

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	405 414	822 528

TRAFFIC SIGNAL NOTES

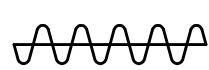
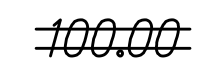
- The locations of the traffic signal standards, pedestrian push buttons, traffic controller, pullboxes, conduits and loop detectors shall be staked out in the field by the Contractor and approval of the locations shall be obtained from the Engineer prior to construction and installation.
- Any required splicing shall be done in the pullboxes.
- Furnishing and installing controller barriers, risers on poles and conduit stubouts (pullboxes to edge of pavement) will not be paid for separately but shall be considered incidental to the various contract items.
- 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.
- All Traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the Plans.
- The Contractor shall install the meter socket breaker and UPS as shown in the electrical drawings.
- The loop amplifier units furnished for this project shall be capable of operating the loop detector configurations shown on the plans. Cost for the loop amplifier shall be incidental to the installation of the loop detector.
- Should any defect be encountered during the controller warranty period, the manufacturer will be notified and he shall promptly correct such defect. Service call (by factory qualified representative) during the warranty period for repairs or other maintenance shall be answered within 24 hours and shall be done at no expense whatsoever to the State. All repairs shall be done as soon as possible.
- Existing traffic signal standards to be replaced shall be removed together with its respective footing. The Contractor may elect to remove only the top portion of the footing and shall ensure that the remaining footing is 12 inches below the existing or finish ground. Costs shall be considered incidental to the various contract items.
- The existing traffic signal shall remain in operation until the new traffic signal system is put into service. The Contractor shall arrange his work accordingly and shall provide temporary relocations and wirings, as necessary. Payment shall be considered incidental to the various contract items.
- The Contractor shall clean and/or repair the existing traffic signal pullboxes to be used prior to installing conduits and cables. This work will not be paid for separately but shall be considered incidental to the various contract items.
- The Contractor shall clean all existing conduits to receive new or temporary cables prior to pulling cables. This work will not be paid for separately but shall be considered incidental to the various contract items.
- The existing controller foundations and pullboxes not to be incorporated in the final traffic signal system shall be removed in accordance with Section 202, "Removal of Structures and Obstructions" of the Standard Specifications. Pavement shall be constructed to match surrounding pavement. Costs shall be considered incidental to the various contract items.

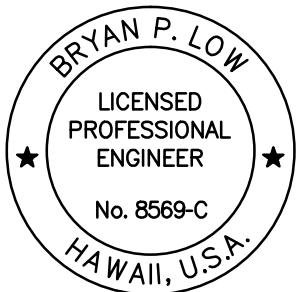
- The Contractor shall maintain a 36" clearance between the Control Ductline and Loop Detectors.
- Restoration of existing pavements and improvements unavoidably damaged shall be incidental to the various contract items. Restoration shall be to original or better condition.
- The Contractor shall provide off-duty police officer(s) to control the flow of traffic as required by the Engineer.
- Removing and disposing of existing Power Source Equipment (i.e. meter, conduits, cables, etc.) shall not be paid for separately but considered incidental to the various contract items.
- The Contractor shall verify and remove existing traffic signal heads, standards, foundations, pedestrian pushbuttons, pullbox frame and covers, cables, and appurtenances, etc. which are called for removal in the plans, abandoned, or not incorporated into the new traffic signal system. The Engineer shall determine the salvageable equipment. All salvageable equipment shall become the property of the County of Hawaii, Department of Public Works, Traffic Division, and the unsalvageable equipment shall become the property of the Contractor for proper disposal. Removing and salvaging existing traffic signal equipment shall not be paid for separately but considered incidental to the various contract items.
- The Contractor shall notify the County of Hawaii, Department of Public Works, Traffic Division, three (3) days prior to commencing work on the Traffic Signal system (Phone: 808-961-8341).
- The Contractor shall verify all work in the field prior to submitting of bid, ordering of materials, fabrication of brackets, etc.
- The Contractor shall not construct conduits, pullboxes, traffic signal standard foundations, etc. outside of State or County right-of-way unless shown otherwise on the plans.
- Existing conduits not incorporated into the new traffic signal system shall be plugged with concrete and abandoned in place. Cables shall be removed and disposed. Restore area of demolition work to match existing surrounding. Payment shall be considered incidental to the various contract items.
- The Contractor shall remove and dispose all temporary microwave detectors not incorporated in the final signal system after the new signal system is operational and prior to final acceptance unless otherwise notified by the State.
- All traffic signal work shall conform to the requirements of the Federal Highways Administration, 'Manual on Uniform Traffic Control Devices for Streets and Highways', 2003 Edition, and amendments.
- Maintenance of the traffic through the construction area shall be in accordance with Part VI of the Federal Highways Administration, 'Manual on Uniform Traffic Control Devices for Streets and Highways', 2003 Edition, and amendments as specified in the special provisions.
- All conduits located beneath paved areas shall be encased in concrete. Conduits located in unpaved areas shall be direct buried.
- The Contractor shall deliver all salvaged traffic signal equipment to the County of Hawaii, Department of Public Works, Traffic Division Baseyard in Hilo. The Contractor shall clean all salvaged traffic signal equipment prior to delivery.
- Signal faces for new traffic signal systems shall be covered until the new signal is activated.

- All traffic signal heads on mast arms shall have backplates.
- Cable runs for interconnect cables shall be continuous between controller cabinets without splices.
- Notes for Traffic Signal Standards.
  - Cantilevered traffic signal structures (Type II and Type III standards) with mast arms greater than 40 feet shall have base plate connections with a minimum of six (6) anchor bolts. A minimum of four (4) anchor bolts shall be provided for all other base plate connections. Anchor bolts with leveling nuts shall be designed to transfer all loads from the structure to its base support.
  - Traffic signal standards, footings, fittings, and appurtenances shall be constructed per the State of Hawaii, Department of Transportation, Highways Division, Standard Plans, 2008.
  - Traffic signal standards shall be designed to meet the following criteria:

Design wind pressure = 105 mph  
A wind importance factor recurrence interval = 50 years  
Resist an equivalent static natural wind gust pressure
  - Design of traffic signal standards shall be based on Fatigue Category I in Table 11-1 of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
  - Traffic signal standards shall be designed for galloping-induced cyclic loads and to resist an equivalent static truck gust pressure range based on a truck speed of 20 mph over the posted speed.
  - Install adhesive Type II Object Markers (2 each) on all new traffic signal standards.
  - Precast signal standard foundations shall conform to Section 615 - Precast Concrete Traffic Signal Foundations of the Contract Special Provisions for this project.

LEGEND FOR AS-BUILT POSTINGS

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-  Double line for as-built deletion
- Roadway Text for as-built posting



LICENSE EXPIRATION DATE 04/30/18

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1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TRAFFIC SIGNAL NOTES  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 1 OF 43 SHEETS

"AS-BUILT"

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405 414

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ORIGINAL PLAN	

S:\Bpl\asbfrm - queen k widening\draw its sensor\405 Traffic Signal Notes.dwg 3/8/2017 4:06 PM



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 415	522-528

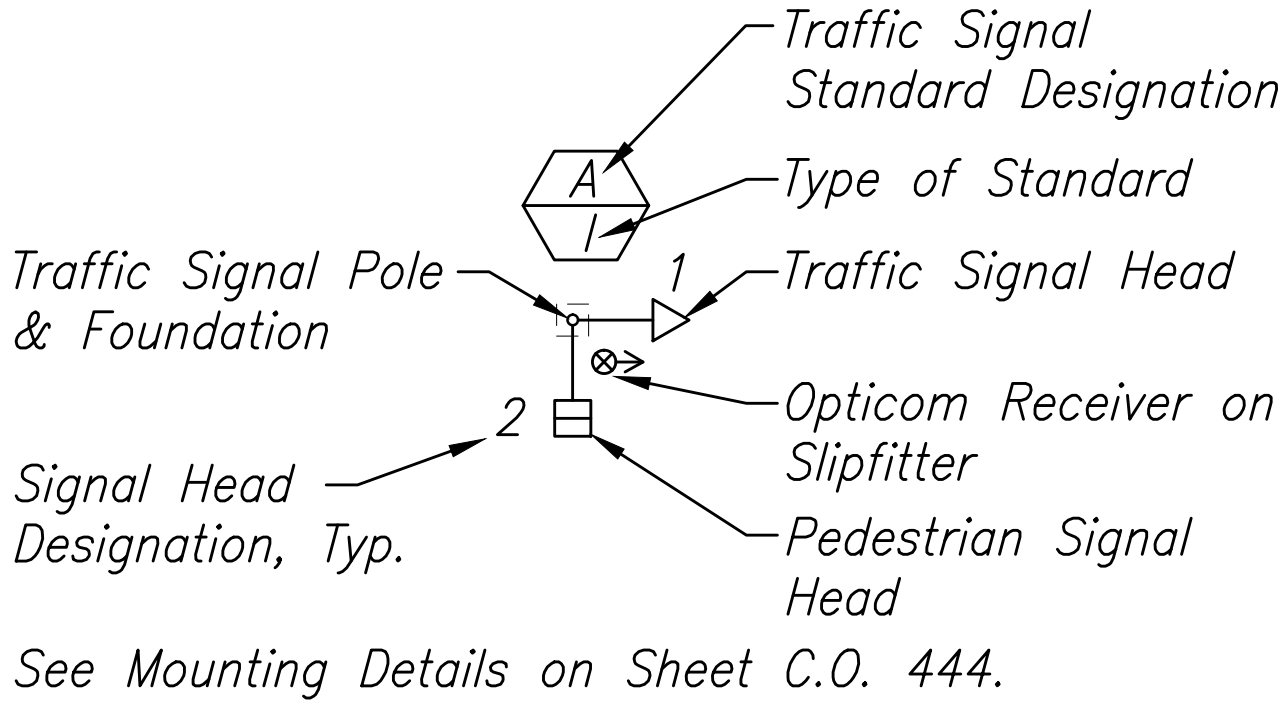
TRAFFIC SIGNAL SYMBOL LEGEND

Existing

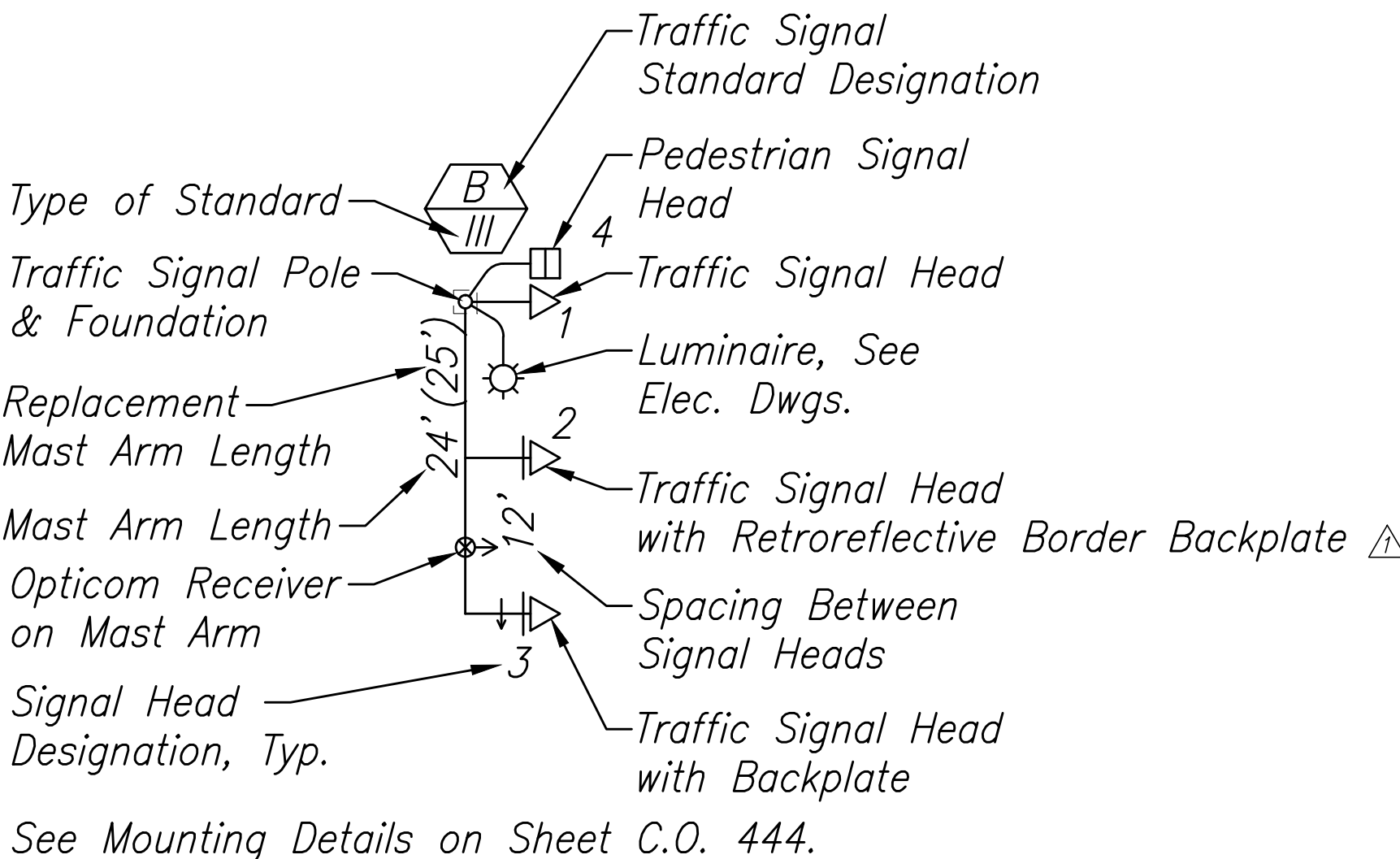
New

		Traffic Signal Controller Cabinet and UPS. See Details on Sheet 443.		Abandon Existing Conduit in Place
		New Traffic Signal Conduits & Cables. See See Standard Plan TE-36		Remove and Salvage Existing Signal Head and Type I Signal Standard.
		New 12" RYG Traffic Signal Head		Remove and Salvage Existing Type II Signal Standard Mast Arm and Signal Heads
		New 12" RYU Traffic Signal Head		Remove and Salvage Existing Type III Signal Standard Mast Arm, Signal Heads, and Luminaire
		New 12" <<< Traffic Signal Head		Demolish and Remove Existing Pullbox
		New 12" RYU Programmable Traffic Signal Head		Remove and Salvage Existing Controller
		New 12" <<< Programmable Traffic Signal Head		
		New 12" RYG< Traffic Signal Head		
		New 12" RYG< Programmable Traffic Signal Head		
		Type I Traffic Signal Standard with Traffic Signal Heads. See Standard Plan TE-32.		
		Type II Traffic Signal Standard with Mast Arm and Traffic Signal Heads with Retroreflective Border Backplates. See Standard Plan TE-32.		
		Type III Traffic Signal Standard with Mast Arm, Traffic Signal Heads with Retroreflective Border Backplates, and Luminaire. See Standard Plan TE-38 and Elec. Dwgs.		
		Countdown Pedestrian Signal Head		
		Existing Pullbox		
		12"x12" Pullbox. Quazite Model PC1212BA12 with Quazite Model PG1212HA00 Cover or Approved Equal. Cover Shall Be Labeled 'Traffic Signal' or 'Lighting' or 'T.S. & LTG.' as Appropriate, Similar to Standard Plan TE-37.		
		17"x30" Pullbox. Quazite Model PG1730BA24 with Quazite Model PG1730HH00 Cover or Approved Equal. Cover Shall Be Labeled 'Traffic Signal' or 'Lighting' or 'T.S. & LTG.' as Appropriate, Similar to Standard Plan TE-37.		
		24"x36" Pullbox. Quazite Model PG2436BA30 with Quazite Model PG2436HH00 Cover or Approved Equal. Cover Shall Be Labeled 'Traffic Signal' or 'Lighting' or 'T.S. & LTG.' as Appropriate, Similar to Standard Plan TE-37.		
		In-Pavement Wireless Sensor, See Details on Sheet 444S-3		
		Opticom Receiver. See Mounting Detail on Sheet C.O. 444.		
		Temporary Microwave Detector		

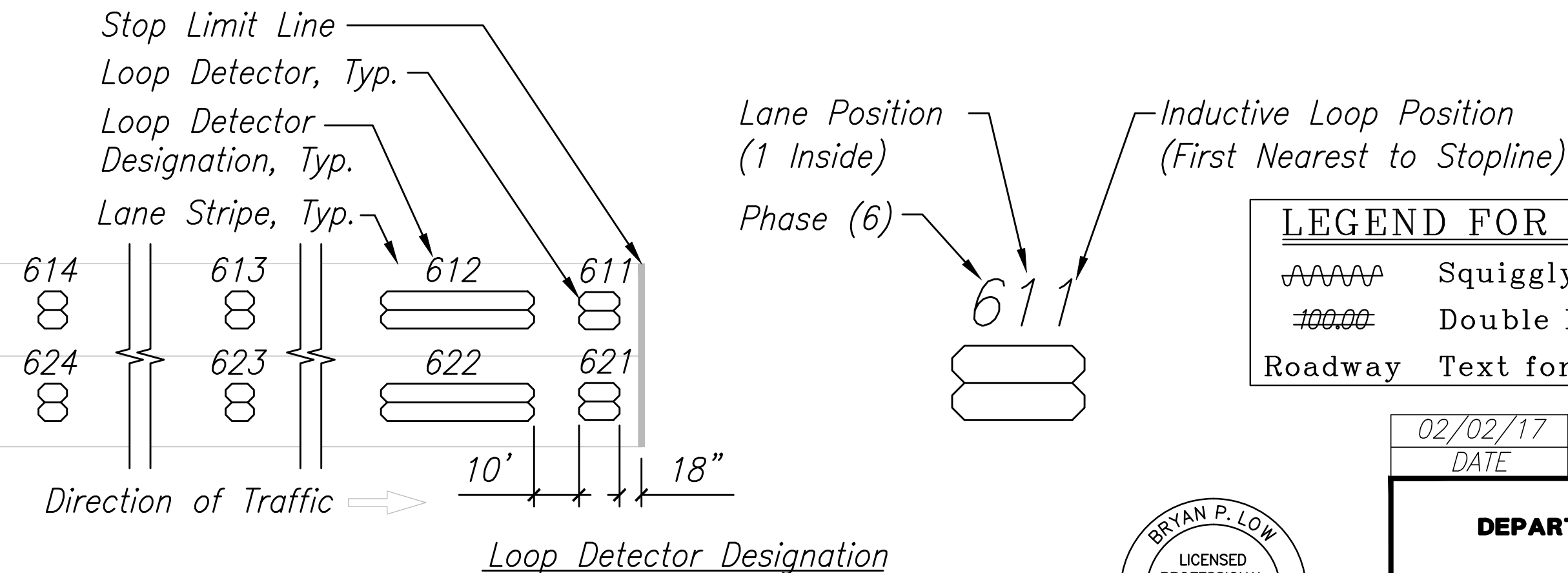
TRAFFIC SIGNAL PLAN LEGEND



Type I Standards



Type II or III Standards



TRAFFIC SIGNAL LEGEND

BRYAN P. LOW

LICENSED PROFESSIONAL ENGINEER

No. 8569-C

HAWAII, U.S.A.

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Honolulu, Hawaii 96816

02/02/17

DATE

Added Retroreflective Backplates

REVISION

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

TRAFFIC SIGNAL LEGEND

QUEEN KAAHUMANU HIGHWAY WIDENING

Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)

Federal Aid Project No. NH-019-1(38)R

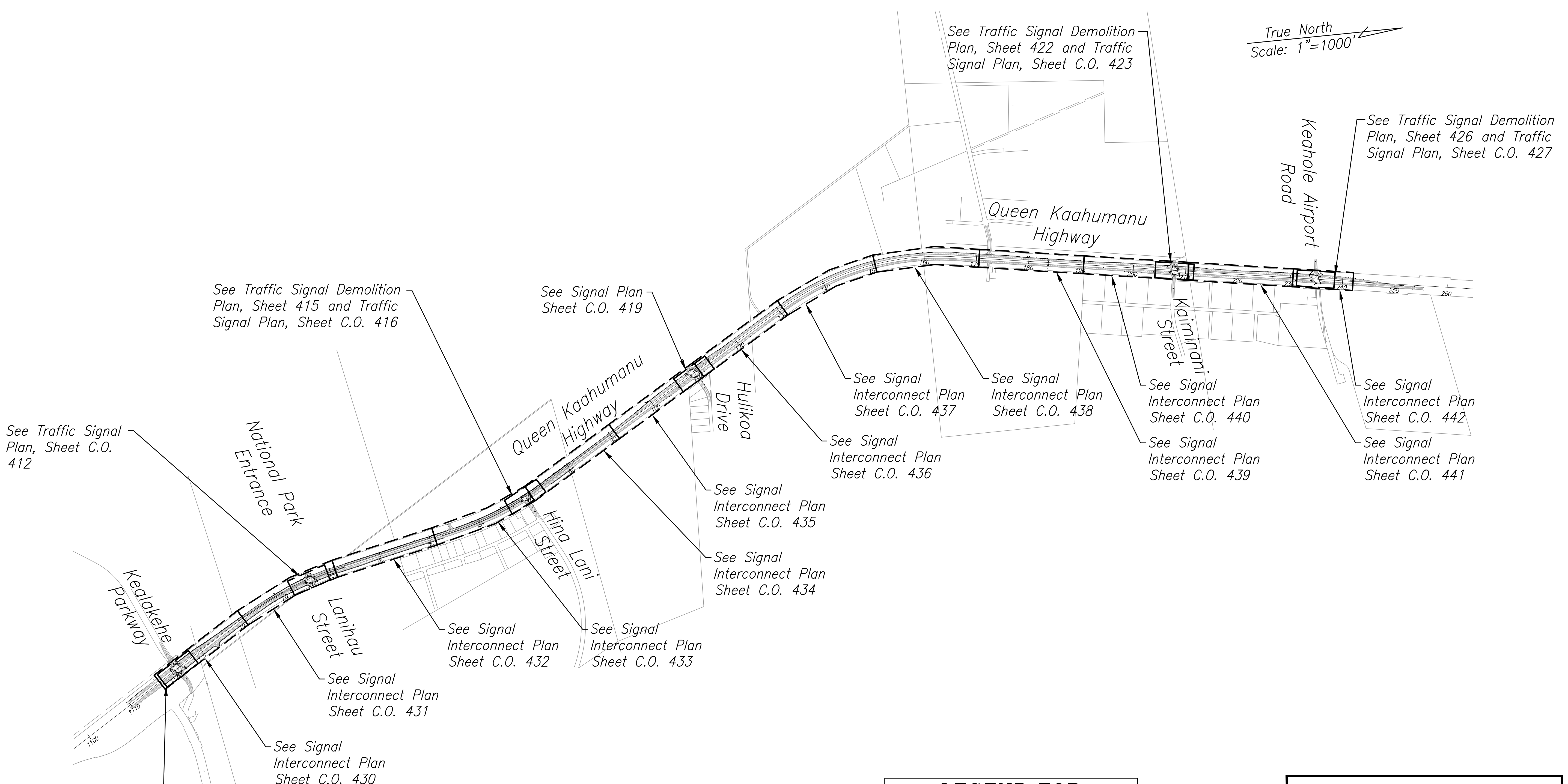
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SHEET No. 2 OF 43 SHEETS

"AS-BUILT"



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	<del>407</del> 416	<del>522</del> 528



True North  
Scale: 1"=1000'

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S:\Bpl\asfm - queen k widening\draw its sensor\407 Signal General Plan.dwg 2/15/2017 10:55 AM

See Traffic Signal Demolition Plan, Sheet 408 and Traffic Signal Plan, Sheet C.O. 409

SIGNAL GENERAL PLAN  
Scale: 1"=1000'

LEGEND FOR  
AS-BUILT POSTINGS

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Double line for as-built deletion

Roadway Text for as-built posting

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1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

SIGNAL GENERAL PLAN  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=1000' Date: AUGUST 2016

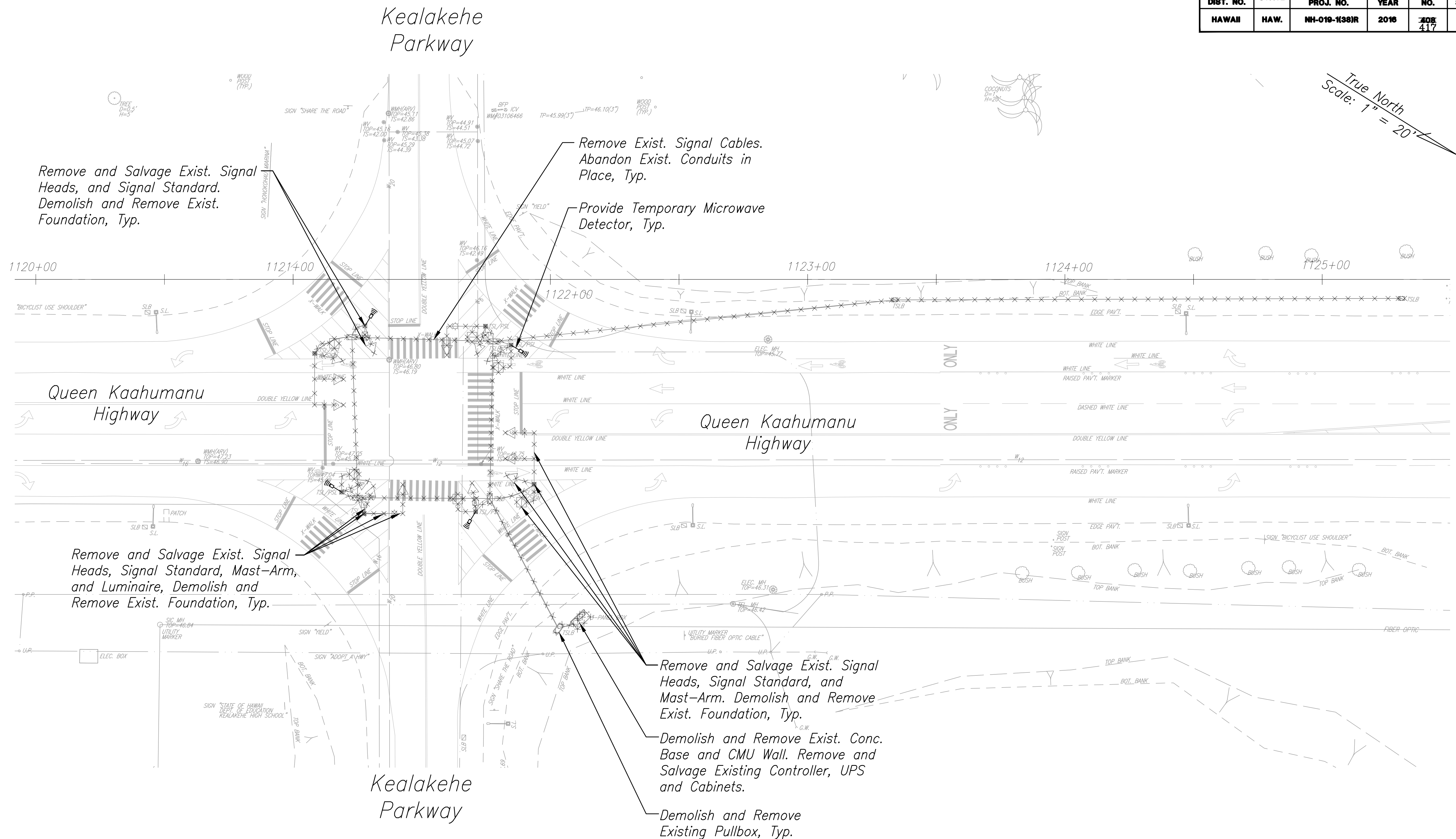
SHEET No. 3 OF 43 SHEETS

"AS-BUILT"

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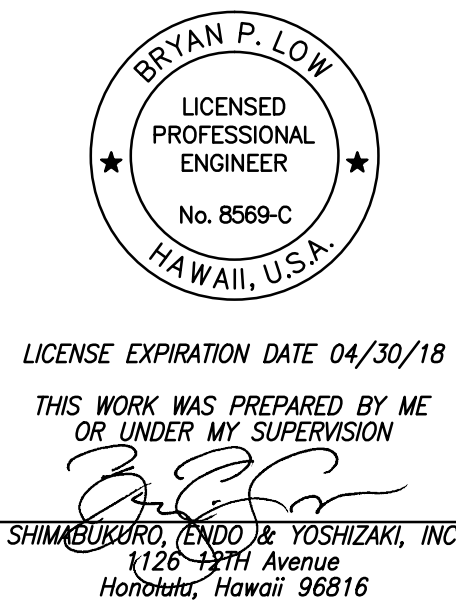
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	408	528



Notes:

- The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the New Signal Improvements are Installed and Activated.
- All Salvaged Signal Equipment Shall be Delivered to the County of Hawaii Department of Public Works, Traffic Division Storage Yard.
- See Sheet C.O. 409 for Final Signal System. See Sheet C.O. 410 for Schedule of Signal Equipment and Sheet 411 for Phasing Diagram.

KEALAKEHE PARKWAY  
TRAFFIC SIGNAL DEMOLITION PLAN  
Scale: 1"=20'



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**KEALAKEHE PARKWAY**  
**TRAFFIC SIGNAL DEMOLITION PLAN**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealakehe Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=20' Date: AUGUST 2016**


**SHEET No. 4 OF 43 SHEETS**

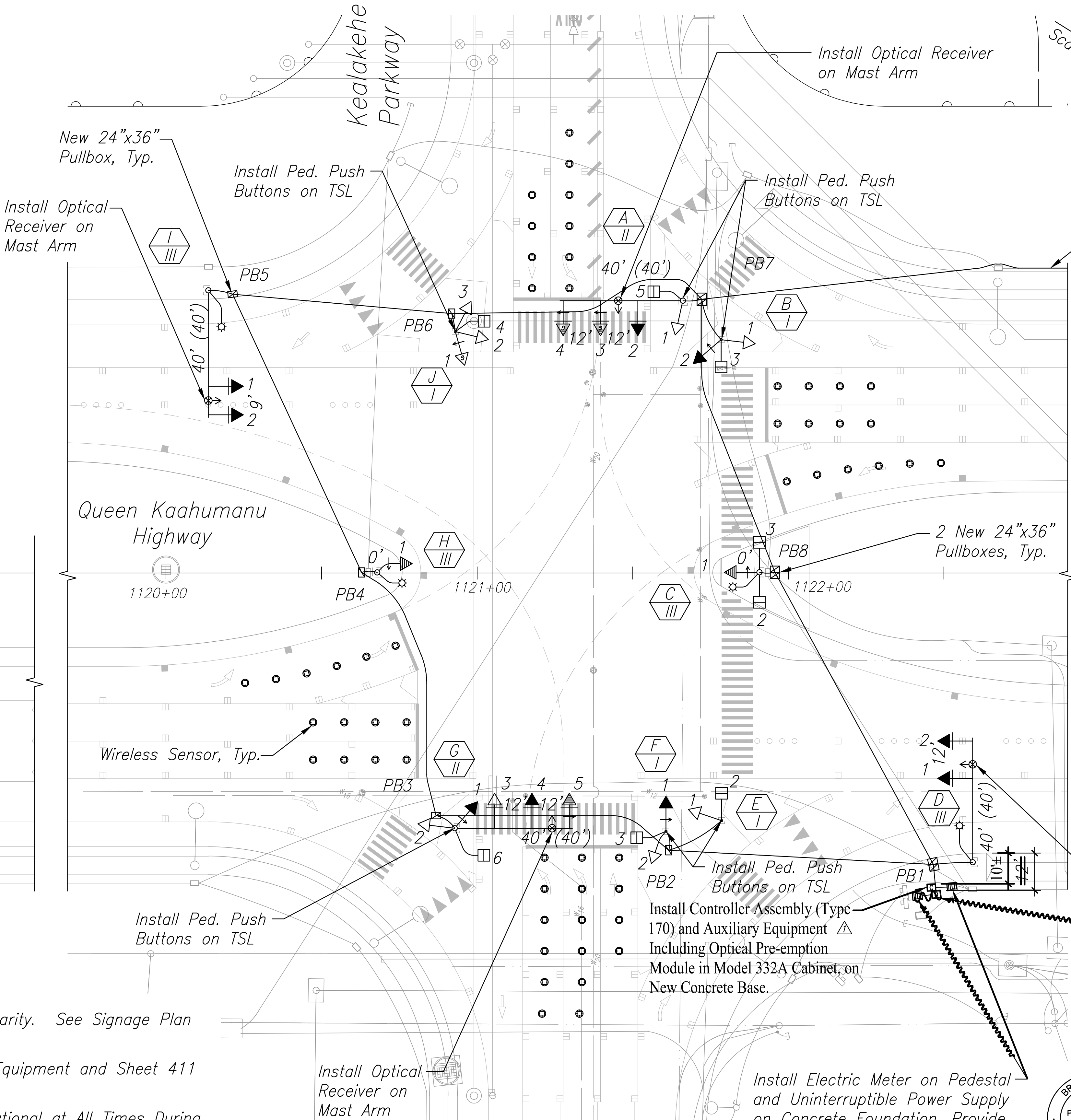
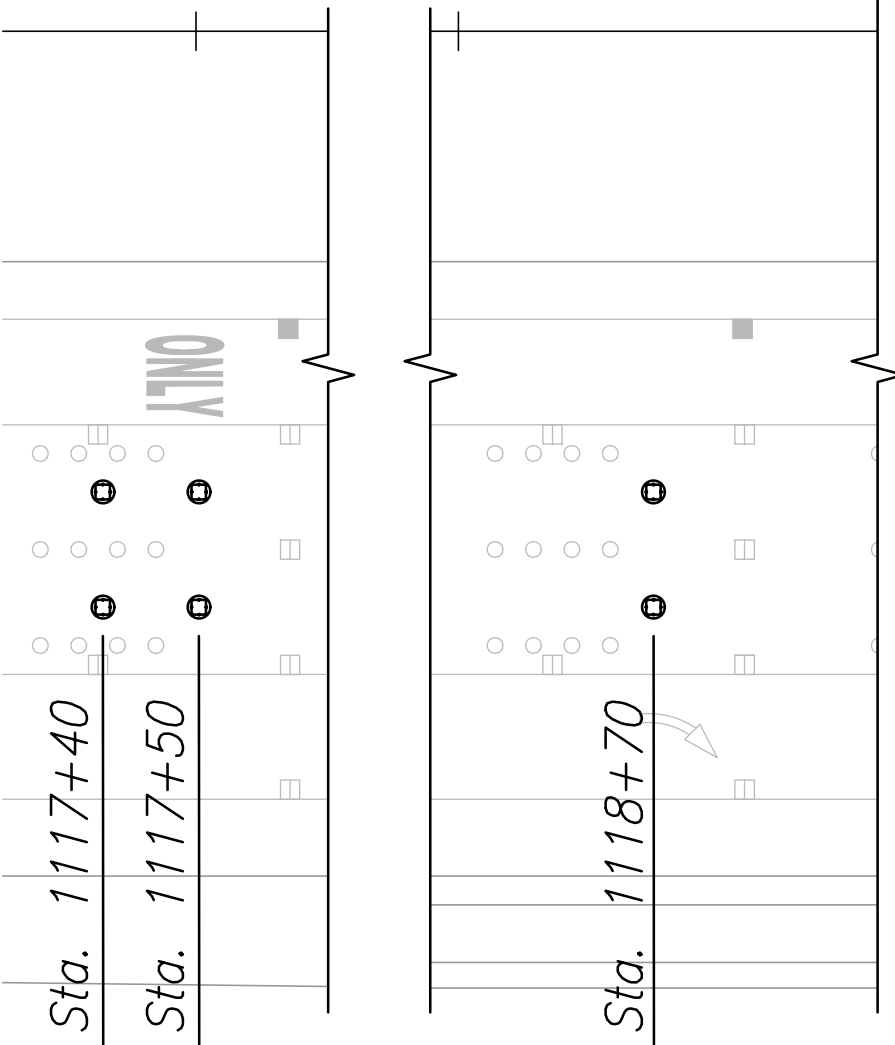
"AS-BUILT"

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408 417





Pedestrian Push Button Schedule	
<div>North</div> <div> R10-4B (Sign Varies w/Direction)</div>	
Pole	Signs
A	(→) R10-4B (R) (←) R10-4B (L)
B	(→) R10-4B (R) (←) R10-4B (L)
C	(↔) R10-4B (L-R)
E	(→) R10-4B (R) (←) R10-4B (L)
F	(→) R10-4B (R) (←) R10-4B (L)
G	(→) R10-4B (R) (←) R10-4B (L)
J	(→) R10-4B (R) (←) R10-4B (L)



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 409 418	522 528

Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), Sch. 80 Conduits. See Signal Interconnect Plans for Continuation. 

