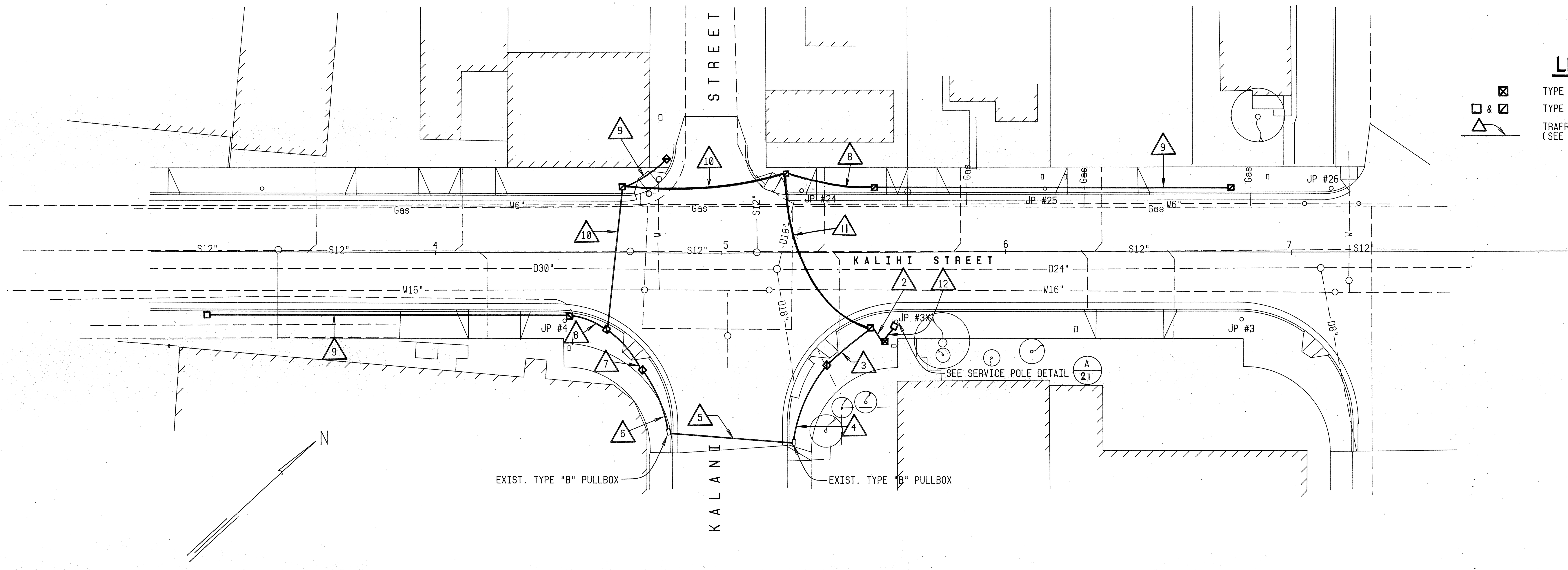
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-89	1991	21	23

LEGEND

- ⊠ TYPE "C" PULLBOX - SEE DET. ON SHEET 22
- □ & ◪ TYPE "B" PULLBOX - SEE DET. ON SHEET 22
- △ TRAFFIC SIGNAL CONDUIT (SEE CONDUIT SCHEDULE FOR No. OF CONDUITS)



