ceasing of the placement.

Prior to texturing, the finished concrete surface shall be examined by the Contractor and the Engineer using a straightedge. The straight-edge shall not be less than 10 feet long. It shall be furnished by the Contractor and maintained in good, usable condition at the placement site at all times. While the concrete is still plastic, surface depressions shall be filled with concrete of the same class as the placement in progress. Surface irregularities greater than 1/4 inch in 10 feet in either the longitudinal or the transverse direction shall be corrected in a manner acceptable to the Engineer. Thin mortar or laitance, which may have accumulated ahead of the finishing machine screed, shall be removed from the work site. They shall not be used to fill depressions.

After finishing, the surface shall be given a suitable texture with an artificial turf drag made of molded polyethylene with approximately 53,500 synthetic turf blades per square yard, each approximately 1/2 inch long. The artificial turf drag shall be of a type and brand appearing on the Department's Approved List.

The Contractor may apply texture in a transverse direction, longitudinal direction, or parallel to the finishing machine. Once begun, the direction of texturing shall not change. All texturing shall be done from a work bridge immediately following the finishing operation. Texturing shall be done prior to the beginning of curing operations. Only one pass of the turf drag over the finished area will be permitted.

If texturing is done in a transverse or skewed direction, the Contractor shall texture by hand methods immediately after finishing machine passage.

If texturing is done in the longitudinal direction the turf drag shall be a seamless strip and shall be attached to the work bridge such that the surface of the concrete is textured immediately after finishing machine passage. Small areas, otherwise inaccessible to the attached drag, may be textured by hand methods. Texture resulting from the drag shall stop within 1 foot of curbs.

The finishing movement and resulting progress of the turf drag shall be done in a manner so as to prevent ridges or gouges forming in the concrete surface. The drag shall be weighted and the contact area changed as required to produce an acceptable texture. The drag shall be cleaned periodically to remove all hardened concrete particles.

557-3.08 Finishing Integral Wearing Surfaces on Structural Approach Slabs. The requirements of §557-3.07 shall apply together with the following:

The Contractor may use an approved, manually driven, vibrator-equipped power screed in lieu of a

power-driven transverse finishing machine. Only screed model types appearing on the Department's Approved List shall be employed for this work. The Engineer may require the use of a power-driven finishing machine if satisfactory results are not being attained.

557-3.09 Finishing Surfaces to be Overlaid with Portland Cement or Asphalt Concrete.

Machine finishing shall be used throughout all superstructure concrete placement operations, with the exception of areas which are inaccessible to finishing machines. In areas which are inaccessible to finishing machines, use of approved manual vibratory equipped power screeds may be used, with written approval of the D.C. E. S.

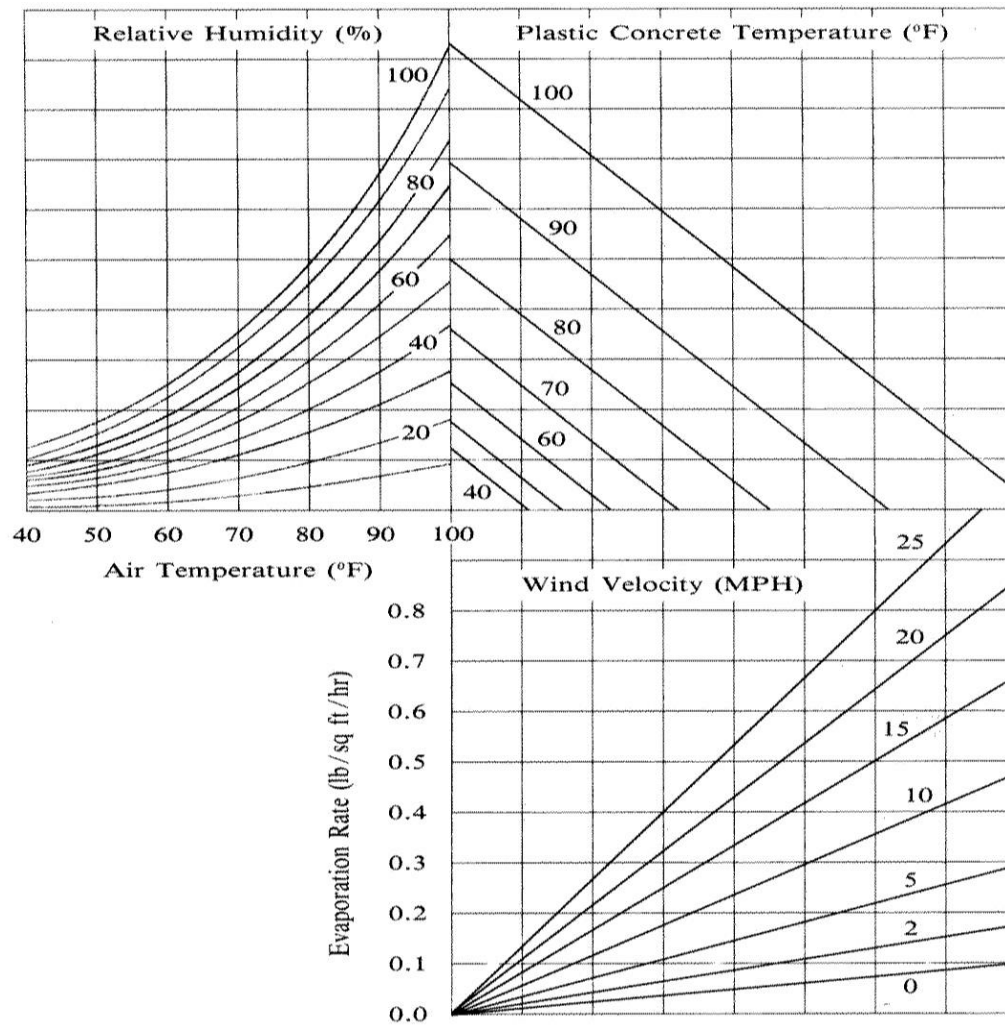
Surfaces shall be finished to a surface tolerance of 3/8 inch in 10 feet. The surface tolerance shall be verified by the Engineer with an approved straightedge not less than 10 feet long. The straightedge shall be furnished by the Contractor who shall maintain it in good condition at the paving site at all times.

Hand finishing shall be allowed only in areas inaccessible to finishing machines or manually driven vibratory-equipped power screeds. Hand finishing shall be performed in the same sequence and manner as machine finishing, unless otherwise permitted by the Engineer. Hand finishing shall be performed in such a manner as to produce a concrete surface with quality and uniformity identical to that produced by the finishing machine. Hand screeds or bullfloats shall be magnesium and 10 inches, or more, in width. Care shall be taken not to overwork the concrete surface during any finishing operation.

Upon completion of screeding, surfaces which will be overlaid with portland cement concrete shall be textured to conform to §557-3.07.

557-3.10 Sidewalk and Safety Walk Finish on Bridges. Sidewalks and safety walks shall be constructed by placing concrete continuously to an elevation slightly higher than shown in the contract documents. The concrete shall then be screeded to the correct elevations and worked with a magnesium float to give uniform surface. Floating shall be kept to a minimum, consistent with the desired finish, in order to avoid overworking the concrete. Follow floating with a broom finish. Surface scoring will not be permitted.

FIGURE 557-1 STRUCTURAL CONCRETE EVAPORATION RATE



To use this chart:

1. Enter with air temperature, move up to relative humidity.
2. Move right to plastic concrete temperature.
3. Move down to wind velocity.
4. Move left to read approximate rate of evaporation.

557-3.11 Curing. After finishing and plastic-concrete texturing operations are completed, the concrete surface shall be completely covered with clean, prewetted burlap. The allowable time period for wet burlap covering shall not exceed five minutes from the completion of texturing, and 30 minutes from the time of concrete placement. Care shall be taken so as not to damage the finished surface and texturing. The curing shall not be delayed beyond the specified period. Burlap shall be lapped a minimum of 1 foot. Lapped edges are not required to be sealed. Burlap shall be thoroughly saturated over its entire surface area and shall be drained of excess water prior to its application. Burlap shall be kept continuously wet, commencing 10 minutes from the time the wet burlap is placed, and protected from displacement. The Contractor may cover the wet burlap and soaker hoses only if it is necessary to maintain curing temperature.

The curing period shall begin only after all concrete for a given placement is complete. A curing day is defined as any day during which the ambient air temperature at the concrete surface is 45°F or higher for the entire day.

Conditions may occur which prevent an entire day from qualifying as a curing day, but do not prevent portions of that day from reaching temperatures that qualify as curing temperatures. If these conditions occur and with the Engineer's approval, the Contractor may aggregate curing hours. A curing hour is defined as any hour during which the curing temperature remains at, or above 45°F.

An aggregation of 24 curing hours will be credited as one curing day. Aggregations of less than 24 curing hours will not be credited.

Curing hours will be determined with continuous recording thermometers. The number and placement of the thermometers will be determined by the Engineer. Thermometers used to monitor curing temperatures shall consist of the following types:

1. **Continuously Recording Thermometer.** The thermometer shall be capable of continuously recording temperatures within a range of 0°F to 120°F for a minimum of 24 hours.
2. **Maximum - Minimum Recording Thermometer.** For all placements the thermometer shall be capable of recording maximum and minimum temperatures in a range of 0°F to 120°F.

The curing temperature of concrete is the air temperature at the concrete surface, or the air temperature between the concrete surface and its protective covering. Temperatures at these locations are critical for proper concrete curing. For the purposes of this section the temperatures at the foregoing locations shall be maintained between 45°F and 85°F inclusive.

A. Superstructure Slabs. After the burlap placement has been fully completed, the concrete surface shall be cured for 14 curing days. The Contractor may use either option listed below. After seven curing days, the Contractor may be permitted to perform incidental work on the structure under the loading limitations of §557-3.14 Loading Limitations for Superstructure Slabs. The burlap may be displaced in limited areas, for short durations, to perform items such as sawcut grooving, placement of sidewalks, safety walks, curbing, bridge rail, and fencing. The amount of burlap displaced to perform these operations shall be limited to the immediate area affected by the Contractor's operations. All concrete surfaces exposed during these operations shall be kept in a saturated condition. Immediately after the work is completed in the affected area, all burlap shall be replaced for the duration of the curing period. Removable forms shall remain in place until the minimum curing period is complete. HPIC Concrete curing requirement is seven days.

1. Fourteen-Day Continuous Wetting. Leave all burlap in place for 14 curing days. Provide continuous, uniform wetting for the entire curing period.

2. Wet Burlap and Curing Covers. Provide continuous uniform wetting for seven curing days. After seven curing days, either of the following methods may be used:

- a. Remove all burlap after seven curing days. Apply curing covers immediately upon burlap removal. Plastic-coated fiber blankets are not required to be laid dry. Application and maintenance of covers shall be in accordance with §555-3.08A General. Concrete cured in this manner shall not be exposed to the atmosphere for more than 10 minutes between burlap removal and curing cover placement.
- b. Apply curing covers directly over the wet burlap. Plastic-coated fiber blankets are not required to be laid dry. Application and maintenance of covers shall be in accordance with §555-3.08A General. The concrete surface shall be inspected periodically to ensure that its condition remains saturated.

The Contractor shall inform the Engineer of the intended curing procedure at the Preplacement Meeting.

B. Structural Approach Slabs, Curbs, Sidewalks and Safety Walks on Bridges. After the burlap placement has been fully completed, leave all burlap in place for 7 curing days. Provide continuous, uniform wetting for the entire curing period. Forms for curbs, sidewalks, and safety walks shall remain in place until the minimum curing period is complete. Forms for structural approach slabs shall remain in place until sufficient strength is achieved to avoid damage to the concrete. After removal of approach slab forms, the formed surfaces shall be cured as per the requirements of §555-3.08A.

557-3.12 Provisions for Concreting in Cold Weather. Cold-weather concreting provisions shall apply when the ambient air temperature below 45°F for 24 consecutive hours, or drops below 32°F at any time, during the curing or drying periods of the concrete.

When cold-weather concreting of superstructure slabs is progressed, curing shall be maintained in accordance with §555-3.08C *Provisions for Curing in Cold Weather*, except as modified here:

A. Superstructure Slabs.

The curing duration shall be 14 days (336 hours). Conditions may occur which prevent an entire 24 hour day from qualifying as a curing day, but do not prevent portions of that day from reaching temperatures that qualify as curing temperatures. If these conditions occur the Contractor may aggregate curing hours. An aggregation of 24 curing hours will be credited as one curing day based on the Engineer's acceptance of monitored temperature data. Any aggregations of less than 24 curing hours will not be credited as a curing day. A curing hour is defined as any hour during which the curing temperature remains at, or above 45°F. Curing temperature is defined as the temperature of the air measured at the surface of the curing concrete.

Curing temperatures shall be maintained in accordance with the requirements of Table 555-2, *Cold Weather Curing Requirements*. If ambient air temperatures are expected to fall below 45°F, materials and equipment necessary to maintain required curing temperatures shall be present on the site or readily available. The contractor shall provide protection in a timely manner to maintain acceptable curing.

External heat and enclosures to maintain curing temperatures may be required, as determined by the contractors proposed curing methods documented at the Preplacement Meeting. Enclosures are defined as those materials, combinations of materials, or systems that provide for uniform temperature and curing management of the concrete. If enclosures are required, they shall be constructed in such a way that all surfaces of the fresh concrete shall be maintained between 45°F and 80°F for the curing period. On structures where bottom formwork is not required, the existing superstructure materials may be considered for their insulating values provided all curing temperature requirements are maintained. If the Contractor expects to, or will, perform work when ambient temperatures are below 45°F, the enclosure shall be constructed in such a manner that work can be performed inside the enclosure without exposing any concrete to a temperature below 45°F. All concrete surfaces within heated areas shall be protected from drying by the use of live steam or use of continuously wetted burlap. All concrete surfaces within heated areas shall be protected from surface disintegration of fresh concrete due to an accumulation of carbon dioxide gas by properly venting the enclosure or use of non-combustion type heating systems.

Continuously recording thermometers shall be placed on both the top and underside of the deck to monitor areas where extreme cold or heat can be expected. Multiple thermometers may be required as directed by the Engineer. On structures where bottom formwork is not required and the existing superstructure materials are considered for their insulating value, temperatures shall be monitored at

the interface between the existing superstructure materials and new concrete using continuously recording thermocouples and thermometers.

A maximum temperature differential of 30° F between any two locations within any form of enclosure, heated or otherwise, shall be maintained at all times.

When the ambient temperature is 45°F or greater, an enclosure may be removed for access to progress additional work providing there is a temperature difference of 30 Fahrenheit degrees or less between the air and the surface of the concrete. If the temperature difference between the air and the surface of the concrete is greater than 30 Fahrenheit degrees, temperatures shall be gradually reduced at a rate not to exceed 1°F /hr until the temperature difference is equal to or less than 30 Fahrenheit degrees. If an enclosure is removed, all heating in other areas shall cease until such time that the enclosure is replaced. Upon completion of the incidental work and replacement of the enclosure, the Contractor shall reestablish acceptable curing temperature differentials, with a maximum temperature differential not more than 30 Fahrenheit degrees between any two locations within the enclosure.

After seven (7) curing days, the Contractor may perform work on the structure to complete sidewalks, safety walks, curbs, and barriers. Work shall progress only when ambient temperatures are 45°F or greater or within an enclosure as described above. Incidental work shall not cause damage to the structure.

For all incidental work, the requirements of §557-3.14, *Loading Limitations for Superstructure Slabs*, shall apply.

B. Structural Approach Slabs, Curbs, Sidewalks and Safety Walks on Bridges.

The provisions of 557-3.12 A *Superstructure Slabs* shall apply except the curing duration shall be 7 days (168 hours). After three (3) curing days, the Contractor may perform work on approach slabs to complete sidewalks, safety walks, curbs, and barriers. Work shall progress only when ambient temperatures are 45°F or greater or within an enclosure as described above. Incidental work shall not cause damage to the structure.

For structural approach slabs, the requirements of §557-3.15 *Loading Limitations for Structural Approach Slabs, Sidewalks, and Safety Walks on Bridges*, shall apply.

C. Saw Cut Grooving.

When concrete is placed, cured, or dried under cold weather provisions, and a surface treatment option requiring saw cut grooving is used, saw cut grooving may be commenced after 7 curing days and shall be completed prior to commencing the drying period. Work shall progress only when ambient temperatures are 45°F or greater or within an enclosure as described in §557-3.12 A. Care shall be taken to prevent damage to the structure and no chipping or spalling of concrete shall occur at the sawcut edges.

D. Winter Surface Treatment - Superstructure Slabs and Structural Approach Slabs.

Upon completion of the curing period, the Contractor shall progress one of the following two options:

1. Option 1. The top surface and fascias of the superstructure slab shall be air dried for 10 days before being sealed with a penetrating sealer or exposed to freezing temperatures. Saw cut grooving shall be completed, as described above, prior to application of penetrating sealer. External heat and enclosures to maintain drying temperatures may be required. Drying shall be achieved by the following:

- a. Providing free air flow and maintaining temperatures between 45°F and 80°F to the top surface and fascias (vertical faces) of the superstructure slab. Fascia forms shall be removed to allow for free air flow.

b. Drying of the underside of the structure, and of the fascias when a concrete barrier is to be placed on the superstructure slab, will not be required. However, ambient temperatures shall be maintained between 45°F and 80°F in these areas for the duration of the drying period.

c. The drying period shall be continuous except that aggregate drying hours may be allowed when a contractor ceases free air flow for any reason but protects the drying concrete from exposure to any additional water. Exposure to any additional water, beyond minor leakage thru an enclosure in limited areas, will require the drying period to re-commence for 10 days. Any 3 hour period of time, or fraction thereof, when the concrete is exposed to minor leakage shall not be counted as part of the drying period. Minor leakage shall be defined as water that dries or evaporates in 3 hours or less. Limited areas are defined as areas less than 100 ft². The total area of allowable minor leakage shall not exceed 5% of the concrete area under drying conditions. The same area of concrete shall not be exposed to minor leakage more than twice. Areas that exceed 100 ft² or are exposed to additional water that does not dry or evaporate in less than 3 hours, may be dried independently to accommodate removal of the original enclosure. Any independent enclosures shall be maintained under the same temperature and air flow requirements as the original enclosure for 10 days.

d. Means of accelerating the drying process will be considered by the Director, Materials Bureau, to achieve an internal moisture content of 85% relative humidity or less, measured at a depth of 1 inch from any concrete surface.

Once the drying period is complete, temperatures shall be gradually reduced at a rate not to exceed 1°F/hr until the temperature within the enclosure equals the temperature outside the enclosure. Application of a penetrating sealer, in accordance with other items shall be completed before opening the superstructure slab to traffic.

2. Option 2. The top surface and fascias of the superstructure slab shall be air dried for 24 hours before being sealed with an interim application of penetrating sealer or being exposed to freezing temperatures. No saw cut grooving will be performed. External heat and enclosures to maintain drying temperatures may be required. Work shall be progressed by doing the following:

a. Providing free air flow and maintaining temperatures between 45°F and 80°F to the top surface and fascias of the superstructure slab. Fascia forms shall be removed to allow for free air flow.

b. Drying of the underside of the structure, and of the fascias when a concrete barrier is to be placed on the superstructure slab, will not be required. However, ambient temperatures shall be maintained between 45°F and 80°F in these areas for the duration of the 24 hour drying period. Application of interim penetrating sealer shall be completed before opening the superstructure slab to traffic.

c. After April 1st the contractor shall clean the deck of debris and provide necessary site access. The Department will inspect the superstructure slab for freeze / thaw or scaling damage. Damage shall be defined as:

(1) Delaminations

(2) Surface defects as follows:

- Total combined area greater than 50 ft² with a scaling rating of 3 or greater as defined by ASTM C-672.
- Total combined area greater than 10 ft² where the surface distress is greater than 3/16 inch deep.

- (3) Pop-outs – surface imperfections greater than 3/4 inch in diameter
- d. If the above described damage exists, the Contractor shall repair any damaged or defective concrete greater than 3/16 inch deep by saw cutting the perimeter of the area to a depth of 3/4 inch, chipping any unsuitable material to 1-1/2 inch or sound concrete (whichever is deeper) with light, hand held, pneumatic tools, at a 45 degree angle into the repair area. Clean all repair area surfaces thoroughly by blast cleaning. Repair small areas 3 ft² or less using approved concrete repair material that provides a permeability less than 1200 coulombs, Item 701-04, preparing the surface according to the material manufacturer's recommendations. Repair larger areas using Class DP concrete, preparing the surface according to §584-3.02 and 584-3.03. Cure Class DP concrete for 7 days.
- e. After all necessary repairs are completed, the Contractor shall perform diamond grinding to the entire superstructure slab and approach slabs, to within 1 foot of any curb or barrier. Diamond grinding shall be performed as follows:
- (1) The depth of the grinding shall be approximately 3/16 inch to obtain a smooth texture.
 - (2) In all travel lanes, use equipment having gang-mounted diamond saw blades on a multi-blade arbor specifically designed for PCC pavement or superstructure production grinding. Using equipment capable of producing a 3 ft wide (minimum) grinding pass that is equipped with a vacuum system capable of removing slurry from the bridge deck surface, such as the Target 3800, Boart-Longyear (Kushion Kut) PC5000 or PC600, or equal as approved by the Director, Materials Bureau. Smaller diamond grinding equipment shall be used as necessary to complete grinding adjacent to curbs or barriers. The Contractor shall submit requests to use other equipment at least 7 days prior to the start of grinding operations.
 - (3) Begin and end diamond grinding lines normal to the bridge deck centerline. Grind the bridge deck longitudinally such that at least 95% of the bridge deck surface is ground and the bridge deck is in the same plane across a joint or crack when measured with a 3 ft (minimum) straightedge. When steel joints are specified, joints shall be placed to allow for the required grinding of 3/16 inch. Feathering of the grinding operation at steel joints shall be kept to a minimum. Provide surface drainage by maintaining the proper cross-slope on the finished surface and by blending adjacent passes. Regrind the bridge deck if an acceptable surface is not being obtained.
 - (4) Continuously remove slurry from the bridge deck using the vacuum system on the grinding equipment. If required, provide equipment capable of transporting the slurry from the job site to an acceptable waste area or facility, without spilling.
 - (5) Traffic may be allowed on ground areas after slurry removal is complete or on decks where only partial diamond grinding is complete.
 - (6) After diamond grinding is complete, concrete shall be saw cut grooved according to contract documents and specifications for saw cut grooving, followed by penetrating sealer application placed in accordance with contract documents and specifications for penetrating sealers.

E. Winter Surface Treatment –Curbs, Sidewalks and Safety Walks on Bridges.

Upon completion of the curing period, concrete shall be air dried for 24 hours by providing free air flow and maintaining temperatures between 45°F and 80°F to all concrete surfaces. The drying period shall be continuous. Upon completion of drying, curbs, sidewalks and safety walks shall be sealed with a penetrating sealer in accordance with contract documents.

557-3.13 Removal of Forms. Removal of forms for superstructure slabs shall meet the requirements of §555-3.09 Form Removal and as modified herein. The minimum curing period prior to form removal is 10 curing days, except that for cold weather concreting a minimum of 14 curing days is required unless

minimum compressive strengths are achieved as determined by the D.C. E. S. A curing day is defined in §555-3.08A. Permanent field connections, if required, shall be made on the same day prior to removal of forms and falsework.

The following inspection procedures will be used as a check to insure the soundness of the concrete structural slab adjacent to the steel forms. Not less than two days after completion of a concrete structural slab pour, but prior to the next slab pour, the Contractor shall remove a section of the steel form from the most recently completed pour of each span, at a location selected by the Engineer, in order to provide visual evidence that the concrete mix or the construction procedures are obtaining the desired results. If either the concrete mix or the construction procedures are varied significantly within a pour, such as a change in the extent of vibration or change in the workability of the mix, the Contractor shall remove another section of form to verify that the new procedures yielded desirable results.

After the concrete has been placed in a span for a minimum of ten days but prior to any further work performed on the superstructure in that span, the Engineer will spot-check the underside areas of the steel forms by sounding with a suitable-weight hammer at least 50% of the area of at least 25% of the individual form panels on a random basis to determine whether any honeycomb or void areas exist. If such areas are detected, the Contractor shall remove the forms from these areas for a visual inspection of the slab.

The amount of sounding and form removal may be reduced after a substantial amount of slab has been constructed and inspected, if the Contractor's methods of construction and the results of the inspections as outlined above indicate that sound concrete is present throughout the slabs.

If, after removing a section of form, the concrete is found to be defective, additional panels shall be removed. All defective concrete shall be repaired to match the adjacent concrete in section and color.

The form sections shall be removed by a metal saw or air-carbon-arc gouging with minimum damage to the concrete. Cuts shall only be sufficiently deep to sever the form. Any other method of removal shall be submitted to the Deputy Chief Engineer (Structures) for approval. Cuts that are parallel to the corrugations in the forms shall be located on the sloping surface midway between a crest and a valley. Cuts parallel to the supporting beams shall be made through the supporting angles taking care not to damage the structural steel beams. The Contractor will not be required to replace the removed forms.

The Contractor shall provide all the facilities required for safe, suitable and convenient means of access to the forms for the Engineer's inspection.

557-3.14 Loading Limitations for Superstructure Slabs. Superstructure slabs, during the curing period, may be subjected to a vehicle load not to exceed 10 tons, or a wheel load not to exceed 3 tons no sooner than seven curing days after placement. Full legal loading may commence using either of the following options:

A. Superstructure slabs may be subjected to full legal loads no sooner than 14 calendar days after completion of the curing period.

B. The Contractor may subject a superstructure slab to its full legal load upon completion of the curing period, or any day thereafter provided that the procedure below is followed:

1. The Contractor shall notify the Engineer at the Preplacement Meeting of the intention to subject the slab to full legal load prior to the 14th day after completion of curing.
2. During the slab concrete placement, the Engineer will cast two sets (pairs) of test cylinders in addition to each set cast for record and cure the cylinders on site in the same manner as the superstructure slab.
3. The Engineer will forward cylinders to the Materials Bureau or Regional Testing Facility. One set will be tested fourteen calendar days after placement and, if necessary, the second set will be tested twenty-one calendar days after concrete placement. Under no circumstances will cylinders be tested sooner than fourteen calendar days after the concrete placement they represent.

4. Concrete cylinder sets (pairs) designated for advance testing shall achieve an average compressive strength of 3000 psi, or greater, with individual cylinders having a compressive strength of 2800 psi, or greater.
5. Results of compression tests will be transmitted to the Engineer as soon as possible. The Engineer will inform the Contractor of the cylinder testing results and allow early loading if appropriate. If the required compressive strengths are not achieved, the requirements of §557-3.14A shall apply.

557-3.15 Loading Limitations for Structural Approach Slabs, Sidewalks, and Safety Walks on Bridges. During the curing period, approach slabs may be subjected to a vehicle load not to exceed 10 tons, or a wheel load not to exceed 3 tons. The Contractor may subject structural approach slabs, sidewalks, and safety walks to their full legal load upon completion of the 7-day curing period.

557-3.16 Damaged or Defective Concrete. Damaged or defective concrete shall be defined by, and repaired in accordance with, the requirements of §555-3.13, Defective or Damaged Concrete.

Subsequent to placement of concrete, either before or after setting, the Engineer will verify at random that the vertical clear distance from the top of the structural slab to the top mat of main reinforcing, as shown on the contract plans, is correct within a tolerance of plus or minus 1/2 inch. If the allowable tolerance is exceeded, the Engineer shall reject the work so advise the Contractor and the Deputy Chief Engineer (Structures), in writing, stating the deficiencies upon which the rejection is based.

The Deputy Chief Engineer (Structures) shall review the nature and extent of the deficiencies and shall designate one or more of the following alternatives:

- The affected placement shall be removed and replaced in whole or in part.
- The Contractor shall provide special corrective measures as directed by the Deputy Chief Engineer (Structures).
- The concrete placement shall be accepted without corrective action.

After the concrete has hardened, the Engineer will examine it using the Contractor's straightedge. Surface irregularities greater than 1/4 inch in 10 feet shall be corrected. Unless otherwise directed by the Regional Materials Engineer, the concrete used for repairs shall be of the same materials as that used for the original placement.

557-3.17 No Bar list provided. When no bar lists are provided in the contract documents the following shall apply:

1. At least thirty (30) days prior to fabrication of the reinforcement the Contractor shall submit a minimum of two copies of the bar lists and placement drawings showing the bar locations to the Engineer. The details of the bar list and placement drawings shall meet the requirements of the current edition of the Concrete Reinforcing Steel Institute's publication Reinforcing Bar Detailing. Placement drawings shall be size "B". Drawings and bar lists shall be clear and legible.
2. Requests for information or changes along with reasons shall be documented in a separate list.
3. The Engineer will transmit the documents to the designer for review for conformance with the design requirements in accordance with the Shop Drawing Approval process. The designer will not be checking lengths, number of bars, weights or bar marks. Corrections will be returned to the Contractor. When the documents are satisfactory they will be returned to the Contractor stamped "Approved In Conformance With Design Requirements".
4. Partial submissions that require coordination with other drawings will not be accepted.

557-4 METHOD OF MEASUREMENT. The work will be measured for payment in square yards of superstructure slab, approach slab, or sidewalk and safety walks installed, measured to the nearest 0.1 square yards.

Winter surface treatment of superstructure and approach slabs will be measured for payment in square yards of superstructure and approach slab, measured to the nearest 0.1 square yard.

557-5 BASIS OF PAYMENT. The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to complete the work. Unless otherwise provided, the unit price bid shall include the cost of furnishing and placing bar reinforcement, wire fabric for concrete reinforcement, copper flashing, flexible water stops, mechanical connectors where specified, sheet packing, water for wetting, joint sealing compounds, joint fillers, concrete curing materials, including any materials for temperature management during the curing period and the cost of screed rail supports and other brackets or braces necessary to support finishing machines.

If permanent metal forms are used, the cost of furnishing all facilities required for access, removing the permanent forms for inspection or repair purposes, painting the cut edges of the forms and repairing the concrete as required herein shall be included in the price bid for this work.

No extra compensation for corrective finishing or repairs to damaged or defective concrete will be paid.

Progress payments will be made on a per-span basis as follows:

Forty (40) percent of the area will be paid for after all reinforcing is properly placed. Forty (40) percent of the area will be paid for after the concrete has been properly placed and proper curing applications have been instituted. The remainder will be paid for after completion of all curing, and necessary corrective work.

The unit price bid for Surface Treatment of Superstructure and Approach Slabs shall include all labor, materials and equipment necessary to satisfactorily complete the work including work zone traffic control for work associated with deck cleaning, evaluation, and diamond grinding. The cost for interim penetrating sealer applied under §557-3.12C.2., prior to the concrete being exposed to freezing conditions, shall be included in this item. The cost for saw cut grooving and final application of penetrating sealer will be paid for under separate items and paid for only once.

Winter Surface treatment – Superstructure Slabs and Structural Approach Slabs shall only be paid when environmental conditions related to temperature and moisture protection during the drying period require use of enclosures.

Payment will be made under:

Item No.	Item	Pay Unit
557.0101	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Required – Type 1 Friction	Square Yard
557.0102	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Required – Type 2 Friction	Square Yard
557.0103	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Required – Type 3 Friction	Square Yard
557.0109	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Required – Type 9 Friction	Square Yard
557.0501	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Not Required – Type 1 Friction	Square Yard
557.0502	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Not Required – Type 2 Friction	Square Yard
557.0503	Superstructure Slab with Integral Wearing Surface – Bottom Formwork Not Required – Type 3 Friction	Square Yard
557.0509	Superstructure Slab with Integral Wearing Surface - Bottom Formwork Not Required – Type 9 Friction	Square Yard
557.07	Superstructure Slab with Separate Wearing Surface – Bottom Formwork Required	Square Yard
557.09	Superstructure Slab with Separate Wearing Surface – Bottom Formwork Not Required	Square Yard

557.13	Class D Concrete	Square Yard
557.2001	Structural Approach Slab with Integral Wearing Surface – Type 1 Friction	Square Yard
557.2002	Structural Approach Slab with Integral Wearing Surface – Type 2 Friction	Square Yard
557.2003	Structural Approach Slab with Integral Wearing Surface – Type 3 Friction	Square Yard
557.2009	Structural Approach Slab with Integral Wearing Surface – Type 9 Friction	Square Yard
557.22	Structural Approach Slab with Separate Wearing Surface	Square Yard
557.29	Winter Surface Treatment – Superstructure Slabs and Structural Approach Slabs	Square Yard
557.30	Sidewalks and Safety Walks	Square Yard
557.4101	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Required, Type 1 Friction	Square Yard
557.4102	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Required, Type 2 Friction	Square Yard
557.4103	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Required, Type 3 Friction	Square Yard
557.4109	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Required, Type 9 Friction	Square Yard
557.4301	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Not Required, Type 1 Friction	Square Yard
557.4302	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Not Required, Type 2 Friction	Square Yard
557.4303	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Not Required, Type 3 Friction	Square Yard
557.4309	Superstructure Slab with Integral Wearing Surface – HPIC Bottom Formwork Not Required, Type 9 Friction	Square Yard

ITEM 557.01XX2403- ACCELERATED SUPERSTRUCTURE CONCRETE (24 HOURS) FOR STRUCTURAL SLAB BRIDGE DECK, FRICTION TYPE XX, FORMWORK REQUIRED

Curing. Wet cure accelerated concrete a minimum of 24 hours or until compressive strength requirements have been met. If additional materials are to be cast or applied to the accelerated concrete, surface preparation and drying shall be progressed according to any manufacture's recommendations for the subsequent materials placement(s). If cold weather conditions exist, upon completion of curing concrete shall be air dried for a minimum of 24 hours while maintaining acceptable curing temperatures.

METHOD OF MEASUREMENT

The work will be measured for payment as the number of square yards of accelerated superstructure concrete satisfactorily placed.

necessary to satisfactorily complete the work.

Payment Will Be Made Under:

Item No.	Description	Pay Unit
557.01XX2403	Accelerated Superstructure Concrete (24 Hours) For Structural Slab Bridge Deck, Friction Type XX, Formwork Required	Square Yard

XX = friction type 01- Type I
 02- Type 2
 03 -Type 3
 09 – Type 9

ITEM 557.01XX2403- ACCELERATED SUPERSTRUCTURE CONCRETE (24 HOURS) FOR STRUCTURAL SLAB BRIDGE DECK, FRICTION TYPE XX, FORMWORK REQUIRED

DESCRIPTION

This work shall consist of placing accelerated superstructure concrete where indicated in accordance with the contract documents and as directed by the Engineer.

MATERIALS AND EQUIPMENT

All the provisions of 557-2 shall apply except as modified herein.

Produce a modified Class H concrete mix design that will achieve 3000 psi in 24 hours. Modifications may include:

- Non-chloride accelerator (§711-08)
- Normal range water reducer (§711-08)
- Hot water
- Insulating materials during curing

Maximum water/cement ratio -0.40

Slump range- 3"-5"

Air content -5.0%- 8.0%

The use of a water reducing, and retarding admixture is not required.

Transit Mixed and Truck Mixed Accelerated Structural Concrete. Use trucks modified to monitor water additions and dispense admixtures on site. Trucks shall be calibrated and approved by the Regional Materials Engineer. Apply the following in addition to the requirements of the Standard Specification sections listed above.

A. Accelerating Admixtures. If used, accelerating admixtures may be batched into transit mixed concrete at the plant in accordance with §501-2.03F, Admixture Dispensing Systems, or added at the site during or after any water addition. For truck mixed concrete, accelerating admixtures shall be added at the site and after the water is added.

When adding accelerating admixtures at the site, equip trucks with an air pressurized tank that:

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

Add the entire admixture into the mixer drum in one uninterrupted operation in one minute or less.

B. Water-to-Cementitious Ratio Control. Twice daily, or more frequently if weather conditions change significantly as determined by the Engineer, determine the aggregate moisture content in accordance with Materials Method 9.1, Plant Inspection of PCC, and

ITEM 557.01XX2403- ACCELERATED SUPERSTRUCTURE CONCRETE (24 HOURS) FOR STRUCTURAL SLAB BRIDGE DECK, FRICTION TYPE XX, FORMWORK REQUIRED

adjust batch quantities accordingly. Determine the maximum amount of water that can be added to the mix that will not exceed the maximum water-to-cementitious ratio. Subtract from this quantity the portion of accelerating admixture that is water and any water added at the plant, including wash down water. Document, on the delivery ticket, the maximum amount of water that may be added at the project to maintain the maximum 0.40 water-to-cementitious ratio. Upon arrival at the site, provide the delivery ticket to the Engineer. Do not add more water than the maximum volume indicated on the delivery ticket.

C. In-Line Water Flow Meter. Equip trucks with an in-line water flow meter that:

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

The Regional Materials Engineer will measure the actual flow rate and inspect the flow meter prior to use. Reset the flow meter to zero before adding any water at the site.

For truck mixed concrete, execute 20 dry revolutions at 12 to 18 rpm before adding water. Add water in one uninterrupted operation. No water is to be removed from the truck for any purpose while water is being added to the drum. After the required water designated on the delivery ticket has been added, add the entire accelerating admixture, if any, as described above in Accelerating Admixtures. Mixing shall not exceed 200 mixing revolutions after the addition of all materials.

Concrete Sampling and Testing. Provide an American Concrete Institute (ACI) Certified Concrete Field-Testing Technician, Grade I, or higher, to measure slump, air content, and unit weight of concrete and to cast cylinders for compressive strength testing. Use an agency accredited by the AASHTO Accreditation Program (AAP) in the field of construction materials testing of Portland Cement Concrete to perform all compressive strength testing. Provide acceptable proof of ACI Certification and AASHTO Accreditation to the Engineer before placing any concrete.

Accelerated Superstructure Concrete Trial Batch. At least 14 days prior to the start of concrete placement, produce a 4.0 yd³ (minimum) trial batch. Produce the trial batch using the same materials and processes as those to be used to produce the project concrete. Provide the Engineer a minimum of 7 days advance notification of trial batch production. Coordinate trial batch production to ensure the presence of the Engineer and the Regional Materials Engineer.

Cast a minimum of 12 cylinders in accordance with Materials Method 9.2, Field Inspection of Portland Cement Concrete. Determine the concrete compressive strength in accordance with

ITEM 557.01XX2403- ACCELERATED SUPERSTRUCTURE CONCRETE {24 HOURS) FOR STRUCTURAL SLAB BRIDGE DECK, FRICTION TYPE XX, FORMWORK REQUIRED

ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens, and establish a rate of strength gain over a period of 96 hours. Cast and test in the presence of the Engineer, or the Engineer's representative. Begin compressive strength testing of the trial batch concrete 18 hours after casting cylinders. Test one pair of cylinders at 18 hours, three pairs at 24 hours, one pair at 48 hours and one pair at 96 hours of age. The mix will be considered acceptable for use if the three cylinder pairs tested at 24 hours (6 cylinders total) achieve an average compressive strength exceeding 3000 psi with no individual cylinder strength less than 2600 psi.

At least 7 days prior to use, submit the mix design to the Engineer. Include admixture brands and dosages as well as mixing, transporting, placing, curing, and strength gain data. Changes other than minor fluctuations in admixture dosage rates will require a new mix design and trial batch. The Engineer may halt placement and order additional trial batches whenever the specified properties are not achieved.

CONSTRUCTION DETAILS

All the provisions of 557-3 shall apply except as modified herein. Meet with the Engineer a minimum of one week in advance to coordinate all aspects of removal, preparation, and material placement including mixing, transport, and discharge, jointing, material requirements and testing, and personnel requirements.

Project Strength Determination. Provide an ACI Certified Concrete Field Testing Technician, Grade I, or higher, to cast all cylinders and use an AASHTO accredited lab for compression testing of all cylinders. Cast and test in the presence of the Engineer, or the Engineer's representative. The Engineer, or the Engineer's representative, will complete the Concrete Cylinder Report as cylinders are cast and tested.

Cast a minimum of one cylinder pair from each truck in a scheduled placement operation in accordance with Materials Method 9.2, Field Inspection of Portland Cement Concrete. A minimum of three cylinder pairs (6 cylinders total) is required. Develop an Engineer-approved marking system that allows a cylinder to be readily associated with the corresponding placement location and placement time.

Determine the concrete compressive strength in accordance with ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. Open the placement to traffic when the average compressive strength of the cylinder pair from the last truck of the operation exceeds 3000 psi. Use other cylinders cast to properly anticipate the time frame required for that pair to reach 3000 psi. If 3000 psi is not achieved, test another cylinder pair from the last truck later, provided an adequate number of additional cylinders were cast and the placement has not been opened to traffic. If the placement is opened to traffic before it has been shown to achieve 3000 psi, the placement will be considered Damaged or Defective Concrete and will be replaced at no additional cost to the State.

557.0502	Superstructure Slab with Integral Wearing Surface - Bottom Formwork Not Required- Type 2 Friction	Square Yard
557.0503	Superstructure Slab with Integral Wearing Surface- Bottom Formwork Not Required -Type 3 Friction	Square Yard
557.0509	Superstructure Slab with Integral Wearing Surface- Bottom Formwork Not Required -Type 9 Friction	Square Yard
557.07	Superstructure Slab with Separate Wearing Surface- Bottom Formwork Required	Square Yard
557.09	Superstructure Slab with Separate Wearing Surface- Bottom Formwork Not Required	Square Yard
557.13	Class D Concrete	Square Yard
557.2001	Structural Approach Slab with Integral Wearing Surface- Type 1 Friction	Square Yard
557.2002	Structural Approach Slab with Integral Wearing Surface – Type 2 Friction	Square Yard
557.2003	Structural Approach Slab with Integral Wearing Surface- Type 3 Friction	Square Yard
557.2009	Structural Approach Slab with Integral Wearing Surface- Type 9 Friction	Square Yard
557.22	Structural Approach Slab with Separate Wearing Surface	Square Yard
557.29	Winter Surface Treatment- Superstructure Slabs and Structural Approach Slabs	Square Yard
557.30	Sidewalks and Safety Walks	Square Yard
557.4101	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Required ,Type 1 Friction	Square Yard
557.4102	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Required ,Type 2 Friction	Square Yard
557.4103	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Required ,Type 3 Friction	Square Yard
557.4109	Superstructure Slab with Integral Wearing Surface -HPIC Bottom Formwork Required ,Type 9 Friction	Square Yard
557.4301	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Not Required, Type 1 Friction	Square Yard
557.4302	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Not Required, Type 2 Friction	Square Yard
557.4303	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Not Required, Type 3 Friction	Square Yard
557.4309	Superstructure Slab with Integral Wearing Surface- HPIC Bottom Formwork Not Required ,Type 9 Friction	Square Yard

SECTION 558 - LONGITUDINAL SAWCUT GROOVING OF STRUCTURAL SLAB SURFACE

558-1 DESCRIPTION. Sawcut grooves into the surface of a Portland cement concrete structural slab at the locations indicated in the contract documents.

The Contractor is hereby notified that concrete curing requirements ,combined with structural slab loading restrictions, may have a significant effect upon the specific time, relative to concrete placement , at which sawcut grooving may be performed. The Contractor shall be familiar with the limits imposed by these factors and conduct operations accordingly.

558-2 MATERIALS. Use multibladed wet saw cutting equipment using circular saw blades. The Engineer may allow the use of single blade, circular saw equipment, where it is determined such equipment is necessary to complete the work as required. The equipment the Contractor proposes to use will be subject to the approval of the Engineer, prior to use.

Use water which meets the requirements of §7 12-01.

558-3 CONSTRUCTION DETAILS. Sawcutting concrete produces silica dust. Include sawcutting of concrete in the Health and Safety Plan in accordance with the silica safety requirements of § 107-05 L.4.

Start sawcutting only after the specified curing period has elapsed, unless otherwise allowed by the applicable specification.

Cut longitudinal grooves parallel to the centerline of roadway using a single pass. Space the center-to-center of grooves at 0.75 inch +/- 10%. Cut all grooves rectangular in shape conforming to the following dimension s:

Width 0.1 inch (+ 20%, - 0) Depth 0.15 inch +/- 50%

During the grooving operations, the Engineer will verify, at random, that the minimum groove depth is being achieved. Should the Engineer determine that minimum groove depth is not being achieved, the Contractor shall stop grooving operations and make all adjustments necessary to achieve the minimum depth.

Supply the Engineer with two (2) accurate, easily readable gauges with which to verify groove depth. Deliver the gauges and applicable manufacturer's instructions for use, if necessary, no later than one week prior to the anticipated beginning of grooving operations.

Terminate grooves within the following limits unless otherwise indicated on the contract documents:

Location	Closest Allowable Distance	Farthest Allowable Distance
Drainage structure	4 inches	15 inches
Vertical face (curb or parapet), or face of railing (no curb)	4 inches	15 inches
Joint System (Dimension measured perpendicular to the centerline of the joint system)	4 inches	15 inches

Using a self-contained system, continuously collect any slurry or debris created by the grooving operation such that it does not accumulate on the surface.

558-4 METHOD OF MEASUREMENT. The quantity will be measured as the number of square yards of structural slab satisfactorily grooved, measured between the faces of barrier, curb, or rail, and between the ends of the slabs, computed to the nearest whole square yard. No deduction will be made for areas left ungrooved near curbs, barriers, rails, joints, drainage structures, or other objects embedded in the slab.

558-5 BASIS OF PAYMENT. The unit price bid per square yard shall include the cost of all labor, materials, and equipment necessary to complete the work.

Payment will be made under:

Item No.	Item	Pay Unit
558.02	Longitudinal Sawcut Grooving of Structural Slab Surface	Square Yard

ITEM 559.02 - PROTECTIVE SEALING OF NEW STRUCTURAL CONCRETE.
ITEM 559.03 - PROTECTIVE SEALING OF EXSISTING STRUCTURAL CONCRETE AND
EXSISTING BRIDGE DECKS.
ITEM 559.04 - PROTECTIVE SEALING OF CONCRETE WITH COATING TYPE
PROTECTIVE SEALER.

559-1 DESCRIPTION. The work in this section shall include work required for protective coatings of concrete.

559-1.01 Scope. Apply a protective sealer to concrete surfaces to slow down/reduce the ingress of water and chlorides into the concrete at locations indicated on the plans or as directed by the Engineer.

559-1.02 Definitions

- A. *Penetrating Type Protective Sealers*** – A Penetrating Sealer is a type of sealer that is applied to a concrete surface and has the ability to penetrate the surface and chemically bond to the concrete. These are used on both new and existing concrete bridge decks and traffic bearing surfaces to include, but not limited to: approach slabs, bridge deck overlays, and sidewalks. Penetrating Sealers are also used on new structural concrete and precast concrete elements that are subject to water and/or chloride exposure and require long term protection.
- B. *Coating Type Protective Sealers*** – A Coating Sealer is a type of sealer that is applied to the surface of existing concrete when a uniform appearance is required. These are two part systems which consist of a primer coat followed by a top coat. Coating Sealers are used on new and existing concrete surfaces when an aesthetic appearance is desired, as they can hide stained or underlying repair areas while providing protection to the concrete.

559-2 MATERIALS

559-2.01 Protective Sealing of Structural Concrete

The protective sealers to be used on concrete surfaces shall be on the Approved List and meet the requirements of one of the following subsections:

- §717-03 Penetrating Type Protective Sealers
- §717-04 Coating Type Protective Sealers

The protective sealer required for use on all traffic and/or pedestrian bearing surfaces shall be a Penetrating Type Protective Sealer which has a 100% solids content as noted on the Approved List.

Penetrating Type Protective Sealer manufactured after April 1, 2022 shall be tinted with a fugitive dye such that the sealer is readily distinguishable upon the concrete surface for at least 4 hours after application but shall become inconspicuous within 7 days after application.

559-3 CONSTRUCTION DETAILS

559-3.01 Protective Sealing of Structural Concrete

A. General. Provide the Engineer with the Sealer Manufacturer's written instructions for application and the proposed method of surface preparation and sealer application at least 7 days prior to the start of work. Only one brand and specific type of sealer off the Approved List will be allowed for use on each individual element of a project (i.e., each pier, bridge deck, abutment, etc.). Follow all sealer manufacturer's written instructions except as modified herein.

B. Surface Preparation. For both new and existing concrete applications, care shall be taken while preparing and cleaning the surfaces to be sealed to ensure that all contaminants are satisfactorily removed without undue damage to the concrete surface or exposure of coarse aggregate. Contaminants may include but not be limited to grime, dirt, laitance, efflorescence, curing compounds, standing water, oil, paint, or other foreign particles which may prevent penetration or adhesion of the sealer. Prepare the surface for sealing by utilizing a procedure with appropriate equipment that will satisfactorily complete this work, in accordance with the sealer manufacturer's written instructions and subject to the approval of the Engineer. Surface preparation methods usually consist of either: sand, shot, or water blasting with a minimum water blast pressure of 7,000 psi. Upon completion of the cleaning process, the concrete surface shall be free of any remaining residue. All surface preparation work shall be completed and approved by the Engineer, prior to sealer application.

1. New Bridge Decks and Bridge Deck Overlays. All required surface texturing, saw cut grooving, diamond grinding, and construction of barriers, parapets, and walks shall be completed prior to the surface being prepared for sealing. All new concrete bridge decks and bridge deck overlays to be sealed shall air dry for a minimum of 72 hours after completion of the required curing period. If the concrete is subjected to rain or moisture from other operations, the drying period shall be extended 24 hours from the time that the concrete has stopped being wetted. After the drying period has ended, the concrete surface shall be lightly cleaned in accordance with the sealer manufacturer's written instructions followed by vacuum cleaning to prepare the surface and remove any contaminants or loose particles. If water blasting is utilized, the surface shall be air dried upon completion for a minimum of 24 hours or as specified in the sealer manufacturer's written instructions, whichever is longer, before the sealer can be applied. The deck shall be clean and free of all debris prior to sealer application. If a new bridge deck or bridge deck overlay is subjected to traffic for 21 days or more prior to sealing, the concrete surface shall be thoroughly cleaned in accordance with the sealer manufacturer's written instructions before sealer can be applied.