#### LEGEND FOR AS-BUILT POSTINGS

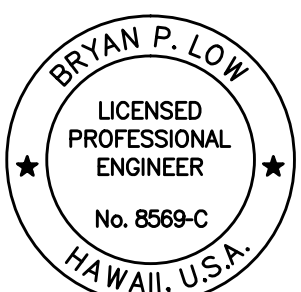
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Roadway	Text for as-built posting

#### Notes:



- Only Final Traffic Signal System Shown.
- Only New Roadway and Striping Shown for Clarity. See Signage Plan for Sign Details.
- See Sheet C.O. 410 for Schedule of Signal Equipment and Sheet 411 for Phasing Diagram.
- The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the Final Signal Is Activated.
- Near and far dilemma zone wireless sensors not shown along Kealakehe Parkway. The Contractor shall furnish and install near and far dilemma zone wireless sensors along Kealakehe Parkway per details on Sheet 444S-3.

KEALAKEHE PARKWAY  
TRAFFIC SIGNAL PLAN  
Scale: 1"=20'

Install Electric Meter on Pedestal and Uninterruptible Power Supply on Concrete Foundation. Provide All Necessary Pullbox, Conduit, Cables and Appurtenances. See Electrical Drawings for Details.



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Honolulu, Hawaii 96816

08/01/16	 Revised Conduits for ITS
01/22/16	 Revised Signals
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

KEALAKEHE PARKWAY  
TRAFFIC SIGNAL PLAN

QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealakehe Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=20' Date: AUGUST 2016

SHEET No. 5 OF 43 SHEETS

"AS-BUILT"

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 410 419	522 528

Pullbox/Standard Location

Description	Center Location
PB1	Sta. 1122+46.60, 93.67' Rt.
PB2	Sta. 1121+61.54, 89.13' Rt.
PB3	Sta. 1120+86.83, 78' Rt.
PB4	Sta. 1120+62.90 0.18' Lt.
PB5	Sta. 1120+21.44, 89.61' Lt.
PB6	Sta. 1120+91.83, 83.39' Lt.
PB7	Sta. 1121+72.18, 87.98' Lt.
PB8	Sta. 1121+95.70, 0.23' Lt.
A	Sta. 1121+66.10, 87.50' Lt.
B	Sta. 1121+78.40, 75' Lt.
C	Sta. 1121+90.70, 0.23' Lt.
D	Sta. 1122+59.22, 92.96' Rt.
E	Sta. 1121+78.53, 79.58' Rt.
F	Sta. 1121+60.67, 83' Rt.
G	Sta. 1120+92.79, 82.03' Rt.
H	Sta. 1120+67.89, 0.18 Lt.
I	Sta. 1120+13.64, 90.85' Lt.
J	Sta. 1120+93, 77.59' Lt.

Conduit/Cable Schedule

From	To	Main Control		Signal Control		Detectors				Interconnect		Opticom		Spare	Concrete Encased	Remarks
		Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor			
		2" C	1-26/C #14 1-9/C #14	2" C	4/C-#14 Color Coded	1" Ped	2" Ped	2/C-#14 Pedestrian		2"C	Fiber Optic	2"C	3/C #20			
Meter	Ups															*
Ups	Control															*
Control	PB1	2	2				1	3		1	1	1	4	2		
PB1	PB2	1	1				1	2				1	1	6	Yes	
PB1	D			1	2							1	1	1		*
PB2	PB3	1	1				1	1				1	1	6	Yes	
PB2	E			1	2	1		1						1	Yes	
PB2	F			1	3	1		1						1	Yes	
PB3	PB4	1	1											6	Yes	
PB3	G			1	6	1		1				1	1	1	Yes	
PB4	PB5	1	1											6	Yes	
PB4	H			1	1									1		*
PB5	PB6	1	1									1	1	9***	Yes	
PB5	I			1	2							1	1	1		*
PB6	PB7	1	1				1	1				1	1	9***	Yes	
PB6	J			1	4	1		1						1	Yes	
PB7	PB8	1	1				1	2		1	1	1	2	7**	Yes	
PB7	A			1	5	1		1				1	1	1	Yes	
PB7	B			1	3	1		1						1	Yes	
PB8	PB1	1	1				1	2		1	1	1	2	7**	Yes	
PB8	C			1	3	1		1						1		*

\* See Electrical Drawings for Street Light and Power Related Conduit and Cable Information



\*\* 1 Spare for ITS  
\*\*\* 3 Spares for ITS

Traffic Signal Head Schedule

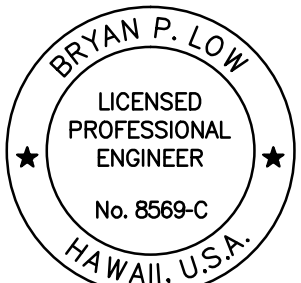
Traffic Signal Head Schedule				
	12" RYG Traffic Signal Head	12" RY↑ Traffic Signal Head	12" ←←← Traffic Signal Head	Countdown Pedestrian Signal Head (L.E.D.)
Pole Letter-Signal Head-Signal Head Mounting Type	A-1-V G-2-V2 B-1-II G-3-VI+ E-1-I J-2-III F-2-II J-3-III	A-2-VI+ G-4-VI+ D-1-VI+ I-1-VI+ D-2-VI+ I-2-VI+	A-3-VI*+ G-1-V2 A-4-VI*+ G-5-VI*+ B-2-II H-1-V* C-1-V* J-1-III F-1-II	A-5-VII E-2-VII B-3-VII F-3-VII C-2-VII G-6-VII C-3-VII J-4-VII

Legend: R = Red Y = Yellow G = Green  
← = Arrow \* = Program Visibility Head + = Signal Head w/ Retroreflective Back Plate

Pole Letter Signal Head A-2-III Signal Head Mounting Type

LEGEND FOR AS-BUILT POSTINGS

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Double line for as-built deletion  
Text for as-built posting



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1126-12TH Avenue  
Honolulu, Hawaii 96816

08/01/16	Revised Conduits for ITS
01/22/16	Revised Signals
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
  
KEALAKEHE PARKWAY  
TRAFFIC SIGNAL SCHEDULE  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealakehe Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: NOT TO SCALE Date: AUGUST 2016  
  
SHEET No. 6 OF 43 SHEETS

"AS-BUILT"

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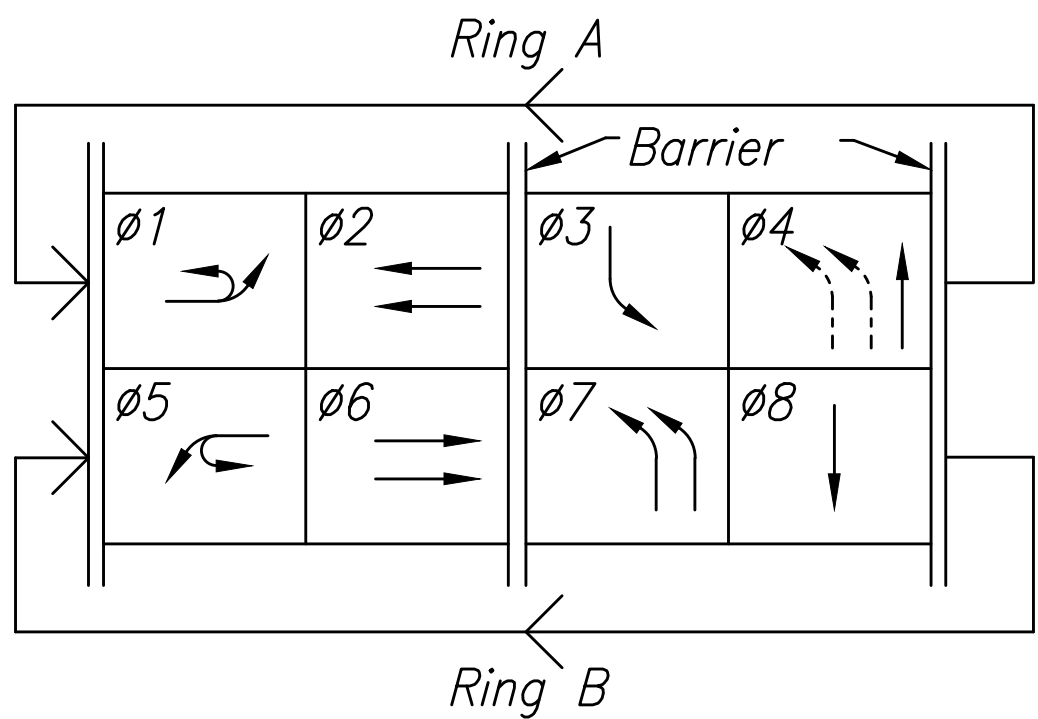
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REVISIONS	

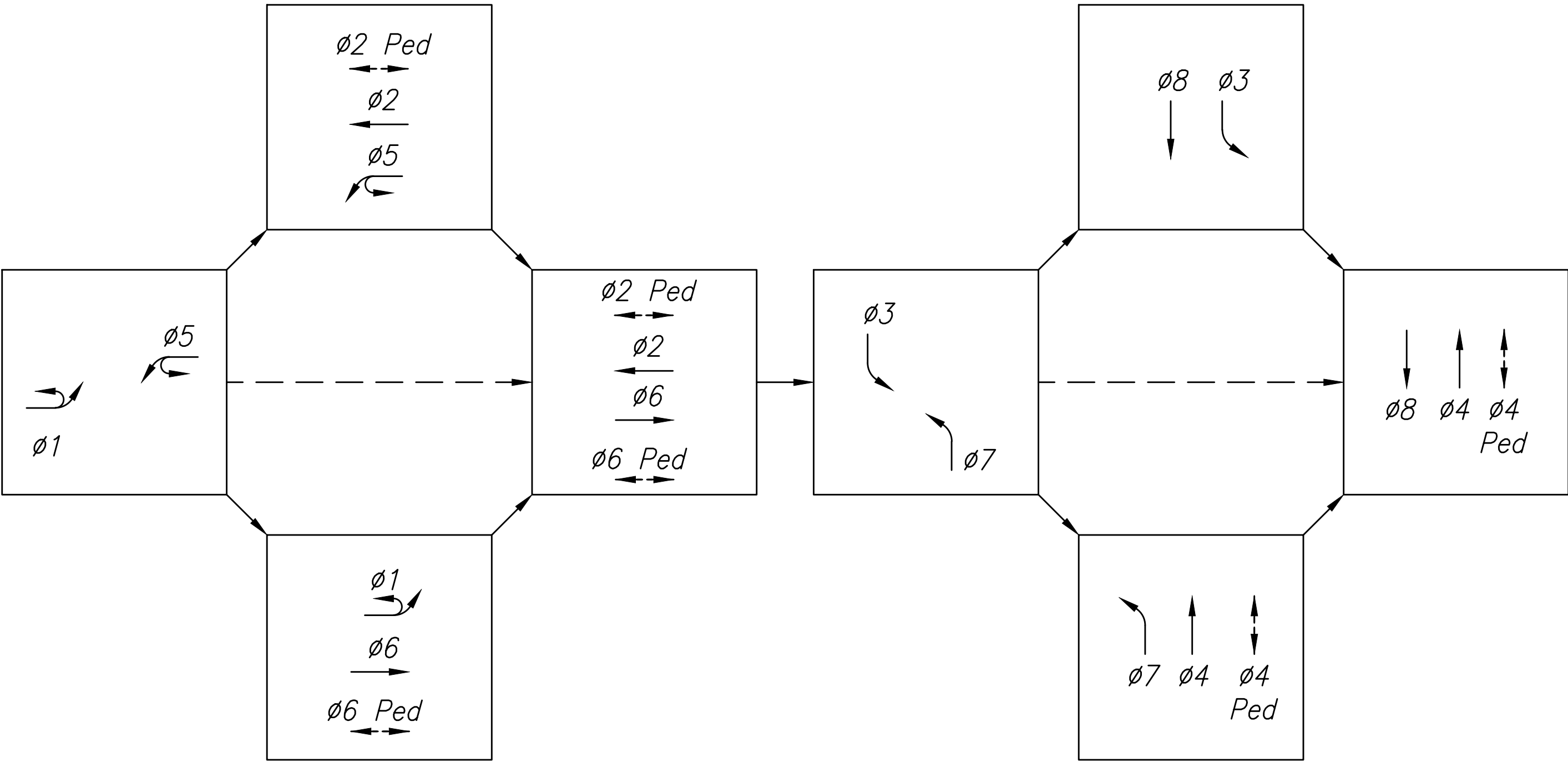
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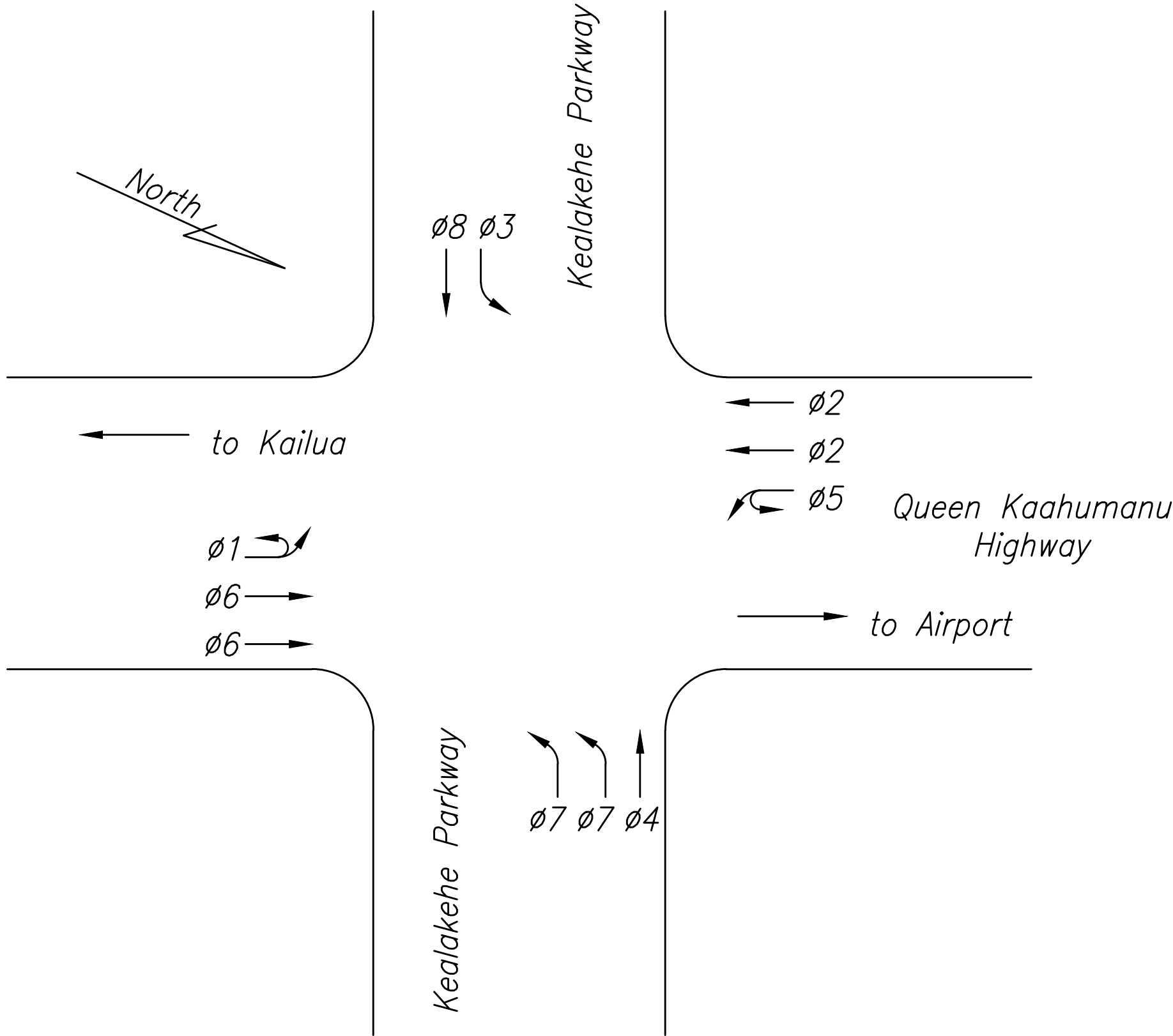
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	411 420	522 528



Controller Phase Assignment



Phase Diagram



Phase Plan

DESIGNED BY	DATE
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CHECKED BY	
NOTED BY	
REVISIONS	
1	
2	
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9	
10	

S:\Bpl\asfm - queen k widening\draw its sensor\411 Kealakehe Parkway.dwg 3/14/2017 12:24 PM

LEGEND FOR  
AS-BUILT POSTINGS

Squiggly line for  
as-built deletion

Double line for  
as-built deletion

Roadway Text for as-built  
posting

BRYAN P. LOW

LICENSED  
PROFESSIONAL  
ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION

SHIMIZUKI, ENDO & YOSHIZAKI, INC.

1126 - 12TH Avenue

Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

KEALAKEHE PARKWAY  
TRAFFIC SIGNAL PHASING

QUEEN KAAHUMANU HIGHWAY WIDENING

Kealakehe Pkwy. To Keahole Airport Rd. (Ph. 2)

Federal Aid Project No. NH-019-1(38)R

Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 7 OF 43 SHEETS

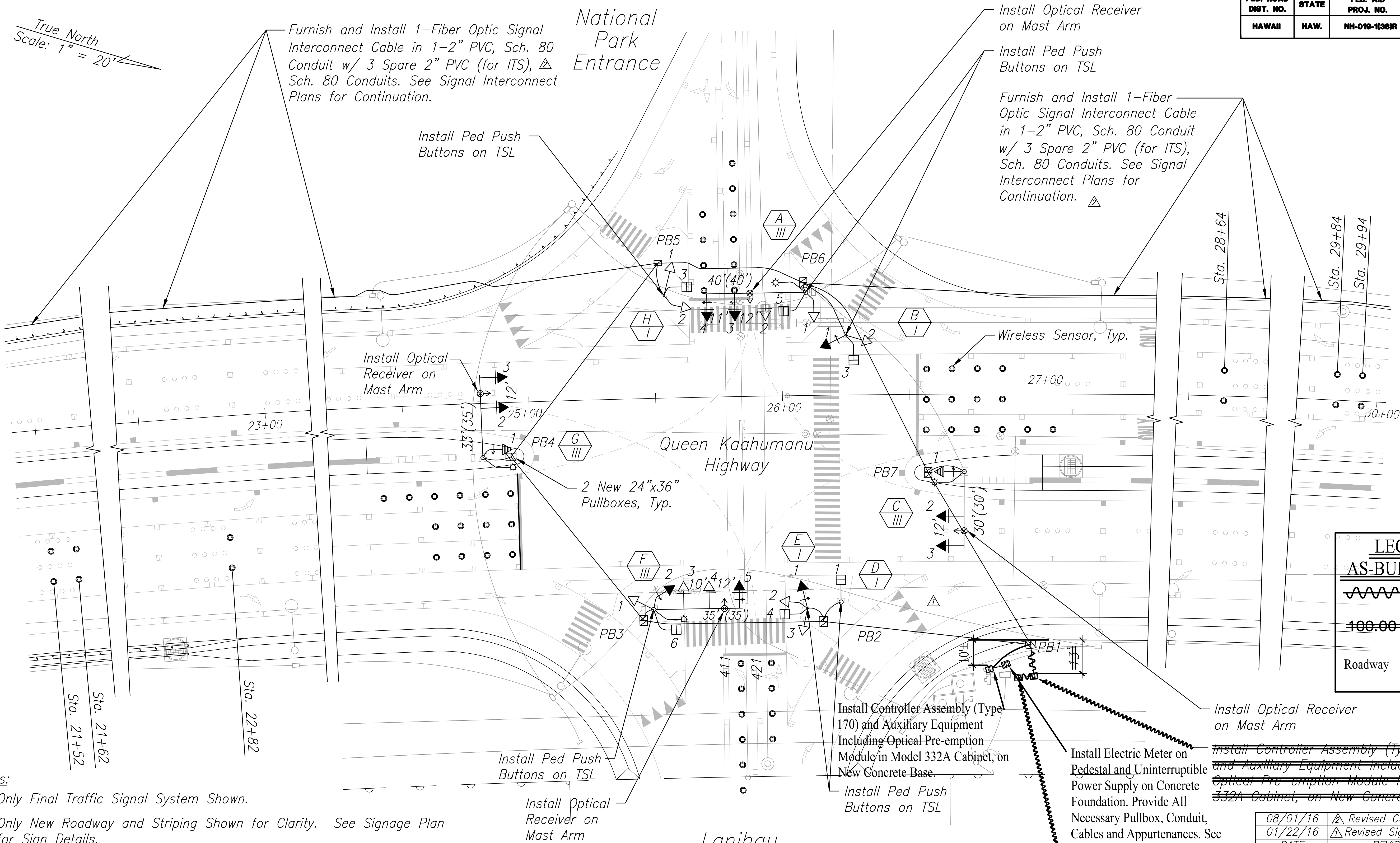
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Plotted: 3/8/2017 4:14 PM

411 420



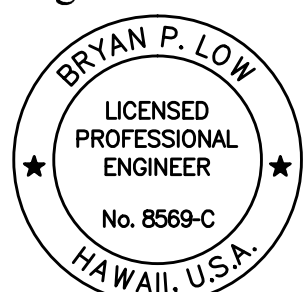
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 412 421	522 528



Notes:

- Only Final Traffic Signal System Shown.
- Only New Roadway and Striping Shown for Clarity. See Signage Plan for Sign Details.
- See Sheet C.O. 413 for Schedule of Signal Equipment and Sheet 414 for Phasing Diagram.
- The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the Final Signal Is Activated.
- Near and far dilemma zone wireless sensors not shown along Lanihau Street and the National Park Entrance. The Contractor shall furnish and install near and far dilemma zone wireless sensors along Lanihau Street and the National Park Entrance per details on Sheet 44S-3.

LANIHAU STREET  
TRAFFIC SIGNAL PLAN  
Scale: 1"=20'



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
SHIMABUKURO, ENDO & YOSHIZAKI, INC.  
1126-12TH Avenue  
Honolulu, Hawaii 96816

08/01/16	Revised Conduits for ITS
01/22/16	Revised Signals
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LANIHAU STREET**  
**TRAFFIC SIGNAL PLAN**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=20' Date: AUGUST 2016**

**SHEET No. 8 OF 43 SHEETS**

"AS-BUILT"

Plotted: 3/1/2019 10:30 AM

C.O. 412 421



DATE: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_  
QUANTITIES BY: \_\_\_\_\_  
No. \_\_\_\_\_  
ORIGINAL PLAN  
NOTE BOOK

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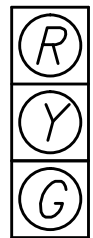
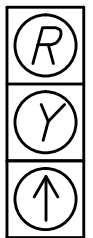
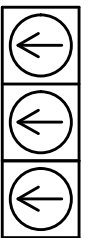
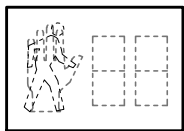
Conduit/Cable Schedule														
From	To	Main Control		Signal Control		Detectors		Interconnect		Opticom		Spare	Concrete Encased	Remarks
		Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor			
		2" C	1-26/C #14 1-9/C #14	2" C	4/C-#14 Color Coded	1" Ped	2" Ped	2/C-#14 Pedestrian	2"C	Fiber Optic	2"C	3/C #20		
Meter	Ups													*
Ups	Control													*
Control	PB1	2	2				1	4	2	2	1	4	6	
PB1	PB2	1	1				1	2			1	2	6	Yes
PB2	PB3	1	1				1	1			1	2	6	Yes
PB2	D			1	1	1		1					1	Yes
PB2	E			1	4	1		1					1	Yes
PB3	PB4	1	1								1	1	6	Yes
PB3	F			1	6	1		1			1	1	1	Yes *
PB4	PB5	1	1										6	Yes
PB4	G			1	3						1	1		*
PB5	PB6	1	1				1	1	1	1			9***	Yes
PB5	H			1	3	1		1					1	Yes
PB6	PB7	1	1				1	2	2	2	1	1	7**	Yes
PB6	A			1	5	1		1			1	1	1	Yes
PB7	PB1	1	1				1	2	2	2	1	2	7**	Yes *
PB7	C			1	3						1	1	1	*
PB6	B			1	3	1		1					1	Yes

\* See Electrical Drawings for Street Light and Power Related Conduit and Cable Information

\*\* 1 Spare for ITS \*\*\* 3 Spares for ITS




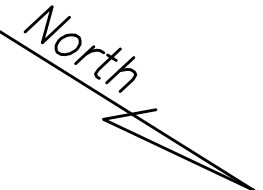





FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 413 422	522 528

Pullbox/Standard Location	
Description	Center Location
PB1	Sta. 26+98, 98.84' Rt.
PB2	Sta. 26+15.10, 89.24' Rt.
PB3	Sta. 25+43.11, 87.49' Rt.
PB4	Sta. 24+92.21, 21.50' Rt.
PB5	Sta. 25+52.11, 53.26' Lt.
PB6	Sta. 26+08.77, 44.47' Lt.
PB7	Sta. 26+57.28, 30.90' Rt.
A	Sta. 26+09.71, 40.70' Lt.
B	Sta. 26+25.19, 23.57' Lt.
C	Sta. 26+71.54, 30.58' Rt.
D	Sta. 26+22.17, 81.68' Rt.
E	Sta. 26+08.72, 83.98' Rt.
F	Sta. 25+47.24, 83.29' Rt.
G	Sta. 24+81.09, 21.38' Rt.
H	Sta. 25+54.19, 40.44' Lt.

Traffic Signal Head Schedule							
Traffic Signal Head Schedule							
	12" RYG Traffic Signal Head	12" RY up Traffic Signal Head	12" left-left-left Traffic Signal Head	Countdown Pedestrian Signal Head (L.E.D.)			
Pole Letter-Signal Head-Signal Head Mounting Type	A-1-V F-1-V2 A-2-VI+ H-1-II B-2-II H-2-II E-2-III E-3-III	C-2-VI+ F-4-VI+ C-3-VI+ G-2-VI+ F-3-VI+ G-3-VI+	A-3-VI+ E-1-III A-4-VI+ F-2-V2 B-1-II F-5-VI+ C-1-V* G-1-V*	A-5-VII E-4-VII B-3-VII F-6-VII D-1-VII H-3-VII			

Legend: R = Red Y = Yellow G = Green  
← = Arrow \* = Program Visibility Head + = Signal Head w/ Retroreflective Back Plate

Pole Letter A-2-III Signal Head Signal Head Mounting Type

Pedestrian Push Button Schedule	Pole		R10-4B (Sign Varies w/Direction)
	A 		(→) R10-4B (R) (←) R10-4B (L)
	B 		(→) R10-4B (R) (←) R10-4B (L)
	D 		(→) R10-4B (R) (←) R10-4B (L)
	E 		(→) R10-4B (R) (←) R10-4B (L)
	F		(→) R10-4B (R) (←) R10-4B (L)
	H		(→) R10-4B (R) (←) R10-4B (L)

### LEGEND FOR AS-BUILT POSTINGS

~~~~~ Squiggly line for as-built deletion  
~~100.00~~ Double line for as-built deletion  
Roadway Text for as-built posting

|          |                          |
|----------|--------------------------|
| 08/01/16 | Revised Conduits for ITS |
| 01/22/16 | Revised Signals          |
| DATE     | REVISION                 |

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.  
LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SHIMABUKURO, ENDO & YOSHIZAKI, INC.  
1126-12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**LANIHAU STREET**  
**TRAFFIC SIGNAL SCHEDULE**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: NOT TO SCALE Date: AUGUST 2016**  
**SHEET No. 9 OF 43 SHEETS**

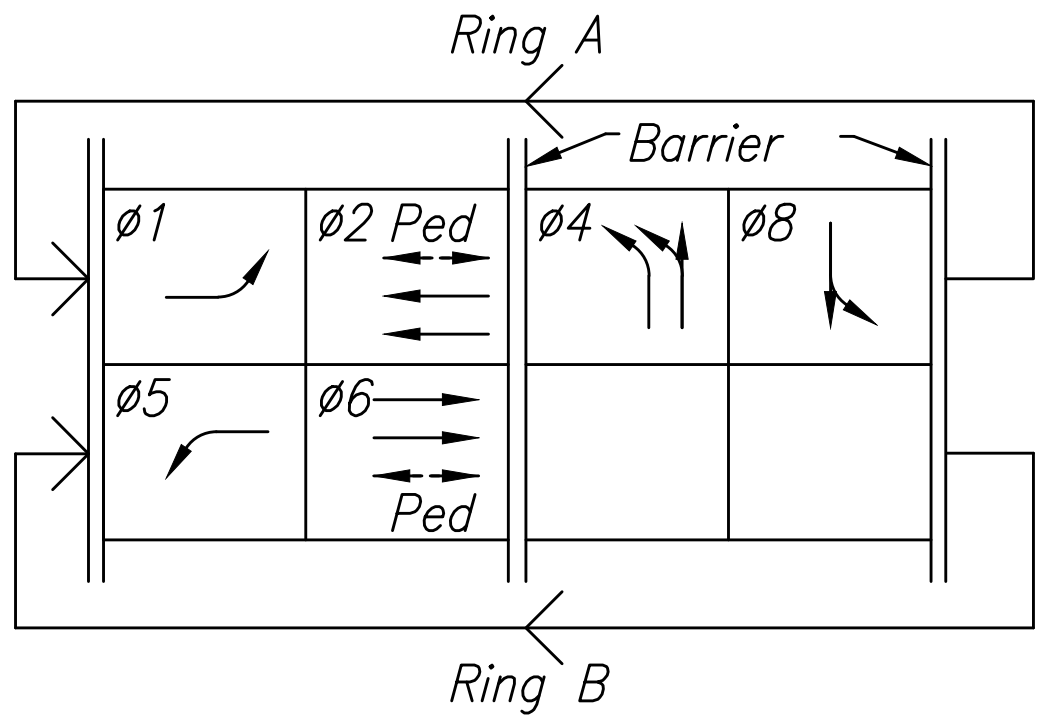
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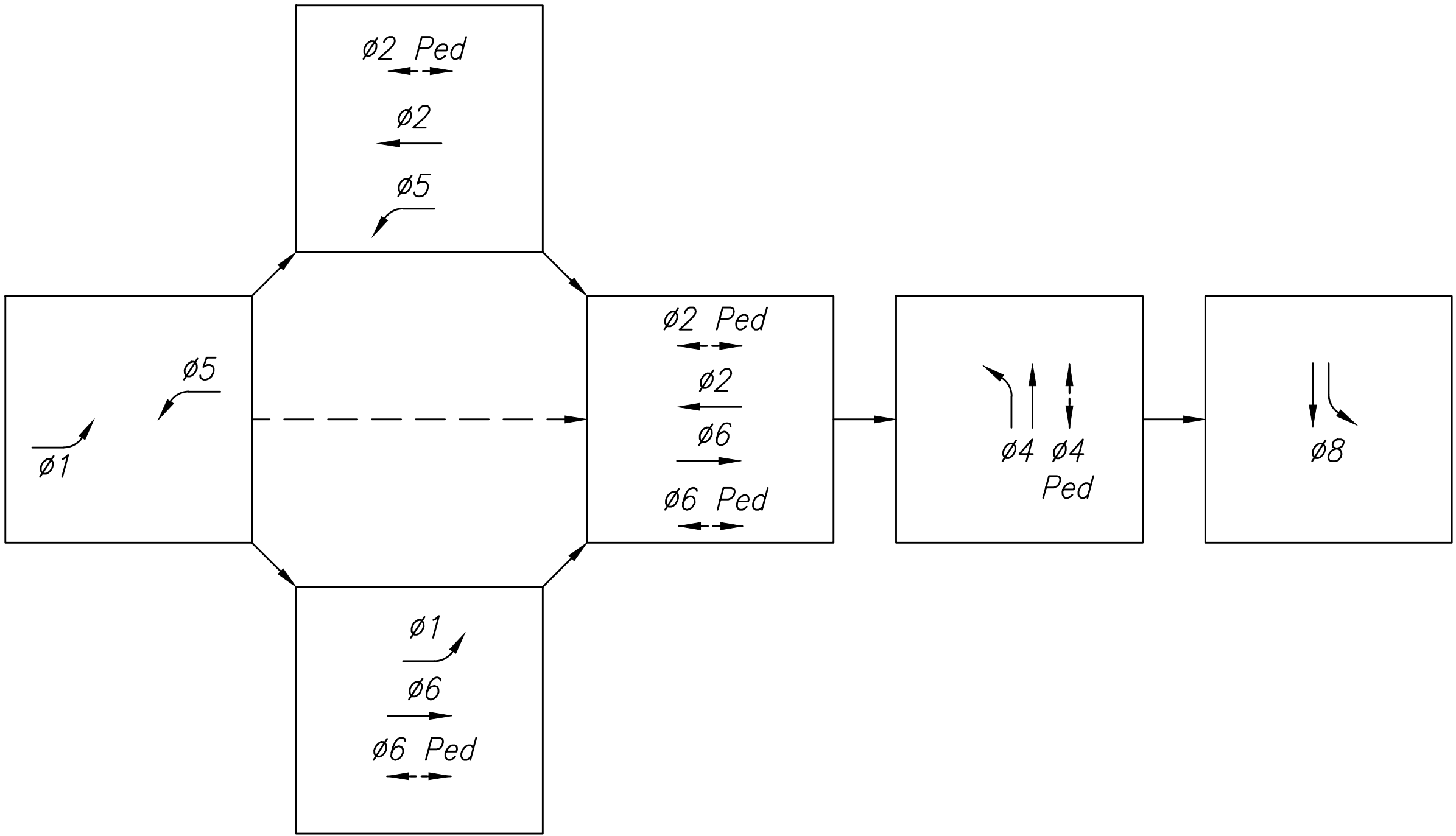
C.O. =413 422



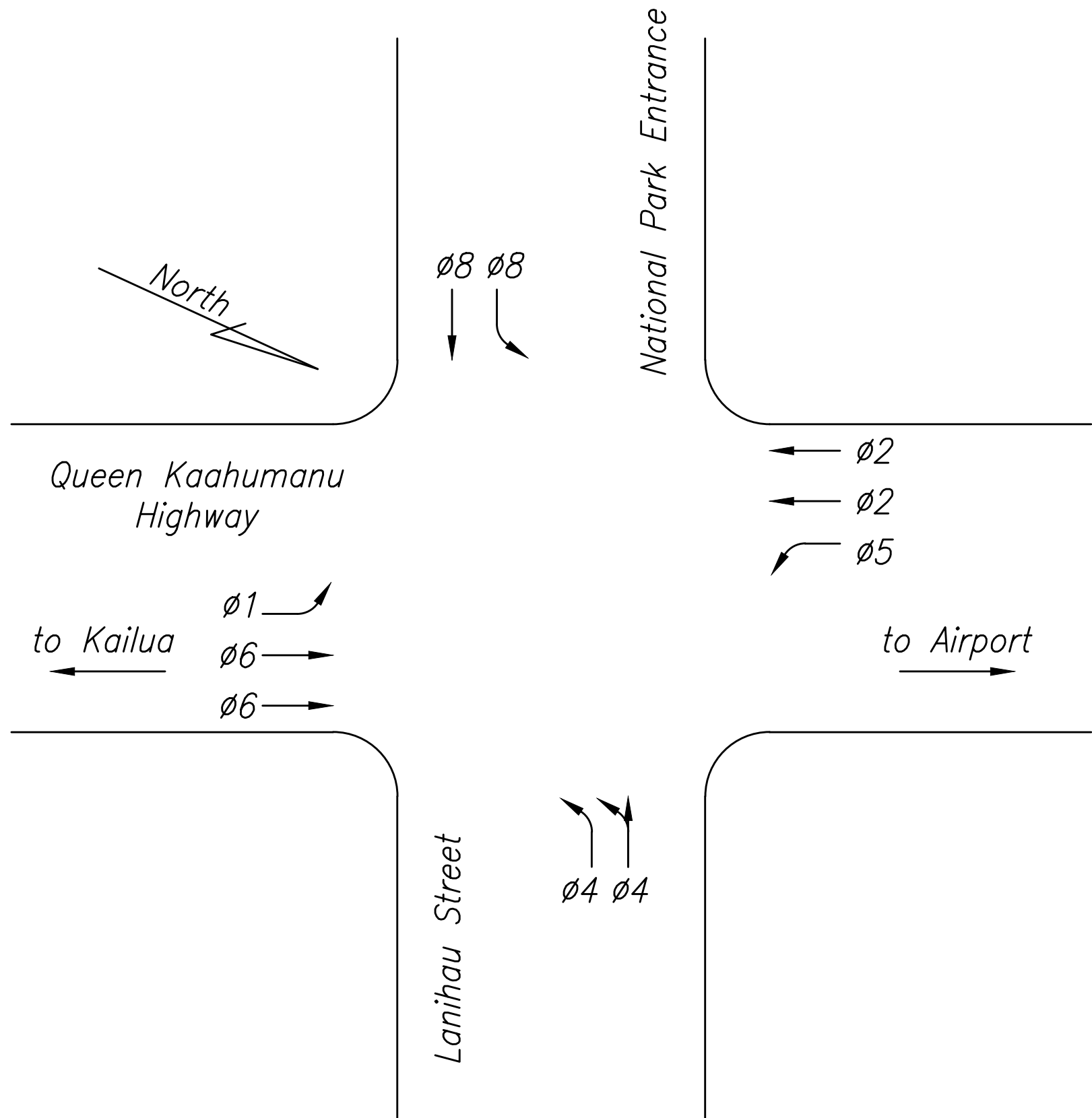
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|---------------------|-------|--------------------|-------------|------------|--------------|
| HAWAII              | HAW.  | NH-019-1(38)R      | 2016        | 414<br>423 | 522<br>528   |



Controller Phase Assignment



Phase Diagram



Phase Plan

|               |      |
|---------------|------|
| ORIGINAL PLAN | DATE |
| NOTE BOOK     |      |
| No.           |      |

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LEGEND FOR  
AS-BUILT POSTINGS