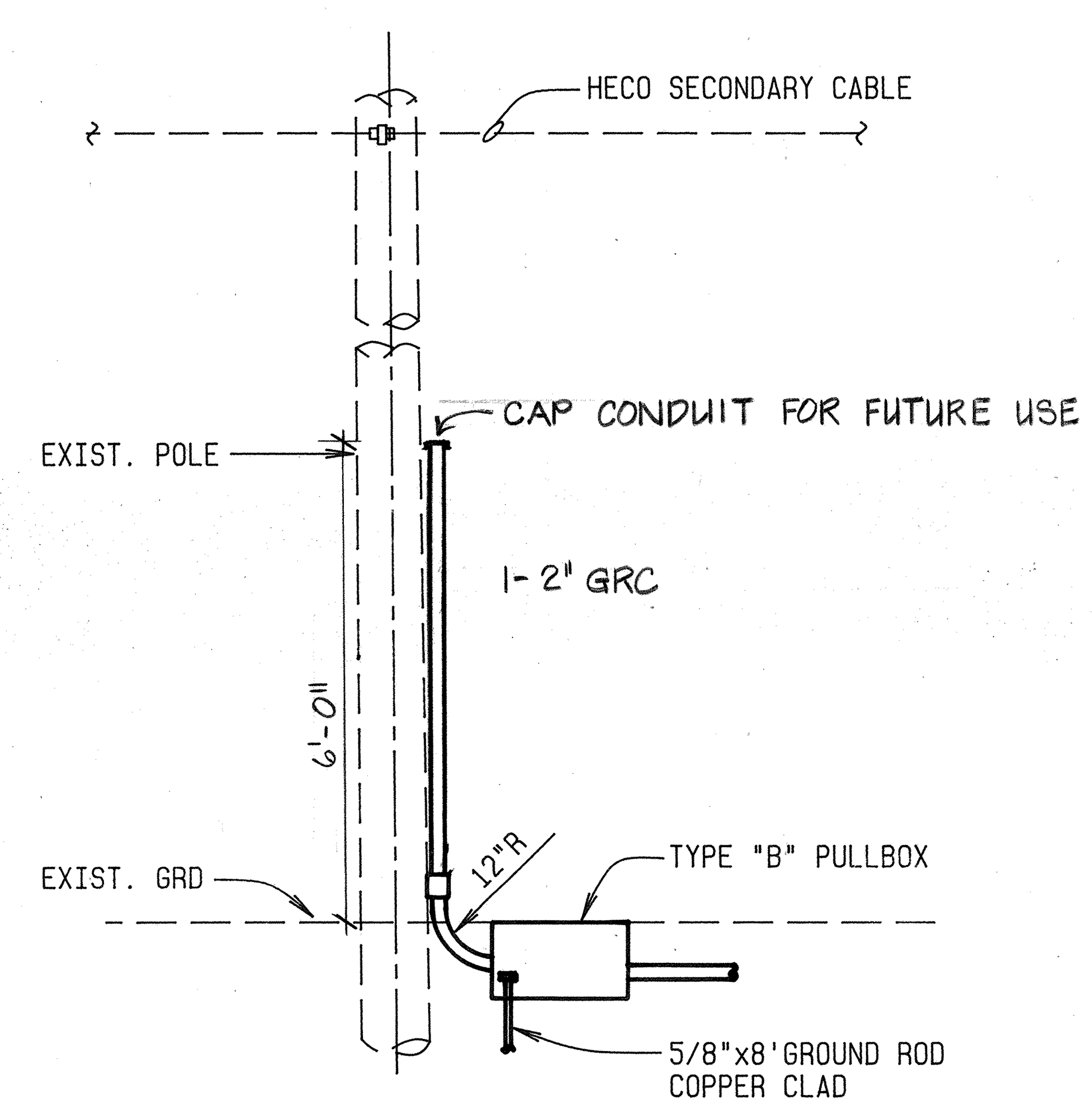
TRAFFIC SIGNAL PLAN

SCALE: 1" = 20'

CONDUIT SCHEDULE

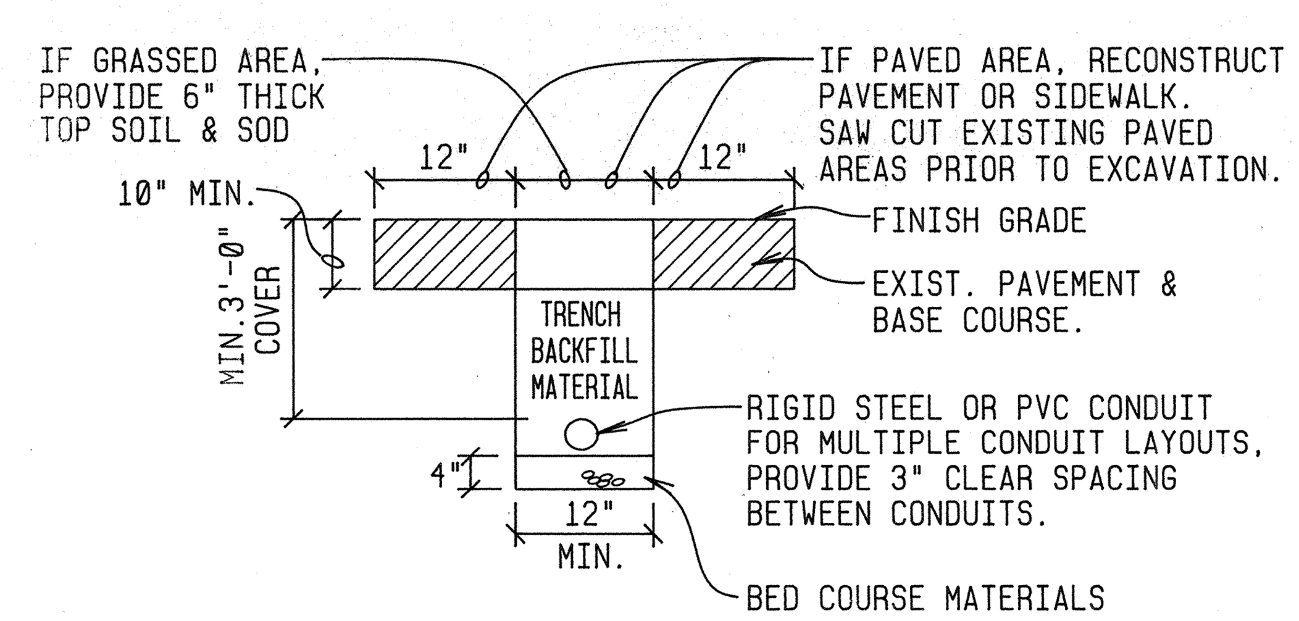
△	CONDUIT
2	5 - 2"
3 & 4	2 - 2"
5	2 - 2"
6	2 - 2"
7	2 - 2"
8	2 - 2"
9	1 - 2"
10	2 - 2"
11	2 - 2"
12	1 - 2"

