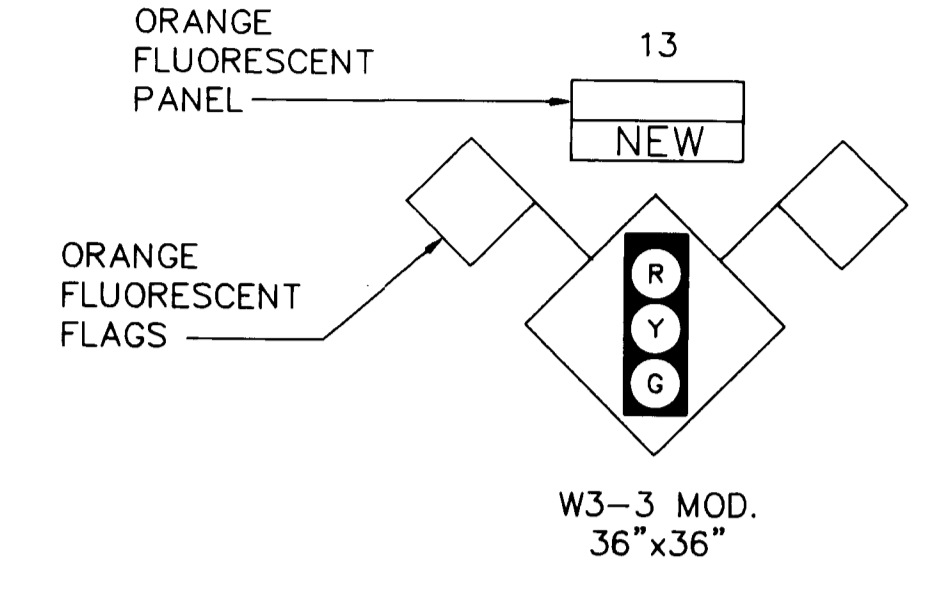
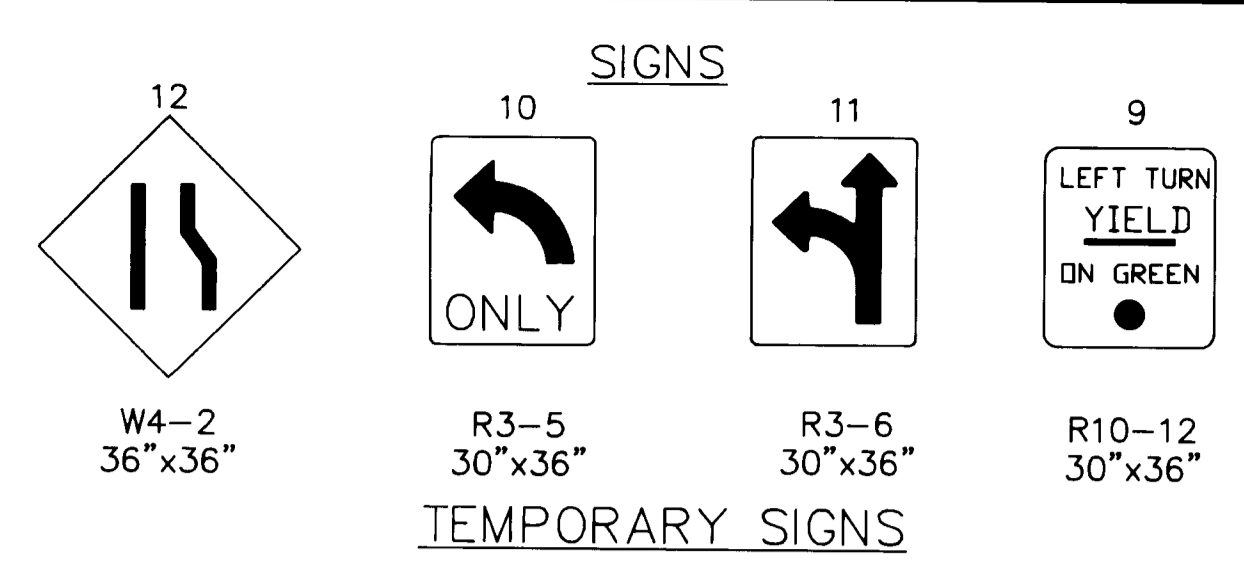
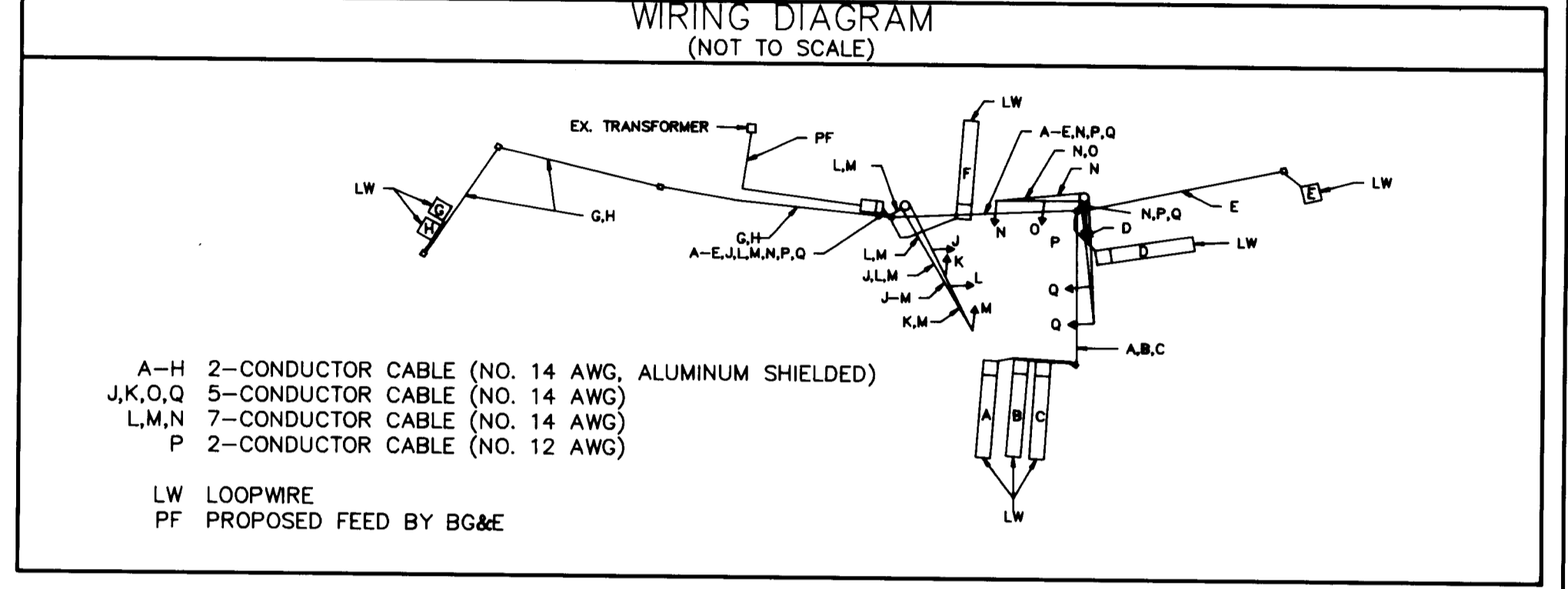