~~~~~

100.00

Roadway

Squiggly line for  
as-built deletion

Double line for  
as-built deletion

Text for as-built  
posting

BRYAN P. LOW

LICENSED  
PROFESSIONAL  
ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION

SHIMIZUKAWA, ENDO & YOSHIZAKI, INC.

1126 - 12TH Avenue

Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANIHAU STREET  
TRAFFIC SIGNAL PHASING

QUEEN KAAHUMANU HIGHWAY WIDENING

Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)

Federal Aid Project No. NH-019-1(38)R

Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 10 OF 43 SHEETS

"AS-BUILT"

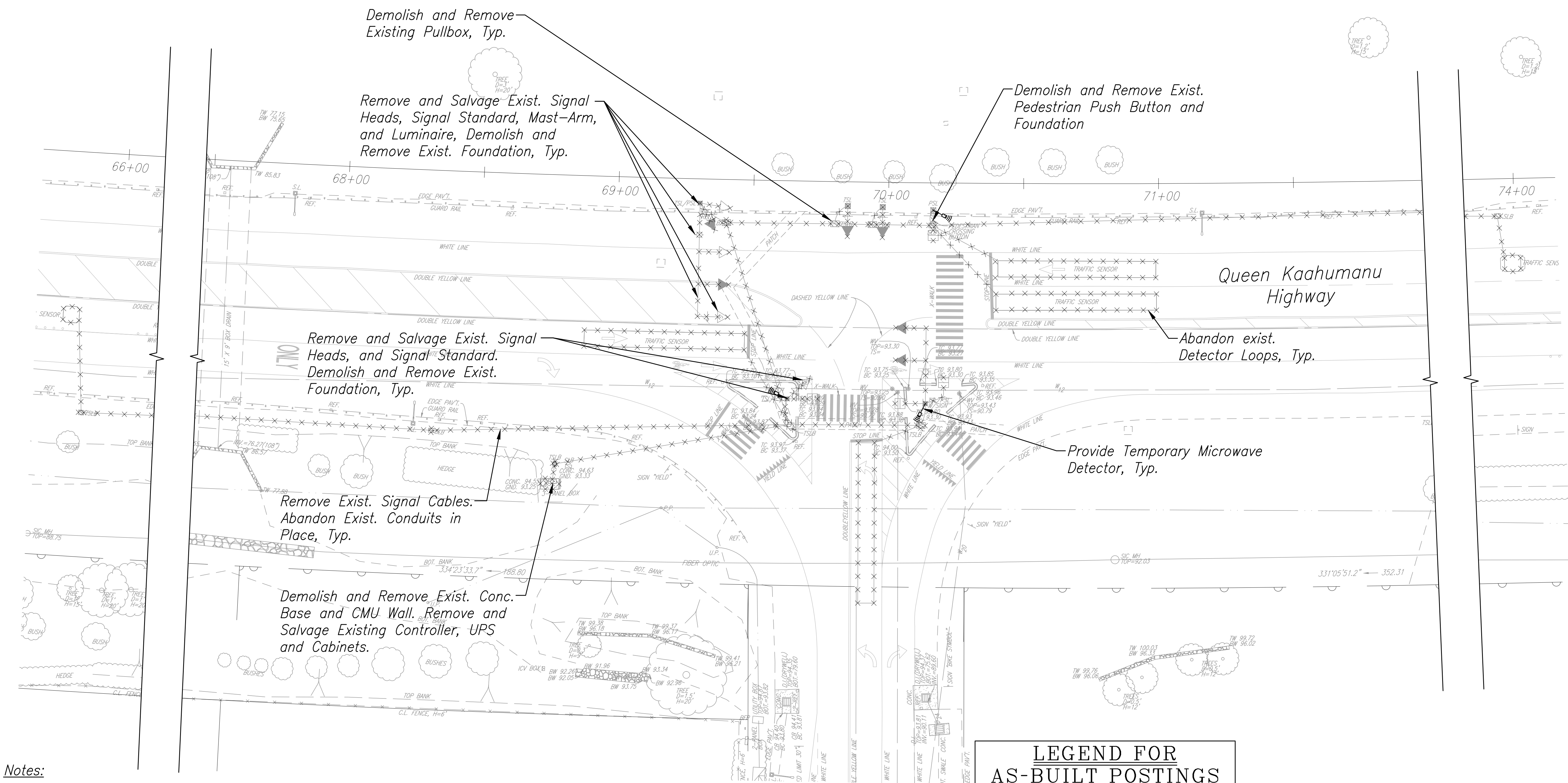
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414 423



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	415	528

True North  
Scale: 1" = 20'



Notes:

1. The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the New Signal Improvements are Installed and Activated.
2. All Salvaged Signal Equipment Shall be Delivered to the County of Hawaii Department of Public Works, Traffic Division Storage Yard.
3. See Sheet C.O. 416 for Final Signal System. See Sheet C.O. 417 for Schedule of Signal Equipment and Sheet C.O. 418 for Phasing Diagram.

Hina Lani Street

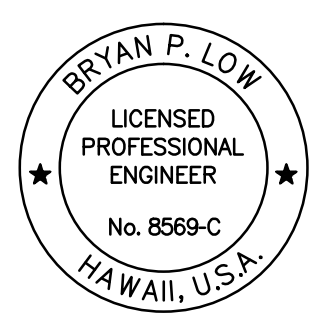
HINA LANI STREET  
TRAFFIC SIGNAL DEMOLITION PLAN  
Scale: 1"=20'

**LEGEND FOR AS-BUILT POSTINGS**

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SHIMIZAKI, ENDO & YOSHIKAWA, INC.  
1126 KAPA Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**HINA LANI STREET**  
**TRAFFIC SIGNAL DEMOLITION PLAN**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=20' Date: AUGUST 2016

**SHEET No. 11 OF 43 SHEETS**

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NOTED BY	
NO.	

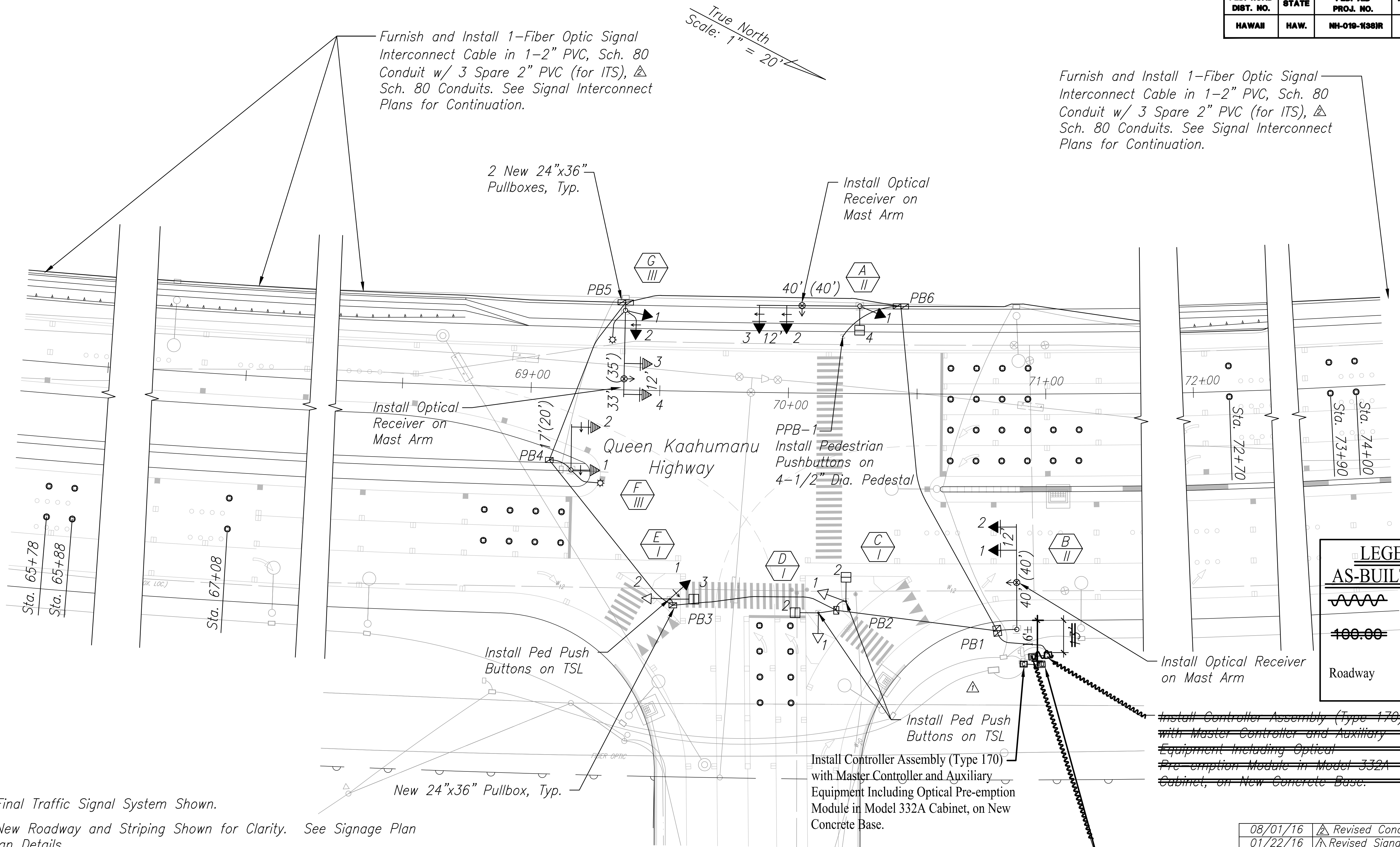
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"AS-BUILT"

Plotted: 3/8/2017 4:15 PM



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 416 425	522 528

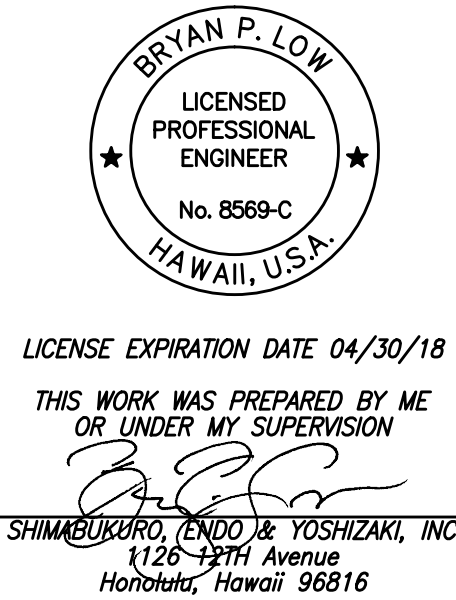


LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

- Notes:
- Only Final Traffic Signal System Shown.
  - Only New Roadway and Striping Shown for Clarity. See Signage Plan for Sign Details.
  - See Sheet C.O. 417 for Schedule of Signal Equipment and Sheet C.O. 418 for Phasing Diagram.
  - The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the Final Signal Is Activated.
  - Near and far dilemma zone wireless sensors not shown along Hina Lani Street. The Contractor shall furnish and install near and far dilemma zone wireless sensors along Hina Lani Street per details on Sheet 444S-3.

Hina Lani Street

HINA LANI STREET  
TRAFFIC SIGNAL PLAN  
Scale: 1"=20'



08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
HINA LANI STREET TRAFFIC SIGNAL PLAN	
QUEEN KAAHUMANU HIGHWAY WIDENING	
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)	
Federal Aid Project No. NH-019-1(38)R	
Scale: 1"=20'	Date: AUGUST 2016
SHEET No. 12 OF 43 SHEETS	

"AS-BUILT"

Plotted: 3/1/2019 10:30 AM C.O. 416 425

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
NO.	

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DATE: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
ORIGINAL PLAN: \_\_\_\_\_  
NOTE BOOK: \_\_\_\_\_  
No. \_\_\_\_\_

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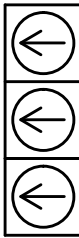
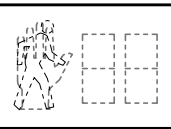
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From	To	Main Control		Signal Control		Detectors			Interconnect		Opticom		Spare	Concrete Encased	Remarks
		Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor				
		2" C	1-26/C #14	2" C	4/C-#14 Color Coded	1" Ped	2" Ped	2/C-#14 Pedestrian	2"C	Fiber Optic	2"C	3/C #20			
Meter	Ups														*
Ups	Control														*
Control	PB1	2	2				1	2	2	2	1	3	6		
PB1	PB2	1	1				1	2					6	Yes	
PB1	B			1	2						1	1			
PB2	PB3	1	1				1	1					6	Yes	
PB2	C			1	2	1		1					1	Yes	
PB2	D			1	2	1		1					1	Yes	
PB3	PB4	1	1										6	Yes	
PB3	E			1	3	1		1					1	Yes	
PB4	PB5	1	1										6	Yes	
PB4	F			1	2										*
PB5	PB6	1	1						1	1	1	1	9***	⚠	
PB5	G			1	4						1	1			*
PB6	PB1	1	1				1	1	2	2	1	2	7 **	⚠Yes	
PB6	A			1	4						1	1	1		
PB6	PPB-1					1		1							

\* See Electrical Drawings for Street Light and Power Related Conduit and Cable Information △



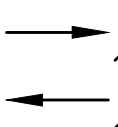
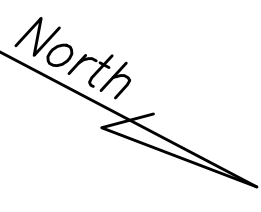






\*\* 1 Spare for ITS \*\*\* 3 Spares for ITS △

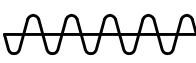
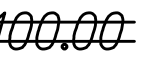
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 417 426	522 528

Pullbox/Standard Location	
Description	Center Location
PB1	Sta. 70+81.08, 92' Rt.
PB2	Sta. 70+19.40, 84.29' Rt.
PB3	Sta. 69+56.71, 83.30' Rt.
PB4	Sta. 69+07.84, 28' Rt.
PB5	Sta. 69+35.97, 34' Lt.
PB6	Sta. 70+43.50, 34' Lt.
PB6B	Sta. 72+22, 23' Lt.
A	Sta. 70+27.47, 34' Lt.
B	Sta. 70+88.56, 91.50' Rt.
C	Sta. 70+23.03, 80.83' Rt.
D	Sta. 70+12.54, 85.37' Rt.
E	Sta. 69+55.49, 80.91' Rt.
F	Sta. 69+16.31, 31.64' Rt.
G	Sta. 69+35.93, 30.94' Lt.
PPB-1	Sta. 70+20.91, 22.15' Lt.

Traffic Signal Head Schedule				
Traffic Signal Head Schedule				
Pole Letter-Signal Head-Signal Head Mounting Type	C-1-I D-1-I E-2-II	A-1-V G-3-VI*+ B-1-VI+ G-4-VI*+ B-2-VI+ G-1-V2	A-2-VI+ E-1-II A-3-VI+ F-1-V* F-2-VI*+ G-2-V2	A-4-VII E-3-VII C-2-VII D-2-VII

Legend: R = Red Y = Yellow G = Green ← = Arrow \* = Program Visibility Head + = Signal Head w/ Retroreflective Back Plate Pole Letter A-2-III Signal Head Signal Head Mounting Type

Pedestrian Push Button Schedule	Pole		R10-4B (Sign Varies w/Direction)
	PPB-1 		(→) R10-4B (R) (←) R10-4B (L)
			(→) R10-4B (R) (←) R10-4B (L)
			(→) R10-4B (R) (←) R10-4B (L)
			(→) R10-4B (R) (←) R10-4B (L)

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.  
LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SHIMABUKURO, ENDO & YOSHIZAKI, INC.  
1126-12TH Avenue  
Honolulu, Hawaii 96816

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION HINA LANI STREET TRAFFIC SIGNAL SCHEDULE QUEEN KAAHUMANU HIGHWAY WIDENING Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2) Federal Aid Project No. NH-019-1(38)R Scale: NOT TO SCALE Date: AUGUST 2016 SHEET No. 13 OF 43 SHEETS	

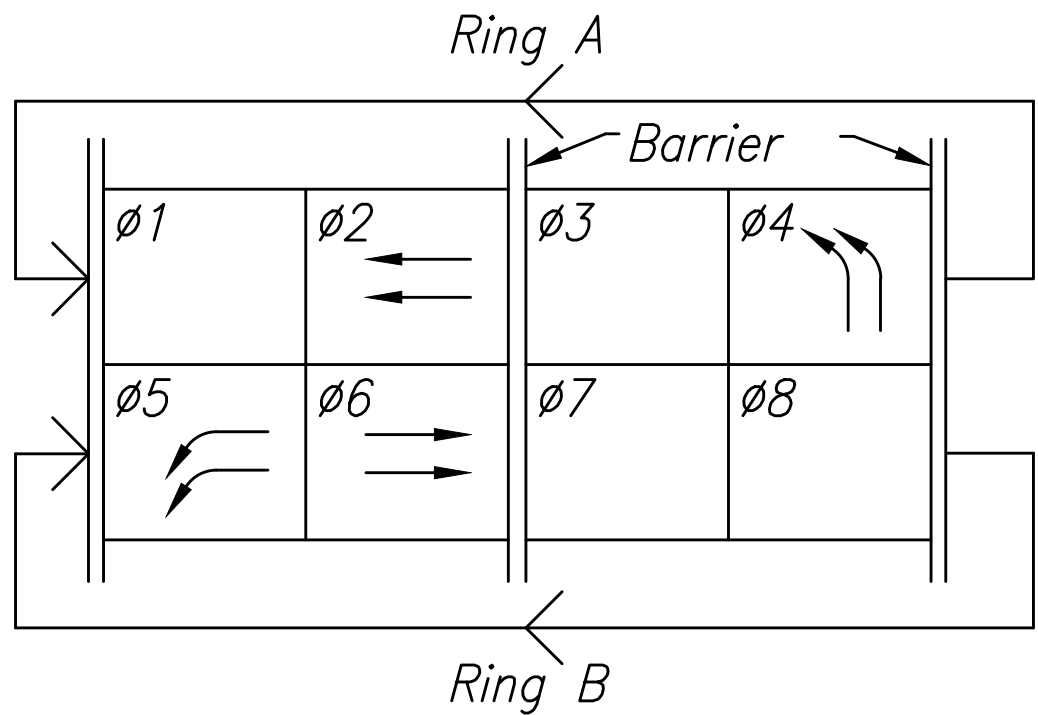
"AS-BUILT"

Plotted: 3/8/2017 4:15 PM

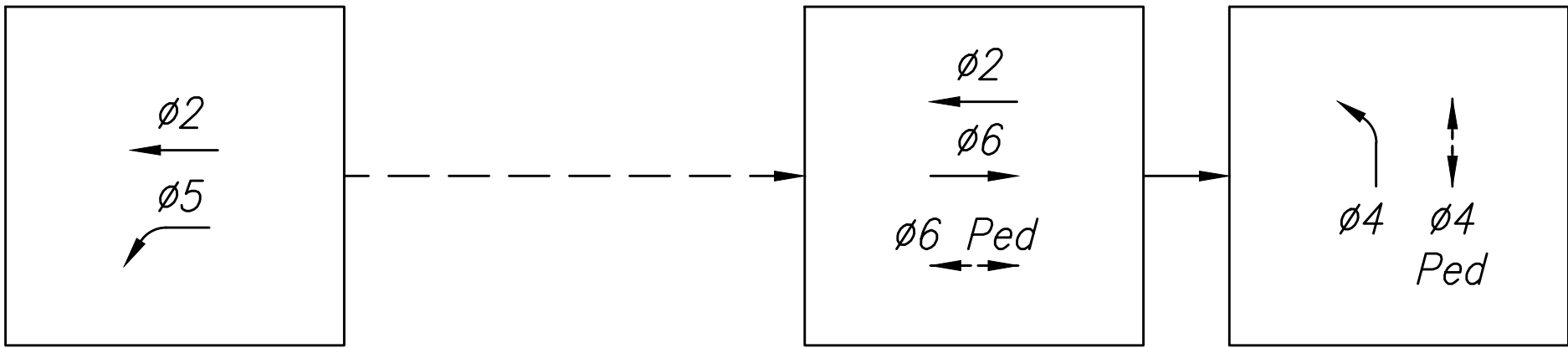
C.O. 417 426



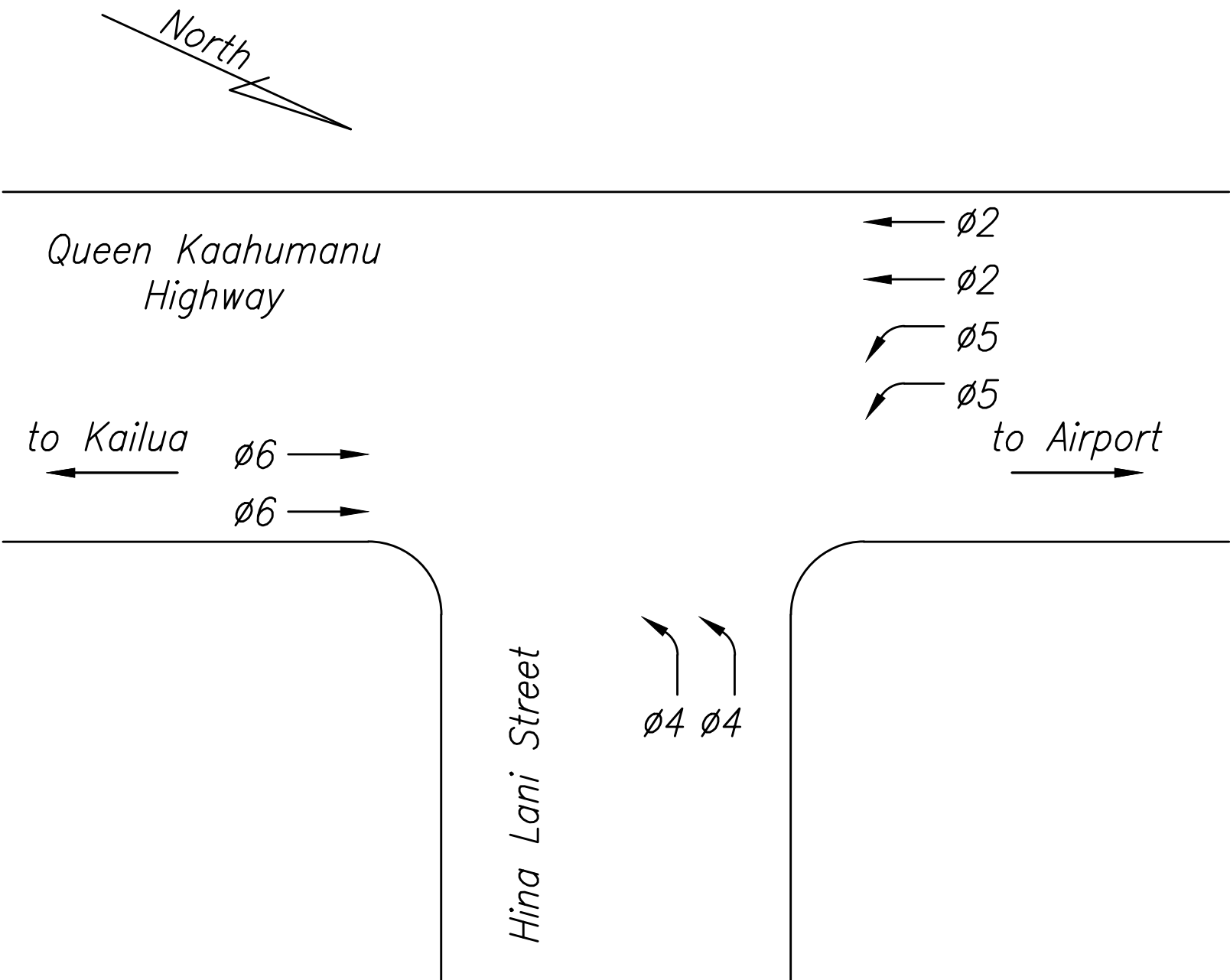
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 418-427	522-528



Controller Phase Assignment



Phase Diagram



Phase Plan

LEGEND FOR  
AS-BUILT POSTINGS

- Squiggly line for as-built deletion
- Double line for as-built deletion
- Roadway Text for as-built posting

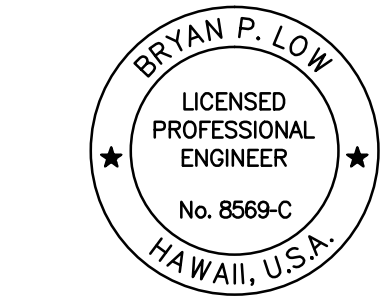
01/22/16  
DATE

Revised Phase Diagrams  
REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

HINA LANI STREET  
TRAFFIC SIGNAL PHASING  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 14 OF 43 SHEETS



LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION

SHIMIZUKI, ENDO & YOSHIZAKI, INC.  
1126-12TH Avenue  
Honolulu, Hawaii 96816

ORIGINAL PLAN	DATE
NOTE BOOK	
No.	

S:\Bpl\asfm - queen k widening\draw its sensor\C.O. 418 Hina Lani Street.dwg 2/14/2017 1:09 PM



Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

Queen Kaahumanu Highway

106+00

107+00

Sta. 105+90  
Sta. 106+00

Install Optical Receiver on Mast Arm

New 24"x36" Pullbox, Typ.

Install Ped Push Button on TSL

2 New 24"x36" Pullboxes, Typ.

F III

E II

D I

Install Ped Push Button on TSL

Install Optical Receiver on Mast Arm

HULIKOA DRIVE  
TRAFFIC SIGNAL PLAN  
Scale: 1"=20'

Hulikoa Drive Extension

Install Ped Push Button on TSL

Install Optical Receiver on Slipfitter

Wireless Sensor, Typ.

110+00

111+00

112+00

113+00

113+61

113+71

113+81

113+91

114+00

114+10

114+20

114+30

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114+50

114+60

114+70

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140+80

140+90

141+00

141+10

141+20

141+30

141+40



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 420-429	522-528

Description	Location
PB1	Sta. 110+91.07, 90' Rt.
PB2	Sta. 110+02.14, 89.33' Rt.
PB3	Sta. 109+51.45, 86.54' Rt.
PB4	Sta. 109+12.17, 1.72' Rt.
PB5	Sta. 108+65.96, 85.33' Lt.
PB6	Sta. 109+48.19, 85.47' Lt.
PB7	Sta. 110+08.35, 69' Lt.
PB8	Sta. 110+41.87, 0.88' Rt.
A	Sta. 110+03.56, 81' Lt.
B	Sta. 110+47.94, 4.19' Rt.
C	Sta. 110+97.70, 90.85' Rt.
D	Sta. 110+02.14, 84.33' Rt.
E	Sta. 109+49.85, 82.04' Rt.
F	Sta. 109+18.46, 1.81' Rt.
G	Sta. 108+58.70, 84.85' Lt.
H	Sta. 109+46.71, 81' Lt.

Conduit/Cable Schedule															
From	To	Main Control		Signal Control		Detectors			Interconnect		Opticom		Spare	Concrete Encased	Remarks
		Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor				
		2" C	1-26/C #14 1-9/C #14	2" C	4/C-#14 Color Coded	1" Ped	2" Ped	2/C-#14 Pedestrian	2"C	Fiber Optic	2"C	3/C #20			
Meter	Ups														*
Ups	Control														*
Control	PB1	2	2				1	2	2	2	1	4	6		
PB1	PB2	1	1				1	1	1	1	1	2	6	Yes	
PB1	C			1	2						1	1	1		*
PB2	PB3	1	1				1	1	1	1	1	2	6	Yes	
PB2	D			1	3	1		1					1	Yes	
PB3	PB4	1	1						1	1	1	1	6	Yes	
PB3	E			1	6	1		1			1	1	1	Yes	
PB4	PB5	1	1						1	1	1	1	6	Yes	
PB4	F			1	1								1		*
PB5	PB6	1	1										9***	△Yes	
PB5	G			1	2						1	1	1		*
PB6	PB7	1	1				1	1					9***	△Yes	
PB6	H			1	4	1		1					1	Yes	
PB7	PB8	1	1				1	1	1	1	1	1	7**	△Yes	
PB7	A			1	4	1		1			1	1	1	Yes	
PB8	PB1	1	1				1	1	1	1	1	1	7**	△Yes	
PB8	B			1	1								1		*

\* See Electrical Drawings for Street Light and Power Related Conduit and Cable Information

\*\* 1 Spare for ITS \*\*\* 3 Spares for ITS △ △

Traffic Signal Head Schedule				
Traffic Signal Head Schedule				
Pole Letter- Signal Head- Signal Head Mounting Type	A-2-III E-4-VI+ A-3-III E-5-VI+ D-1-II H-1-III D-2-II H-2-III E-2-V2 H-3-III E-3-VI+	C-1-VI+ C-2-VI+ G-1-VI+ G-2-VI+	A-1-III B-1-V* E-1-V2 F-1-V*	A-4-VII D-3-VII E-6-VII H-4-VII

Legend: R = Red Y = Yellow G = Green < = Arrow \* = Program Visibility Head + = Signal Head w/ Retroreflective Back Plate Pole Letter A-2-III Signal Head Signal Head Mounting Type

Pedestrian Push Button Schedule	
	R10-4B (Sign Varies w/Direction)
Pole or PPB	Signs
A	(→) R10-4B (R) (←) R10-4B (L)
D	(→) R10-4B (R) (←) R10-4B (L)
E	(→) R10-4B (R) (←) R10-4B (L)
H	(→) R10-4B (R) (←) R10-4B (L)

LEGEND FOR AS-BUILT POSTINGS

- Squiggly line for as-built deletion
- Double line for as-built deletion
- Roadway Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION

BRYAN P. LOW

LICENSED PROFESSIONAL ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SHIMABUKURO, ENDO & YOSHIZAKI, INC.