NOTE: ALL NEW 2" CONDUIT SHALL BE SCHEDULE 80



A/21 SERVICE POLE DETAIL

NOT TO SCALE



NOTE: ALL CONDUITS UNDER ROADWAYS SHALL BE STEEL OR PVC SCHEDULE 80.

DUCT DETAIL

NOT TO SCALE

APPROVED:

ELECTRICAL ENGINEER — DATE
ELEC. & MAINT. SVCS. DIV.
C & C OF HONOLULU
(FOR TRAFFIC SIGNAL WORK ONLY)

DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL SYSTEM PLAN AT KALANI STREET

KALIHI STREET IMPROVEMENTS
NIMITZ HWY TO DILLINGHAM BLVD

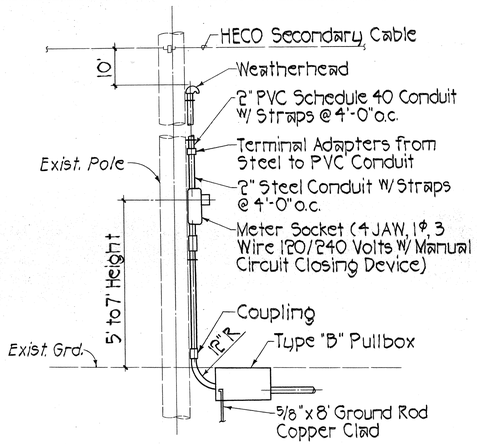
PROJECT NO. 63A-02-89

SCALE: 1" = 20'