**PHASING NOTES**  
 1. PHASES ASSOCIATED WITH A SOLID LINE WILL NOT OPERATE CONCURRENTLY.  
 2. PHASES ASSOCIATED WITH A DASHED LINE WILL OPERATE CONCURRENTLY.



PHASE, SEQUENCE & TIMING DIAGRAM	TRAFFIC SIGNAL HEADS								MIN. GREEN	PASSAGE YELLOW	PED. CLEARANCE	MAX. I	MAX. II	SECONDS PER ACTUATION	TIME TO CLEAR	MIN. REDUCION	MIN. GAP	RECALL	MEMORY	
	(R) (Y) (G)	(R) (Y) (G)	(R) (Y) (G)	(R) (Y) (G)	(R) (Y) (G)	(R) (Y) (G)	(R) (Y) (G)	(R) (Y) (G)												
← PHASE A CLEAR	R	R	+GG	G	R	R	R	R	4										OFF	NON-LOCK
← PHASE B CLEAR	G	G	G	G	R	R	R	R	10					35	1.5	30	10	1.5	ON	LOCK
↑ PHASE C CLEAR	R	R	R	R	+G	G	R	R	8										OFF	NON-LOCK
↓ PHASE D CLEAR	R	R	R	R	R	R	+G	G	3										OFF	NON-LOCK
↕ FLASHING OPERATION	FL/Y	FL/Y	FL/Y	FL/Y	FL/R	FL/R	FL/R	FL/R												



