REQUIRED CONSTRUCTION

1. Install steel pole with a 50' mast arm and signals as shown (Note: 1-2" 90° elbow).
2. Install steel pole with two 40' mast arms and signals as shown (Note: 1-2", 90° elbow).
3. Install base mounted cabinet on concrete pad and all necessary control equipment (Note: 1-2" and 1-4", 90° elbow).
4. Install handbox (frame and cover).
5. Install 6' x 30' loop detector (2-turns).
6. Install 6' x 24' loop detector (2-turns).
7. Install 1" galvanized steel electrical conduit for detector lead-in.
8. Install 2" P.V.C. electrical conduit (trenched).
9. Install 2" galvanized steel electrical conduit (pushed).
10. Install 3" galvanized steel electrical conduit (pushed).
11. Install 4" P.V.C. electrical conduit (trenched).
12. Proposed location of underground feed (separate from luminaires).

CONTROLLER AND ACCESSORIES

1. NEMA eight phase modular controller with solid state circuitry and digital timing, similar to Econolite KMC E-8000 Series Digital Controller Unit, equivalent manufactured by Crouse-Hinds, Eagle Signal Corporation or approved equal.
   a. Equipped with time base coordination unit. (Non Interconnect Type - modular unit).
   b. Equipped with two (2) vehicular actuated modules.
   c. Equipped with one (1) vehicular actuated module with volume density controls.
   d. Vehicular actuated phase modules shall be capable of the following functions: Minimum Green, Passage Time, Yellow, All Red Clearance, Dual Maximum, Pedestrian Timing, Recall and Memory.
   e. Vehicular actuated phase module with volume density controls shall be capable of the following functions: Minimum Green, Passage Time, Yellow, All Red Clearance, Dual Maximum, Pedestrian Timing, Seconds per Acutation, Time to Reduce, Time for Reduction, Minimum Gap, Recall and Memory.
   f. Four phase signal overlap capability.
2. Conflict Monitor for all phases and Solid State load switches fully wired in cabinet.
3. Ground mounted traffic controller cabinet large enough to accommodate the above control equipment and detectors. The cabinet shall be furnished with a thermostatically controlled cabinet vent fan.
4. Finish of the cabinet shall be all-weather bronze paint.
5. The controller shall be wired with six loop detector amplifiers (delay output type) and harnesses.
6. Meter box shall be installed in vandal proof enclosure provided by the Contractor. Finish of the meter box, housing and conduits shall be all-weather bronze paint.
7. All phases shall be skippable.

UNDERGROUND WIRING

1. Underground wiring shall be placed in new galvanized conduits pushed under the road surface. P.V.C. electrical conduit in grass median shall be trenched as specified and shown on the Contract Drawings.
2. The contractor shall furnish an "as-built" drawing as per "General Specifications 4.02b".

LOOPS AND DETECTORS

1. The following new loops shall be installed:

Phase	Dimensions	No. of Loops Required
A	6' x 30'	1
B	6' x 24'	2
C	6' x 30'	3

2. All wiring and saw cuts shall be in accordance with manufacturers recommendations for correct operation.
3. Phase C and Phase A (left turns) shall operate in the presence mode. Phase B and Phase A (main line) shall operate by (extension) phase detection.
4. Detector amplifiers shall be Sarasota 235-T or equivalent manufactured by Econolite Control Products, Inc., Crouse-Hinds, or approved equal.

SIGNAL HEADS

1. The Contractor shall provide the following signal heads:

Signal Number	Description
3, 4, 5, 6, 7, 8	1 way, 3 section 12" signal heads or approved equal, having red, yellow, and green indications with tunnel visors and proper adjustable rigid mounting brackets for mast arm installation.
1, 2	1 way, 3 section 12" signal heads having red, yellow arrow and green arrow indications with tunnel visors including proper adjustable rigid mounting brackets for mast arm (Signal Number 2) and pole mounted (Signal Number 1) installation.