SHEET No. 21 OF SHEETS

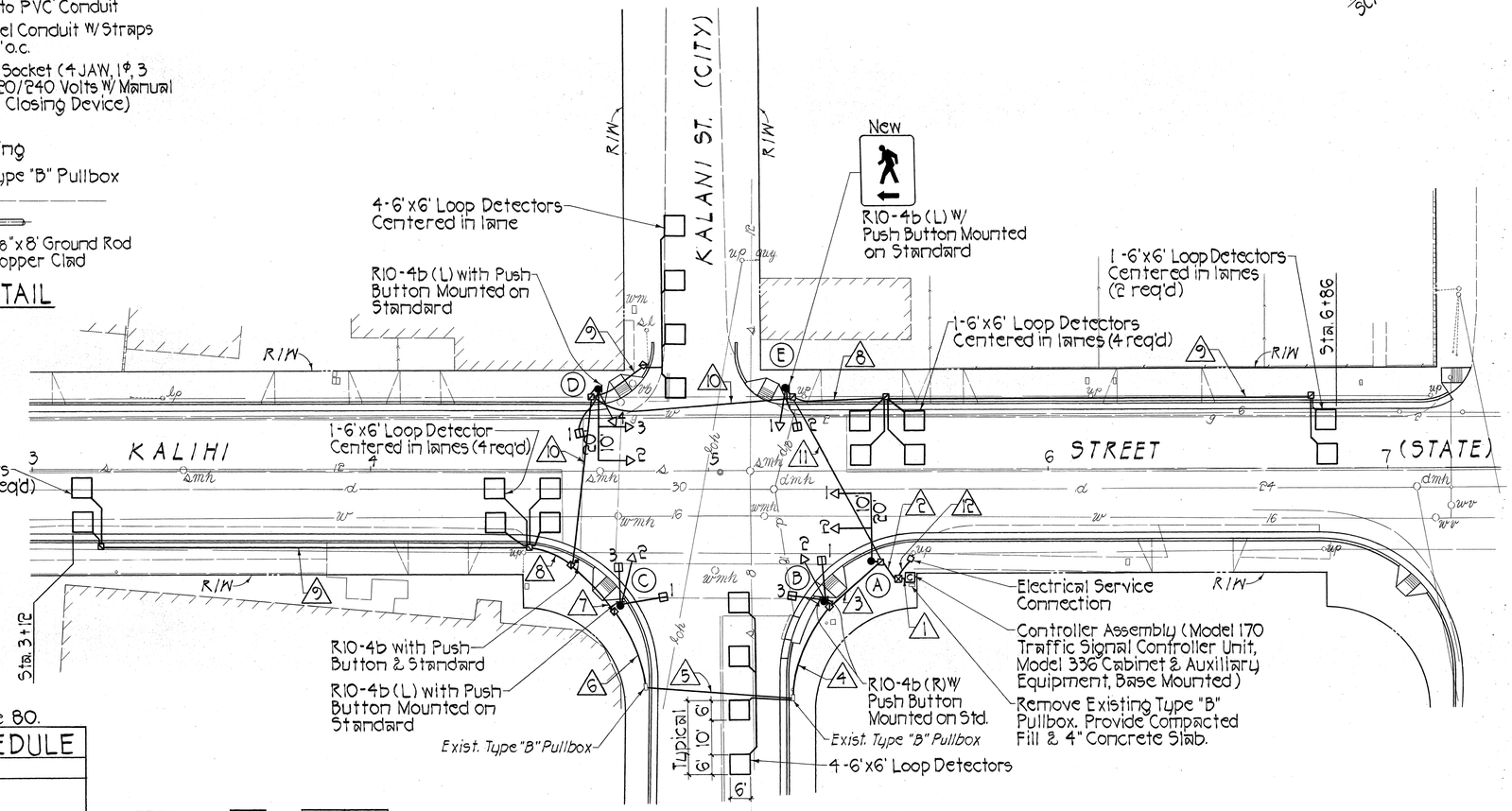
ORIGINAL PLAN / NOTE BOOK / No. — SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY — DATE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-89	1991	C.O. 215-1	23



SERVICE POLE DETAIL

Not to Scale



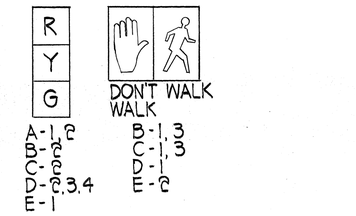
PLAN

Scale: 1" = 20'

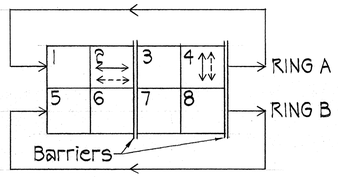
NOTE: All new 2" conduit shall be Schedule 80.

CONDUIT & CABLE SCHEDULE

△	CONDUIT	CABLE
1	New 2"	1-2C #14
	New 2"	1-2C #14
	New 2"	5-2C #14
	New 2"	4-2C #14
	New 2"	1-3C #12
2	New 2"	1-2C #14
	New 2"	1-2C #14
	New 2"	5-2C #14
	New 2"	4-2C #14
3&4	New 2"	1-2C #14
	New 2"	5-2C #14
5	New 2"	1-2C #14
	Exist. 2"	4-2C #14
6	New 2"	1-2C #14
	New 2"	4-2C #14
7	New 2"	1-2C #14
	New 2"	3-2C #14
8	New 2"	2-2C #14
9	New 2"	1-2C #14
10	New 2"	1-2C #14
	New 2"	1-2C #14
11	New 2"	1-2C #14
	New 2"	4-2C #14
12	New 2"	1-3C #12



SIGNAL INDICATIONS



PHASE DIAGRAM

TRAFFIC SIGNAL NOTES:

1. All traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the Plans.
2. The Contractor shall install the meter socket and 50 amp. breaker on the power pole as shown on the plans in accordance with HECO requirements. Meter shall be mounted between 5' & 7' above ground. Meter socket shall be 4-prong, complete with a manual circuit closing device.
3. "STOP" Sign (R1-1) shall be removed after traffic signal system becomes operational.
4. Existing pullboxes and conduits shall be clean before installing cables. Work shall not be measured separately for payment but shall be considered incidental to various items of work.
5. All Traffic Signal Conduits and Type A & B Pullboxes were installed under Project No. 63A-02-89.