- GENERAL NOTES**
- THE SIGNAGE MARKING AND SIGNAL MOUNTING SHALL BE THE RESPONSIBILITY OF HOWARD COUNTY.
  - THE UTILITIES SHOWN ON THE CONSTRUCTION PLAN ARE SCHEMATIC ONLY AND ARE NOT TO BE CONSIDERED COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL UTILITIES PRIOR TO CONSTRUCTION TO THAT ALL UTILITIES CAN BE LOCATED IN THE FIELD. THE CONTRACTOR SHALL LOCATE EXISTING UTILITIES A MINIMUM OF TWO (2) FEET FROM THE CENTERLINE OF THE CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES IN THE VICINITY OF THE UTILITIES. ANY DAMAGE INCURRED BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE (5) DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS:
    - WIRE UTILITY DISTRICTS 1-800-0100
    - BALTIMORE GAS & LIGHTING COMPANY - UNDERGROUND GAS DISTRIBUTION
    - BALTIMORE TELEPHONE COMPANY - UNDERGROUND GAS DISTRIBUTION
    - BALTIMORE TELEPHONE COMPANY - UNDERGROUND GAS DISTRIBUTION
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  - CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH HOWARD COUNTY STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (FORM MANUAL VOLUME IV).
  - ALL NEW SIGNAL HEADS SHALL BE SECURELY WRAPPED AND/OR BAGGED IN BURLAP, PRIOR TO SIGNAL HEADS PLACED IN SERVICE.
  - THE CONTRACTOR SHALL COMPLY WITH OSHA AND NEMA CODES.
  - THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING:
    - MINIMUM SIX (6) FEET MINIMUM CLEARANCE WITH ALL UNDERGROUND UTILITIES AND ALL OVERHEAD CLEARANCES SHALL BE IN ACCORDANCE WITH THE MARYLAND HIGHWAY ACT.
  - 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 THESE PLANS.
  - THE ELECTRICAL FEED AND SOURCE FOR THE TRAFFIC SIGNALS SHOULD BE SEPARATE FROM POWER FOR THE LUMINAIRES.