1126-12TH Avenue

Honolulu, Hawaii 96816

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

HULIKOA DRIVE

TRAFFIC SIGNAL SCHEDULE

QUEEN KAAHUMANU HIGHWAY WIDENING

Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)

Federal Aid Project No. NH-019-1(38)R

Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 16

OF 43

SHEETS

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

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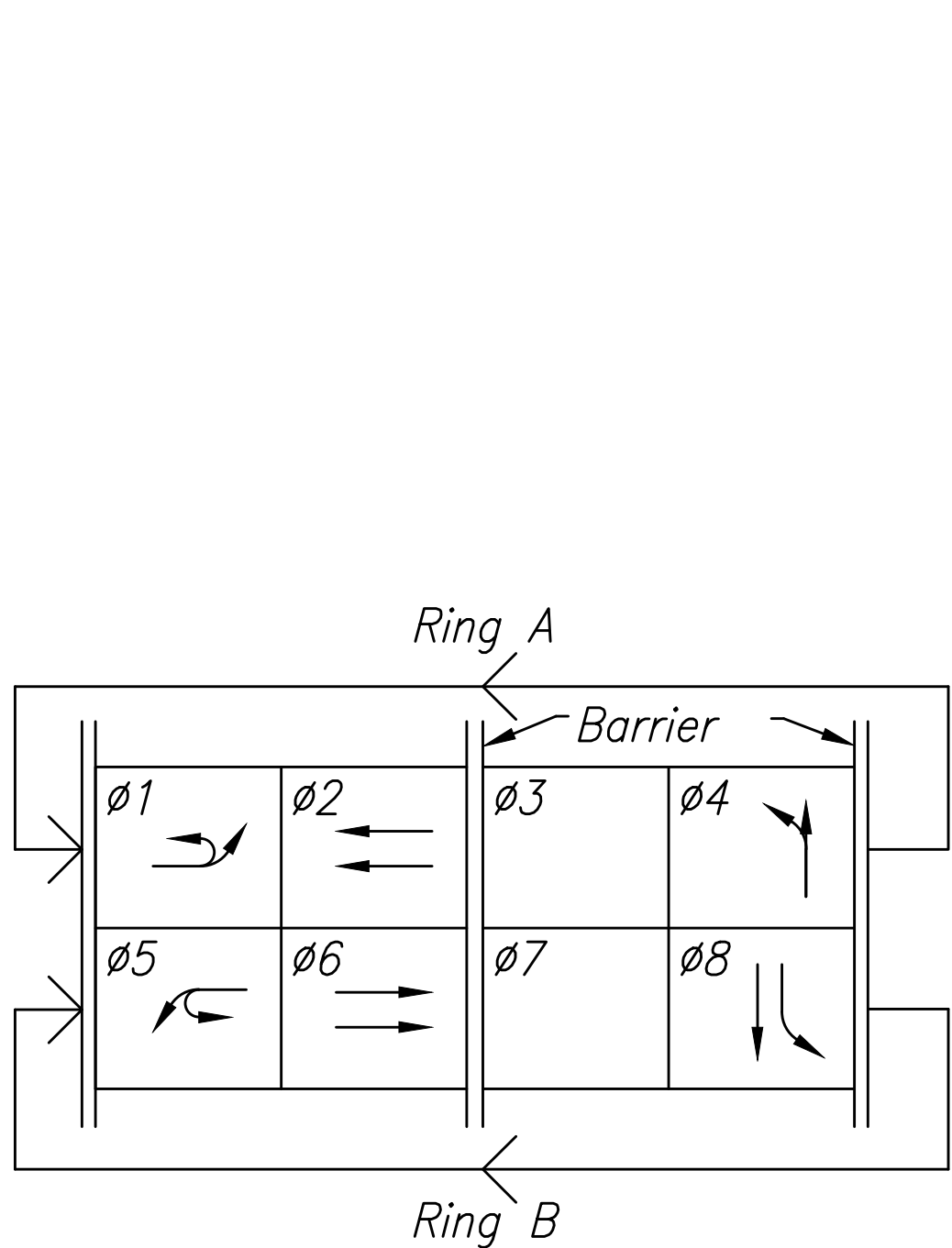
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Plotted: 3/8/2017 4:16 PM

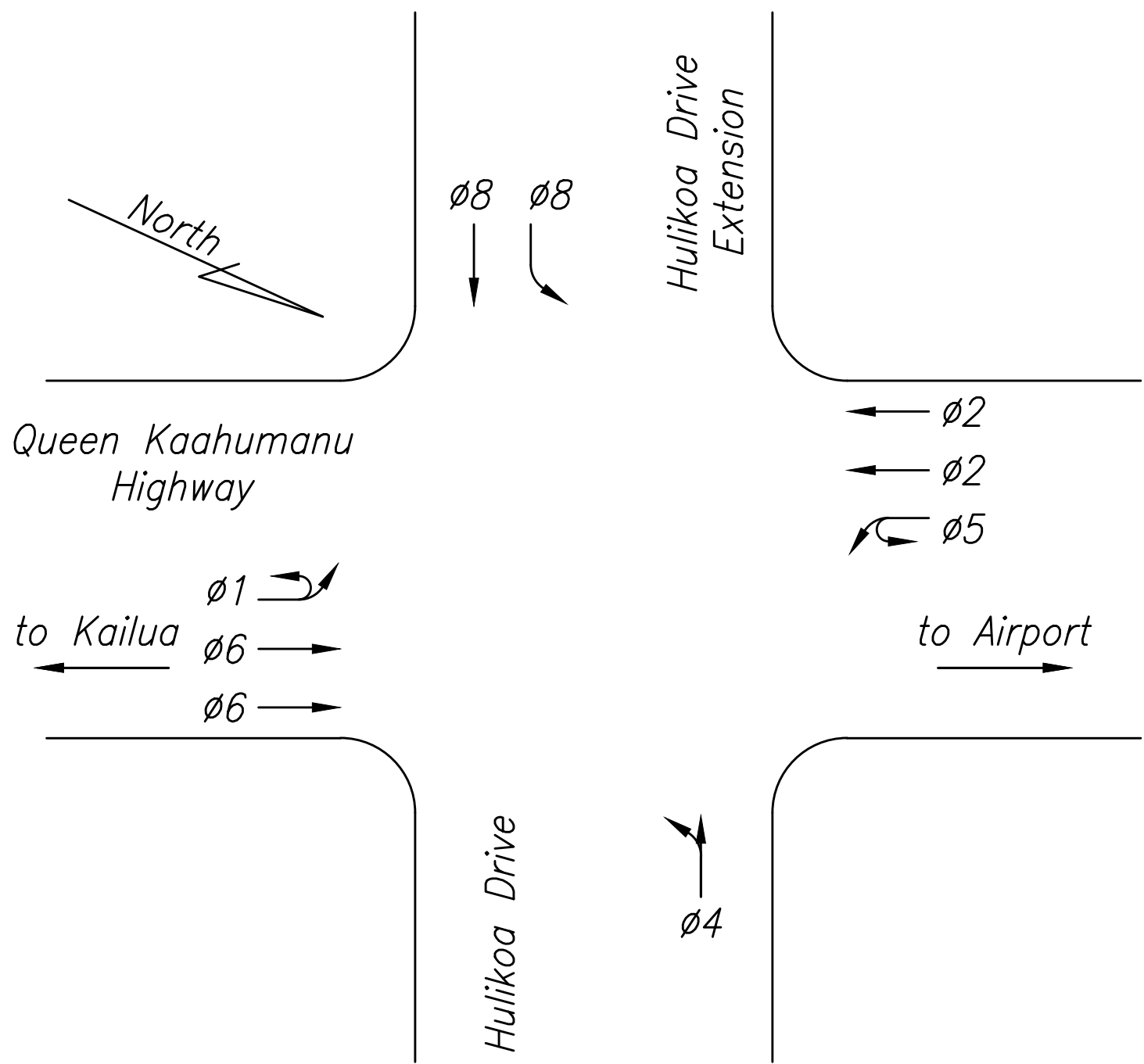
C.O. 420-429



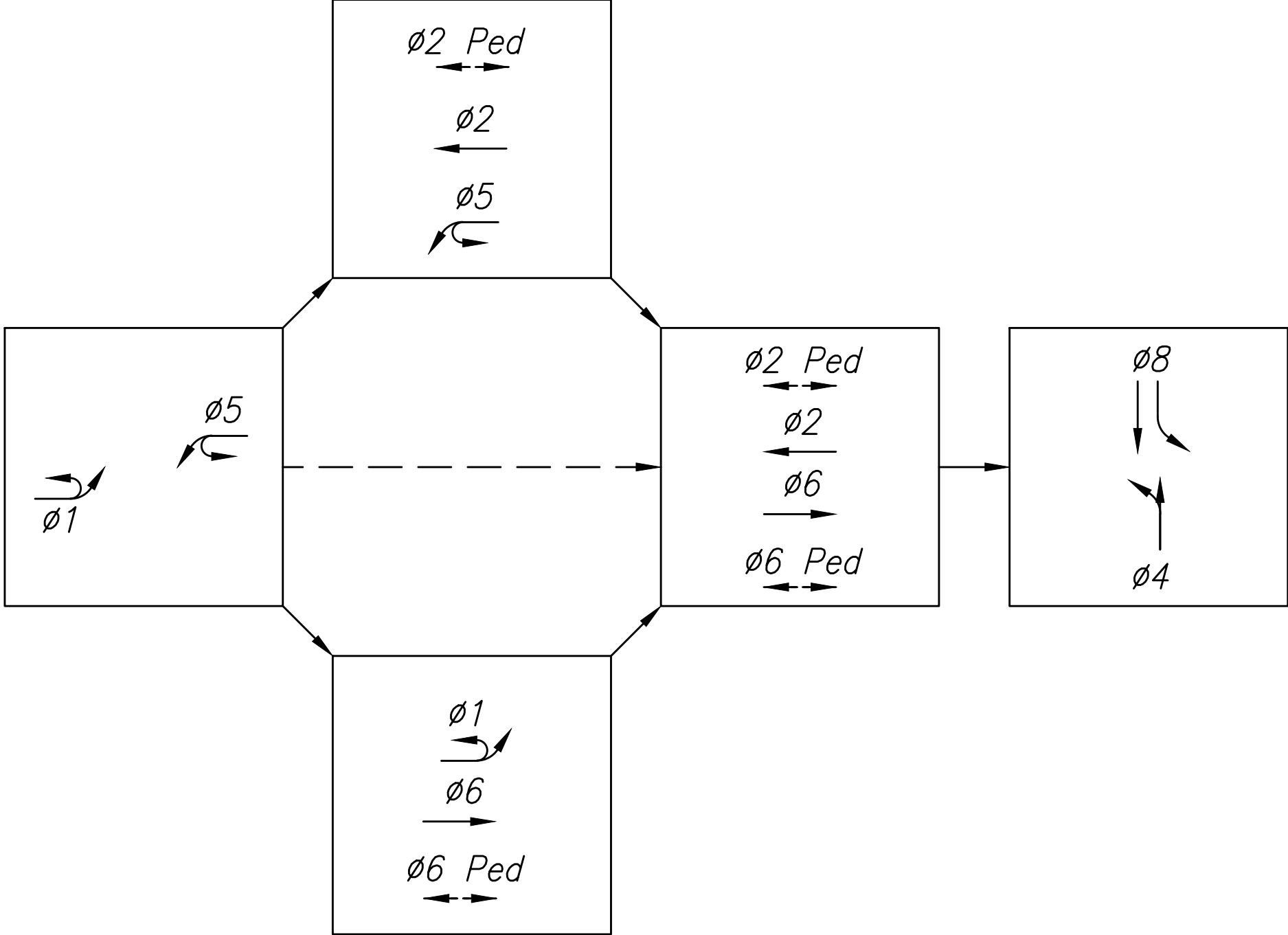
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	421 430	522 528



Controller Phase Assignment



Phase Plan

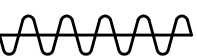
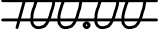


Phase Diagram

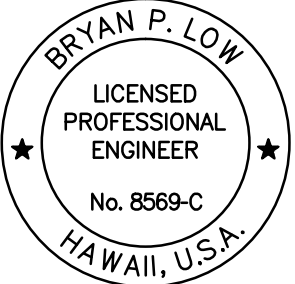

ORIGINAL PLAN	DATE
NO. 1	
DESIGNED BY	
CHECKED BY	
DATE	

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LEGEND FOR  
AS-BUILT POSTINGS

  
  
Roadway

Squiggly line for  
as-built deletion  
Double line for  
as-built deletion  
Text for as-built  
posting

  
LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
  
SHIMAEUNDO, ENDO & YOSHIZAKI, INC.  
1126-12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

HULIKOA DRIVE  
TRAFFIC SIGNAL PHASING  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 17 OF 43 SHEETS

"AS-BUILT"

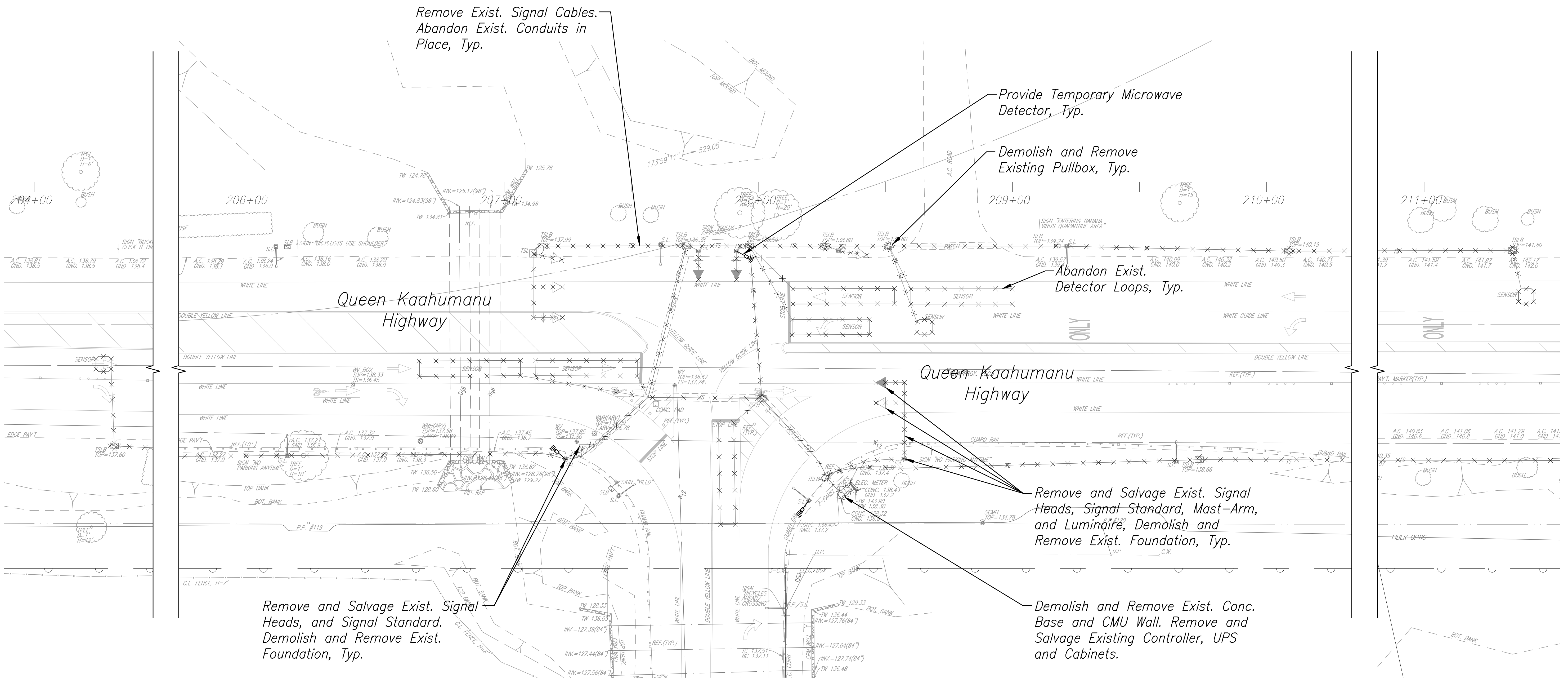
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421 430



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	422	528

True North  
Scale: 1" = 20'



Notes:

- The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the New Signal Improvements are Installed and Activated.
- All Salvaged Signal Equipment Shall be Delivered to the County of Hawaii Department of Public Works, Traffic Division Storage Yard.
- See Sheet C.O. 423 for Final Signal System. See Sheet C.O. 424 for Schedule of Signal Equipment and Sheet 425 for Phasing Diagram.

**LEGEND FOR AS-BUILT POSTINGS**

	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.  
LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SHIMIZAKI, KENDO & YOSHIKAWA, INC.  
1126 KAPAHULU AVENUE  
HONOLULU, HAWAII 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**KAIMINANI STREET**  
**TRAFFIC SIGNAL DEMOLITION PLAN**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=20' Date: AUGUST 2016  
**SHEET No. 18 OF 43 SHEETS**

KAIMINANI STREET  
TRAFFIC SIGNAL DEMOLITION PLAN  
Scale: 1"=20'

"AS-BUILT"

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NOTED BY	
NO.	

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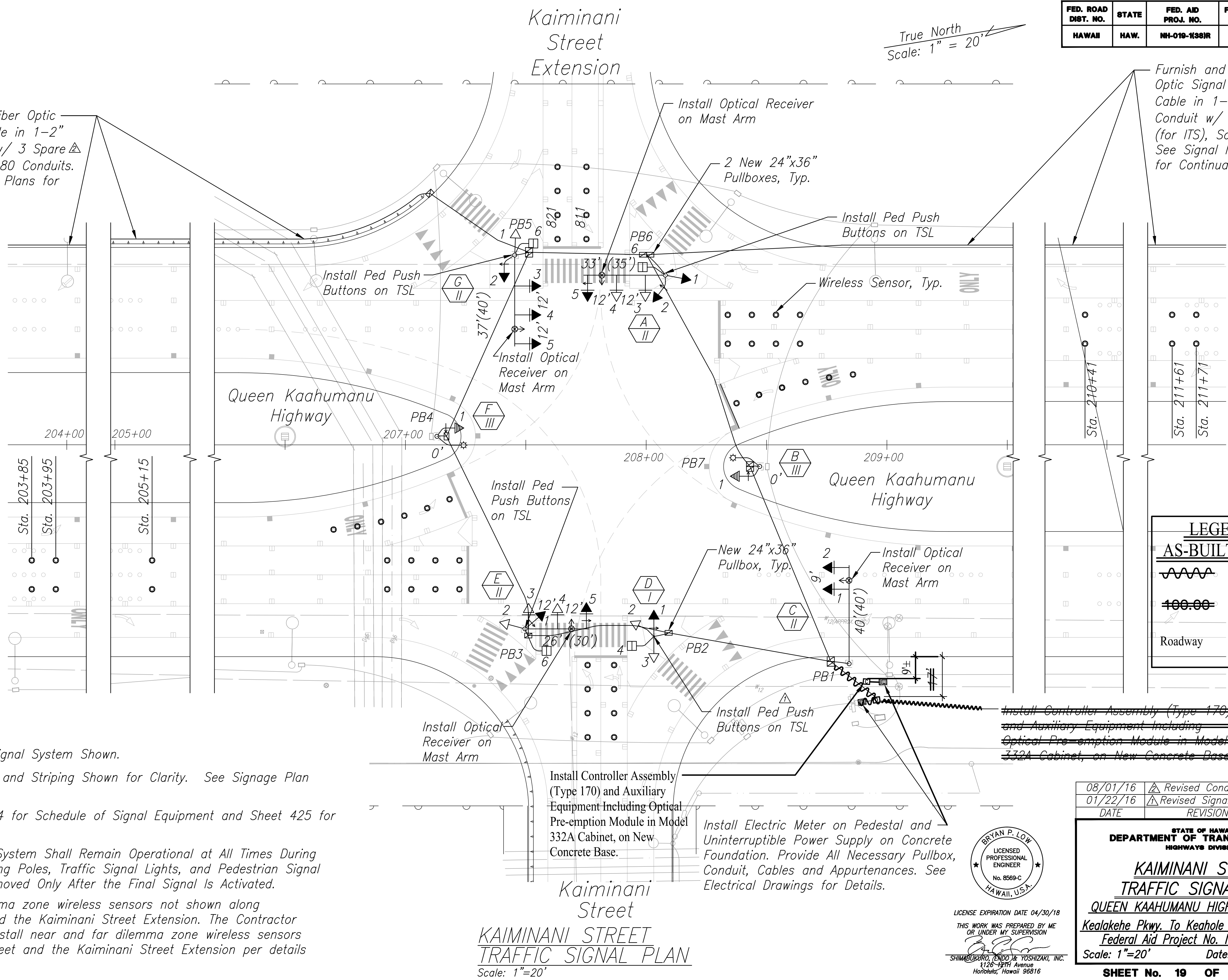


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 423 432	522 528

True North  
Scale: 1" = 20'

Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.



LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
	Text for as-built posting

- Notes:
- Only Final Traffic Signal System Shown.
  - Only New Roadway and Striping Shown for Clarity. See Signage Plan for Sign Details.
  - See Sheet C.O. 424 for Schedule of Signal Equipment and Sheet 425 for Phasing Diagram.
  - The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the Final Signal Is Activated.
  - Near and far dilemma zone wireless sensors not shown along Kaiminani Street and the Kaiminani Street Extension. The Contractor shall furnish and install near and far dilemma zone wireless sensors along Kaiminani Street and the Kaiminani Street Extension per details on Sheet 444S-3.

Kaiminani Street  
KAIMINANI STREET  
TRAFFIC SIGNAL PLAN  
Scale: 1"=20'

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.  
LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SHIMIZU, ENDO & YOSHIKAWA, INC.  
1126-12TH Avenue  
Honolulu, Hawaii 96816

08/01/16  
01/22/16  
DATE  
Revised Conduits for ITS  
Revised Signals  
REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

KAIMINANI STREET  
TRAFFIC SIGNAL PLAN  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=20' Date: AUGUST 2016

SHEET No. 19 OF 43 SHEETS

DESIGNED BY	DATE
NOTED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

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"AS-BUILT"

Plotted: 3/1/2019 10:30 AM C.O. 423 432



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

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Conduit/Cable Schedule															
From	To	Main Control		Signal Control		Detectors			Interconnect		Opticom		Spare	Concrete Encased	Remarks
		Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor	Conduit	Conductor				
		2" C	1-26/C #14	2" C	4/C-#14 Color Coded	1" Ped	2" Ped	2/C-#14 Pedestrian	2"C	Fiber Optic	2"C	3/C #20			
Meter	Ups														*
Ups	Control														*
Control	PB1	2	2				1	2	2	2	1	4	6		
PB1	PB2	1	1				1	1			1	1	6	Yes	
PB1	C			1	2						1	1	1		*
PB2	PB3	1	1				1	1			1	1	6	Yes	
PB2	D			1	4	1		1					1	Yes	
PB3	PB4	1	1										6	Yes	
PB3	E			1	6	1		1			1	1	1	Yes	
PB4	PB5	1	1										6	Yes	
PB4	F			1	1								1		*
PB5	PB6	1	1				1	1	1	1	1	1	9***	⚠Yes	
PB5	G			1	6	1		1			1	1	1	Yes	
PB6	PB7	1	1				1	1	2	2	1	2	7**	⚠Yes	
PB6	A			1	6	1		1			1	1	1	Yes	
PB7	PB1	1	1				1	1	2	2	1	2	7**	⚠Yes	
PB7	B			1	1								1		*

\* See Electrical Drawings for Street Light and Power Related Conduit and Cable Information

\*\* 1 Spare for ITS \*\*\* 3 Spares for ITS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 424 432	522 528

Pullbox/Standard Location	
Description	Center Location
PB1	Sta. 208+76.68, 90' Rt.
PB2	Sta. 208+09.34, 78.10' Rt.
PB3	Sta. 207+51.04, 79.22' Rt.
PB4	Sta. 207+17.06, 3.53' Lt.
PB5	Sta. 207+51.37, 80' Lt.
PB6	Sta. 208+00.19, 79' Lt.
PB7	Sta. 208+43.16, 9' Rt.
A	Sta. 208+07.91, 70.50' Lt.
B	Sta. 208+47.16, 9' Rt.
C	Sta. 208+84.29, 90.94' Rt.
D	Sta. 208+03.21, 79.58' Rt.
E	Sta. 207+49.62, 76.44' Rt.
F	Sta. 207+13.06, 3.53' Lt.
G	Sta. 207+45.38, 78.85' Lt.

Traffic Signal Head Schedule						
Traffic Signal Head Schedule						
Pole Letter-Signal Head-Signal Head Mounting Type	A-3-VI+ E-2-V2 A-4-VI+ E-3-VI+ D-2-III E-4-VI+ D-3-III G-1-V2	A-1-V2 G-3-VI+ C-1-VI+ G-4-VI+ C-2-VI+ G-5-VI+	A-2-V2 E-1-V2 A-5-VI+ E-5-VI+ B-1-V* F-1-V* D-1-III G-2-V2	Countdown Pedestrian Signal Head (L.E.D.)		

Legend: R = Red Y = Yellow G = Green  
← = Arrow \* = Program Visibility Head + = Signal Head w/ Retroreflective Back Plate  
Pole Letter-Signal Head-Signal Head Mounting Type

Pedestrian Push Button Schedule	
North	R10-4B (Sign Varies w/Direction)
Pole or PPB	Signs
A	(→) R10-4B (R) (←) R10-4B (L)
D	(→) R10-4B (R) (←) R10-4B (L)
E	(→) R10-4B (R) (←) R10-4B (L)
G	(→) R10-4B (R) (←) R10-4B (L)

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.  
LICENSE EXPIRATION DATE 04/30/18  
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1126-12TH Avenue  
Honolulu, Hawaii 96816

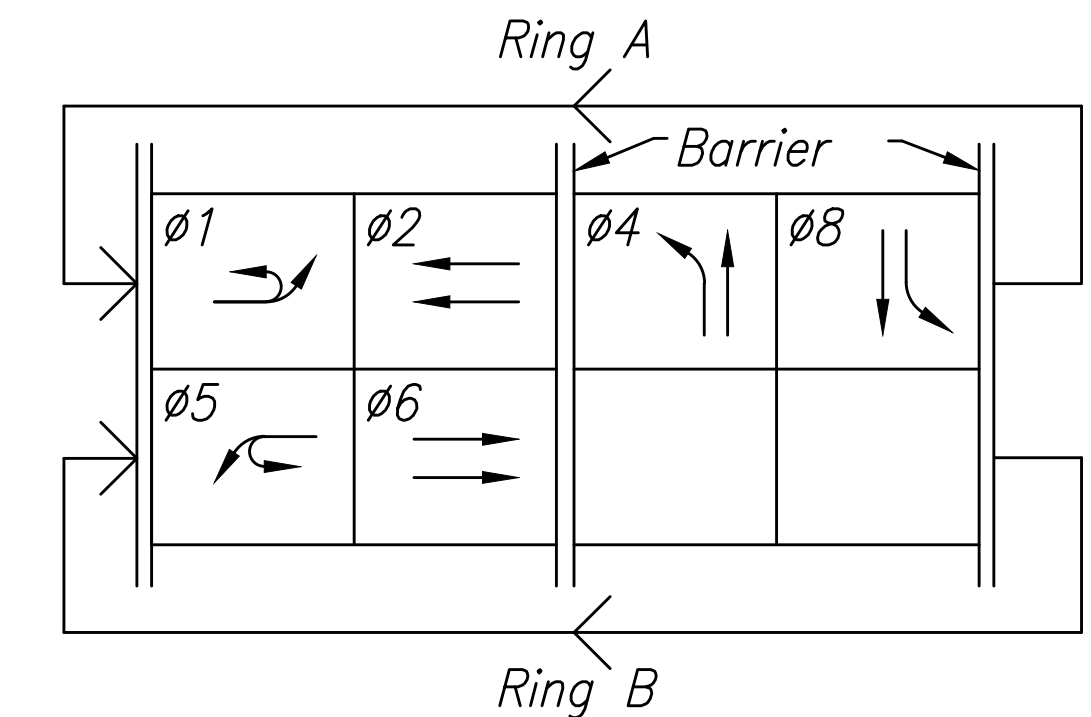
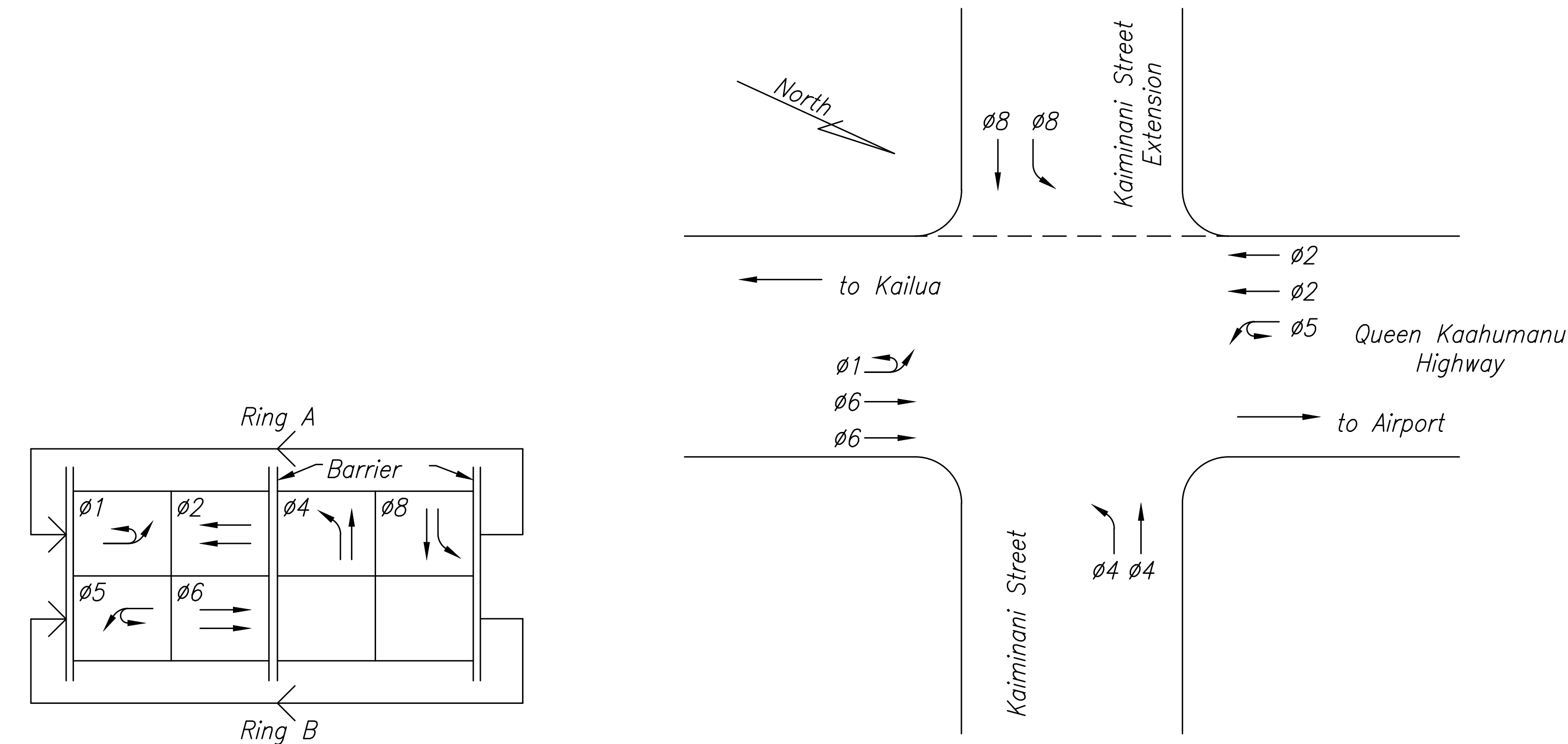
08/01/16	Revised Conduits for ITS
01/22/16	Revised Signals
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION KAIMINANI STREET TRAFFIC SIGNAL SCHEDULE QUEEN KAAHUMANU HIGHWAY WIDENING Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2) Federal Aid Project No. NH-019-1(38)R Scale: NOT TO SCALE Date: AUGUST 2016 SHEET No. 20 OF 43 SHEETS	

"AS-BUILT"

Plotted: 3/8/2017 4:16 PM C.O. 424 432

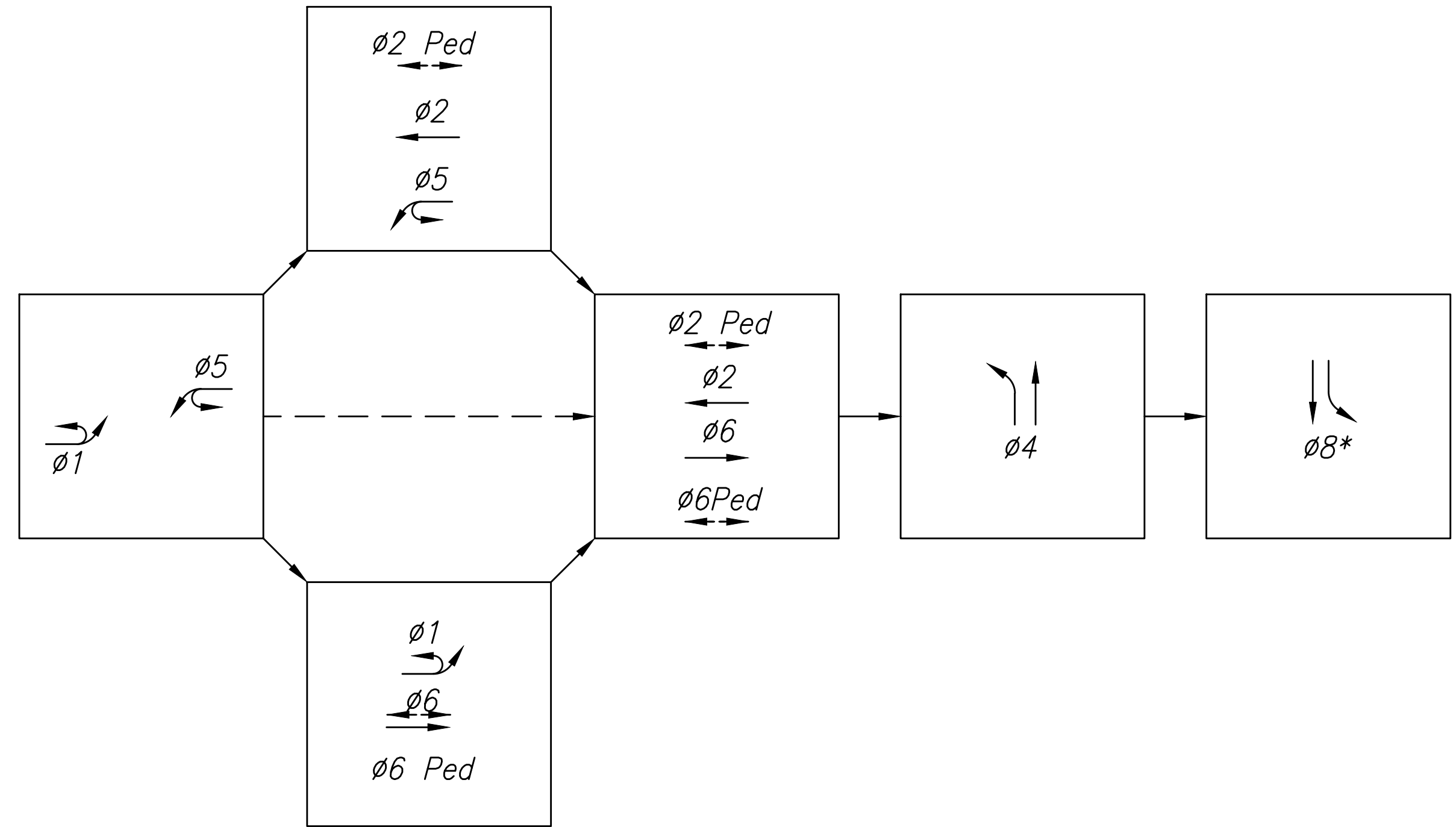


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	425 434	522 528



Controller Phase Assignment

Phase Plan



Phase Diagram

ORIGINAL PLAN	DATE
NOTE BOOK	
No.	