2. All signals shall be painted bronze with M.A. Bruder and Sons, Inc. Seashore Gloss Trim 27721, Duranodic Bronze Code 7557581 or equal.
3. Signal head locations and aiming to be determined in the field with the Engineer.

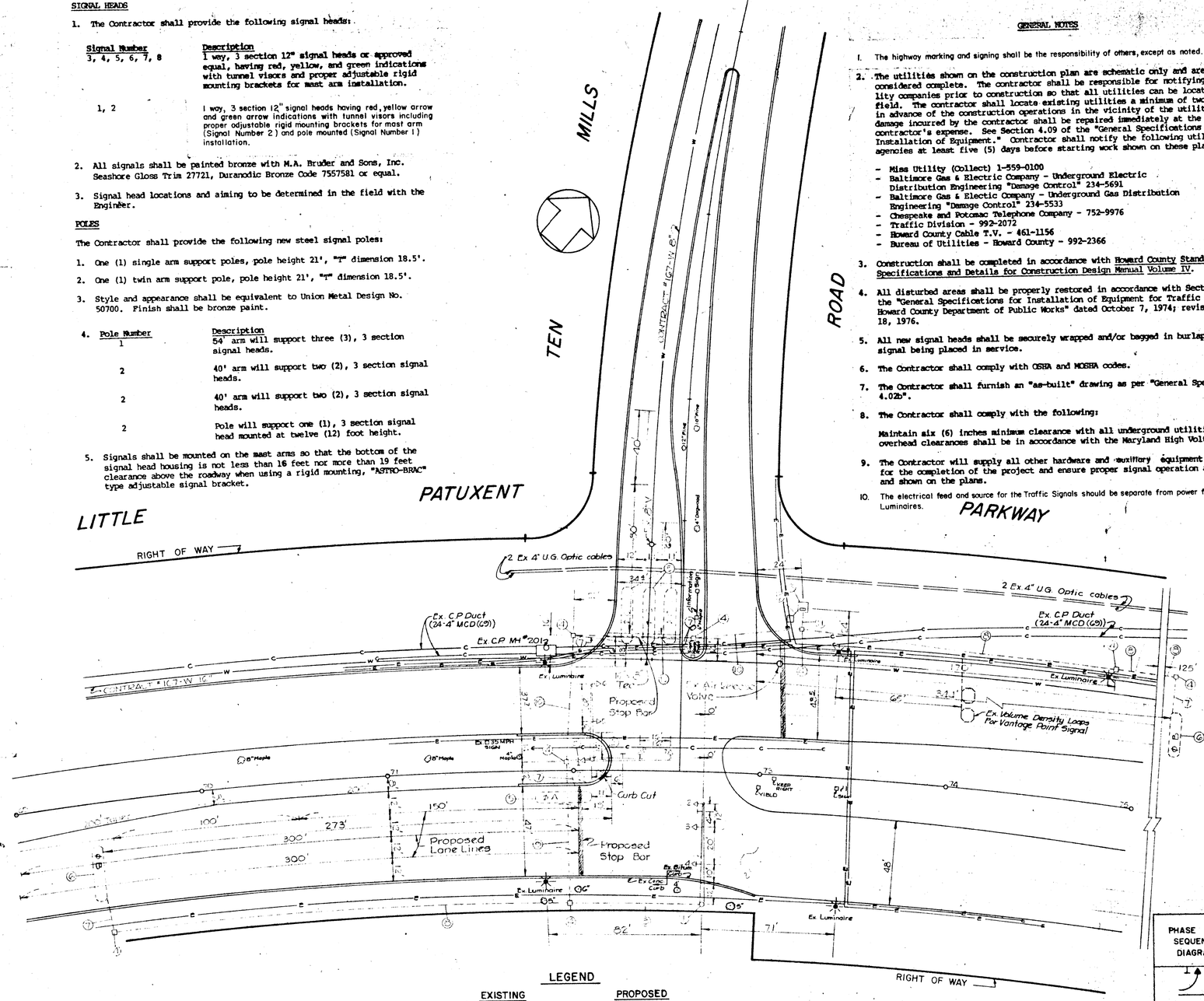
POLES

The Contractor shall provide the following new steel signal poles:

1. One (1) single arm support poles, pole height 21', "I" dimension 18.5'.
2. One (1) twin arm support pole, pole height 21', "I" dimension 18.5'.
3. Style and appearance shall be equivalent to Union Metal Design No. 50700. Finish shall be bronze paint.