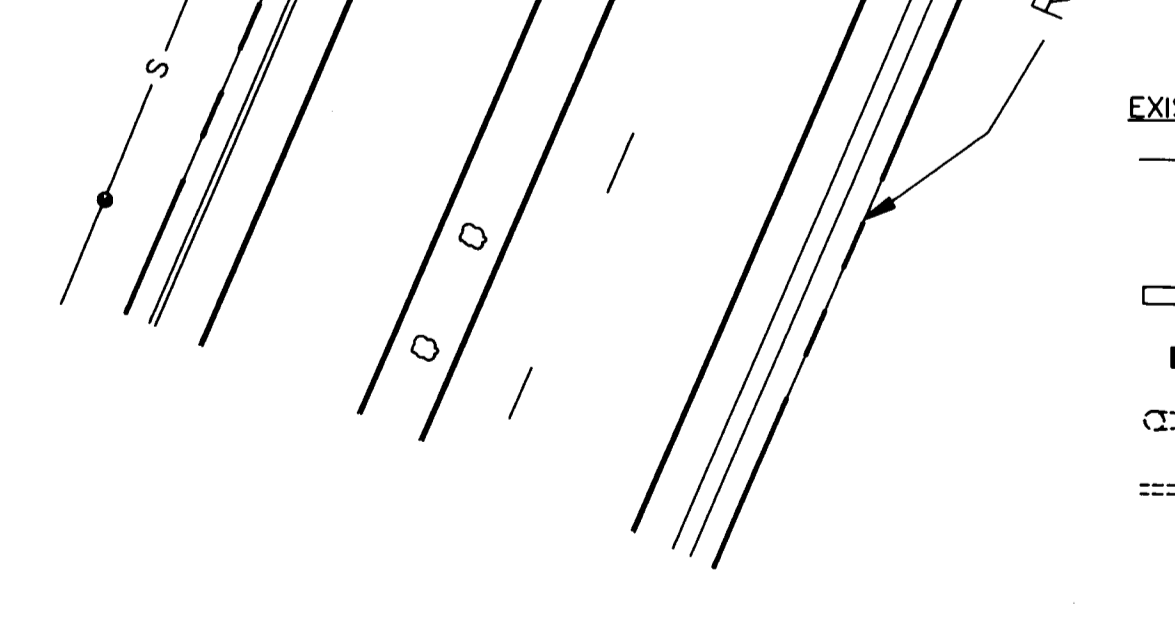
- CONTROLLER AND ACCESSORIES**
- NEMA BUILT PHASE MODULAR CONTROLLER WITH SOLID STATE CIRCUITRY AND DIGITAL TRAFFIC SIGNALS SHALL BE EQUIPPED WITH 8 CHANNEL LOOP DETECTOR UNIT. EQUIPMENT MANUFACTURED BY CROUSE-HINDS, EMBLE SIGNAL CORPORATION OR APPROVED EQUAL SHALL BE ACCEPTED.
  - FOUR PHASE SIGNAL OVERLAP CAPABILITY.
  - VARIABLE ACTUATED MODULES WITH VOLUME DENSITY CONTROLS FOR TWO APPROACHES.
  - VARIABLE ACTUATED MODULES (CAPABLE OF CONTROLLING FIVE TRAFFIC MOVEMENTS).
  - VARIABLE ACTUATED PHASE MODULES SHALL BE CAPABLE OF THE FOLLOWING:
    - FUNCTIONAL PHASING: THE YELLOW, ALL RED CLEARANCE, DUAL MAINTENANCE, PROHIBITED TURN, SIGNAL AND HARBOR.
    - FUNCTIONAL PHASING: THE YELLOW, ALL RED CLEARANCE, DUAL MAINTENANCE, PROHIBITED TURN, SIGNAL AND HARBOR.
    - FUNCTIONAL PHASING: THE YELLOW, ALL RED CLEARANCE, DUAL MAINTENANCE, PROHIBITED TURN, SIGNAL AND HARBOR.
    - FUNCTIONAL PHASING: THE YELLOW, ALL RED CLEARANCE, DUAL MAINTENANCE, PROHIBITED TURN, SIGNAL AND HARBOR.
    - FUNCTIONAL PHASING: THE YELLOW, ALL RED CLEARANCE, DUAL MAINTENANCE, PROHIBITED TURN, SIGNAL AND HARBOR.

- SIGNAL HEADS**
- THE CONTRACTOR SHALL PROVIDE THE FOLLOWING NEW SIGNAL HEADS:
 

SIGNAL NUMBER	DESCRIPTION
1,2,4	3-SECTION 12" DIAMETER RED, AMBER AND GREEN INDICATORS WITH 1 1/2" YELLOW AND GREEN 1/2" TURN ARROWS
3,6	12" DIAMETER INDICATORS
7	12" DIAMETER RED BALL AND GREEN ARROW WITH 6" DIAMETER AMBER AND GREEN INDICATORS
8	3-SECTION 12" DIAMETER RED INDICATOR, 6" DIAMETER AMBER AND GREEN INDICATORS
  - ALL SIGNALS SHALL BE PAINTED BRONZE WITH ALL BRUSHES & BOLS, INC. SEASONS GLASS 789 2721 DURAMODIC BRIDGE CO. THE 287508 OR EQUAL.
  - ALL SIGNALS SHALL BE VERTICALLY MOUNTED ON THE SIGNAL POLE MAST ARMS WITH AN ADJUSTABLE SIGNAL BRACKET EQUIVALENT TO THE "ASTRO-BRAC" MODEL O-AB-101 BY MOVED TRAFFIC CONTROLS, INC. OR APPROVED EQUAL.
  - ALL SIGNAL HEADS SHALL BE CAPABLE OF ACCEPTING A STANDARD BACK PLATE.