S:\Bpl\asfm - queen k widening\draw its sensor\425 Kaiminani Street.dwg 2/14/2017 1:22 PM

LEGEND FOR  
AS-BUILT POSTINGS

~~~~~

100.00

Roadway

Squiggly line for  
as-built deletion

Double line for  
as-built deletion

Text for as-built  
posting

BRYAN P. LOW

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No. 8569-C

HAWAII, U.S.A.

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Honolulu, Hawaii 96816

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

KAIMINANI STREET

TRAFFIC SIGNAL PHASING

QUEEN KAAHUMANU HIGHWAY WIDENING

Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)

Federal Aid Project No. NH-019-1(38)R

Scale: NOT TO SCALE Date: AUGUST 2016

SHEET No. 21 OF 43 SHEETS

"AS-BUILT"

Plotted: 3/8/2017 4:17 PM

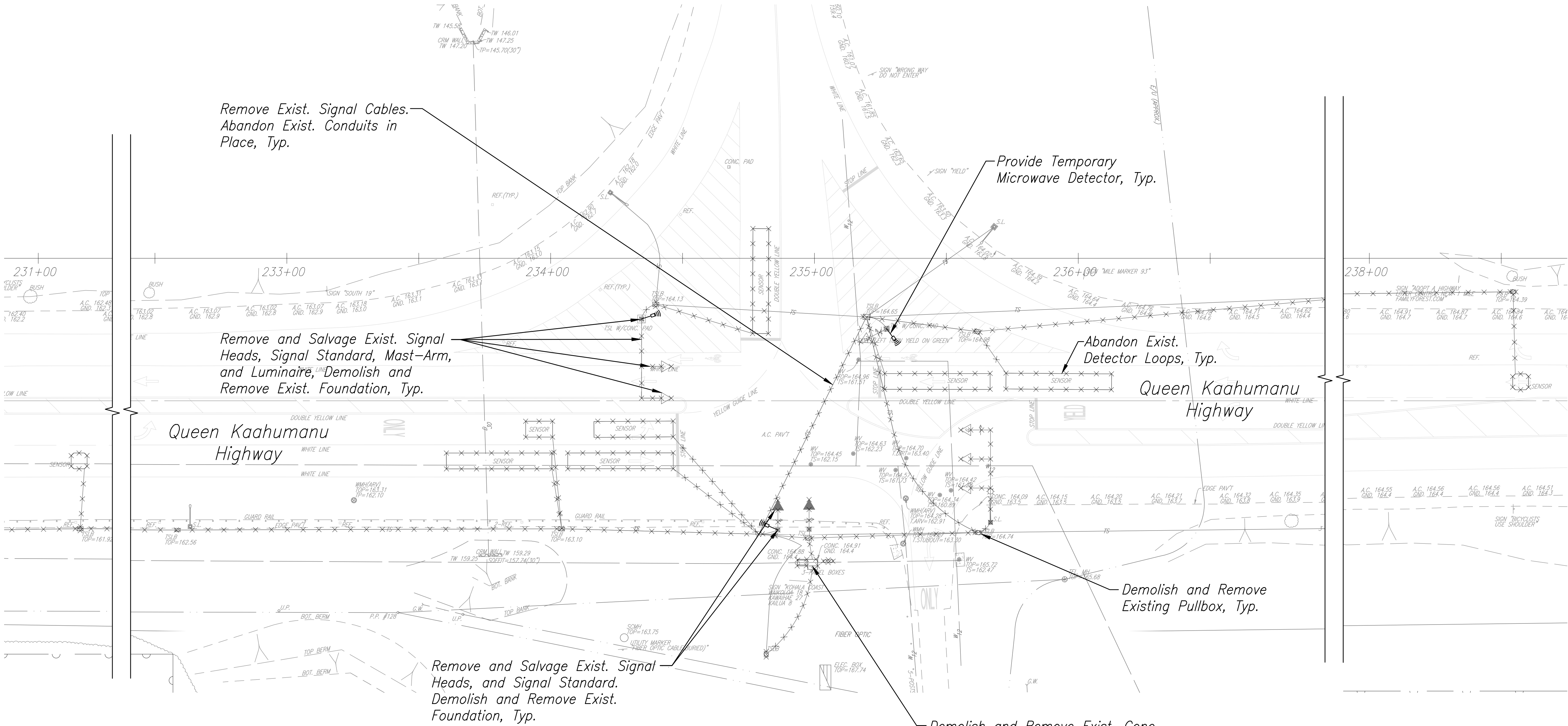
425 434



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | NH-019-1(38)R      | 2016        | 426       | 528          |

Keahole  
Airport  
Road

True North  
Scale: 1" = 20'



Notes:

- The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the New Signal Improvements are Installed and Activated.
- All Salvaged Signal Equipment Shall be Delivered to the County of Hawaii Department of Public Works, Traffic Division Storage Yard.
- See Sheet C.O. 427 for Final Signal System. See Sheet C.O. 428 for Schedule of Signal Equipment and Sheet 429 for Phasing Diagram.

KEAHOLE AIRPORT ROAD  
TRAFFIC SIGNAL DEMOLITION PLAN  
Scale: 1"=20'

| LEGEND FOR AS-BUILT POSTINGS |                                     |
|------------------------------|-------------------------------------|
|                              | Squiggly line for as-built deletion |
|                              | Double line for as-built deletion   |
| Roadway                      | Text for as-built posting           |

BRYAN P. LOW

LICENSED PROFESSIONAL ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

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1126 - 12TH Avenue

Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

KEAHOLE AIRPORT ROAD  
TRAFFIC SIGNAL DEMOLITION PLAN  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahoe Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=20'      Date: AUGUST 2016

SHEET No. 22 OF 43 SHEETS

|               |      |
|---------------|------|
| DESIGNED BY   | DATE |
| TRACED BY     |      |
| DESIGNED BY   |      |
| QUANTITIES BY |      |
| CHECKED BY    |      |
| ORIGINAL PLAN |      |
| NOTE BOOK     |      |
| No.           |      |

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"AS-BUILT"

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426 435



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO.    | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|--------------|--------------|
| HAWAII              | HAW.  | NH-019-1(38)R      | 2016        | C.O. 427 436 | 522 528      |

Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

Install Optical Receiver on Mast Arm

True North  
Scale: 1" = 20'

Install Ped Push Button on TSL  
New 24"x36" Pullbox, Typ.

Wireless Sensor, Typ.

Install Ped Push Button on TSL

2 New 24"x36" Pullboxes, Typ.

Install Optical Receiver on Mast Arm

Install Optical Receiver on Slipfitter

Install Controller Assembly (Type 170) and Auxiliary Equipment Including Optical Pre-emption Module in Model 332A Cabinet, on New Concrete Base.

Install Electric Meter on Pedestal and Uninterruptible Power Supply on Concrete Foundation. Provide All Necessary Pullbox, Conduit, Cables and Appurtenances. See Electrical Drawings for Details.

LEGEND FOR  
AS-BUILT POSTINGS

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway

Text for as-built posting

Notes:

- Only Final Traffic Signal System Shown.
- Only New Roadway and Striping Shown for Clarity. See Signage Plan for Sign Details.
- See Sheet C.O. 428 for Schedule of Signal Equipment and Sheet 429 for Phasing Diagram.
- The Traffic Signal System Shall Remain Operational at All Times During Construction. Existing Poles, Traffic Signal Lights, and Pedestrian Signal Heads May Be Removed Only After the Final Signal Is Activated.
- Near and far dilemma zone wireless sensors not shown along Keahole Airport Road. The Contractor shall furnish and install near and far dilemma zone wireless sensors along Kealhole Airport Road per details on Sheet 444S-3.

KEAHOLE AIRPORT ROAD  
TRAFFIC SIGNAL PLAN  
Scale: 1"=20'

BRYAN P. LOW

LICENSED PROFESSIONAL ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

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1126 - 12TH Avenue

Honolulu, Hawaii 96816

08/01/16  
01/22/16  
DATE

REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

KEAHOLE AIRPORT ROAD  
TRAFFIC SIGNAL PLAN  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealakehe Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=20' Date: AUGUST 2016

SHEET No. 23 OF 43 SHEETS

"AS-BUILT"

|               |      |
|---------------|------|
| DESIGNED BY   | DATE |
| CHECKED BY    |      |
| NOTED BY      |      |
| ORIGINAL PLAN |      |
| NOTE BOOK     |      |
| No.           |      |

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DATE: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_  
QUANTITIES BY: \_\_\_\_\_  
ORIGINAL PLAN: \_\_\_\_\_  
NOTE BOOK: \_\_\_\_\_  
No. \_\_\_\_\_

S:\Bpl\asfm - queen k widening\Draw Its sensor\C.O. 428 Keahole Airport Roadway 3/8/2017 12:03 PM

| Conduit/Cable Schedule |         |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
|------------------------|---------|--------------|------------|----------------|---------------------|-----------|-----------|--------------------|-----------|-------------|-----------|---------|------------------|---------|
| From                   | To      | Main Control |            | Signal Control |                     | Detectors |           | Interconnect       |           | Opticom     |           | Spare   | Concrete Encased | Remarks |
|                        |         | Conduit      | Conductor  | Conduit        | Conductor           | Conduit   | Conductor | Conduit            | Conductor | Conduit     | Conductor |         |                  |         |
|                        |         | 2" C         | 1-26/C #14 | 2" C           | 4/C-#14 Color Coded | 1" Ped    | 2" Ped    | 2/C-#14 Pedestrian | 2"C       | Fiber Optic | 2"C       | 3/C #20 |                  |         |
| Meter                  | Ups     |              |            |                |                     |           |           |                    |           |             |           |         |                  | *       |
| Ups                    | Control |              |            |                |                     |           |           |                    |           |             |           |         |                  | *       |
| Control                | PB1     | 2            | 2          |                |                     |           | 1         | 1                  | 1         | 1           | 3         | 6       |                  |         |
| PB1                    | PB2     | 1            | 1          |                |                     |           |           |                    | 1         | 1           | 1         | 7 **    | △Yes             |         |
| PB1                    | PB1A    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB1                    | D       |              |            | 1              | 1                   |           |           |                    |           | 1           | 1         | 1       |                  |         |
| PB1                    | E       |              |            | 1              | 2                   |           |           |                    |           |             |           | 1       |                  |         |
| PB1A                   | PB1B    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB1B                   | PB1C    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB1C                   | PB1D    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB2                    | PB3     | 1            | 1          |                |                     |           |           |                    | 1         | 1           | 1         | 7 **    | △Yes             |         |
| PB2                    | PB2A    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB3                    | PB4     | 1            | 1          |                |                     |           |           |                    |           |             |           | 9 ***   | △Yes             |         |
| PB3                    | PB3A    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB3                    | F       |              |            | 1              | 2                   |           |           |                    |           | 1           | 1         | 1       |                  | *       |
| PB4                    | PB5     | 1            | 1          |                |                     |           | 1         | 1                  |           |             |           | 9 ***   | △Yes             |         |
| PB4                    | G       |              |            | 1              | 3                   | 1         |           | 1                  |           |             |           | 1       | Yes              |         |
| PB5                    | PB6     | 1            | 1          |                |                     |           | 1         | 1                  |           |             |           | 6       | Yes              |         |
| PB5                    | PB5A    |              |            |                |                     |           |           |                    |           |             |           | 3 ***   | △Yes             |         |
| PB5                    | A       |              |            | 1              | 3                   | 1         |           | 1                  |           |             |           | 1       | Yes              |         |
| PB5A                   | PB5B    |              |            |                |                     |           |           |                    |           |             |           | 3 ***   | △                |         |
| PB5B                   | PB5C    |              |            |                |                     |           |           |                    |           |             |           | 3 ***   | △                |         |
| PB6                    | PB7     | 1            | 1          |                |                     |           | 1         | 1                  |           |             |           | 6       | Yes              |         |
| PB6                    | PB6A    |              |            |                |                     |           |           |                    |           |             |           |         |                  |         |
| PB6                    | B       |              |            | 1              | 1                   |           |           |                    |           |             |           | 1       |                  | *       |
| PB7                    | PB1     | 1            | 1          |                |                     |           | 1         | 1                  |           | 1           | 1         | 6       |                  |         |
| PB7                    | C       |              |            | 1              | 3                   |           |           |                    |           | 1           | 1         | 1       |                  | *       |

\* See Electrical Drawings for Street Light and Power Related Conduit and Cable Information

\*\* 1 Spare for ITS \*\*\* 3 Spares for ITS △

△

| Traffic Signal Head Schedule                      |                            |                                                    |                                              |                    |
|---------------------------------------------------|----------------------------|----------------------------------------------------|----------------------------------------------|--------------------|
| Traffic Signal Head Schedule                      |                            |                                                    |                                              |                    |
| Pole Letter-Signal Head-Signal Head Mounting Type | A-2-II<br>G-1-II<br>G-2-II | C-2-VI+<br>C-3-VI+<br>E-2-II<br>F-1-VI+<br>F-2-VI+ | A-1-II<br>B-1-V*<br>C-1-V<br>D-1-I<br>E-1-II | A-3-VII<br>G-3-VII |

Legend: R = Red Y = Yellow G = Green  
← = Arrow \* = Program Visibility Head + = Signal Head w/ Retroreflective Back Plate

Pole Letter Signal Head A-2-III Signal Head Mounting Type

| Pedestrian Push Button Schedule |                                  |
|---------------------------------|----------------------------------|
| North                           |                                  |
| Pole or PPB                     | Signs                            |
|                                 | (→) R10-4B (R)<br>(←) R10-4B (L) |
|                                 | (→) R10-4B (R)<br>(←) R10-4B (L) |

LEGEND FOR AS-BUILT POSTINGS

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Roadway Text for as-built posting

|          |                            |
|----------|----------------------------|
| 08/01/16 | △ Revised Conduits for ITS |
| 01/22/16 | △ Revised Signals          |
| DATE     | REVISION                   |

BRYAN P. LOW  
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No. 8569-C  
HAWAII, U.S.A.  
LICENSE EXPIRATION DATE 04/30/18  
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1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
KEAHOLE AIRPORT ROAD  
TRAFFIC SIGNAL SCHEDULE  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahoke Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: NOT TO SCALE Date: AUGUST 2016  
SHEET No. 24 OF 43 SHEETS

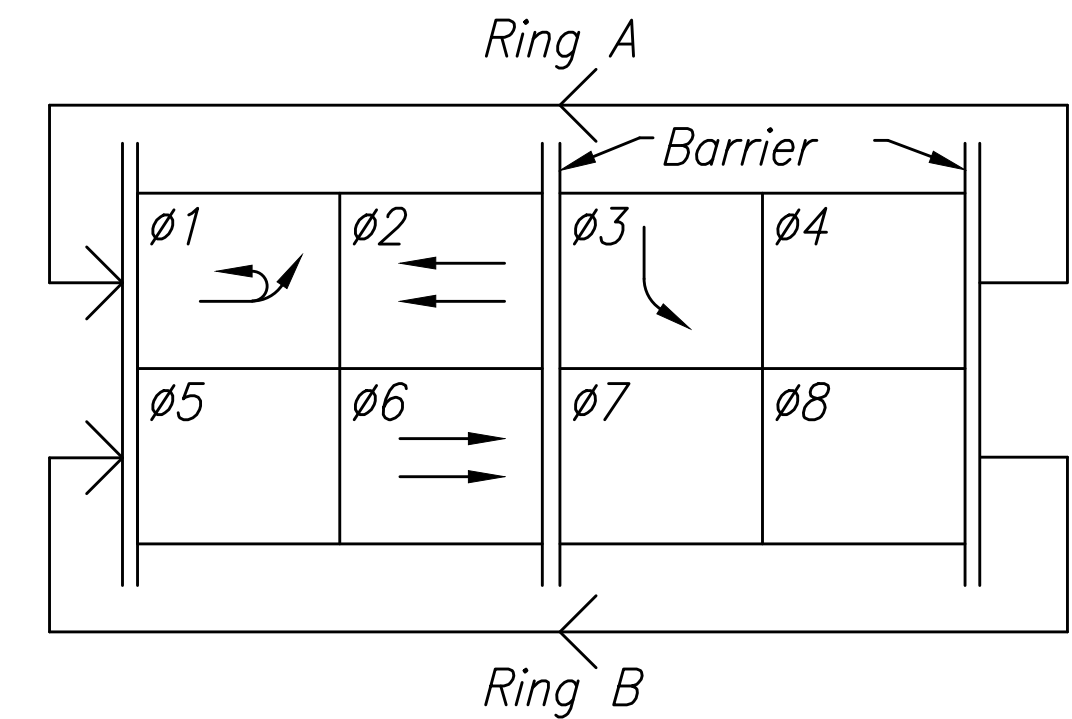
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Plotted: 3/8/2017 4:17 PM

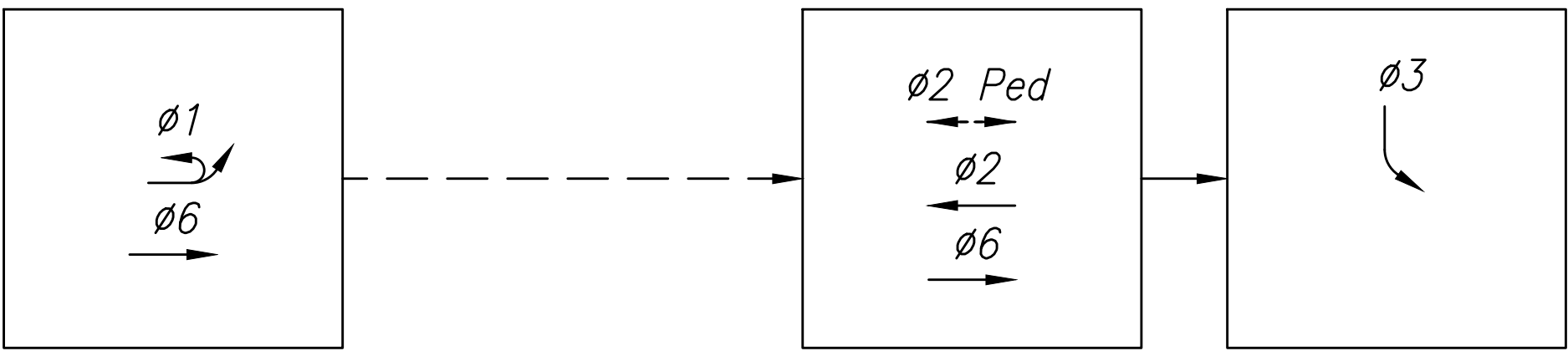
C.O. 428 437



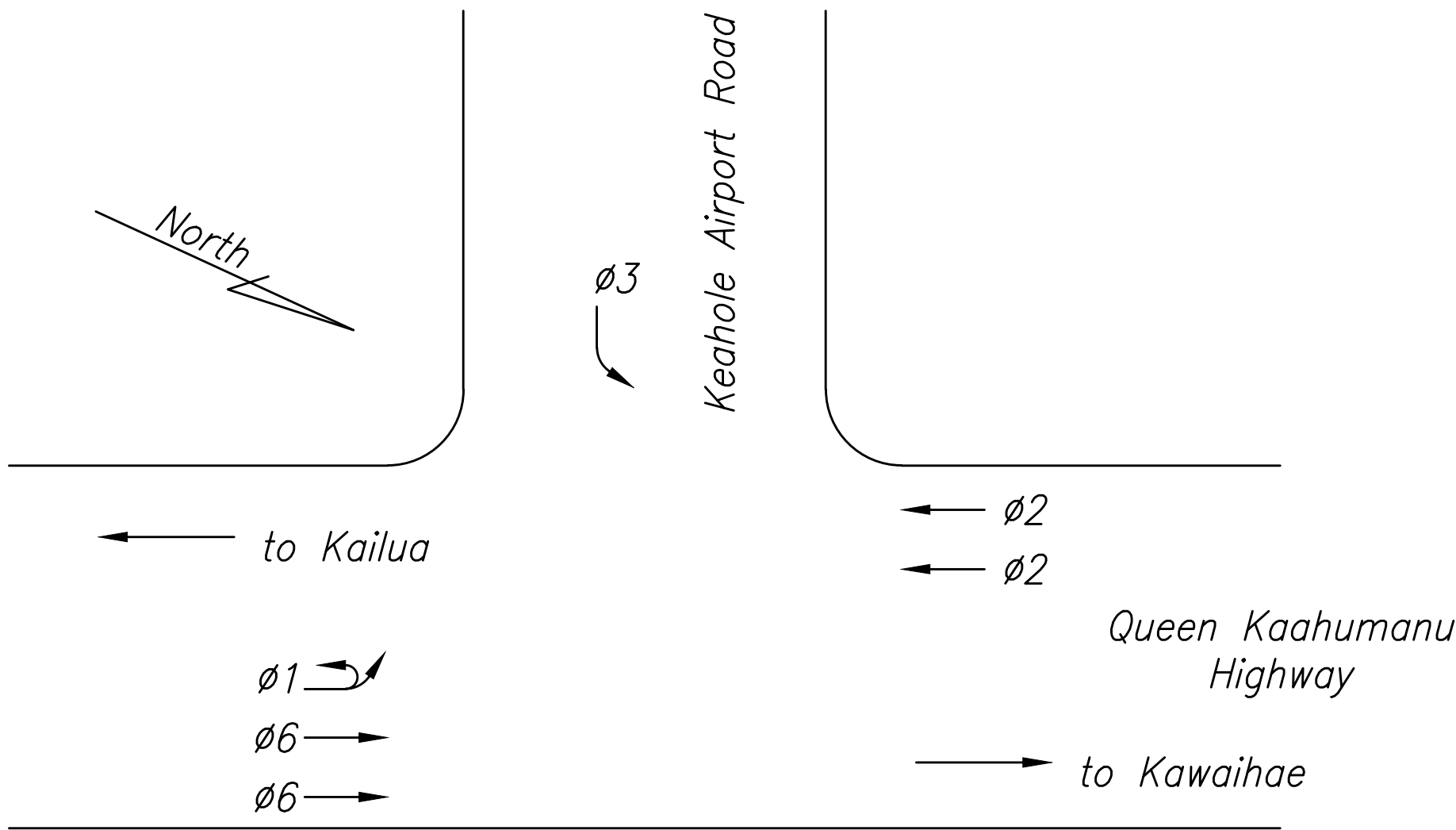
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|---------------------|-------|--------------------|-------------|------------|--------------|
| HAWAII              | HAW.  | NH-019-1(38)R      | 2016        | 429<br>438 | 522<br>528   |



Controller Phase Assignment



Phase Diagram



Phase Plan

|             |      |
|-------------|------|
| DESIGNED BY | DATE |
| DRAWN BY    |      |
| CHECKED BY  |      |
| NOTED BY    |      |
| REVISIONS   |      |
| 1           |      |
| 2           |      |
| 3           |      |
| 4           |      |
| 5           |      |
| 6           |      |
| 7           |      |
| 8           |      |
| 9           |      |
| 10          |      |

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LEGEND FOR  
AS-BUILT POSTINGS

~~~~~

100.00

Roadway

Squiggly line for as-built deletion

Double line for as-built deletion

Text for as-built posting

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LICENSED PROFESSIONAL ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

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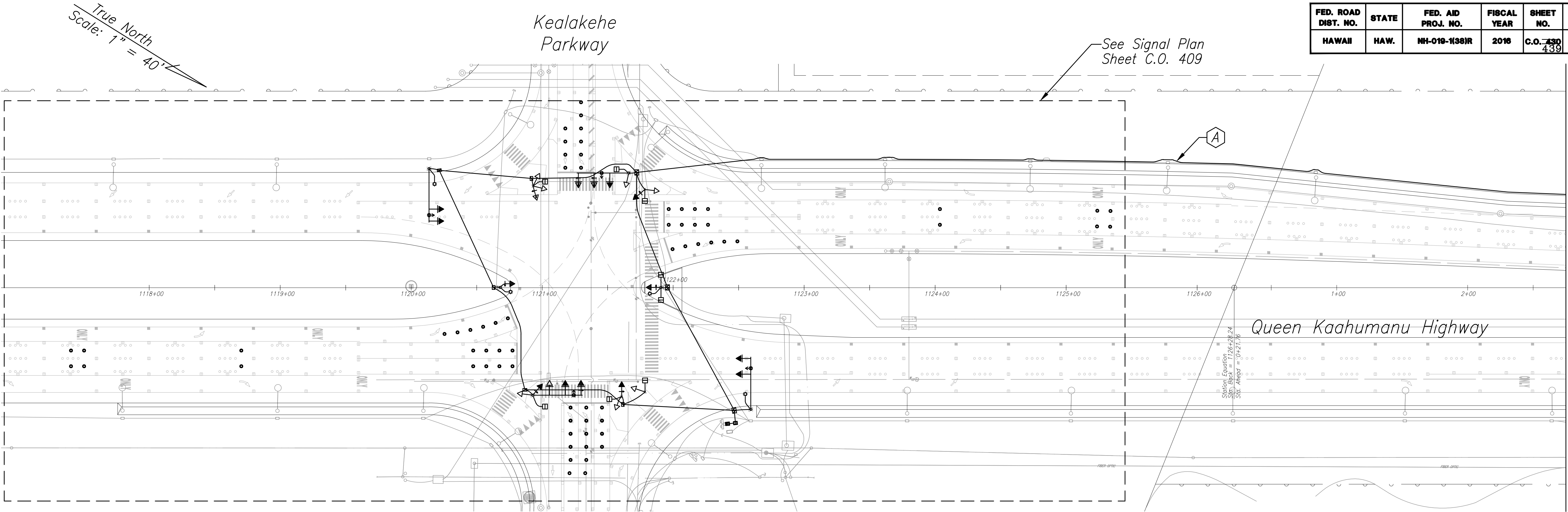
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

KEAHOLE AIRPORT ROAD  
TRAFFIC SIGNAL PHASING  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: NOT TO SCALE Date: AUGUST 2016

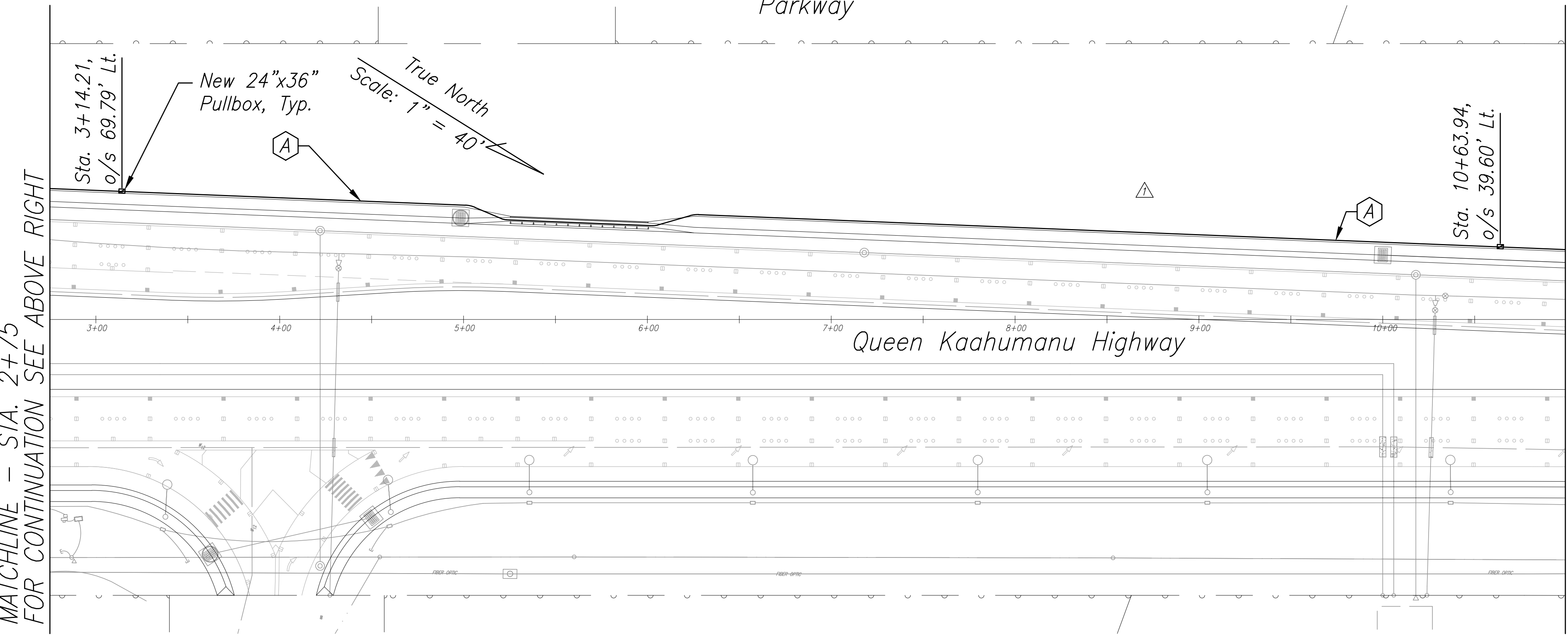
SHEET No. 25 OF 43 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 430 439	822 528



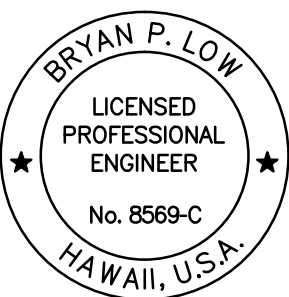
MATCHLINE - STA. 2+75  
FOR CONTINUATION SEE BELOW LEFT



**A** Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS),  $\triangle$  Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

**LEGEND FOR AS-BUILT POSTINGS**

- Squiggly line for as-built deletion
- Double line for as-built deletion
- Roadway Text for as-built posting



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1126 - 12TH Avenue  
Honolulu, Hawaii 96816

08/01/16	$\triangle$ Revised Conduits for ITS
01/22/16	$\triangle$ Revised Signals
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 1125+50 TO STA. 11+00**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealakehe Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

**SHEET No. 26 OF 43 SHEETS**

**SIGNAL INTERCONNECT PLAN**  
**STA. 1125+50 TO STA. 11+00**  
**Scale: 1"=40'**

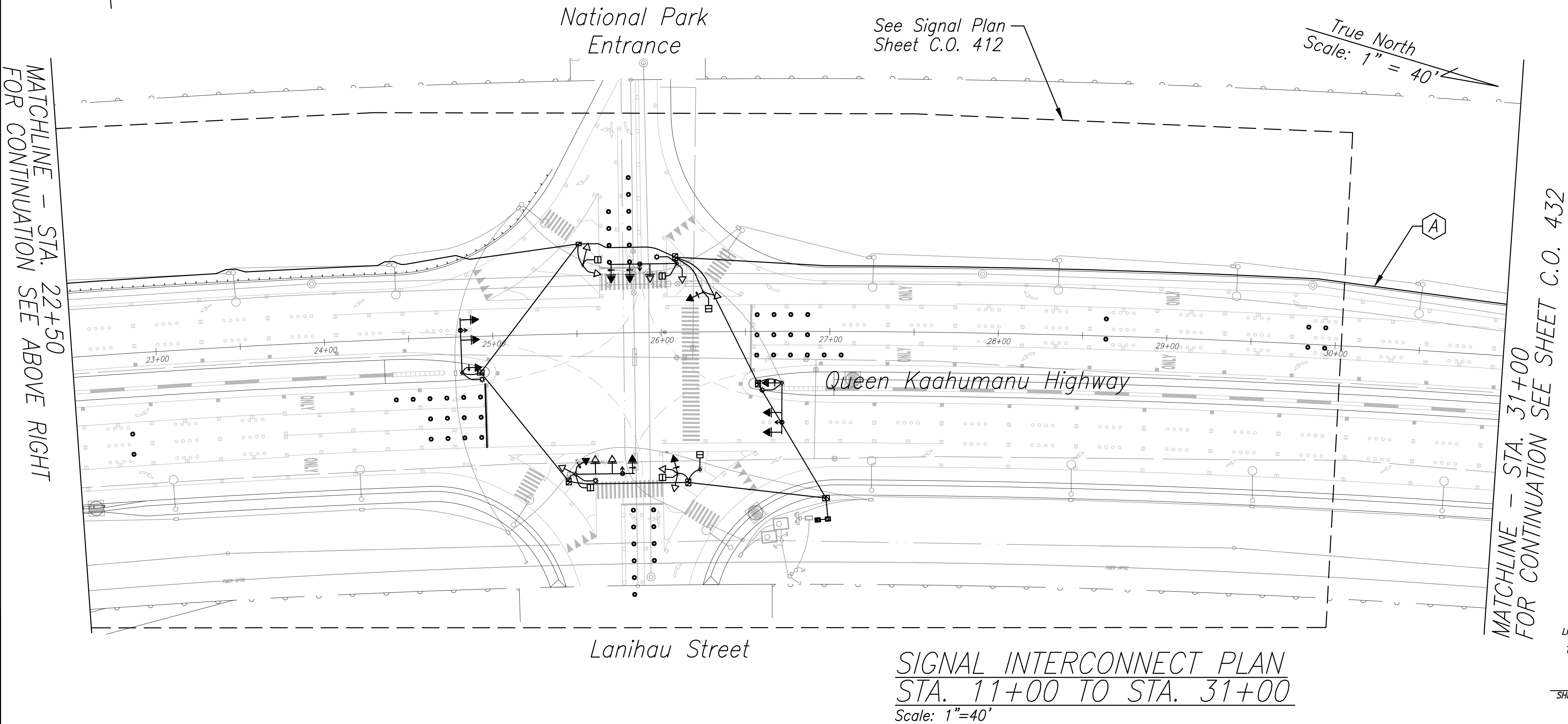
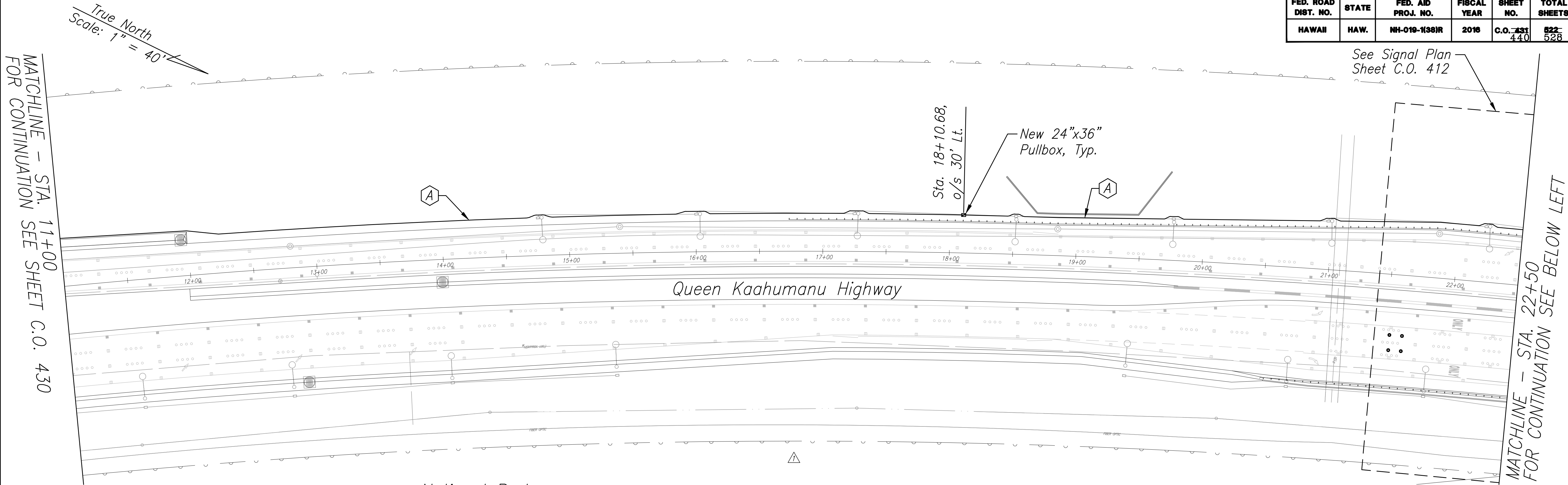
"AS-BUILT"

ORIGINAL PLAN	DATE
NOTE BOOK	
No.	

