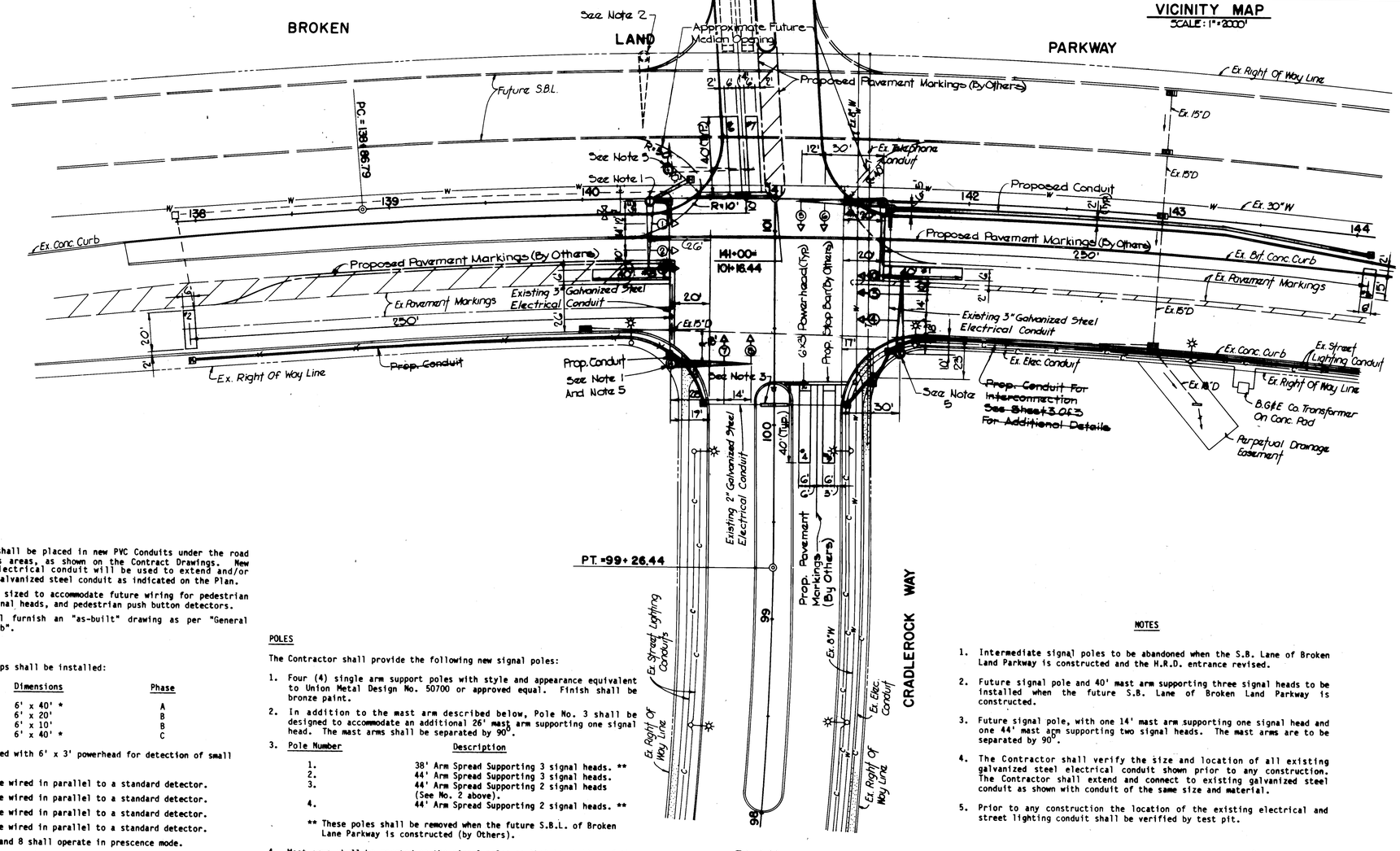
PHASE AND SEQUENCE DIAGRAM		Traffic Signal Head 1,2,3,4	Traffic Signal Head 5,6,7,8	Traffic Signal Head 9,10		Min. Green	Passage	Yellow	Red Clear	Max I	Seconds Per Actuation	Time To Reduce	Time Before Reduction	Min. Gap	Recall	Memory
	Phase A	R	R	GA		10	1			25					Off	Off
	Phase A Clear	R	R	YA				4	2							
	Phase B	G	R	R		10	5			21	1.0	5.0	10.0	3.5	Off	On
	Phase B Clear	Y	R	R				4	1							
	Phase C	R	G	R		10	1								Off	Off
	Phase C Clear	R	Y	R				4	2							
	Flash	Y	R	Y												