Pole Number	Description
1	54' arm will support three (3), 3 section signal heads.
2	40' arm will support two (2), 3 section signal heads.
2	40' arm will support two (2), 3 section signal heads.
2	Pole will support one (1), 3 section signal head mounted at twelve (12) foot height.

5. Signals shall be mounted on the mast arms so that the bottom of the signal head housing is not less than 16 feet nor more than 19 feet clearance above the roadway when using a rigid mounting, "ASTRO-BRAC" type adjustable signal bracket.



LEGEND

EXISTING	PROPOSED
LUMINAIRE	HANDBOX
WATER MAIN	CONDUIT
WATER VALVE	STEEL POLE
C&P DUCT (U.G.)	MAST ARM
C&P CABLE (U.G.)	SIGNAL HEAD
ELECTRIC (U.G.)	LOOP DETECTOR
OPTIC CABLES (U.G.)	LANE LINE MARKINGS

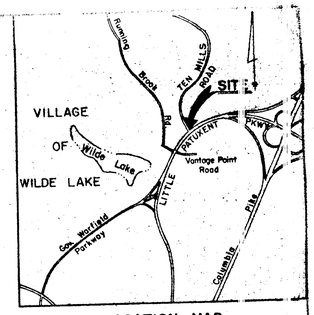
GENERAL NOTES

1. The highway marking and signing shall be the responsibility of others, except as noted.
2. The utilities shown on the construction plan are schematic only and are not to be considered complete. The contractor shall be responsible for notifying all utility companies prior to construction so that all utilities can be located in the field. The contractor shall locate existing utilities a minimum of two (2) weeks in advance of the construction operations in the vicinity of the utilities. Any damage incurred by the contractor shall be repaired immediately at the contractor's expense. See Section 4.09 of the "General Specifications for Installation of Equipment." Contractor shall notify the following utilities or agencies at least five (5) days before starting work shown on these plans:
   - Miss Utility (Collect) 1-559-0100
   - Baltimore Gas & Electric Company - Underground Electric Distribution Engineering "Damage Control" 234-5691
   - Baltimore Gas & Electic Company - Underground Gas Distribution Engineering "Damage Control" 234-5533
   - Chesapeake and Potomac Telephone Company - 752-9976
   - Traffic Division - 992-2072
   - Howard County Cable T.V. - 461-1156
   - Bureau of Utilities - Howard County - 992-2366
3. Construction shall be completed in accordance with Howard County Standard Specifications and Details for Construction Design Manual Volume IV.
4. All disturbed areas shall be properly restored in accordance with Section 4.20 of the "General Specifications for Installation of Equipment for Traffic Signals for Howard County Department of Public Works" dated October 7, 1974; revised February 18, 1976.
5. All new signal heads shall be securely wrapped and/or bagged in burlap, prior to signal being placed in service.
6. The Contractor shall comply with OSHA and MOSHA codes.
7. The Contractor shall furnish an "as-built" drawing as per "General Specifications 4.02b".
8. The Contractor shall comply with the following:

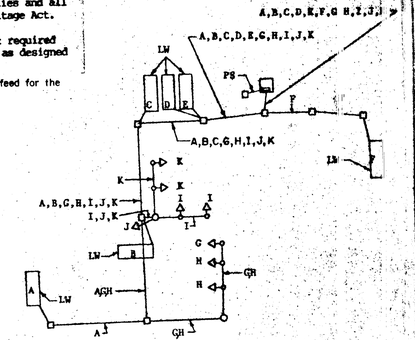
   Maintain six (6) inches minimum clearance with all underground utilities and all overhead clearances shall be in accordance with the Maryland High Voltage Act.
9. The Contractor will supply all other hardware and auxiliary equipment required for the completion of the project and ensure proper signal operation as designed and shown on the plans.
10. The electrical feed and source for the Traffic Signals should be separate from power feed for the Luminaires.