2. New Structural Concrete. All new structural concrete that is to be sealed shall air dry for 14 days after completion of the required curing period or for the length of time specified in the sealer manufacturer's written instructions, whichever is longer. If the concrete is subjected to rain or moisture from other project operations, the drying period shall be extended 24 hours for every day the concrete is subjected to water. After the drying period has ended, the concrete surface shall be lightly cleaned in accordance with the sealer manufacturer's written instructions followed by vacuum cleaning, to prepare the surface and remove any contaminants or loose particles. If water blasting is utilized, the surface shall be air dried upon completion for a minimum of 24 hours or as specified in the sealer manufacturer's written instructions, whichever is longer, before the sealer can be applied. The concrete surface shall be clean and free of all debris prior to sealer application.

3. Existing Structural Concrete and Existing Bridge Decks. Existing concrete surfaces to be sealed shall be thoroughly cleaned with light sand or shot blasting, in accordance with the sealer manufacturer's written instructions followed by vacuum cleaning, to prepare the surface and remove any contaminants or loose particles. Where the use of sand or shot blasting is prohibitive, water blasting may be allowed, provided the Contractor can demonstrate the ability to provide a clean, porous surface in accordance with the requirements of the sealer manufacturer's written instructions. If the concrete is subjected to rain or moisture from other operations such as water blasting, upon completion the surface shall be air dried for a minimum of 24 hours or as specified in the sealer manufacturer's written instructions, whichever is longer, before the sealer can be applied. Surface preparation of any concrete or bridge deck surfaces with existing coatings known to be asbestos containing shall be performed subsequent to coating removal and completed in accordance with Section 210 of the Standard Specifications.

C. Sealer Application

1. Weather Limitations. Sealer materials shall not be applied during wet weather conditions or when adverse weather conditions are anticipated within 12 hours of the completion of sealer application or as specified in the sealer manufacturer's written instructions, whichever is longer. Ambient and surface temperatures shall be a minimum of 40°F and rising during application until the sealed concrete is dry to the touch. Application by spray methods will not be permitted during windy conditions if unsatisfactory coverage will result.

2. Yield Check. If penetrating sealer is to be applied in a single coat to a traffic bearing surface, the Contractor shall demonstrate to the satisfaction of the Engineer that the proposed equipment and procedure will result in uniform coverage at the application rate specified on the Approved List before sealer can be applied.

3. Application. The protective sealer shall be used as supplied by the manufacturer without thinning or alteration with exception of the fugitive dye. Equipment for sealer application shall be compatible with sealer manufacturer requirements, in good working order, clean of foreign materials and approved for use by the Engineer. The quantity of sealer material delivered to the project shall be demonstrated by direct measurement in the presence of the Engineer prior to commencement of sealing application. Assumptions of volumes of unopened containers will not be permitted. The sealer shall be applied by brushing, spraying, or rolling, as recommended by the sealer manufacturer. The direct measurement shall be repeated in the presence of the Engineer when sealer application work is complete to verify the quantity of sealer applied.

- a. For Penetrating Type Protective Sealers** – Apply sealer in one or more coats in accordance with the sealer manufacturer's written instructions. The total quantity of sealer applied by all coats shall be equal to the quantity required at the application rate specified on the Approved List. The application rate for all traffic and pedestrian bearing surfaces shall be 200 ft²/gal. Additional coats shall be applied perpendicular to the previous coat. Care shall be taken when applying each coat, such that running or pooling does not occur. The final coat shall be allowed to dry according to the sealer manufacturer's written instructions before opening to traffic. On sloping and vertical concrete surfaces, sealer application shall progress from bottom to top. Care shall be taken to ensure that the entire surface of the concrete is covered, and all pores filled.

A 1-pint sample of sealer is required to be taken at a random time during sealer application from the point of application (i.e., from the nozzle of sprayer or spray bar

or from the sealer container where sprayers, brushes or rollers are loaded) for quality assurance purposes. This sample shall be submitted to the Department's Central Testing Laboratory (CTL), to the attention of the Chemistry Lab for evaluation. Additional samples may be requested by the Department at any time.

- b. *For Coating Type Protective Sealers* – Apply in accordance with the Contract Plans and the sealer manufacturer's written instructions.

559-4 METHOD OF MEASUREMENT

The quantity to be measured for payment will be in the number of square feet of concrete sealed measured to the nearest whole square foot.

559-5 BASIS OF PAYMENT

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

Payment will be made under:

Item No.	Item	Pay Unit
559.01	Protective Sealing of Structural Concrete on New Bridge Decks and Bridge Deck Overlays	Square Foot
559.02	Protective Sealing of New Structural Concrete	Square Foot
559.03	Protective Sealing of Existing Structural Concrete and Existing Bridge Decks	Square Foot
559.04	Protective Sealing of Concrete with Coating Type Protective Sealer	Square Foot

SECTION 560 - MASONRY

560-1 DESCRIPTION. Under this work the Contractor shall furnish and place masonry, with or without coping, of the type, shape, size, color and location indicated in the plans, proposal or as directed by the Engineer.

560-2 MATERIALS. Materials shall meet the requirements specified in the following subsections of 700 -Material s:

Split Faced Concrete Brick	704- 10
Precast Concrete Coping	704-1 1
Caulking Compound for Structures	705-06
Premolded Resilient Joint Filler	705-07
Masonry Mortar	705-2 1
Bar Reinforcement - Grade 60	709-01
Wire Fabric for Concrete Reinforcement	709-02
Admixtures	711-08

560-2.01 Dimension Stone Masonry. All stone shall be sound, durable, free from reeds, rifts, seams, laminations and minerals which would cause discoloration or deterioration from weathering. The stone shall be of size, quality and color acceptable to the Regional Director. Duplicate samples of stone showing the complete color range shall be submitted to the Regional Director for approval. Stone shall be quarried so the stratification will be radial or parallel to the bed when set in place except where split face or seam face finish is called for on the plans. All beds and joints shall have a "Fine Point or Sawn Finish" for at least 2 inches from the arris lines. The balance shall not fall off from a straight line for more than 1/6 of the stone's minimum dimension. When stones project beyond adjoining faces, the fine pointing shall be carried at least 2 inches in from the adjoining surfaces (arris lines of stone or face of concrete).

Soffits of ring stones shall be cut to the curve of the arch and shall have a "Fine Point or Sawn Finish" unless otherwise shown on the plans. All other showing surfaces shall be finished as indicated on the plans.

On square bridges and on bridges where the skew is 30 degrees or less, the ring stones shall be cut so the joint sides are parallel to the faces of the abutments. On bridges with a skew greater than 30 degrees the ring stones shall be cut so the joint sides of each stone will be at right angles with the face. Soffit joints shall lie in a horizontal plane.

"Fine Point or Sawn Finish" shall be as described in §560-2.07, Definition of Finishes.

560-2.02 Split Faced Concrete Masonry. Split faced concrete masonry units shall be new, sound, durable, true to size, free from laminations and cracks, and uniform quality which complies with the requirements of §704-10. All split face concrete masonry units delivered to the site shall be of the sizes necessary to produce the wall pattern as indicated on the plans.

An approved mechanical self-leveling splitting machine with two steel knives, one directly above the other will be used for all field splitting. Four samples of each thickness of each split faced concrete masonry unit shall be submitted to the Engineer for tentative approval. They shall be labeled with the contract title and number, the Contractor's name, and manufacturer's name. The split faced concrete masonry units used in the work shall be equal in all respects, color, quality, texture and surface to the approved samples.

Anchors shall be a metal slot formed from sheet zinc not less than 0.025 inches in thickness, bent to form a dovetail channel 5/8 inch wide at the front, 1 inch wide at the rear, 1 inch deep and with wings 1/8 to 1/4 inch wide. The slots shall be provided with a felt insert to prevent the entrance of fresh concrete. These inserts shall be removed just prior to the insertion of the ties. Ties shall be formed of zinc not less than 0.078 inches thick, 1 inch wide with one end designed to fit snugly into the anchor slots and shall be crimped with corrugations 1/8 inch deep, but no less than 1/16 inch deep.

The ties shall be at least 4 inches long. The Contractor shall submit to the Engineer for tentative approval four samples of the material used to fabricate the ties, i.e. anchors, felt and ties.

560-2.03 Stone Masonry. All stone shall be sound, durable, properly quarried, free from reeds, rifts, seams, laminations and minerals which would cause discoloration from weathering. Samples of stone shall be submitted to and be approved by the Regional Director prior to the beginning of any work on this masonry. The size, color and quality of the stone delivered to the site shall be substantially in accordance with the approved samples.

The stones may have an average variation of 1/6 of the thickness shown on the plans, however, they shall have a minimum thickness of at least 2/3 that shown on the plans and a maximum thickness of 1/6 over the maximum thickness shown on the plans.

560-2.04 Rubble Stone Masonry. All stones shall be clean, free from structural defects and acceptable to the Engineer. Selected stones, roughly squared and pitched to line, shall be used at all angles and ends of walls.

560-2.05 Precast Concrete Coping. Precast concrete coping units shall be new, sound, durable, true to size, free from laminations and cracks and of uniform quality which complies with the requirements of §704-11.

560-2.06 Mortar. Use 705-21 Masonry Mortar.

560-2.07 Definition of Finishes. Finishes of stone or manufactured masonry units shall be defined as shown in Table 560-1.

560-3 CONSTRUCTION DETAILS

560-3.01 General. Masonry or precast concrete coping shall not be constructed when the ambient temperature is 40°F or below, or when the stone or masonry units contain frost, except by written permission of the Engineer and subject to any conditions the Engineer may require.

Stone, masonry units or coping units shall not be dropped upon or slid over existing masonry, nor shall hammering or turning of stones, masonry units or coping on the masonry be allowed. Stones, masonry unit or coping units shall be carefully set without jarring masonry already laid, and they shall be handled in a manner so as not to cause disfigurement.

TABLE 560-1 MASONRY UNITS, SURFACE FINISH	
Finish Name	Maximum Surface Projection Beyond Pitch Lines

Smooth Finish	1/16 inch
Fine Point or Sawn Finish	1/4 inch
Rough Finish	1/2 inch
Scabbed Finish	3/4 inch
Seam and Split Face	1 inch
Rock Face	1/10 the vertical height of the individual stone
Thermal Finish	1/4 inch

NOTE: All faces of Dimension Masonry shall extend to the pitch lines shown on the plans.

560-3.02 Dimension Stone Masonry. The provisions of §560-3.01 shall apply with the following additional requirements :

A. Preparation of Stone and Bed. Each stone shall be cleaned and thoroughly saturated with water before being set. The bed which is to receive the masonry shall also be cleaned and moistened.

B. Bedding of Stone. All stone shall be well bedded in mortar and settled in place with a suitable wooden maul before the setting of the mortar.

C. Spalls not Permitted in Mortar Beds. No pinning up of stones with spalls will be permitted, and no spalls will be permitted in beds.

D. Expansion Joints. All surfaces of stone in contact with expansion joint material shall be made smooth, unless otherwise shown on the plans. The joints shall be filled with premolded resilient joint filler and sealed with an approved joint sealer as shown on the plans, or as ordered by the Engineer.

All joints in concrete backing shall be protected against intrusion of water into or through the joint by the installation of an approved water stop. The water stop shall be embedded into the concrete at least 3 inches on each side of the joint and shall be installed as near to the inside face of the concrete backing as practicable. The water stop may be of ASTM B370, 20 ounce preformed copper strip, 0.025 inch minimum thickness, soldered to be water tight and continuous, or may be approved flexible water stop as shown on the plans. Water stops shall be manufactured and installed so as to provide for the expansion and contraction movements present at the joint.

In case any stone is moved or the joint broken, the stone shall be taken up, the mortar thoroughly cleaned from beds and joints, and the stone reset in fresh mortar.

Joints shall not be filled by pouring in a thin or liquid mortar.

E. Pointing (new construction) and Tuck Pointing (raking out and repointing).

1. Pointing. Tool the face joints with a pointing tool before the mortar sets, as approved by the Engineer. Avoid smearing the masonry surfaces with excess mortar forced out of the joints. For joints not pointed when the masonry is laid, prepare the joints for pointing by following the tuck pointing procedures. There will be no separate payment for this work.

2. Tuck Pointing (Repointing). Repoint the joints in masonry where indicated on the Contract plans or directed by the Engineer. Use an Item 705-21 Type M, S or N masonry or mortar cement, tuck pointing mortar (or a specially designed one) with the same or weaker strength than the original mortar, as approved by the Engineer.

Remove soft, loose, cracked and deteriorated mortar to a minimum depth (measured from the wall face) of twice the average joint width, and remove all deteriorated mortar beyond the

minimum depth, as ordered by the Engineer. Do not damage the masonry during the removal process. Clean all contamination from the prepared joints.

Prior to repainting, flush with water and leave all surfaces to be re-mortared in a dampened, surface dry state. Pack the prepared joints in layers with mortar that closely matches the original color and texture, allowing each layer to become thumb-print hard before the next. Use at least two layers when the joint depth is twice the joint width. Apply a final layer thickness that does not exceed the joint width. When the final layer is thumb-print hard, finish with a pointing tool that recreates the original joint shape, or as approved by the Engineer.

Perform pointing when the ambient temperature is 40°F or above, and the masonry is frost free. Avoid recessed joints that hold water.

After the mortar sets, clean all mortar and cement stains from other surfaces. In direct sunlight, keep the newly pointed masonry moist for at least 3 days. In shade, moisten 2 to 3 times a day for at least 3 days.

F. Drawings. The contract plans show the general character of the masonry. Prior to the beginning of any work, the Contractor shall prepare and submit for the approval of the Regional Director, three sets of detail plans for all dimension masonry shown on the plans. The Contractor shall carefully check and assume full responsibility for the accuracy of this work. These detail plans will be examined and either approved or returned without approval to the Contractor, who shall check the indicated corrections and resubmit two sets of prints of revised details. When the detail plans have been approved, the Contractor shall furnish the Regional Director with three sets, one of which shall be reproducible. The drawings shall conform to the size and type of requirements for Shop Drawings set forth in the New York State Steel Construction Manual.

560-3.03 Split Faced Concrete Masonry. The provisions of §560-3.01 shall apply with the following additional requirements:

A. Sample Wall. The Contractor shall construct a split faced concrete masonry wall 6 feet long and 4 feet high of approved units and matching mortar at a location designated. This procedure shall be repeated until a sample wall is approved by the Engineer. The approved sample wall shall be maintained intact until the Engineer directs its removal.

In lieu of the field sample wall, the Contractor may show, for approval, a building constructed with units of the same type, color, texture and surface finish required. The field sample wall shall be required if the building masonry is not approved.

Upon approval of the sample wall or building, the Contractor shall furnish and lay split masonry to conform with the approved sample wall.

B. Protection and Handling. Split faced concrete masonry units shall be protected by a wrapping of 4 mil polyethylene, and shall be handled on pallets by mechanical means, or by hand or tongs. Dumping of the masonry units from trucks, wheel barrows or other conveyances is prohibited. Care shall be taken to protect all edges and the face of the masonry units. Distorted, laminated, checked or cracked masonry units will be rejected and removed from the site of construction.

On delivery to the site, the masonry units shall be neatly piled off the ground, on pallets or other approved implements, and protected from moisture by wrapping them with 4 mil polyethylene.

Masonry units which become wet, shall not be laid in the wall until their conformance with the specifications for §704-10 is shown by tests. The cost of these tests shall be borne by the Contractor.

C. Laying. The split faced concrete masonry shall be laid up, in the pattern shown on the plans, by skilled masons and in a first-class manner. The masonry shall be laid true to line and grade in level horizontal beds and be properly anchored. Each masonry unit shall be laid in a full mortar bed and in

a manner to form a full end joint in one operation. The space between the split face masonry and the supporting concrete shall be filled with mortar and rodded until the mortar rises to the top of the masonry unit as each unit is placed.

D. Bonding. The split faced concrete masonry shall be bonded to the supporting concrete. Dovetail anchors shall be continuous, set vertically and spaced on centers not exceeding 1 foot on the concrete walls. Ties shall be installed in the anchor slots at a maximum vertical height of 1 foot on centers.

E. Joints. Joints in the exposed face shall be struck with a concave jointing unless otherwise specified. The joints shall be 3/8 inch wide and the concave jointing shall be 11/8 inch deep at the center.

F. Protection Against Weather. The split faced concrete masonry shall be protected against the action of the weather. The tops and at least 2 feet down the sides of all walls not completed shall be constantly protected with suitable waterproof covering properly secured in place during periods of suspended work. The facing shall be so protected until it has been bonded to the concrete wall and completely sealed against moisture. During hot dry weather, the masonry shall be protected from the sun and kept moist for at least three days after completion.

G. Protection Against Damage. Projections and angles exposed to damage shall be boxed or otherwise protected to prevent damage. Any units damaged during the progress of the work shall be replaced with new units at the Contractor's expense.

H. Cleaning of Exposed Faces of Mortar and Drippings. Exposed faces of split faced concrete masonry units shall be cleaned free of excess mortar and mortar drippings, as the work progresses, to prevent excessive rubbing during final cleaning operations.

I. Expansion and Contraction Joints. Expansion and contraction joints shall be constructed as shown on the plans. The surfaces of the joints shall be plumb, true to line and smooth to the caulking compound.

J. Final Cleaning. After the completion of adjacent work likely to soil the masonry, the split faced concrete masonry shall be thoroughly cleaned, removing all dirt, dust, mortar, stains, etc. The concrete masonry shall be brushed, while dry, with stiff fiber brushes. If this brushing does not clean the masonry to the satisfaction of the Engineer, then the Contractor shall clean the facing with soap powder in clean water applied with stiff fiber scrub brushes. After scrubbing with soap and water the Contractor shall rinse the masonry with clean water. The Contractor may, with the Engineer's approval, substitute a cleaning solution that will not harm the concrete or mortar joints. The cleaning operation shall in all cases start at the top and proceed downward.

K. Caulking. When the split faced concrete masonry has received the final cleaning, all expansion and contraction joints shall be filled at least 1 inch deep with caulking compound.

All surfaces to receive the caulking compound shall be clean, free of loose materials, dirt, dust, frost, moisture, oils, laitance or curing compounds and shall be primed with clear lacquer, shellac or the manufacturer's recommended primer after the surfaces have been cleaned. A bond breaker shall be used as a release material back of the caulking compound. The bond breaker may be polyethylene, specially treated bond inhibiting pressure sensitive tape or any approved equal. The caulking compound shall be tooled with a concave joint finishing tool to provide a neat smoothly finished joint of uniform width. Where solvents are required on the jointing tool, they shall be as recommended by the manufacturer of the caulking compound.

560-3.04 Stone Masonry. The construction provisions of §560-3.02 shall apply. The individual stones shall be trimmed, recut and dressed, as may be necessary at the site, to obtain a pattern in the finished wall which will be in character with the requirements of drawings, specifications and the approved sample wall.

The following general requirements will apply to the placing of stone masonry:

A. Cross-Joints, Steps or Ladders. There shall be no cross-joints, steps or ladders.

B. Subdivision of Rectangles. There shall be no subdivision of rectangles.

C. Stone Shapes. There shall be no unusually shaped stone.

D. Clusters. There shall be no clusters of stone of the same length and height.

E. Horizontal Joint Length. There shall be no continuous horizontal joint greater in length than 10 feet.

F. Vertical Joints. There shall be no more than five stones abutting any one vertical joint.

G. Stone Proportions. There shall be no stone longer than six times its height nor shorter than one and one halftimes its height. The length of the average stone shall be three to five times its height.

H. Horizontal Joints. Horizontal joints shall not have a slope varying from the horizontal by more than one percent.

I. Color. Where stone masonry and dimension masonry are specified, for the same structure or in close proximity to each other, there shall be no great contrast in size or color between the Stone Masonry and the Dimension Masonry.

Prior to beginning the work the Contractor shall lay up a sample wall conforming to the requirements of §560-3.03A except that the material details for the work shall conform to those for Stone Masonry.

560-3.05 Rubble Stone Masonry. The provision of §560-3.01 shall apply with the following additional requirements:

The stone shall be laid to form substantial masonry presenting a neat, finished appearance. The minimum size of stone to be used shall be 4 inches in depth or rise, 9 inches in width, and 12 inches long. Spalls and pinnars will not be allowed to show on the face of the work and shall be used otherwise only where necessary. All stones shall be soundly and completely bedded in the mortar. The length of stretchers shall not exceed three times their rise, and the width of stretchers shall in no case be less than one and one-halftimes their rise. At least one-fourth of the stones in the face shall be headers and shall be evenly distributed. The length of headers shall be not less than 32 inches nor more than the thickness of the wall, where the work is 4 feet or less in thickness. Where the work is more than 4 feet thick, the length of headers shall be not less than 32 inches. The width of headers shall be not less than their rise. All stones shall be laid to break joints 6 inches or more and to thoroughly bond the work. No joint in the face shall be over 1 inch in width. Backing shall be good-sized, well-shaped stones so laid as to break joints. Spaces between stones shall be filled with spalls set in mortar. The degree of roughness of exposed faces shall be measured with a 6 foot straight edge supported between adjacent projections on the stone face. Variations in the stone face, in excess of 4 inches, measured from the straight edge to the extreme depression in stone or mortar will not be permitted. Rear faces shall present approximately plane surfaces.

Pointing shall conform to the requirements of §560-3.02E.

560-3.06 Rubble Stone Masonry Laid Dry. The specifications of §560-3.05, Rubble Stone Masonry, shall apply except that no mortar shall be used and the requirements of §560-3.01 Construction Details (General), pertaining to frost shall not apply unless otherwise directed by the Engineer.

560-3.07 Precast Concrete Coping. The provisions of §560-3.02, Dimension Stone Masonry and §560-3.03, Split Faced Concrete Masonry, shall apply with exception of §560-3.02D, §560-3.03A, and §560-3.03O.

560-3.08 Tuck Pointing. Apply the provisions of §560-3.02E2 Tuck Pointing. For re-caulking work, rake out any old caulking to a minimum 1 inch depth and follow the provisions of §560-3.03K. Caulking. Do not damage masonry during the removal and cleaning process.

560-4 METHOD OF MEASUREMENT

560-4.01 Dimension Masonry. Dimension masonry will be measured as the number of square feet (including joints within the dimension masonry) measured on the plane of all the exposed surfaces of the dimension masonry incorporated in the work.

560-4.02 Split Faced Concrete Masonry. Split faced concrete masonry will be measured as the number of square feet (including joints within the masonry and between the split faced concrete masonry and the concrete wall, and the mortar bed for precast concrete coping), on the plane of all exposed surfaces of the masonry incorporated in the work. Split faced masonry below the finished surface of the ground or paving shall be considered as exposed in computing the area for payment. The approved, constructed, split faced concrete masonry sample wall will be paid for as split face concrete masonry.

560-4.03 Rubble Stone Masonry. Payment for rubble stone masonry will be made for the number of cubic feet within the payment lines shown on the plans and placed in accordance with the specifications. Concrete, mortar or any joint material within these payment lines will, for the purpose of payment, be classified as stone masonry and will not be paid for under any other item.

560-4.04 Stone Masonry. Payment for stone masonry will be made for the number of square feet (including joints within the stone masonry) measured on the plane of all the exposed surfaces of the stone masonry incorporated in the work. Mortar joints between concrete and stone masonry will be paid for as stone masonry.

Stone masonry shown on the plans below the finished grade or sidewalk (to prevent the possible exposure of unfaced concrete) shall be considered as exposed in computing the payment area for *this* item.

Thirty square feet will be used in payment for the complete accepted sample wall required in this specification.

560-4.05 (Vacant)

560-4.06 Precast Concrete Coping. The quantity to be paid for will be the number of feet of precast concrete coping (including the joints between the coping units) placed in accordance with the plans, specification and orders of the Engineer.

560-4.07 Tuck Pointing. The Engineer will measure this work in the field as the number of square or linear feet of masonry pointed and cleaned, as bid. Linear measurements will be made along the joint centerline.

560-5 BASIS OF PAYMENT

560-5.01 Dimension Stone Masonry. The unit price bid per square feet shall include the cost of furnishing all labor, materials and equipment necessary to complete the work.

Concrete, dimension masonry, mortar or any joint material within the nominal thickness of the dimension masonry will, for the purpose of payment, be classified as dimension masonry and will not be paid for under any other item. Projections, if any, into the concrete beyond the nominal thickness of dimension masonry will be paid for as the class of concrete displaced by the stone. No deduction will be made for railing post holes.

Mortar Joints between Dimension Masonry and Concrete will be paid for as Dimension Masonry.

Mortar Joints between Dimension Masonry and Stone Masonry will be paid for as Stone Masonry.

560-5.02 Split Faced Concrete Masonry. The unit price bid per square feet shall include the cost of furnishing all labor, materials (including anchors, ties, premolded bituminous joint material, and caulking compound) and equipment necessary to complete the work. The payment shall also include the labor, materials and equipment necessary to remove and dispose of all constructed sample masonry panels when directed by the Engineer.

No payment shall be made to the Contractor for the submitted alternate sample walls or for any unapproved sample walls.

The cost of furnishing and placing anchoring devices shall be included in the unit price bid for this work.

The cost of erecting and disposing the sample wall shall be included in the unit price bid for this item.

560-5.03 Stone Masonry. The unit price bid per square feet shall include the cost of furnishing all labor, materials and equipment necessary to complete the work.

Concrete, stone masonry, mortar or any joint material within the nominal thickness of the stone masonry will, for the purpose of payment, be classified as stone masonry and will not be paid for under any other item. Projections, if any, into the concrete beyond the nominal thickness of stone masonry will be paid for as the class of concrete displaced by the stone. No deduction will be made for railing post holes.

The cost of furnishing and placing anchoring devices shall be included in the unit price for this item.

560-5.05 Rubble Stone Masonry. The unit price bid per cubic feet for Rubble Stone Masonry with joints or laid dry, shall include the cost of furnishing all labor, materials and equipment necessary to complete the work except excavation will be paid for under the appropriate excavation item.

560-5.06 Precast Concrete Coping. The unit price bid per feet shall include the cost of furnishing all labor, materials (including anchors, reinforcement, premolded resilient joint materials, and caulking compound) and equipment necessary to complete the work.

560-5.07 Tuck Pointing. Include all labor, material (including any re-caulking material), and equipment to complete the work in the unit bid price.

560-5.08 Progress Payments. Progress payments will be made, at the unit price bid, for 75% of the quantity properly placed. The balance of the quantity will be paid for upon proper cleaning and caulking of the joints.

Payment will be made under:

Item No.	Item	Pay Unit
560.01	Dimension Stone Masonry	Square Foot
560.02	Split Faced Concrete Masonry	Square Foot
560.0401	Stone Masonry	Square Foot
560.05	Rubble Stone Masonry	Cubic Foot
560.06	Rubble Stone Masonry Laid Dry	Cubic Foot

560.07	Precast Concrete Coping	Foot
560.08	Tuck Pointing	Foot
560.09	Tuck Pointing	Square Foot

SECTION 561 (VACANT)

SECTION 562 - REINFORCED CONCRETE THREE-SIDED STRUCTURES

562-1 DESCRIPTION. The work consists of designing and constructing reinforced concrete three-sided structure(s) at the location(s) indicated on the Plans.

A reinforced concrete three-sided structure is composed of some of the following discrete elements:

1. Span Unit
2. Span Unit Footing
3. Wing Wall with Footing
4. Headwall
5. Invert Slab with Cut-off Wall
6. Apron with Cut-off Wall

NOTE: Any of the above elements may be cast in place at no additional cost to the State.

562-2 MATERIALS. Materials for all precast concrete components shall meet the requirements of the PCCM. Materials for cast-in-place concrete shall be Class HP concrete meeting the requirements of Section 555 and modified to include corrosion inhibitor meeting the requirements of 711-13. The penetrating type protective sealer shall meet the requirements of 717-03. Reinforcement shall meet the requirements of Section 556.

562-3 CONSTRUCTION

562-3.01 Design. An appropriate structure design and all details necessary for construction meeting the Design parameters given in these specifications shall be developed and submitted to the DCES for approval. All design work, detail development, and proposed handling and installation procedure development, shall be done by a Professional Engineer. The design submittal shall conform to the requirements stated in the PCCM. The DCES reserves the right to reject a proposed design(s) if the structure type is determined to be unsuitable for the proposed application based on safety, durability, serviceability, or maintainability.

The Load Rating shall be determined in accordance with the current AASHTO *"Manual for Bridge Evaluation"* with all interim provisions in effect. The contractor shall show which method (allowable stress or load factor) was used in load rating computations. Load ratings shall also be computed by the Load and Resistance Factor Rating (LRFR) method. The load ratings shall be shown on the Production Note Sheet of the shop drawings. The contractor shall include all load rating computations in the design calculation submittal.

562-3.02 Design Parameters. The design of the structure(s) described above shall meet the following:

1. Design Specification : NYSDOT LRFD Bridge Design Specifications.
2. Live Load : HL-93 and the NYSDOT Design Permit \
3. Highway Profile Section : As shown in the contract documents.
4. Soil Parameters : As shown in the contract documents.

A. Setting Anchor Bolts for Bridge Bearings. The pipe sleeves, anchor bolts and work required to furnish, set and grout the anchor bolts, shall be included in the price bid for the respective bearing item.

B. Vertical Load Transmitting Devices. The furnishing and installing of vertical load transmitting devices, such as; rubber impregnated random fiber pad, and plain rubber pad, shall be included in the price bid for the respective item.

Payment will be made under:

Item No.	Item	Pay Unit
564.05XX	Structural Steel (Type 1-22)	Lump Sum
564.10nnnn	Structural Steel Replacement	Pound
564.51nnnn	Structural Steel	Pound
564.70nnnn	Structural Steel Replacement	Each

NOTE: nn denotes a serialized pay item.

ITEM 560.16010008 - REMOVE, STORE AND RESET EXISTING STONE COPING
ITEM 560.16020008 - REMOVE AND STORE EXISTING STONE COPING

DESCRIPTION:

This work shall consist of removing and storing existing stone coping at locations indicated on the plans and as directed by the Engineer.

The coping that is designated for reuse in this item shall be approved by the Engineer and reset as shown in the plans.

MATERIALS:

All stone coping is existing material.

Mortar used to reset the coping shall conform to the requirements of Subsection 560-2.06 of the Standard Specifications.

CONSTRUCTION DETAILS:

The contractor shall remove the existing stone coping from its original position, clean off the existing mortar, and store the coping at location(s) approved by the Engineer.

The coping that is to be reset shall be placed in accordance with the requirements of Subsection 560-3.02 of the Standard Specifications and as directed by the Engineer.

The stone coping that is to be stored but is not to be reset shall be picked up by others, designated by the Engineer, and removed from the project.

Coping that is to be reset and is damaged as a result of the contractor's operations shall be repaired or replaced by the contractor at no additional cost to the State.

METHOD OF MEASUREMENT:

This work will be measured as the number of feet of existing stone coping that is either removed, stored and reset or removed and stored, depending on the item specified. Measurement shall be taken along the centerline of the top surface of the coping.

BASIS OF PAYMENT:

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

The cost of the fresh mortar bedding shall be included in this item for resetting the coping.

ITEM 560.18000008 - REMOVE AND REPLACE CAULK IN MASONRY EXPANSION JOINTS

DESCRIPTION:

Remove caulk and replace with new caulk in masonry expansion joints at locations indicated on the plans or where directed by the Engineer.

MATERIALS:

Caulking Compound for Structures	705-06
Premolded Resilient Joint Filler	705-07

CONSTRUCTION DETAILS:

Caulk Removal:

Remove caulk to a depth of 1 inch, or more if directed by the Engineer, by methods which do not damage masonry edges or adjacent mortar joints. Clean old caulk and dirt from the masonry.

Use vacuum or oil free compressed air to clean joints of all loose dirt or particles prior to placement of new caulk.

New Caulk:

Place additional premolded resilient joint filler in the joint if required by the Engineer.

Use caulk that color matches the mortar joints between masonry units, as approved by the Engineer.

Caulk when the ambient temperature is 40°F or above, and when the masonry is frost-free and surface dry.

Place caulk at a 1 inch minimum thickness (depth), or more if directed by the Engineer. Clean all masonry faces smeared with caulk to the satisfaction of the Engineer.

METHOD OF MEASUREMENT:

This work will be measured as the number of feet of joints caulked. The measurement will be taken along the centerline of caulked joints.

BASIS OF PAYMENT:

Include the cost of furnishing all labor, materials, and equipment necessary to complete the work in the unit price bid.

ITEM 560.18100011 - REMOVE AND RESET STONE MASONRY

DESCRIPTION

The work under this item shall include removing existing stone masonry, removing existing anchoring devices and furnishing and placing new anchoring devices, cleaning mortar, etc. from the stone, cataloguing and tagging each stone including a key drawing indicating location of each stone, storing and protecting the stones on pallets, and replacing the stone masonry including repair if required, as shown on the plans.

MATERIALS

The requirements of Subsections 560-2 and 560-2.06 shall apply.

CONSTRUCTION DETAILS

The requirements of Subsections 560-3.01 and 560-3.02, Sections A through E, shall apply.

METHOD OF MEASUREMENT

The method outlined in Subsection 560-4.04 shall apply with the exception that a sample wall will not be required nor measured.

BASIS OF PAYMENT

The basis of payment outlined in Subsection 560-5.03 shall apply. Progress payments will be made, at the unit price bid, for 40% of the quantity when the masonry is removed, an additional 50% when the masonry is reset, and 10% when all remaining work is complete.

ITEM 564.20010008- HOT-DIP GALVANIZING OF STRUCTURAL STEEL

DESCRIPTION

This work shall consist of hot-dip galvanizing of fabricated structural steel members.

MATERIALS

Materials for galvanizing shall meet the requirements of §719-01, Type I.

CONSTRUCTION DETAILS

Hot-dip galvanizing shall be in accordance with the material specifications.

Galvanizing shall be performed consistent with the current New York State Steel Construction Manual.

METHOD OF MEASUREMENT

This work will be measured as the number of pounds of steel hot dip galvanized and installed as per the contract documents.

BASIS OF PAYMENT

The unit price bid per pound shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work including transportation to and from the galvanizing facility and any necessary drilling or reaming. No additional payment will be made for additional fabrication step. required as a result of the galvanizing process.

ITEM 564.75010004 - STRUCTURAL STEEL REPAIR, TYPE I
ITEM 564.75020004 - STRUCTURAL STEEL REPAIR, TYPE II
ITEM 564.75030004 - STRUCTURAL STEEL REPAIR, TYPE III
ITEM 564.75040004 - STRUCTURAL STEEL REPAIR, TYPE IV

DESCRIPTION. Under this item the Contractor shall perform repair work to the existing structural steel where indicated on the plans. A Type I repair involves grinding, gouging, welding, and/or bending processes as defined in the contract documents. A Type II repair involves heat straightening, bending, and making/breaking connections by welding/bolting as defined in the contract documents. A Type III repair occurs at girder webs and may include such work as steel tear repair, crack repair, and/or other impact damage repair as defined in the contract documents. A Type IV repair occurs at bracing elements including diaphragms, connecting plates, stiffeners, etc, and may include crack repair, tear repair and/or other impact damage repair as defined in the contract documents.

MATERIALS. Materials for this work shall meet the requirements of the New York State Steel Construction Manual (SCM), the welding procedure specifically listed in the Special Notes and subsection 700 - Materials of the Standard Specifications.

Paint, as specified	708
Structural Steel	715-01
High Strength Bolts, Nuts & Washers	715-14
Painting Procedure	573

CONSTRUCTION DETAILS. See the contract documents for the repair procedure required for each location. The procedure specifies all welding work which shall be done in accordance with the provisions of the SCM. Unless otherwise specified in the contract documents, the SCM establishes the workmanship standards and standards of acceptance.

All testing of the finished repair shall be done by qualified technicians in accordance with the appropriate sections of the SCM and witnessed by a representative of the State. Ultrasonic Testing shall be performed by a New York state certified technician in accordance with the SCM. Written inspection reports documenting the results of all testing shall be provided to the EIC.

All existing paint shall be removed to a distance of 6 inches from any cut line, crack or any location to be heated prior to actual cutting, gouging or heating work being performed. All workers shall wear protective clothing and respirators as required by OSHA Regulations. No work shall be performed by unprotected workers.

All damage done to the structure while performing the necessary repairs shall be corrected to the satisfaction of the Engineer at the Contractor's expense.

METHOD OF MEASUREMENT. This work will be measured as the number of structural steel repairs performed in accordance with the plans. One repair shall be considered the work involved to complete the repair at one location shown on the plans. Removal and disposal of existing paint shall be paid under the appropriate contract items. Localized painting of the repair location, when required by the contract documents, shall be included in the price bid for this item.

BASIS OF PAYMENT. The unit price bid for each structural repair shall include the cost of furnishing all labor, materials, equipment, and non-destructive testing (including visual, magnetic particle, dye penetrant, and ultrasonic testing) necessary to complete the work.

SECTION 565 - BRIDGE BEARINGS

565-1 DESCRIPTION. The work shall consist of furnishing, placing and setting bridge bearings at the locations indicated on the plans.

The Contractor shall notify the Deputy Chief Engineer, Structures (DCES) of the name and address of the fabricator of all bridge bearings in accordance with §106-01 Sources of Supply.

565-1.01 Bearing Types. There are various types of bearings. The specific type required will be indicated on the plans. Bearing types are:

A. Type S.R. - Steel Rocker Bearings. These accommodate rotation by pivoting around a pinned joint. They are fabricated in fixed and expansion versions. The expansion version accommodates longitudinal movement by means of a curved rocker rotating on the bearing surface. Steel rocker bearings do not allow for transverse movement. This type of bearing shall only be used in rehabilitation situations where only one or two bearings are to be replaced on a bridge.

B. Type S.S. - Steel Sliding Bearings. These accommodate rotation by means of a rocker. They are fabricated in fixed and expansion versions. The expansion version accommodates movement with a sliding element. Steel sliding bearings do not allow for transverse movement. This type of bearing shall only be used in rehabilitation situations where only one or two bearings are to be replaced on a bridge.

C. Type M.R. - Multi-Rotational Bearings. These accommodate rotation by the deformation of a confined elastomeric element, or an unconfined urethane disc. Multi-rotational bearings are fabricated in fixed and expansion versions. The expansion version accommodates movement by means of sliding elements. Expansion versions may be guided, allowing movement in only one direction, or non-guided, allowing multi-directional movement.

D. Type E.P. - Plain Elastomeric Bearings. These accommodate rotation by the deformation of a plain elastomeric pad. They may be used for both fixed and expansion applications without changes in details. The bearings will accommodate longitudinal, transverse, and rotational movements.

E. Type E.L. - Steel Laminated Elastomeric Bearings. These accommodate rotation by the deformation of a laminated elastomeric and steel pad. They may be used for both fixed and

expansion applications without changes in details. The bearings will accommodate longitudinal, transverse, and rotational movements.

F. Type E.B.- Elastomeric Bearings with External Load Plates. These accommodate rotation by the deformation of a plain or steel laminated elastomeric pad. Elastomeric bearings with external load plates are fabricated in fixed and expansion versions. The fixed version will accommodate rotational movements. The expansion bearings will accommodate longitudinal, transverse, and rotational movements.

565-2 MATERIALS

565-2.01 General. Materials shall meet the following requirements:

Concrete Grouting Material	701-05
Steel Anchor Dowel	709-01 ³
Disc-Design Structural Bridge Bearings	716-06
Pot-Design Structural Bridge Bearings	716-07
Plain Elastomeric Bridge Bearings	716-10
Steel-Laminated Elastomeric Bridge Bearings	716-II
Elastomeric Bridge Bearings with External Load Plates	716-12
Rubber-Impregnated Woven Cotton Fabric	728-01
Rubber-Impregnated Random Fiber Pad	728-02
Plain Rubber Pad	728-03
Nuts	ASTM A563
Washers	ASTM F436
Anchor Studs	ASTM A325 or A449 Type I
Cap Screws	ASTM F835M or A574M
Structural Steel Paint Class 1	708-01

NOTE a. Steel anchor dowels shall meet the requirements of §709-01 - Bar Reinforcement.

565-2.02 Fabrication. Steel components of bridge bearings shall be fabricated in accordance with the applicable requirements of the NYS Steel Construction Manual (SCM). In addition, component parts of individual bearings shall meet fabrication details as shown in the contract documents.

A. Type S.R. Bearings. These shall conform to the plans and other contract documents.

B. Type S.S. Bearings. These shall conform to the plans and other contract documents.

C. Type M.R. Bearings. These shall conform to the requirements of either §716-06.01 or §716-07.01 as applicable, and other contract documents. When type M.R. bearings are specified, the Contractor may supply either disc design or pot design bearings. Only one bearing design, disc or pot, shall be supplied for any one bridge.

D. Type E.P. Bearings. These shall conform to the requirements of §716-10 and other contract documents.

E. Type E.L. Bearings. These shall conform to the requirements of §716-II and other contract documents.

F. Type E.B. Bearings. These shall conform to the requirements of §716-12 and other contract documents.

565-2.03 Drawings. Shop drawings shall meet the requirements specified in the following:

Type S.R. and S.S. Bearings	SCM
Type M.R. Bearings	716-06.01 or 716-07.01
Type E.L. Bearings	716-11
Type E.B. Bearings	716-12

565-2.04 Protective Coatings

A. Machine finished surfaces in contact, including pins, pin holes, surfaces in sockets at the top of rocker bearings, and bronze or copper plates in sliding contact shall receive one coat of automotive grease as soon as machining is complete. None of these surfaces shall be painted.

B. Stainless steel and polytetrafluoroethylene surfaces shall not be painted or otherwise coated.

C. Metal to metal surfaces to be field welded shall be given a coat of clear lacquer or other protective coating approved by the Engineer, or Inspector, if exposure is to exceed three months prior to welding. The coating shall be removed at the time of welding. Painting, if required, will be done only after the completion of welding. Surfaces to be painted shall be primed and painted in accordance with §565-2.040.

D. All other metal surfaces shall be cleaned to meet SSPC-SP10, "*Near-White Metal Blast Cleaning*" and painted in accordance with section 572, Structural Paint System: Shop Applied. The paint shall be selected from the Department's Approved List, Structural Steel Paints- Class 1. For bearings used in conjunction with unpainted steel, the color of the finish coat shall Weathered Brown as defined by §708-05.

565-2.05 Shipping. Each bearing shall be shipped as an assembled unit, except for elastomeric bearings. Elastomeric bearings may be shipped in packages containing more than one bearing, provided the package can be handled with normal construction equipment. Bearings shall be packaged in such a manner to protect all rotating and sliding surfaces from the intrusion of outside material. Bearings shall be packaged securely to prevent separation of the elements during shipping.

565-3 CONSTRUCTION DETAILS

565-3.01 Concrete Bearing Surface Elevations

A. General. The elevation of the concrete bearing surface for all types of bearings, except Type M.R. bearings, shall be as given on the plans.

B. Type M.R. Bearings. The elevation of the concrete bearing surface may vary from that given on the plans depending on the vertical dimension of the actual bearing supplied. The Contractor shall notify the Engineer of all required elevation changes. Changes to the roadway profile will not be allowed. All elevation adjustments necessary to maintain the profile shall be made to the concrete bearing surfaces. Any adjustments, including changes to the reinforcement, will be made at no additional cost to the State.

565-3.02 Concrete Bearing Surface Preparation. No bearing shall be placed upon a concrete bearing surface which is deformed, irregular, or poorly finished. The entire bearing surface area shall be floated and troweled.

565-3.03 Setting Anchor Studs. Anchor studs shall be set as shown on the plans unless changes are permitted by the DCES. If anchor studs are cast in substructure concrete, templates, or other suitable means, shall be used to keep the studs vertical at the required embedment and in the correct horizontal position during concrete placement. If the Contractor elects to drill the finished, cured concrete in order

to set the anchor studs, the reinforcing steel shall be positioned prior to casting the concrete so that it will not be damaged during drilling. If anchor studs are drilled and grouted, material and construction details shall be in conformance with §586-2 and §586-3.

565-3.04 Bearing Pad Installation. Bearing pads placed between concrete, or other masonry, and steel masonry plates shall be located to correct alignment and elevation, and placed at the time of masonry plate installation. Bearing pads shall conform to §728-01, §728-02, or §728-03 at the Contractor's option. Each bearing pad shall be the same size in plan as the masonry plate it supports. Holes to accommodate anchor studs shall be cleanly and accurately cut prior to bearing pad placement.

565-3.05 Bearing Installation and Alignment

A. Type S.R. and Type S.S. Bearings

1 General

- a. The centerline of sole plates or fixed portions of bearing assemblies attached to the structural steel shall not be offset from the centerline of bearing stiffeners or diaphragm connection plates by more than one-half the thickness of the flange at that location, or the thickness of the bearing stiffener or connection plate, whichever is the lesser distance.
- b. The bearing shall be cleaned and regreased with automotive grease at the time of installation.

2. Fixed. No additional requirements apply.

3. Expansion. These may vary from perfect alignment. Therefore, expansion bearings shall be set in accordance with the following.

a. Type S R. Bearings

- (1) The bearing shall be set vertical under full dead load at an ambient temperature of 68°F.
- (2) The maximum variation from perfect alignment is a function of the bearing height. The bearing height is the distance between the upper and lower contact surfaces of the movable portion of the bearing. For bearings with a height of 20 inches or less, the maximum variation from perfect alignment, considering the effect of temperature and load at the time of measurement, shall be calculated by the following formula:

$$M = \pm (1/2 \text{ inch} + (U/14,000))$$

where "M" = maximum variation from perfect alignment measured as the horizontal distance between the centerline of the cap plate and the centerline of the masonry plate in inches and "L" = total expansion length in inches between the centerline of the movable bearing being considered and the centerline of the fixed bearing, from which motion must progress. Such variations shall not exceed 1 inch offset, or a five degree rotation of the movable portion of the bearings from the required alignment, whichever is less.

The maximum variation of all bearings having a height exceeding 20 inches shall be approved on an individual basis by the DCES.

(3) No bearing adjustments shall be made until the completed structural slab has been in place for at least seven curing days. Any adjustments needed to meet the above requirements may require jacking the superstructure. All adjustments shall be accomplished according to a written procedure submitted by the Contractor for DCES approval. All adjustments shall be made at no additional cost to the State.

b. Type S. S. Bearings

(1) The sliding plate shall be centered on the masonry plate under full dead load at an ambient temperature of 68°F.

(2) The maximum variation from perfect alignment between the centerlines of the fixed and movable portions of the bearing device, taking into account the effect of temperature and load at the time of measurement, shall not exceed plus or minus 1/2 inch longitudinally. This variation shall be measured as the horizontal distance between the centerline of the sliding plate and the centerline of the masonry plate. The movable portion of the bearing device shall be fully supported by the fixed portion under all temperature and loading conditions.

(3) No bearing adjustments shall be made until the completed structural slab has been in place for at least seven curing days. Any adjustments needed to meet the above requirements may require jacking the superstructure. All adjustments shall be accomplished according to a written procedure submitted by the Contractor for DCES approval. All adjustments shall be made at no additional cost to the State.

B. Type M.R. Bearings

1. General. The centerline of sole plates or other fixed portions of bearing assemblies attached to the structural steel shall not be offset from the centerline of bearing stiffeners or diaphragm connection plates by more than one-half the thickness of the flange at that location, or the thickness of the bearing stiffener or connection plate, whichever is the lesser distance.

2. Fixed. No additional requirements apply.

3. Expansion. These may vary from perfect alignment. Therefore expansion bearings shall be set in accordance with the following:

a. The sliding plate shall be centered on the masonry plate under full dead load at an ambient temperature of 68°F.

b. The maximum variation from perfect alignment between the centerline of the fixed and movable portions of the bearing device, taking into account the effects of temperature and load at the time of measurement, shall not exceed plus or minus 1 inch longitudinally unless otherwise indicated on the plans. This variation shall be measured as the horizontal distance between the centerline of the sliding plate and the centerline of the masonry plate.

c. No bearing adjustments shall be made until the completed structural slab has been in place for at least seven curing days. Any adjustments needed to meet the above requirements may require jacking the superstructure. All adjustments shall be accomplished according to a written procedure submitted by the Contractor for DCES approval. All adjustments shall be made at no additional cost to the State.

C. Type E.P. and Type E.L. Bearings

1. General

a. These bearings are designed to function properly provided that minimum distortion occurs along the beam axis under full dead load at an ambient temperature of 68°F. Elastomeric bearings shall be installed when the ambient temperature is between 40° and 80°F inclusive. The Contractor may elect to install the bearings when the ambient temperature is outside of the

allowable range, provided the Contractor submits, and receives DCES approval, of an installation procedure that either resets the bearings when the temperature is in the allowable range or deforms the bearings so that they perform as if they were installed at 68°F.

b. For prestressed concrete superstructures, the bearing shall be anchored to establish the fixed end of the bridge as soon as possible after stringer erection. For adjacent prestressed box beams, or prestressed slab superstructures, the anchorage shall be completed prior to filling the shear keys. The method of anchorage shall be in accordance with the details shown on the plans. Anchor dowel holes shall be core drilled to the nominal size and depth and at the locations required by the plans. In lieu of core drilling, the Contractor may submit an installation procedure that incorporates the use of either preset anchor bolts or pipe sleeves to the DCES for approval. Prior to placing the anchor dowel, the hole shall be inspected and approved for filling by the Engineer. Fill material shall be in accordance with the details on the plans.

2. Fixed. No additional requirements apply.

3. Expansion

a. These may vary from perfect alignment. The maximum variation from perfect alignment under full dead load shall not exceed the value shown on the plans. This variation shall be measured as the horizontal distance between the centerline of the highest elastomer surface and the centerline of the lowest elastomer surface.

b. No bearing adjustments shall be made until the completed structural slab has been in place for at least seven curing days. Any adjustments needed to meet the above requirements may require jacking the superstructure. All adjustments shall be accomplished according to a written procedure submitted by the Contractor for DCES approval. All adjustments shall be made at no additional cost to the State.