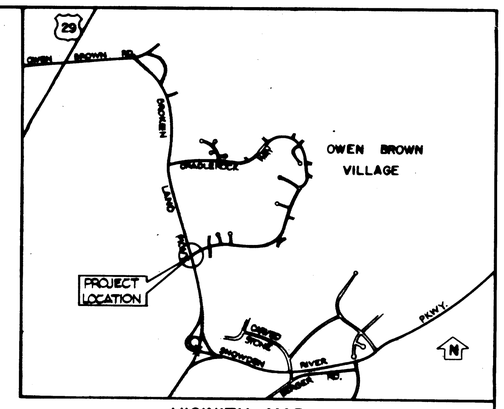
GA = Green Arrow YA = Yellow Arrow *1 = Left On Green With Caution

LEGEND

EXISTING	PROPOSED	FUTURE
Steel Pole	②	○
Mast Arm		
Signal Head	—②—	
Luminaire and Support		
Sign		
Handbox	H	
Underground Signal Wiring	Prop. Conduit	
Vehicular Loop Detector	Powerhead	
Control Cabinet	C	
Meter Box	M	



PLAN
SCALE: 1"=30'-0"



VICINITY MAP
SCALE: 1"=2000'

GENERAL NOTES

1. All highway marking shall be the responsibility of the Division of Traffic Engineering of the Bureau of Engineering, Department of Public Works, of Howard County, Maryland, and is not to be considered a part of this contract.
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.

   In addition, the contractor shall verify the location of the existing 30" water line in the vicinity of poles nos. 1 and 3 prior to excavation for the mast arm pole foundations. A minimum 5' lateral clearance shall be maintained between the proposed foundation and the existing water main.
3. All materials and workmanship employed under this contract shall conform with 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.
4. All disturbed areas shall be properly restored in accordance with Section 4.20 of the General Specifications.

CONTROLLER AND ACCESSORIES

1. NEMA three phase modular controller with solid state circuitry and digital timing, similar to the Crouse-Hinds DM 400 Series Digital Controller unit, equivalent manufactured by Econolite Control Products, Inc., Eagle Signal Corporation or approved equal. The controller shall be capable of expansion to four phase operation.
   a. Equipped with two (2) vehicular actuated modules.
   b. Equipped with one (1) vehicular actuated module with volume density controls.
   c. 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.
   d. 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 Actuation, Time to Reduce, Time Before Reduction, Minimum Gap, Recall and Memory.
   e. Four phase signal overlap capability.
2. Conflict Monitor and Solid State load switches.
3. Ground mounted traffic controller Cabinet large enough to accommodate the above control equipment and detectors, and the future installation of coordination equipment. Coordination equipment may include a master traffic responsive coordination unit, secondary coordination unit and/or required interconnection equipment. The cabinet shall be furnished with a thermostatically controlled cabinet vent fan.
4. Finish of the cabinet shall be all-weather bronze paint.
5. Meter box shall be installed in vandal proof enclosure provided by the contractor.

SIGNAL HEADS

1. The contractor shall provide the following new signal heads:

Signal Number	Description
1, 2, 3, 4	12" Diameter Red, Amber and Green Indications
5, 6, 7, 8	12" Diameter Red Indication 8" Diameter Amber and Green Indications.
9, 10	12" Diameter Red Indication 12" Diameter Amber and Green Left Turn Arrows.

2. Signals 1, 2, 9, and 10 shall be furnished with back-plates.
3. Signals 9 and 10 shall be optically programmed traffic signal heads equivalent to Model M-131 offered by Minnesota Mining and Manufacturing Co., or approved equal.
4. All signals shall be painted bronze with M.A. Bruder & Sons, Inc. Seashore Gloss Trimm 27721 Duranodic Bronze Code 7557581 or equal.
5. 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 or O-AB-103 (for optically programmed signals) by VePed Traffic Controls, Inc., or approved equal.