COORDINATION

Coordination with improved Signal at Little Patuxent Parkway, Running Brook and Vantage Point Road shall be accomplished as shown on sheet 2 of 2.



LOCATION MAP
Scale: 1" = 2000'



A	2-Conductor Cable (Aluminum Shielded)
B	2-Conductor Cable (Aluminum Shielded)
C	2-Conductor Cable (Aluminum Shielded)
D	2-Conductor Cable (Aluminum Shielded)
E	2-Conductor Cable (Aluminum Shielded)
F	2-Conductor Cable (Aluminum Shielded)
G	5-Conductor Cable (No. 14 AWG)
H	5-Conductor Cable (No. 14 AWG)
I	5-Conductor Cable (No. 14 AWG)
J	5-Conductor Cable (No. 14 AWG)
K	5-Conductor Cable (No. 14 AWG)
LW	Loop Wire
PS	Proposed Service

WIRING DIAGRAM

PHASE AND SEQUENCE DIAGRAM		TRAFFIC SIGNAL HEADS 1-2	3-4	5-6	7-8	Min. Green	Passage	Yellow	Red. Clear	Max. I	Max. II	Seconds Per Actuation	Time Reduce	Time Before Reduction	Min. Gap	Recall	Memory
	Phase A	G	G	R	R	5	3			30	15						
	Phase A Clear	Y	G	R	R			5									
	Phase B	R	G	G	R	10	5			45	40	1.0	15.0	20.0	2.0	X	X
	Phase B Clear	R	Y	Y	R			5									
	Phase C	R	R	R	G	5	3.0	5		10	30						
	Phase C Clear	R	R	R	Y												
	Flash	FL/R	FL/Y	FL/Y	FL/R												

NOTES: 1. INSTALL BACK PLATES FOR SIGNAL HEADS 5 AND 8 AS SPECIFIED ON THE PLANS.
2. TIMINGS SHOULD BE SET AND ADJUSTED IN THE FIELD AFTER THE SIGNAL IS IN OPERATION AND BASED ON CURRENT TRAFFIC VOLUMES.

C794D201

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS — DATE 6-26-85
CHIEF, BUREAU OF ENGINEERING — DATE 6/26/85
CHIEF, DIVISION OF ROADS, BRIDGES, AND STORM DRAINS — DATE 6/26/85

JOHN E. HARMS, JR. & ASSOCIATES, INC.
CONSULTING ENGINEERS
PASADENA, MARYLAND
PROFESSIONAL TRANSPORTATION CONSULTANTS
LANHAM, MARYLAND