LEGEND

- Traffic Signal Controller
- Type "A" Pullbox
- Type "B" Pullbox
- Existing Pullbox
- 12" Traffic Signal Head
- Pedestrian Signal Head
- Type I Traffic Signal Standard. Signal Heads as specified
- Type II Traffic Signal Standard. (Mast Arm Length & Signal Head Spacing) Signal Heads as specified
- Loop Detector
- w — 8 — Existing Water Line & Size
- d — 24 — Existing Drain Line & Size
- s — 12 — Existing Sewer Line & Size
- g — 2 — Existing Gas Line & Size
- e/h — Existing Overhead Electrical Line
- Traffic Signal Cable & Conduit

TRUE NORTH
SCALE: 1" = 20'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL SYSTEM PLAN AT KALANI STREET

KALIHI STREET IMPROVEMENTS
Nimitz Hwy. to Dillingham Blvd.
PROJECT NO. 63A-02-89

SCALE: AS SHOWN DATE: SEPT., 1991

SHEET No. OF 2 SHEETS

C.O. 215-1

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-89	199	C.O. 215-2	23

HECO NOTES

1. The Contractor shall exercise extreme caution when the excavation & construction crosses or is in close proximity of underground electrical facilities & maintain adequate clearance for his equipment while working close to and/or under the overhead facilities.
2. The Contractor shall obtain an excavation permit from HECo Mapping & Record Division, 4th floor, 820 Ward Ave. two weeks prior to start of construction.
3. Should it become necessary, any work required to relocate HECo facilities shall be done by HECo & cost shared by the State and HECo per Hawaii Revised Statutes §64-33. The State shall be responsible for all coordination.
4. When trench excavation is adjacent to or under existing structures or facilities, the Contractor shall be responsible for properly sheeting & bracing the excavation & stabilizing the existing ground to render it safe & secure from possible slides, cave-ins & settlement and for properly supporting existing structures & facilities with beams, struts or underpinning to fully protect it from damage.
5. The existing HECo facilities shown on the plans are approximate only. For verifying the location of underground duct lines & for assistance in providing proper support & protection of the underground duct lines, the Contractor shall contact HECo Underground Division at 548-7385 a minimum of 72 hours in advance.
6. Any damage caused to HECo facilities shall be repaired by HECo with payment for this work to be borne by the Contractor.

BWS NOTES

1. Unless otherwise specified, all materials & construction of water system facilities & appurtenances shall be in accordance with the "Standard Specifications For Road And Bridge Construction," dated 1985, as amended, of the Hawaii Highways Division, Department of Transportation & the City and County of Honolulu Board of Water Supply's "Water System Standards," Volume 1, dated 1985 & the "Approved Material List and Standard Details for Water System Construction," Vol. 2, dated 1985 & all subsequent amendments & additions.
2. All plans approved by the Board of Water Supply are based solely on the adequacy of the water supply. All other features of the water system, such as lines, grades, fittings, etc. and drainage and other features of improvements shall not be the responsibility of the Board of Water Supply.
3. The Contractor shall notify the Board of Water Supply in writing one week prior to commencing work on the water system.
4. The existence & location of underground utilities & structures as shown on the plans are from the latest available data but is not guaranteed as to the accuracy or the encountering of other obstacles during the course of the work. The Contractor shall be responsible and shall pay for all damages to existing utilities.

LEGEND

- C — New Traffic Signal Controller
- Traffic Signal Conduits & Cables
- New 12" Traffic Signal Head
- New 12" Traffic Signal Head (Programmed Visibility)
- 24' — New Type II Traffic Signal Standard (Mast Arm Length & Signal Head spacing as specified). Signal Heads as specified.
- New Type I Traffic Signal Standard. Signal Heads as specified.
- New Loop Detector
- New Regulatory, Warning or Guide Sign
- Existing Regulatory, Warning or Guide Sign
- New Pavement Markers. Type as indicated on the Plans
- Existing Pavement Markers
- New Pavement Line
- Existing Pavement Line
- W — 8" — Existing Water Line & Size
- S — 8" — Existing Sewer Line & Size
- D — 18" — Existing Drain Line & Size
- G — 4" — Existing Gas Line & Size
- eu — Existing Underground Electrical Conduit & Energized High Voltage Cables
- tu — Existing Underground Telephone Conduit
- e/t — Existing Overhead Electrical Power Line or Telephone Line
- New Pedestrian Signal Head
- New Type "A" Pullbox
- New Type "B" Pullbox
- New Type "B" Pullbox w/Modified Cover