D. Type E.B. Bearings

1. General

a. The centerline of sole plate or other fixed portions of bearing assemblies, attached to steel stringers, shall not be offset from the centerline of bearing stiffeners of diaphragm connection plates by more than one-half the thickness of the flange at that location, or the thickness of the bearing stiffener or connection plate, whichever is the lesser distance.

b. These bearings are designed to function properly provided that minimal distortion occurs along the beam axis under full dead load at an ambient temperature of 68°F. Elastomeric bearings shall be installed when the ambient temperature is between 40° and 80°F inclusive. The Contractor may elect to install the bearings when the ambient temperature is outside of the allowable range, provided the Contractor submits, and receives DCES approval, of an installation procedure that either resets the bearings when the temperature is in the allowable range or deforms the bearings so that they perform as if they were installed at 68°F.

2. Fixed. No additional requirements shall apply.

3. Expansion

a. These may vary from perfect alignment. The maximum variation from perfect alignment under full dead load shall not exceed the value shown on the plans. This variation shall be measured as the horizontal distance between the centerline of the highest elastomer surface and the centerline of the lowest elastomer surface.

b. No bearing adjustments shall be made until the completed structural slab has been in place for at least seven curing days. Any adjustments needed to meet the above requirements may require jacking the superstructure. All adjustments shall be accomplished according to a written procedure submitted by the Contractor for DCES approval. All adjustments shall be made at no additional cost to the State.

565-3.06 WELDING

A. Type S.R. Bearings. Bearings shall be welded permanently to the structural steel only after all necessary adjustments have been made. All welding shall be done in accordance with the requirements of the SCM. The Contractor shall submit a Welding Procedure Specification to the DCES. No welding shall be performed until the manufacturer receives an approved Welding Procedure Specification.

B. Type S.S. Bearings. The requirements of §565-3.06A shall apply.

C. Type M.R. Bearings. The requirements of §565-3.06A shall apply except that during field welding operations the temperature of the steel adjacent to the rotational element shall not exceed 200°F. Temperature shall be controlled by welding procedures and monitored using temperature indicating crayons, or other devices. Procedures, crayons, and other devices shall be acceptable to the Engineer. If the temperature limit is exceeded, the DCES and the Director, Materials Bureau shall be immediately notified. The DCES will provide the proper repair procedure, which may include complete replacement of the bearing. All repair work shall be done at no additional cost to the State.

D. Type E.B. Bearings. The requirements of §565-3.06A and §565-3.06C shall apply.

565-3.07 Grouting Anchor Bolt Holes. All slotted anchor bolt holes in masonry plates shall be filled with concrete grouting material to the top edge of the hole. All excess grout material shall be cleaned from the bearing surfaces in a manner satisfactory to the Engineer. Slotted anchor bolt holes in fixed bearings may be filled any time subsequent to stringer placement. Slotted holes in expansion bearings shall be filled only after all necessary bearing adjustments have been made.

565-3.08 Final Verification. Prior to final acceptance of the bridge, the Engineer will verify that all necessary adjustments have been made; that all steel bearings, or external load plates, are permanently welded or attached with cap screws to the superstructure steel as shown on the contract plans; that all slotted holes are completely filled with grout; that all anchor studs are firmly tightened; and that all other work required to make the bearings completely functional has been completed.

565-4 METHOD OF MEASUREMENT. Measurement will be taken as the number of bearings installed in accordance with the Contract Documents.

565-5 BASIS OF PAYMENT. The unit price bid for each bearing shall include the cost of all labor, materials, equipment and adjustment necessary to complete the work. All material between the bottom of the superstructure, and the top of the substructure, including anchor studs and sole plates, shall be included in the price bid for this item.

565-5.01 Progress Payments. Eighty percent of the quantity will be paid for after the bearing is installed. The remainder of the quantity will be paid for after the bearing is aligned.

Payment will be made under:

Item No.	Item	Pay Unit
565.1121	Type S.R. Expansion Bearing (All Load Ranges)	Each
565.1221	Type S.R. Fixed Bearing (All Load Ranges)	Each
565.1321	Type S.S. Expansion Bearing (All Load Ranges)	Each
565.1421	Type S.S. Fixed Bearing (All Load Ranges)	Each
565.1521	Type M.R. Expansion Bearing (0 to 225 k)	Each
565.1522	Type M.R. Expansion Bearing (226 to 450 k)	Each
565.1523	Type M.R. Expansion Bearing (451 to 675 k)	Each
565.1524	Type M.R. Expansion Bearing (676 to 900 k)	Each
565.1525	Type M.R. Expansion Bearing (Over 900 k)	Each
565.1721	Type M.R. Fixed Bearing (0 to 225 k)	Each
565.1722	Type M.R. Fixed Bearing (226 to 450 k)	Each
565.1723	Type M.R. Fixed Bearing (451 to 675 k)	Each
565.1724	Type M.R. Fixed Bearing (676 to 900 k)	Each
565.1725	Type M.R. Fixed Bearing (Over 900 k)	Each
565.182 1	Type E.P. Bearing (All Load Ranges)	Each
565.1921	Type E.L. Bearing (0 to 55 k)	Each
565.1922	Type E.L. Bearing (56 to 111 k)	Each
565.1923	Type E.L. Bearing (112 to 168 k)	Each
565.1924	Type E.L. Bearing (169 to 225 k)	Each
565.1925	Type E.L. Bearing (Over 225 k)	Each
565.2021	Type E.B. Fixed Bearing (0 to 55 k)	Each
565.2022	Type E.B. Fixed Bearing (56 to 111 k)	Each
565.2023	Type E.B. Fixed Bearing (112 to 168 k)	Each
565.2024	Type E.B. Fixed Bearing (169 to 225 k)	Each
565.2025	Type E.B. Fixed Bearing (Over 225 k)	Each
565.2031	Type E.B. Expansion Bearing (0 to 55 k)	Each
565.2032	Type E.B. Expansion Bearing (56 to 111 k)	Each
565.2033	Type E.B. Expansion Bearing (112 to 168 k)	Each
565.2034	Type E.B. Expansion Bearing (169 to 225 k)	Each
565.2035	Type E.B. Expansion Bearing (Over 225 k)	Each
565.30	Rubber Impregnated Woven Cotton-Polyester Fabric	Each

ITEM 565.43020015 - BRIDGE BEARING RESTORATION

DESCRIPTION

The work shall consist of restoring bearings designated for restoration by the plans or by the Engineer.

Restoration of bearings shall consist of dismantling, removal, repairing, unfreezing, replacing designated parts, cleaning, lubricating, and painting, if indicated by the Contract Documents or ordered by the Engineer.

MATERIALS

Mill and Shop Inspection. All new steel shall be mill and shop inspected as required by the SCM.

Fabrication Details. The requirements of subsection 565-2.02 shall apply to all fabrication done for bearing restoration unless subsection 565-2.02 clearly does not apply to the bearing being restored.

Lubricants. The lubricant shall be multi-purpose automotive grease conforming to SAE J310 designation MPG.

Only fresh lubricants arriving at the work site, in the manufacturer's unopened containers shall be used to lubricate the bearings.

Bearing Pads. New bearing pads shall comply with the requirements of 728-01, 728-02, or 728-03. Only one type of bearing pad shall be installed on any one structure.

Protective Coatings. The requirements of subsection 565-2.04 shall apply.

Miscellaneous Steel. Anchor bolts, nuts and washers shall conform to the requirements given on the plans.

CONSTRUCTION DETAILS

Drawings. Drawings shall be required for all newly fabricated parts. The requirements of the SCM shall apply.

Repair. Bearings shall be repaired in the manner indicated on the plans.

All machine finished surfaces, shall be lubricated. Stainless steel plates shall not be lubricated. Polytetrafluoroethylene surfaces shall not be lubricated.

ITEM 565.43020015 - BRIDGE BEARING RESTORATION

Reinstallation. If the bearing has been removed and requires reinstallation, the following subsections shall apply:

565-3.02	565-3.06
565-3.03	565-3.07
565-3.04	565-3.08
565-3.05	

If the bearing is of a type that the requirements of subsection 565-3.05 will not apply, then the bearing shall be reinstalled in the manner indicated on the plans.

Painting. New fabricated steel parts which require painting shall be painted in accordance with the requirements of §565-2.04.D.

METHOD OF MEASUREMENT

The work will be measured as each bearing restored.

BASIS OF PAYMENT

The unit price bid for each bearing shall include the cost of all labor, material and equipment necessary to complete the work.

SECTION 568 - BRIDGE RAILING

568-1 DESCRIPTION. This work shall consist of furnishing and erecting bridge railing as shown on the contract plans and in accordance with the specifications.

As soon as the Contract is awarded, the Contractor shall notify the DCES of the name and address of the Fabricator of all bridge railing in accordance with §106-01 Sources of Supply. This notification shall list the specific shop or shops in which the railing will be fabricated.

568-2 MATERIALS. Materials shall meet the requirements of the following subsections:

Concrete Grouting Material	701-05
Steel Bridge Railing	710-23
Stainless Steel Connecting Products	715-16
Rubber Impregnated Random Fiber Pad	728-02

568-3 CONSTRUCTION DETAILS

568-3.01 Erection of Railing

A. Inspection of Railing. Immediately prior to erection, the railing shall be inspected for damage. Significant bends or kinks in the railing not specifically called for in the contract documents shall constitute sufficient cause for rejection. Straightening of such bends or kinks shall not be allowed.

Bending or curving rails in the field in order to fit alignment requirements, shall not be permitted. The Engineer may order some bending or curving to allow for necessary minor adjustments.

B. Inspection of Galvanizing. Damage to galvanizing of steel bridge railing shall constitute sufficient cause for rejection except for the following conditions:

1. If the damaged area is not required to be repaired under the provisions of 710-23, Steel Bridge Railing.
2. If the total damaged area of a single piece (i.e. post or rail) is 6 square inches or less. Total damaged area is exclusive of the damaged area as described under §568-3.01B1.

C. Field Galvanizing for Repair. Field galvanizing repair shall be allowed to be performed upon damaged areas meeting the requirements of §568-3.01B2.

Field galvanizing repair shall be made by painting zinc repair material onto the damaged area in accordance with the requirements of §719-01, Galvanized Coatings and Repair Methods.

All finished surfaces of welds and adjacent surfaces of rails and posts upon which galvanizing has been removed, due to any field welding operation, shall be field galvanized.

D. Field Welding. Field welding shall not be permitted unless noted in the contract documents or ordered by the Engineer.

E. Erection. All railing shall be erected in accordance with the contract documents or, when required, the approved shop drawings prepared and submitted as specified in the New York State Steel Construction Manual.

F. Positioning Railing. Railing shall be erected so that the rails are parallel to each other and to the top of parapet, sidewalk or structural slab.

G. Positioning Posts. Posts shall be set vertical.

H. Base Plates. Post base plates shall be perpendicular to the post, unless otherwise noted. When the railing is to be placed on a preformed surface, the base plate may be placed parallel to the grade or may be perpendicular to the post and made level by the use of beveled shims conforming to the applicable requirements of §710-23, Steel Bridge Railing.

I. Non-Metallic Pads. Posts which are to be placed on a preformed surface shall be mounted on a non-metallic pad conforming to the requirements of §728-02. Beveled Shims, if required, shall be inserted between the non-metallic pad and the post base plate.

J. Jacking Nuts. For railings set on jacking nuts, the railing posts shall be erected to proper line and grade before concrete under the post and in back of the granite curb is placed or before the mortar pad is placed.

K. Rail Span. The rails of railings shall span the following minimum number of posts:

Railing Type	Number of Posts
Two-Rail, Steel	3*
Four-Rail, Steel	3
Five-Rail Steel	3

NOTE: *If this is not possible, the absolute minimum shall be 2 posts if approved by the DCES.

L. Anchor Studs. After the anchor stud nuts have been tightened in a manner satisfactory to the Engineer, the studs shall be flame cut 1 inch above the nut. The first thread of the stud above the nut shall be damaged. The cut end of the anchor stud shall be coated in conformance with the requirements of §719-01, Galvanized coating and Repair Methods.

M. Touch-Up Painting. Any damage to the paint on a railing system shall be repaired in accordance with §657 Painting Galvanized Surfaces.

N. Inspection. All erection shall be subject to the inspection of the Engineer who shall be given all facilities required for a visual inspection of workmanship and materials.

Any single piece of the railing system with a total damaged area in excess of the amount specified in §568-3.01 B2 shall be rejected and replaced.

568-3.02 Cement Mortar Pads

A. Proportioning. Cement mortar pads shall consist of a concrete grouting material.

The concrete grouting material shall meet the requirements of §701-05, Concrete Grouting Material. The grouting material shall be mixed with water, in the ratio recommended by the manufacturer, to produce a trawable mix.

B. Mixing. Mixing shall be carried out in strict accordance with the manufacturers recommendations or the following as determined by the Engineer.

- All necessary mixing equipment shall be present and in good working order prior to the start of mixing.

- Mixing time shall not exceed three minutes unless otherwise permitted. No mixing shall be started until all preparations have been made to place the mortar.
- All mortar in any individual batch shall be used within 25 minutes after the start of mixing.
- Retempering will not be allowed.

C. Surface Preparation. All concrete surfaces to receive the mortar shall be free from laitance, oil, grease, paint, dust, loose particles or other foreign material.

The concrete surface shall be cleaned by sandblasting to the satisfaction of the Engineer, followed by a thorough vacuum cleaning.

The bottom surfaces of the base plates shall be free of oil, dirt and other foreign matter.

The concrete surface shall be lightly moistened with water.

D. Form Preparation. The forms shall be positioned about the base plate as shown in the plans or as directed by the Engineer. If the forms are to be coated with a release agent, it shall not be deleterious to the physical properties of the mortar system being used as determined by the Engineer.

E. Application. After the concrete surfaces and the base plates surfaces have been properly prepared the mortar shall be placed within the limits of the forms and tamped into place to assure that there are no voids in the completed pad. Exposed surfaces of the mortar shall be screeded and troweled to the level of the bottom of the base plate. The mortar pads shall be protected from rain for at least 24 hours.

F. General. In all cases, the installation of the mortar pads shall be made when the concrete and ambient air temperatures are above 50°F.

568-4 METHOD OF MEASUREMENT

568-4.01 Bridge Railing. The quantity to be paid for bridge railing shall be the number of feet measured along the centerline of railing anchorage between the extreme outer limits indicated on the contract plans.

568-4.02 Transition Bridge Railing. The quantity to be paid for transition railing shall be the number of feet measured along the axis of the top rail between the limits shown on the plans.

568-5 BASIS OF PAYMENT

568-5.01 Bridge Railing. The unit price bid shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. All pads (including Mortar Pads), shims, splices with their hardware, railing anchor studs with nuts, washers and anchor plates, and hand rails when specified shall also be included in the price bid.

No payment shall be made for those railing pieces which are replacements for those railing pieces that have been rejected.

Progress payments will be made when the railing is erected in accordance with the contract documents as specified in the New York State Steel Construction Manual exclusive of the cutting, peening and galvanizing of studs. Payment will be made at the unit bid price for 90% of the quantity erected. The balance of the quantity will be paid for upon proper completion of the work.

568.50	Steel Bridge Railing (Two-Rail)	Foot
568.51	Steel Bridge Railing (four-Rail)	Foot
568.52	Steel Bridge Railing (Five-Rail)	Foot
568.53	Steel Bridge Railing (Two-Rail) with Handrail	Foot
568.54	Steel Bridge Railing (Three-Rail)	Foot
568.60	Steel Bridge Railing- Brown (Two-Rail)	Foot
568.61	Steel Bridge Railing- Brown (Four-Rail)	Foot
568.62	Steel Bridge Railing- Brown (Five-Rail)	Foot
568.63	Steel Bridge Railing- Brown (Two-Rail) with Handrail	Foot
568.64	Steel Bridge Railing- Brown (Three-Rail)	Foot
568.70	Transition Bridge Railing	Foot
568.71	Transition Bridge Railing- Brown	Foot
568.80	Pedestrian and Bicycle Railing (One-Rail)	Foot
568.81	Pedestrian and Bicycle Railing (Two-Rail)	Foot
568.82	Pedestrian and Bicycle Railing (Three-Rail)	Foot
568.83	Pedestrian and Bicycle Railing (Four-Rail)	Foot
568.84	Pedestrian and Bicycle Railing (Five-Rail)	Foot
568.85	Pedestrian and Bicycle Railing- Brown (One-Rail)	Foot
568.86	Pedestrian and Bicycle Railing - Brown (Two-Rail)	Foot
568.87	Pedestrian and Bicycle Railing- Brown (Three-Rail)	Foot
568.88	Pedestrian and Bicycle Railing -Brown (Four-Rail)	Foot
568.89	Pedestrian and Bicycle Railing- Brown (Five-Rail)	Foot
568.90	Bicycle Railing (Two-Rail)	Foot
568.91	Bicycle Railing- Brown (Two-Rail)	Foot
568.92	Bicycle Railing (Four-Rail)	Foot
568.93	Bicycle Railing- Brown (Four-Rail)	Foot

SECTION 571- DISPOSAL OF PAINT REMOVAL WASTE

(Last Revised January 2019)

571-1 DESCRIPTION. The work shall consist of managing, accumulating, packaging, labeling, loading, transporting, treating, and disposing paint removal waste.

571-1.01 Paint Removal Waste. Paint removal waste consists of removed paint particles combined with material used to remove the paint and any organic or inorganic materials from bridge surfaces, by either bridge washing or blast cleaning operations, without use of any added chemical solvents. All testing of the paint removal waste necessary to satisfy the requirements of the waste transporter or disposal facility shall be the responsibility of the contractor.

Paint removal waste does not include used tyvek suits, respirator filters, tarpaulins or incidental trash. These incidental wastes generated by the Contractor in completing the work are covered by § 107-10 *Managing Surplus Material and Waste*.

A. Hazardous Paint Removal Waste Containing Lead. This shall apply to spent abrasives, coatings and paint chips removed from steel substrates on bridges designated in the contract documents as being lead-based. This does not include waste containing a mixture of lead and asbestos. Waste containing a mixture of lead and asbestos shall be disposed of in accordance with Section 210 *Removal and Disposal of Asbestos-Containing Material (Buildings, Bridges and Highways)*.

B. Non-Hazardous Industrial Solid Paint Removal Waste. This shall apply to spent abrasives and coatings removed from steel substrates on bridges designated in the contract plans as being non-lead-based.

571-2 MATERIALS. The Contractor shall use containers or roll-offs acceptable to the Waste Disposal Facility. The capacity of each container shall be clearly marked on each container in an easily visible location.

571-3 CONSTRUCTION DETAILS.

571-3.01 General. The Engineer will provide the Contractor with the Generator site identification number(s) issued by the USEPA. All paint removal waste shall be deposited and sealed in containers or roll-offs concurrent with generation. The paint removal waste shall be accumulated in clean, dry, weatherproof, watertight containers or roll-offs furnished by the Contractor and shall not be left exposed to the elements at the end of the working shift. All equipment and containers or roll-offs shall meet the requirements of USDOT for transport.

Paint removal waste shall be accumulated, handled, packaged, documented, loaded, transported, treated and disposed in accordance with all applicable Federal and State laws, rules, and regulations.

571-3.02 Paint Removal Waste Composition.

A. Hazardous Paint Removal Waste Containing Lead. Paint chips are known to contain lead and the combined paint removal waste stream is therefore categorized as hazardous waste. The Department has presumed that the waste will test as hazardous. The Contractor shall ensure that only solid paint removal waste is deposited into the containers or roll-offs. The determination has been made that such waste contains less than 2% by weight of organic material. Disposal facilities may refuse to accept paint removal waste that is different than the Typical Paint Waste Composition. Paint removal waste containing additional contaminants added by the Contractor or by the Contractor's operations shall be the responsibility of the Contractor. All testing of the paint removal waste necessary to satisfy the requirements of the chosen Disposal Facility or Transporter shall be the responsibility of the Contractor.

Provided is typical lead-based paint waste information which provides typical chemical and physical properties of paint removal waste based on previous testing, as follows:

Lead-Based Paint Waste Profile: Lead-based paint waste generated by the removal of paint consists of a mixture of abrasive blast media such as boiler slag or steel grit and paint chips. This supplemental information about the waste is provided in accordance with Resource Conservation and Recovery Act (RCRA) regulations. This composition profile does not include waste resulting from removal by chemical strippers for which the resulting waste will contain components of the stripper. Based on the knowledge of the process and the resulting waste material, and on previous testing of typical waste by independent laboratories approved by the NYS Department of health, this composition waste material information has been developed for typical lead-based paint waste.

Process Generating Waste: The waste results from removal of lead-based coatings from painted structures, typically steel bridges, by abrasive blasting, manual, shrouded mechanical, or high- pressure (hp) water methods. The North American industry Classification System Code (NAICS) typically assigned for the site is 23731-Highway, Street, and Bridge Construction.

Composition: To the Department's knowledge, the waste does not contain PCBs, pesticides, cyanides, organic TCLP constituents, dioxins, asbestos, ozone depleting substances, volatile organics or greater than 1000 ppm halogenated organic compounds. The waste is not a RCRA reactive, corrosive or ignitable, or source-listed or chemical product-listed waste. It is not radiological, etiological, explosive, water reactive, or shock sensitive. The specific composition will vary based on the removal method used, abrasive used, the proportion of paint chips to abrasives and other variables determined by the Contractor's operation. For wastes resulting from any chemical stripping of paint, the Contractor shall consider the components and properties of the stripper and the resulting waste mixture to characterize the waste.

The waste typically contains the following:

Removal Method	Approximate %	
	Abrasive	<u>Paint Chips</u>
Boiler Slag (an amorphous mixture of Fe, Al and Ca silicates)	90-95%	5-10%
Steel Grit (% varies by degree of grit recycling)	40-90%	10-60%
No Abrasive (manual, shrouded mechanical and water methods)	0%	100%

Paint Chips: Paint chips contain basic lead silico chromate, titanium dioxide, chromate dioxide, magnesium silicate, linseed oil, alkyd resin, fillers, driers, and other miscellaneous materials.

Other Components: Water may be present from water used during removal. Iron oxide (rust, mill scale) may be present. Animal waste (i.e., feces, guano, nesting materials, etc.) and dirt/miscellaneous debris may also be potentially present.

RCRA Metals: The waste is presumed to contain lead at levels exceeding the regulatory limit of 5 milligrams per liter (approximately 5 ppm) by the Toxicity Characteristic Leaching Procedure (TCLP) test for lead (unless contract documents provided for testing to determine lead toxicity characteristic). Chromium is considered present as an underlying characteristic.

Typical Physical Characteristics:

Physical State- Solid

Color- Black for boiler slag component, or metallic grey/black for steel grit component.

Color varies for paint chips.

Odor-None

pH- Not Applicable

Liquid Flash Point- Not Applicable

Specific Gravity- Approximately 2.7 (boiler slag) and Approximately 7.5 (steel grit)

Bulk Density- Approximately 1.2 kg/1 (boiler slag)

Approximately 3.6 kg/1 (steel grit)

Free Liquids- None (moisture may be present from water added during removal)

Consolidated Hazardous Waste Information: The following consolidated information for hazardous lead-based paint waste can be used in completing the required items needed for its proper shipment and disposal:

- USDOT Shipping Description- RQ Hazardous Waste, Solid, n.o.s. (D008); 9; NA3077; PG III
n.o.s. = Not Otherwise Specified, PG = Packing Group
- Hazard Label on containers- Class 9
- Placard for shipments exceeding 455 kg or bulk- Class 9
- Hazardous Waste due to the Characteristic Lead Toxicity, Waste Code D008
- Constituents of Concern- Lead and Chromium
- Treatability Group-Non-wastewater
- Treatment Standard- 0.75 mg/L Lead and 0.06 mg/L Chromium by TCLP test
- Reportable Quantity- 4.54 kg or greater
- Markings on Container-
Hazardous waste, solid, n.o.s. (D008); NA3077
HAZARDOUS WASTE -Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the Environmental Protection Agency.
Generator's Name: NYSDOT Region ()
EPA ID Number ()
Manifest Document Number ()
Accumulation Start Date ()

USDOT Emergency Response Guidebook Guide: 171, Substances (Low to Moderate Hazard)

B. Non-Hazardous Industrial Solid Paint Removal Waste. The Contractor shall ensure that only solid paint removal waste is deposited into the containers or roll-offs. All testing of the paint removal waste necessary to satisfy the requirements of the disposal facility or transporter shall be the responsibility of the Contractor.

571-3.03 Hazardous Paint Removal Waste Containing Lead - Management

Requirements. Employees handling hazardous paint removal waste shall be trained in accordance with 6 NYCRR Part 373-3.2(g) in hazardous waste management procedures including hazardous waste accumulation, preparedness and prevention, contingency and emergency procedures. The Contractor's Preparedness

and Prevention Plan, Contingency Plan and Emergency Procedures, and Personnel Training Records, as required by 6 NYCRR Part 373-1.1(d)(1)(iii), shall be submitted to the Engineer for acceptance prior to the generation of any hazardous waste. Containers in storage shall be inspected on at least a weekly basis in accordance with 6 NYCRR Part 373-3.9(b)-(d).

571-3.04 Containers and Labeling. No roll-off shall be filled to a capacity in excess of that marked on the roll-off as the maximum capacity. Once the Engineer determines the quantity within a specific container or roll-off, that container or roll-off shall be properly sealed and not thereafter be tampered with. No additional waste shall be placed in it, nor shall any be removed from it (except for analytical sampling). All containers or roll-offs shall be located in a place secured from traffic and in a manner acceptable to the Engineer. The Contractor shall take measures to prevent the blowing or dispersion of the waste during each loading operation and while being transported.

The Contractor shall label, mark, and placard all containers or roll-offs prior to shipment in accordance with USDOT and NYSDEC regulations. Each container shall have an appropriate label prior to filling with the applicable words identifying its contents as paint removal waste providing the presumed waste classification of hazardous or non-hazardous industrial waste, and indicating the hazard of the contents CRCRA Toxicity. The accumulation start date shall be completed at the time when waste is first deposited into each container. All label markings shall be permanent, printed in English, and displayed on a background of contrasting color un-obscured by other labels or attachments. Labeling shall be located away from other markings that could substantially reduce its effectiveness.

571-3.05 Document Preparation.

A. Hazardous Paint Removal Waste Containing Lead. The Contractor shall prepare and distribute all documentation including the Uniform Hazardous Waste Manifest. The Engineer will sign the Generator's Certification on the Uniform Hazardous Waste Manifest. The LOR (Land Disposal Restricted) certification shall be completed and attached to the manifest, as required by 40 CFR Part 268 *Land Disposal Restrictions*.

B. Non-Hazardous Industrial Solid Paint Removal Waste. The Contractor shall prepare and distribute all documentation, including the disposal record forms.

571-3.06 Paint Removal Waste Transport. All paint removal waste shall be in transit to the disposal site from the site of generation no later than 45 calendar days unless otherwise approved by the Engineer, but no longer than 90 days. Any additional required shipment information, including manifest number, shall be entered on the container label(s) prior to shipment offsite. The Contractor shall present evidence that the vehicle that will be used for the shipment is permitted to transport the designated waste in accordance with 6 NYCRR Part 364.

Conditions for hazardous paint removal waste transporting vehicles to pick up paint waste debris, in bulk, from one or more bridge sites (multiple collection) for delivery to an authorized Treatment, Storage and Disposal Facility (TSDF) include the following:

A. Hazardous Paint Removal Waste Containing Lead.

- The materials picked up at each site shall be essentially identical in physical and chemical characteristics. No materials, other than paint waste debris, may be included if wastes from several individual generating sites are to be combined on the same truck. All of the component shipments are presumed to be 0008 hazardous wastes, and disposed as such.
- A manifest is prepared for each generating bridge site. Each manifest shall reflect a bulk shipment, and all manifests being carried by the same transporting vehicle must express the

quantity in pounds. In sum total, the manifests accompanying the shipment shall account for the entire quantity transported.

All component shipments are intended to be conveyed to the same TSDF, and the TSDF has agreed to accept consolidated bulk loads.

All component shipments shall have originated at sites where the Department is the waste generator. No loads may be included that were generated at a site for which another agency is the waste generator.

Measures shall be taken to prevent the blowing or dispersion of the paint removal waste during each loading operation and while being transported.

The weight of waste shall be provided by the disposal facility.

B. Non-Hazardous Industrial Solid Paint Waste. Conditions for non-hazardous waste transporting vehicles to pick up paint waste debris, in bulk, from one or more bridge sites (multiple collection) for delivery to an authorized disposal facility include the following:

The materials picked up at each site shall be essentially identical in physical and chemical characteristics. No materials, other than paint waste debris, may be included if wastes from several individual generating sites are to be combined on the same vehicle.

- All component shipments are intended to be conveyed to the same disposal facility, and the disposal facility has agreed to accept consolidated bulk loads.

All component shipments shall have originated at sites where the Department is the waste Generator. No loads may be included that were generated at a site for which another agency is the waste Generator.

- Measures shall be taken to prevent the blowing or dispersion of the waste during each loading operation and while being transported.
- The weight of waste shall be provided by the disposal facility.

571-3.07 Conditionally Exempt Small Quantity Generator (CESQG) Exemption.

Shipments of non-hazardous paint removal wastes of less than 200 pounds shipped in a single load may be transported without a waste transporter permit as allowed by the Small Quantity Waste Transporter

Exemption at 6 NYCRR Part 364.1(e)364-2.1(b)C5). For activities with generation of hazardous paint removal wastes that meet Conditionally Exempt Small Quantity Generator (CESQG) status (generate less than 220 pounds in any month and store less than 2205 pounds on site at any time), no USEPA ID number is required, the waste can be shipped without a manifest, and a CESQG can self-transport up to 220 pounds of waste in any calendar month to a disposal facility. CESQGs can dispose of their waste at a permitted hazardous waste facility or municipal or industrial solid waste facilities that are permitted to accept that type of waste.

571-3.08 Hazardous Paint Removal Waste Containing Lead Stabilization. Treatment of hazardous paint removal waste, as required by Federal regulations, is presumed to require stabilization of the waste such as mixing it with portland cement and water at a permitted Hazardous Waste Treatment or Disposal Facility. The stabilized waste shall meet the treatment standards of the Federal regulations prior to disposal in a permitted Hazardous Waste Disposal Facility.

571-3.09 Non-Hazardous Industrial Solid Paint Waste Sampling and Analysis. The Contractor shall conduct all sampling and analysis as required by the designated authorized disposal facility as soon as feasible upon waste generation at each non-hazardous designated bridge. Sampling shall be conducted by individuals thoroughly trained in sampling protocols, handling and chain of custody procedures, and laboratory requirements. Accepted sampling practices shall be used to obtain representative composite sample(s) as required for the specific analysis to be completed. Each composite sample shall include a minimum of four distinctly different sampling points. Analyses shall be completed

at a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory using NYSDEC Analytical Services Protocols (ASPs). The analysis must include, at a minimum, the RCRA heavy metals analysis using the Toxicity Characteristic Leaching Procedure (TCLP) and a total weight analysis. If analytical results indicate that the waste is hazardous, the waste shall be disposed of as such and the hazardous waste pay item shall be used.

571-3.10 Waste Disposal Facility.

A. Hazardous Paint Waste Containing Lead. Prior to generating any hazardous paint removal waste, the Contractor shall provide the Engineer with a letter from a permitted Hazardous Waste Disposal Facility, stating that the Facility has agreed to accept the hazardous waste generated by the work requirements of this contract; is authorized to accept the hazardous waste under the laws of the State of residence; has the required capacity to treat and dispose of the material; and will provide, or assure the ultimate disposal method indicated on the Uniform Hazardous Waste Manifest. The letter shall be signed by a representative of the Disposal Facility who is legally authorized to sign such an agreement.

B. Non-Hazardous Industrial Solid Paint Waste. Prior to generating any non-hazardous paint removal waste, the Contractor shall provide the Engineer, in writing, the name and location of the permitted solid waste management facility selected for disposal.

571-4 METHOD OF MEASUREMENT.

571-4.01 Hazardous Paint Waste Containing Lead. The quantity of paint removal waste to be measured for payment will be in net pounds of waste disposed of, based on disposal facility weight tickets of the waste as manifested, not including the weight of the containers.

571-4.02 Non-Hazardous Industrial Solid Paint Waste. The quantity of paint removal waste to be measured for payment will be in net pounds of waste disposed of, based on disposal facility weight tickets, not including the weight of the containers.

571-5 BASIS OF PAYMENT.

571-5.01 Hazardous Paint Waste Containing Lead. The unit price bid per pound of paint removal waste shall include the cost of all labor, materials, equipment, sampling, testing, and fees necessary to complete the work based on the assumption that treatment by stabilization will satisfy the applicable Federal regulations. Only waste for which manifest copies (not applicable for CESQG exemption) and weight ticket(s) are returned to the Engineer by the Contractor and Disposal Facility will be authorized for payment. If the Department is fined or penalized as a result of the Contractor's performance or lack thereof, in addition to other remedies the Department may possess, said fine or penalty will be deducted from monies due the Contractor.

571-5.02 Non-Hazardous Industrial Solid Paint Waste. The unit price bid per pounds of paint removal waste shall include the cost of all labor, materials, equipment, sampling, testing, and fees necessary to complete the work. Only waste for which weight ticket(s) are returned to the Engineer by the Contractor and Disposal Facility will be authorized for payment. If the Department is fined or penalized as a result of the Contractor's performance or lack thereof, in addition to other remedies the Department may possess, said fine or penalty will be deducted from monies due the Contractor.

ITEM 574 - STRUCTURAL STEEL PAINTING: OVERCOATING AND LOCALIZED

574-1 DESCRIPTION. This work shall consist of pressure washing and power-tool or vacuum-blast cleaning of damaged paint areas and corroded structural steel surfaces, and painting surfaces described in contract documents. See Special Note entitled *Structural Painting Details* for the description and requirements of serialized items.

574-2 MATERIALS

574-2.01 Paints. Paints shall meet the requirements of §708-02 *Structural Steel Paints Class 2* and shall appear on the Department's Approved List, Structural Steel Paints – Class 2 for localized and overcoat painting, or on the Structural Steel Paints – Class 1 Approved List for localized painting only. All new paint to be applied to a single structure shall be the same paint system produced by the same manufacturer. The Contractor shall assure this to be the case in the event that multiple paint items are specified on a single structure. This includes both shop and field painted components of the structure.

A. Shelf Life. The shelf life of all components of the coating system shall be a maximum of 12 months from the date of manufacture. The shelf life of factory sealed containers of thinners shall be per manufacturer's recommendations or 3 years from the date of manufacture, whichever is less, and a maximum of 7 months after the factory seal has been broken. Paint and thinner shall arrive at the work site in new, unopened containers. The label shall include the manufacturer's name, batch number, color, paint name, and date of manufacture.

B. Paint Storage. Paint in storage shall be protected from damage and maintained in accordance with manufacturer's recommendations. Paint will be considered in storage if it is onsite for more than 8 hours prior to application.

C. Color. Each single coat of paint shall be a different color and provide substantial contrast with the underlying substrate and previous coats. The color of the finish coat shall be as specified in contract documents. The color of the other coats will at the Contractor's option.

D. Data Sheets. The Contractor shall supply the Department's representative with the paint manufacturer's material safety data sheets for each paint to be applied. The material safety data sheets shall be delivered to the Department's representative a minimum of five work days prior to beginning of work. The Department's representative and Contractor shall use the product data sheets posted on the Structural Steel Paints Class 1 or Class 2 Approved List, as applicable.

574-2.02 Water for Washing. Water for pressure washing shall be potable water. Any detergent or soluble salt remover used must receive approval by the paint manufacturer and the Materials Bureau. Water shall not be recycled.

574-2.03 Abrasive for Blast Cleaning. Abrasive material for blast cleaning shall be selected by the Contractor. Silica sand and other types of nonmetallic abrasive containing more than one percent free silica, by weight, will not be allowed. The abrasive blasting shall produce an angular anchor profile suitable for the paint system to be applied.

574-2.04 Paint Inspection Equipment. Prior to the start of work the Contractor shall supply the Engineer with the following specifications and equipment in good working order:

1. One bound copy of the Steel Structures Painting Council surface preparation specification, SSPC SP-1 – *Solvent Cleaning*.
 2. One (1) bound copy of the Steel Structures Painting Council surface preparation specification, SSPCSP 11 – *Power Tool Cleaning to Bare Metal*.
 3. One (1) bound copy of the Steel Structures Painting Council surface preparation specification, SSPCSP 10 – *Near-White Metal Blast Cleaning*.
 4. One bound copy of the Steel Structures Painting Council pictorial standards, SSPC-VIS 3, *Guide and Reference Photographs for Steel Surfaces Prepared by Hand and Power Tool Cleaning*.
 5. One bound copy of the most current Steel Structures Painting Council pictorial standards, SSPC-VIS 1, *Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning*.
 6. One bound copy of the Steel Structures Painting Council method SSPC-PA2, *Paint Application Specification No. 2 - Measurement of Dry Film Thickness With Magnetic Gages*.
 7. One copy of ASTM D4417 Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel.
 8. One copy of ASTM D4285-83 (1999) Test Method for Indicating Oil or Water in Compressed Air.
 9. One Air Thermometer, pocket type, 10°F to 110°F.
 10. One noncontact Infrared Thermometer, 10°F to 110°F.
 11. One Contact Thermometer, 10°F to 110°F.
 12. One Paint Thermometer, 10°F to 110°F.
 13. One Magnetic Dry-Film Thickness Gage, Type 2 (as defined per SSPC PA-2), with a display capable of measuring 0 to 60 mils in 0.1 mil increments, with calibration shims.
 14. Two Wet-Film Thickness Gages, Prong Type, capable of measuring 1 to 10 mils in 1 mil increments.
 15. Psychrometer and US Weather Bureau Psychrometric Tables.
 16. Profile micrometer with extra coarse replica tape.
- All equipment will be returned to the Contractor upon completion of the work.

574-3 CONSTRUCTION DETAILS. Overcoating is defined as treating corroded areas by spot cleaning and applying two coats of primer, followed by applying intermediate and topcoats of paint to all prepared steel surfaces, both cleaned and primed previously corroded areas and cleaned existing intact painted surfaces. Localized cleaning and painting are defined by spot cleaning and applying four coats of paint, including two coats of primer, intermediate and topcoat, to spot-cleaned steel only. The Contractor shall provide adequate access, suitable lighting, and time for inspections to be made. Any work done while the Engineer has been denied, or restricted from access, shall be recleaned and repainted at no additional cost to the State.

574-3.01 Quality Control Plan. The Contractor shall provide the Engineer a copy of the Contractor's Quality Control (QC) procedures and/or Quality Control Plan (QCP). The QCP describes the minimum QC activities that will be performed by Contractor's QC personnel to ensure compliance. The QCP shall minimally include operating procedures and maintenance records for equipment on site, proof of formal QC training for the Contractor's QC personnel on site, and daily reports including the following information:

- Compressed Air Cleanliness
- Dry-Film Thickness
- Air Temperature
- Humidity and Dew Point
- Surface Temperature
- Abrasive Cleanliness Checks
- Degree of Cleanliness Achieved

- Surface Profile
- Batch Numbers of Paint Used
- Batch Numbers of Thinner Used
- Mixing According to Specification

The Contractor must provide daily reports to the Engineer upon request. The reports shall be submitted no later than 24 hours following the completion of the days work.

574-3.02 Surface Preparation for Overcoating. Steel surfaces shall be prepared for painting by a combination of pressure washing and power-tool or vacuum-shrouded blast cleaning. Pressure washing of all areas to be painted shall be performed first, followed by power-tool cleaning of areas demonstrating corrosion of the steel substrate to remove all paint, rust, rust scale, and mill scale, as per SSPC SP-11, *Power Tool Cleaning to Bare Metal* or SSPC SP-10, *Near-White Metal Blast Cleaning* as applicable. If heavy deposits of rust and scale are present, they shall be removed by hand or power tool prior to pressure washing. Areas of tightly adhered coating to remain shall be abraded to provide an anchor profile for overcoat paint. Large deposits of bird droppings shall be removed prior to pressure washing.

A. Pressure Washing and Solvent Cleaning. All steel surfaces to be painted shall be pressure washed, using an operating pressure range of 1800 to 2000 psi, a minimum flow of 3.5 gal/minute, and a water temperature of 185°F to 200°F. The nozzle shall be held at a distance of 6 to 12 inches from the steel surface. Pressure washing shall only be allowed when ambient air temperatures are greater than 40°F and rising. In no case will pressure washing be conducted when spent wastewater could freeze on roadway or bridge surfaces or in any other way create a hazardous situation. The washing is intended to remove contaminants from the surface, not to remove tightly adhered paint. Oil and grease shall be removed by solvent cleaning as described in SSPC SP1, *Solvent Cleaning*. The areas shall be pressure washed again following this cleaning.

When the washing is completed, the cleaned surfaces shall be free of dust, dirt, oil, grease, animal waste, salts, and other debris

A containment shall be suspended around and beneath the work area during pressure washing.

The containment for pressure washing is intended to capture solid paint chips and other solid debris that may become dislodged from washing operations. Unless otherwise noted, spent wash water will not require collection and will be allowed to fall to the underlying ground or waterway, provided that the other requirements of this specification are met.

Special note, Structural Painting Details, will provide scheduling requirements for washing a structure over a body of water. Spent wash water over a public water supply or the New York City watershed shall be collected and diverted to the adjoining land mass.

If steel surfaces become contaminated or 7 calendar days elapse between washing and abrasive blasting cleaning, they shall be rewashed at no additional cost to the State.

B. Power Tool Cleaning. Power tools as described in SSPC-SP 11 shall be used to clean corroded steel. Vacuum-shrouded abrasive blasting may be allowed. Steel cleaned using vacuum shrouded blasters shall be cleaned to SSPC-SP 10.

1. Atmospheric Conditions. No cleaning operations will be conducted under the following conditions:

The relative humidity exceeds 85%.

When the substrate is damp or covered by frost.

The surface temperature is less than 5°F above the dew point.

2. Steel Cleanliness and Profile. Surfaces which have become visibly corroded shall be

cleaned in accordance with SSPC-SP 11 or SSPC-SP 10, as applicable. Areas where the existing paint has peeled, flaked, blistered, or otherwise become deteriorated shall be cleaned until only sound paint, tightly adherent paint remains. These areas need not be cleaned to SP-11 or SP-10 if the damage does not extend to the steel surface and corrosion of the steel substrate or the mill scale is not evident.

Equipment used shall produce an anchor profile meeting the manufacturer's requirements as reported on the manufacturer's data sheets. The anchor profile shall be measured in accordance with ASTM D4417, Method C.

Special attention shall be given to the edges of beam flanges, angles and plates, bearings, rivets, the heads of nuts and bolts, structural steel surrounding bridge joints, and similar surfaces that are marginally accessible and difficult to clean.

The edges of intact paint shall be feathered back, and the adjoining paint must be tightly adhered. Ragged or lifting edges on adjoining paint will not be allowed. Adherence will only be considered satisfactory if the adjoining paint is smoothly feathered back and cannot be removed by lifting with a dull putty knife.

3. Vacuuming. The vacuum assembly on all tools shall be capable of containing all visible dust and debris produced by the operation of the cleaning equipment. Air passing through the vacuum assembly shall be exhausted through a HEPA filter. A HEPA filter shall be defined as a filter that is at least 99.97% efficient for particles that are 0.3 µm in diameter, or larger.

4. Preparation of Remaining Coating. Areas exhibiting damaged or deteriorated paint not extending to the steel shall be power tool cleaned to remove all damaged or loosely adhered paint and provide a suitable surface for top coating. Loosely adhered paint will lift when scraped with a dull putty knives.

After cleaning and feathering edges, all remaining tightly adhered coating shall be abraded.

The abrading operation shall not fracture or remove a significant amount of existing coating, only provide surface profile suitable to receive additional coats of paint. The degree of abrasion shall

be in accordance with the manufacturer's recommendations.

The Contractor shall choose the method of abrasion. No additional payment will be made for the appropriate containment and waste collection required to abrade the surface. Open abrasive blasting to abrade the surface shall require a Class A containment, in accordance with Section 570 *Paint Removal Operations*. All other methods of abrasion shall minimally require the same level of containment as specified in contract documents for a particular structure.

If the Contractor chooses a wet-abrasive method for abrasion, the containment must meet the requirements of SSPC – Guide 6, Class 2W. All water and abrasive must be collected and disposed of as hazardous waste.

All dust, powder, or residual abrasive remaining on the surface after the abrading operation shall be thoroughly removed and the remaining surface clean prior to painting.

5. Cleaning Area. The area cleaned shall be limited to that which can be cleaned, inspected and prime coated within a 10-hour period. Cleaned areas shall be inspected by the Engineer prior to priming. Areas that exhibit flash rusting within the 10-hour period or fail to meet the project cleaning standard prior to painting shall be recleaned.

C. Visual and Project Standards. The Contractor shall prepare at least one project cleaning standard for each representative area on the structure that is being prepared for painting. Multiple standards may be required if the cleaned steel differs significantly from the photographic standards due to surface conditions, location from work area, or other factors such as distance of the standard from the work area.

The prepared standard shall generally conform to SSPC VIS 3, *Guide and Reference Photographs for Steel Surfaces Prepared by Hand and Power Tool Cleaning* or SSPC VIS 1, *Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning*, as appropriate, and shall be approved by the Engineer before the start of general cleaning work. Each cleaning standard shall be at least 12 x 12 inches in size, and shall be located in an area of the structure that is accessible to, and approved by the Engineer. The Contractor shall protect the cleaning standard from corrosion and contamination throughout the duration of work by applying a clear coat of polyurethane. At the completion of cleaning work, the project standard shall be recleaned and painted. If the project cleaning standard becomes deteriorated, or otherwise ineffective, it shall be reestablished at no additional cost to the State. Corroded and deteriorated surfaces that have been cleaned using power tools shall be accepted by visual comparison to the project prepared standard(s) for each structure. In case of a dispute over the visual standard, the written standard shall take precedence.

574-3.03 Surface Preparation for Localized Cleaning and Painting. All of the requirements of §574-3.02 shall apply with the exception of abrading the remaining coating. Only tightly adherent existing coating within 6 inches of a power tool cleaned surface shall be abraded.

574-3.04 Overcoat Painting. The paint shall appear on the Department's Approved List, 'Structural Steel Paints - Class 2' and be approved for overcoating application. The Contractor shall apply each coat of paint in the order listed on the Department's Approved List 'Structural Steel Paints - Class 2.'

A. Atmospheric Conditions. Paint shall be applied only if surface and ambient temperatures are greater than or equal to 40°F and rising. Paint shall not be applied when surface or ambient temperatures are greater than 100°F. If the temperature range listed on the manufacturer's data sheets is more restrictive, the manufacturer's range shall be used. The use of accelerator additives is prohibited. No paint shall be applied unless the receiving surface is absolutely dry. Paint shall not be applied when the relative humidity is more than 85% or the surface temperature is less than 5°F

above the dew point. If the manufacturer's requirements are more restrictive, they shall be followed. No paint shall be applied during rain.

The Contractor shall observe the dew point restrictions listed on the manufacturer's data sheets. If an epoxy coating is exposed to cold temperatures or humid conditions outside of the manufacturer's recommended values prior to cure, the surface shall be visually examined for greased or oily surfaces which may have formed. The Engineer may also require the Contractor to use a commercially available amine blush test kit in various locations. If testing indicates the presence of an amine blush or if there is any oily film on the surface, the surfaces shall be cleaned in accordance with paint manufacturer's recommendations at no additional cost to the State.

B. Paint Mixing. All paint shall be thoroughly mixed with mechanical mixers in accordance with the manufacturer's recommendations. After mixing the bottom of the container shall have no unmixed pigment.

C. Solvents and Thinners. Paint may be thinned if recommended by the manufacturer and approved by the Engineer. The primer, if classified as metallic pigmented, shall not be thinned such that the resulting VOC level exceeds the maximum allowable limit set by 6 NYCRR Part 205, §205.3 for metallic pigmented coatings. All other coats of paint shall not be thinned such that the resulting VOC level exceeds the maximum allowable §205.3 limit for industrial maintenance coatings. Use of unauthorized thinners or using excess amounts of thinners is prohibited. Any area where unauthorized solvents or thinners are used shall be recleaned and repainted at no additional cost to the

State. All thinning shall be performed in the presence of the Engineer.

D. Paint Application. Painting shall not begin until cleaned surfaces have been inspected and approved by the Engineer. Paint may be applied using spray, brush, or roller, unless otherwise indicated by the contract documents or prohibited by the paint manufacturer. All paint shall be applied so as to produce a uniform, even coating, free of runs, sags, drips, ridges or other defects. Roller nap shall be limited in accordance with the paint manufacturer's recommendation. Areas exhibiting trapped fiber or bristles shall be rejected. Prepared areas that exhibited damaged paint not extending to the steel substrate shall receive two coats of paint: intermediate and finish coat. Complete protection against paint spatter, spillage, wind-blown paint, or similar releases of paint shall be provided. Covers, tarps, mesh, and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine, or other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure. The use of spray equipment for paint application shall be allowed within containments provided that the aforementioned protection against paint release is provided, all equipment used (including tarps, mesh and similar materials) meets all safety requirements for such enclosed use with paint spraying, and all OSHA requirements for safety and ventilation is met.