- POLES**
- THE CONTRACTOR SHALL PROVIDE THE FOLLOWING NEW SIGNAL POLES:
- ONE (1) SINGLE ARM SUPPORT POLE - 30' HEIGHT.
  - ONE (1) TWIN ARM SUPPORT POLE - 21' HEIGHT WITH 90 DEGREE ANGLE OF SEPARATION, WITH ONE (1) 6-FOOT LUMINAIRE ARM.
  - STEEL AND APPEARANCE SHALL BE EQUIVALENT TO UNION METAL DESIGN NO. 50388 FROM SHALL BE BRONZE PAINT.
  - POLE NUMBER:
 

DESCRIPTION	NO. REQUIRED
3-SECTION 12" DIAMETER SUPPORTING 4 SIGNAL HEADS AND ONE 6-FOOT LUMINAIRE ARM	1
3-SECTION 12" DIAMETER SUPPORTING 2 SIGNAL HEADS AND ONE 6-FOOT LUMINAIRE ARM	1
12" DIAMETER SUPPORTING 2 SIGNAL HEADS AND ONE 6-FOOT LUMINAIRE ARM	1
12" DIAMETER SUPPORTING 2 SIGNAL HEADS AND ONE 6-FOOT LUMINAIRE ARM	1
  - MAST ARMS SHALL BE MOUNTED ON THE SIGNAL POLES SO THAT THE BOTTOM OF THE SIGNAL HEAD HOUSING IS NOT LESS THAN 18 FEET HIGH AND NOT MORE THAN 18 FEET CLEAR ABOVE THE ROADWAY WHEN USING THE "ASTRO-BRAC" ADJUSTABLE SIGNAL BRACKET.



**UNDERGROUND WORK**

UNDERGROUND WORK UNDER ROAD SURFACES SHALL BE PLACED IN NEW GALVANIZED CORRUGATED FIBER UNDER ROAD SURFACES. P.V.C. ELECTRICAL CONDUIT IN GRADE AREAS SHALL BE INSTALLED AS SHOWN ON THE CONTRACT DRAWINGS.

**LOOP AND DETECTORS**

THE FOLLOWING LOOPS SHALL BE INSTALLED:

PHASE	DESCRIPTION	NO. OF LOOPS REQUIRED
1	12" x 12" x 1/4"	1
2	12" x 12" x 1/4"	1
3	12" x 12" x 1/4"	1
4	12" x 12" x 1/4"	1
5	12" x 12" x 1/4"	1
6	12" x 12" x 1/4"	1
7	12" x 12" x 1/4"	1
8	12" x 12" x 1/4"	1

ALL WIRING AND BAY CUTS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR CORRECT OPERATION.

PHASES 2 AND 3 SHALL OPERATE IN PHASE MODE. PHASES 1, 4, 5, 7, AND 8 SHALL OPERATE IN THE PRESENCE MODE.

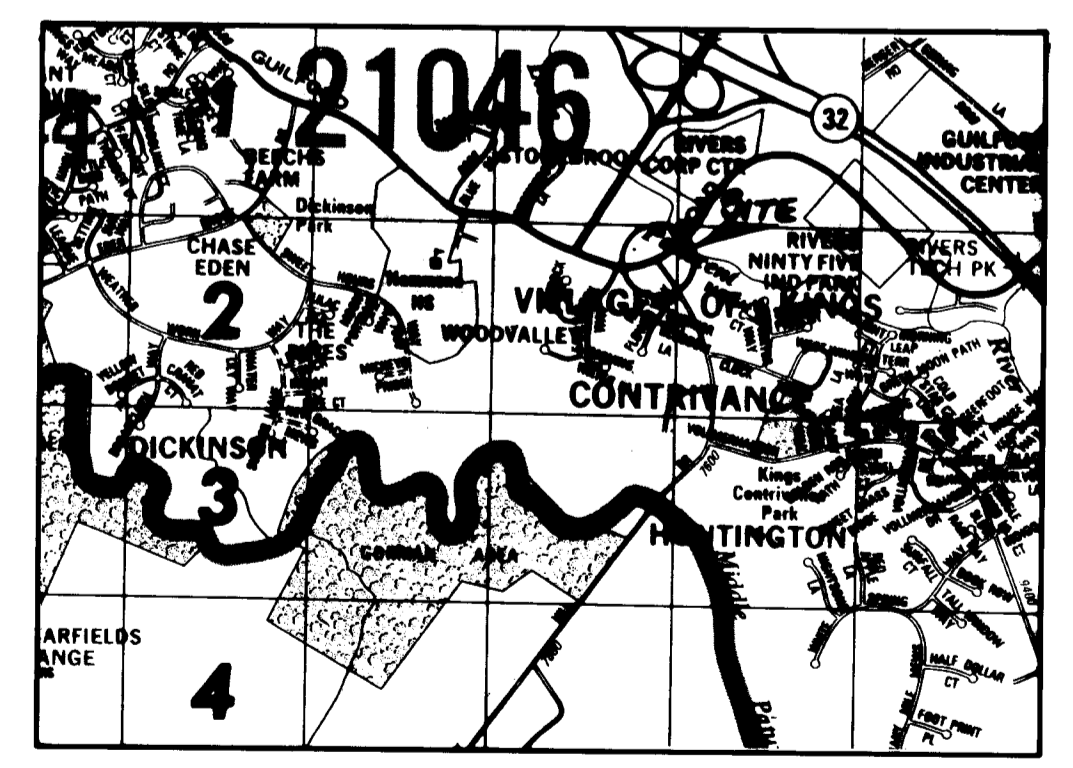
DETECTOR EQUIPMENT SHALL BE SARGENT & Lundy 235-T OR EQUIVALENT MANUFACTURED BY EQUIVALENT CONTROL PRODUCTS, INC. (CROUSE-HINDS) OR APPROVED EQUAL.