ORIGINAL PLAN | NOTE BOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

GENERAL NOTES

1. All construction work shall be done in accordance with these plans, all applicable sections of the Standard Specifications for Road and Bridge Construction, dated 1976, as amended, of the State Highways Division, Dept. of Transportation & the project's Special Provisions, unless otherwise specified.
2. All lanes shall be opened to traffic during the morning peak hours from 6:00 a.m. to 8:30 a.m. and during the afternoon peak hours from 3:00 p.m. to 5:30 p.m. and during off-work hours.
3. The Contractor shall provide, install & maintain all necessary signs, lights, flares, barricades, markers, cones & other protective facilities and shall take all necessary precautions for the protection & for the convenience & safety of public traffic. All such protective facilities & precautions to be taken shall conform with the "Rules and Regulations Governing the Use of Traffic Control Devices at Work Sites on or Adjacent to Public Streets and Highways" adopted by the Highway Safety Coordinator & the U.S. Federal Highway Administration's "Manual on Uniform Traffic Control Devices for Streets and Highways, Part VI~Traffic Controls for Highway Construction and Maintenance Operations", dated 1978.
4. Full compensation for all additional materials & labor, not specifically shown or called for which are necessary to complete the construction of the project, shall be considered incidental to the various contract items in the proposal & no additional compensation will be allowed therefor.
5. The Contractor shall remove all silt & debris resulting from his work and deposited in drainage facilities, roadways & other areas. The costs incurred for any necessary remedial action by the Chief Engineer shall be payable by the Contractor.
6. The Contractor, at his own expense, shall keep the project area and surrounding area free from dust nuisance. The work shall be in conformance with the Air Pollution Control Standards & Regulations of the State Department of Health.
7. All exposed areas shall be sodded or planted immediately after the grading work has been completed.

HTCO NOTES

1. Existing telephone facilities shown on these plans are approximate only. The Contractor shall verify their actual locations, dimensions & details and shall make adjustments as directed by HTCo.
2. Any damage to existing HTCo facilities shall be repaired by HTCo & paid for by the Contractor.
3. Contractor to contact HTCo Outside Plant Records Section at 3239 Ualena St. a minimum of 72 hours prior to start of excavation.

GAS NOTES (GASCO, INC.)

1. The Gasco, Inc. gas pipe lines in the project area are plastic coated & cathodically protected. The Contractor shall be extremely careful when working near these gas pipe lines.
2. Contractor to contact Gasco, Inc., five (5) working days prior to any excavation, for written clearance. (Ph. 547-3575)
3. The Contractor shall verify the exact locations & depths of existing gas lines prior to start of construction operations. The Contractor shall call Gasco, Inc. a minimum of 48 hours before starting excavation to arrange for field location of all existing gas pipe lines. The telephone number is 547-3575 during business hours & 547-3555 after hours.
4. The Contractor shall excavate & backfill around gas pipe lines in the presence of a Gasco, Inc. representative. All backfill within six inches of gas line shall be select crusher screening cushion material approved by Gasco, Inc.
5. The Contractor shall notify Gasco, Inc. immediately after any damage has been caused to existing gas pipe lines, their coatings or their cathodic protection devices. Repair work on this damage will be done by Gasco, Inc. with payment for this work to be borne by the Contractor.
6. Minimum vertical or horizontal clearance between gas pipe lines & other pipe lines, conduits or duct lines shall be 12 inches. Adequate support & protection for gas pipe lines exposed in the trench shall be provided. Such support & protection will be approved by Gasco, Inc. If this clearance cannot be attained, the gas line shall be protected with a Gasco, Inc. approved insulation material furnished & installed by the Contractor and the work must be approved by Gasco, Inc.
7. The Contractor shall work in an expeditious manner in order to keep uncovered gas pipe lines exposed for as short a period of time as possible.
8. All maps, toning and site indication furnished by Gasco, Inc. are approximations only of the gas line locations.

TRAFFIC SIGNAL NOTES

1. All traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the plans.
2. The Contractor shall install each meter socket & 50 Amp. breaker on power pole as shown on the plans in accordance with HECo requirements. Meter shall be mounted between 5' & 7' above ground. Meter socket shall be 4-prong, complete with a manual circuit closing device.