E. Paint Film Thickness. Paint shall be applied to produce the specified dry-film thickness (DFT) as directed by the range listed on the paint manufacturer's data sheets. The dry-film thickness shall be determined in accordance with SSPC-PA 2, Paint Application Specification No. 2 - *Measurement of Dry Film Thickness with Magnetic Gages*, using a Type 2, fixed-probe magnetic gages. Dry film thickness gauges shall be calibrated over a cleaned, approved surface on the structure using two NIST traceable shims as described in the "two-point calibration adjustment" section of Appendix 2 of SSPC-PA 2. The two shims must be just below and above the recommended thickness range of the prime coat, or the combined thickness of successive coats, as applicable. DFTs of the all coats applied subsequent to the primer shall be determined by subtracting the average DFT readings of the previous coat(s) from the actual DFT readings. An average DFT value shall minimally be recorded and calculated for every 1000 square feet prepared. The average shall be calculated using a minimum of 5 spot measurements as defined by SSPC-PA2. At least one of the spot measurements shall be performed on the bottom face of the bottom flange of stringers, girders or floor beams if these elements are in the work area. Areas failing to meet the specified minimum dry-film thickness shall be top coated with the same paint to produce the total dry film thickness required. The top coating must be performed within the paint manufacturer's specified recoat window. The Engineer may require any area exceeding the manufacturers recommended dry film thickness to be cleaned to the SSPC-SP 11 or SSPC-SP 10 condition.

F. Painting Schedule. Primer shall be applied as per §574-3.02, B.5 of this specification. The second coat of primer shall be applied within 72 hours of the application of the initial prime coat. The intermediate coat shall be applied within 72 hours of prime coating of the areas as defined by §574-3.02, B.5. All areas of adherent existing paint to be overcoated shall receive the intermediate coat within 72 hours of that area's cleaning operation. To prevent intercoat adhesion failure, topcoat must be applied within the manufacturer's recommended recoat window, or 14 days, whichever is shorter. If the contractor fails to recoat within the specified time period, the surface to be painted shall be cleaned and abraded in accordance with manufacturer's recommendations. This work shall be done at no additional cost to the State. If the steel has become dirty between coats, the Contractor shall wash the bridge again at no additional cost to the State.

574-3.05 Painting for Localized Cleaning and Painting. The paint shall appear on the Department's Structural Steel Paints – Class 1 Approved List, or Structural Steel Paints – Class 2 Approved List and be approved for localized application. The Contractor shall apply each coat of paint in the order listed on the Department's Approved List. All of the requirements of §574-3.04 shall apply with the exception of area painted. Only areas that have been cleaned shall be painted. Paint shall not extend more than 6 inches beyond all power-cleaned areas.

574-4 METHOD OF MEASUREMENT

574-4.01 Overcoating - Lump Sum. The work under this item will be measured on a lump sum basis, per structure.

574-4.02 Overcoating - Square Feet. The measurement of this item will include the area requiring overcoating, measured to the nearest whole square feet.

574-4.03 Localized - Square Feet. The quantity to be measured will be in square feet of area of steel cleaned and painted, measured the nearest whole square feet.

574-5 BASIS OF PAYMENT

The lump sum price bid shall include the cost of all labor, materials, and equipment necessary to complete the work, including the cost of providing protection against damage to public and private property during pressure washing and paint application. Payment for the containment, collection and disposal of dust and paint waste generated by surface preparation work shall be paid for separately. Progress payments will be based on the percentage of steel cleaned and painted. 60% of the quantity will be paid for surface preparation and priming. The remaining amount will be paid following the satisfactory completion of work.

Payment will be made under:

Item No.	Item	Pay Unit
574.01nnnn	Structural Steel Painting: Overcoating	Lump Sum
574.02nnnn	Structural Steel Painting: Overcoating	Square Foot
574.03nnnn	Structural Steel Painting: Localized	Square Foot

ITEM 580 - REMOVAL OF STRUCTURAL CONCRETE

580-1 DESCRIPTION. This work shall consist of removal and disposal of structural concrete from structural concrete elements, concrete approach slabs, concrete bridge pylons, concrete from structural steel members, and other concrete removal and disposal in accordance with the contract documents and as directed by the Engineer.

580-2 MATERIALS. Not Specified.

580-3 CONSTRUCTION DETAILS

580-3.01 General. The Contractor shall remove structural concrete in accordance with the contract documents, so as not to damage material designated to remain in place. Reinforcement designated to remain in place shall be cleaned.

The Contractor shall only remove structural concrete from elements to remain to the limits shown in the contract documents, in order to preserve structural adequacy and stability. Replacement concrete shall be placed and allowed to reach its initial set prior to any additional removals. A minimum of 7 calendar days prior to beginning removal of structural concrete, the Contractor shall provide a Structural Concrete Removal Plan for acceptance by the Engineer. The Structural Concrete Removal Plan shall identify the equipment to be used, the sequence of operations, provisions for protection of structural steel, provisions for removal and disposal of material, and any additional work zone traffic control or worker safety provisions.

580-3.02 Removal of Structural Concrete. The Contractor shall remove concrete to a sound surface in accordance with the contract documents. The removal operation shall be angled inward creating a key. Small angle corners shall be minimized per contract documents to prevent voids. Reinforcing bars and miscellaneous material shall be removed or shall be retained, as shown in the contract documents. After removal of concrete has been performed; surfaces designated to come in contact with new concrete placements shall be cleaned in order to ensure proper bonding with the new concrete. Concrete surfaces to be cleaned shall be thoroughly blast cleaned or abraded by other mechanical means to remove remaining loose material. After blast cleaning or abrading, vertical or overhead surfaces shall be air-blown, or rinsed with water to remove dust. Other surfaces shall be vacuum cleaned.

Demolition or chipping hammers shall weigh no more than 45 lbs excluding the weight of the bit and muffler. The hammers shall deliver no more than 1600 blows per minute. The Contractor shall provide the Engineer information from the hammer manufacturer to assure that these requirements are not exceeded. The air pressure used to power the hammer shall not exceed 110 psi, measured at the air compressor, as shown by an air pressure gauge in proper working condition provided by the Contractor. Only sharp chisel point bits, a minimum of 2 inches wide, shall be used.

If the Contractor's operations result in damage to concrete that is to remain, the Contractor shall make immediate corrections to prevent damage. Exceptions to the hammer limitations shall be approved by the Deputy Chief Engineer (Structures) prior to use.

580-3.03 Removal of Concrete Approach Slabs. The Contractor shall remove concrete approach slabs in accordance with the contract documents. Sawcutting of the concrete approach slab in order to separate it from existing abutment will be shown in the contract documents and paid for separately.

580-4 METHOD OF MEASUREMENT

580-4.01 General. Vacant.

580-4.02 Removal of Structural Concrete. The quantity to be measured for payment will be in cubic

yards measured to the nearest 0.1 cubic yards of concrete removed.

580-4.03 Removal of Concrete Approach Slabs. The quantity to be measured for payment will be in square feet of concrete approach slab removed, measured to the nearest whole square foot.

580-5 BASIS OF PAYMENT

580-5.01 General. Vacant.

580-5.02 Removal of Structural Concrete. The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, and all costs of disposal.

580-5.03 Removal of Concrete Approach Slabs. The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including any sawcutting other than separating the approach slab from the existing abutment, and all costs of disposal.

Payment will be made under:

Item No.	Item	Pay Unit
580.01	Removal of Structural Concrete	Cubic Yard
580.04	Removal of Concrete Approach Slab	Square Foot

584.3200nn Slab Reconstruction Concrete, Class D, DP or Microsilica Concrete Square Yard

NOTE: nn denotes a serialized pay item.

SECTION 585 - STRUCTURAL LIFTING OPERATIONS

585-1 DESCRIPTION. The work shall consist of raising, supporting and lowering each bearing point designated on the plans in order to perform the work to be done under other items.

585-1.01 Bearing Point. For purposes of this specification the term bearing point is defined as a point on the structure, designated on the plans, to be raised in order to perform other work.

585-1.02 Lift Point. For purposes of this specification, the term lift point is defined as a point on the structure where the lifting force is applied.

585-1.03 Type. Some bearing point locations may require different methods of accomplishing the work. Such situations will be noted on the contract plans. They will be defined by a type designation. The type designation will be reflected in the pay item title (e.g., 585.01 Structural Lifting Operations-Type A, etc.).

585-2 MATERIALS

585-2.01 Used Materials. Used materials will be allowed, except that materials that are permanently attached to the structure shall be in conformance with the current New York State Department of Transportation Standard Specifications.

585-2.02 Lifting Equipment. Unless otherwise specified on the plans, the choice of lifting equipment shall be at the Contractor's option, subject to the following provisions:

If jacks are used for the lifting operations, each jack shall have the rated capacity clearly shown on the manufacturer's name plate attached to each jack. Jacks or other lifting equipment shall have a rated capacity of at least one and a halftimes the calculated lifting force. The Engineer may require that any lifting equipment deemed to be inadequate or faulty be removed from the project site.

Jacks or other lifting equipment shall be equipped with pressure gages or other load measuring devices that will enable the applied lifting force to be monitored at all times.

585-3.01 General. The plans designate, by type, the bearing points that must be raised in order to perform the work. The loads at each bearing point are shown on the plans.

The Contractor shall select the location of the lift points, subject to the approval of the Deputy Chief Engineer (Structures), and calculate the required lifting force.

Unless a specific distance is shown on the plans, each designated bearing point shall be raised the minimum distance that will allow the work to be completed.

The Contractor shall engage the services of a New York State Licensed Professional Engineer (PE) to design and detail the structural lifting system. The PE shall be available for consultation in interpreting his plans and in the resolution of problems which may arise during the performance of the work.

All design and details shall be in conformance with the current New York State Department of Transportation Standard Specifications for Highway Bridge and the current New York State Steel Construction Manual.

585-3.02 Working Drawings. The Contractor shall furnish working drawings, prepared, stamped and signed by a New York State Licensed Professional Engineer, for the system proposed to raise, support

and lower each designated bearing point. The working drawings shall not alter the number or location of designated bearing points.

The drawings shall include, but need not be limited to the following:

- Lift point locations.
- Calculated lifting forces.
- Details for all lifting equipment and support systems.
- Type and grade of all materials.
- Distance that each bearing point is to be raised.
- Schematic hydraulic layout.
- All disconnections, reconnections or adjustments that are necessary to properly complete the lifting operations. This includes but is not limited to railings, joints, power lines, gas lines, water lines, etc.

Three legible, standard sized (22 x 34 inches nominal, 20 1/2 x 33 inches working area) prints of each drawing, together with three copies of all design computations shall be submitted to the Deputy Chief Engineer (Structures) for approval. Failure to submit drawings of the required size will be cause for their return without examination.

The Deputy Chief Engineer (Structures) shall be allowed the longest of the following time durations to examine design computations and working drawings:

- Fifteen working days.
- Two working days for each drawing of a set of working drawings.
- One working day for every four (4) design computation sheets. Any design computation sheet written on both sides will be considered as two design computation sheets.

All time for examination shall begin upon receipt of all pertinent information by the Deputy Chief Engineer (Structures).

The Deputy Chief Engineer (Structures) comments shall be indicated on the returned copies. Should the proposed system not be approved, the reasons shall be indicated with the return of the material. The Contractor shall then submit revised drawings for approval, subject to the same terms as the first submission. Resubmission shall not be considered a legitimate reason to request an extension of time.

All work shall be done in accordance with the approved working drawings. The Contractor must have approved working drawings prior to the start of any structural lifting operations.

The Contractor shall bear all costs and/or damages which may result from the ordering of any materials, or equipment; or the use of any preparatory labor prior to the approval of the working drawings.

585-3.03 Lifting Operations. The Contractor shall raise each designated bearing point by applying the necessary lifting force at each lift point. At no time will the Contractor be allowed to apply a lifting force in excess of one and a halftimes the calculated lifting force.

During all phases of the operation, the differential lift between any two adjacent bearings on a common centerline of bearing shall not exceed 5/8 inch unless otherwise noted on the Plans.

The Contractor shall, at the earliest possible moment during or after each lift, safely secure the structure with shims, cribbings, bolsters or other suitable supports. Details to be used shall be shown on the working drawings.

Unless otherwise indicated on the plans, vehicular traffic or construction equipment shall not be permitted on the lifted span until shims, cribbing, bolsters or other suitable supports are in their required position.

The lifting operation shall be conducted such that the distance between the structure and the shims, cribbing, bolsters or other suitable supports do not exceed 3/8 inch at any time.

Any replacement , repair, or adjustments to the superstructure steel shall be performed in conformance with the current New York State Steel Construction Manual.

All welding shall comply with the requirements specified in the current New York State Steel Construction Manual.

All materials required for temporary support of the structure shall remain the property of the Contractor and shall be removed from the site after the work is completed, unless otherwise agreed to.

585-4 METHOD OF MEASUREMENT. The quantity to be paid for under this item shall be the number of bearing points designated on the plans, actually raised , supported and lowered. Payment will be made only once at each bearing point regardless of the number of times the bearing point is raised , supported and lowered during the course of the planned work.

585-5 BASIS OF PAYMENT. Payment will be made at the unit price bid for each bearing point actually raised , supported and lowered. The unit price bid per bearing point shall include the cost of all labor, materials and equipment necessary to complete this work.

For payment purposes each bearing point will be considered a separate unit. After all lifting has been performed and all temporary supports have been installed for any one bearing point, payment will be made for seventy percent of that particular unit. The remainder of the unit will be paid for after the bearing point has been lowered to its final permanent position and the lifting equipment and temporary supports have been removed.

Payment will be made under:

Item No.	Item	Pay Unit
585.XX	Structural Lifting Operations - (Types A- K)	Each
	<i>XX (OJ through I I) = Type Designation (A through K)</i>	

ITEM 586.0201 - DRILLING AND GROUTING BOLTS OR REINFORCING BARS.

586-1 DESCRIPTION

586-1.01 Drilling and Grouting Anchors. This work shall consist of drilling and grouting anchors. For the purposes of this specification, the term ‘anchors’ refers either to bolts or to reinforcing bars, as appropriate. When the item number indicates Pull-Out Testing is required, all anchors shall be paid for under that item number regardless of whether they are selected to be tested.

586-1.02 Removal of Rivets-Replacement with High Strength Bolts. This work shall consist of removal of rivets and replacement with high strength bolts.

586-1.03 Field Drill Holes in Existing Structural Steel. This work shall consist of field drilling holes in existing structural steel that is in service prior to the beginning of construction.

586-2 MATERIALS

586-2.01 Drilling and Grouting Anchors. Grout Material used in Permanent applications where a sustained tensile load will exist, shall conform to §701-05 *Concrete Grouting Material*. Grout used in other applications shall conform to either §701-07 *Anchoring Materials - Chemically Curing* or §701-05 *Concrete Grouting Material*. Chemically curing anchoring materials or adhesives are referred to herein as grout.

Permanent and temporary installations using Anchoring Materials – Chemically Curing shall be designed using the current edition of ACI 318 for the given loading conditions.

Anchoring Materials – Chemically Curing shall not be used in permanent applications where sustained tensile loads will exist, including but not limited to all horizontal or overhead applications, as well as all angles in between. Installation of anchors for Bridge railing, decorative railing, pedestrian fence and screening are not typically subject to sustained tensile loads. Some cantilever applications can produce sustained tensile loads, and chemically curing anchors shall not be used in these applications.

When such work is required, alternative anchoring methods or materials such as mechanical anchors or cementitious grouting operations shall be used in these locations. Use of alternate materials or methods not previously approved shall require approval of the Deputy Chief Engineer Structures (DCES).

Anchoring Materials – Chemically Curing may be used for temporary applications, as a part of a design sealed and signed by a Professional Engineer.

586-2.02 Removal of Rivets - Replacement with High Strength Bolts. High strength bolts, nuts and washers shall meet the requirements of §715-14 *High Strength Bolts, Nuts and Washers*. If paint color is not specified, the color selected shall match the existing paint. Paint shall meet the requirements of §708-02, *Structural Steel Paint - Class 2*.

586-2.03 Field Drill Holes in Existing Structural Steel. None Specified.

586-3 CONSTRUCTION DETAILS

586-3.01 Drilling and Grouting Anchors. All holes shall be drilled by means of a rotary impact drill. Except as indicated below, if reinforcing steel is encountered, the reinforcing steel shall be cut and removed by means of a core drill. The remainder of the drilling shall be done with the rotary impact drill. Where plans indicate significant design reinforcement, a non-destructive investigation shall be done to determine the location of existing reinforcing steel prior to drilling. If after the non-destructive investigation, reinforcing steel is determined to be in conflict with, or encountered during the drilling operation, the DCES shall be notified to determine the appropriate course of action.

The Contractor shall not perform drilling with a lubricant, except in this case water is not considered a lubricant. Drilling methods shall not cause spalling, or other damage to concrete. Concrete spalled, or otherwise damaged by the Contractor's operations shall be repaired at no additional cost to the State.

Holes shall be surface dry and shall have had all foreign and loose material removed immediately prior to grout placement. Prior to anchor placement in the grouted hole, all material which might interfere with bond between the anchor and the grout shall have been removed. This includes, but is not limited to: moisture, grease, dirt, mill scale and rust. Rust which cannot be removed from the anchor even by vigorous scrubbing with a wire brush is considered firmly bonded and may remain, unless more specific instructions are provided in the manufacturer's installation procedures. The depth of hole and hole diameter shall be in accordance with the grout manufacturer's recommendation, and shall consider: anchor diameter, strength of existing concrete, anchor spacing and edge distance. The distance from the bottom of the hole to the nearest free surface of a structural element, shall be at least 1 5/8 inches or as recommended by the manufacturer, whichever is greater. The length of any plastic sleeve used as an aid to grout placement shall not be included in the length of the hole. The Contractor may increase the embedment length beyond that required by the contract documents if approved by the Engineer, at no additional cost to the State.

Grout shall be stored, mixed, and placed in accordance with the manufacturer's instructions. No grout shall be placed at a temperature outside the range recommended by the grout manufacturer.

Anchors shall be inserted full depth into the grouted hole and shall be manipulated or rotated in accordance with the Manufacturer's recommendations to ensure complete coverage of the embedded anchor with grout. After insertion of the anchor, all excess grout shall be struck off flush with the concrete face. Care shall be taken to prevent grout from running out of the drilled hole. Should the grout fail to fill the hole after anchor insertion, additional grout shall be added immediately after insertion of the anchor to allow a flush strike-off.

If the anchor is inserted in a hole with an axis that is predominantly horizontal, care shall be taken to prevent grout from running down the face of the concrete.

All uses of Anchoring Materials - Chemically Curing, both permanent and temporary, shall be installed by a certified ACI/CRSI Adhesive Anchor Installer.

Temporary applications using §701-07 Anchoring Materials - *Chemically Curing* shall be inspected by the Contractor every 90 days at a minimum to ensure that the adhesive anchor is performing as intended. The Contractor shall check for such things as creep of anchor material, movement of the anchors, loose bolts, loose nuts, etc. Temporary items anchored using §701-07 Anchoring Materials – Chemically Curing shall be removed or abandoned, in such a way that the anchors are no longer subject to any load upon completion of their temporary use.

A. Anchor Pull-Out Testing. Table 586-1 *Number of Anchors to be Pull-Out Tested* gives the number of anchors (N1) to be tested for any lot size. The Engineer will randomly choose the anchors to be tested. Testing of anchors in a lot shall not begin until all the anchors in the lot are installed. If one (N1) anchors fails, N2 indicates the number of additional anchors that must be tested. If only one anchor fails (N1+N2), the lot will be accepted. If more than one anchor fails, all remaining anchors must be tested.

A lot size is determined by the Contractor, but must meet the following criteria:

1. A lot size shall not exceed 600 anchors.
2. All anchors in a lot must be installed within a two-month period.
3. Any anchors installed beyond the two-month period set forth in 2 above shall be part of another lot.
4. A lot shall only include anchors grouted with a single product
5. A lot shall only include anchors of the same type, diameter and embedment depth.

Table 586-1 NUMBER OF ANCHORS TO BE PULL-OUT TESTED		
LOT SIZE	N1	N2
1-30	All the anchors in the lot	-
31-50	30	All remaining anchors
51-75	38	All remaining anchors
76-100	44	21
101-200	49	26
201-300	50	30
301-600	55	30

B. Test Equipment. The test equipment shall consist of a load cell, jacking system, a frame to distribute the jack load, couplers to connect the jack to the anchors, and appropriate safety devices. A calibrated pressure gauge with hydraulic ram is equivalent to a load cell. Prior to starting the testing, the Contractor shall supply the Engineer with a certificate of calibration for the load cell performed within the previous six months by an independent testing agency. Supports for the frame used to distribute the jack load shall be located outside a circle centered at the anchor. The circle shall have a diameter equal to 2 inches plus twice the anchor embedment length, but need not exceed 24 inches. The frame and jack shall be positioned so that the load is applied along the axis of the anchor. Chains or cables shall be used to connect the various pieces of the tensioning system so that free flying projectiles will not be created by the failure of an anchor coupling or other portion of the testing system.

C. Test Load. The test load for bolts shall be 90% of the ASTM proof load. When no proof load is given in the ASTM specifications for the bolt, the test load shall be the yield strength. The test load for reinforcing bar shall be 90% of the yield strength. Table 586-2, *Anchor Pull-Out Test Loads* lists the test loads for the most commonly used anchor bolts and rebar steels.

Table 586-2 ANCHOR PULL-OUT TEST LOADS			
ASTM F3125 GRADE A325 or ASTM A449 Bolts (Coarse-Threaded Full Length)		ASTM A615 Grade 60 Reinforcing Bars	
Diameter (inches)	Test Load (kips)	Size	Test Load (kips)
1/2	11	4	11
5/8	17	5	17
3/4	26	6	24
7/8	35	7	32
1	46	8	43
1 1/8	51	9	54
1 1/4	65	10	69
		11	84
		14	122

Note: this load testing is designed to be non-destructive. Loading shall be stopped as soon as the test load is reached.

Anchors pass if the specified test load is attained without permanently displacing the anchors. Concrete spalled or otherwise damaged by the load testing shall be repaired at no additional cost to the State. All

anchors which fail a load test, or are otherwise damaged, shall be replaced at no additional cost to the State. All replaced anchors shall be successfully load tested.

586-3.02 Removal of Rivets-Replacement with High Strength Bolts. If the existing steel is painted, prior to the beginning of any other work operations, the paint shall be removed for a minimum distance of 4 inches on each side of the centerline of work location in accordance with the requirements of Section 574 *Structural Steel Painting: Localized*.

Rivets shall be removed by one of the following methods: Shear rivet head using a pneumatic rivet breaker (helldog), and drive out rivet shank with a pneumatic punch or flame cut rivet head above the base metal using a rivet scarfing tip without damaging the base metal, and drive out shank using a pneumatic punch. If punching will damage the base metal, the shank shall be removed by drilling. Any damage to the base metal shall be repaired at no additional cost to the State.

All high strength bolts shall be the same diameter as the rivets they replace. High strength bolts shall be installed after the nicks, burrs and foreign substances that might interfere with seating of the bolt head and nut washers are removed. Light grinding may be required. Installation and inspection of high strength bolts shall be performed in accordance with the Steel Construction Manual.

If it becomes necessary to disconnect, or adjust, steel remaining as part of the structure to complete the work, the Contractor shall obtain the Engineer's approval prior to performing disconnections or adjustments. If the bolt will not fit the rivet hole, the hole may be reamed sufficiently to accommodate the bolt.

If the contract does not include an item(s) for cleaning, priming and painting of structural steel, cleaning and painting of the bolt and immediate surrounding area shall be done as part of this work. Cleaning and painting shall be done in accordance with the requirements of Section 574 *Structural Steel Painting: Localized*. All steel exposed by the cleaning operations shall be painted, including at least 2 inches in every direction from the washer's edge.

586-3.03 Field Drill Holes in Existing Structural Steel. If the steel is painted, prior to the beginning of any other work operations, the paint shall be removed for a minimum distance of 4 inches on each side of the centerline of work location in accordance with the requirements of Section 574 *Structural Steel Painting: Localized*. Any required re-painting will be paid for separately.

The required hole diameter will be indicated on the contract documents. The Contractor shall not flame cut, or flame drill holes. All damage to existing steel caused by the contractor's operation, shall be repaired by the Contractor at no additional cost to the State.

586-4 METHOD OF MEASUREMENT

586-4.01 Drilling and Grouting Anchors. The quantity to be measured for payment will be the number of holes into which grout and bolts have been inserted.

586-4.02 Removal of Rivets - Replacement with High Strength Bolts. The quantity to be measured for payment will be the number of high strength bolts installed.

586-4.03 Field Drill Holes in Existing Structural Steel. The quantity to be measured for payment will be each hole drilled.

586-5 BASIS OF PAYMENT

586-5.01 Drilling and Grouting Anchors. The unit price bid for drilling and grouting anchors shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work. The cost of new bolts and/or reinforcing bars will be paid for separately.

586-5.02 Removal of Rivets - Replacement with High Strength Bolts. The unit price bid for removal of rivets and replacement with high strength bolts shall include the cost of all labor, material and equipment necessary to satisfactorily complete the work, including paint removal and painting. Payment will be made for each installed bolt regardless of whether a rivet was removed from the location.

586-5.03 Field Drill Holes in Existing Steel. The unit price bid for field drill holes in existing steel shall include the cost of all labor, equipment and materials necessary to satisfactorily complete the work, including paint removal when required. No additional payment will be made for holes drilled through different thicknesses, or through different numbers of plates.

Payment will be made under:

Item No.	Item	Pay Unit
586.0201	Drilling and Grouting Bolts or Reinforcing Bars	Each
586.0202	Drilling and Grouting Bolts or Reinforcing Bars (with Non-Destructive Investigation)	Each
586.0301	Drilling and Grouting Bolts or Reinforcing Bars with Pullout Test	Each
586.0302	Drilling and Grouting Bolts or Reinforcing Bars with Pullout Test (with Non-Destructive Investigation)	Each
586.0401	Drilling and Grouting Bolts, Overhead or Sustained Tension, with Pullout Test	Each
586.0402	Drilling and Grouting Bolts, Overhead or Sustained Tension, with Pullout Test (with Non-Destructive Investigation)	Each
586.05	Removal of Rivets-Replacement with High Strength Bolts	Each
586.10	Field Drill Holes in Existing Structural Steel	Each

ITEM 589 - REMOVAL OF STRUCTURAL STEEL

589-1 DESCRIPTION. The work shall consist of removal and disposal of existing structural steel as shown in the contract documents and as directed by the Engineer.

589-2 MATERIALS. Not Specified.

589-3 CONSTRUCTION DETAILS

589-3.01 General. A minimum of 14 days prior to the removal of existing structural steel, the Contractor shall submit a written Structural Steel Removal plan meeting the requirements of §202-3.01A. *Demolition Plan* to the Engineer for approval. The Structural Steel Removal plan shall set forth all expected supports, disconnections and adjustments to steel which is to remain. If, during the course of the work it becomes necessary to support, disconnect, or adjust steel not previously noted in the Structural Steel Removal plan, the Contractor shall submit a revised plan to the Engineer for approval.

All work performed on steel which is to remain shall be in accordance with the applicable requirements of the Steel Construction Manual (SCM). Materials removed as part of this work shall become the property

of the Contractor and shall be removed from the work site.

Cutting of steel to remain shall be performed in a manner to produce edges and surfaces suitable for welding, in accordance with the requirements of the SCM, Part 603 *Surfaces and Edges to be Welded*.

Thermal cutting of A709 steels shall be performed in accordance with the requirements of the SCM, Part 602 *Thermal Cutting of A709 Steels*. Replacement of steel removed will be paid for separately.

589-3.02 Steel Structures Coated with Paint. If the steel is coated with paint, prior to the start of steel removal operations, the paint shall be removed for a minimum distance of 4 inches on each side of the centerline of cut, bolt row, rivet row, or weld, as applicable. The paint removal work shall be performed in accordance with the requirements of §202-3.01D. *Paint Removal*.

589-3.03 Fastener Removals. If rivet shanks, or bolts, cannot be removed by punching without damaging the base metal, the rivet shank, or bolt, shall be removed by drilling.

A. Bolts. Nuts shall be removed with wrenches, wherever possible, and the bolts driven out with a handheld punch. Alternate removal procedures shall be set forth in the Removal Plan.

B. Rivets. Rivets shall be removed by either of the following methods:

- Shearing the rivet head, using a pneumatic rivet breaker (hell dog), and driving out the rivet shank with a pneumatic punch
- Flame-cutting the rivet head 1/16 inch above the base metal, using a rivet scarfing tip, and driving out the shank using a pneumatic punch.

589-3.04 Welded Connection Disassembly. Welded connections shall be disassembled in accordance with the following:

A. Removal. The affected weld shall be removed by means of air carbon arc gouging equipment. To avoid damaging the base material, 1/8 inch of weld material should be left in place. If more removal is needed to break the weld, then the removal shall be done in the vicinity of the component which will not remain. Any damaged steel to remain shall be repaired or replaced in a manner to be approved by the DCES.

B. Grinding. The weld material on the existing steel to remain in place shall be ground flush with

the base metal surfaces. No base metal shall be removed by grinding.

C. Inspection. The Engineer will perform a visual inspection of all weld removal locations. If the Engineer suspects that damage has occurred, the Contractor shall perform a dye penetrant inspection in accordance with the requirements of the SCM.

If the Contractor's operations damage existing steel which is to remain in place, the damaged steel shall be repaired, or replaced, as determined by the DCES at no additional cost to the State.

589-4 METHOD OF MEASUREMENT.

The quantity to be measured for payment for removal of existing steel with a pay unit of pounds will be in pounds of existing steel removed, measured to the nearest whole pound. The weight of existing steel removed will be computed from the nominal sizes indicated in the contract documents. If the nominal size is not indicated, field measurements shall be used to determine the weight, using 490 pcf as the density of steel. The weight of bolts, rivets and welds will be neglected, and no deductions will be made for any rivet or bolt holes in the existing steel or for any section loss due to corrosion.

The quantity to be measured for payment for removal of existing steel with an each pay unit will be in each unit of existing steel removed.

589-5 BASIS OF PAYMENT. The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including the removal of paint and fasteners, and disconnecting, supporting, or adjusting steel as necessary.

The treatment, handling and disposal of the paint removal waste will be paid separately.

Payment will be made under:

Item No.	Item	Pay Unit
589.01nnnn	Removal of Existing Steel	Pound
589.52nnnn	Removal of Existing Steel	Each

ITEM 594 - TIMBER AND LUMBER

594-1 DESCRIPTION. Under this work the Contractor shall furnish and place timber and lumber of various sizes and types as may be specified for sills or platforms beneath the road, for culverts, bridges reinforcing existing structures, and for other similar purposes as shown on the plans or specified by the Engineer.

594-2 MATERIALS. Materials shall meet the following requirements:

Wood Preservative - Creosote Oil, Type I	708-30
Wood Preservative - Water Borne	708-31
Wood Preservative - Oil Borne	708-32
Timber and Lumber	712-13
Stress Graded Timber and Lumber	712-14
Steel Plates as Specified	715-01

594-2.01 Fasteners. Fasteners such as: spikes, nails, screws, timber connectors, bolts, nuts and washers shall meet the standard industrial fastener specifications for the intended application.

594-2.02 Approval of Order. Prior to ordering timber and lumber, the Contractor shall submit to the Engineer for approval, a detailed statement of his proposed order. No material shall be ordered until the statement is approved.

594-2.03 Preservative Treatment. The preservative treatment shall be applied to stress graded lumber and timber and shall conform to the requirements of the AWPAC2, C3, and C18.

594-2.04 Sampling and Inspection. Sampling and inspection will be done by an accredited representative of the Department. The Inspector shall have the power to take samples of the material for analysis and to reject those materials which do not fulfill the requirements of these specifications as to either quality or workmanship. The acceptance of any materials by the Inspector shall not be a bar to their subsequent rejection if found defective. The Contractor shall furnish all facilities and equipment for the inspection and testing of materials and workmanship and the Inspector shall be allowed free access to all premises where inspections can be made.

The Contractor shall give the Department and Department's Inspection Agents ample notice relative to the location of, and time when, treating operations will take place. Inspection of all timber and lumber will be made by the Department's Inspection Agents before, during, and after pressure treatment at the treating plant. No treated timber and lumber shall be shipped which does not bear, in legible form, the Inspector's stamp of approval.

594-3 CONSTRUCTION DETAILS

594-3.01 General. Timber and lumber shall be placed or erected as shown on the plans or specified by the Engineer.

Any surface breaks resulting from storage and handling which do not warrant rejection shall be treated in accordance with AWPAC M4 with the addition that at least three coats of preservative shall be applied.

Paint, where specified, shall be applied as required by the Contract Documents.

594-3.02 Treatment after Fabrication. All cutting, framing and boring of timber and lumber shall be done before treatment whenever practicable. Cutting and boring below high water shall be particularly

avoided in material which is to be used in waters infested with marine borers.

All cut surfaces and all bolt holes bored subsequent to treatment shall be treated in accordance with AWWPA M4 with the addition that at least three coats of preservative shall be applied. Any unfilled holes, after being treated with preservative shall be plugged with preservative treated plugs.

All cut surfaces and bolt holes below the high-water line shall, in addition to the AWWPA M4 preservative treatment be coated with a thick application of a mixture of 30% creosote and 70% pitch. The Contractor shall obtain all necessary permits pertaining to the purchase and field application of wood preservatives from the U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation.

594-4 METHOD OF MEASUREMENT. The quantity to be paid for timber and lumber will be the number of cubic feet placed in the completed work. In measuring dressed timber and lumber, the cross section of any piece will be taken as the minimum nominal commercial size of undressed material from which the piece could have been cut. When round timber is used, it shall be estimated as square timber of the smallest undressed commercial size from which the timber can be manufactured. The length of any piece will be taken as the actual length in the finished work, making no deductions for bevels, notches or splices. If the measured quantity is first computed in board feet, the conversion factor shall be 0.083334 cubic feet per board feet.

594-5 BASIS OF PAYMENT. The unit price bid per cubic foot shall include the cost of furnishing all spikes, nails, screws, timber connectors, bolts, nuts, washers, hardware, preservative treatment and other required materials together with labor and equipment necessary to complete the work.

Payment will be made under:

Item No.	Item	Pay Unit
594.01	Timber and Lumber	Cubic Foot
594.02	Stress Graded Timber and Lumber	Cubic Foot
594.03	Treated Timber and Lumber	Cubic Foot

ITEM 604.501LB – LEACHING BASIN TYPE B-1 & B-2

All provisions of the *New York State Department of Transportation Standard Specifications* for *Section 604 – Drainage Structures* shall apply with the following modifications:

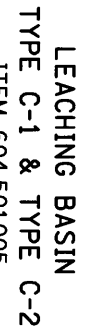
604-4 METHOD OF MEASUREMENT

The quantity paid for under this Item will be the number of cubic yards of concrete constructed or installed in accordance with the Plans, NYSDOT Regional Guide Sheet (attached), NYSDOT Specifications and as ordered by the Engineer. Deductions shall be made for all openings whose areas are one (1) square foot or greater.

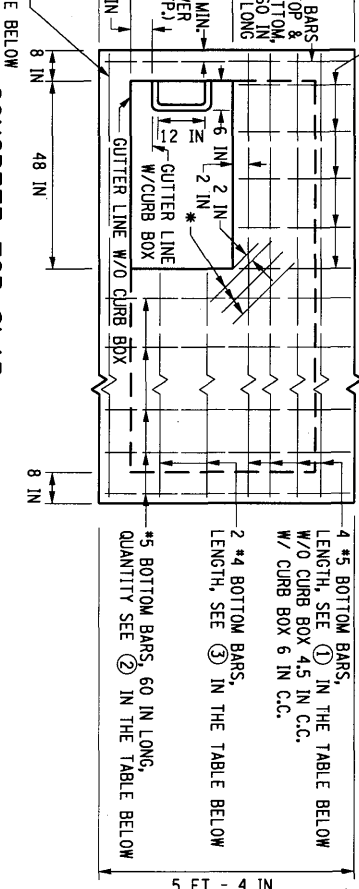
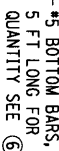
604-5 BASIS OF PAYMENT

The unit price bid per cubic yard for this item shall include the cost of furnishing all labor, materials, tools, equipment, and incidentals necessary to satisfactorily complete the work. This includes all excavation and backfill; geotextile fabric; gravel or stone (in accordance with Item 19 specifications); temporary sheeting.

Metal frames, gratings, covers, and step irons furnished and installed as part of the work will be paid for separately under Item 34, “Miscellaneous Metals.”



* #5 BARS, 24 IN LONG, 4 IN C.C. TOP & BOTTOM
FOR QUANTITY SEE ④ IN THE TABLE BELOW



3. WHERE THERE IS INTERFERENCE WITH UTILITY LINES OR FOR OTHER REASONS, IT MAY BE NECESSARY TO INSTALL ROADWAY TYPE LEACHING BASINS WHICH WILL ENCOACH INTO THE SIDEWALK AREA. IN SUCH CASES, PLANS WILL INDICATE OR THE ENGINEER WILL ORDER THE "FRAME REVERSED". THE CONTRACTOR SHALL THEN INSTALL THE LEACHING BASINS ROTATED 180° FROM THE POSITIONS SHOWN IN THE PLANS, AND WITH THE FRAMES REVERSED.

4. POROS MATERIAL FOR FILLING SHALL BE SCREENED GRAVEL, CRUSHED STONE OR CRUSHED SLAG, SIZES 1 AND 2, AS DEFINED IN TABLE 703-4 OF THE STANDARD SPECIFICATIONS.
5. FOR ADDITIONAL NOTES, SEE DWG. RGS 98-1.
6. SEE DWG. RGS 98-2 FOR EXCAVATION & BACKFILL PAYMENT LINES.

TYPE B-2		(1)	(2)	(3)	(4)
B48	604.501002 M	58 IN	1	0	0
B60	604.501003 M	70 IN	3	14 IN	2
B72	604.501004 M	82 IN	5	26 IN	3
B84	604.501005 M	94 IN	6	38 IN	3
B90	604.501006 M	100 IN	7	44 IN	3

NOTE: ONLY ITEM NUMBERS, DETAILS AND NOTES APPLICABLE TO THIS PROJECT SHALL BE USED.

PREVENTIVE MAINTENANCE DISCOUNT

PIN 0809.31

BRIDGE:

VERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED

CONTRACT NUMBER
D363160



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR TO ALTER AN ITEM IN ANY MANNER. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

ITEM 685.0715XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 15 MILS THICK
(WET NIGHT VISIBILITY SPHERES)
ITEM 685.0720XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 20 MILS THICK
(WET NIGHT VISIBILITY SPHERES)

DESCRIPTION:

Under this work the contractor shall furnish and apply epoxy reflectorized pavement markings in accordance with these specifications, the Contract Documents, the NYSMUTCD, or as ordered by the Engineer. Items for Special Markings include stop bars and crosswalks.

Yield line symbols are isosceles triangles with height equaling 1.5 times the base dimension:
A small yield line symbol shall have a base dimension of one foot.
A large yield line symbol shall have a base dimension of two feet.
Yield line symbols are to be installed with the Apex of the triangle oriented towards oncoming traffic.

The epoxy marking material shall be hot-applied by spray methods onto bituminous and portland cement concrete pavement surfaces at the thickness and width shown on the Contract Documents. Following a simultaneous application of Standard Glass Beads (Type 2) and Wet/Night Visibility Beads (Type 1), the cured epoxy marking shall be an adherent reflectorized stripe that will provide wet night retro-reflectivity.

MATERIALS REQUIREMENTS:

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

Reflective Glass Spheres

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

EPOXY APPLYING EQUIPMENT

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

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

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

ITEM 685.0715XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 15 MILS THICK
(WET NIGHT VISIBILITY SPHERES)
ITEM 685.0720XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 20 MILS THICK
(WET NIGHT VISIBILITY SPHERES)

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

1. Individual tanks for the storage of Part A and Part B of the epoxy resin.
2. Individual tanks for the storage of Standard (Type 2) and Wet/Night Visibility (Type 1) glass spheres. Each tank shall have a minimum capacity of 3000 lbs.
3. Heating equipment of sufficient capacity to maintain the individual epoxy resin components at the manufacturer's recommended temperature for spray application.
4. Individual dispensers for the simultaneous application of Standard (Type 2) and Wet/Night Visibility (Type 1) glass spheres. Each dispenser shall be capable of applying spheres at a minimum rate of 10 lbs/gal of epoxy resin composition.
5. Metering devices or pressure gauges on the proportioning pumps, positioned to be readily visible to the Engineer.
6. All necessary spray equipment, mixers, compressors, and other appurtenances for the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described in Construction Details, D. Application of Epoxy ReflectORIZED Pavement Markings.

CONSTRUCTION DETAILS

A. General

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

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

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

When pavement markings are applied under traffic, the Contractor shall provide all necessary flags, markers, signs, etc. in accordance with the MUTCD to maintain and protect traffic, and to protect marking operations and the markings until thoroughly set.

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

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(WET NIGHT VISIBILITY SPHERES)

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, all tracking marks, spilled epoxy, and epoxy markings applied in unauthorized areas.

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

B. Atmospheric Conditions

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

C. Surface Preparation

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

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

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

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

D. Application of Epoxy ReflectORIZED Pavement Markings

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

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

Pavement markings shall be applied by the following simultaneous operation:

1. The pavement surface is air-blasted to remove dirt and residues.
2. The epoxy resin, mixed and heated in accordance with the manufacturer's

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recommendations, is uniformly hot-sprayed onto the pavement surface at the minimum specified thickness.

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

E. Defective Epoxy Pavement Markings

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

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

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

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

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

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

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

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

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

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

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

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

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired or replaced as directed by and to the satisfaction of the Engineer.

All work in conjunction with the repair or replacement of defective epoxy reflectorized pavement markings shall be performed by the Contractor at no additional cost to the State.

METHOD OF MEASUREMENT

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

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

BASIS OF PAYMENT

The accepted quantities of markings will be paid for at the contract unit price, which shall include the cost of furnishing all labor, materials and equipment to satisfactorily complete the work. The cost for maintaining and protecting traffic during the marking operations shall be included in the price bid. The cost of removal of concrete curing compounds and existing pavement markings will be paid under separate items and are not included in this item.

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

<u>PAY ITEM NO.</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
685.07150110	White Epoxy Reflectorized Pavement Stripes – 15 mils	Foot

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(WET NIGHT VISIBILITY SPHERES)
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(WET NIGHT VISIBILITY SPHERES)

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

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

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

DESCRIPTION:

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

Items for Special Markings include stop bars and crosswalks.

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

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

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

MATERIALS REQUIREMENTS:

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

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

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

TABLE 1	
Product Name	Manufacturer Location
3M Series 70E-White 3M Series 71E-Yellow	3M Traffic Control Materials Division Brownwood, TX

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

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

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

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

EPOXY PAINT APPLICATION EQUIPMENT

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

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

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

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

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

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

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

CONSTRUCTION DETAILS

General

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

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

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

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

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

Epoxy Paint Application

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

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

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

Application of Epoxy Reflectorized Pavement Markings

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

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

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

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

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

Pavement markings shall be applied by the following simultaneous operation:

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

Defective Epoxy Pavement Markings

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

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

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

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

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

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

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

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

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

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

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

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

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

METHOD OF MEASUREMENT

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

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

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

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

BASIS OF PAYMENT

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

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

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

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

ITEM 711 - OUTDOOR ELECTRONIC MULTI-SPORT SCOREBOARDS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Outdoor Electronic Multi-Sport Scoreboards suitable for football, soccer and lacrosse in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials.

1. **Model.** Outdoor Electronic Multi-Sport Scoreboard Model 3515 as manufactured by Nevco, 301 East Harris Avenue, Greenville, Illinois 62246; (800) 851-4040; www.nevco.com or approved equal.
 - a. **Aluminum Faces and Perimeter Frame.** Fabricated from 0.050 minimum thickness, ASTM B221 aluminum sheet with reinforcement and slotted mounting brackets top and bottom.
 - b. **Finish.** Acrylic polyurethane paint. Color as selected by the County from Manufacturer's standard range: Desert Tan, Electronic Blue, Maroon, Forest Green, Print Black, Silver Gray, Golden Yellow, Team Orange, Cardinal Red, Medium Purple, Teal Blue, Midnight Blue, Royal Blue, Navy Blue, Kelly Green. Provide white striping to separate scoreboard features.
 - c. **Brackets.** S and J brackets fabricated from 5/16 inch minimum thickness steel plate for support and attachment of scoreboards to support framing.
 - d. Fasteners, anchors, and other exposed hardware shall be corrosion resistant.
 - e. **Electronics.** Low voltage, solid state, 2-wire cable, multiplex system, quartz crystal controlled.
 - f. Provide gold plated electrical contacts on interconnecting wiring to reduce corrosion and improve reliability.
 - g. Provide fiber optic communication interface to reduce threat of damage from electrical storms and ESD.
 - h. **LED Units.** Seven-bar, segmented digits with protective aluminum cover, rated typical life 100,000 hours and designed to provide excellent visibility from all angles and sides.
 - i. **Junction Boxes.** Sheet metal box and cover, 4-1/2" x 2-1/8" x 2-1/8" minimum complying with NEMA standards as required.
 - j. **Control Cable.** UL listed, 2-wire, RG-58/U, coaxial cable, 1/4 inch diameter.
2. **Scoreboard.**
 - a. **Type.** Exterior, electronic football scoreboard with integral horn and LED displays for time, scores, quarter, down, yards to go, ball location, and ball possession.
 - b. **Size.** 24 feet long x 8 feet high x 8 inches deep.

- c. **Approximate Weight.** 480 pounds.
- d. **White on Black Captions.** 15 inches high: "HOME", "GUESTS", "QTR", "DOWN", "YDS TO GO", and "BALL ON".
- e. **High Intensity Red LED Displays.**
 - 1) 24 inches high digits: Time in minutes and seconds separated by colon, quarter, scores, down, yards to go, and ball location.
- f. High intensity red LED ball possession or hit/run and indicators: One football shaped indicator per team.
- g. **Power Requirements.** 120/240 volts, 2.8/1.4 amps, with ETN 3.5/1.8 amps.
- h. Provide optional conversion caption plates for:
 - 1) Baseball: "INN", "OUT", "BALL", "STRIKE", "AT BAT", "H", and "E".
 - 2) Soccer: Two "SHOTS".

3. Control Center

- a. **Type.** Handheld wireless, basic, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard; Model MPCX as manufactured by Nevco.
- b. Unit shall comply with Part 15 of FCC Rules and Regulations.
- c. **Control unit.** High impact, break-resistant black ABS plastic Size: 3-1/4" x 5-1/2" x 7/8".
- d. **Features.**
 - 1) Wireless operation within 1000 feet.
 - 2) Operate multiple scoreboards simultaneously.
 - 3) System allows multiple controllers to link to individual scoreboards.
 - 4) High visibility LCD display with a sealed keyboard.
 - 5) Long battery life with indicator; include two AA batteries.
 - 6) Single hand operation with a no slip grip.
 - 7) Built-in belt clip.
 - 8) Wireless signal strength meter and internal antenna.
 - 9) **Receiver.** Injection molded case, 5-1/2" by 3-3/4" by 2" mounted at scoreboard.
 - 10) **Maximum Range.** 1,000 feet from control center to receiver.
 - 11) **Power Adapters.** Provide for each scoreboard receiver.
 - a) Input: 120 volts, 0.4 amps, 50/60 Hz.
 - b) Output: 9 volts, 1.67 amps, 15 watts.
- e. Provide carrying case for up to two control centers, Model CC-4 as manufactured by Nevco.
- f. **Size.** 18-1/2" x 14-1/2" x 6".
- g. **Construction.** Double wall, high density black polyethylene with padded interior, mechanical latches, and hinges.
- h. Provide suitable, RF transparent, NEMA 4 enclosure for receiver, to be located

upon scoreboard supporting structure per installation diagrams.

C. Construction Details.

1. Preparation.

- a. Verify exact scoreboard and control center quantities and junction box locations with County.
- b. Coordinate requirements for electrical power and other components to be provided under Force Account Work to ensure adequate provisions are made for complete, functional installation of scoreboards.
- c. Coordinate scoreboard electrical requirements to ensure proper power source, conduit, wiring, and boxes are provided. Prior to installation, verify type and location of power supply.

2. Installation.

- a. Install scoreboards and accessories in accordance with manufacturer's instructions and approved installation drawings.
- b. Before installation, field test scoreboards and accessories for operating functions. Ensure that scoreboards accurately perform all operations. Correct deficiencies.
- c. Rigidly mount scoreboards and accessories level and plumb with brackets and fasteners.
- d. Clean exposed surfaces.
- e. Protect scoreboards and finishes from other construction operations.
- f. Supports Posts and Concrete Foundations.
 - 1) Supports posts shall consist of two (2) - 8 5/8" O.D. black powder coated Schedule 40 posts
 - 2) Supports posts shall be set plumb in 30" diameter by 60" deep concrete footings. All footing tops shall be crowned with a 1" slope to shed water.
 - 3) The concrete shall conform to and be paid for under Item 17A, Class A concrete 1-2-4 mix.
 - 4) Excavation and backfilling for the foundations are included hereunder.

3. Demonstrating and Training.

4. Provide demonstration and training session for Owner's representative covering operation and maintenance of electronic scoreboard.

D. Manufacturer's Warranty.

1. Warranty to cover defects in materials and workmanship.
 - a. Five (5) years parts and factory labor guarantee for scoreboards and accessories from invoice date.
 - b. Two (2) years part and factory labor guarantee for wireless controls and receivers from invoice date.
 - c. Lifetime telephone support.

E. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Outdoor Multi-Sport Scoreboards furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 712 - OUTDOOR ELECTRONIC BASEBALL SCOREBOARDS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Outdoor Electronic Baseball Scoreboards in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials.