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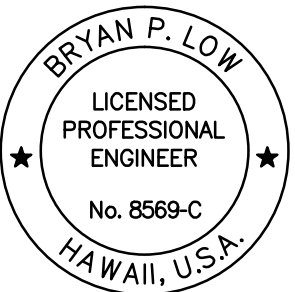
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 431 440	522 528



A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), △ Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

LEGEND FOR AS-BUILT POSTINGS	
~~~~~	Squiggly line for as-built deletion
==	Double line for as-built deletion
Roadway	Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18  
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1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
STA. 11+00 TO STA. 31+00  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: 1"=40' Date: AUGUST 2016

**SHEET No. 27 OF 43 SHEETS**

"AS-BUILT"

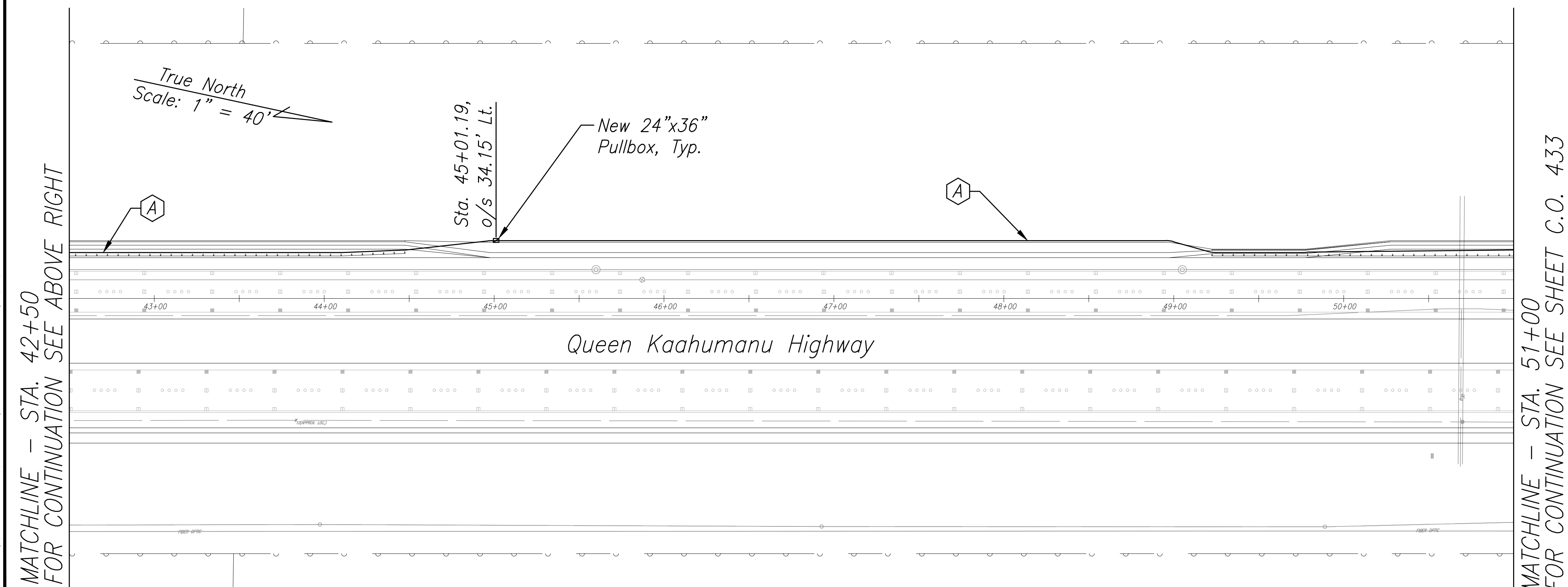
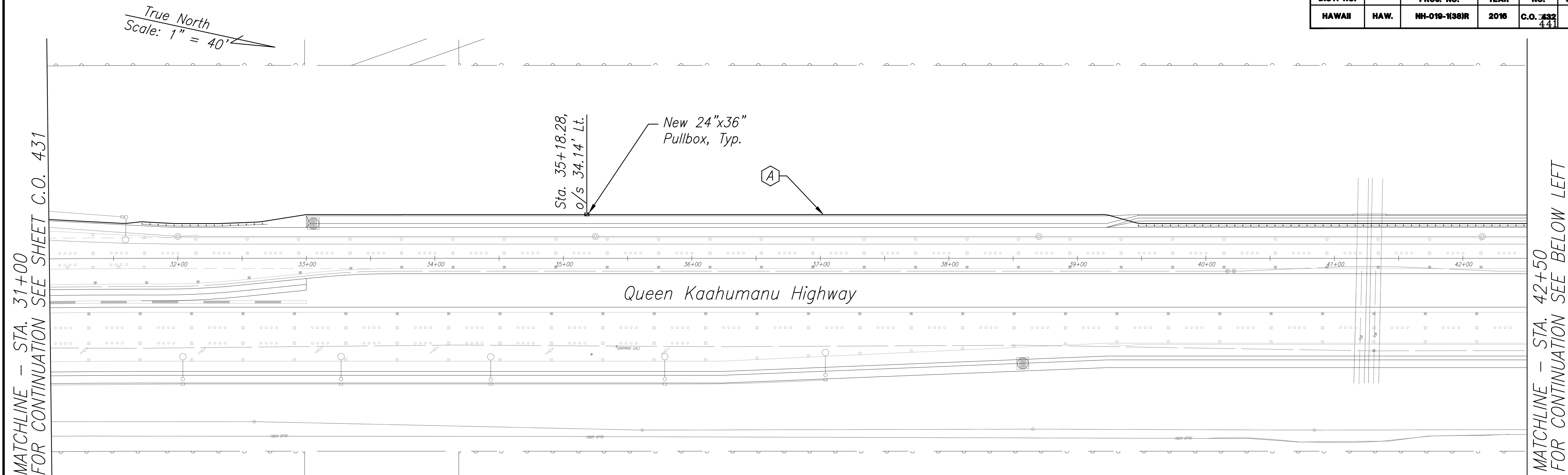
Plotted: 3/8/2017 4:18 PM **C.O. 431 440**


DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
IN CHARGE	_____
ORIGINAL PLAN	_____
NOTE BOOK	_____
No.	_____



S:\BPI\asfm - queen k widening\Draw Its sensor\C.O. 431 Signal Interconnect Plan.dwg 2/17/2017 2:23 PM



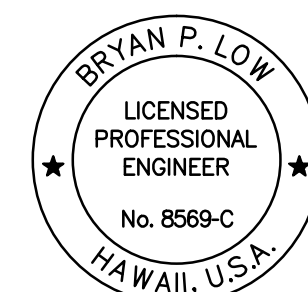
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 432 441	522 528



**A** Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS),  Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.


LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION

  
SHIMABUKURO, ENDO & YOSHIZAKI, INC.  
1126 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

SIGNAL INTERCONNECT PLAN  
STA. 31+00 TO STA. 51+00  
QUEEN KAAHUMANU HIGHWAY WIDENING

Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
 Scale: 1"=40' Date: AUGUST 2016

**SHEET No. 28 OF 43 SHEETS**

SIGNAL INTERCONNECT PLAN  
STA. 31+00 TO STA. 51+00  
Scale: 1"=40'

"AS-BUILT"

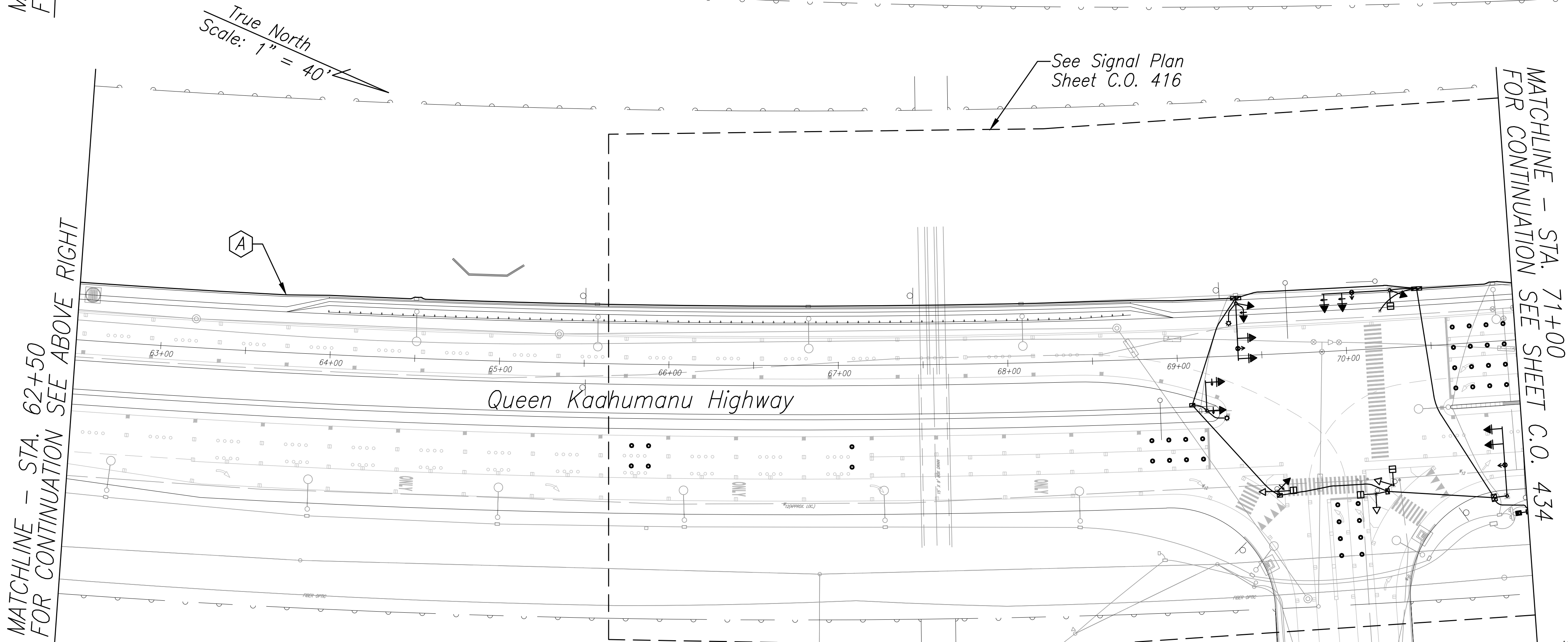
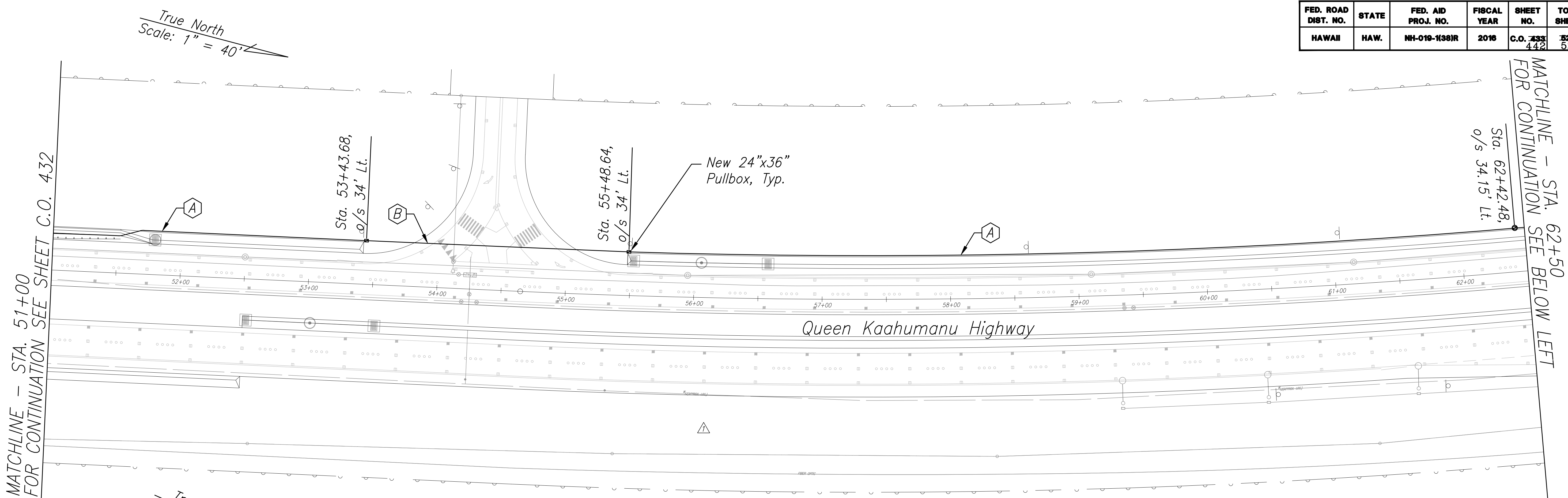
Plotted: 3/8/2017 4:18 PM **C.O. ~~432~~ 441**

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

S:\Bpl\ssfm - queen k widening\draw ils sensor\C.O. 432 Signal Interconnect Plan.dwg 2/17/2017 2:27 PM



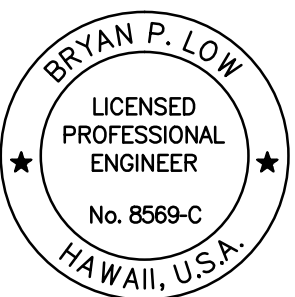
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 433 442	522 528



LEGEND FOR AS-BUILT POSTINGS

- ~~~~~ Squiggly line for as-built deletion  
~~100.00~~ Double line for as-built deletion  
Roadway Text for as-built posting
- A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC, Sch. 80 Conduits (for ITS). Cable Shall be Continuous between Controllers without Splices.
- B Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 40 Concrete Encased Conduit w/ 3 Spare 2" PVC, Sch. 40 Concrete Encased Conduits (for ITS). Cable Shall be Continuous between Controllers without Splices.

08/01/16	Revised Conduits for ITS
01/22/16	Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
SHIMBUBURO, ENDO & YOSHIZAKI, INC.  
1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 51+00 TO STA. 71+00**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

**SHEET No. 29 OF 43 SHEETS**

**SIGNAL INTERCONNECT PLAN**  
**STA. 51+00 TO STA. 71+00**  
Scale: 1"=40'

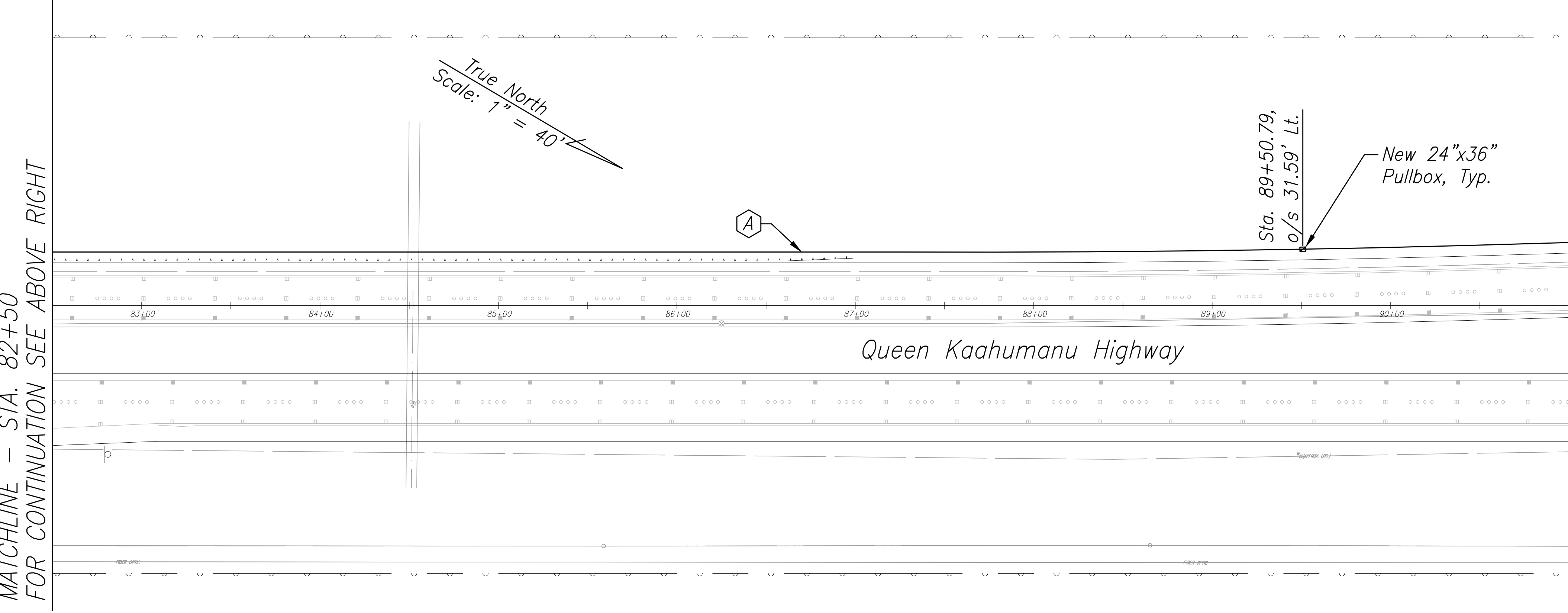
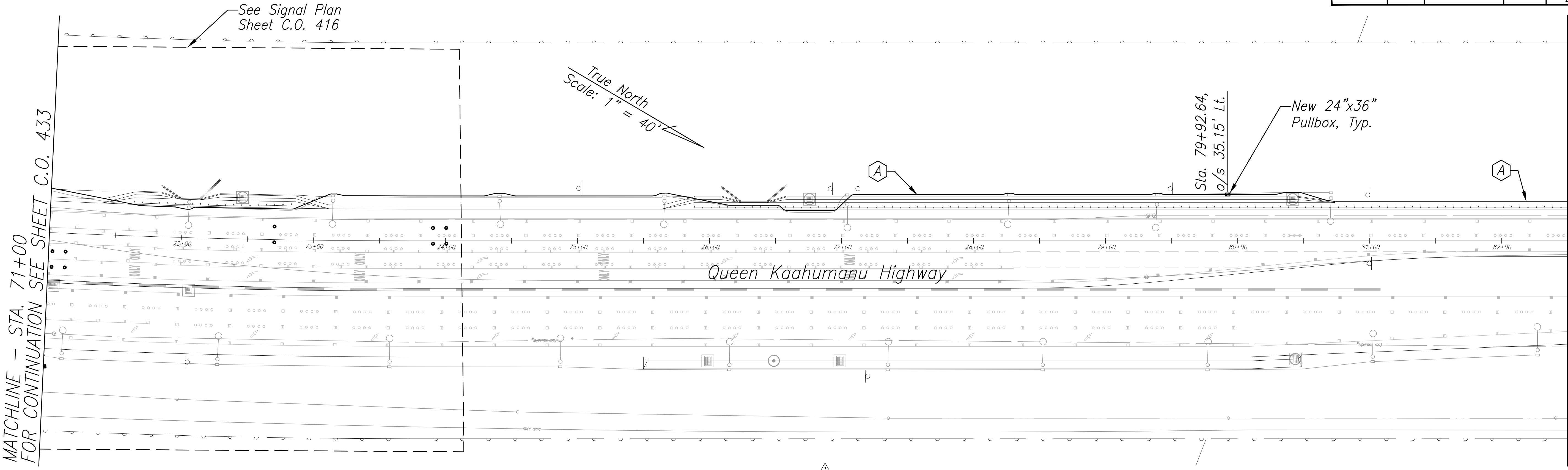
"AS-BUILT"

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
DATE	

S:\BPI\asbim - queen k widening\Draw Its sensor\C.O. 433 Signal Interconnect Plan.dwg 2/17/2017 2:34 PM



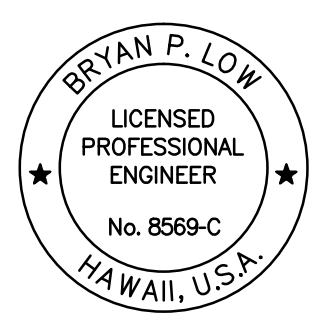
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 434 443	822 528



A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), △ Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