CONSTRUCTION NOTES

1. Locations of existing underground structures & utilities, such as pipelines, conduits, cables, etc. shown on plans are approximate only. It is not the intent of these plans to show the exact location of all underground utilities & structures. It is the responsibility of the Contractor to verify the locations of all existing utilities with the respective owners. Existing utilities damaged by the Contractor shall be repaired by the Contractor at his own cost.
2. The locations of the traffic signal standards, traffic signal standards with mast-arm, pedestrian push buttons, traffic controller, pullboxes, conduits, barriers & loop detectors shall be staked out in the field by Contractor & approval of the locations obtained from the Engineer prior to construction & installation.
3. Department of Transportation Services, City & County of Honolulu will assist the Engineer in construction inspection for the traffic signal system.
4. Work by the Dept. of Transportation Services, C & C of Honolulu:
   a. Test controller & auxiliary equipment in cabinet.
   b. Make all electrical equipment connections in the field for signal system after the system has been installed in place by the Contractor.
   c. Final adjustment of traffic signal control equipment.
5. Removal of existing signs shall also include the removal of posts & foundations unless otherwise noted. All such materials shall be the property of the Contractor. Cost shall be incidental to other items of work.
6. Locations of traffic markings & markers (lane lines, stop lines, pavement arrows, etc.) shown on the plans shall be verified by the Contractor with the Engineer prior to installation of the traffic signal system.
7. Removal of pavement markings & stripings shall be done by the Contractor.
8. A solid #8 bare copper wire shall be pulled with the traffic signal control cable for equipment ground. Cost shall be incidental to the installation of the control cable.
9. Stop signs indicated to be removed shall be removed after the traffic signal system is operational.
10. Restoration of existing pavements & improvements unavoidably damaged shall be incidental to the various contract items. Restoration shall be to original or better condition.
11. All traffic signal work shall conform to the requirements of the "Manual on Uniform Traffic Control Devices for Streets and Highways", Federal Highway Administration (1978) and amendments.
12. Maintenance of traffic through the construction area shall be in accordance with Part VI of the "Manual on Uniform Traffic Control Devices for Streets and Highways", Federal Highway Administration (1978) and as specified in the special provisions. The Contractor shall furnish and maintain adequate barricades, blinkers, construction signs, etc. for the safety of the motoring public.

NOTES FOR CONSTRUCTION WITHIN CITY RIGHT-OF-WAY

1. All construction work within the City Right-of-Way shall be performed in accordance with the "Standard Details for Public Works Construction", dated Sept. 1984, as amended & the "Standard Specifications for Public Works Construction", dated Sept. 1986 of the Department of Public Works, City & County of Honolulu and the Revised Ordinances of Honolulu, 1978.
2. The underground pipes, cables or ductlines known to exist by the Engineer from his search of records are indicated on the plans. The Contractor shall verify the location & depth of the facilities and exercise proper care in excavating in the area. Wherever connections of new utilities to existing utilities are shown on the plans, the Contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.
3. The Contractor shall notify the DPW Division of Engineering Construction Branch 7 days prior to commencement of construction.

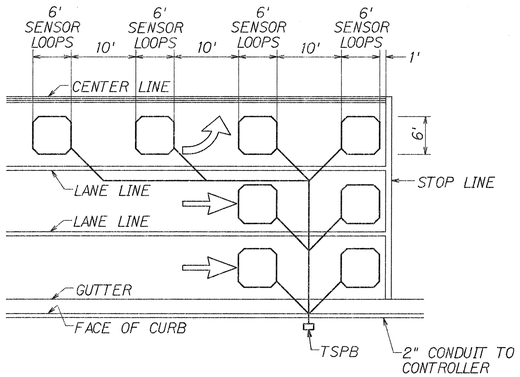
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NOTES & LEGEND

KALIHI STREET IMPROVEMENTS
Nimitz Hwy. to Dillingham Blvd.
PROJECT NO. 63A-02-89
SCALE: None DATE: SEPT., 1991
SHEET No. OF SHEETS