1. **Model.** Outdoor Electronic Multi-Sport Scoreboard Model 1535 as manufactured by Nevco, 301 East Harris Avenue, Greenville, Illinois 62246; (800) 851-4040; www.nevco.com or approved equal.
 - a. **Aluminum Faces and Perimeter Frame.** Fabricated from 0.050 minimum thickness, ASTM B221 aluminum sheet with reinforcement and slotted mounting brackets top and bottom.
 - b. **Finish.** Acrylic polyurethane paint. Color as selected by the County from Manufacturer's standard range: Desert Tan, Electronic Blue, Maroon, Forest Green, Print Black, Silver Gray, Golden Yellow, Team Orange, Cardinal Red, Medium Purple, Teal Blue, Midnight Blue, Royal Blue, Navy Blue, Kelly Green. Provide white striping to separate scoreboard features.
 - c. **Brackets.** S and J brackets fabricated from 5/16 inch minimum thickness steel plate for support and attachment of scoreboards to support framing.
 - d. Fasteners, anchors, and other exposed hardware shall be corrosion resistant.
 - e. **Electronics.** Low voltage, solid state, 2-wire cable, multiplex system, quartz crystal controlled.
 - f. Provide gold plated electrical contacts on interconnecting wiring to reduce corrosion and improve reliability.
 - g. Provide fiber optic communication interface to reduce threat of damage from electrical storms and ESD.
 - h. **LED Units.** Seven-bar, segmented digits with protective aluminum cover, rated typical life 100,000 hours and designed to provide excellent visibility from all angles and sides.
 - i. **Junction Boxes.** Sheet metal box and cover, 4-1/2" x 2-1/8" x 2-1/8" minimum complying with NEMA standards as required. Control Cable. UL listed, 2-wire, RG-58/U, coaxial cable, 1/4 inch diameter.
2. **Scoreboard.**
 - a. **Type.** Exterior, electronic baseball scoreboard with LED displays for inning, scores, balls, strikes, and outs and LED indicators for hit and error.
 - b. **Size.** 16 feet long x 6 feet high x 8 inches deep.
 - c. **Approximate Weight.** 255 pounds.
 - d. **White on Black Captions.**
 - 1) 10 inches high: "HOME", "GUESTS", "INNING", "BALL", "STRIKE", "OUT", "H", and "E".

- e. **High Intensity Red LED Displays.**
 - 1) 18 inches high digits: Scores, inning, balls, strikes, and outs.
 - 2) Circular indicators for hit and error.
- f. **Power Requirements.** 216 Watts MAX w/ETN's. 100-240 volts, AC 50/60 Hz. Requires earth ground.

3. Control Center

- a. **Type.** Handheld wireless, basic, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard; Model MPCX as manufactured by Nevco.
- b. Unit shall comply with Part 15 of FCC Rules and Regulations.
- c. **Control unit.** High impact, break-resistant black ABS plastic Size: 3-1/4" x 5-1/2" x 7/8".
- d. **Features.**
 - 1) Wireless operation within 1000 feet.
 - 2) Operate multiple scoreboards simultaneously.
 - 3) System allows multiple controllers to link to individual scoreboards.
 - 4) High visibility LCD display with a sealed keyboard.
 - 5) Long battery life with indicator; include two AA batteries.
 - 6) Single hand operation with a no slip grip.
 - 7) Built-in belt clip.
 - 8) Wireless signal strength meter and internal antenna.
 - 9) **Receiver.** Injection molded case, 5-1/2" by 3-3/4" by 2" mounted at scoreboard.
 - 10) **Maximum Range.** 1,000 feet from control center to receiver.
 - 11) **Power Adapters.** Provide for each scoreboard receiver.
 - a) Input: 120 volts, 0.4 amps, 50/60 Hz.
 - b) Output: 9 volts, 1.67 amps, 15 watts.
- e. Provide carrying case for up to two control centers, Model CC-4 as manufactured by Nevco.
- f. **Size.** 18-1/2" x 14-1/2" x 6".
- g. **Construction.** Double wall, high density black polyethylene with padded interior, mechanical latches, and hinges.
- h. Provide suitable, RF transparent, NEMA 4 enclosure for receiver, to be located upon scoreboard supporting structure per installation diagrams.

C. Construction Details.

1. Preparation.

- a. Verify exact scoreboard and control center quantities and junction box locations with County.
- b. Coordinate requirements for electrical power and other components to be provided under Force Account Work to ensure adequate provisions are made for complete, functional installation of scoreboards.
- c. Coordinate scoreboard electrical requirements to ensure proper power source, conduit, wiring, and boxes are provided. Prior to installation, verify type and location of power supply.

2. Installation.

- a. Install scoreboards and accessories in accordance with manufacturer's instructions and approved installation drawings.
- b. Before installation, field test scoreboards and accessories for operating functions. Ensure that scoreboards accurately perform all operations. Correct deficiencies.
- c. Rigidly mount scoreboards and accessories level and plumb with brackets and fasteners.
- d. Clean exposed surfaces.
- e. Protect scoreboards and finishes from other construction operations.
- f. Supports Posts and Concrete Foundations.
 - 1) Supports posts shall consist of two (2) - 6 5/8" Black Powder Coated Schedule 40 Galvanized Steel Posts.
 - 2) Supports posts shall be set plumb in 24" diameter by 60" deep concrete footings. All footing tops shall be crowned with a 1" slope to shed water.
 - 3) The concrete shall conform to Item 17A, Class A concrete 1-2-4 mix and be paid for under that item.
 - 4) Excavation and backfilling for the foundations are included hereunder.

3. Demonstrating and Training.

4. Provide demonstration and training session for Owner's representative covering operation and maintenance of electronic scoreboard.

D. Manufacturer's Warranty.

1. Warranty to cover defects in materials and workmanship.
 - a. Five (5) years parts and factory labor guarantee for scoreboards and accessories from invoice date.
 - b. Two (2) years part and factory labor guarantee for wireless controls and receivers from invoice date.
 - c. Lifetime telephone support.

E. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Outdoor Multi-Sport Scoreboards furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 713 - INTEGRATED FOOTBALL AND SOCCER GOAL SETS - ONE PAIR

A. Description.

1. Under this Item, the Contractor shall furnish and install two football goal post sets complete with uprights and goal post pads and soccer goal sets complete with anchoring system, mobility kit and safety system as described in the following Specification, as shown on Plans and/or as directed by the Engineer.

B. Submittals.

1. Submit two copies of manufacturer's shop drawings, installation instruction and maintenance procedures if applicable.

C. Materials.

1. The Contractor shall install a #SG4980HS (#SG4900 - Square Soccer Posts) or #SG4985HS (#SG4950 - Round Soccer Posts) High School Football and Soccer Goal Sets as manufactured by Sportsfield Specialties Inc., P.O. Box 231, 41155 State Highway 10, Delhi, New York 13573; Phone: (888) 975-3343; Fax: (607) 746- 8481 or approved equal and shall consist of the following:
 - a. Football Goal Post Sets
 - 1) Gooseneck Support - #4285 fabricated of 6 5/8" O.D. Schedule 40 aluminum pipe, 5 foot radius, 8 foot offset
 - 2) Crossbar - #4231 fabricated of 6 5/8" O.D. x 23'-4" long Schedule 40 aluminum pipe with internal rotating sleeve for upright adjustment
 - 3) Uprights - #4226 fabricated of 4" O.D. x 20'-0" long extruded 6061 T6 aluminum tube with rigid wire loop at upper end.
 - 4) Above items to be powder coated yellow
 - 5) Ground Sleeve - #4212, 8 5/8" O.D. x 5'-0" long Schedule 40 steel pipe
 - 6) Access Frame Kit - #4570 fabricated of 1/8" thick aluminum, 8" high x 22 3/8" square with eight anchor bolts.
 - 7) Full Cover Plug - #4521 fabricated of 1/2" in pressure treated plywood and 3/16" aluminum hardware.
 - 8) Half Cover Plug - #4544 fabricated of 1/2" in pressure treated plywood and 3/16" aluminum hardware.
 - 9) Stainless steel assembly bolts, nuts and roll pins.
 - 10) Directional wind flags.
 - 11) Yellow Touch-up paint
 - b. #SG4900 Square Post Soccer Goals or #SG4950 Round Post Soccer Goals.
 - 1) Crossbar fabricated of 6061 T6 extruded aluminum tube - Choose a) or b)
 - a) #SG4900: 4" square x 3/16" thick with radiused outside corners

- b) #SG4950: 4 3/8" square × 3/16" thick with 4 11/16" round face and backside radiused backside corners.
 - c) Length. 24 feet
 - d) 7 Gauge Steel Crossbar Attachment Brackets
- 2) End Frame - #4901 fabricated of 6061 extruded aluminum tube having the following attributes.
 - a) Corner Upright Posts.
 - (1) #SG4900: 4" square × 3/16" thick with radiused outside corners
 - (2) #SG4950: Corner Upright Posts, 4 3/8" square × 3/16" thick with 4 11/16" round face and backside radiused backside corners.
 - b) Rolled Side Frame, 2"×3"×1/8" with radiused outside corners, Tig Welded to Corner Upright Posts
- 3) Ground Bar fabricated of 6061 T6 extruded aluminum tube, 2" square × 1/4" thick
- 4) Above items to be powder coated white
- 5) Accessories
 - a) Welded aluminum net clips
 - b) Orange polypropylene soccer net
 - c) Associated stainless steel hardware
- c. Soccer Goal Portable Wheel Mobility Kit.
 - 1) #SG4905 for Square Post or #SG4955 Round Post Soccer Goals
 - 2) Soccer goal wheel insert.
 - a) Welded 13 gauge stainless steel frame
 - b) UHWM plastic wheel
 - c) All stainless steel hardware
 - 3) Soccer goal mobility handle.
 - a) Welded stainless steel frame
 - b) All stainless steel hardware
 - c) Powder coated white
- d. #SG2SGP - Soccer Goal Safety System for square or round post
 - 1) Fabricated of 1/4" Aluminum
 - 2) Powder coated white
 - 3) Stainless steel assembly hardware

- e. #4516 - Access Frame Kit
 - 1) Fabricated of 1/8" thick x 22 1/4" square x 6" high aluminum
 - 2) Filler Plugs fabricated of 1/2" pressure treated plywood and 3/16" aluminum.
 - 3) Stainless steel assembly hardware and galvanized steel anchoring hardware
- f. Football Goal Post Pads
 - 1) #4590 6 5/8" I.D. Split Cylindrical, Urethane Foam Core, External Vinyl Only or
 - 2) #4590H 6 5/8" I.D. Hex, Urethane Foam Core Exterior and Interior Vinyl
- 2. Vinyl Laminated Polyester Fabric, 18 oz./square yard Minimum Weight
 - a. 72" minimum height
 - b. Full length hook & loop closure strip
 - c. Two Tie Cords, Top and Bottom (#4590 Only)
 - d. Standard colors are Blue, Gray, White, Black, Red, Green and Purple
 - e. The concrete shall conform to Item 17A, Class A concrete 1-2-4 mix and be paid for under that item.

D. Construction Details.

- 1. The Contractor shall install all these components as per manufacturer's specifications, instructions and requirements.
- 2. The Soccer goals must come with two soccer nets and the Football goal posts must come with four directional flags. Any specialized equipment and all instructions that come with the equipment must be provided to the County.

E. Measurement and Payment.

- 1. The quantity to be paid for under this Item shall be the number of pairs of football goal post sets complete with uprights and goal post pads and soccer goal sets complete with anchoring system, mobility kit and safety system sets furnished and installed. The unit bid price shall include, but not be limited to all necessary labor, materials, concrete, reinforcing, tools, supplies, equipment and incidentals necessary to complete the work.

ITEM 714 - LACROSSE GOALS - ONE PAIR

A. Description.

1. Under this Item, the Contractor shall furnish and install two Lacrosse goals as described in the following Specification, as shown on Plans and/or as directed by the Engineer.

B. Submittals.

1. Submit two copies of manufacturer's shop drawings, installation instructions and maintenance procedures, if applicable.

C. Materials.

1. The Contractor shall furnish and install #LG090 - Lacrosse Goal as manufactured by Sportsfield Specialties Inc., P.O. Box 231, 41155 State Highway 10, Delhi, New York 13573; Phone: (888) 975-3343; Fax: (607) 746-8481 or approved equal and shall consist of the following:
 - a. Frame.
 - 1) Uprights and top bar fabricated of 1.50 inch schedule 40 aluminum pipe, Tig welded with aluminum welded net clips.
 - b. Ground Bar.
 - 1) Fabricated of ½" Steel Bar, Tig welded with welded Steel Net Clips
 - c. Above items to be powder coated orange.
 - d. Ground sleeve kit.
 - 1) Fabricated of 1 5/8" O.D. x 18" long inch Schedule 40 Aluminum Pipe.
 - 2) Ground Sleeve Insert fabricated of 1 5/8" O.D. steel round stock.
 - 3) Stainless steel assembly hardware.
 - e. Standard white nylon net.

D. Construction Details.

1. The Contractor shall install all the Lacrosse goal components as per manufacturer's specifications, instructions and requirements.
2. Any specialized equipment and all instructions that come with the equipment shall be provided to the County.

E. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the number of pairs of Lacrosse goals furnished and installed. The unit bid price shall include, but not be limited to all necessary labor, materials, concrete, reinforcing, tools, supplies, equipment and incidentals necessary to complete the work.

ITEM 715 - INSTALLATION OF CLAY SURFACE AREAS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install clay surface areas as shown on Plans or directed by the Engineer.

B. Submittals.

1. Provide clay soil analysis for approval by the County's Representative.
2. Provide shop drawings for synthetic turf/clay soil boundary separation.
3. Provide two (2) 8 ounce containers of soil for approval.

C. Materials.

1. The clay material shall be "Best Top" or approved equal. The percentage of clay shall be 12-20% with the following gradation:

Particle Size	Sieve	% Passing
4.75 mm	4 mesh	98.4%
0.59 mm	30 mesh	72.0%
0.30 mm	50 mesh	45.0%
0.14 mm	100 mesh	22.2%
0.50 um	270 mesh	14.6%

D. Construction Details.

1. The Contractor shall remove six (6") inches of existing material and install six (6") inches of clay material. The Contractor may be requested to remove additional existing material to provide suitable foundation for clay material, as directed by the Engineer. Additional material removal, beyond the six (6") inch excavation, shall be paid for under Item 2, Unclassified Excavation. In the event that excess material is removed by direction of the County's representative, the Contractor will be directed to install additional Item 5C, Selected Fill to bring the subgrade to the proper elevation and shall be paid under that item.
2. The Contractor shall ensure a straight and true finish and ensure that no settlement takes place.
3. Contractor shall install the specified perimeter edge nailer around the perimeter/boundary of the clay area. The synthetic turf is to wrap around the perimeter edge nailer and provide a clean, defined edge between the synthetic turf and the clay surface. This portion of work shall be paid for under appropriate Item for perimeter edge nailer.

E. Measurement and Payment.

1. The quantity to be paid under this Item shall be the number of cubic yards of clay material as measured in place. The unit bid price shall include, but not be limited to all necessary labor, materials, tools, supplies, equipment and incidentals necessary for completion of the work.

ITEM 716 - PITCHER'S MOUND AND BASE SETS

A. Description.

1. Under this Item, the Contractor shall furnish and install pitcher's mound, three bases and home plate as shown on Plans or as directed by the Engineer.

B. Submittals.

1. Submit two copies of manufacturer's shop drawings, installation instructions and maintenance procedures, if applicable.

C. Materials.

1. Pitcher's Rubber

- a. The Pitcher's Rubber shall be 6"×24" and constructed of durable heavy duty rubber.
- b. Anchoring the Pitcher's Rubber shall be accomplished in accordance with the manufacturer's recommendations.

2. Three Bases

- a. Each base shall consist of a three component system.
- b. Base tops shall be selected based on the field size to appropriately accommodate youth, teen or adult players and constructed using a heavy gauge rubber cover over high density foam interior.
- c. The base top shall rest on top of a base plate, which in turn shall connect to an anchoring system. Anchoring of the base plate shall be accomplished in accordance with the manufacturer's recommendations.

3. Home Plate

- a. Home Plate shall be the "bury-all" style and constructed from durable all-rubber with no corners or edges to catch spikes.

D. Construction Details.

1. The Contractor shall meet all of the manufacturer's requirements for the installation of the bases, pitcher's mound and home plate.
2. When applicable, the Contractor shall make provisions during the installation of the field's manifold underdrain system, base stone bed and finishing stone to accommodate the installation of the above baseball field accessories in accordance with the manufacturer's recommendations.

E. Measurement and Payment.

1. The unit price bid for each set of pitcher's mound, three bases and home plate shall include the cost of all materials, labor, tools, equipment and incidentals necessary to complete the work in accordance with the manufacturer's recommendations, specifications, Plans and/or as directed by the Engineer

ITEM 717 - ALUMINUM PLAYERS BENCHES

A. Description.

1. Under this Item the Contractor shall furnish and install Aluminum Players' Benches without back rests as shown on the Plans, as herein specified and as directed by the Engineer.

B. Materials.

1. The Contractor shall install □LG-ALBCH010, LG-ALBCH015 and/or LG-ALBCH021 aluminum players' benches without back rests as manufactured by Sportsfield Specialties Inc., P.O. Box 231, 41155 State Highway 10, Delhi, New York 13573; Phone. (888) 975-3343; Fax. (607) 746-8481 or approved equal.
2. Frame and Bench Supports: The bench supports shall be fabricated from two (2") inch x two (2") inch x one-eighth (1/8") inch square aluminum tubing. The frame and bench supports shall be powder coated black.
3. Planking: All horizontal slats shall be fabricated from a 10" wide aluminum extrusion. The planking shall be powder coated black.
4. The upright supports shall be anchor bolted into concrete footings as per the manufacturer's specifications.
5. Concrete for bench support footings shall meet the requirements of Class A Concrete, except for payment which shall be included under this Item.

C. Construction Details.

1. The bench standards shall be set in concrete with supports vertical and true to line and position as shown on the Plans, or as directed by the Engineer.

D. Method of Measurement.

1. The quantity to be paid for under this Item will be the number of aluminum players' benches without back rests installed in accordance with the Plans, Specifications, and directions of the Engineer.

E. Basis of Payment.

1. The unit price bid for each ballfield players bench system shall include the cost of all labor, materials, and incidentals to complete the work including but not limited to excavation, placement of concrete footings, backfill/restoration, if any, placement of two benches, standards, hardware, concrete pad and all expenses necessary to complete the work.

ITEM 718 - FOUL POLES - ONE PAIR

A. Description.

1. Under this Item, the Contractor shall furnish and install foul poles as shown on Plans or as directed by the Engineer.

B. Submittals.

1. Submit two copies of manufacturer's shop drawings, installation instructions and maintenance procedures, if applicable.

C. Materials.

1. The Contractor shall furnish and install BSPOLE as manufactured by BSN Sports Collegiate Specific (BSNCP), P.O. Box 7726, Dallas, Texas, 75209; Phone: (800) 527-7510; Fax: (800) 899-0149 or approved equal.
 - a. Powder coated optic yellow.
 - b. Heavy duty 3 ½" O.D. heavy wall pipe.
 - c. Twenty (20') foot exposed height.
 - d. 1'-6" x 12'-0" visual wings.
2. Contractor shall install 16" diameter x 48" deep concrete footings in accordance with Item 17A - Class A Concrete for Structures.

D. Construction Details.

1. The installation shall be in accordance with manufacturer's specifications, instructions and requirements.
2. Foul pole shall be set true and plumb in the concrete footing along the foul line at the location shown on the drawings.
3. The concrete footings shall be as shown on the drawings, unless a larger footing is recommended by the manufacturer of the foul pole. The Contractor shall install the larger of the two footing designs.

E. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the number of pairs of foul poles furnished and installed. The unit bid price shall include, but not be limited to all necessary labor, materials, reinforcing, tools, supplies, equipment and incidentals necessary to complete the work. Payment for concrete footings will be made under Item 17A – Class A Concrete.

ITEM 719 - FENCE GUARD

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, fence guard in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials and Construction Details.

1. The Contractor shall furnish Standard Fence Guard as manufactured by Mid-America Sports Advantage, 1413 S Meridian Rd, Jasper, IN 47546 - Phone: 800-264-4519 - E-Mail: service@sportsadvantage.com or an approved equal.
2. The fence guard shall be manufactured from polypropylene in a teardrop shaped profile - 2 5/8"W x 4"H x 0.07" wall thickness and designed to fit over standard chain link fencing.
3. **Color.** Safety Yellow.
4. **Fasteners.** The fence guard and secured to the fence using zip ties at two foot intervals.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of linear feet of Fence Guard furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each linear foot shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 720 - TENNIS NET AND POST SETS

A. Description.

1. Under this Item the Contractor shall furnish and install tennis net post systems in accordance with the Specifications, as shown on the Plans or as directed by the Engineer.

B. Construction Details.

1. The tennis net post system shall consist of two (2) net posts and one (1) net complete with concrete footings and all accessories necessary to outfit one tennis court.
2. **Net Posts.**
 - a. Net posts shall be 66" long, 3" O.D., 8 gauge steel pipe or tubing coated with a black or green epoxy powder coated finish. Color to be designated by the Engineer.
 - b. Each net post shall include:
 - 1) One domed post cap.
 - 2) One heavy duty brass (outside) and carbon steel (inside) internal winder complete with a removable handle.
 - 3) Lacing bars and stainless steel ground sleeves.
 - 4) One 1/4" pin located 42" from the top.
 - 5) One 24" long sleeve to be set in the concrete footing.
 - c. Center Net Strap Anchor
 - 1) The center net strap anchor shall consist of 1 5/8" O.D. by 1'-0" long heavy duty, galvanized steel pipe.
 - 2) A 1/4" diameter pin stainless steel pin shall be inset through the pipe 3/8" from the top end of the pipe to accept the snap hook that fastens down the net.
 - d. Tennis Net.
 - 1) The net shall be forty-two (42') feet long and constructed of 3.5 mm braided polyethylene with a headband constructed of heavy duty 4-ply duck. The netting shall be of high density, braided polyethylene with 4 rows of heavy lock stitched polyester thread with wood or fiberglass dowels.
 - 2) The top 6 rows shall be double netted for durability.
 - e. Concrete Footings.
 - 1) The net posts shall be set in 36" diameter by 42" deep concrete footings conforming to Item 17A - Class A Concrete.
 - 2) The center net strap anchor shall be set in a 12" x 12" x 12" concrete footing.

C. Measurement and Payment.

1. The quantity to be paid for under this item shall be the actual number of tennis net post system(s) furnished and installed in accordance with the Plans, Specifications and the directions of the Engineer.
2. The unit price bid for each tennis net post system shall include the cost of all labor, materials, tools, equipment and other incidentals necessary to complete the work.
Payment for concrete footings will be made under Item 17A – Class

ITEM 721 - WIND SCREENS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Wind Screens in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials and Construction Details.

1. Material.

- a. Fiber Content: 100% high density polyethylene
 - b. Construction: 85-90% knit Raschel weighing 3.8 lbs. per 100 sf
 - c. Colors: black or green
2. **Fasteners.** Wind Screens shall be attached using zip ties at twelve inch intervals along entire perimeter of fabric roll.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of square feet of Wind Screens furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each square foot shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 722 - BASKETBALL BACKSTOP SYSTEM - ONE PAIR

A. Description

1. Under this Item the Contractor shall furnish and install basketball backstop systems in accordance with the Specifications, as shown on the Plans or as directed by the Engineer.

B. Construction Details

1. Each permanent basketball backstop system shall consist of two (2) 4-1/2" O.D. galvanized steel tubular uprights with a formed (not welded) 4'-0" extension with backboard, two (2) official size goal (one per post) and two (2) nylon nets (one per backboard). All required attaching hardware shall be zinc plated.
2. The backboard shall be a rust resistant official size (42" x 72") rectangular backboard or aluminum fan shaped board. Each heavy duty super goal shall be directly mounted to the extension arm in accordance with manufacturer's instructions.
3. Each goal shall be furnished complete with a heavy-duty, anti-whip nylon net and mounting hardware.
4. **Concrete Footings.**
 - a. Backstop Posts shall be set in 36" diameter by 48" deep concrete footings conforming to Item 17A - Class A Concrete. All footing tops shall set flush with top course of asphalt or top of concrete.

C. Measurement and Payment

1. The quantity to be paid for under this Item shall be the actual number of pairs of basketball backstop systems furnished and installed in accordance with the Plans, Specifications and the directions of the Engineer.
2. The unit price bid for each basketball backstop system shall include the cost of all labor, materials, tools, equipment and other incidentals necessary to complete the work.
3. Payment for concrete footings will be made under Item 17A - Class A Concrete.

ITEM 723 - ORNAMENTAL STEEL PICKET FENCE (4'-0" to 8'-0" HIGH)

A. Description.

1. Under this Item the Contractor shall furnish and install Ornamental Steel Picket Fence in Four (4') to Eight (8') Foot Heights in accordance with the Plans, Specifications and appropriate Detail as approved and directed by the Engineer.

B. Materials and Construction Details.

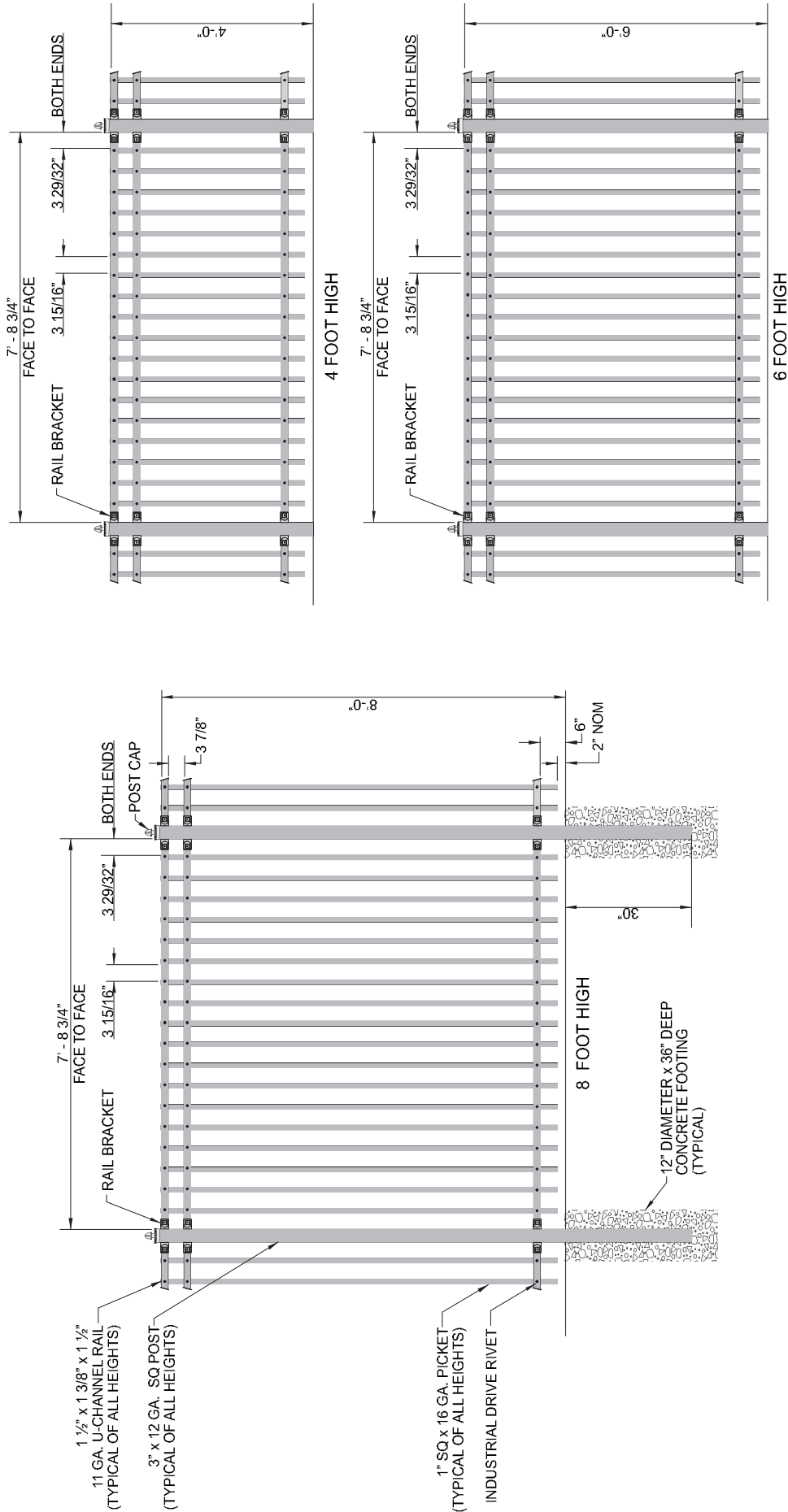
1. **Heights.** Fence sections shall come in four (4') to eight (8') foot heights (See individual Plans.).
2. **Style.** Monumental Iron Works (25 Mill Rd., Ronkonkoma, NY 11779 Telephone No. 631 585-8150) Ornamental Picket Fence shall be Imperial Fence - Style B or Approved Equal.
3. **Pickets.** Pickets shall consist of 1" square x 16 gauge (0.83 plf) thick galvanized steel tubular members manufactured in accordance with ASTM A 787, having a yield strength of 45,000 psi and zinc coated in accordance with ASTM A 90. Pickets shall be spaced at 3 15/16" maximum face to face and attached to each rail with industrial drive rivets.
4. **Rails.** 1 1/2" x 1 3/8" x 1 1/2" x 11 gauge (0.120") thick galvanized steel "U" channel per ASTM A 653 or ASTM A 607, having a yield strength of 50,000 psi and zinc coated in accordance with ASTM A 90. Punch rails to receive pickets and rivets and attach rails to rail brackets with two industrial drive rivets. Steel for rail shall conform to ASTM A 653.
5. **Posts.** Posts shall be 3" square x 12 gauge (4.29 plf) thick galvanized steel tubular members manufactured in accordance with ASTM A-787, having a yield strength of 45,000 psi and zinc coated in accordance with ASTM A 90. Zinc coating shall be applied inside and outside.
6. **Finish.** All pickets, channels, posts, fittings and accessories shall be black, polyester coated individually after drilling and layout, to ensure maximum corrosion protection. Coating of assembled sections is unacceptable. All components shall be power washed to clean and prepare the galvanized surface to assure complete adhesion of the finish coat. All metal shall receive a polyester resin based powder coating applied by the electrostatic spray process to a 2.5 mil thickness. The finish is then baked in a 450⁰F (metal temperature) oven for 20 minutes.
7. **Hardware.**
 - a. Rail Attachment Brackets. - Brackets shall be die cast of zinc (ZAMAK #3 Alloy) in accordance with ASTM B 86-83Z 33521. Ball and socket design capable of 30° swivel (up/down - left/right). Bracket to fully encapsulate rail end for complete security.
 - b. Industrial Drive Rivets. Rivets shall be 1/4" (Size #4) and of sufficient length to attach items in a secure non-rattling position. Rivet to have a minimum of 1100 lbs. holding power and a shear strength of 1500 lbs.
 - c. Post Caps. Post caps shall be the flat style consisting of formed steel, cast of malleable iron or aluminum alloy, weather tight closure cap.

C. Construction Details.

1. Heights. Fence sections shall come in four (4') to eight (8') foot heights (See individual Plans and/or Release Number(s)).
2. Post Spacing. Post spacing shall be 7'-8 3/4" face to face.
3. Concrete Footings.
 - a. Line Posts shall be set in 12" diameter by 36" deep concrete footings. All footing tops shall be crowned with a 1" slope to shed water.
 - b. All gate posts shall be set plumb in concrete footings of the depths and sizes shown. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
 - c. Excavation and backfilling for footings is included hereunder.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of Ornamental Steel Picket Fence in Four (4') to Eight (8') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as Approved by the Engineer.
2. The unit price bid per square foot shall include the cost of all labor, materials, tools, equipment, shop drawings, excavation, backfill, restoration and other incidentals necessary to satisfactorily complete the required work.
3. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.



THREE RAIL ORNAMENTAL FENCE (BLACK)

SCALE: 1/2" = 1'-0"

MONUMENTAL IRON WORKS ORNAMENTAL PICKET FENCE SHALL BE IMPERIAL FENCE - STYLE B OR APPROVED EQUAL

DATE: 10/27/09

NASSAU COUNTY

**ITEM 724 - 4'-0" WIDE SINGLE SWING ORNAMENTAL STEEL PICKET GATES
(4'-0" TO 8'-0" HIGH)**

A. Description.

1. Under this Item the Contractor shall furnish and install 4' Wide Single Swing Ornamental Steel Picket Gate(s) in Four (4') to Eight (8') Foot Heights in accordance with the Plans, Specifications and appropriate Detail and as approved and directed by the Engineer.

B. Materials and Construction Details.

1. **Heights.** Fence gates shall come in Four (4') to Eight (8') foot heights (See individual Plan.).
2. **Style.** Monumental Iron Works (25 Mill Rd., Ronkonkoma, NY 11779 Telephone No. 631 585-8150) Ornamental Picket Fence shall be Imperial Fence - Style B or Approved Equal.
3. **Pickets.** Pickets shall consist of 1" square x 16 gauge (0.83 plf) thick galvanized steel tubular members manufactured in accordance with ASTM A 787, having a yield strength of 45,000 psi and zinc coated in accordance with ASTM A 90. Pickets shall be spaced at 3 15/16" maximum face to face and attached to each rail with industrial drive rivets.
4. **Rails.** 1 1/2" x 1 3/8" x 1 1/2" x 11 gauge (0.120") thick galvanized steel "U" channel per ASTM A 653 or ASTM A 607, having a yield strength of 50,000 psi and zinc coated in accordance with ASTM A 90. Punch rails to receive pickets and weld inside gate frame. Steel for rail shall conform to ASTM A 653.
5. **Gate Posts.** Posts shall be 3" square x 12 gauge (4.29 plf) galvanized steel tubular members manufactured in accordance with ASTM A-787, having a yield strength of 45,000 psi and zinc coated in accordance with ASTM A 90. Zinc coating shall be applied inside and outside.
6. **Finish.** All pickets, channels, posts, fittings and accessories shall be black, polyester coated individually after drilling and layout, to ensure maximum corrosion protection. Coating of assembled sections is unacceptable. All components shall be power washed to clean and prepare the galvanized surface to assure complete adhesion of the finish coat. All metal shall receive a polyester resin based powder coating applied by the electrostatic spray process to a 2.5 mil thickness. The finish is then baked in a 450 F (metal temperature) oven for 20 minutes.
7. **Hardware.**
 - a. Bracing. Provide diagonal adjustable length truss rods on gates to prevent sag.
 - b. Hinges. Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180°.
 - c. Latch. Capable of retaining gate in closed position and have provision of padlock.
 - d. Industrial Drive Rivets. Rivets shall be 1/4" (Size #4) and of sufficient length to attach items in a secure non-rattling position. Rivet to have a minimum of 1100 lbs. holding power and a shear strength of 1500 lbs.
 - e. Post Caps. Post caps shall be the flat style consisting of formed steel, cast of malleable iron or aluminum alloy, weather tight closure cap.

C. Construction Details.

1. Footings.

- a. All gate posts shall be set plumb in concrete footings of the depths and sizes shown. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
- b. Excavation and backfilling for footings is included hereunder.

2. **Bottom Clearance.** The bottom of the gates shall clear the finished grade by approximately two (2") inches. The clearance under the gates in the closed position is not to exceed three (3") inches.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of 4' Wide Single Swing Ornamental Steel Picket Gate(s) in Four (4') to Eight (8') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage shall be determined by measuring the clear opening between the inside faces of the gate's hinge and latch posts and multiplying by the nominal height of the fence.
3. The unit price bid per each square foot of gate shall include the cost of furnishing all labor, materials, tools, equipment and other incidentals necessary to satisfactorily complete the required work, including the gate posts, excavation, fill, restoration, grading, and shop drawings.
4. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.

**ITEM 725 - 10'-0" WIDE DOUBLE SWING ORNAMENTAL STEEL PICKET GATES
(4'-0" to 8'-0" HIGH)**

A. Description.

1. Under this Item the Contractor shall furnish and install 10' Wide Double Swing Ornamental Steel Picket Gate(s) in Four (4') to Eight (8') Foot Heights in accordance with the Plans, Specifications and appropriate Detail as approved and directed by the Engineer.

B. Materials and Construction Details.

1. **Heights.** Fence gates shall come in Four (4') to Eight (8') heights (See individual Plans.).
2. **Style.** Monumental Iron Works (25 Mill Rd., Ronkonkoma, NY 11779 Telephone No. 631 585-8150) Ornamental Picket Fence shall be Imperial Fence - Style B or Approved Equal.
3. **Pickets.** Pickets shall consist of 1" square x 16 gauge (0.83 plf) thick galvanized steel tubular members manufactured in accordance with ASTM A 787, having a yield strength of 45,000 psi and zinc coated in accordance with ASTM A 90. Pickets shall be spaced at 3 15/16" maximum face to face and attached to each rail with industrial drive rivets.
4. **Rails.** 1 1/2" x 1 3/8" x 1 1/2" x 11 gauge (0.120") thick galvanized steel "U" channel per ASTM A 653 or ASTM A 607, having a yield strength of 50,000 psi and zinc coated in accordance with ASTM A 90. Punch rails to receive pickets and weld inside gate frame. Steel for rail shall conform to ASTM A 653.
5. **Gate Posts.** Posts shall be 4" square x 12 Gauge (5.77 plf) galvanized steel tubular members manufactured in accordance with ASTM A-787, having a yield strength of 45,000 psi and zinc coated in accordance with ASTM A 90. Zinc coating shall be applied inside and outside.
6. **Finish.** All pickets, channels, posts, fittings and accessories shall be black, polyester coated individually after drilling and layout, to ensure maximum corrosion protection. Coating of assembled sections is unacceptable. All components shall be power washed to clean and prepare the galvanized surface to assure complete adhesion of the finish coat. All metal shall receive a polyester resin based powder coating applied by the electrostatic spray process to a 2.5 mil thickness. The finish is then baked in a 450 F (metal temperature) oven for 20 minutes.
7. **Hardware.**
 - a. Bracing. Provide diagonal adjustable length truss rods on gates to prevent sag.
 - b. Hinges. Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180°.
 - c. Latch. Capable of retaining gate in closed position and have provision of padlock.
 - d. Keeper. Gate keeper (holdback) shall consist of mechanical device for securing the free end of the gate when in the open position.
 - e. Drop Rod. Provide a drop rod to secure the inactive leaf; gate stop pipe to engage the center of the drop rod; locking device and padlock eyes as an integral part of the latch; and one padlock for each double swing gate.
 - f. Industrial Drive Rivets. Rivets shall be 1/4" (Size #4) and of sufficient length to attach

items in a secure non-rattling position. Rivet to have a minimum of 1100 lbs. holding power and a shear strength of 1500 lbs.

- g. Post Caps. Post caps shall be the flat style consisting of formed steel, cast of malleable iron or aluminum alloy, weather tight closure cap.

C. Construction Details.

1. **Heights.** Fence sections shall come in four (4') to eight (8') foot heights.
2. **Footings.**
 - a. All gate posts shall be set plumb in concrete footings of the depths and sizes shown. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
 - b. Excavation and backfilling for footings is included hereunder.
3. **Bottom Clearance.** The bottom of the gates shall clear the finished grade by approximately two (2") inches. The clearance under the gates in the closed position is not to exceed three (3") inches.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of 10' Wide Double Swing Ornamental Steel Picket Gate(s) in Four (4') to Eight (8') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage shall be determined by measuring the clear opening between the inside faces of the gate's hinge and latch posts and multiplying by the nominal height of the fence.
3. The unit price bid per each square foot of gate shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work, including the gate posts, excavation, fill, restoration, grading, and shop drawings.
4. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.

ITEM 726 - ORNAMENTAL STEEL PICKET CANTILEVER SLIDE GATES IN FOUR (4') TO EIGHT (8') FOOT HEIGHTS (16'-0" TO 22'-0" WIDE)

A. Description.

1. Under this Item the Contractor shall furnish and install Ornamental Steel Picket Cantilever Slide Gates in Four (4') to Eight (8') Foot Heights between 16'-0" and 22'-0" wide in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.

B. Materials and Construction Details.

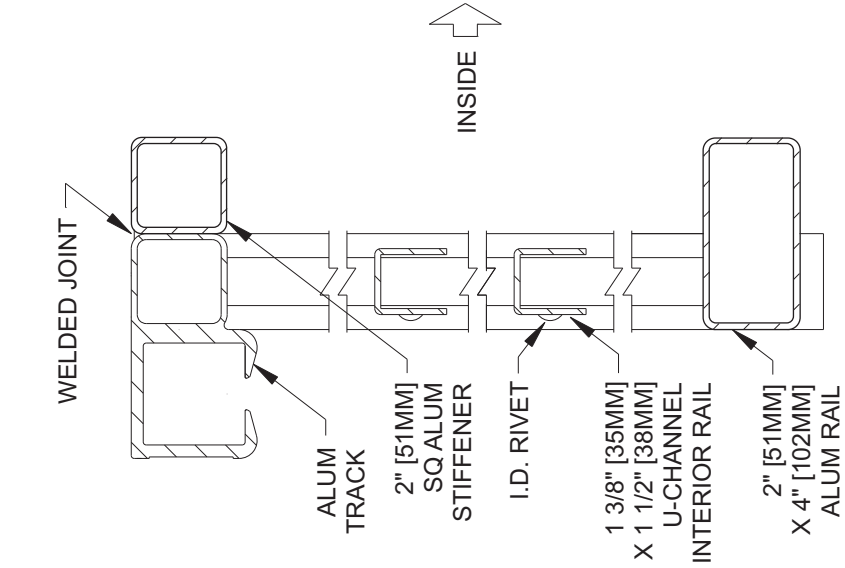
1. **Gate Frames.** Fabricate ornamental steel picket cantilever slide gates in accordance with ASTM F1184, Type II, Class 2, using 2" square aluminum members, ASTM B 221, alloy and temper 6063-T6, weighing 1.88 lbs/ft. Weld members together forming rigid one-piece frame integral with top track. Provide two (2) truck assemblies for each gate leaf
2. **Internal Uprights.** 1" x 2" aluminum members welded in gate frames, at maximum 6' - 2" face to face subdividing frame into panels.
3. **Ornamental Picket Infill.** "U" channel rails formed aluminum, 1-3/8" wide x 1- 1/2" deep, 11 gauge [0.120"] wall thickness. Punch rails to receive pickets, and welded inside gate frame. Pickets, galvanized steel, 1" square tube of 16 gauge and 3 15/16" spacing. Attach pickets to "U" rails by 1/4" industrial drive rivets.
4. **Bracing.** Provide diagonal adjustable length truss rods, or 3/8 inch galvanized steel, in each panel of gate frames.
5. **Top Track/Rail.** Enclosed, combination one-piece track and rail, aluminum extrusion with weight of 3.72 lbs/ft. Track to withstand reaction load of 2,000 lbs.
6. **Truck Assembly.** Swivel type, zinc die cast, with Four (4) sealed lubricant ballbearing rollers, 2" in diameter by 9/16" in width, and two (2) side rolling wheels to ensure truck alignment in track. Mount trucks on post brackets using 7/8" diameter ball bolts with 1/2" shank. Design truck assembly to withstand same reaction load as track.
7. **Gate Hangers, Latches, Brackets, Guide Assemblies, and Stops.** Malleable iron or steel, galvanized after fabrication. Provide positive latch with provisions for padlocking.
8. **Bottom Guide Wheel Assemblies.** Each assembly shall consist of two 3" diameter rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.
9. **Gate Posts.** Galvanized steel 4" square, weighing 9.59 lb./ft. Provide 1 latch post and 2 support posts for single slide gates.
10. **Finish.** To match fence.
11. **Concrete Footings.**
 - a. Gate Posts shall be set plumb in 18" diameter by 48" deep concrete footings and filled completely with concrete. All footing tops shall be crowned with a 1" slope to shed water.
 - b. The concrete shall be Item 17A, Class A concrete 1-2-4 mix.

c. Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

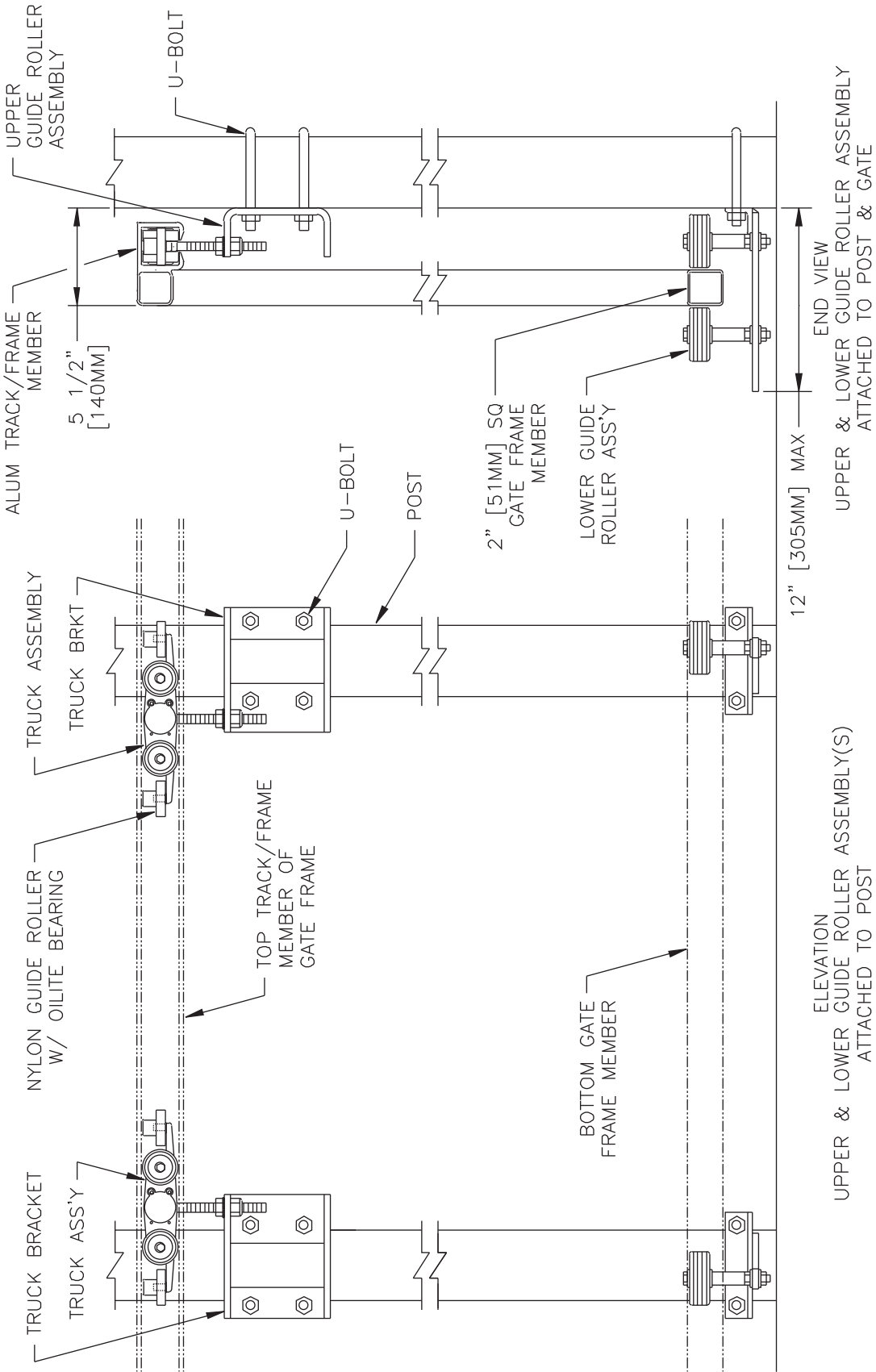
1. The quantity to be paid for under this item shall be the total number of square feet of Ornamental Steel Picket Cantilever Slide Gates in Four (4') to Eight (8') Foot Heights between 16'-0" and 22'-0" wide furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage shall be determined by measuring the clear opening between the inside faces of the gate's hinge and latch posts and multiplying by the nominal height of the fabric.
3. The unit price bid per each square foot of gate shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work, including the gate posts, excavation, fill, restoration, grading, and shop drawings.
4. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.

OPENING	LENGTH (L)	GATE POSTS (G)	BAYS	OVERHANG
I/S POST FACE TO I/S POST FACE	O/S DIM OF GATE LEAF	O/S POST FACE TO O/S POST FACE	NUMBER OF BAYS WITH PICKETS	NUMBER OF BAYS W/O PICKETS
16'-0" [4877MM]	26'-3" [8001MM]	10'-0" [3048MM]	(3) THREE	(2) TWO
17'-0" [5182MM]	27'-3" [8306MM]	10'-0" [3048MM]	(3) THREE	(2) TWO
18'-0" [5486MM]	28'-3" [8611MM]	10'-0" [3048MM]	(3) THREE	(2) TWO
19'-0" [5791MM]	29'-3" [8915MM]	10'-0" [3048MM]	(3) THREE	(2) TWO
20'-0" [6096MM]	30'-3" [9220MM]	10'-0" [3048MM]	(3) THREE	(2) TWO
21'-0" [6401MM]	31'-3" [9525MM]	10'-0" [3048MM]	(4) FOUR	(2) TWO
22'-0" [6706MM]	32'-3" [9830MM]	10'-0" [3048MM]	(4) FOUR	(2) TWO



SEC A (16' THRU 22' OPENINGS)

SCALE: 3" = 1'-0"



SCALE: 1 1/2" = 1'-0"

M I W Ornamental Picket	COPYRIGHT©2000 MASTER-HALCO, INC. ALL RIGHTS RESERVED. MONUMENTAL IRON WORKS	IMPERIAL SINGLE CANTILEVERED SLIDING GATE	BY: JRR	DWG: 6-8100		
			DATE: 08-18-95			
		NASSAU COUNTY	REV: D	LAYER: 1	SHEET: 2	
					SCALE: VARIES	
			REV DATE: 05-10-00			

ITEM 727 - STRAIGHT PICKET PVC FENCE (4'-0" TO 6'-0" HIGH)

A. Description.

1. Under this Item the Contractor shall furnish and install Straight Picket PVC Fence in Four (4') to Six (6') Foot Heights in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.