DESIGNED BY: H.S. CHADDA
DRAWN BY: W.E.B.
CHECKED BY: W.H.V.
DATE: 6/24/85

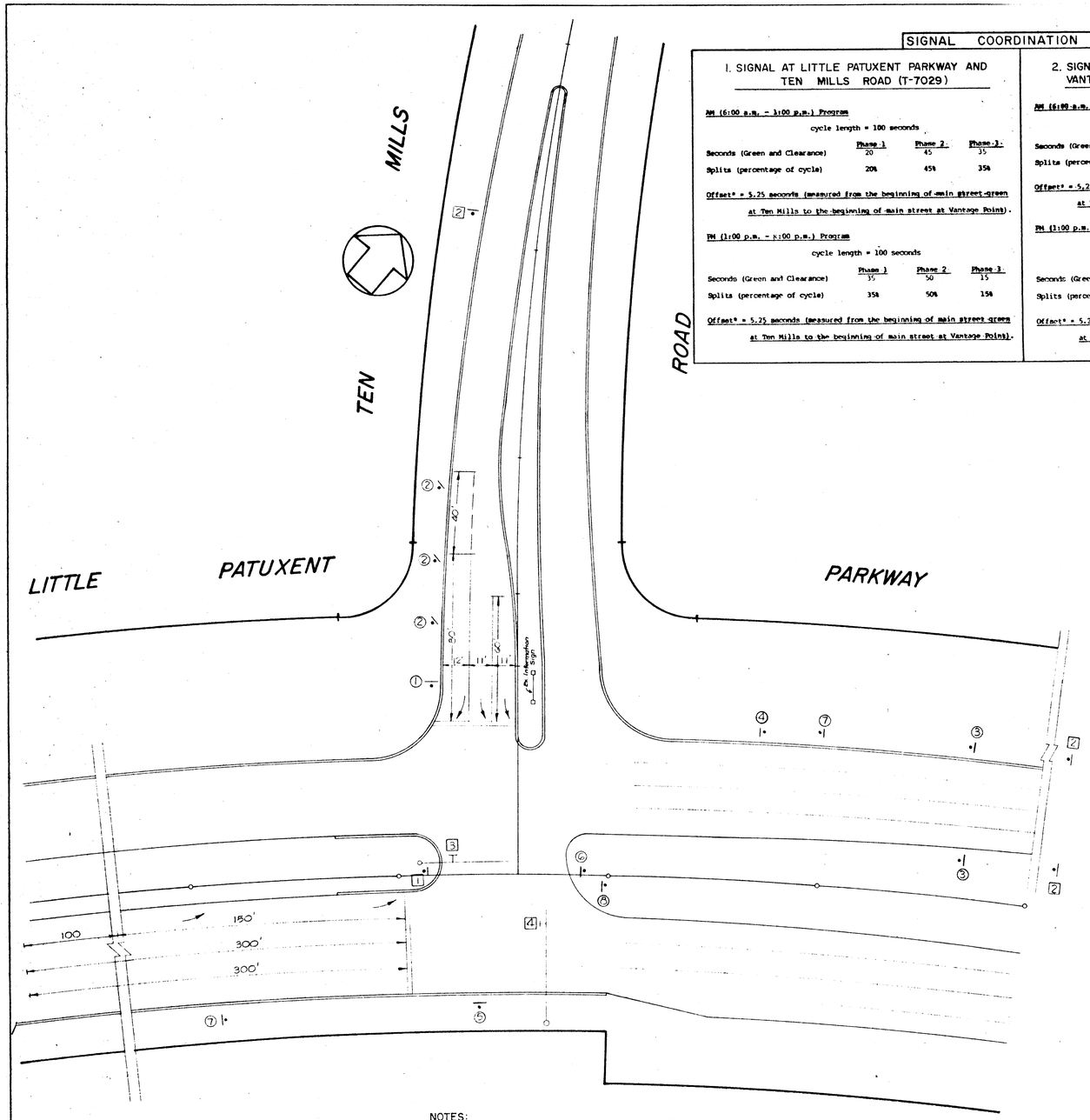
BY	NO	REVISION	DATE

TRAFFIC SIGNAL PLAN

600' SCALE MAP NO. _____ BLOCK NO. _____

LITTLE PATUXENT PARKWAY AND TEN MILLS ROAD
CAPITAL PROJECT T-7029
HOWARD COUNTY, MARYLAND

SCALE 1" = 30'
SHEET 1 OF 2



SIGNAL COORDINATION PLAN

1. SIGNAL AT LITTLE PATUXENT PARKWAY AND TEN MILLS ROAD (T-7029)

AM (6:00 a.m. - 1:00 p.m.) Program

cycle length = 100 seconds

	Phase 1	Phase 2	Phase 3
Seconds (Green and Clearance)	20	45	35
Splits (percentage of cycle)	20%	45%	35%

Offset* = 5.25 seconds (measured from the beginning of main street green at Ten Mills to the beginning of main street at Vantage Point).

PM (1:00 p.m. - 8:00 p.m.) Program

cycle length = 100 seconds

	Phase 1	Phase 2	Phase 3
Seconds (Green and Clearance)	35	50	15
Splits (percentage of cycle)	35%	50%	15%

Offset* = 5.25 seconds (measured from the beginning of main street green at Ten Mills to the beginning of main street at Vantage Point).