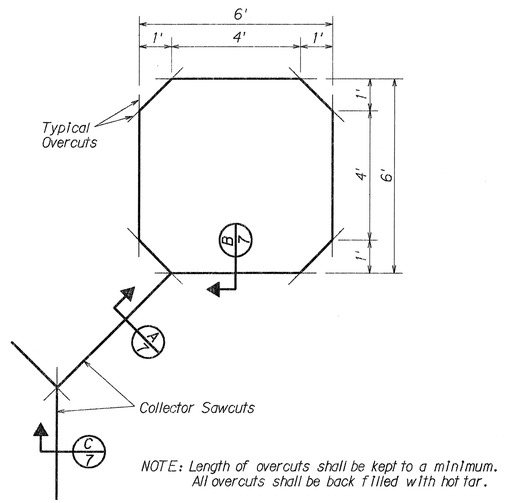
C.O. 215-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-89	1991	C021S-3	23



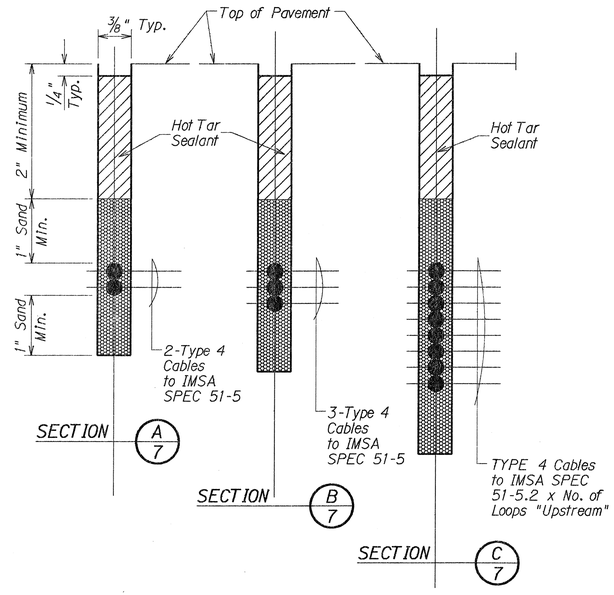
NOTES:
1. Center sensor loops in lanes.
2. Collector cables shall be twisted 2 turns per foot.
3. Number of loops and locations vary. See project plans.
4. Number and locations of collector sawcuts may be varied in the field to suit.

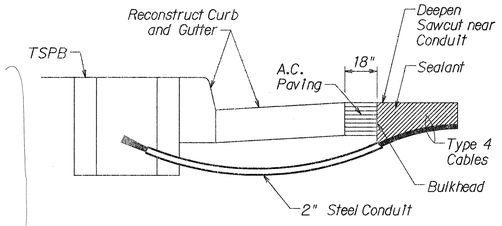
TYPICAL SENSOR LOOP LAYOUT



NOTE: Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL

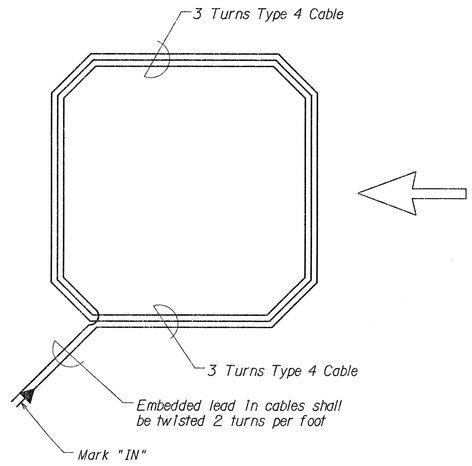




NOTES ON CONSTRUCTION AT END OF SAWCUT

1. Seal roadway end of conduit after installation of conductors.
2. Install bulkhead across conduit trench.
3. Place hot tar in sawcut.
4. Backfill over conduit with new A.C.
5. Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY



TYPICAL SENSOR LOOP WIRING DIAGRAM

TYPES OF CABLES

TYPE 1	Signal Loop Cable: Stranded No. 14, 26 conductors
TYPE 2	Detector Lead-In Cable and Pedestrian Push Button Circuit Cable: Stranded, No. 14, 2 Conductors
TYPE 3	Interconnect Cable: Solid No. 20, 12 Pairs
TYPE 4	Loop Sensor Cable: Solid No. 12, Single Conductor to IMSA SPEC 51-5
TYPE 5	Cable from Signal Loop to Signal Head: Stranded, No. 14, Single Conductor
TYPE 6	Service Cable: Solid, No. 6, 3 Conductors

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOOP DETECTOR DETAILS

KALIHI STREET IMPROVEMENTS
Nimitz Hwy. to Dillingham Blvd.
PROJECT NO. 63A-02-89

Not to Scale — Date: Sept., 1991

SHEET No. OF SHEETS

C.O. 21S-3