B. Materials and Construction Details.

1. Materials

- a. Solid Wall Virgin Polyvinyl Chloride (PVC) conforming to ASTM F 964
- b. **Manufacturer.** Nebraska Plastics, Inc., P.O. Box 45, Cozard, Ne 69130; Telephone 1-800-445-2887; Fax 1-308-784-3216 or Approved Equal.
- c. **Style.** Country Estate Fence – Hampton or approved equal

2. **Heights.** Fence sections shall come in four, five and six foot heights.

3. Line Post and Components.

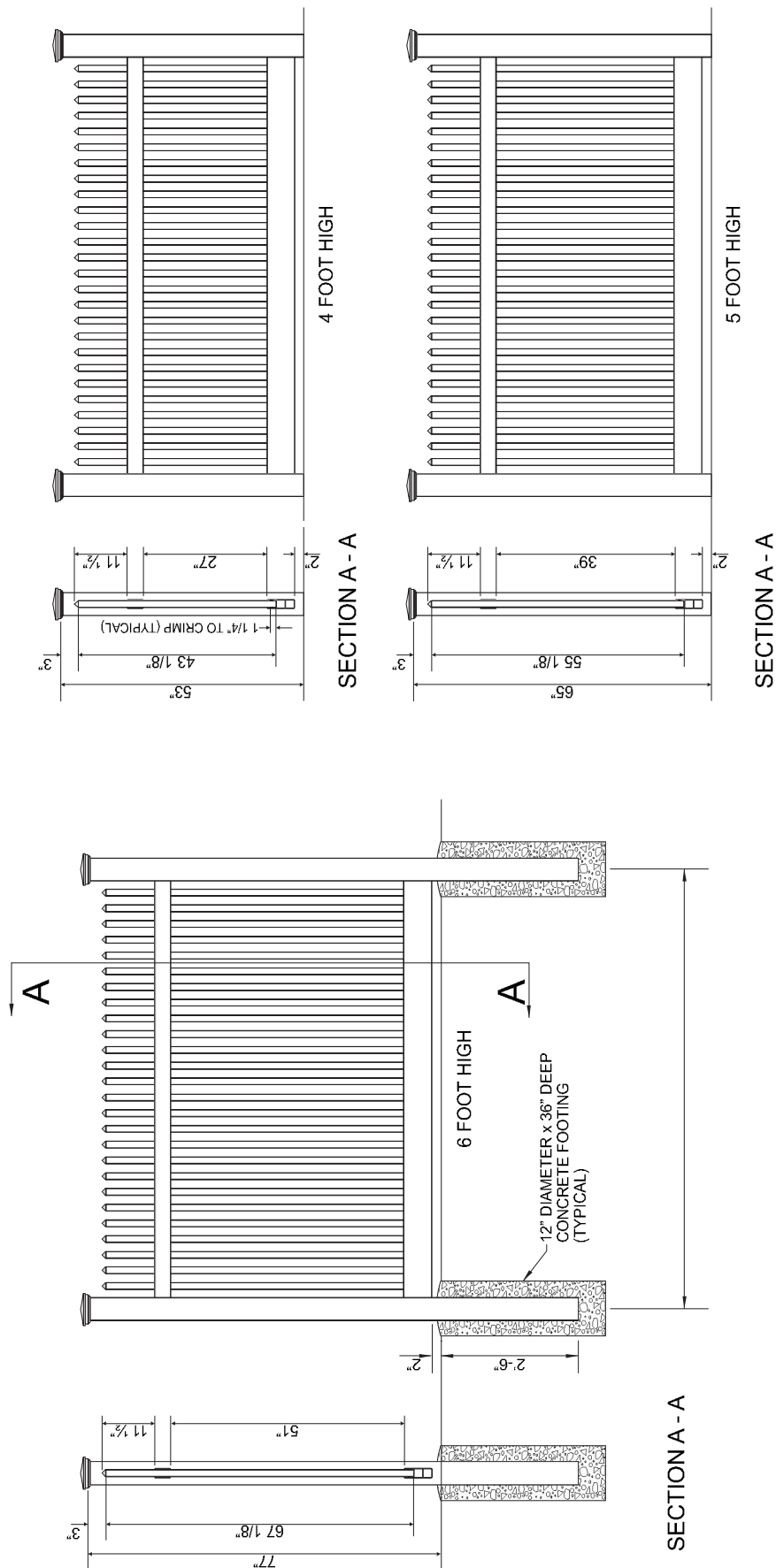
- a. One (1) – 5" x 5" x 0.135" Fence Post
- b. One (1) – New England Post Cap
- c. Line posts shall be spaced at 8'-0" on centers
- d. Every fourth line post shall be filled two-thirds of its height with concrete - the same concrete as used in concrete footings.

4. Section Specifications

- 1) **Heights.** Fence sections shall come in four, five and six foot heights.
 - 2) Top Horizontal – 2" x 3 1/2"
 - 3) Bottom Horizontal – 2" x 6" 4) Verticals – 1 1/2" x 1 1/2"
 - 4) One white powder coated latch
- b. Concrete Footings
 - 1) Line Posts shall be set in 12" diameter by 36" deep concrete footings. All footing tops shall be crowned with a 1" slope to shed water.
 - 2) All posts shall be set plumb in concrete. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
 - 3) Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of Straight Picket PVC Fence in Four (4') to Six (6') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The unit price bid per each square foot of fence shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work including gate posts, excavation, fill, concrete, grading, and shop drawings.
3. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.



STRAIGHT PICKET PVC FENCE

LINE POSTS:	5" x 5", x 0.135" THICK FENCE POST SET IN 12" DIAMETER BY 36" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 8'-0" O.C. AND VARIABLE MANUFACTURED BY MARKSMEN MANUFACTURING CORP. OR EQUAL
TOP RAIL:	2" x 3 1/2" RIBBED FENCE PROFILE
BOTTOM RAIL:	2" x 6" RIBBED PLANK PROFILE
PICKETS:	1 1/2" x 1 1/2" RIBBED FENCE PROFILE
PVC MATERIAL:	CONSTRUCTED OF SOLID WALL VIRGIN POLYVINYL CHLORIDE CONFORMING TO ASTM F 964 - COUNTRY ESTATE AS MANUFACTURED BY NEBRASKA PLASTICS, INC. OR EQUAL.

SCALE: 1/2" = 1'-0"	NASSAU COUNTY
DATE: 10/27/09	

**ITEM 728 - 4'-0" WIDE SINGLE SWING STRAIGHT PICKET PVC GATES
(4'-0" to 6'-0" HIGH)**

A. Description.

1. Under this item the Contractor shall furnish and install 4' Wide Single Swing PVC Picket Gates in Four (4') to Six (6') Foot Heights for PVC Fence, including two heavy duty gate in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.

B. Materials and Construction Details.

1. Materials

- a. Solid Wall Virgin Polyvinyl Chloride (PVC) conforming to ASTM F 964
- b. **Manufacturer.** Nebraska Plastics, Inc., P.O. Box 45, Cozard, Ne 69130; Telephone 1-800-445-2887; Fax 1-308-784-3216 or Approved Equal.
- c. **Style.** Country Estate Fence – Hampton or approved equal.

2. **Heights.** Single Swing Gates shall come in four, five and six foot heights.

3. **Gate Posts:** 6 1/2" x 6 1/2" heavy duty (two required)

4. Gate Specifications

- a. Straight Picket PVC Fence Gate

- 1) Top Horizontal – 2" x 3 1/2"
- 2) Bottom Horizontal – 2" x 6" 3) Verticals – 1 1/2" x 1 1/2"
- 4) One pair of white powder coated stainless steel hinges and
- 5) One white powder coated latch

- b. Concrete Footings

- 1) Gate Posts shall be set in 16" diameter by 42" deep concrete footings and filled completely with concrete. All footing tops shall be crowned with a 1" slope to shed water.
- 2) All posts shall be set plumb in concrete. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
- 3) Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of 4' Wide Single Swing PVC Picket Gates in Four (4') to Six (6') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage of gates shall be determined by measuring the clear opening between the inside faces of the gate's hinge and latch posts and multiplying by the nominal height of the fence.

3. The unit price bid per each square foot of gates shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work including gate posts, excavation, fill, restoration, grading, and shop drawings.
4. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.

ITEM 729 - 10'-0" WIDE DOUBLE SWING STRAIGHT PICKET PVC GATES (4'-0" TO 6'-0" HIGH)

A. Description.

1. Under this item the Contractor shall furnish and install 10' Wide Double Swing PVC Gates in Four (4') to Six (6') Foot Heights for PVC Fence, including two heavy gate posts in accordance with the Plans, Specifications and appropriate Detail Sheet and as approved by the Engineer.

B. Materials and Construction Details.

1. Materials

- a. Solid Wall Virgin Polyvinyl Chloride (PVC) conforming to ASTM F 964
- b. **Manufacturer.** Nebraska Plastics, Inc., P.O. Box 45, Cozard, Ne 69130; Telephone 1-800-445-2887; Fax 1-308-784-3216 or Approved Equal.
- c. **Style.** Country Estate Fence – Hampton or approved equal.
- d. **Heights.** Double Swing Gates shall come in four, five and six foot heights

2. **Gate posts:** 6 1/2" x 6 1/2" heavy duty (two required)

3. Gate Specifications

- a. Straight Picket PVC Fence Gate
 - 1) Top Horizontal – 2" x 3 1/2"
 - 2) Bottom Horizontal – 2" x 6"
 - 3) Verticals – 1 1/2" x 1 1/2"
 - 3) Two pairs of white powder coated stainless steel hinges and
 - 4) One white powder coated cane rod
- b. Concrete Footings
 - 1) Gate Posts shall be set in 18" diameter by 48" deep concrete footings and filled completely with concrete. All footing tops shall be crowned with a 1" slope to shed water.
 - 2) All posts shall be set plumb in concrete. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
 - 3) Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of square feet of 10' Wide Double Swing PVC Gates in Four (4') to Six (6') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage of gates shall be determined by measuring the clear opening between the inside faces of the two gate posts and multiplying by the nominal height of the fence.

3. The unit price bid per each square foot of gates shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work including gate posts, excavation, fill, restoration, grading, and shop drawings. Payment of concrete for footings will be paid under Item 17A-Class A Concrete

ITEM 730 - STRAIGHT SOLID PANEL PVC FENCE (4'-0" TO 8'-0" HIGH)

A. Description.

1. Under this Item the Contractor shall furnish and install Straight Solid Panel PVC Fence in Four (4') to Eight (8') Foot Heights in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.

B. Materials and Construction Details.

1. Materials

- a. Solid Wall Virgin Polyvinyl Chloride (PVC) conforming to ASTM F 964
- b. **Manufacturer.** Nebraska Plastics, Inc., P.O. Box 45, Cozard, Ne 69130; Telephone 1-800-445-2887; Fax 1-308-784-3216 or Approved Equal.
- c. **Style.** Country Estate Fence – Lakeland or approved equal.

2. Heights. Fence sections shall come in four, five, six and eight foot heights

3. Line Post and Components.

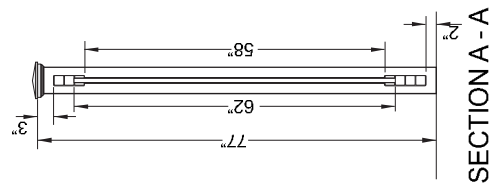
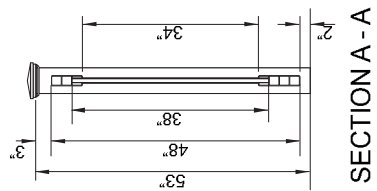
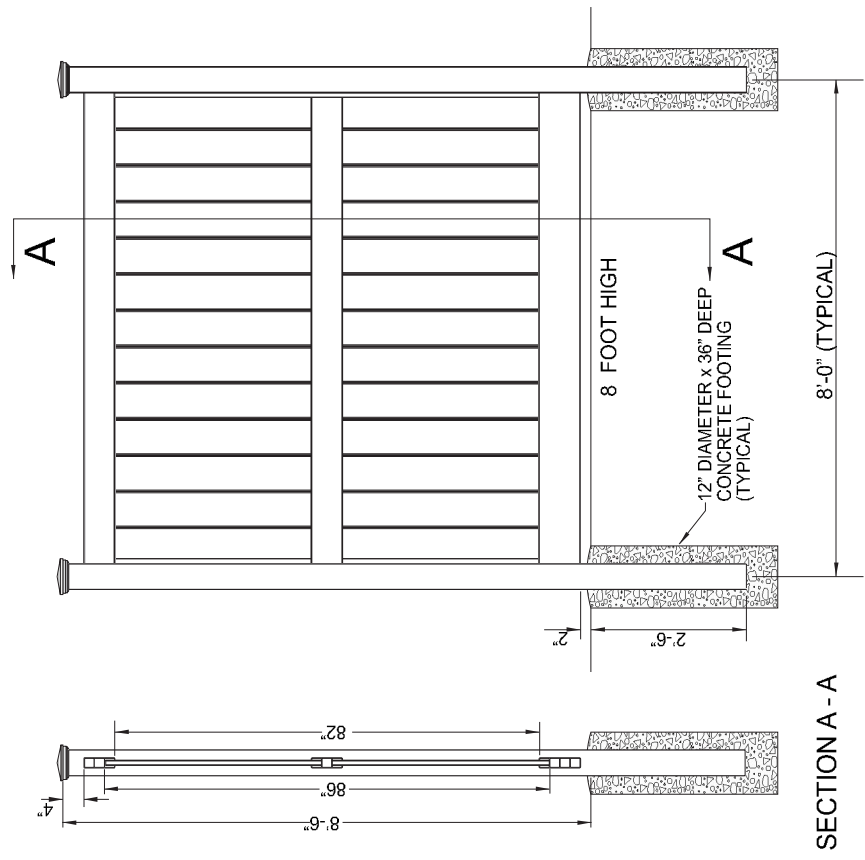
- a. One (1) - 5" x 5" x 0.135" Fence Post
- b. One (1) - New England Post Cap
- c. Line posts shall be spaced at 8'-0" on centers
- d. Every fourth line post shall be filled two-thirds of its height with concrete - the same concrete as used in concrete footings.

4. Section Specifications

- a. Straight Solid Panel PVC Fence
 - 1) Top Horizontal - 2" x 6"
 - 2) **8' High Only** - Middle Horizontal - 2" x 6"
 - 3) Bottom Horizontal - 2" x 8"
 - 4) Verticals - 7/8" x 7"
 - 5) U Channel - 1" x 1 1/2"
- b. Concrete Footings
 - 1) Line Posts shall be set in 12" diameter by 36" deep concrete footings. All footing tops shall be crowned with a 1" slope to shed water.
 - 2) All posts shall be set plumb in concrete. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
 - 3) Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of Straight Solid Panel PVC Fence in Four (4') to Eight (8') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The unit price bid per each square foot of fence shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work including gate posts, excavation, fill, restoration, grading, and shop drawings.
3. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.



STRAIGHT SOLID PANEL PVC FENCE

LINE POSTS:	5" x 5" x 0.135" THICK FENCE POST SET IN 12" DIAMETER BY 36" DEEP, 3,000 PSI CONCRETE FOOTINGS AT 8'-0" O.C. AND VARIABLE
TOP RAIL:	MANUFACTURED BY MARKSMEN MANUFACTURING CORP. OR EQUAL
BOTTOM RAIL:	2" x 6" RIBBED FENCE PROFILE W/1 3/4" x 1 3/4" ALUMINUM U-CHANNEL INSERT
VERTICAL:	2" x 8" RIBBED PLANK PROFILE W/1 3/4" x 1 3/4" ALUMINUM U-CHANNEL INSERT
PVC MATERIAL:	7/8" x 1 1/2" U-CHANNEL 1" x 1 1/2" U-CHANNEL CONSTRUCTED OF SOLID WALL VIRGIN POLYVINYL CHLORIDE CONFORMING TO ASTM F 964 - COUNTRY ESTATE AS MANUFACTURED BY NEBRASKA PLASTICS, INC. OR EQUAL.

SCALE: 1/2" = 1'-0"
DATE: 10/27/09

NASSAU COUNTY

ITEM 731 - 4'-0" WIDE SINGLE SWING STRAIGHT SOLID PANEL PVC GATES (4'-0" to 8'-0" HIGH)

A. Description.

1. Under this item the Contractor shall furnish and install 4' Wide Single Solid Panel PVC Picket Gates in Four (4') to Eight (8') Foot Heights for PVC Fence, including two heavy duty gate in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.

B. Materials and Construction Details.

1. Materials

- a. Solid Wall Virgin Polyvinyl Chloride (PVC) conforming to ASTM F 964
- b. **Manufacturer.** Nebraska Plastics, Inc., P.O. Box 45, Cozard, Ne 69130; Telephone 1-800-445-2887; Fax 1-308-784-3216 or Approved Equal.
- c. **Style.** Country Estate Fence – Lakeland or approved equal.

2. **Heights.** Single Swing Gates shall come in four, five, six and eight foot heights

3. **Gate Posts:** 6 1/2" x 6 1/2" heavy duty (two required)

4. Gate Specifications

a. Straight Solid Panel PVC Fence Gates

- 1) Two (2) - 5" x 5" x 0.135" Fence Posts
- 2) Two (2) - New England Post Caps
- 3) Top Horizontal - 2" x 6"
- 4) **8High Only** - Middle Horizontal - 2" x 6"
- 5) Bottom Horizontal - 2" x 8"
- 6) Verticals - 7/8" x 7"
- 7) U Channel - 1" x 1 1/2"
- 8) One pair of white powder coated stainless steel hinges and
- 9) One white powder coated latch

b. Concrete Footings

- 1) Gate Posts shall be set in 16" diameter by 42" deep concrete footings and filled completely with concrete. All footing tops shall be crowned with a 1" slope to shed water.
- 2) All posts shall be set plumb in concrete. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
- 3) Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of 4' Wide Single Swing PVC Solid Panel Gates in Four (4') to Eight (8') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage of gates shall be determined by measuring the clear opening between the inside faces of the gate's hinge and latch posts and multiplying by the nominal height of the fence.

3. The unit price bid per each square foot of gates shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work including gate posts, excavation, fill, restoration, grading, and shop drawings.
4. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.

**ITEM 732 - 10'-0" WIDE DOUBLE SWING STRAIGHT SOLID PANEL PVC GATES
(4'-0" TO 8'-0" HIGH)**

A. Description.

1. Under this item the Contractor shall furnish and install 10' Wide Double Swing PVC Gates in Four (4') to Eight (8') Foot Heights for PVC Fence, including two heavy gate posts in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.

B. Materials and Construction Details.

1. **Materials**
 - a. Solid Wall Virgin Polyvinyl Chloride (PVC) conforming to ASTM F 964
 - b. **Manufacturer.** Nebraska Plastics, Inc., P.O. Box 45, Cozard, Ne 69130; Telephone 1-800-445-2887; Fax 1-308-784-3216 or Approved Equal.
 - c. **Style.** Country Estate Fence – Lakeland or approved equal.
2. **Heights.** Double Swing Gates shall come in four, five, six and eight foot heights
3. **Gate posts:** 6 ½" x 6 ½" heavy duty (two required)
4. **Gate Specifications**
 - a. Straight Solid Panel PVC Fence Gates
 - 1) Two (2) - 5" x 5" x 0.135" Fence Posts
 - 2) Two (2) - New England Post Caps
 - 3) Top Horizontal - 2" x 6"
 - 4) **8High Only** - Middle Horizontal - 2" x 6"
 - 5) Bottom Horizontal - 2" x 8"
 - 6) Verticals - 7/8" x 7"
 - 7) U Channel - 1" x 1 ½"
 - 8) Two pairs of white powder coated stainless steel hinges and
 - 9) One white powder coated cane rod
 - b. Concrete Footings
 - 1) Gate Posts shall be set in 18" diameter by 48" deep concrete footings and filled completely with concrete. All footing tops shall be crowned with a 1" slope to shed water.
 - 2) All posts shall be set plumb in concrete. The concrete shall be Item 17A, Class A concrete 1-2-4 mix. Footings shall be cast rough in the ground and pitched above grade to shed water.
 - 3) Excavation and backfilling for footings is included hereunder.

C. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of square feet of 10' Wide Double Swing PVC Gates in Four (4') to Eight (8') Foot Heights furnished and installed in accordance with the Plans, Specifications and appropriate Detail as approved by the Engineer.
2. The actual square footage of gates shall be determined by measuring the clear opening between the inside faces of the two gate posts and multiplying by the nominal height of the fence.

3. The unit price bid per each square foot of gates shall include the cost of furnishing all labor, materials, tools, equipment and incidentals necessary to satisfactorily complete the required work including gate posts, excavation, fill, restoration, grading, and shop drawings.
4. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.

ITEM 733 - 35' HIGH ALUMINUM FLAGPOLE - INTERNAL HALYARD

A. Description.

1. Under this Item, the Contractor shall furnish and install 35' High Aluminum Flagpoles with internal halyards as described in the following Specification, as shown on Plans and/or as directed by the Engineer.

B. Submittals.

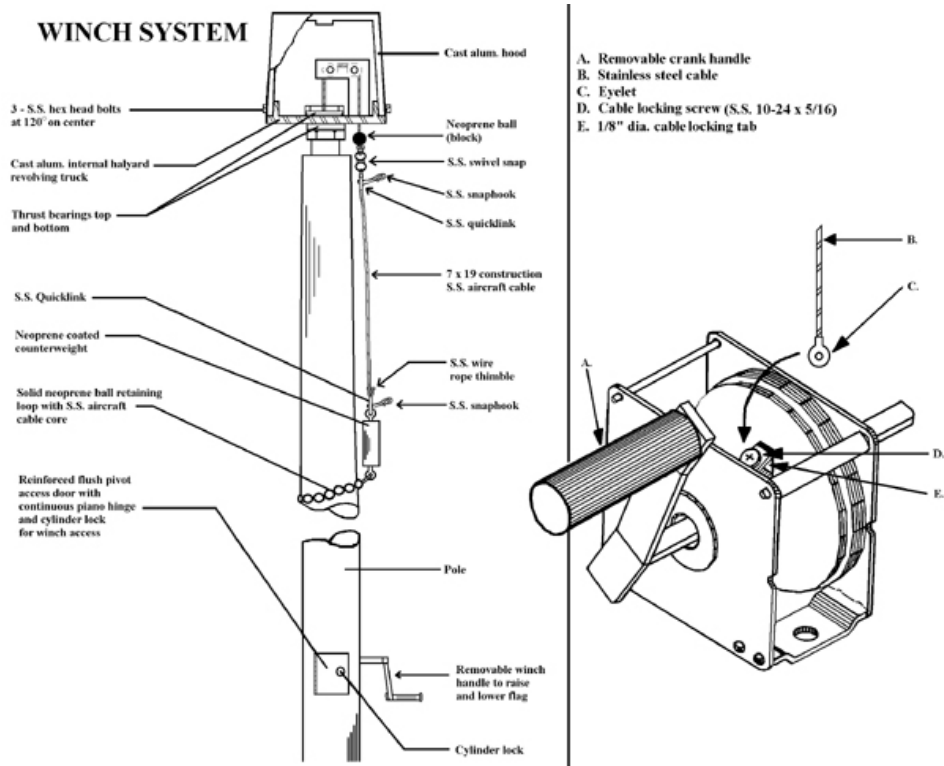
1. Submit two copies of manufacturer's shop drawings, installation instructions and maintenance procedures.

C. Materials and Construction Details.

1. The Contractor shall furnish and install 35' Exposed x 38'-6" Overall x 6" Butt x 3/16" Wall Thickness Tapered Aluminum Flagpole as manufactured by Pole Tech CO., Inc., 97 Gnarled Hollow Road, East Setauket, New York 11733, Web Site: www.poletech.com; Phone: (631) 689-5525; Fax (631) 689-5528 or approved equal and shall consist of the following:
2. **Pole.** Fabricated from seamless, extruded tubing complying with ASTM B241, alloy 6063-T6, with a minimum yield strength of 30,000 psi. The rate of taper is 1" every 5'6". Polished Satin Brush Finish. A textured mechanical finish produced by abrasive polishing yielding a smooth and uniform appearance.
3. **Internal Winch System** - See Detail. A stainless steel cable is attached to a gearless positive locking winch that allows display of the flag at any position on the pole. The cable is routed over two pulleys inside the revolving truck and ends with a neoprene ball block to prevent jamming at the poles top. Then, an arrangement, the length of each flag to be flown, is attached. At the bottom of this arrangement a beaded sling encircles the pole and keeps the flag tight against the flagpole. The neoprene-coated counterweight allows for proper lowering of the flag.
4. **Access.** A flush-hinged door with a cylinder lock is provided to access and maintain the winch and cable. The winch handle is removable and is used to raise and lower the flag through an access hole in the pole.
5. **Ball.** The ornamental ball shall be 6" in diameter and made of 14 gauge gold anodized aluminum.
6. **Ground Sleeve.** The ground sleeve is made of a 16 gauge corrugated galvanized steel tube. On the inside, at the bottom, 4 steel wedges are welded to center the pole upon installation. A 1/2" steel base plate is welded to the bottom with an 18" length x 3/4" diameter steel spike attached to act as lightning protection
7. **Foundation** - See Detail. The foundation shall be cast in accordance with the attached detail using concrete conforming to the requirements of and be paid for under Item 17A - Class A Concrete.
8. **Flag.** The United States flag shall be 6' x 10' made using durable heavyweight Dupont Solarmax nylon with embroidered stars and sewn stripes. The fly end shall have four rows of stitching, the heading shall be made of canvas and the flag shall connect to the swivel snaps with two brass grommets.

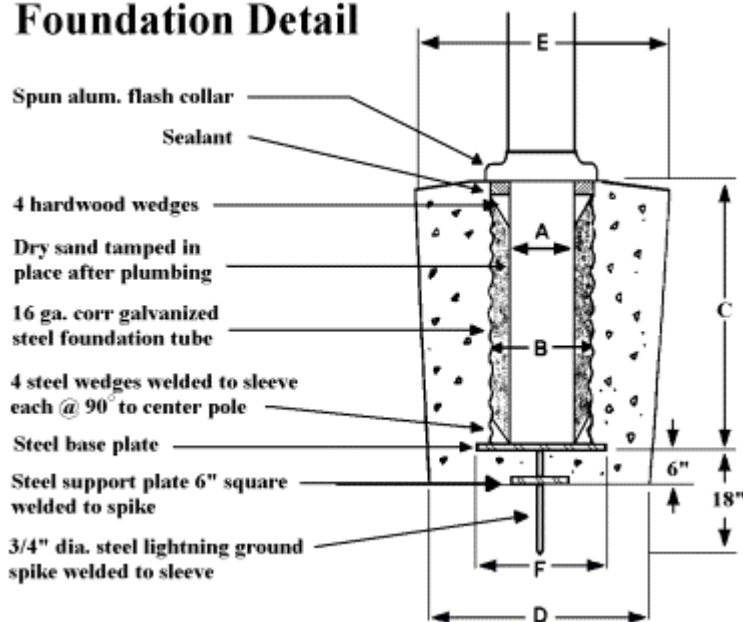
D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the number of 35' High Aluminum Flagpoles with internal halyards furnished and installed. The unit bid price shall include, but not be limited to all necessary labor, materials, tools, supplies, equipment and incidentals necessary to complete the work.
2. Payment of concrete for footings will be paid under Item 17A-Class A Concrete.



Flagpole		A	B	C	D	E	F
EXPOSED HEIGHT	OVERALL LENGTH	POLE BUTT	SLEEVE DIA	SLEEVE LENGTH	FOUNDATION BASE	FOUNDATION TOP	BASE PLATE
35'	38.5'	6/7"	10"	42"	30"	36"	14"

Foundation Detail



ITEM 734 - PARK LIGHTING

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Park Lighting in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials.

1. **Model.** Parklite Luminaire on Nassau Pole as manufactured by Magniflood Inc., 7200 New Horizons Boulevard, North Amityville, NY 11701; Phone: (631) 226-1000; Fax: (631) 226-4444; Web Site: <http://www.magniflood.com> or approved equal.

a. Parklite-2 Luminaire.

- 1) **Material.** The cage and base mounting shall be cast aluminum and the cage shall be welded to form a vandal resistant Luminaire.
- 2) **Finish.** TGIC polyester acrylic powder coat in MagniBlack.
- 3) **Reflector.** The microfinished reflector tower in conjunction with the upper dome reflector create a Type V lighting distribution making the entire fixture appear as if it's aglow.
- 4) **Lens.** The lens shall be a polycarbonate injection molded diffuser allowing for uniform Type V lighting distribution. The Luminaire shall include a high pressure sodium 150 watt bulb.
- 5) **Electrical.** The ballast shall be a standard 120 volt, 60 hz reactor type. The fixture shall be a mogul base lamp in a glazed porcelain 4KV pulse rated socket. The luminaire shall be manufactured to meet UL Standard 1598 for wet locations.

b. Nassau Pole.

- 1) **Material.** The base and fixture tenon adapter shall be fabricated from cast aluminum. The column shaft shall be extruded 6063-T6 aluminum.
- 2) **Finish.** TGIC polyester acrylic powder coat in MagniBlack.
- 3) **Dimensions.** The total pole height shall be 12' and the post base diameter shall be 17".
- 4) **Mounting.** The bolt circle of the base mounting casting shall consist of four slotted openings allowing for adjustability in the 11 1/2" bolt circle diameter. The anchor bolts shall be 3/4" x 30" galvanized steel with 3" hooks.
- 5) **Access Door.** The access door shall be secured by heavy duty galvanized tamper proof screws.

C. Construction Details.

1. **Pole Foundation.** The Contractor shall furnish and install one 18" diameter x 36" deep concrete foundation. It shall be rough cast using concrete conforming to the requirements of and be paid for under Item 17A - Class A Concrete.
2. Orient anchor bolts in accordance with manufacturers guidelines. Set anchor bolts using

template provided by pole manufacturer. Set all poles plumb and level. Fill the annular space between pole base and pavers with non-shrink metallic aggregate grout, Embeco 885 by Master builders technologies or an approved equal.

3. The Contractor shall connect all wiring to the pole and provide all internal wiring from the base of the pole to the fixture. Wiring shall be type XLP-USE, 10 AWG, minimum; provide fused connection at the handhole, Bussman HEB-AA fuseholder and Bussman #FNM-10 amp fuse. All of the labor associated with the energizing shall be paid for under the Force Account Work item.
4. Protect all protruding bolts until poles are set in place with standard 36" high reflectorized roadway cone. Anchor in place.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Park Lights furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work, except the following:
 - a. Concrete for footing will be paid under Item 17A-Class A Concrete.
 - b. Energizing from nearest power supply point will be paid under Force Account Item 744.

ITEM 735 - BARRIER FREE WATER FOUNTAINS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Barrier Free Water Fountains in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials and Construction Details.

1. Model. 4590 Sanitary FR as manufactured by Halsey Taylor, 2222 Camden Court, Oak Brook, Illinois 60523; Phone: 630-574-3500; Fax: 630-574-3503; Web Site: www.halseytaylor.com or approved equal.
 - **General.** The pedestal shall be weather-resistant exposed Sierra™ stone aggregate. The contour-formed basin with rounded corners and edges reduces splatter, insures proper drainage and prevents standing waste water. The fountain shall be designed to be easily accessible to both physically challenged and able-bodied individuals. This model meets state and federal requirements as defined by the Americans with Disabilities Act.
 - **Sanitary Freeze-Resistant Valve System.** The assembly shall be fully sealed to minimize chance of ground water contamination and prevent drain water from mixing with fresh water. Freeze-resistant valve shall be designed for ground installation 18" below the frost line.
 - **Bubbler.** The unit shall include a one-piece, vandal-resistant, chrome plated two-stream mound-building bubbler with non-removable anti-squirt feature and integral hood to insure a satisfying drink of water.
 - **Pushbutton Actuation Mechanism.** The front mounted push button shall be self closing and vandal-resistant so as not to require grasping or twisting.
 - **Automatic Stream Height Regulator.** To prevent tampering, the Stream height regulator shall be located inside sanitary freeze-resistant valve system. The unit shall resist corrosion and liming. A constant stream height shall be automatically maintained under line pressures that vary from 20 to 105 psi.
 - **Water Inlet.** 1/2" male NPT fitting.
 - **Drain Outlet.** Drain requirements are detailed in owner's manual.
 - **Access Panel.** Manufactured of heavy-gauge steel with vandal resistant screws. Provides access for easy hook-up of all plumbing connections.
 - The fountain shall comply with ANSI 117:1 and ADA for visual and motion disabilities. The manufacturer shall certify the unit to meet the requirements of NSF/ANSI 61 and the Safe Drinking Water Act.

C. Construction Details.

1. Barrier Free Water Fountains shall be installed on cement concrete pads and secured using four (4) 1/2" x 4" anchor bolts. The concrete pads shall conform to Item 27 - Cement Concrete Sidewalk and be paid for under Item 27.

2. Fountain shall be furnished with service valve. Assemble fountain to prepared site and mounting pad. Position pedestal over plumbing and secure base to anchor bolts. Remove access panels and connect supply and water lines. Turn on water supply and check for leaks. All plumbing work, including supply water and drain outlet shall be performed by a licensed plumber and shall be paid for under the Force Account Work Item, based on site condition.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Barrier Free Water Fountains furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 736 - PARK BENCHES WITH BACKS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Park Benches with Backs in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials.

1. **Model.** CY420D - 6' Bench - Surface Mounted - Diamond as manufactured by Wabash Valley Manufacturing, Inc., 505 E. Main Street, P.O. Box 5, Silver Lake, IN 46982; Phone: (800) 253-8619; Fax: (260) 352-2160; Web Site: <http://www.wabashvalley.com> or approved equal.
 - a. **Finish.** The Inner metal structure shall be heat fused polyvinyl coated to an approximate thickness of 3/16". The framework assemblies shall be powder coated - electrostatically applied and oven cured. Fasteners shall be stainless steel.
 - b. **Bench Leg.** The bench leg thickness shall be 1 1/2" and the foot pads are 5 1/8" long x 2 3/8" wide. The overall height shall be 33 1/4".
 - c. **Bench Seat.** Bench seats shall be fabricated from 3/4" x 9 gauge steel mesh expanded metal. The frame/mounting brackets shall be 10 gauge sheet metal. The rolled sides shall be supported using 1/4" x 1 1/4" steel flat bar.
 - d. **Footprint.** 29" x 75 1/8".

C. Construction Details.

1. Park benches shall be installed on cement concrete pads and secured using SG135N - Surface Mount Package and four (4) anchor bolts. The concrete pads shall conform to Item 27 - Cement Concrete Sidewalk and be paid for under Item 27.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Park Benches with Backs furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 737 - PARK PICNIC TABLES WITHOUT BACKS

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Park Picnic Tables without Backs in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials.

1. **Model.** PP240D – 6' Rectangular Table without Back - Diamond as manufactured by Wabash Valley Manufacturing, Inc., 505 E. Main Street, P.O. Box 5, Silver Lake, IN 46982; Phone: (800) 253-8619; Fax: (260) 352-2160; Web Site: <http://www.wabashvalley.com> or approved equal.
 - a. **Finish.** The Inner metal structure shall be heat fused polyvinyl coated to an approximate thickness of 3/16". The framework assemblies shall be powder coated - electrostatically applied and oven cured. Fasteners shall be stainless steel.
 - b. **Table Frame.** Main supports shall be constructed of 2 3/8" O.D. x 12 gauge galvanized structural steel tubing. Mounting bracket on legs shall be 1/4" thick galvanized steel plate.
 - c. **Top and Seat.** Table tops and bench seats shall be fabricated from 3/4" x 9 gauge steel mesh expanded metal. The top and seat frame/mounting brackets shall be 10 gauge sheet metal. The top center support brace, which run the length of the top shall be 1/4" x 1 1/2" steel flat bar. The ends of the rolled sides of the top and seat shall be supported using 1/2" diameter steel rods. The seats shall be supported on the underside of the seat's crease using 1/4" x 1 1/2" steel flat bar.
 - d. **Footprint.** 79 1/2" x 72 1/8".

C. Construction Details.

1. Picnic tables shall be installed on cement concrete pads and secured using four (4) anchor bolts. The concrete pads shall conform to Item 27 - Cement Concrete Sidewalk and be paid for under Item 27.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Park Picnic Tables without Backs furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 738 - PARK RECEPTACLES

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, Park Receptacles in accordance with the Plans, Specifications and as directed by the Engineer.

B. Materials.

1. Model. 9W37 Infinity Square Funnel or Dome Top Frame - 35 Gallon Receptacle, Rubbermaid Commercial Products LLC, 3124 Valley Avenue, Winchester, VA 22601; Phone: (540) 667-8700; Fax: (540) 542-8770; <http://www.rubbermaidinfinity.com/> or approved equal.
 - a. **Frame.** ABS resin base to preclude rust stains
 - b. **Panels.** Infinity 35 Gallon Square Perforated Panel Kit - 4 (four) panels and 4 (four) uprights with automotive paint finish.
 - c. **Lid.** Infinity Square Funnel Top for 35 gallon frame or Infinity Square Dome Top as required.
 - d. **Footprint.** 23 1/2" Square.

C. Construction Details.

1. Receptacles shall be installed on cement concrete pads conforming to Item 27 - Cement Concrete Sidewalk. Payment to be made under Item 27.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the actual number of Park Receptacles furnished and installed in accordance with the Plans, Specifications and as directed by the Engineer.
2. The unit price bid for each shall include the cost of all labor, materials, tools, equipment, and other incidentals necessary to satisfactorily complete the required work.

ITEM 744 - FORCE ACCOUNT WORK

A. Description.

1. The amount estimated for the work under this Item is approximate and may be less or greater than the amount of the force account work indicated on the bid sheets. The amount will be based on the Force Account Work actually performed during the term of the contract with prior written approval of the Commissioner.
2. The use of this Item will require prior authorization of the County for each individual Force Account Work to be performed under this contract.

B. Materials and Construction Details.

1. Materials incorporated into the force account work shall be approved by the Engineer prior to installation. When no applicable contract unit prices exist, material costs shall be reimbursed based upon acceptable receipts and/or invoices plus markup, as per the requirement of contract documents, and as approved by the Commissioner of Public Works.

C. Method of Measurement.

1. All Force Account work performed under this Item shall be either:
 - a. agreed upon unit price with backup if required by the Engineer
 - b. agreed upon lump sum cost with backup/breakdown
 - c. not to exceed agreed prices with detailed backup (final cost may be lower but will never exceed the agreed price)
 - d. on a Time and Material basis plus applicable overhead and profit as stipulated within the Contract Documents and will be inspected and measured by the Engineer on a daily basis and signed off by the Contractor.

D. Basis of Payment.

1. Under this Item, all provisions as incorporated in the Contract concerning payment for extra or additional work are applicable. Total payment for this Item is subject to the requirements and conditions of this contract.
2. The amount to be paid for each type of Force Account Work per work order shall be based (see Method of Measurement, Section C.1.) upon the actual work satisfactorily completed and/or materials/machines furnished and approved in accordance with the requirements of the Contract documents.

ITEM 751 - SYNTHETIC TURF FIELD WITH UNDERDRAIN

A. Description.

1. Under this Item, the Contractor shall furnish all labor, materials, tools and equipment necessary to install, all synthetic turf, underdrain system and infill materials as indicated and as specified herein. The installation of all new materials shall be performed in strict accordance with the manufacturer's written installation instructions and in accordance with the approved shop drawings.

B. Submittals

1. **Product Data.** The Contractor shall submit information/cut sheets for each type of product indicated.
2. **Shop Drawings.** Show fabrication and installation details for synthetic turf and underdrain system, including plans, elevations, sections, details and attachments to other work.
3. **Samples for Verification.** For the following products, in manufacturer's standard sizes:
 - a. A minimum of 10" x 6" finished product sample of the exact synthetic turf and infill system that is specified for this Project.
 - b. Sand / Rubber mix with proper mix ratio, if different than specified.
4. **Manufacturer's Certificates.** Provide a certified list of fifteen (15) installations of 65,000 square feet or more of this specific type infill system, all being located in the United States in locations similar in climate to the Northeast USA. The fields shall not have been constructed over an e-layer (elastic layer) of a formed underpad.
5. **Warranties.**
 - a. **Third Party Insured Warranty.** The Bidder must supply a sample of the prepaid, Third party Insured Warranty with a \$5,000,000.00 aggregate per year that guarantees the usability and playability of the synthetic surface for eight years including:
 - 1) Coverage Term will be Ninety Six (96) months from the date of completion for all jobs completed.
 - 2) Limit of Liability: Minimum of \$5,000,000 for all fields installed during the 12 month period and no deductible shall apply to the warranty holder.
 - 3) Premium: Premium is pre-paid for the full term of the warranty period or 96 months.
 - 4) Period of indemnity to commence upon acceptance of the project by the owner or at the time the turf field is used for its intended purpose, whichever first occurs.
 - 5) Bankruptcy or Insolvency: Bankruptcy or insolvency of the Insured or of the insured's estate shall not relieve the insurance company of any of its obligations under its Policy.
 - 6) Security: Underwriter - Insurance Company is rated by AM Best "Secure" (A-) or higher.

b. **Manufacturer's Warranty.**

- 1) The 8 year Manufacturer's Warranty shall include coverage for damage caused from UV degradation or defects in workmanship and materials in the manufacturing or installation of the synthetic turf.
 - 2) All turf warranties shall be limited to repair or replacement of the affected areas, at the Manufacturer's option, and shall include all necessary materials, labor, transportation costs, etc. to complete the required repairs.
- c. **G-Max Warranty.** Turf must maintain an ASTM F355, G-Max no greater than a level of 175 for the life of the warranty. Contractor shall provide third-party testing results twice annually as directed by Owner.
- d. Synthetic turf system shall be approved as ADA Handicap accessible as determined by Test Method - ASTM 1951 for determination of accessibility of surface under and around playground equipment. The source, material description, gradation and sample of all items in the materials section shall be provided for County approval.

C. **Quality Assurance.**

1. **Installer Qualifications.** The Contractor must be or engage an authorized representative of synthetic turf manufacturer for installation and maintenance of units required for this Project. Cost shall be included in price bid for this item.
2. **Source Limitations.** Obtain synthetic turf through one source from a single manufacturer.
3. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The materials as hereinafter specified, should be able to withstand full climatic exposure in the Northeast USA, be resistant to insect infestation, rot, fungus and mildew; to ultra-violet light and heat degradation, and shall have the basic characteristic of flow through-drainage allowing free movement of surface run-off through turf and directly into the prepared granular base and into the field drainage system.
4. The synthetic turf and components shall be of national reputation with previous use at all levels of competition, including professional and collegiate levels and shall have been in use for a period of not less than one year. The turf fabric shall be produced by the manufacturer.
5. Prior to Project start, the Contractor and manufacturer shall specify in writing that their turf system does not violate any other manufacturers' patents, patents allowed or patents pending. Prior to the beginning of installation, the manufacturer of the synthetic turf shall inspect the sub-base and supply a Certificate of Sub-base Acceptance for the purpose of obtaining manufacturer's warranty for the finished synthetic playing surface.
6. The manufacturer must be a member of the "Synthetic Turf Council".

D. **Project Conditions.**

1. **Weather Limitations.** Proceed with installation only when existing and forecasted weather conditions permit synthetic turf to be performed according to manufacturers' written instructions and warranty requirements.
2. **Field Measurements.** When Engineering plans are not provided, the Contractor must

submit shop drawings and/or plans showing the proposed field and dimensions.

E. Manufacturer.

1. The synthetic turf field system shall be manufactured by one of the following companies:
 - a. A-Turf, Inc., 505 Aero Drive, Cheektowaga, NY 14225
Phone: (716) 204-0748; Toll Free: (888) 777-6910; Fax: (716) 204-0189
E-Mail:-.:c aiurLc.cn:
 - b. FieldTurf Tarkett, 8088 Montview, Montreal, Quebec H4P 2L7, Canada Phone: (514) 340-9311; Toll Free: (800) 724-2969; Fax: (514) 904-9311 E-Mail: infofieldturf.com
 - c. Sprinturf, Inc., 1200 Liberty Ridge Drive, Wayne, Pennsylvania, 19087 Phone: (610) 828-6500; Toll Free: (877) 686-8873; Fax: (610) 828-7925 E-Mail:EntDidcsoriniuni-?Dir,or approved equal.

F. Materials.

1. Synthetic Turf with in-fill.

- a. The 100% polyethylene fiber shall be consist of a spinneret mono-filament fiber, and may include a mono-filament tape fiber in duel fiber systems. The spinneret monofilament fiber material must be a minimum of 10,000 denier and the tape monofilament fiber material must be a minimum of 8,500 denier.
- b. The fiber shall be between 2 1/4" to 2' long and consist of a minimum of 44 ounces of fiber per square yard.
- c. The primary backing shall be a minimum of 8.5 ounce per square yard and consist of a minimum of two layers of material of woven and or non-woven fabrics or a combination of both. The backing must be heat and UV resistant, providing dimensional stability in all directions, to prevent stretching, shrinking, creeping and line distortion.
- d. The secondary backing shall consist of a heat activated polyurethane coating weighing a minimum of 20 ounces per square yard. The backing shall be heat punched to create a grid of drainage perforations on 2" x 2'/a' centers to maximize drainage.
- e. Install a resilient infill system consisting of a 70% homogenous mixture of specifically sized 10-20 sieve recycled crambient SBR rubber granules and 30% of specifically sized, rounded, washed and kiln dried silica sand. The sand content shall represent no more than 30% by weight of the total infill system.

2. Perimeter Nailer.

- a. 6" x 6" (or as approved by the engineer) recycled plastic lumber perimeter edge nailer (Refer to Item 757 for payment and item specification).

3. Porous Stone Base and Drainage System.

- a. Provide a semi-pervious geotextile fabric, Mirafi 140N or approved equal. An impervious liner may be specified by order of the Engineer only in poorly drained soil conditions.
- b. The stone aggregate shall be installed in two layers:

- 1) 5 3/4" open graded stone (OGS) base aggregate
- 2) 1/4" finish aggregate with the following gradation:

	(OGS) BASE	FINISH
Sieve Size	% Passing	% Passing
1 1/4"	100	
3/4"	70-100	
3/8"	35-50	
1/4"		100
1/8"		80-100
#4	20-35	
#8		40-65
#16	12-20	15-35
#100	5-9	5-9
#200	1-5	1-5

c. Drainage Piping

- 1) Panel Drains: 1"x12" Multi-Flow or approved equal.
- 2) Perimeter Drain: Properly sized to six (6") inch to twelve (12") inch diameter of HDPE, ADS N-12 or approved equal.

G. Construction Details.

1. Subgrade.

- a. **Preparation of Subgrade.** All topsoil, organic, and non-compactable materials need to be removed to a minimum depth of eight (8") inches below the soil bed. If unsuitable soil is encountered the Engineer shall be notified. If additional excavation of unsuitable material is required, this shall be in conformance with and paid for under Item 2, Unclassified Excavation. If acceptable fill is not available on-site, the fill required to raise the subgrade to the proper elevation shall be in conformance and paid for under Item 5C, Selected Fill.
- b. The subgrade must have a minimum slope of 0.5% and a maximum slope of 1.0%, depending on the soil analysis, from the longitudinal center of the field towards the

sidelines.

- c. The subgrade must be compacted in both directions to attain the specified compaction rate of 95% standard Proctor.
- d. The subgrade must be prepared to tolerances of not more than 1/2" from design grade to allow for even drainage. The cost of fine grading the subgrade shall be paid for under Item 7 - Preparing Fine Grade.

2. Porous Stone Base and Drainage System.

- a. A geotextile fabric shall be installed over a compacted and prepared sub-grade. Seams shall be overlapped a minimum of twelve (12") inches. The geotextile shall extend into and completely wrap the perimeter drainage trench.
- b. Multi-flow TM 1"x12" panel drains or approved equal shall be installed and secured over the geotextile, thirty (30') feet on center, diagonally across the playing field in a herringbone design. The drains shall be terminated at the perimeter drain.
- c. A properly sized perimeter drain, 6" to 12" in diameter, shall be installed in a properly excavated ditch, lined with geotextile. The CPPP (corrugated perforated plastic pipe) shall be sloped 0.05" per lineal foot toward the exit point to the existing storm drain.
- d. The base (OGS) aggregate layer shall be installed with care to avoid damaging the geotextile or the strip drains. The stone shall conform to the sieve in Section F.3.b.2). The base (OGS) layer shall be 5 3/4" thick. The surface planarity shall not vary more than 3/8" in any direction.
- e. Laser guided grading of the stone base is mandatory.
- f. The finish aggregate layer is one-quarter (1/4") inch thick and shall be installed in a single layer. The stone shall conform to the sieve in Section F.3.b.2. The surface planarity must not vary more than one-quarter (1/4") inch in any 10' direction. Enough finish stone shall be installed to insure a full one-quarter (1/4") inch above the base (OGS) aggregate. All stone layers must be rolled in both directions to obtain maximum compaction and settlement.
- g. The finished stone base must be accepted by the turf manufacturer for planarity.

3. Perimeter Edge Nailer.

- a. A perimeter edge nailer shall be installed along the entire perimeter boundary of the synthetic turf field as shown on Project drawings and installed as per the manufacturer's specifications.
- b. The perimeter edge nailer shall be paid under Item 757.

4. Examination by the Manufacturer.

- a. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of work.
- b. Proceed with installation only after unsatisfactory conditions have been corrected.
- c. The surface to receive the synthetic turf shall be inspected and certified by the

manufacturer as ready for the installation of the synthetic turf system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process. The final subbase surface shall be surveyed by the Contractor by means of a laser level on a 25 foot grid shot.