LEGEND FOR AS-BUILT POSTINGS	
~~~~~	Squiggly line for as-built deletion
<del>100.00</del>	Double line for as-built deletion
Roadway	Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SHIMIZUKI, ENDO & YOSHIZAKI, INC.  
1126 Kalia Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 71+00 TO STA. 91+00**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40'      Date: AUGUST 2016**

SHEET No. 30 OF 43 SHEETS

**SIGNAL INTERCONNECT PLAN**  
**STA. 71+00 TO STA. 91+00**  
Scale: 1"=40'

"AS-BUILT"

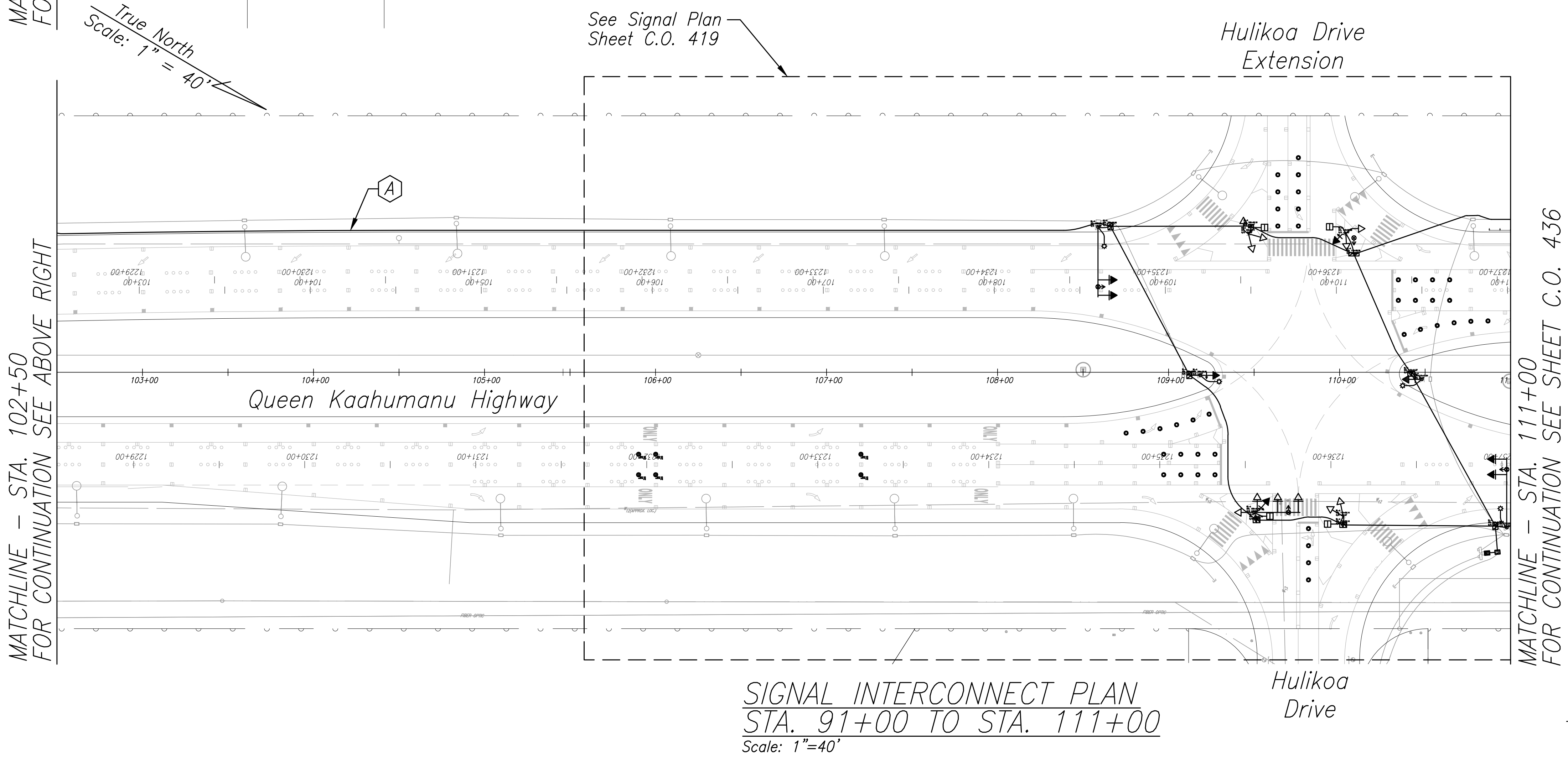
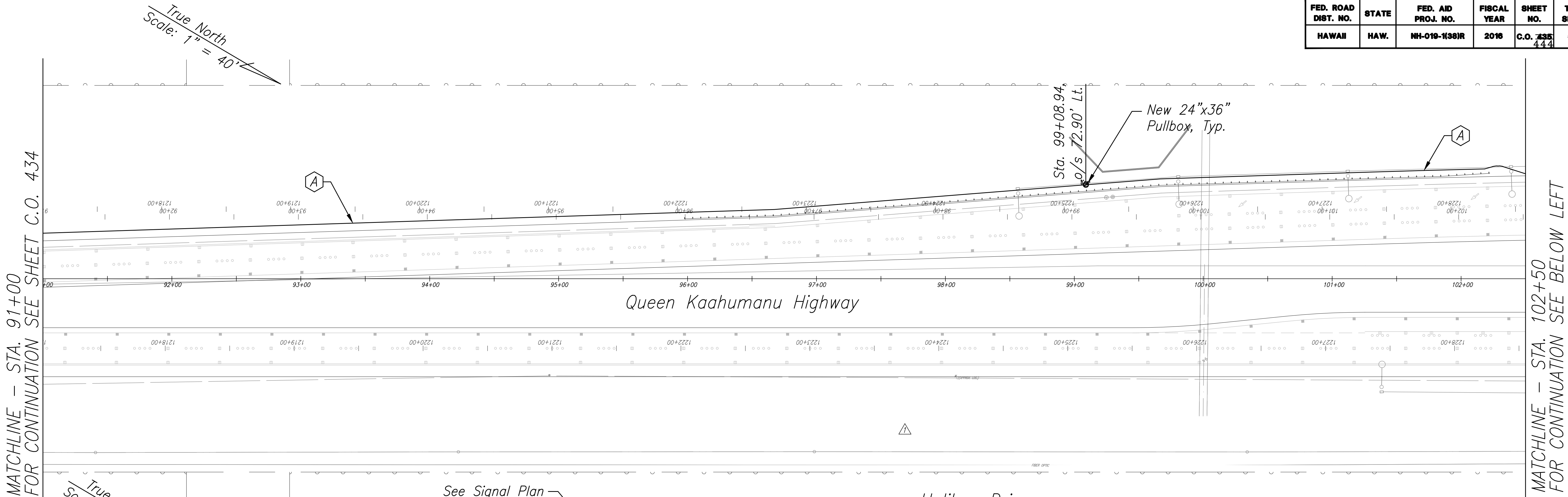
Plotted: 3/8/2017 4:18 PM **C.O. 434 443**

ORIGINAL PLAN	DATE
NOTED BY	
DESIGNED BY	
CHECKED BY	

S:\Bp\asb\asb - queen k widening\Draw Its sensor\C.O. 434 Signal Interconnect Plan.dwg 2/17/2017 2:43 PM



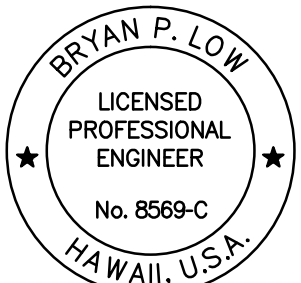
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 435 444	522 528



A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), △ Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
	Roadway Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
SHIMIZUKI, ENDO & YOSHIZAKI, INC.  
1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 91+00 TO STA. 111+00**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

**SHEET No. 31 OF 43 SHEETS**

DESIGNED BY	DATE
CHECKED BY	
NOTED BY	
NO.	

S:\Bpl\asfm - queen k widening\Draw Its sensor\C.O. 435 Signal Interconnect Plan.dwg 2/17/2017 2:47 PM

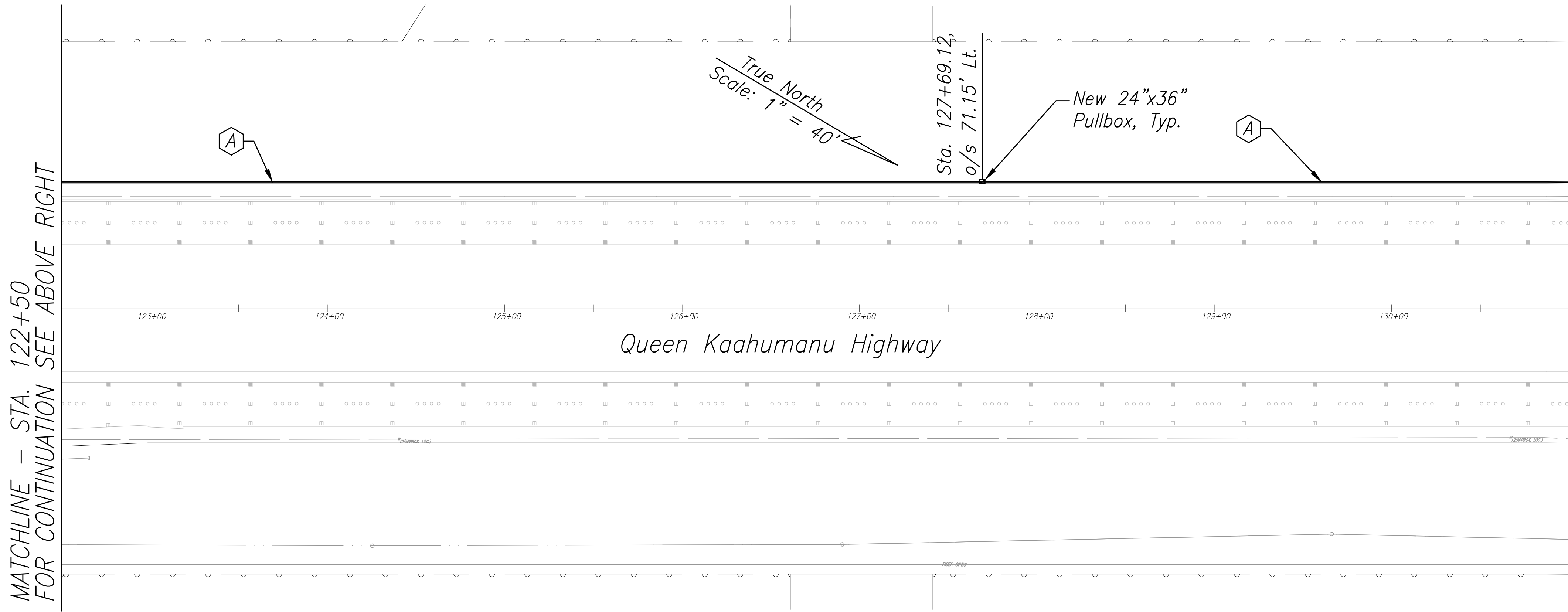
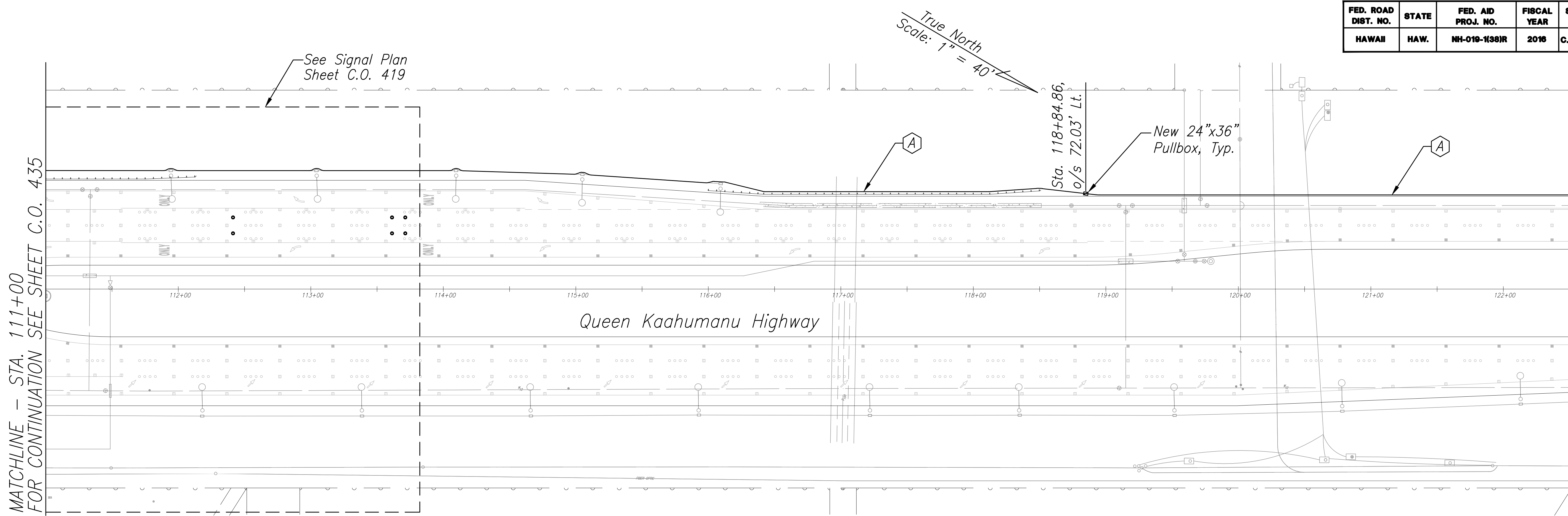
"AS-BUILT"

Plotted: 3/8/2017 4:18 PM

C.O. 435 444



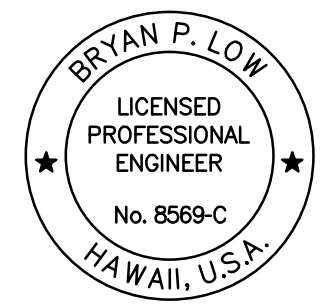
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 436 445	522 528



A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), A Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

08/01/16	A Revised Conduits for ITS
01/22/16	A Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
SHIMBUBURO, ENDO & YOSHIZAKI, INC.  
1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 111+00 TO STA. 131+00**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

**SHEET No. 32 OF 43 SHEETS**

**SIGNAL INTERCONNECT PLAN**  
**STA. 111+00 TO STA. 131+00**  
**Scale: 1"=40'**

"AS-BUILT"

ORIGINAL PLAN	DATE
NOTED BY	
DESIGNED BY	
CHECKED BY	

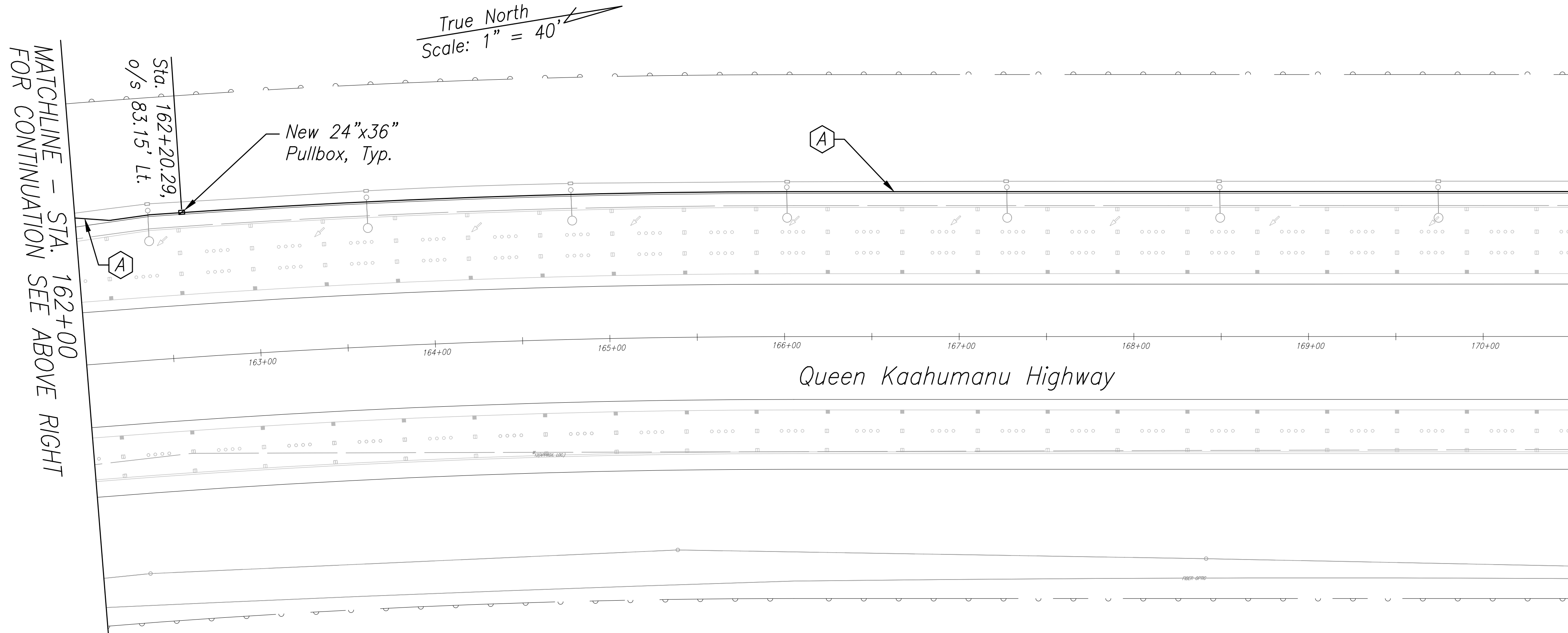
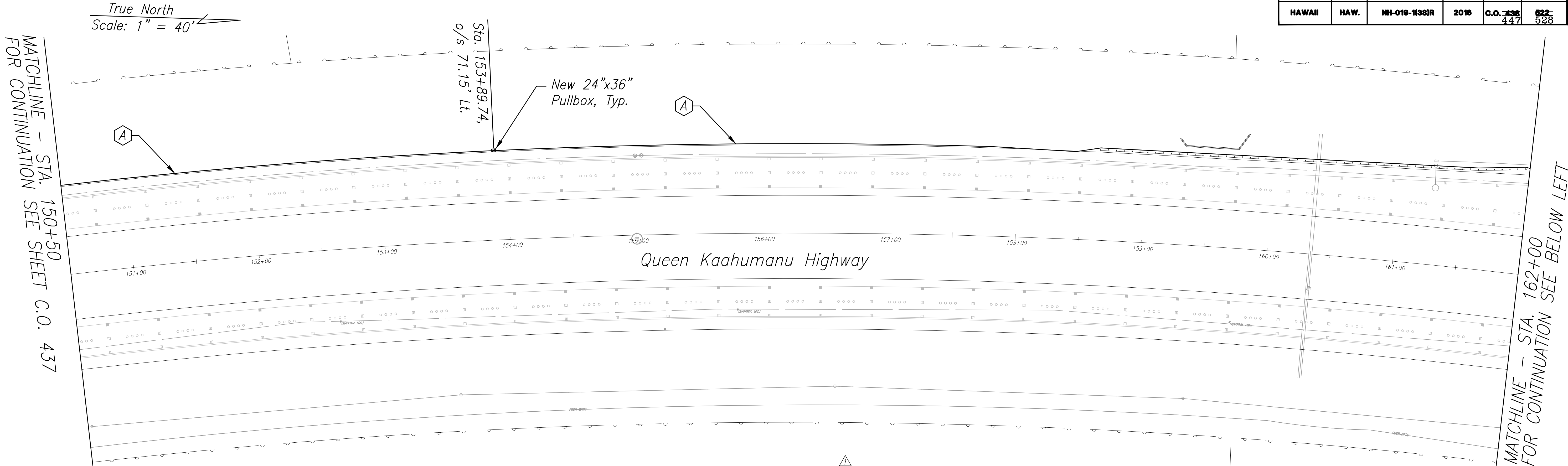
S:\Bpl\asbplm - queen k widening\Draw Its sensor\C.O. 436 Signal Interconnect Plan.dwg 2/17/2017 2:56 PM







FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 438 447	522 528



A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), △ Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
SHIMABUKURO, ENDO & YOSHIZAKI, INC.  
1126 - 12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 150+50 TO STA. 170+50**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

**SHEET No. 34 OF 43 SHEETS**

**SIGNAL INTERCONNECT PLAN**  
**STA. 150+50 TO STA. 170+50**  
**Scale: 1"=40'**

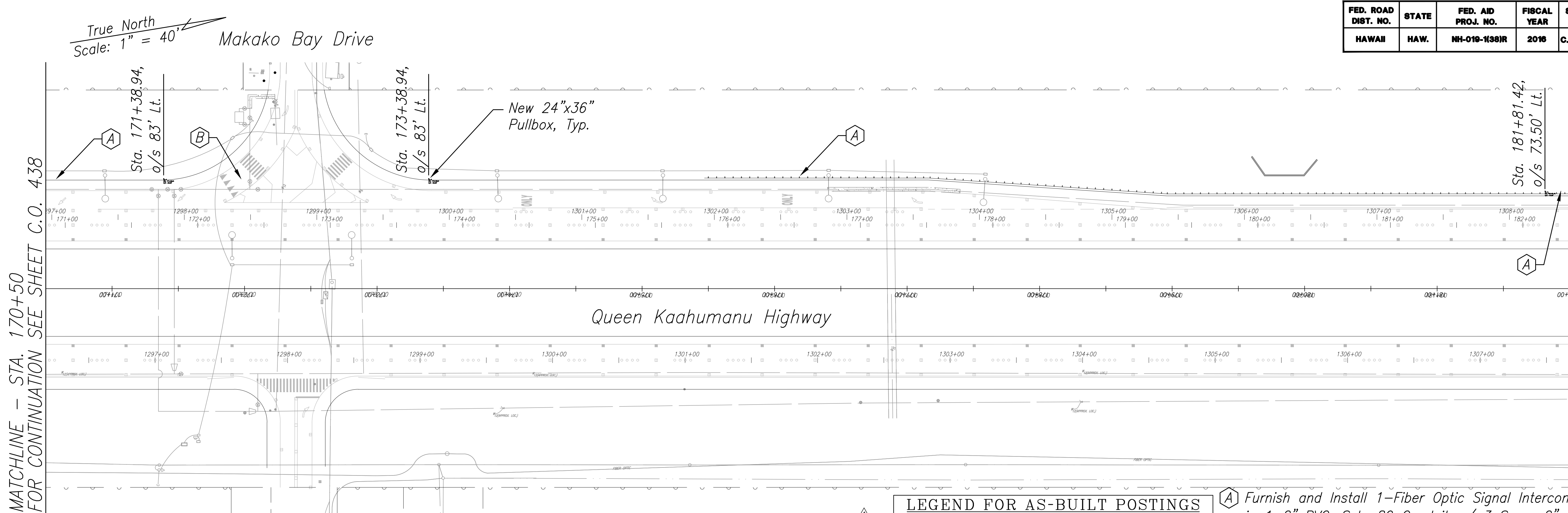
"AS-BUILT"

DATE	_____
DESIGNED BY	_____
DRAWN BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTE BOOK	_____
No.	_____

S:\Bpl\asbplm - queen k widening\Draw Its sensor\C.O. 438 Signal Interconnect Plan.dwg 2/17/2017 3:16 PM

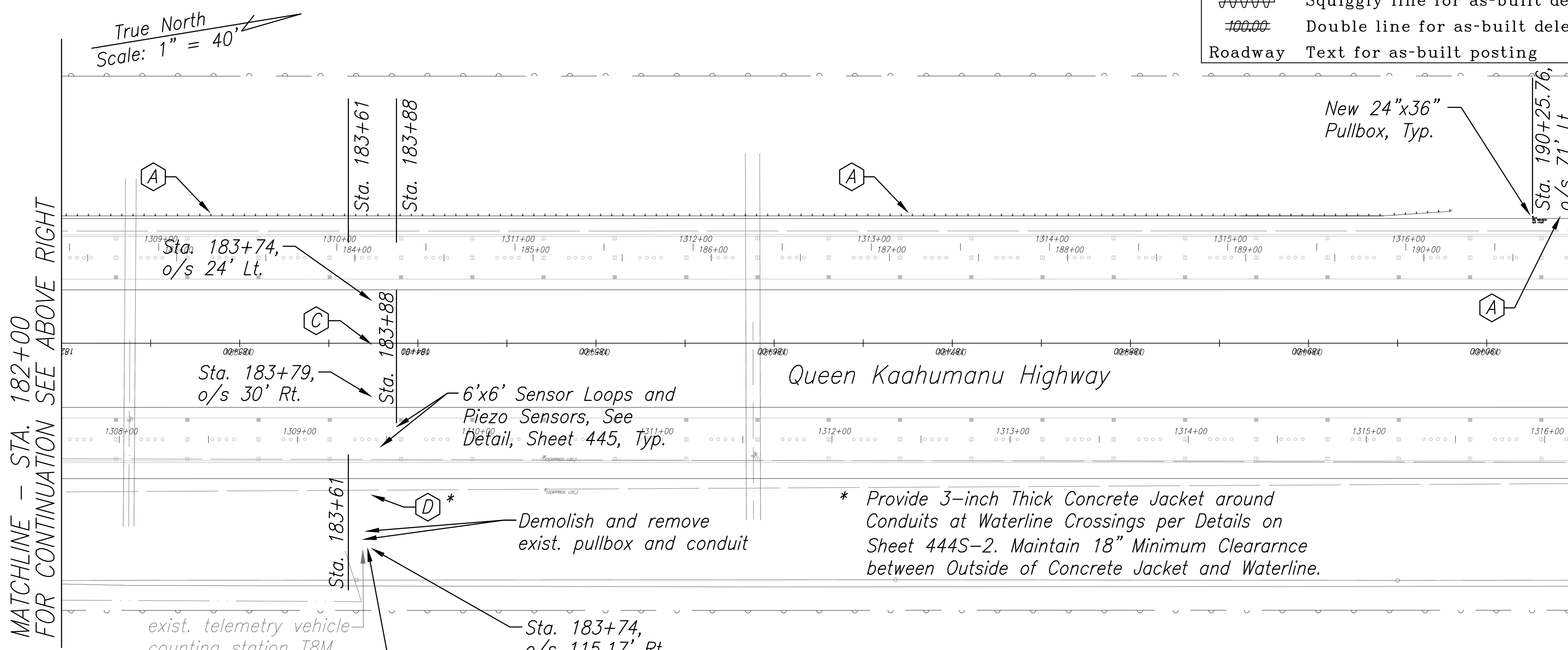


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 439 448	822 528



LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

- A** Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC, Sch. 80 Conduits (for ITS). Cable Shall be Continuous between Controllers without Splices.
- B** Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 40 Concrete Encased Conduit w/ 3 Spare 2" PVC, Sch. 40 Concrete Encased Conduits (for ITS). Cable Shall be Continuous between Controllers without Splices.
- C** Furnish and Install 1-2" PVC, Sch. 80 Conduit, 4 Piezo Sensor Lead Cables and 4 Sensor Loop Cables.
- D** \*Furnish and Install 2-2" PVC, Sch. 40 Concrete Encased Conduits, 8 Piezo Sensor Lead Cables, 8 Sensor Loop Cables and 1 In-Road Temperature Sensor Cable.
- E** Furnish and Install 2-2" PVC, Sch. 80 Conduits, 8 Piezo Sensor Lead Cables, 8 Sensor Loop Cables and 1 In-Road Temperature Sensor Cable. Tie into New 2-2" LB Type Connector or NEMA 4X Stainless Steel Junction Box Mounted on Side of Exist. Cabinet. Connect Lead-ins to Terminal Block in Existing Vehicle Counting Station Cabinet T8M.



\* Provide 3-inch Thick Concrete Jacket around Conduits at Waterline Crossings per Details on Sheet 444S-2. Maintain 18" Minimum Cleararnce between Outside of Concrete Jacket and Waterline.

Demolish and remove exist. pullbox and conduit

Sta. 183+74, o/s 115.17' Rt.

Note:  
See Sheet 445 for Vehicle Traffic Counting System Details

SIGNAL INTERCONNECT PLAN  
STA. 170+50 TO STA. 190+50  
Scale: 1"=40'

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SHIMABUKURO, ENDO & YOSHIZAKI, INC.  
1126 SOUTH AVENUE  
Honolulu, Hawaii 96816

08/01/16	Revised Conduits for ITS
01/22/16	Revised Signals
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 170+50 TO STA. 190+50**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

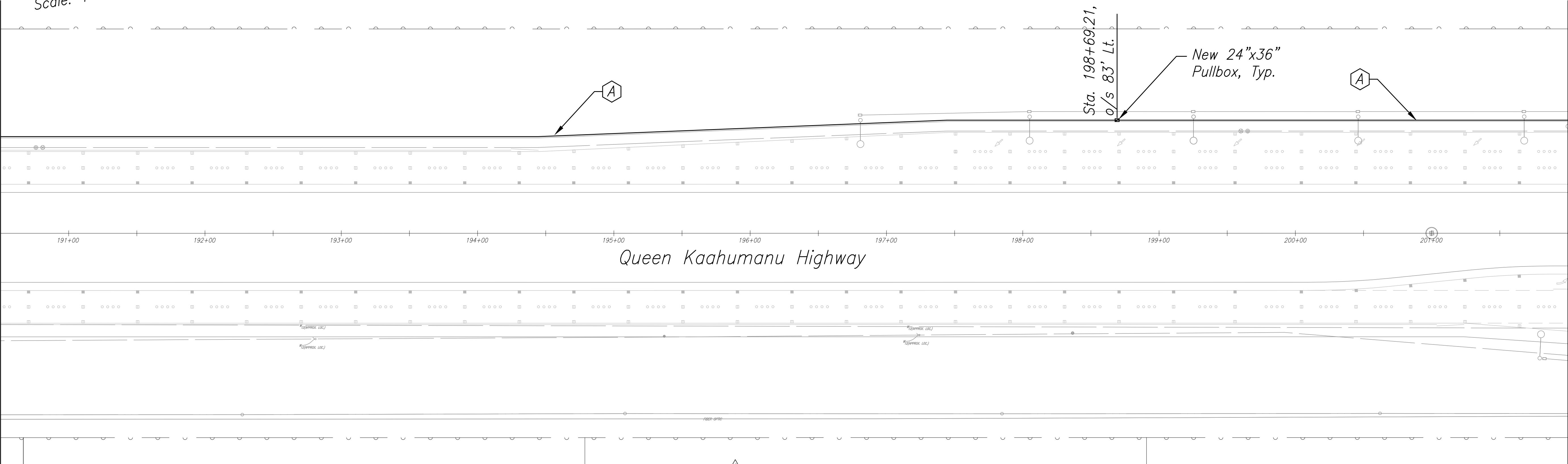
**SHEET No. 35 OF 43 SHEETS**



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 440 449	522 528

True North  
Scale: 1" = 40'

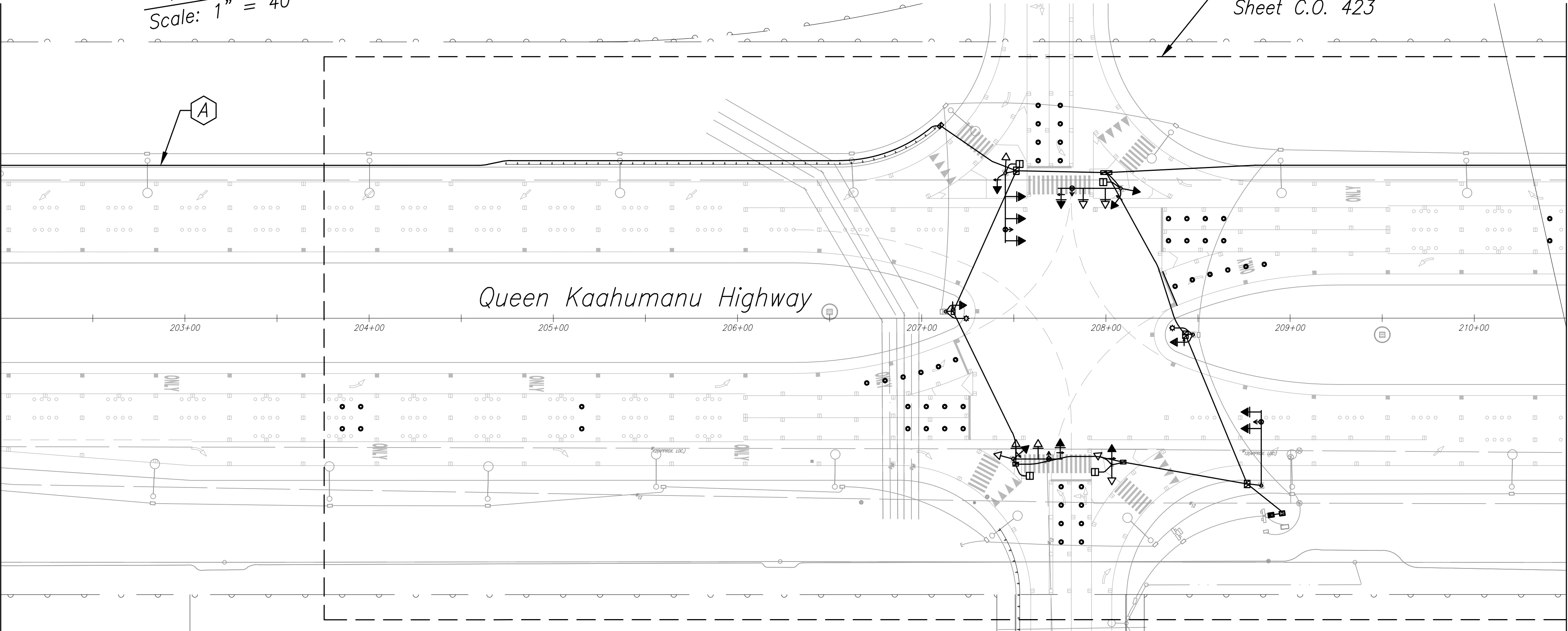
MATCHLINE - STA. 190+50  
FOR CONTINUATION SEE SHEET C.O. 439



MATCHLINE - STA. 202+00  
FOR CONTINUATION SEE BELOW LEFT

True North  
Scale: 1" = 40'

MATCHLINE - STA. 202+00  
FOR CONTINUATION SEE ABOVE RIGHT

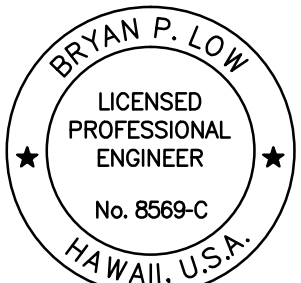


A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), △ Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

#### LEGEND FOR AS-BUILT POSTINGS

- ~~~~~ Squiggly line for as-built deletion
- ~~100.00~~ Double line for as-built deletion
- Roadway Text for as-built posting

08/01/16	△ Revised Conduits for ITS
01/22/16	△ Revised Signals
DATE	REVISION



LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SHIMBUNAKI, ENDO & YOSHIZAKI, INC.  
1126 KITA Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SIGNAL INTERCONNECT PLAN**  
**STA. 190+50 TO STA. 210+50**  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**Kealahoe Pkwy. To Keahole Airport Rd. (Ph. 2)**  
**Federal Aid Project No. NH-019-1(38)R**  
**Scale: 1"=40' Date: AUGUST 2016**

**SHEET No. 36 OF 43 SHEETS**

**SIGNAL INTERCONNECT PLAN**  
**STA. 190+50 TO STA. 210+50**  
Scale: 1"=40'

Kaiminani Street

MATCHLINE - STA. 210+50  
FOR CONTINUATION SEE SHEET C.O. 441

"AS-BUILT"

Plotted: 3/8/2017 4:19 PM

C.O. 440 449

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
NOTED BY	
CHECKED BY	

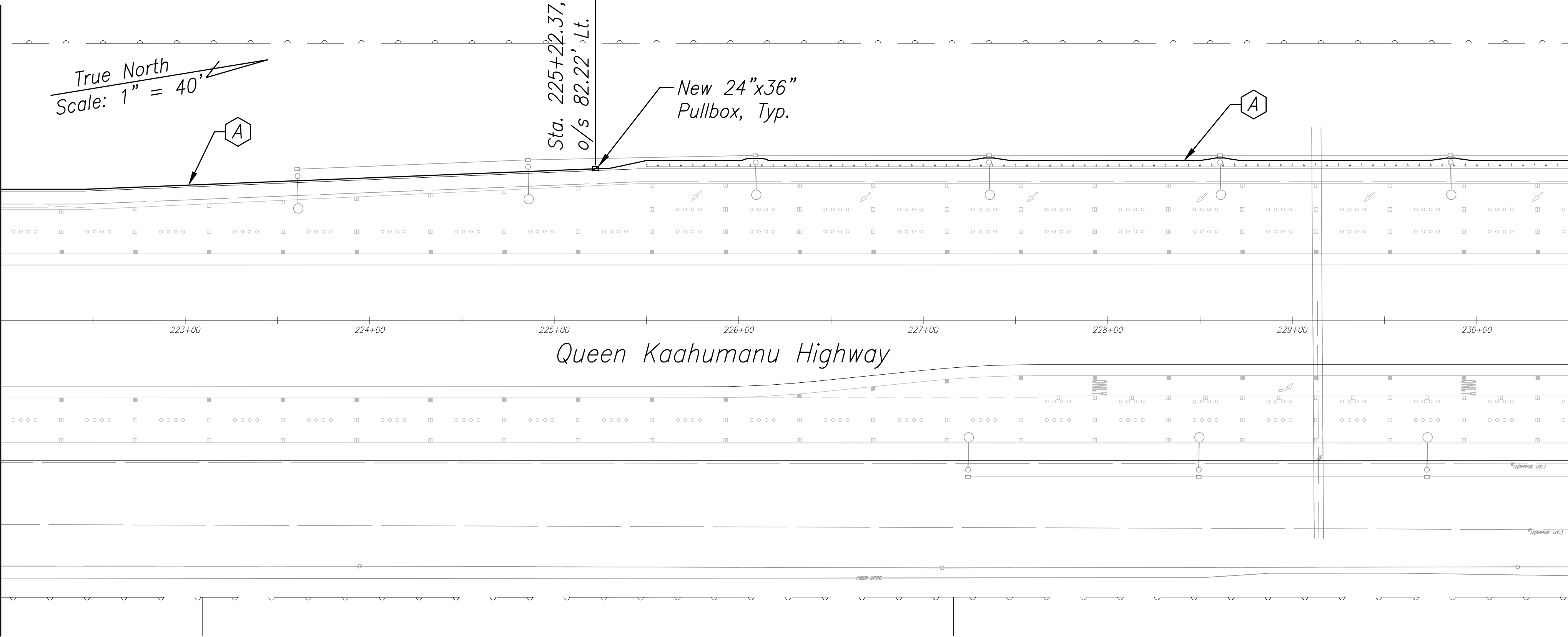
S:\Bpl\asfm - queen k widening\Draw Its sensor\C.O. 440 Signal Interconnect Plan.dwg 2/17/2017 3:22 PM



DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
NO.	

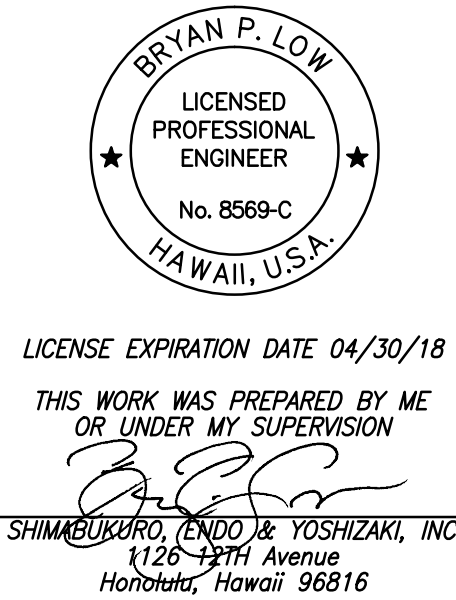
S:\B01\asfm - queen k widening\Draw Its sensor\C.O. 441 Signal Interconnect Plan.dwg 2/17/2017 3:28 PM

MATCHLINE - STA. 210+50  
FOR CONTINUATION SEE SHEET C.O. 440



MATCHLINE - STA. 230+50  
FOR CONTINUATION SEE SHEET C.O. 442

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
	Roadway Text for as-built posting



08/01/16	Revised Conduits for ITS
01/22/16	Added Sheet
DATE	REVISION

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>SIGNAL INTERCONNECT PLAN</b>	
<b>STA. 210+50 TO STA. 230+50</b>	
<b>QUEEN KAAHUMANU HIGHWAY WIDENING</b>	
<b>Kealahoe Pkwy. To Keahole Airport Rd. (Ph. 2)</b>	
<b>Federal Aid Project No. NH-019-1(38)R</b>	
Scale: 1"=40'	Date: AUGUST 2016
<b>SHEET No. 37 OF 43 SHEETS</b>	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 441 450	522 528

MATCHLINE - STA. 222+00  
FOR CONTINUATION SEE BELOW LEFT

SIGNAL INTERCONNECT PLAN  
STA. 210+50 TO STA. 230+50  
Scale: 1"=40'

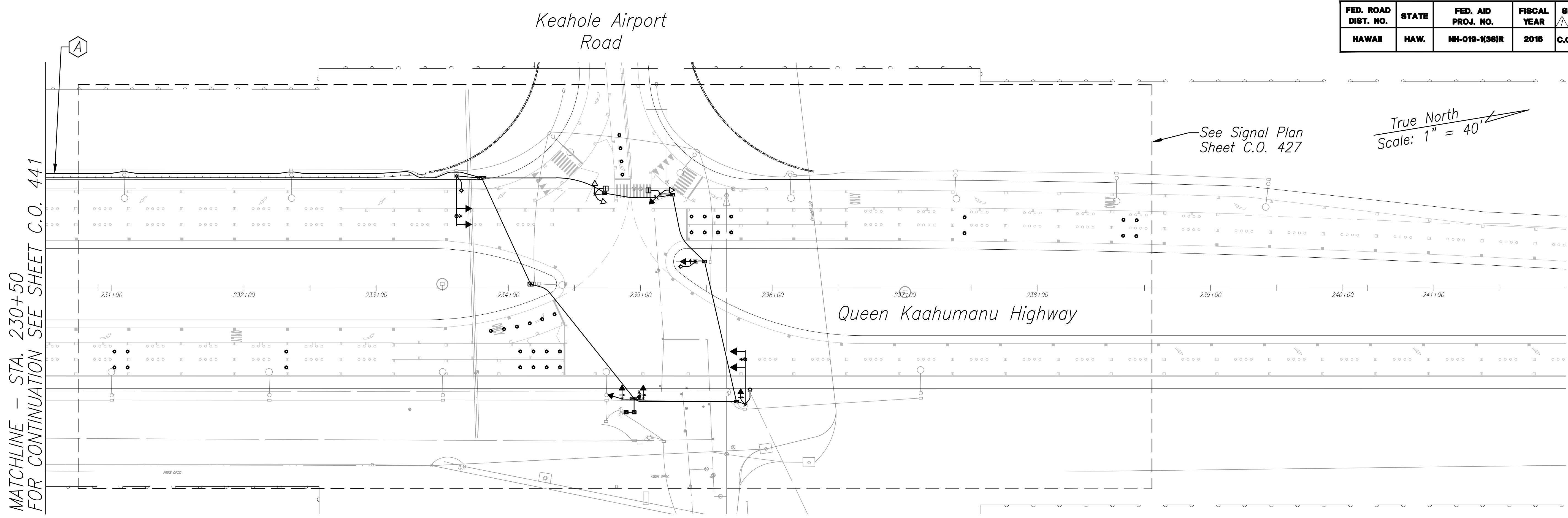
"AS-BUILT"

Plotted: 3/8/2017 4:19 PM

C.O. 441 450



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 442 451	522 528



A Furnish and Install 1-Fiber Optic Signal Interconnect Cable in 1-2" PVC, Sch. 80 Conduit w/ 3 Spare 2" PVC (for ITS), △ Sch. 80 Conduits. See Signal Interconnect Plans for Continuation.

LEGEND FOR  
AS-BUILT POSTINGS

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting

BRYAN P. LOW

LICENSED PROFESSIONAL ENGINEER

No. 8569-C

HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SHIMABUKURO, ENDO & YOSHIZAKI, INC.