UNDERGROUND WIRING

1. Underground wiring shall be placed in new PVC Conduits under the road surface and in grass areas, as shown on the Contract Drawings. New galvanized steel electrical conduit will be used to extend and/or connect to existing galvanized steel conduit as indicated on the Plan.
2. The conduit shall be sized to accommodate future wiring for pedestrian (WALK/DON'T WALK) signal heads, and pedestrian push button detectors.
3. 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:

Number	Dimensions	Phase
1, 8	6' x 40' *	A
2	6' x 20'	B
3	6' x 10'	B
4,5,6,7	6' x 40' *	C

* Loops to be installed with 6' x 3' powerhead for detection of small vehicles.

2. Loops 1 and 8 shall be wired in parallel to a standard detector.
3. Loops 2 and 3 shall be wired in parallel to a standard detector.
4. Loops 4 and 5 shall be wired in parallel to a standard detector.
5. Loops 6 and 7 shall be wired in parallel to a standard detector.
6. Loops 1, 4, 5, 6, 7, and 8 shall operate in prescence mode.
7. Loops 2 and 3 shall operate in pulse mode.
8. Standard Detectors shall be Sarasota 2158/MS, equivalent as manufactured by Crouse-Hinds, Econolite Control Products, Inc., or approved equal.

POLES

The Contractor shall provide the following new signal poles:

1. Four (4) single arm support poles with style and appearance equivalent to Union Metal Design No. 50700 or approved equal. Finish shall be bronze paint.
2. In addition to the mast arm described below, Pole No. 3 shall be designed to accommodate an additional 26' mast arm supporting one signal head. The mast arms shall be separated by 90°.
3. Pole Number — Description
   1. 38' Arm Spread Supporting 3 signal heads. **
   2. 44' Arm Spread Supporting 3 signal heads.
   3. 44' Arm Spread Supporting 2 signal heads (See No. 2 above).
   4. 44' Arm Spread Supporting 2 signal heads. **

   ** These poles shall be removed when the future S.B.L. of Broken Lane Parkway is constructed (by Others).
4. Mast arms shall be mounted on the signal poles so that the bottom of the signal head housing is not less than 15 feet nor more than 19 feet (clearance) above the roadway when using the "ASTRO-BRAC" adjustable signal bracket.

NOTES

1. Intermediate signal poles to be abandoned when the S.B. Lane of Broken Land Parkway is constructed and the H.R.D. entrance revised.
2. Future signal pole and 40' mast arm supporting three signal heads to be installed when the future S.B. Lane of Broken Land Parkway is constructed.
3. Future signal pole, with one 14' mast arm supporting one signal head and one 44' mast arm supporting two signal heads. The mast arms are to be separated by 90°.
4. The Contractor shall verify the size and location of all existing galvanized steel electrical conduit shown prior to any construction. The Contractor shall extend and connect to existing galvanized steel conduit as shown with conduit of the same size and material.
5. Prior to any construction the location of the existing electrical and street lighting conduit shall be verified by test pit.

Revised '92

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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

5-4-83 — DIRECTOR OF PUBLIC WORKS — DATE
5/4/83 — CHIEF, BUREAU OF ENGINEERING — DATE
5/4/83 — CHIEF, DIVISION OF ROADS, BRIDGES AND STORM DRAINAGE — DATE

Johnson, Mirmiran & Thompson, P. A.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS
8081 ENGLE EAGLES CT. • BALTIMORE, MARYLAND • 21204 • (301) 881-8500

STATE OF MARYLAND — DANIEL T. CHANG — No. 10261 — REGISTERED PROFESSIONAL ENGINEER
Daniel T. Chang 5-3-83

PLAN
CONSTRUCTION OF TRAFFIC
SIGNAL AND EQUIPMENT LIST

BROKEN LAND PARKWAY AT CRADLEROCK WAY (EAST)
CAPITAL PROJECT NO. T-7017
ELECTION DISTRICT NO. 6
HOWARD COUNTY, MARYLAND

DRAWING	SCALE	DES. D.T.C.
NO. 2 OF 3	1"=30'	DRW. D.C.S.
		CHK.

AS BUILT — 7-21-86 BLPCRAD 4