- d. The installation shall be performed in full compliance with approved shop drawings. Only factory-trained technicians skilled in the installation of athletic caliber synthetic turf systems, working under the direct supervision of the manufacturer's supervisors, shall undertake the placement of the system. The designated Supervisory personnel on the Project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the infill mixture. The manufacturer shall certify the installation for warranty compliance.
- e. The surface to receive the synthetic turf shall be inspected and certified by the manufacturer as ready for the installation of the synthetic turf system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

5. Synthetic Turf with In-Fill.

- a. The turf rolls are to be installed directly on the laser graded stone base. Extreme care should be taken to avoid disturbing the aggregate base. A 2-5 ton static roller shall be used compact the base ahead of the placement of each roll of turf.
- b. Full width rolls shall be laid out across the field. Using "state of the art" gluing or sewing techniques each roll shall be attached to the next. When all of the rolls of the playing surface have been installed, the sideline rolls shall be installed at right angles to the playing surface rolls. There shall be no "head seams" permitted in the playing area.
- c. The infill mixture shall be evenly spread with large drop spreaders, minimum 5' wide, in multiple layers. Between each layer, the fiber shall be brushed or dragged to insure that fibers are not trapped by the infill.
- d. The markings on the field shall be inlaid or factory tufted. All inlays will be installed using state of the art gluing techniques.
- e. The average G-max of the finished system must remain under 175 G's for the life of the warranty period.
- f. On completion of the surface the fiber shall be approximately three-quarters (¾) of an inch above the finished infill. The finished surface will have the planarity and subtle undulations, similar to a typical natural grass athletic field.
- g. All field markings shall be installed in accordance with manufacturer's specifications and paid under their respective items.

H. Field Quality Control.

- 1. Testing Agency. The Contractor shall provide a qualified independent testing and inspecting agency, approved by County, to perform field tests and inspections and prepare test reports.
- 2. Testing Services. Testing and inspecting of completed applications of synthetic turf system shall take place in successive stages, in areas of extent and using methods as

follows. Do not proceed with application of the next stage until test results for previously completed applications show compliance with requirements.

3. Remove and replace applications where test results indicate that it does not comply with specified requirements.

I. Final Acceptance.

1. Prior to Final Acceptance, the Contractor shall submit to the County three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and striping.
2. The Contractor shall provide evidence that the turf can be plowed with conventional rubber bladed snow removal equipment.
3. The finished playing surface shall appear as mowed grass with no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use.
4. Contractor shall perform a GMAX test at the completion of installation and prior to final acceptance to demonstrate compliance with an ASTM F355 GMAX of less than or equal to 175.
5. Turf Groomer. The Contractor shall provide a turf groomer sweeper as recommended by the synthetic turf manufacturer. The groomer cost shall be included in the bid price for this item and shall only be provided to the County for full size youth/adult athletic fields.

J. Cleaning.

1. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items. All usable remnants of new material shall become the property of the County. The Contractor shall keep the area clean throughout the Project and clear of debris. Surfaces, recesses, enclosures, etc., shall be cleaned, as necessary, to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the County.

K. Measurement and Payment.

1. The quantity to be paid for shall be the number of square feet of artificial turf field surface, completed and measured in place and accepted in accordance with the provisions of these Specifications. The unit price bid shall include, but not limited to, all necessary excavation, select granular fill (except as stated in Section G-1), compaction, underdrain system, connection to storm water retention area with corrugated polyethylene pipe, synthetic grass system, resilient infill, geotextile fabric, stone base, finishing stone, compaction, other incidentals necessary as specified herein, and all labor, materials, tools, supplies, equipment, shop drawings, testing and other incidentals necessary to complete the work.

ITEM 752 - UPGRADE TO COLORED INFILL

A. Description.

1. Under this Item the Contractor shall upgrade the infill specified in Item 751 - Synthetic Turf Field with Underdrain System, with a colored infill.

B. Materials.

1. The materials used shall be identical to those specified in Item 751 - Synthetic Turf Field with Underdrain System, except that the infill will be a colored infill of green, light brown or tan, as ordered by the Engineer.

C. Method of Measurement.

1. The method of measurement for Item 751 shall apply.

D. Basis of Payment.

1. This unit price bid for this Item shall be limited to the additional cost of material to provide a colored infill in lieu of the infill specified in Item 751.

ITEM 753 - SPORTS FIELD STRIPING

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install sports field striping on various types of synthetic turf athletic fields as indicated and as specified herein. The installation shall be performed in strict accordance with the manufacturer's written installation instructions and in accordance with all approved shop drawings.

B. Related Documents.

1. All requirements of Item 751, Synthetic Turf Field with Underdrain, shall apply, including but not limited to materials, quality assurance, project conditions, warranty, etc.

C. Submittals.

1. Shop Drawings shall be submitted for all striping layouts.
2. The Contractor shall submit two (2) - 4" x 12" samples of all striping colors intended in use of field.

D. Construction Details.

1. The installation of sports field striping shall be performed in strict accordance with the manufacturer's written installation instructions and in accordance with all approved shop drawings.

E. Measurement and Payment.

1. The quantity to be paid under this Item shall be the actual linear feet of striping installed to the nearest linear foot, completed and measured in place and accepted in accordance with the provisions of these specifications. In the event that the County elects to install numbers or other "striping" on the field that is not 4" wide, the total square footage of striping shall be divided by 4" to determine the equivalent linear footage. The unit bid price shall include, but not be limited to, all necessary labor, materials, tools, supplies, equipment, shop drawings and incidentals necessary to complete the work.

ITEM 754 - CUSTOM LOGOS, NUMBERS AND LETTERING

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to install in place, County of Nassau logo, or other logos, numbers and lettering specified on the Plans provided for construction. They shall be the same type synthetic turf as installed within the field. Their installation shall be performed in strict accordance with the manufacturer's written installation instructions, and in accordance with all approved shop drawings.

B. Related Documents.

1. All requirements of Item 753, Sports Field Striping shall apply, including but not limited to materials, quality assurance, project conditions, warranty, etc.

C. Submittals.

1. Shop Drawings shall be submitted for all custom logos, numbers and lettering layouts, based upon artwork to be provided by the County of Nassau.
2. The Contractor shall submit two (2) - 12"x12" synthetic turf samples, in colors to be incorporated into the logo.

D. Construction Details.

1. The installation of synthetic turf logos, numbers and lettering shall be performed in strict accordance with the manufacturer's written installation instructions and in accordance with all approved shop drawings.
2. The Contractor shall fabricate the custom logos, numbers and lettering offsite and transport them to the proposed field and be installed in the same manner as specified in Item 751, Synthetic Turf Field With Underdrain.

E. Measurement and Payment.

1. The area to be paid shall be defined as a rectangle encompassing the outside boundary of each logo, number and letter, as approved by the Engineer.
2. The quantity to be paid under this Item shall be the number of square feet supplied and installed for each logo, number and letter. The unit bid price shall include, but not be limited to, all necessary labor, materials, tools, supplies, equipment, shop drawings and incidentals necessary to complete the work.

ITEM 755 - HEAVY DUTY NON-INFILL BATTING CAGE TURF

A. Description.

1. Under this Item, the Contractor shall furnish all labor, materials, tools and equipment necessary to install Heavy Duty Non-Infill Batting Cage Turf as specified herein. The installation of all new materials shall be performed in strict accordance with the manufacturer's written installation instructions and in accordance with the approved shop drawings.

B. Materials.

1. The 100% texturized monofilament nylon fibers that comprise the synthetic turf system shall be 3/16" gauge, 5,700 denier and tufted to a minimum of 48 oz. per square yard.
2. The texturized nylon fibers shall be tufted to a double backing consisting of woven polypropylene layers.
3. The synthetic turf system shall consist of a nominal 3/8" pile height texturized nylon monofilament weighing no less than 48 oz. per square yard.
4. The synthetic turf fibers shall be tufted through a minimum double layered polypropylene primary backing and coated with a 5mm urethane foam pad. The secondary backing shall consist of a 5mm urethane pad measuring no less than 90 oz. per square yard.

C. Construction Details.

1. The non-infill synthetic turf system shall be glued to an existing concrete base utilizing Nordot 34N, Chapco 7/11 or approved equivalent.
2. The finished base must be accepted by the turf manufacturer for planarity. It shall not vary more than 1/8" in any 10' direction.
3. Any rolls wider than the manufactured width must be seamed together utilizing 12" wide seaming tape and high strength polyurethane adhesive such as Nordot 34G or an approved equivalent by the synthetic turf manufacturer.

D. Manufacturer's Warranty.

1. The Warranty shall include coverage for damage caused from UV degradation or defects in workmanship and materials in the manufacturing or installation of the synthetic turf for a period covering 5 years.
2. All turf warranties shall be limited to repair or replacement of the affected areas, at the Manufacturer's option, and shall include all necessary materials, labor, transportation costs, etc. to complete the required repairs.

E. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the total number of square feet of Heavy Duty Non-Infill Batting Cage Turf furnished and installed in accordance with the Plans, Specifications and appropriate Standard Detail Sheet as approved and as directed by the Engineer.
2. The unit price bid per each square foot of Heavy Duty Non-Infill Batting Cage Turf and shall include the cost of furnishing all labor, materials, tools, equipment, shop drawings and incidentals necessary to satisfactorily complete the required work.

ITEM 756 - SYNTHETIC TURF REPAIR

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to repair synthetic turf field areas as directed by the Engineer or County's Authorized Representative. The repairs shall be in accordance with manufacturer's repair procedures.

B. Related Documents.

1. All requirements of Item 751, Synthetic Turf Field with Underdrain shall apply, including but not limited to materials, quality assurance, project conditions, warranty, etc.

C. Warranty.

1. The Contractor will make repairs to the field for items not covered under the warranty. All corrective actions and turf replacement will be made in accordance with the manufacturer's specifications and those specifications outlined in Item 751, Synthetic Turf Field with Underdrain. All repairs will be made utilizing methods and materials that will not void the manufacturer's standard warranty.

D. Construction Details.

1. The Contractor shall first make an assessment of the field damage to determine if such a repair is covered under the manufacturer's standard warranty. The Contractor shall coordinate a site visit with the manufacturer's field representative on the County's behalf. If a repair is deemed to be outside the manufacturer's warranty, the Contractor shall make the repair as approved by the manufacturer and the County. Contractor shall remove and replace the synthetic turf and infill in accordance with the specifications, Item 751, Synthetic Turf Field with Underdrain and the manufacturer's specifications. With the approval of the County and the manufacturer, repair seams may be glued. The finished product shall match the existing grades and should be identical to the existing field, with the exception of ultraviolet degradation and natural discoloration.

E. Measurement and Payment.

1. The quantity to be paid under this Item shall be the number of square feet of synthetic turf installed for the repair as ordered by the Engineer. The unit bid price shall include, but not be limited to all necessary labor, materials, tools, supplies, equipment and incidentals necessary to complete the necessary work.

ITEM 756A – SYNTHETIC TURF SEAM REPAIR

All provisions of Item 756 shall apply, except as modified herein.

A. Description

1. Under this item, the contractor shall furnish all labor, tools, materials, and equipment necessary to repair synthetic turf field areas (seams only) as directed by the Engineer to County's Authorized Representative. The repairs shall be in accordance with the manufacturers' repair procedures.

B. Measurement and Payment.

1. The quantity to be paid under this Item shall be the number of linear feet of synthetic turf seams repaired as ordered by the Engineer. The unit bid price shall include, but not be limited to all necessary labor, materials, tools, supplies, equipment and incidentals necessary to satisfactorily complete the work.

ITEM 757 - 6"x6" RECYCLED PLASTIC LUMBER PERIMETER EDGE NAILER

A. Description.

1. Under this Item, the Contractor shall supply and install a 6"x6" recycled plastic lumber perimeter edge nailer for the synthetic turf field where shown on the Plans or as ordered by the Engineer.

B. Materials.

1. 6" x 6" recycled plastic lumber
2. 2" x 4" recycled plastic lumber

C. Construction Details.

1. Contractor shall set perimeter edge nailer on subgrade as shown on drawings. The Contractor shall ensure nailer is straight and at the required grade.
2. Contractor shall nail 2" x 4" recycled plastic lumber to field face or 6" x 6" recycled plastic lumber in accordance with manufacturer's recommendations.

D. Measurement and Payment.

1. The quantity to be paid for under this Item shall be the number of linear feet of perimeter edge nailer as measured in place to the nearest foot. The unit bid price for this Item shall include the cost of all labor, materials, equipment and other incidentals required to complete the work in accordance with these specifications.

ITEM 758 - G-MAX TESTING

A. Description.

1. Under this Item the Contractor shall furnish all labor, tools, materials and equipment necessary to test synthetic turf fields shock absorbing characteristics (G-Max), as directed by the Engineer.

B. Submittals.

1. Provide testing company and their qualifications to be approved by the County.
2. Written report of all data, results, resultant summary and remediation recommendations (if applicable) within seven business days maximum from testing date.
3. Testing company must be a member of the Synthetic Turf Council.

C. Materials.

1. Testing material shall be the equipment recommended as per ASTM F 355.

D. Procedure.

1. The testing shall conform to ASTM F 355, "Standard Test Method for Shock- Absorbing Properties of Playing Surface Systems and Materials."
2. The test shall be performed at a minimum of six (6) specific drop locations, with a minimum of three (3) tests per location.

E. Measurement and Payment.

1. The total quantity to be paid for under this Item shall be each test performed at a field as directed by the Engineer. The unit bid price shall include, but not be limited to all necessary labor, materials, tools, supplies, equipment and incidentals necessary to complete the work.

ITEM 759 - ANTIMICROBIAL TREATMENT

A. Description.

1. Under this Item, the Contractor shall furnish all labor, tools, materials and equipment necessary to supply and apply antimicrobial treatment for synthetic turf athletic fields as directed by the Engineer.

B. Submittals.

1. Submit two (2) samples, 12"x12" in size, each of complete synthetic turf system with and without antimicrobial.
2. Certified copies of independent (third-party) laboratory reports on ASTM tests as follows.
 - a. Antimicrobial Activity, E 2149-01
 - b. Traction Characteristics, F 2333
3. Copy of the Manufacturer and Applicator insurance policy specifying aggregate levels of insurance coverage.
4. Application pattern diagram.

C. Warranty.

1. The antimicrobial manufacturer shall provide a Warranty to the County that covers the antimicrobial treatment for a period of one (1) year. The antimicrobial manufacturer shall verify that their onsite representative has inspected the application and that the work conforms to the manufacturer's requirements.
2. The antimicrobial manufacturer's warranty shall include general wear to the surface.
3. The antimicrobial manufacturer must verify the validity of the antimicrobial treatment at least once per year and provide a written analysis report to the field owner.
4. The manufacturer shall provide written documentation from the synthetic turf manufacturer attesting that the antimicrobial treatment is compatible with the synthetic turf system and will not void or otherwise change the synthetic turf system warranty.

D. Quality Assurance.

1. **Manufacturer Qualifications.** Company specializing in manufacturing coatings specified in this section.
 - a. Antimicrobial product must be registered with the EPA;
 - b. Technology must have 30 years or more of documented performance;
 - c. The antimicrobial treatment must chemically bond to become a polymeric non-leachable coating.
2. **Product Assurances.**
 - a. Antimicrobial treatment must be verifiable via quick non-destructive analysis.

3. Application Assurances.

- a. Product must be applied by Authorized Applicator that has undergone training and certification by Manufacturer.
- b. Manufacturer must demonstrate the antimicrobial treatment has been applied to all the graded sand, crumb rubber and the turf fibers.

E. Materials.

1. The Contractor shall use Turfaide — 1 year as manufactured by Coatings Specialists Group, 2849 Product Drive, Rochester Hills, Michigan, 48309; Phone. (248) 299-2607, or approved equal.

2. Product Requirements.

- a. The antimicrobial shall impart a durable, long lasting layer of antimicrobial protection on the synthetic turf system including the blades of synthetic grass and infill components.
- b. The antimicrobial shall be invisible and odorless and shall attach to the synthetic grass fiber and sand or rubber infill component through a molecular bond.
- c. The antimicrobial shall not leach, dissipate or be absorbed by other organisms.
- d. The antimicrobial shall not contain heavy metals, polychlorinated phenols, enzymes or PCBs.
- e. The antimicrobial mode of action shall be mechanical-physical action.
- f. The antimicrobial mode of action shall not be chemical poisoning.
- g. The antimicrobial shall be effective against a broad spectrum of gram (+) and gram (-) bacteria, mold, mildew, fungi, yeasts and algae.
- h. The antimicrobial shall not create an environment that promotes adaptive microorganisms.
- i. The antimicrobial shall not negatively affect traction characteristics of the synthetic turf system.
- j. The antimicrobial shall not adversely affect the UV resistance of the athletic turf field.
- k. The antimicrobial must not diminish the durability of logo and marking paints.
- l. The antimicrobial must be resistant to maintenance products and paint removers used in the field.
- m. The antimicrobial must be resistant to groomers, drag brooms, debris removers and sweepers
- n. The antimicrobial shall be 100% compatible with rubber backing, adhesives, polyester thread and seam underlayments.

F. Application.

1. The synthetic surface to receive the topical antimicrobial coating shall be inspected by the applicator prior to the application and must be accepted by the applicator and the general contractor in writing. The acceptance will depend on the synthetic turf installer confirming that the turf system and infill component has been installed in accordance with the synthetic turf manufacturer's specifications.
2. The synthetic surface must be clear of any turf installation equipment or sporting equipment that may interfere with the application of the antimicrobial.
3. The applicator shall apply antimicrobial in accordance with manufacturer's instructions. The applicator shall strictly adhere to the application procedures outlined in the certification process from the manufacturer. Any variance from these requirements must be accepted in writing by a manufacturer's representative and submitted to the owner verifying that the changes do not in any way affect the warranty.
4. The application shall commence after the synthetic field installers onsite representative has concluded the installation of the turf and infill.
5. The applicator shall provide the labor and equipment necessary to complete the application procedures in accordance with the manufacturer's instructions.
6. The antimicrobial will be applied by a spray method.

G. Measurement and Payment.

1. The total quantity to be paid for under this Item shall be the number of square feet of the existing synthetic field surface that antimicrobial treatment is being applied. The unit bid price shall include, but not be limited to all necessary labor, materials, tools, supplies, equipment and incidentals necessary to complete the work, to the satisfaction of the Engineer or Authorized County Representative.

ITEM 760 - MAINTENANCE FOR TURF FIELDS INSTALLED UNDER THIS CONTRACT

A. Description.

1. Under this Item, the Contractor shall maintain synthetic turf fields and infill materials as indicated and as specified herein. The maintenance shall be performed in strict accordance with the manufacturer's written maintenance instructions.
2. This agreement is to include the maintenance of new synthetic turf field installed under this contract, after expiration of maintenance warranty period.
3. The Contractor must provide competent workmen skilled in synthetic grass. The designated supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the maintenance of this material.
4. It is the contractor's responsibility to coordinate with the County for scheduling of proposed maintenance.

B. Submittals.

1. Equipment. For each type of equipment used.
2. Evidence from the turf manufacturer stating that the contractor for the maintenance of the synthetic turf is certified by the manufacturer to maintain said turf.

C. Quality Assurance.

1. Prior to Engineer approval of the specified synthetic turf equipment, the Contractor and manufacturer shall specify in writing that their turf equipment does not violate any other manufacturer's patents, patents allowed or patents pending.

D. Project Conditions.

1. Weather Limitations. Proceed with maintenance only when existing and forecasted weather conditions permit synthetic turf to be performed according to manufacturer's written instructions and warranty requirements.

E. Warranty.

1. The contractor must obtain a letter from turf manufacturer that the proposed maintenance and equipment does not violate the current warranty.

F. Products.

1. **Turf Groomer.** The Contractor shall provide a turf grooming system, which consists of spiked wheels designed to penetrate the infill in order to loosen the infill without damaging the grass fibers and light raking tines attached to the rear of the unit designed to groom the exposed grass fibers to keep them from matting down excessively. Hydraulic driven rotary sweeper equipped with nylon bristles and drag brush shall be used. This equipment must be approved by the manufacturer.
2. **Utility Tractor.** Equipped with turf tires, approved by the manufacturer.

G. Procedure.

1. Examination.

- a. Examine substrates and conditions, for compliance with requirements of maintenance instructions as directed by turf manufacturer.
- b. Proceed with maintenance only after unsatisfactory conditions have been corrected.
- c. The maintenance shall be performed in full compliance as directed by turf manufacturer. Only factory-trained technicians skilled in the maintenance of athletic caliber synthetic turf systems, working under the direct supervisions of the manufacturer's supervisors, shall undertake the placement of the system. The designated supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the maintenance of this material. The manufacturer shall certify the maintenance and warranty compliance.

2. Services.

a. Frequency.

- 1) Maintenance shall be provided on an as needed basis as outlined by turf manufacturer.
 - a) It is anticipated that maintenance will be performed eight times per year starting on or about April 15th and ending on or about November 15th.

b. Grooming.

- 1) Contractor must sweep entire field;
- 2) Aerate the infill with specialized equipment;
- 3) Drag entire field to assure proper level of infill;
 - a) All of the above should be done in two directions, right angles from each other.
- c. Contractor shall remove all debris on field including chewing gum.
- d. Contractor shall supply and install additional infill materials as required in accordance with manufacturer's specifications.

e. G-Max Testing.

- 1) Contractor is required to perform testing twice annually, as directed by the County, meeting the requirements of ASTM F355 G-Max of less than 175.
- 2) Contractor is required to perform any necessary remediation to comply with this requirement.

3. Inspection.

- a. Contractor must inspect entire field for damage, loose lines, high wear and deportment of infill and subbase conditions.
- b. Contractor must supply to the owner a full written report of any deficiencies within twenty-four (24) hours.

H. Measurement and Payment.

1. The finished playing surface shall appear to the satisfaction of the County as mowed grass with no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use.
2. The payment for this Item shall be the price per square foot of synthetic turf area to provide the routine maintenance in accordance with the Specifications.
3. This Item will be paid on a per visit basis to the bidder, as ordered by the Engineer.
4. The unit price bid shall include all labor, materials and equipment required to perform the routine maintenance.

ITEM 761 - MAINTENANCE FOR TURF FIELDS INSTALLED BY OTHERS

A. Description.

1. Under this Item, the Contractor shall maintain synthetic turf fields and infill materials as indicated and as specified herein. The maintenance shall be performed in strict accordance with the manufacturer's written maintenance instructions.
2. This agreement is to include the maintenance of synthetic turf field installed by Others.
3. The Contractor must provide competent workmen skilled in synthetic grass. The designated supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the maintenance of this material.
4. It is the contractor's responsibility to coordinate with the County for scheduling of proposed maintenance.

B. Submittals.

1. Equipment. For each type of equipment used.
2. Evidence from the turf manufacturer stating that the contractor for the maintenance of the synthetic turf is certified by the manufacturer to maintain said turf.

C. Quality Assurance.

1. Prior to Engineer approval of the specified synthetic turf equipment, the Contractor and manufacturer shall specify in writing that their turf equipment does not violate any other manufacturer's patents, patents allowed or patents pending.

D. Project Conditions.

1. Weather Limitations. Proceed with maintenance only when existing and forecasted weather conditions permit synthetic turf to be performed according to manufacturer's written instructions and warranty requirements.

E. Warranty.

1. The contractor must obtain a letter from turf manufacturer that the proposed maintenance and equipment does not violate the current warranty.

F. Products.

1. **Turf Groomer.** The Contractor shall provide a turf grooming system, which consists of spiked wheels designed to penetrate the infill in order to loosen the infill without damaging the grass fibers and light raking tines attached to the rear of the unit designed to groom the exposed grass fibers to keep them from matting down excessively. Hydraulic driven rotary sweeper equipped with nylon bristles and drag brush shall be used. This equipment must be approved by the manufacturer.
2. **Utility Tractor.** Equipped with turf tires, approved by the manufacturer.

G. Procedure.

1. Examination.

- a. Examine substrates and conditions, for compliance with requirements of maintenance instructions as directed by turf manufacturer.
- b. Proceed with maintenance only after unsatisfactory conditions have been corrected.
- c. The maintenance shall be performed in full compliance as directed by turf manufacturer. Only factory-trained technicians skilled in the maintenance of athletic caliber synthetic turf systems, working under the direct supervisions of the manufacturer's supervisors, shall undertake the placement of the system. The designated supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the maintenance of this material. The manufacturer shall certify the maintenance and warranty compliance.

2. Services.

a. Frequency.

- 1) Maintenance shall be provided on an as needed basis as outlined by turf manufacturer.
 - a) It is anticipated that maintenance will be performed eight times per year starting on or about April 15th and ending on or about November 15th.
 - b) The County may add additional services depending on usage of fields.

b. Grooming.

- 1) Contractor must sweep entire field;
- 2) Aerate the infill with specialized equipment;
- 3) Drag entire field to assure proper level of infill;
 - a) All of the above should be done in two directions, right angles from each other.
- c. Contractor shall remove all debris on field including chewing gum and spray paint.
- d. Contractor shall supply and install additional infill materials as required in accordance with manufacturer's specifications.

e. G-Max Testing.

- 1) Contractor is required to perform testing twice annually, as directed by the County, meeting the requirements of ASTM F355 G-Max less than what is warranted by the synthetic turf manufacturer.
- 2) Contractor is required to perform any necessary remediation to comply with this requirement.

3. Inspection.

- a. Contractor must inspect entire field for damage, loose lines, high wear and deportment of infill and subbase conditions.
- b. Contractor must supply to the owner a full written report of any deficiencies within twenty-four (24) hours.

H. Measurement and Payment.

1. The finished playing surface shall appear to the satisfaction of the County as mowed grass with no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use.
2. The payment for this Item shall be the price per square foot of synthetic turf area to provide the routine maintenance in accordance with the Specifications.
3. This Item will be paid on a per visit basis to the bidder, as ordered by the Engineer.
4. The unit price bid shall include all labor, materials and equipment required to perform the routine maintenance.

ITEM 762 - INTEGRAL COLOR PIGMENT FOR CEMENT CONCRETE

A. Description.

1. Under this item, the contractor shall furnish and mix color pigment into cement concrete at locations shown on the plans, or as directed by the Engineer.

B. Materials.

1. The pigment shall conform to "Integral Colors" as supplied by "Stampcrete International Ltd.", of Centereach, N.Y., or approved equal. The color to be used shall be as indicated on the plans or as directed by the Engineer.

C. Construction Details.

1. The pigment shall be added to, and thoroughly mixed into, the cement concrete prior to placement, to insure a consistent color throughout the concrete. Pigment shall be added at the rate of 12 pounds per cubic yard of concrete, or in accordance with the manufacturer's instructions, or as directed by the Engineer.

D. Method of Measurement.

1. The quantity to be paid under this item will be the number of pounds of pigment added to the cement concrete mix.

E. Basis of Payment.

1. The unit price bid shall include the cost of all labor, materials, and equipment necessary to complete the work, including cleaning residue of color pigment from the concrete truck. Imprinting and cement concrete will be paid for under their respective items.

ITEM 763 - IMPRINTING ON CONCRETE PAVEMENT OR SIDEWALK

A. Description.

1. Under this item the contractor shall modify the surface of newly placed cement concrete pavement or sidewalk to create a pattern as specified in the plans and/or as directed by the Engineer.

B. Construction Details.

1. Cement concrete pavement or sidewalk shall be placed at locations and dimensions shown on the plans and/or as directed by the Engineer, in accordance with Items No. 24, 27, 30, 32A, 32X and 7 as described in the Standard Specifications. At the appropriate time in the concrete curing process (as detailed in the specific treatment directions) the concrete surface shall be imprinted, stamped, or rolled such that the specified pattern is obtained. The contractor shall submit the recommended method of operation, containing dimensions of forms and/or rollers, timing of installation, and any other pertinent information to the Engineer for approval. Immediately after the surface finishing has been completed, the Impervious Membrane Method of curing shall be implemented, as detailed in the latest edition of the New York State Department of Transportation Standard Specifications.
2. Suppliers and/or Installers - Possible technology to complete this work is available from, but not limited to:
 - a. Bomanite Corporation, P.O. Box 599, Madera, California 93639
 - b. Quick Imprint Systems, P.O. Box 7, Goodman, Mo., 64850
 - c. Stampcrete International Ltd., Centereach, N.Y., 11720
 - d. Or equal

C. Method of Measurement.

1. The quantity to be paid under this item will be the number of square feet of imprinting on cement concrete pavement or sidewalk, in accordance with the plans and specifications, or as directed by the Engineer.

D. Basis of Payment.

1. The unit price bid per square foot for this item shall include the cost of furnishing all labor, materials, equipment and incidentals necessary to complete the imprint work to the satisfaction of the Engineer. Cement concrete pavement or sidewalk will be for paid under their respective items.

ITEM 764 - COLORED AND IMPRINTED ASPHALT

A. Description.

1. This work shall consist of furnishing and installing Colored and Imprinted Asphalt System, as manufactured by, Integrated Paving Concepts Inc., #102 - 17957 - 55 Ave. Surrey, BC V3S 6C4, Phone: (604) 574-7510, FAX: (604) 574-7520 or approved equal. Colored and Imprinted Asphalt System shall be installed on new Asphalt Concrete pavement installed as part of this contract under other items. The surface of the HMA shall be patterned and colored to create the appearance of hand laid decorative paving stones by an authorized StreetPrint™ applicator. Two areas will receive this treatment. First is roadway pavement that has been overlaid with new asphalt concrete pavement. The second is new mowstrip asphalt within raised median areas. Asphalt pavement texturing is a highly specialized process that requires the skill of a qualified applicator working with the proper equipment and applying highly specialized coating(s) designed specifically for application to asphalt pavement.

B. References.

1. ASTM D-4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester. ASTM D-4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser. ASTM D522-93A Standard Test Method for Mandrel Bend Test of Attached Organic Coatings. ASTM G-155 QUV Accelerated Weathering Environment. Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials. ASTM D-2486 MEK rub test for chemical resistance. ASTM E-303 British Pendulum test for friction. EPA 24 ASTM D3960-05 Volatile Organic Compounds.

C. Submittals.

1. The documents shall be submitted to the Engineer prior to installation:
 - a. Proof of applicator's ability. A copy of the current year license as provided to the proposed applicator issued by a recognized authority in the execution of asphalt pavement texturing work.
 - b. Failing that, at least 3 reference sites and written references from 3 previous customers for work performed by this applicator.
 - c. A list of the major equipment to be used in the execution of the Work. This list will include the asphalt pavement reheat machinery, spray equipment, compactor(s) and templates.
 - d. The name of the coating(s) and the coating supplier's name.
 - e. Certified performance test results of the coating materials as outlined in Table 1.
 - f. Confirmation of coating color(s).

D. Materials.

1. Coatings.

- a. Properly designed asphalt pavement coatings have been scientifically formulated to provide the optimal balance of performance properties for a durable, long lasting color and texture to asphalt pavement surfaces. Some of these key properties include wet wear durability, crack resistance, fade resistance, adhesion, and friction properties. These properties must be backed up by a Certificate of Analysis from an independent laboratory or an equal document that certifies these performance properties.
- b. The asphalt pavement coating must be environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).
- c. Only use asphalt pavement coatings from qualified pavement coating suppliers who can provide proof of these required performance properties.

2. Minimum Performance Properties of Asphalt Coating.

- a. The following table outlines the minimum required performance properties of the asphalt pavement coating. These performance properties must be ascertained by a Certificate of Analysis issued by an approved testing facility

Characteristic	Test Specification	Minimum Required Results
Durability Taber Abrasion (cycles to wear-through)	ASTM D-4060 Abrasion Resistance of Organic Coatings (wet wear) 7 day cure, 24 hour soak; H-10 wheel	Wear Index (WI) < 5.0
Color stability		Brick color ΔE < 1.5
Flexibility: Mandrel Bend	ASTM D 522-93A Flexibility as measured by Mandrel bend 0.5mm thick sample passes 10 mm at 21°C 0.5mm thick sample passes 125mm at -18°C	
Chemical resistance	ASTM D-2486 Modified MEK scrubs 16 dry mils, number of scrubs until 50% substrate exposed	> 5000
Adhesion to Asphalt	ASTM D-4541	Substrate Failure
Friction Wet	ASTM E-303 British Pendulum Tester	> 55
Environmental Sensitivity	EPA 24 ASTM D3960-05 Volatile Organic Compounds	VOC < 150

Table 1: Required Performance Properties of Asphalt Pavement Coating.

3. Equipment.

- a. The following specialized equipment shall be used in the execution of the Work.
 - 1) Metal wire rope templates are used to create the desired imprint pattern. Only use templates that have been supplied by a manufacturer who has the proven expertise in manufacturing these templates for this type of application.
- b. Asphalt pavement reheat equipment specifically designed for asphalt pavement texturing is to be used in the execution of this work. The primary asphalt pavement re-heat equipment must cycle the heat application and must allow the equipment operator to check the pavement surface temperature during the

heating process, These controls are necessary to enable the pavement temperature to be elevated gradually, giving the operator the ability to ensure that the pavement is not overheated or adversely affected. Heaters without these controls are strictly prohibited as the primary re-heats equipment.

- c. Hand-held portable heating devices may be used only for areas where It is difficult to operate the re-heat machine. These may not be used as the primary pavement re-heating device.
- d. Finishing tools that are designed to enable the applicator to complete the imprinting of the asphalt pavement in areas which may be inaccessible to the template such as curbs and manhole covers are permitted.
- e. Vibratory Plate Compactors shall be used for pressing the templates into the heated asphalt pavement to create the specified pattern.
- f. Specialized coating spray equipment must be used in the application of the coating and must be capable of applying the coating to the asphalt pavement surface in a thin, controlled film which will optimize the drying and curing time of the coating. More specifically, the spray equipment pump must be capable of providing a continuous recirculation of the coating in order to keep the solids within the coating in suspension.

E. Construction Details.

1. **General.** The Colored and Imprinted Asphalt System shall be supplied and installed by a Qualified Applicator in accordance with the plans and specifications or as directed by the Owner. Do not begin the Work until confirmation of the Applicator's qualifications is provided.
2. **Surface Preparation.** The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.
3. **Layout.** Layout of the pattern for imprinting into the surface of the asphalt pavement shall be as per the drawings and specifications.
4. **Heating the Asphalt Pavement.** The Applicator shall use asphalt pavement reheat equipment as described above. The optimal pavement temperature for imprinting the template is dependent upon mix design, modifiers used in the mix, the age of the pavement and weather. The surface temperature of the pavement should not exceed 325°F as determined by an infra-red thermometer reading taken after the heat is applied to the asphalt pavement. In order to achieve the proper depth of imprint it is important to elevate the asphalt pavement temperature to a minimum depth of 1/2 inch (12.5mm) without burning the pavement surface. This can only be accomplished using asphalt pavement reheat equipment that is specifically designed for this Work.
5. **Surface Imprinting.** The pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue. Once the asphalt pavement has reached imprinting temperature, the templates shall be placed in position and pressed into the surface using vibratory

plate compactors. The top of the template is to be flush with the surrounding asphalt pavement and can then be removed. Areas that have an imprint depth less than 3/8 inch shall be re-heated and re-stamped prior to applying the coatings. Hand tooling is a permitted method to achieve proper imprint depth in areas difficult to get at with the template.

6. Application of Asphalt Pavement Coating Guidelines

- a. The qualified applicator shall refer to the asphalt pavement coating supplier's recommendations for methods of application. Special care and attention must be paid to ensure asphalt pavement coatings are applied in environmental conditions that permit proper cure.
 - b. The coating application shall proceed as soon as possible upon completion of the imprinting of the asphalt pavement. The pavement surface shall be completely dry and thoroughly cleaned prior to application of the asphalt pavement coating(s).
 - c. Depending upon the condition and age of the pre-existing pavement, primer may be required. Refer to the asphalt pavement coating supplier's specifications.
 - d. The qualified applicator shall use spray equipment specifically designed for the application of the coating(s) as outlined in Section 2.3 above.
 - e. Refer to the asphalt pavement coating supplier's recommendations for coating coverage rate, number of recommended passes and recommended film thickness.
7. **Opening to Traffic.** Minimally, the surface coating must be 100% dry before traffic is permitted. Refer to the asphalt pavement coating supplier's guide.

F. Method of Measurement.

1. The installation of the Colored and Imprinted Asphalt System will be measured by the number of square feet of hot mix asphalt satisfactorily imprinted, colored and sealed in accordance with the plans, this specification and as approved by the Engineer.

G. Basis of Payment.

1. The unit price bid per square foot shall include the cost of test panels, maintenance kit and the furnishing all labor, materials, equipment and tools necessary to complete the work. The asphalt pavement will be paid for under separate individual items. Areas where the Colored and Imprinted Asphalt System is deemed unacceptable by the Engineer will not be measured for payment. The contractor will be directed by the Engineer to re-apply the Colored and Imprinted Asphalt System to the satisfaction of the Engineer before payment is made. Milling and re-Installation of asphalt top course and reapplication of misapplied Colored and Imprinted Asphalt System will be done at the contractor's expense.

ITEM 765 - FURNISH & INSTALL CONCRETE PARKING BUMPER

A. Description.

1. Under this item, the contractor shall furnish and install precast cement concrete parking bumpers at locations shown on the plans, or as directed by the Engineer.

B. Materials.

1. Precast parking bumpers shall be manufactured for the intended purpose by a company or firm specializing in the manufacture of precast concrete parking bumpers. Provide precast concrete parking bumpers of half octagonal cross section, with dimensions approved by the Engineer. Unless indicated otherwise, provide bumpers of 6 foot length.
2. Bumpers shall be manufactured of 4000 p.s.i minimum reinforced concrete, to withstand constant use and rough service. Each bumper shall be reinforced with two No. 4 deformed steel reinforcing bars, minimum.
3. Each bumper to be installed on at-grade asphalt pavement shall be manufactured with two holes to accommodate the anchor rebar. Bumpers to be installed on concrete slabs shall be manufactured without holes.
4. Epoxy Adhesive: Adhesive for anchoring bumpers to pavement shall be an epoxy adhesive manufactured for the purpose, complying with ASTM C 881/C 881M, Type IV, Grade 3, Class B or C. Use Class B whenever the surface temperature is from 40 to 60 degrees F. Use Class C whenever the surface temperature is above 60 degrees F. Whenever the surface temperature is below 40 degrees F, go home and wait until such time that the surface temperature is above 40 degrees F.
5. Steel Bars for Installation: Epoxy-coated rebar, No. 5 size, conforming item 33X.
6. Submit shop drawings of bumpers, including plan layout and installation details, for approval.
7. Product data: Submit manufacturers' product data of precast bumpers and epoxy adhesive for approval

C. Construction Details.

1. No installation shall begin until shop drawings, catalog cuts, details or illustrated literature, and installation details are submitted and approved by the Engineer.
2. The pavement surface shall be prepared as per epoxy adhesive manufacturer's instructions prior to installation.
3. Precast concrete bumpers shall be anchored and secured in position on at-grade asphalt pavements, as indicated, with an appropriate epoxy adhesive as specified above and two No. 5 epoxy-coated rebar (24" long each, recessed 1/4" below the top of the bumper after installation).
4. Precast concrete bumpers shall be secured in position on concrete pavements, as indicated, with an appropriate epoxy adhesive as specified above.

D. Method of Measurement.

1. The quantity to be paid under this item will be the number of parking bumpers installed in accordance with this specification.

E. Basis of Payment.

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

ITEM 766 - RETAINING WALL SYSTEM

A. Description.

1. The work shall consist of furnishing and installing a low height retaining wall system, in accordance with all applicable Standard Sheets and Specifications, and in accordance with the Contract Documents and as ordered by the Engineer.
2. Retaining wall systems are externally stabilized fill structures. Externally stabilized fill structures are structures which utilize the weight of the wall system elements and the weight of the infill to resist lateral soil pressure.
3. The location(s), elevation(s) and aesthetics shall be as shown in the contract documents or as directed by the Engineer.
4. The work shall include any demolition, saw cutting, excavation, disposal, fill, sub- base material, compaction, drainage material, drain pipe, geotextile material and all labor and material necessary for the construction of the new wall system (including backfill, leveling pads, joint fillers, geotextiles, face units and coping units, and subsurface drainage system). Also included are landscaping (adjustments and grading of existing ground), patching and repairs to affected asphalt or concrete as necessary, topsoil, establishing turf on disturbed areas, finish work, and any required adjustments to utilities. All material and labor required to perform these tasks is included.
5. The material and aesthetic treatment (color, texture and pattern) will be as described in the contract documents, using special notes and details, or as directed by the Engineer, as needed.
6. The contractor shall submit a plan including the sample materials, aesthetic treatments and proposed construction methods. Written approval of the plan must be received from the Engineer in Charge prior to commencement of the work.

B. Materials.

1. Ensure that the proper materials are supplied for the chosen system design.
2. The material shall comply with the latest edition of the New York State Department of Transportation, Standard Specifications, and the latest update to the effective at the date of letting, including the associated Material and Manufacturing requirements of Section 700.
3. The material shall comply with, but not be limited to, the requirements of the following sections of the New York State Department of Transportation Standard Specifications: 202-2, 203-2, 204-2, 206-2, 304-2, 554-2, 605-2, 608-2 and 610-2.

C. Construction Details.

1. The work shall be in conformance with the NYSDOT Standard Sheets. The work performed shall comply with, but is not limited to, the following Specification Sections: 202-3, 203-3, 204-3, 206-3, 304-3, 554-3, 605-3, 608-3, and 610-3.

2. The contractor shall be in compliance with New York State Code, Rule 753. The contractor shall coordinate with utility companies and any appropriate governmental agency when utilities and/or access to these facilities are affected by the contractor's work. This may include, but is not limited by, utility poles, pull boxes, shut off boxes, manhole access covers, and underground equipment. Any existing facilities not indicated to be removed that are damaged by the contractor's operations, shall be repaired by the contractor to the satisfaction of the Engineer at no additional cost.
 - a. During construction, remove and replace any face units damaged beyond repair with approved face units at no additional cost to Nassau County.
 - b. Movement of construction equipment and all other vehicles and loads over and adjacent to the low height retaining wall system shall be done at the Contractor's risk. Control all operations and procedures to prevent misalignment of the low height retaining wall system. Any damage to face units from any cause shall be repaired or replaced by the Contractor at no additional cost to Nassau County.
 - c. Provide aesthetic treatment as specified in the contract documents. Any damage to the treatment shall be repaired to the satisfaction of the Engineer at no additional cost to Nassau County.

D. Method of Measurement.

1. The quantity to be paid shall be, measured by the square foot, (measured to the nearest square foot), of satisfactorily installed Retaining Wall System, in accordance with the Contract Documents or as ordered by the Engineer. The area of the wall is obtained from the product of the height of the wall (measured as the vertical projection distance from the top of the leveling pad to the top of the wall, (including cap blocks, when utilized) and the horizontal length of the wall (measured along the bottom of the wall at the top of the leveling pad). The computations will take into consideration variations in the height of the wall.

E. Basis of Payment.

1. The inclusive unit price bid per square foot shall include the cost of furnishing all labor, material, and equipment necessary to satisfactorily complete the work, to the acceptance of the Engineer, including all applicable items described in Sections 554-5 and 610-5. The unit price bid shall be inclusive of the aesthetic treatment, topsoil and turf establishment. Any required survey, shall be paid for separately under the price bid for survey operations.

ITEM 767 - FURNISH & INSTALL & MAINTAIN TURBIDITY CURTAIN

A. Description.

1. This work shall consist of furnishing, installing, repairing, maintaining, and removing turbidity curtains in accordance with the contract documents and as directed by the Engineer.

B. References.

1. New York State Department of Transportation, (NYSDOT) Standard Specifications dated September 2, 2010 and updated supplements.

C. Materials.

1. The turbidity curtain shall be a commercially available, preassembled system, including a geotextile, flotation system, bottom weight, and anchoring and securing mechanism. If assembled in panels, it shall include a secure mechanism for joining panels together. Geotextiles shall conform to the requirements specified in §737- 01F. Turbidity Curtain. Hemmed pockets shall be sewn or heat bonded to contain flotation material, bottom weights, and for anchor lines. The flotation material shall maintain buoyancy if punctured or cut. The bottom weight shall be sufficient to hold the curtain in a vertical position. For sites not subject to tidal or heavy wave action, the curtain shall be capable of molding to conform to bottom contours so that suspended sediment is prevented from escaping underneath the curtain. Anchorage lines shall be provided of sufficient strength and number to support the curtain and maintain it in position under normally expected conditions. End anchors shall be provided, with intermediate anchor points (for stakes or anchors) such that unanchored spans do not exceed 100 feet, sufficient to maintain the turbidity curtain in place. Where the turbidity curtain is constructed in panels, anchor-line and shackle connections securing the panels together shall be sufficient for normally expected current, wind, or wave conditions.

D. Construction Details.

1. Systems Requirements.

- a. Perform all work in accordance with Section 209 except as modified herein.
- b. For sites not subject to tidal or heavy wave action the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected highwater level (including waves) while the bottom maintains continuous contact with the bottom of the water body. The bottom edge of the curtain shall have a weight system capable of holding the bottom of the curtain down and conforming to the bottom of the water body, so as to prohibit escape of turbid water under the curtain.
- c. For sites subject to tidal or heavy wave action, the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected highwater level (including waves) while the bottom remains 12 inches above the bottom. The weight system shall hold the lower edge of the curtain in place so as to allow 12 inches of clearance above the bottom at mean low water, so that the curtain does not stir up sediment by repeatedly striking the bottom.

- d. If constructed in panels, panels shall be connected in such a manner as to prevent suspended particles passing through joints. Load lines shall be connected so as to develop the full strength of the line across the joint.
- e. Flotation material shall be arranged so as to be flexible and to provide continuous support.
- f. The flotation and curtain top shall be such as to provide a minimum of 4 inches of freeboard along the entire length of the curtain, to prohibit escape of turbid water over the top.

2. Installation.

- a. The turbidity curtain shall be installed as shown in the contract documents in accordance with the manufacturer's instructions. It shall be placed as close to the site of disturbance as possible without interfering with construction activity.
- b. Turbidity curtain shall be installed and maintained in a manner that precludes entry of equipment, other than hand-held equipment or boats, to the water body outside the protected area.
- c. The fully assembled turbidity curtain shall be prepared for installation by being furled and tied at intervals of 5 foot for the length of the curtain. It shall be placed and secured in the furled condition, then released to allow the bottom edge to sink.
- d. At sites subject to tidal or heavy wave action, adjustment lines may be used to achieve the required height of the curtain.
- e. At sites not subject to tidal or heavy wave action, excess curtain material shall lay on the bottom, away from construction activity.
- f. Turbidity curtain shall be placed as nearly as possible parallel to current flow. It shall not be deployed across a flowing water course.
- g. The ends of the installation shall be anchored securely well up the bank. Intermediate anchors of a type and number sufficient to hold the curtain in place under expected conditions shall be placed, and firmly fastened to the top of the curtain assembly. Maximum spacing between anchorage points shall not exceed 100 feet.
- h. In situations with flow velocities that exceed 5 feet/sec use a redirection barrier. The redirection barrier shall be installed prior to installation of the turbidity curtain wherever possible, and care should be exercised in order to minimize disturbance of the bottom of the water body during installation of the redirection barrier.

3. Maintenance.

- a. The turbidity curtain shall be inspected daily, with additional monitoring of performance during storms or significant flow events.
- b. Any visible plume of cloudy water passing beyond the curtain from the enclosed construction area shall constitute inadequate performance of the turbidity curtain. The Contractor shall immediately modify, adjust, or repair any portion of the turbidity curtain to correct inadequate performance.
- c. The turbidity curtain shall remain in place until the protected construction activities have

ceased and the turbidity of the water enclosed is reduced to acceptable levels. The curtain shall be removed within 72 hours of this condition being met.

4. Removal.

- a. The turbidity curtain shall be removed in such a way as to minimize release of sediment.
- b. Sediment behind the curtain shall be removed before removal of the curtain, if directed by the Engineer. If so, any resulting turbidity shall be allowed to settle before removal proceeds.

E. Method of Measurement.

1. Payment for this work will be made per linear foot for work satisfactorily completed. Progress payments will be made in proportion to the amount of work done as determined by the Engineer.

F. Basis of Payment.

1. The unit price bid per linear foot shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including redirection barrier and the cost of removal associated with the removal of accumulated sediment. Payment will not be made for work which is attributed to the Contractor's negligence, carelessness or failure to install temporary or permanent controls in accordance with the contract documents.

ITEM 768 - FURNISH & INSTALL ARMORLESS BRIDGE JOINT SYSTEM

A. Description.

1. The system shall consist of components shown on a NYSDOT Approved Materials Detail Sheet for a Manufacturer and System whose name appears on the NYSDOT Materials Bureau Approved List. The required method of installation will be shown on the NYSDOT Approved Materials Detail Sheet.
2. **Terminology.** Materials Detail Sheet (MDS). A sheet approved by the NYSDOT DCES and containing all material requirements and installation information for Armorless Bridge Joints which are included on the NYSDOT Materials Bureau Approved List

B. Materials.

1. The material requirements shall be as shown on the NYSDOT Approved Materials Detail Sheet corresponding to a Manufacturer and System listed on the NYSDOT Materials Bureau Approved List.
2. Shop drawings will be required for any joint system supplied as part of this work. All shop drawings shall note the name and address of the joint system (or segment) fabricator as well as the location where the joint system (or segments) are to be fabricated.