2. SIGNAL AT LITTLE PATUXENT PARKWAY - VANTAGE POINT RD. AND RUNNING BROOK RD. (T-7037)

AM (6:00 a.m. - 1:00 p.m.) Program

cycle length = 100 seconds

	Phase 1-5	Phase 2-6	Phase 3	Phase 4-8
Seconds (Green and Clearance)	14.5	34.5	25	26
Splits (percentage of cycle)	14.5%	34.5%	25%	26%

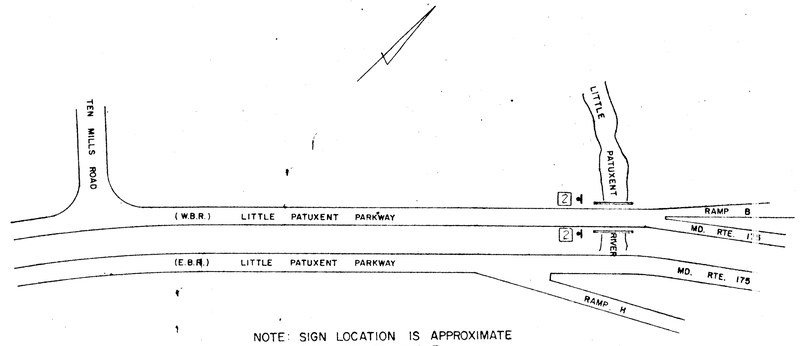
Offset* = 5.25 seconds (measured from the beginning of main street green at Ten Mills to the beginning of main street at Vantage Point).

PM (1:00 p.m. - 8:00 p.m.) Program

cycle length = 100 seconds

	Phase 1-5	Phase 2-6	Phase 3	Phase 4-8
Seconds (Green and Clearance)	29.5	39.5	15	16
Splits (percentage of cycle)	29.5%	39.5%	15%	16%

Offset* = 5.25 seconds (measured from the beginning of main street green at Ten Mills to the beginning of main street at Vantage Point).



NOTE: SIGN LOCATION IS APPROXIMATE AND NOT TO SCALE.

NOTES:
1. SIGN LOCATION IS APPROXIMATE AND NOT TO SCALE.
2. Two signs [3] and [4] to be mounted on mast arm and to be installed by the Contractor.
3. All other proposed signs will be supplied and installed by others.
4. All markings will be installed by others.

PROPOSED SIGNS

NUMBER	SIGN TYPE	CLASSIFICATION	SIZE	QUANTITY
[1]	NO U TURNS	R3-4	24" x 24"	1
[2]	SIGNAL AHEAD SIGN	W3-3	36" x 36"	3
[3]	NO TURN ON RED	R10-11a	24" x 30"	1
[4]	LEFT TURN SIGNAL	R10-10	24" x 30"	2

EXISTING SIGNS

NUMBER	SIGN TYPE	CLASSIFICATION	QUANTITY
①	STOP SIGN	R1-1	1
②	NO PARKING	R7-1	3
③	REDUCE SPEED AHEAD	R2-5a	2
④	DO NOT ENTER	R5-1	1
⑤	ONE WAY	R6-1	1
⑥	ONE WAY & YIELD	R6-1 & R2-1	COMBINATION
⑦	STREET NAME SIGN (TEN MILLS ROAD)		1
⑧	KEEP RIGHT	R4-7	1

NOTES:
1. Remove R1-1 (Stop Sign) after the signal is installed and in operation. (By others)
2. Remove sign #6 (One Way & Yield) after the signal is installed and in operation. (By others)

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HOWARD COUNTY, MARYLAND

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PROPOSED SIGN AND MARKING PLAN

600' SCALE MAP NO. _____ BLOCK NO. _____

LITTLE PATUXENT PARKWAY AND TEN MILLS ROAD
CAPITAL PROJECT T-7029
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

SHEET 2 OF 2