DETECTOR LOOPS OPERATING IN THE PRESENCE MODE SHALL BE CONSTRUCTED WITH A 6" x 6" POWER HEAD LOOP.

LOOPS ARE TO BE INSTALLED CENTERED IN THE TRAVEL LANES FOR WHICH THEY ARE DESIGNED.

**CONSTRUCTION DETAILS**

- INSTALL 21' STEEL POLE WITH 60' MAST ARM, TRAFFIC SIGNAL HEADS AND SIGN.
- INSTALL 30' STEEL POLE WITH ONE 36' AND ONE 50' MAST ARM, TRAFFIC SIGNAL HEADS, SIGNS, AND ONE 6' LUMINAIRE ARM WITH 250 WATT HPS LUMINAIRE.
- INSTALL HANDBOX.
- INSTALL 6' x 6' LOOP DETECTOR (3 TURNS) ENCASED IN 1/4" FLEXIBLE TUBING.
- INSTALL 6' x 40' LOOP DETECTOR WITH 6' x 6' POWER HEAD (3 TURNS) ENCASED IN 1/4" FLEXIBLE TUBING.
- INSTALL 1" GALVANIZED STEEL ELECTRICAL CONDUIT SLEEVE FOR DETECTOR WIRE.
- INSTALL 2" GALVANIZED STEEL ELECTRICAL CONDUIT - TRENCHED.
- INSTALL 2" GALVANIZED STEEL ELECTRICAL CONDUIT - PUSHED.
- INSTALL 3" GALVANIZED STEEL ELECTRICAL CONDUIT - PUSHED.
- INSTALL 4" POLYVINYL CHLORIDE ELECTRICAL CONDUIT - TRENCHED.
- PROPOSED UNDERGROUND POWER FEED BY B G & E.
- INSTALL BASE MOUNTED CABINET AND CONTROLLER WITH ALL NECESSARY EQUIPMENT (NOTE: TWO - 4", 90° POLYVINYL CHLORIDE ELBOWS AND ONE 2", 90° GALVANIZED STEEL ELBOW).



DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

DATE: 12/4/87

CHIEF, BUREAU OF ENGINEERING  
 Elizabeth Collins 4/5/88  
 CHIEF, ROADS, BRIDGES, AND  
 STORM DRAINAGE DIVISION

GPI GREENMAN-PEDERSEN INC.  
 CONSULTING ENGINEERS - LAUREL, MARYLAND

DES: M.A.H.  
 DRN: M.A.H.  
 CHK: P.A.H.  
 DATE: 12/4/87

TF-254

DATE: 600' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

TRAFFIC SIGNAL PLAN  
 GUILFORD ROAD & MURRAY HILL ROAD  
 CAPITAL PROJECT NO. T-7023  
 ELECTION DISTRICT NO. 6  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 1 OF 1

GUILMURR