C. Construction Details.

1. **Manufacturer's Representative.** The joint system shall be installed in strict accordance with the manufacturer's instructions and the NYSDOT Approved Materials Detail Sheet. In the event of a conflict, the terms of the NYSDOT Approved Materials Detail Sheet shall rule. A representative of the bridge joint system manufacturer shall be present prior to placement to inspect the prepared surfaces and remain at the job during all phases of the installation. The representative shall be fully conversant in all respects with the correct installation methods. The representative shall be responsible to advise both the Engineer and the Contractor on properly installing the joint system. The representative may be excused from the project site at the discretion of the NCDPW project manager.
2. **Preparation.** All surfaces shall be prepared as per the NYSDOT Approved MDS. At a minimum, the preformed recess which is to receive the joint system shall be air blown using air free of water and oil or vacuum-cleaned so that all loose or foreign matter is removed prior to installation of the system. The substrate shall be dry for a minimum of 24 hours prior to installation for the joint system.
3. **Storage Inspection and Handling.** The joint system shall be stored, inspected and handled in accordance with the NYSDOT Approved Materials Detail Sheet.
4. **Installation Inspection.** All installation work shall be subject to the Engineer's inspection.
5. **Watertight Integrity Test.** At least five work days after the joint system has been fully installed the Contractor shall test the entire (full length) joint system for watertight integrity. The entire joint system shall be covered with water, either ponded or flowing, for a minimum duration of 15 minutes.

6. The concrete surfaces under the joint shall be inspected during this 15 minute period, and also for a minimum of 45 minutes after the supply of water has stopped, for any evidence of dripping water or moisture. Water tightness shall be interpreted to be no free dripping water on any surface on the underside of the joint. Patches of moisture shall not be cause for non-acceptance.
7. Should the joint system exhibit evidence of water leakage at any place whatsoever, the Contractor shall locate the place(s) of leakage and take all measures necessary to seal the leak. A subsequent water integrity test shall be performed subject to the same conditions and consequences as the original test. No additional payment will be made for corrective actions.

D. Method of Measurement.

1. Measurement will be made as the number of feet of joint system completely installed, measured horizontally and vertically along the centerline of joint system between the outer limits as indicated on the contract plans.
2. The words “completely installed” shall be interpreted to mean the joint system in place with the following operations completed where applicable:
 - a. All sealant in its proper position.
 - b. All nuts tightened or retightened as required.
 - c. Concrete placed and finished.
 - d. Elastomeric concrete placed and finished.
 - e. Water-tight integrity tests

E. Basis of Payment.

1. The unit price bid per foot shall include all labor, materials and equipment necessary to complete the work.

ITEM 769A – Type “A” Catch Basin Insert- Filter Type (Combination Inlet)

ITEM 769B – Type “B” Catch Basin Insert- Filter Type (Curb Inlet Only)

A. Description.

1. Under each of these items the Contractor shall furnish and install cartridge type catch basin inserts to collect and retain sediment and debris prior to entering the storm water system.

B. Submittals.

1. The manufacturer shall develop and furnish a worksheet to be used by the installer(s) to measure and certify the actual condition of the catch basin which will receive the catch basin insert.

C. Delivery, Storage & Handling.

1. All materials shall be protected during loading, transporting, and unloading, in accordance with the manufacturer's recommendations.

D. Materials.

1. The catch basin insert to be used in Type A and B catch basins shall comply with the following specifications:
 - a. Physical Properties:
 - 1) Material:
 - a) Adjustable Flange and Deflector
 - b) Splash Guard: Neoprene Rubber (Trim to Fit)
 - c) Plastic or polypropylene basket
 - d) Protected by-pass to retain re-suspended material
 - e) Support Hardware
 - 2) Performance Characteristics & Removal Rates:
 - a) Debris Capacity: 4.0 Cu-Ft
 - b) Filtered Flow Rate: 0.5 cfs
 - c) Bypass Flow Rate: 4.0 cfs
 - d) Sediment Removal: Remove $\geq$ 50% of sub 100 micron
 - e) Hydrocarbons, Oil & Grease: Remove $\geq$ 80%
 - f) Phosphorous: Remove $\geq$ 50%
 - g) Nitrogen Compounds: Remove $\geq$ 40%
 - h) Bacteria: Remove $\geq$ 70%
 - 3) Under this item the catch basin insert manufacturer is required to submit test data to the County (with supporting documentation) specifically indicating that the proposed

devices have been proven to achieve the performance characteristics and removal rates specified herein. No materials may be ordered until the County has accepted said documentation, in writing.

b. Serviceability:

1) Catch Basin Insert Maintenance

- a) The catch basin inserts shall be serviceable from the street level only; maintenance shall not require "confined space" entry into the catch basin.
- b) The consumables (filters) shall be designed to enable replacement from the street level only; maintenance shall not require "confined space" entry into the catch basin.

E. Method of Measurement.

1. The quantity to be paid for under these two items shall be the number of catch basin insert assemblies that are furnished and installed.

F. Basis of Payment.

1. The unit price bid for each item(s) shall include the cost of furnishing and installing one (1) complete catch basin insert assembly which shall consist of all materials including one set of filters and the metal framework to be installed inside the catch basin.

G. Warranty.

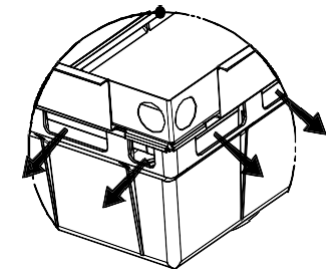
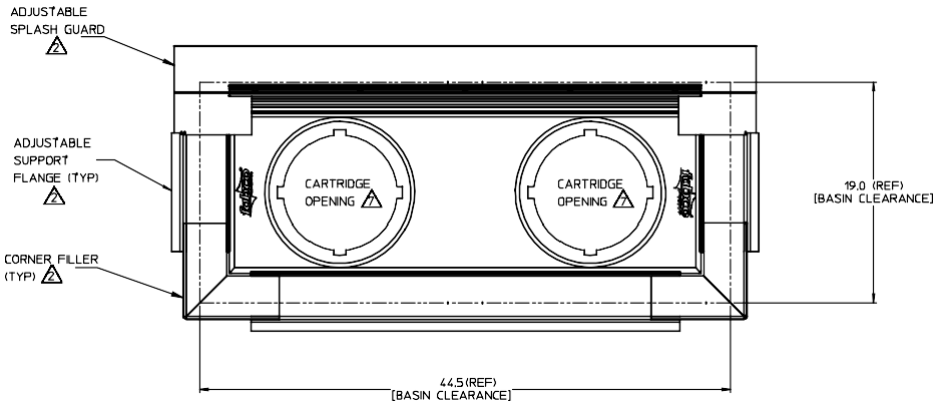
1. The equipment, materials, and products furnished under this item shall be guaranteed against defective design, materials, workmanship and operation for a period of one (1) year from the date the equipment is placed into problem free operation. The date of problem free operation will be determined by the Owner's representative. Upon receipt of notice from the Owner of failure of any part of the equipment, material, or product during the guarantee period, the affected item shall be repaired or replaced (if necessary), at the sole cost and expense of the Contractor, and at no additional cost to the County.

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	FIRST RELEASE	8/21/14	

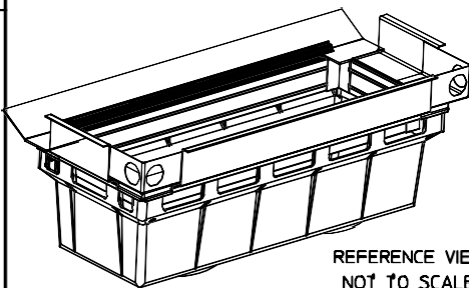
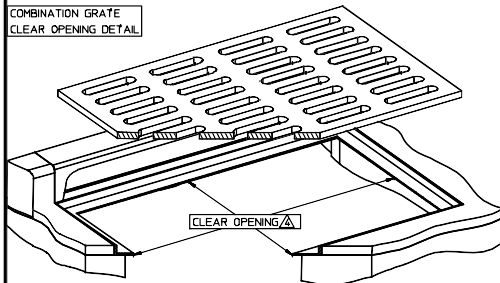
NOTES:

- WEIGHT (EMPTY): 50 LB MAX, NO CARTRIDGES
- MATERIAL:
 - ADJUSTABLE FLANGE AND DEFLECTOR: ALUMINUM ALLOY 6063-T6
 - BASIN (PLASTIC): POLYPROPYLENE POLYETHYLENE COPOLYMER
 - CORNER FILL: ALUMINUM ALLOY: 5052-H32
 - SUPPORT HARDWARE: CRES 300 SERIES
 - SPLASH GUARD: NEOPRENE RUBBER (TRIM IF NECESSARY)
- PERFORMANCE CHARACTERISTICS (TYP):
 - DEBRIS CAPACITY: 5.2 CU-FT
 - FILTERED FLOW RATE (CLEAN HIGH FLOW CARTRIDGE): 520 GPM (1.16 CFS)
 - PRIMARY BYPASS FLOW RATE: 1917 GPM (4.3 CFS)
 - SECONDARY BYPASS FLOW RATE: 164 GPM (0.37 CFS)
 - TOTAL BYPASS FLOW RATE: 2082 GPM (4.6 CFS)
- CLEAR OPENING RANGE (0.5 INCH INCREMENTS):
 - MINIMUM SIZE: 19.0 X 45.0
 - MAXIMUM SIZE: 24.0 X 50.0
- RECOMMENDED MINIMUM VAULT DEPTH 2-IN BELOW CARTRIDGE
- TYPICAL INSTALLATION: REMOVE STORM GRATE, MEASURE CATCH BASIN CLEAR OPENING AND ADJUST FLANGES TO REST ON GRATE SUPPORT LEDGE, INSTALL STORMBASIN INSERT WITH RUBBER SPLASH GUARD EXTENDING INTO CURB-BOX AND VERIFY THE ADJUSTABLE FLANGES ARE SECURELY RESTING ON THE GRATE SUPPORT LEDGES, INSTALL THE CORNER FILL PIECES, REINSTALL THE STORM GRATE DIRECTLY ON STORMBASIN SUPPORT FLANGES.
- USE WITH FABCO REPLACEABLE MEDIA CARTRIDGES ONLY.

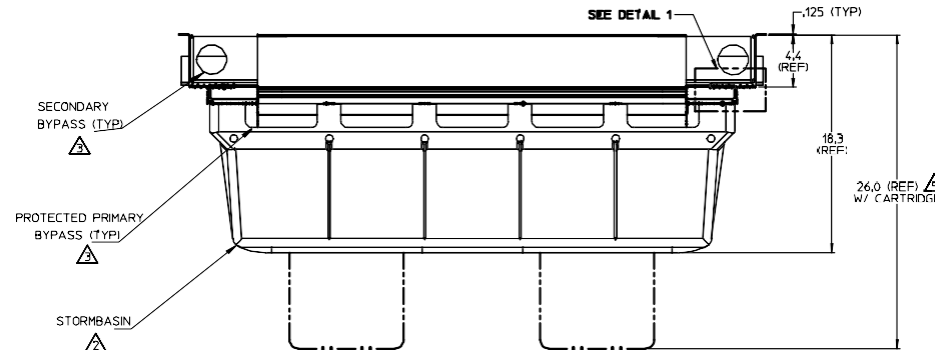


PROTECTED BYPASS, TYPICAL
(NOT TO SCALE)

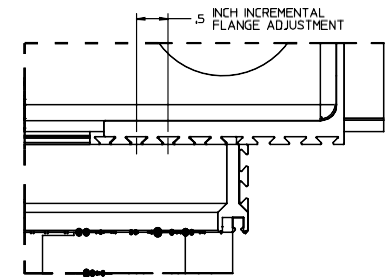
COMBINATION GRATE
CLEAR OPENING DETAIL



REFERENCE VIEW
NOT TO SCALE



DOV	AIL	ADJUS	MEN	FEA	UR-
(TYPICAL)	(TYPICAL)	(TYPICAL)	(TYPICAL)	(TYPICAL)	(TYPICAL)



DETAIL 1
SCALE 1/1

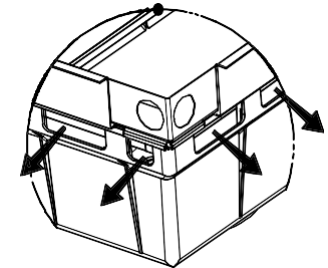
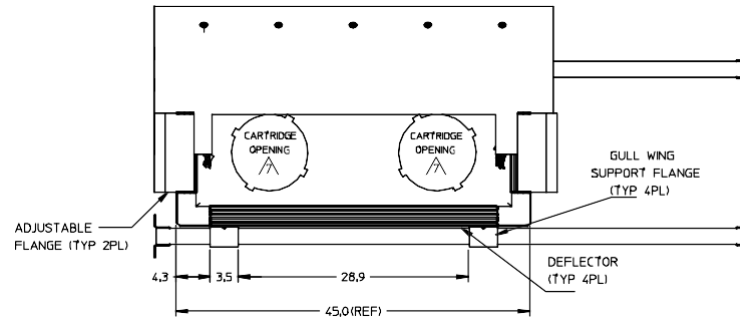
NO	QTY	PART NUMBER	DESCRIPTION	REMARKS
BILL OF MATERIALS				
APPROVALS				
DESIGNED: N. NEUWIRTH 9/17/07				
CHECKED: R. MARSTON 5/10/11				
APPROVED: J. PETERS 9/17/07				
MATERIAL				
SEE NOTES				
FABCO INDUSTRIES, INC. 66 CENTRAL AVENUE FARMINGDALE, NY 11735				
WWW.FABCO-INDUSTRIES.COM				
TITLE: NASSAU COUNTY, NY TYPE-1A STORMBASIN				
SIZE: 19BA4				
DWG NO: 10130-1-000				
REV: A				
SCALE: 3/16"=1"				
SHEET 1 OF 1				

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	FIRST RELEASE	8/21/14	

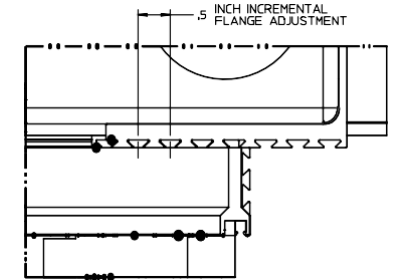
NOTES:

- WEIGHT (EMPTY): 40 LB MAX.
- MATERIAL:
 - STORMBASIN SUPPORT FLANGE AND DEFLECTOR: ALUMINUM ALLOY 6063-T6
 - CORNER DEFLECTOR (PLASTIC): POLYPROPYLENE POLYETHYLENE COPOLYMER
 - BASIN (PLASTIC): POLYPROPYLENE POLYETHYLENE COPOLYMER
 - RUBBER SUPPORT PLATE: ALUMINUM ALLOY 5052-H32
 - SUPPORT HARDWARE: CRES 300 SERIES OR EQUAL
 - OIL BOOM: 3" DIAMETER, POLYPROPYLENE
 - GULL WING SUPPORT FLANGE: 6063-T6, CLEAR ANODIZE
- PERFORMANCE CHARACTERISTICS (TYP):
 - DEBRIS CAPACITY: 4.0 CU-FT
 - FILTERED FLOW RATE (CLEAN HIGH FLOW CARTRIDGE): 520 GPM (1.16 CFS)
 - PROTECTED BYPASS FLOW RATE: 1207 GPM (2.7 CFS)
 - TOTAL BYPASS FLOW RATE: UNRESTRICTED
- PROTECTED BYPASS PREVENTS RE-SUSPENSION OF FLOATABLES
- USE WITH FABCO REPLACIBLE FILTER CARTRIDGES ONLY, FABCO P/N: 9718-7-000.
- VISIT FABCO INDUSTRIES WEBSITE FOR COMPLETE INSTALLATION INSTRUCTIONS, WWW.FABCO-INDUSTRIES.COM

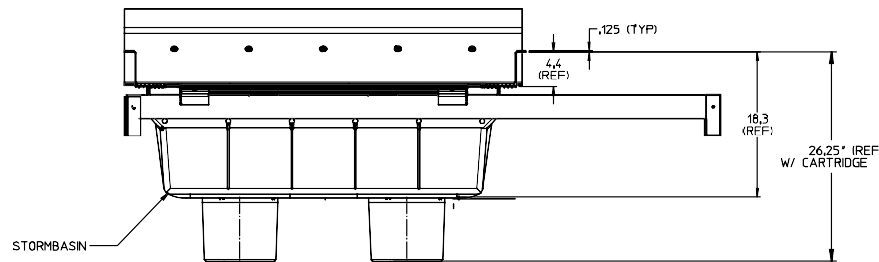


PROTECTED BYPASS, TYPICAL

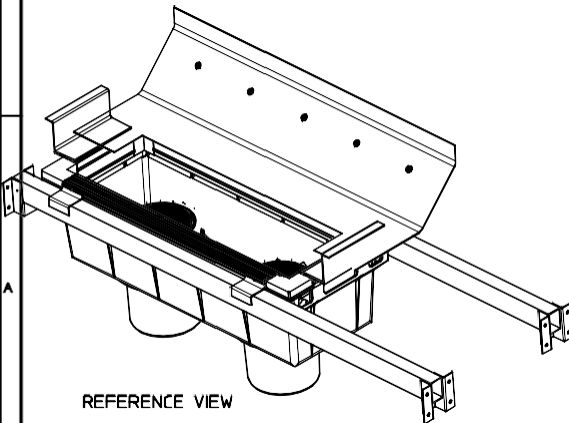
DOVETAIL ADJUSTMENT FEATURE (TYPICAL EACH FLANGE)



DETAIL 1



STORMBASIN



REFERENCE VIEW

NO	QTY	PART NUMBER	DESCRIPTION	REMARKS
BILL OF MATERIALS				
APPROVALS				
DESIGNED BY			DATE	
DRAWN BY			8/21/14	
CHECKED BY				
APPROVED BY			8/21/14	
MATERIAL				
SEE B.O.M.				
MODEL LINK				
10130-2				
FABCO INDUSTRIES, INC. 44 CENTRAL AVENUE FARMINGDALE, NY 11735 WWW.FABCO-INDUSTRIES.COM				
TITLE				
NASSAU COUNTY, NY TYPE-1B STORMBASIN				
SIZE	CAGE CODE	QWG NO	REV	
D	1P8A4	10130-2-000	A	
SCALE 1/4" = 1"				
SHEET 1 OF 1				

ITEM 770A - Type “A” Catch Basin Insert- Sediment Control Type (Combination Inlet)

ITEM 770B - Type “B” Catch Basin Insert- Sediment Control Type (Curb Inlet Only)

A. Description.

1. Under each of these items the Contractor shall furnish and install geotextile technology catch basin inserts to collect and retain sediment and debris prior to entering the storm water system.

B. Submittals.

1. The manufacturer shall develop and furnish a worksheet to be used by the installer(s) to measure and certify the actual condition of the catch basin which will receive the catch basin insert

C. Delivery, Storage & Handling.

1. All materials shall be protected during loading, transporting, and unloading, in accordance with the manufacturer's recommendations.

D. Materials.

The catch basin insert to be used in both the Type A and B installations shall comply with the following specifications.

1. Physical Properties.

a. Material:

1) Adjustable Flange and Deflector

- a) Splash Guard: Neoprene Rubber to redirect water from curb opening to the insert
- b) Woven Polypropylene Geotextile bag, replaceable oil boom
- c) Protected by-pass to retain re-suspended material
- d) Lifting Tabs
- e) Mounting kit and support hardware

2) Performance Characteristics:

- a) Debris Capacity: 6.0 Cu-Ft
- b) Filtered Flow Rate: 5.0 cfs
- c) Bypass Flow Rate: 3.4 cfs

3) Oil Absorbing Boom:

- a) Absorbent Material: 100% polypropylene, non-biodegradable
- b) Hydrophobic Media
- c) Absorption Capacity: 3.0 gal (max)
- d) Dimensions: 3" diameter x 100" long

2. Serviceability.
 - a. Catch Basin Insert Maintenance
 - 1) The catch basin inserts shall be serviceable from the street level only; maintenance shall not require “confined space” entry into the catch basin.
 - 2) The consumables (filters) shall be designed to enable replacement from the street level only; maintenance shall not require “confined space” entry into the catch basin.

E. Method of Measurement.

1. The quantity to be paid for under these two items shall be the number of catch basin insert assemblies that are furnished and installed.

F. Basis of Payment.

1. The unit price bid for each item(s) shall include the cost of furnishing and installing one (1) complete catch basin insert assembly which shall consist of all materials including one set of filters and the metal framework to be installed inside the catch basin.

G. Warranty.

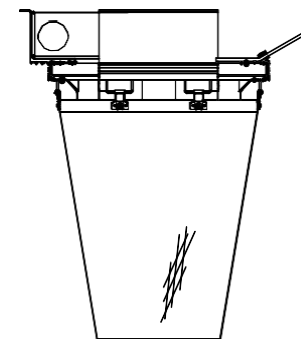
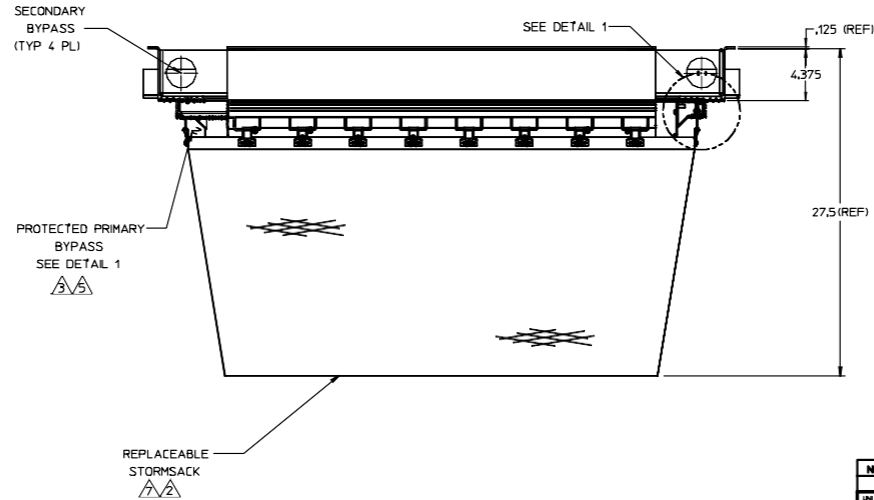
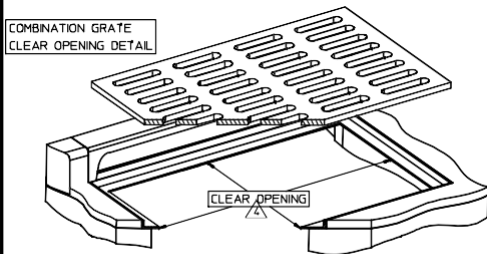
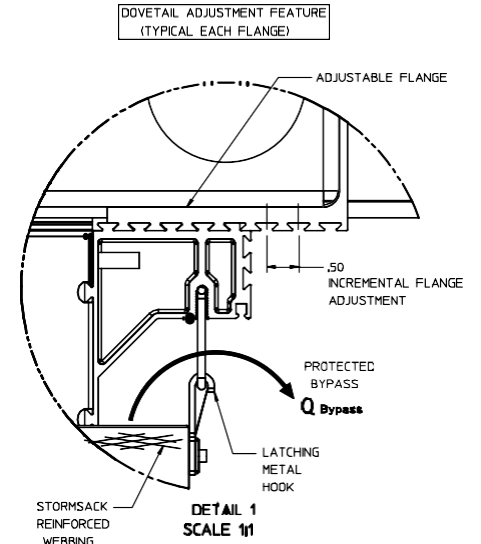
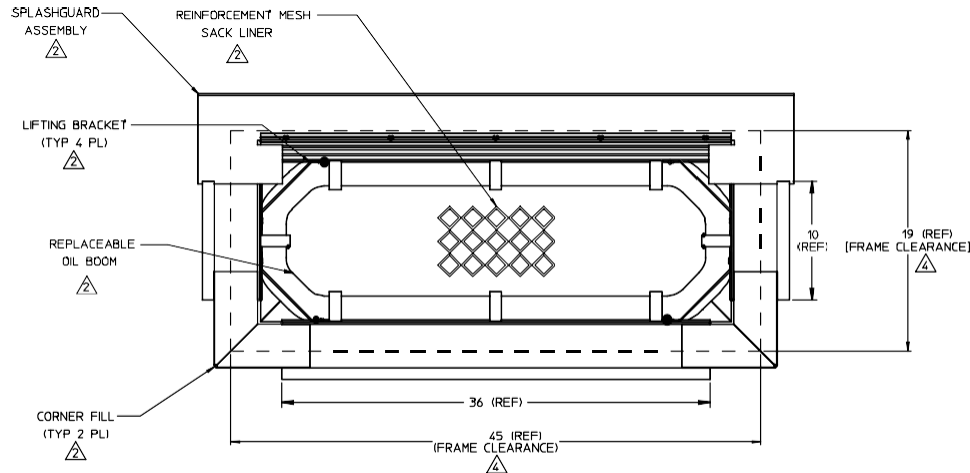
1. The equipment, materials, and products furnished under this item shall be guaranteed against defective design, materials, workmanship and operation for a period of one (1) year from the date the equipment is placed into problem free operation. The date of problem free operation will be determined by the Owner’s representative. Upon receipt of notice from the Owner of failure of any part of the equipment, material, or product during the guarantee period, the affected item shall be repaired or replaced (if necessary), at the sole cost and expense of the Contractor, and at no additional cost to the County.

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	FIRST RELEASE	8/21/14	

NOTES:

1. WEIGHT (EMPTY): 40 LB MAX
2. MATERIAL:
 - A) ADJUSTABLE FLANGE AND DEFLECTOR: ALUMINUM ALLOY 6063-T6
 - B) SPLASH GUARD: NEOPRENE RUBBER (TRIM TO FIT)
 - C) STORMSACK: GEOTEX 117F, REINFORCEMENT RIBBON
 - D) MESH LINER: HDPE, DIAMOND PATTERN
 - E) LIFTING TABS: ALUMINUM ALLOY: 5052-H32
 - F) CORNER FILLER: ALUMINUM ALLOY: 5052-H32
 - G) SUPPORT HARDWARE: CRES 300 SERIES
 - H) OIL BOOM: POLYPROPYLENE, 3' DIAMETER
3. PERFORMANCE CHARACTERISTICS (TYP):
 - A) DEBRIS CAPACITY: 8.5 CU-FT
 - B) FILTERED FLOW RATE (INITIAL): 3504 GPM (7.8 CFS)
 - C) PROTECTED PRIMARY BYPASS FLOW RATE: 1884 GPM (4.2 CFS)
 - D) SECONDARY BYPASS FLOW RATE: 164 GPM (0.37 CFS)
 - E) TOTAL BYPASS FLOW RATE: 2048 GPM (4.6 CFS)
 - F) OIL BOOM ABSORPTION CAPACITY: 376 OZ (3 GAL)
4. CLEAR OPENING RANGE (0.5 INCH INCREMENTS):
 - A) MINIMUM SIZE: 19 X 45
 - B) MAXIMUM SIZE: 24 X 50
 - C) MINIMUM RECOMMENDED VAULT DEPTH: 2-IN BELOW STORMSACK
5. PROTECTED BYPASS PREVENT RE-SUSPENSION OF FLOATABLES
6. TYPICAL INSTALLATION: REMOVE STORM GRATE, MEASURE CATCH BASIN CLEAR OPENING AND ADJUST FLANGES TO REST ON GRATE SUPPORT LEDGE. TRIM SPLASH GUARD AS NEEDED. INSTALL CORNER FILL PIECES, REINSTALL STORM GRATE DIRECTLY ON STORMSACK SUPPORT FLANGES.
7. USE ONLY FABCO REPLACEABLE STORMSACKS, FABCO PART NO: 9748-1-200

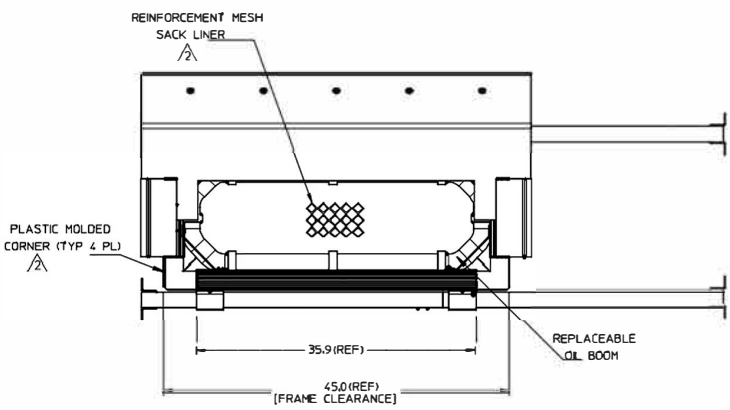


NO	QTY	PART NUMBER	DESCRIPTION	REMARKS
BILL OF MATERIALS				
MATERIAL		SEE NOTES	APPROVALS	DATE
HOLD LINK		9748-1E-ASSY4	OWN HS	8/21/14
			OWNR JP	8/21/14
			APVD	
			FABCO INDUSTRIES, INC.	
			66 CENTRAL AVE.	
			FARMINGDALE, NY 11735	
			WWW.FABCO-INDUSTRIES.COM	
			SIZE	CAGE CODE
			D	1PBA4
			DWG NO	10130-3-000
			SCALE	1/4" = 1'
			SHEET	1 OF 1

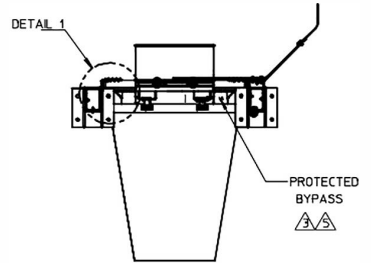
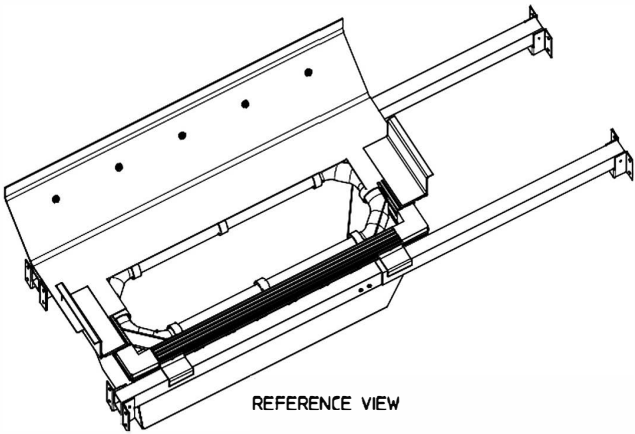
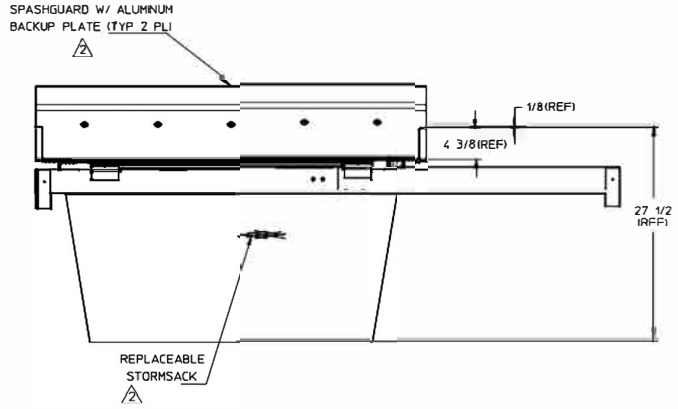
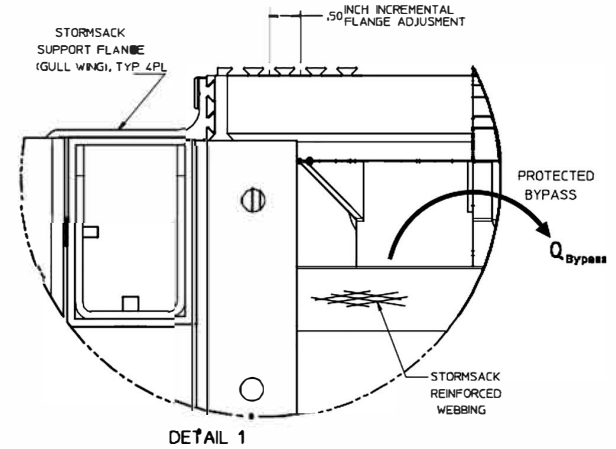
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NOTES:

1. WEIGHT (EMPTY): 50 LB. MAX.
2. MATERIAL:
 - A) STORMSACK SUPPORT FLANGE AND DEFLECTOR: ALUMINUM ALLOY 6063-T6
 - B) CORNER DEFLECTOR (PLASTIC): POLYPROPYLENE POLYETHYLENE COPOLYMER
 - C) GEOTEXTILE SACK: WOVEN POLYPROPYLENE, 20 US STD SIEVE SIZE
 - D) SUPPORT PLATE: ALUMINUM ALLOY 5052-H32
 - E) SUPPORT HARDWARE: CRES 300 SERIES OR EQUAL
 - F) OIL BOOM: 3" DIAMETER, POLYPROPYLENE
 - G) MESH LINER: HDPE, DIAMOND PATTERN
3. PERFORMANCE CHARACTERISTICS (TYP):
 - A) DEBRIS CAPACITY: 7.1 CU-FT
 - B) FILTERED FLOW RATE (INITIAL): 3440 GPM (7.7 CFS)
 - C) PROTECTED BYPASS FLOW RATE: 1412 GPM (3.1 CFS)
 - D) TOTAL BYPASS FLOW RATE: 1412 GPM (3.1 CFS)
4. COVERED BYPASS PREVENTS RE-SUSPENSION OF FLOATABLES
5. USE WITH FABCO REPLACABLE STORMSACKS ONLY. FABCO P/N: 9748-1-200. CONTACT FABCO REPRESENTATIVE FOR ALTERNATE STORMSACK SIZES.
6. VISIT FABCO INDUSTRIES WEBSITE FOR COMPLETE INSTALLATION INSTRUCTIONS. WWW.FABCO-INDUSTRIES.COM



DOVETAIL ADJUSTMENT FEATURE (TYPICAL EACH FLANGE)



NO		QTY	PART NUMBER	DESCRIPTION	REMARKS	
BILL OF MATERIALS				APPROVALS	DATE	
UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS: DECIMALS: DIMENSIONS: UNLESS OTHERWISE SPECIFIED: DO NOT SCALE THIS DRAWING.				OWN	MS	8/2/16
				OWN	MS	8/2/16
				OWN	JP	8/2/16
				OWN	JP	8/2/16
MATERIAL				FABCO INDUSTRIES, INC. 44 CENTRAL AVENUE FARMINGDALE, NY 11735		
MODEL LINK				10130-4		
SIZE				D		
CAGE CODE				10130-4-000		
SCALE				1/4" = 1"		
SHEET				1 OF 1		

**ITEM 771A – Type “A” Catch Basin Insert- Sediment Control Type with Pathogen
Filtration (Combination Inlet)**

**ITEM 771B – Type “B” Catch Basin Insert- Sediment Control Type with Pathogen
Filtration (Curb Inlet Only)**

A. Description.

1. Under each of these items the Contractor shall furnish geotextile technology catch basin inserts to collect and retain sediment and debris prior to entering the storm water system.

B. Submittals.

1. The manufacturer shall develop and furnish a worksheet to be used by the installer(s) to measure and certify the actual condition of the catch basin which will receive the catch basin insert.

C. Delivery, Storage & Handling.

1. All materials shall be protected during loading, transporting, and unloading, in accordance with the manufacturer’s recommendations.

D. Materials.

1. The catch basin insert to be used in both the Type A and B installations shall comply with the following specifications:
 - a. Physical Properties:
 - 1) Material:
 - a) Adjustable Flange, Deflector and Treated Media
 - b) Treated Polyether Open-Cell Foam for Bacteria Reduction
 - c) Splash Guard: Neoprene Rubber to redirect water from curb opening to the insert
 - d) Inner woven polypropylene geotextile pre-filter bag, with outer polypropylene pocket to house treated foam.
 - e) Replaceable oil boom
 - f) Protected by-pass to retain re-suspended material
 - g) Lifting Tabs
 - h) Mounting kit and support hardware
 - 2) Performance Characteristics:
 - a) Debris Capacity: 6.0 Cu-Ft
 - b) Filtered Flow Rate: 5.0 cfs
 - c) Bypass Flow Rate: 3.4 cfs

- 3) Oil Absorbing Boom:
 - a) Absorbent Material: 100% polypropylene, non-biodegradable
 - b) Hydrophobic Media
 - c) Absorption Capacity: 3.0 gal (max)
 - d) Dimensions: 3" diameter x 100" long
- b. Serviceability:
 - 1) Catch Basin Insert Maintenance
 - a) The catch basin inserts shall be serviceable from the street level only; maintenance shall not require "confined space" entry into the catch basin.
 - b) The consumables (filters) shall be designed to enable replacement from the street level only; maintenance shall not require "confined space" entry into the catch basin.

E. Method of Measurement.

- 1. The quantity to be paid for under these two items shall be the number of catch basin insert assemblies that are furnished to the County or its Municipalities.

F. Basis of Payment.

- 1. The unit price bid for each item(s) shall include the cost of furnishing one (1) complete catch basin insert assembly which shall consist of all materials including one set of filters and the metal framework to be installed inside the catch basin.

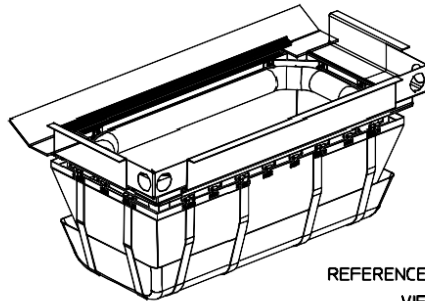
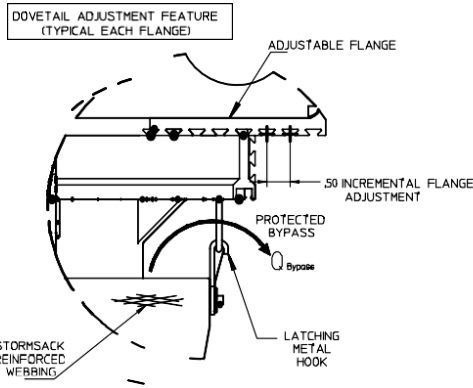
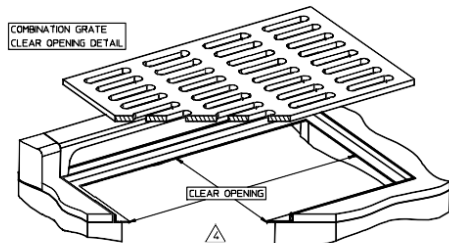
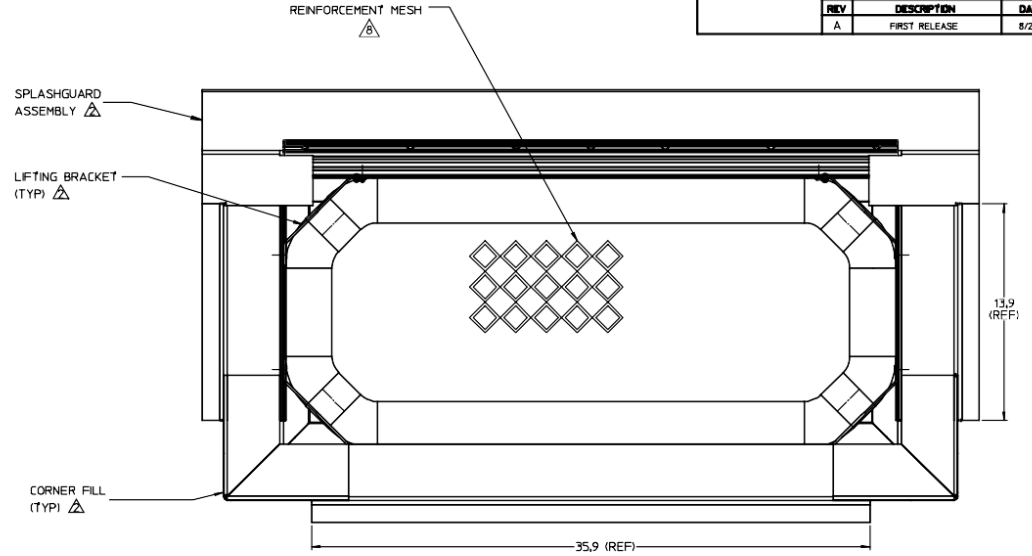
G. Warranty.

- 1. The equipment, materials, and products furnished under this item shall be guaranteed against defective design, materials, workmanship and operation for a period of one (1) year from the date the equipment is placed into problem free operation. The date of problem free operation will be determined by the Owner's representative. Upon receipt of notice from the Owner of failure of any part of the equipment, material, or product during the guarantee period, the affected item shall be repaired or replaced (if necessary), at the sole cost and expense of the Contractor, and at no additional cost to the County.

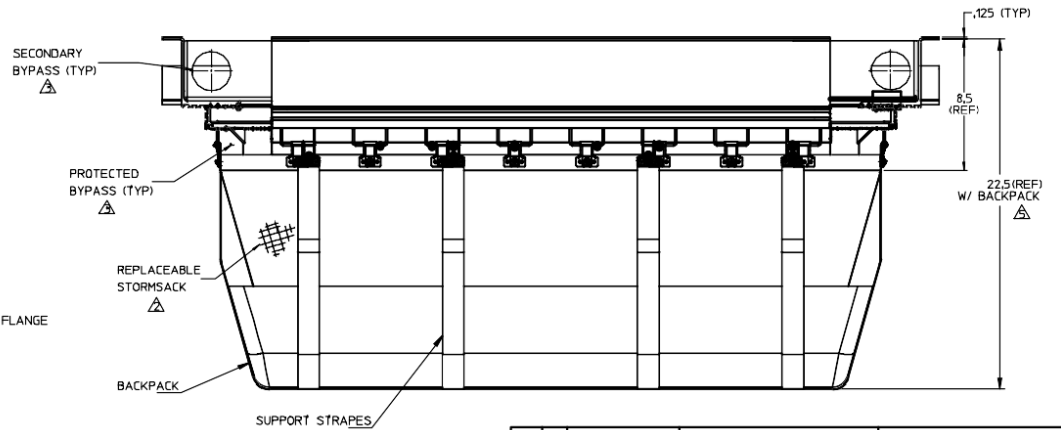
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NOTES FOR BACTERIA PACK:

1. WEIGHT: 5-LBS
2. MATERIALS:
 - A) PERMEABLE FABRIC: GEOTEXTILE, 20 US MESH
 - B) NON-PERMEABLE FABRIC: POLYESTER LAMINATED VINYL
 - C) SUPPORT STRAPS: WOVEN NYLON
 - D) SPRING CLIPS: CRS W/ ALUMINUM RIVETS
 - E) FABGUARD ANTI-MICROBIAL FOAM: POLYETHER BASE MATERIAL
3. PERFORMANCE CHARACTERISTICS:
 - A) TREATMENT FLOW RATE: 2300 GPM (5.1 CFS)
 - B) BYPASS FLOW RATE: 2000 GPM (4.5 CFS)
4. TYPICAL INSTALLATION
THE BAC-PACK UNIT HAS BEEN DESIGNED TO ADD BACTERIA TREATMENT CAPABILITY TO A TYPICAL FABCO STORMSACK PRODUCT, ESSENTIALLY CREATING A TWO-STAGE FILTERING SYSTEM, WITH THE BAC-PACK POSITIONED BENEATH THE STORMSACK. ATTACH EACH METAL SPRING CLIP TO THE STORMSACK FRAME HANGERS AS ILLUSTRATED.



REFERENCE
VIEW



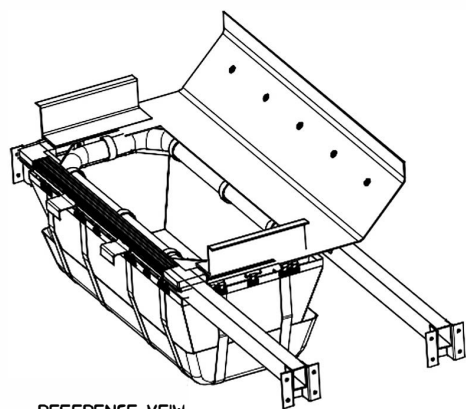
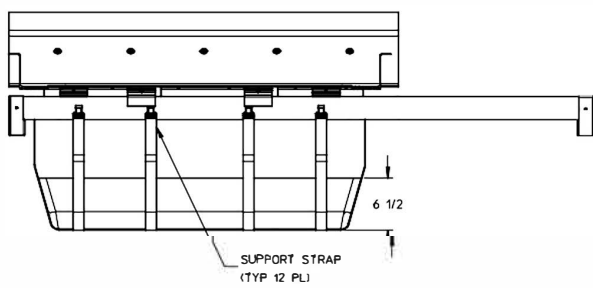
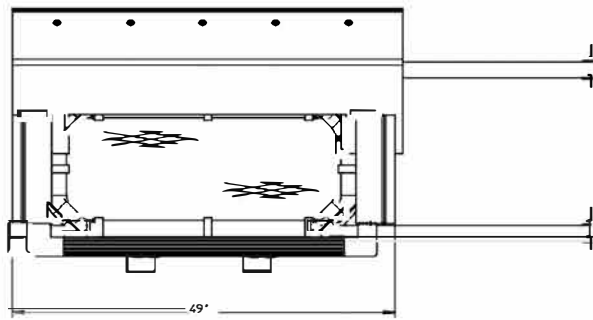
NO	QTY	PART NUMBER	DESCRIPTION	REMARKS
BILL OF MATERIALS				
APPROVALS			DATE	
DRAW			HS	8/22/14
CHECK			8/22/14	
APPROVED			8/22/14	
MATERIAL			SEE NOTES	
MODEL LINK			10130-5	
FABCO INDUSTRIES, INC.			46 CENTRAL AVENUE	
FARMINGDALE, NY 11735			WWW.FABCO-INDUSTRIES.COM	
TITLE			NASSAU COUNTY, NY	
TYPE-3A BACTERIA PACK			SIZE	
D			CAGE CODE	10130-5-000
SCALE			1/4" = 1"	1 OF 1

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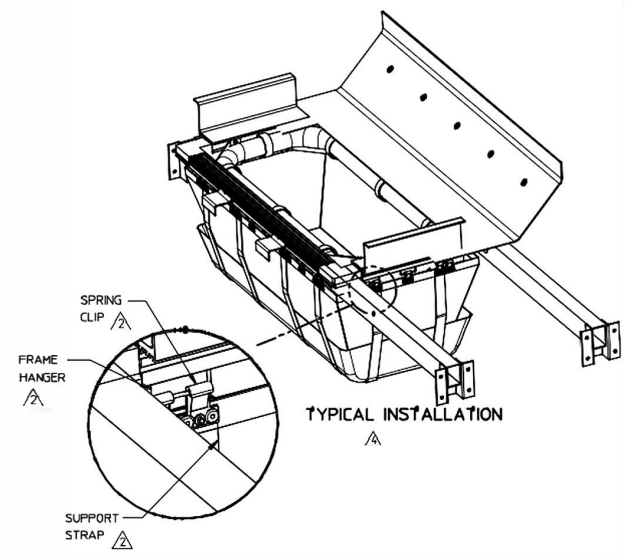
NOTES FOR BACTERIA PACK:

- 1. WEIGHT: 5-LBS
- 2. MATERIALS:
 - A) PERMEABLE FABRIC: GEOTEXTILE, 20 US MESH
 - B) NON-PERMEABLE FABRIC: POLYESTER LAMINATED VINYL
 - C) SUPPORT STRAPS: WOVEN NYLON
 - D) SPRING CLIPS: CRS W/ ALUMINUM RIVETS
 - E) FABGUARD ANTI-MICROBIAL FOAM: POLYETHER BASE MATERIAL
- 3. PERFORMANCE CHARACTERISTICS:
 - A) TREATMENT FLOW RATE: 2300 GPM (5.1 CFS)
 - B) BYPASS FLOW RATE: 2000 GPM (4.5 CFS)
- 4. TYPICAL INSTALLATION:

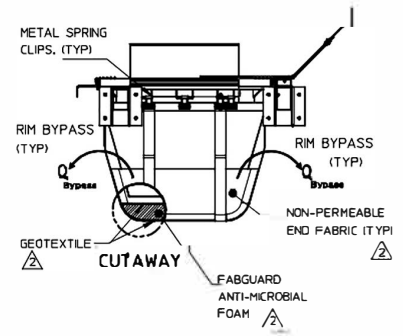
THE BAC-PACK UNIT HAS BEEN DESIGNED TO ADD BACTERIA TREATMENT CAPABILITY TO A TYPICAL FABCO STORMSACK PRODUCT. ESSENTIALLY CREATING A TWO-STAGE FILTERING SYSTEM. WITH THE BAC-PACK POSITIONED BENEATH THE STORMSACK, ATTACH EACH METAL SPRING CLIP TO THE STORMSACK FRAME HANGERS AS ILLUSTRATED.



REFERENCE VIEW



TYPICAL INSTALLATION



CUTAWAY

REV		DESCRIPTION		DATE	APPROVED
A		FIRST RELEASE		8/21/16	

IND	QTY	PART NUMBER	DESCRIPTION	REMARKS
BILL OF MATERIALS				
SIZES OTHERWISE SPECIFIED TOLERANCES: FRACTIONS: DECIMALS: ANGLES: DIMENSIONS: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE MAINTAINED TO THE CLOSEST POSSIBLE TOLERANCE.				
APPROVALS: DESIGNER: [Signature] DATE: 8/21/16				
CHECKED: [Signature] DATE: 8/21/16				
DRAWN: [Signature] DATE: 8/21/16				
SCALE: 1/4" = 1"				
TITLE: NASSAU COUNTY, NY TYPE-3B BACTERIA PACK				
FABCO INDUSTRIES, INC. 44 CENTRAL AVENUE FARMINGDALE, NY 11735				
WWW.FABCO-INDUSTRIES.COM				
CAGE CODE: 10130-6-000				
REV: A				
SHEET: 1 OF 1				

NO TEXT ON THIS PAGE