1126 Kalia Avenue

Honolulu, Hawaii 96816

08/01/16

△ Revised Conduits for ITS

01/22/16

△ Added Sheet

DATE

REVISION

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

SIGNAL INTERCONNECT PLAN

STA. 230+50 TO STA. 239+00

QUEEN KAAHUMANU HIGHWAY WIDENING

Kealahou Pkwy. To Keahou Airport Rd. (Ph. 2)

Federal Aid Project No. NH-019-1(38)R

Scale: 1"=40'

Date: AUGUST 2016

SHEET No. 38 OF 43 SHEETS

SIGNAL INTERCONNECT PLAN  
STA. 230+50 TO STA. 239+00  
Scale: 1"=40'

"AS-BUILT"

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

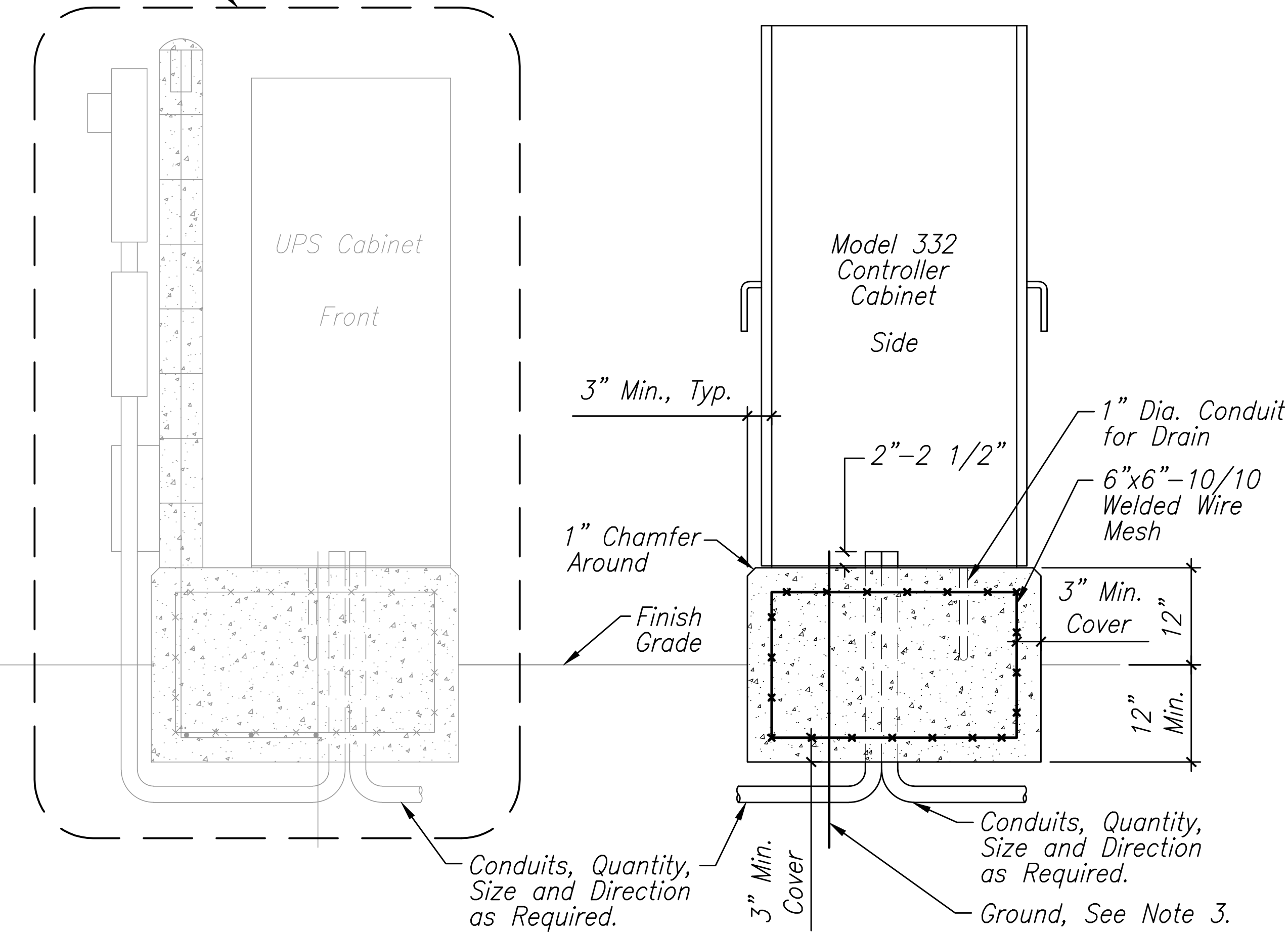
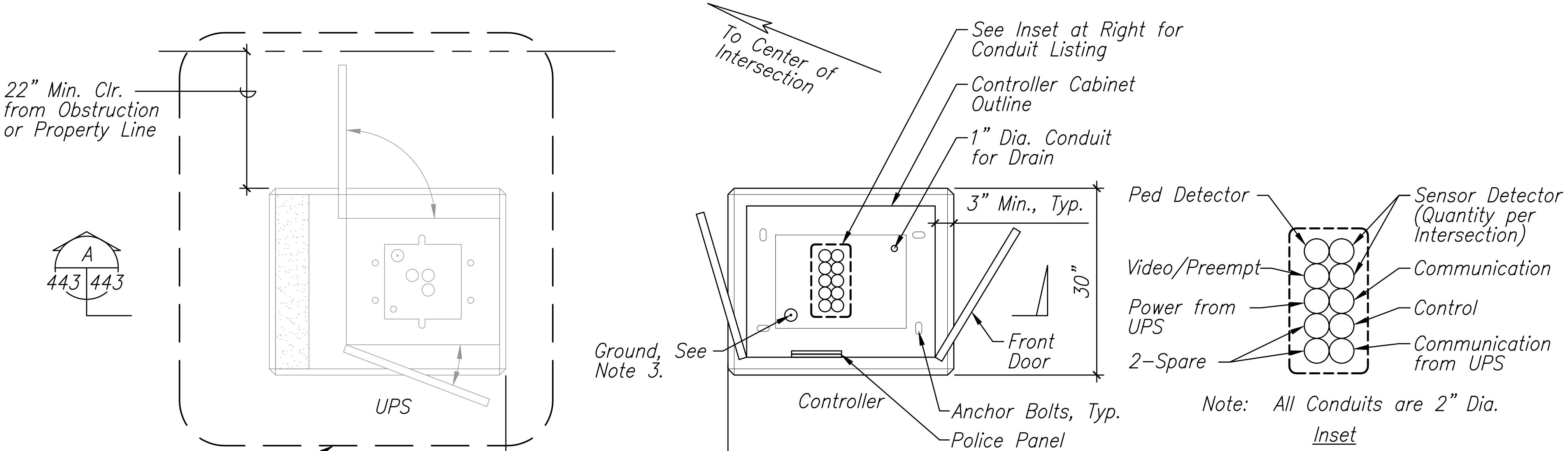
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(38)R	2016	443	528

NOTES:

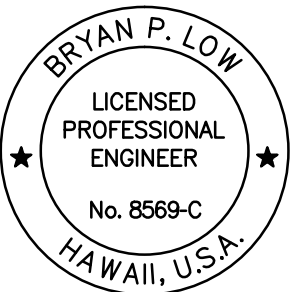
- Contractor Shall Verify All Conduit Requirements Prior to Installation.
- Confirm Location of Conduits with Actual Cabinets.
- Concrete Encased Electrode (UFER Ground). Per Section 250-50(c) of the National Electrical Code.
- Controller Cabinet Shall be Located so that Personnel Facing the Front Door of the Controller Cabinet Have a Clear View of the Intersection.
- Anchor Bolts (Size and Quantity) Shall be per the Cabinet Manufacturers Recommendations.
- Dimensions of Concrete Foundation to be Determined by the Size of the Controller Cabinet. Concrete for Foundations shall be 4000 PSI.
- Seal Controller Cabinet to Foundation with an Approved Sealant.



SECTION A  
443 443

CONTROLLER CABINET UPS CONCRETE BASE DETAIL 1  
Not to Scale C.O. 406 443

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting



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1126-12TH Avenue  
Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: AS SHOWN Date: AUGUST 2016

SHEET No. 39 OF 43 SHEETS

"AS-BUILT"

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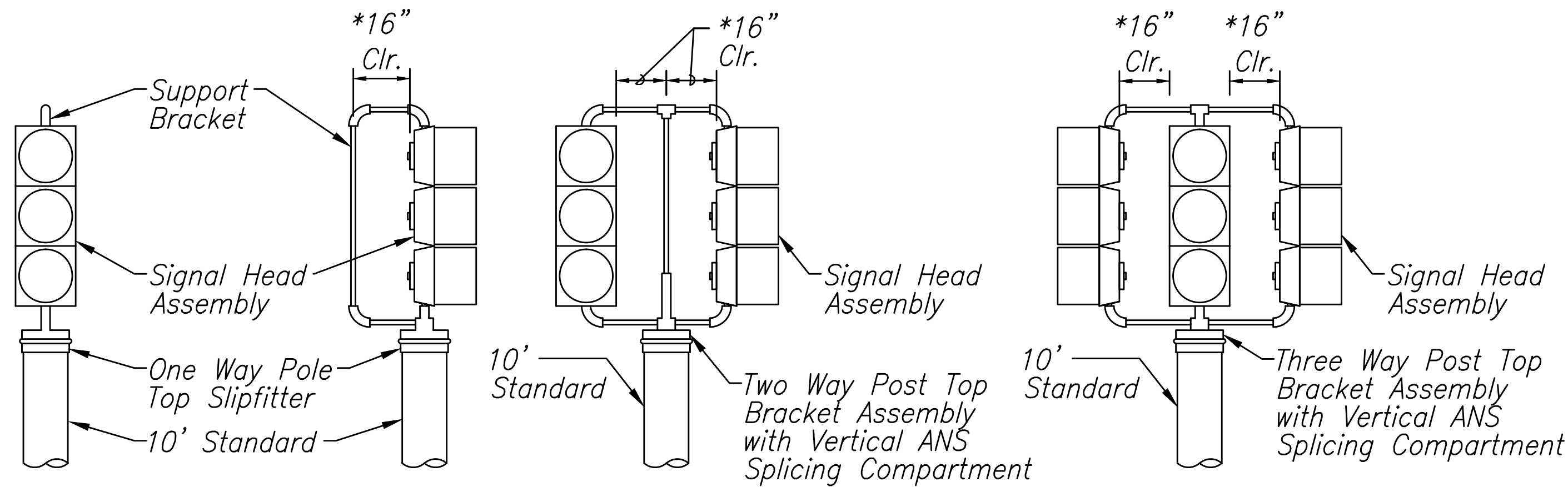
443 452

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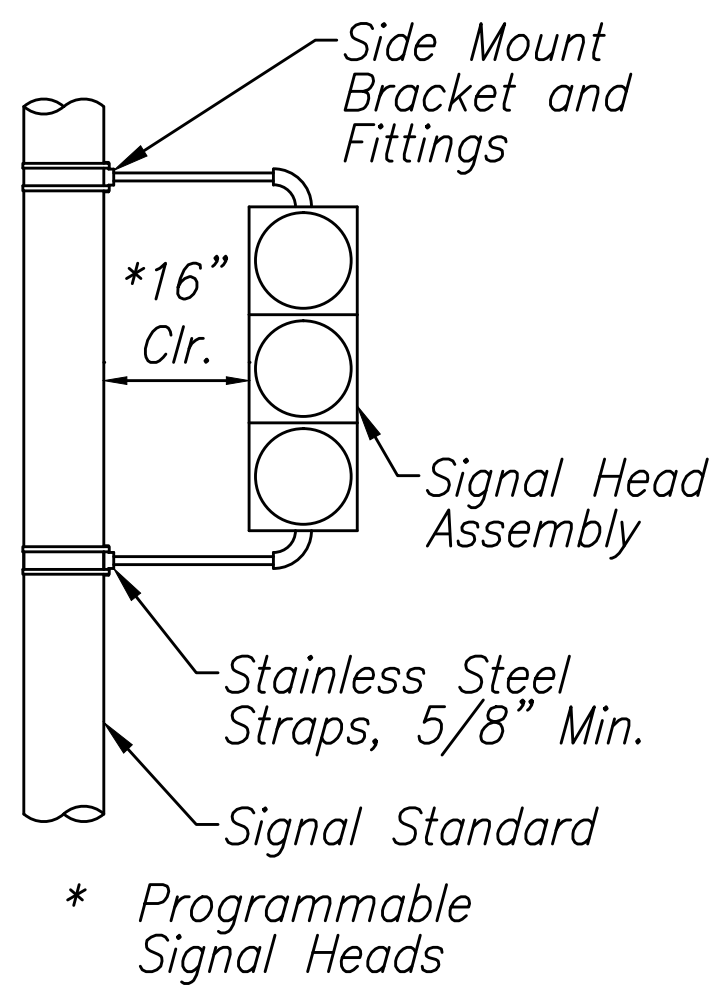
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HAWAII	HAW.	NH-019-1(38)R	2016	C.O. 444 453	522 528



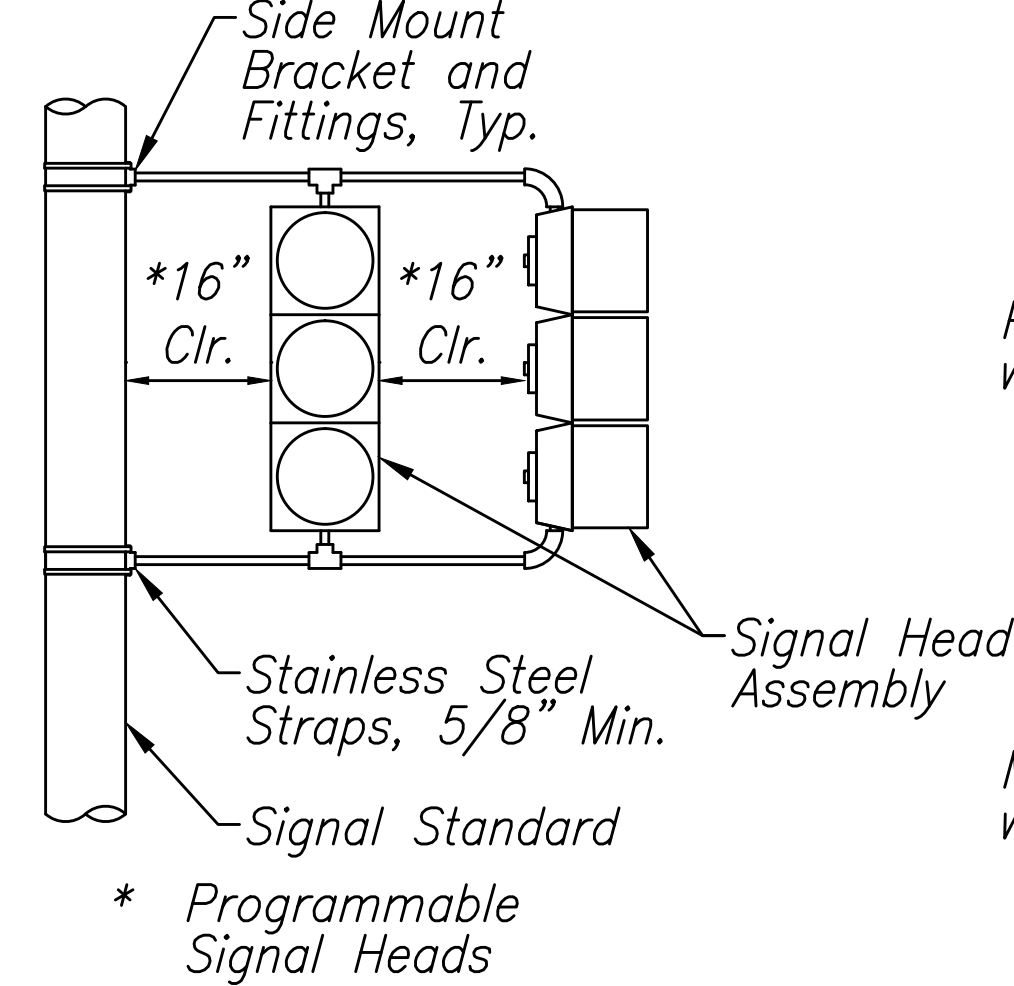
\* Programmable Signal Heads  
**Type I Mounting**  
Post Top Mounting

\* Programmable Signal Heads  
**Type II Mounting**  
Post Top Mounting, Two Way

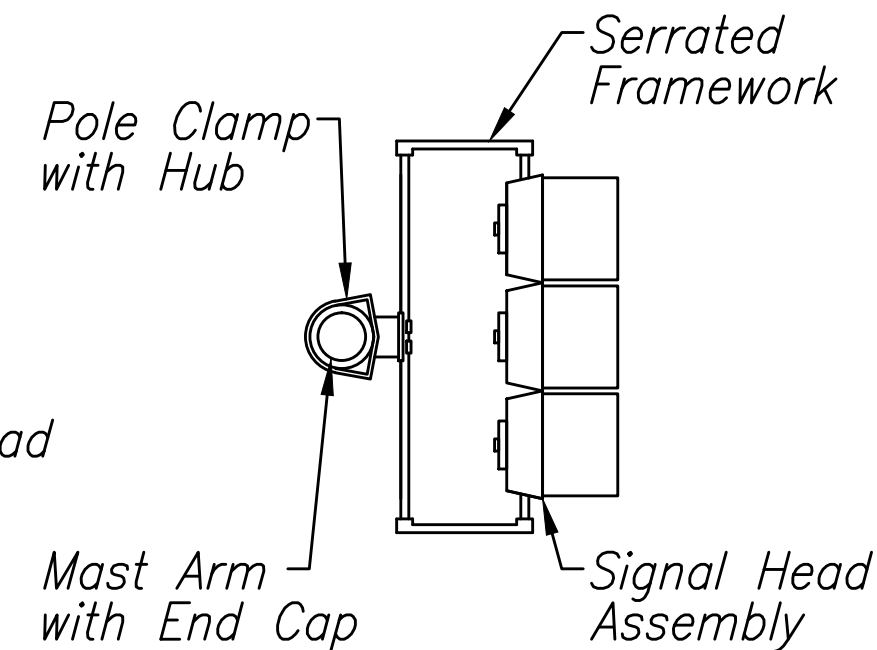
\* Programmable Signal Heads  
**Type III Mounting**  
Post Top Mounting, Three Way



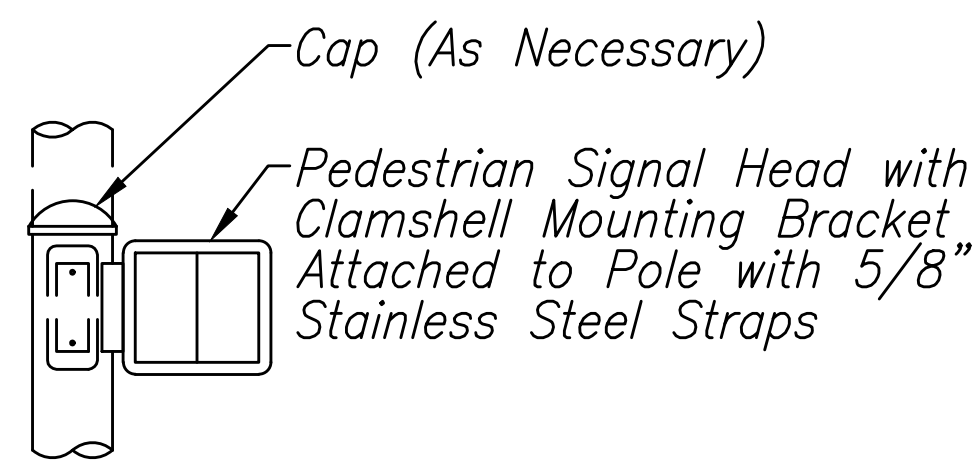
\* Programmable Signal Heads  
**Type V Mounting**  
Side Pole Mounting, One Way



\* Programmable Signal Heads  
**Type V2 Mounting**  
Side Pole Mounting, Two Way



**Type VI Mounting**  
Mast Arm Mounting

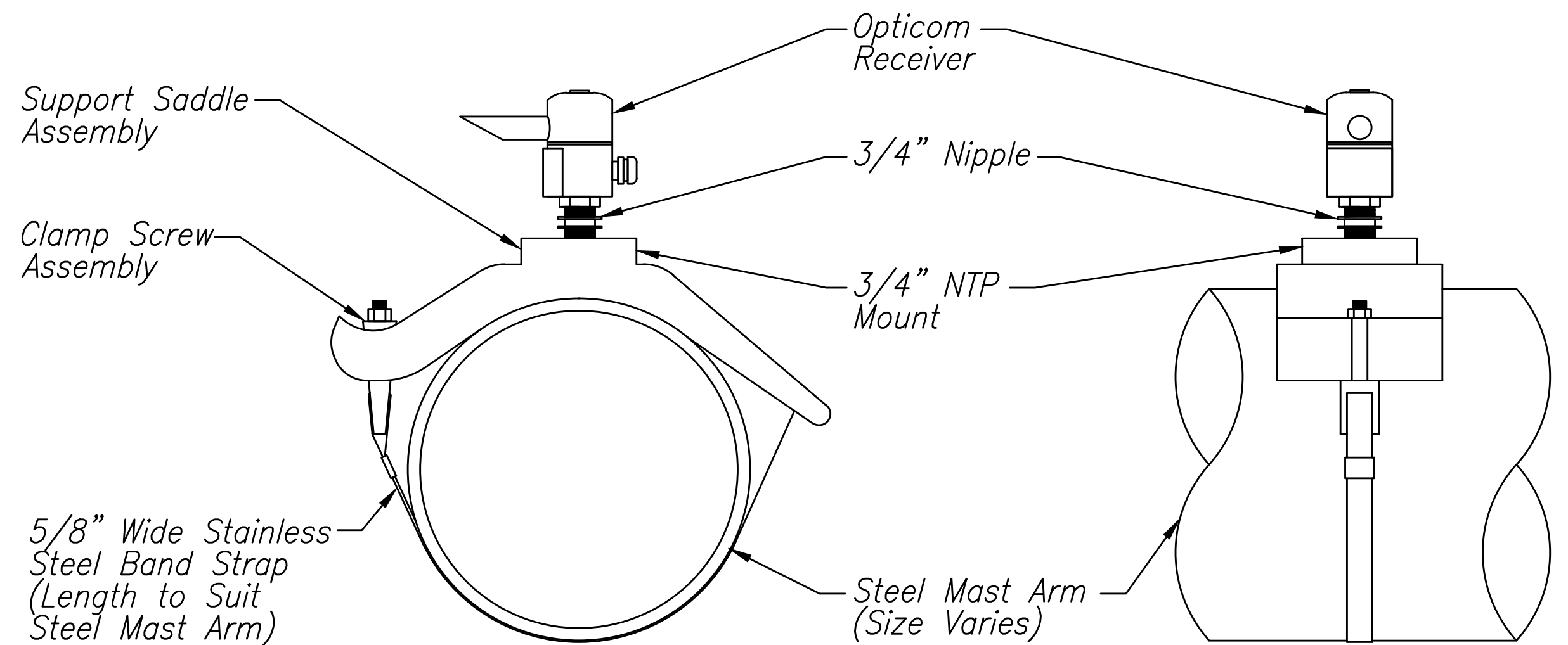


**Type VII Mounting**  
Pedestrian Signal Head Mounting

**NOTES:**

- All Threaded Items, i.e. Bolts, Fittings, Screws, Etc., Shall Be Coated with an Approved Anti-seize Compound Prior to Assembly or Installation.
- All Singular Signal Heads (Except Fiberoptic and Programmable) Shall Have Approved Glass Lenses.

**SIGNAL ASSEMBLY MOUNTING** 1  
Not to Scale C.O. 406 C.O. 444

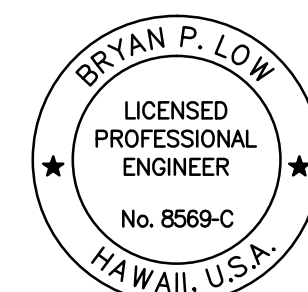


**NOTES:**

- Optical Detector Shall Be "Opticom M711 Optical Detector", or Approved Equal, Unless Noted Otherwise in the Special Provisions.
- Support Saddle Assembly Shall Be "Astro Mini-Brac, AB-0132-29", or Approved Equal, Unless Noted Otherwise in the Special Provisions.

**OPTICOM RECEIVER MAST-ARM MOUNTING** 2  
Not to Scale C.O. 406 C.O. 444

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Roadway	Text for as-built posting



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Honolulu, Hawaii 96816

01/22/16	Revised Layout
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
TRAFFIC SIGNAL DETAILS QUEEN KAAHUMANU HIGHWAY WIDENING Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2) Federal Aid Project No. NH-019-1(38)R Scale: AS SHOWN Date: AUGUST 2016	
SHEET No. 40 OF 43 SHEETS	

"AS-BUILT"

Plotted: 3/8/2017 4:20 PM C.O. 444 453

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CHECKED BY	
IN CHARGE	
NOTE BOOK	
No.	

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VEHICLE TRAFFIC COUNTING (VTC) SYSTEM NOTES

1. The location of new sensor loops and piezo sensors shall be staked out in the field by the Contractor and approved by the Engineer prior to installation.
2. The Contractor shall inform the Engineer at least three days prior to saw-cutting pavement and installing sensor loops and piezo sensors.
3. Pull in in-bound lanes sensor loop cable and piezo sensor lead cables into conduit, where indicated. Cables shall be tested for acceptance before and after installation into conduit.
4. Piezo lead cables shall be continuous with no splices.
5. The Contractor shall restore all affected areas to their original condition. This item of work shall not be paid for separately, but shall be considered incidental to work of other paid items.
6. The Contractor shall verify the location of the existing utilities and underground structures whether or not it is shown on the plans.
7. The Contractor shall assume that existing underground utilities not shown on the plans may exist. The contractor shall be responsible for contacting the different utility companies for information and toning.
8. The Contractor shall be held liable for any damages incurred to the existing utilities and underground structures as a result of his operations. All damages portions shall be replaced in accordance with the standards and specifications of the affected utility company at no cost to the State.
9. Changes to the contract plans and specifications will not be permitted, unless approval by the Engineer in writing.
10. All cables are to be terminated within the existing EVC cabinet shall have a minimum 12" additional slack.
11. Highway crossing conduit shall be provided with 36" cover.
12. Saw cuts shall be made by wet cutting only. Dry cutting shall not be allowed.
13. Clean away collect, dust, dirt and refuse after saw cutting is done. The saw cuts shall be cleared by water applied by pressure washer. Residual water within the saw cuts shall be vacuumed by use of a wet / dry vacuum. The saw cuts shall then be dried by air compressor.
14. After slots are dried, any remaining debris stuck within the slot shall be removed. The saw cuts must be completely clean and dry before inserting the sensors and filling the voids with Epoxy Loop Sealant (for sensor loops) or PU200 Piezo Installation Resin (for piezo sensors).
15. Slurry shall be disposed of appropriately (i.e., either, placed in a Filter Fabric Lined Filtration Box or in a Filter Fabric Lined Dug Up Retention/Percolation Basin, and after Filtration/Percolation, the Filter Fabric and the retained sediments, disposed of appropriately).

SENSOR LOOP LAYOUT NOTES

1. Detector loop shall consist of four turns of 1C #14 cable meeting IMSA Spec 51-3 or equivalent embedded in a 3/8" wide by 4" deep sawcut, except as noted.

SENSOR LOOP LAYOUT NOTES (CONTINUED)

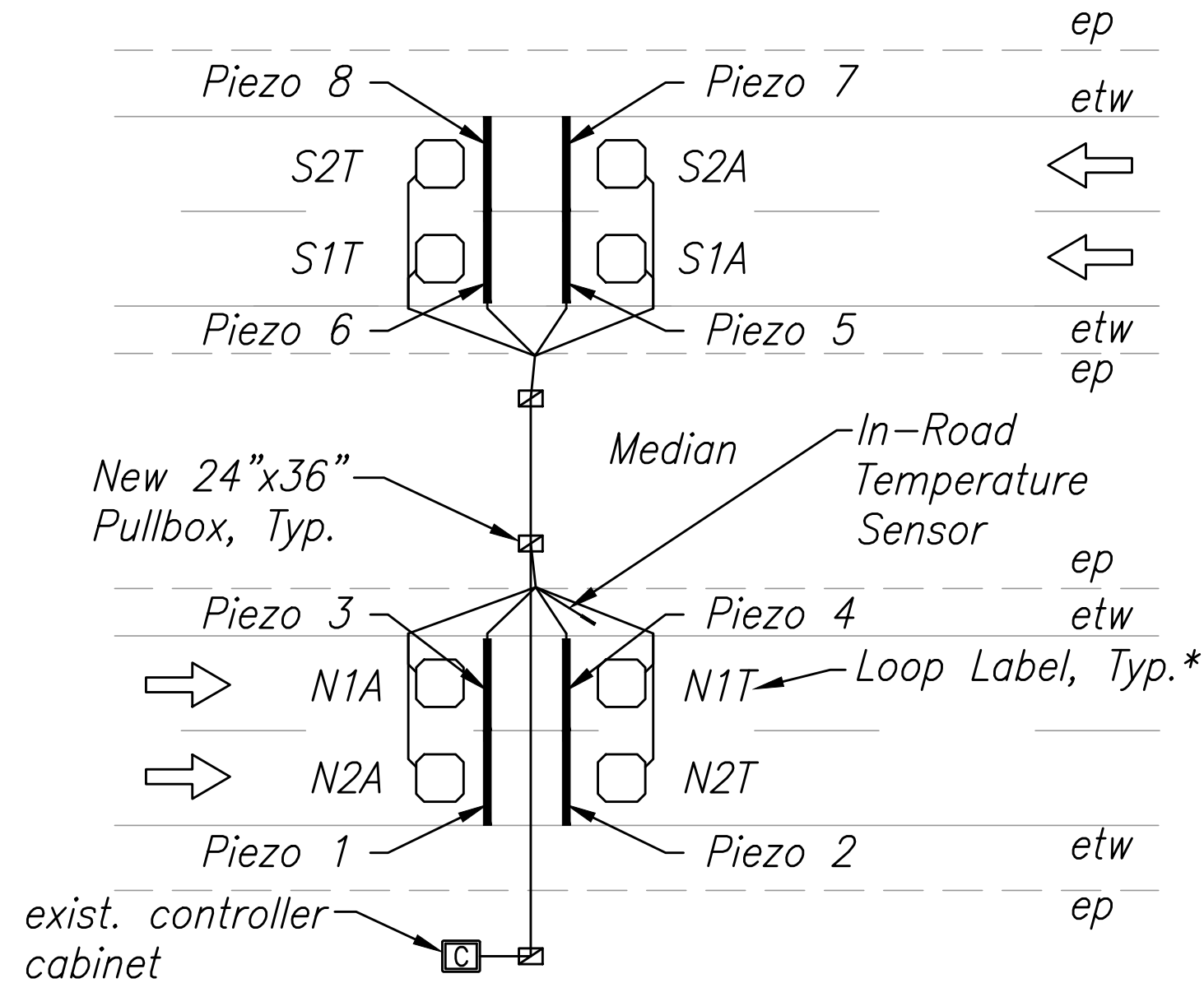
2. After laying sensor loop in four (4) turns within the 4" deep saw cut, press 1" long pieces of backer rod in each foot of the loop and the loop lead saw cut, to anchor the wire in the slot before applying the Epoxy Loop Sealant. Backer rod shall be embedded at least 2" below the top of pavement. The backer rod shall be placed into the saw cut with a blunt object, such as a wooden paint stir stick. No sharp object such as a screw driver shall be used to place the backer rod into the pavement.
3. Sensor loop and lead cable shall be one continuous wire. Lead wires from the same loop shall be twisted in pairs, five twists per foot from the edge of paved shoulder to the pullbox. Do not twist one loop pair with another loop pair.
4. Continuity of sensor loops and lead-in wires shall be tested and warranted for one year from date of acceptance by the Engineer.
5. Sensor loop lead cables shall be spliced only at the final pullbox to the EVC cabinet. Splice point of cables must be suspended near the top of the pullbox with a j-hook.
6. Splices shall be made by use of a splice kit.
7. All sensor loop lead cables shall be crimped with open end lugs that will fit into the terminal board slots snugly.
8. Stagger sensor loops on roadways with lanes that are less than 12 feet in width.
9. The Contractor shall connect the sensor loop wires on each terminal slot, as shown on plans.
10. The left lane in the direction of traffic flow is designated as lane 1, and the lane next to its right as lane 2 and so on as indicated on plans.
11. All sensor loop lead wires in the EVC cabinet and the pullboxes shall be identified and labeled by direction of traffic flow and lane number as shown on plans.
12. Only one sensor loop shall be placed per saw cut.

N2T

└┐ Indicates approaching or trailing loop  
└┐ Indicates lane number  
└┐ Indicates directions\*

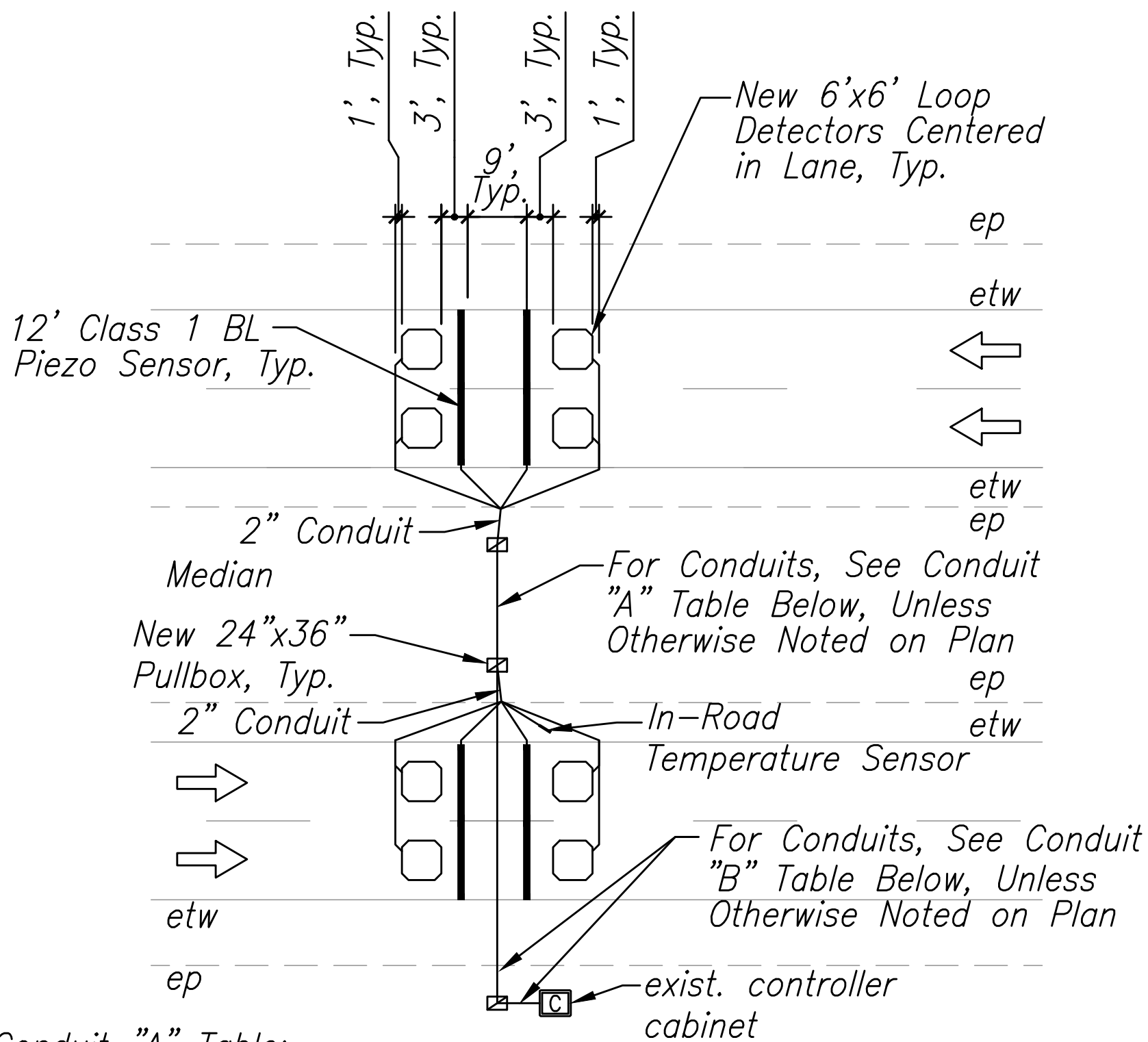
LOOP LABEL LEGEND:

N = North  
S = South  
A = Approaching  
T = Trailing



LABELING OF LOOPS AND PIEZOS

Not to Scale



Conduit "A" Table:

Conduit* #-Size	Class 1 BL Sensor Lead Cables	2C #18 Loop Detector Cable
1-2"	4	4

Conduit "B" Table:

Conduit* #-Size	Class 1 BL Sensor Lead Cables	2C #18 Loop Detector Cable	In-Road Temperature Sensor Cable
2-2"	8	8	1

\*Conduits under pavement and at utility crossings shall be concrete encased.

\*NOTES:

1. All dimensions and callouts are typical unless otherwise noted on plan.
2. Furnish and install 1-1" LB Type Connectors or new NEMA 4X Stainless Steel Junction Box on side of existing cabinet to provide connection for new conduits and cables into existing controller cabinet.
3. Contractor shall coordinate service agreements and connections to electrical and communication service. Contractor shall also contact the appropriate State Dept of Transportation Representative for service agreement. (Hawaii District, Contact, Stanley Tamura, P.E., at 933-8620.

COUNTING STATION LAYOUT DETAIL

Not to Scale

LEGEND FOR  
AS-BUILT POSTINGS

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Roadway Text for as-built posting

BRYAN P. LOW  
LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

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Honolulu, Hawaii 96816

01/22/16  
DATE

Added Sheet  
REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TRAFFIC COUNTING  
STATION DETAILS

QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: AS SHOWN Date: AUGUST 2016

SHEET No. 41 OF 43 SHEETS

"AS-BUILT"

Plotted: 3/8/2017 4:20 PM

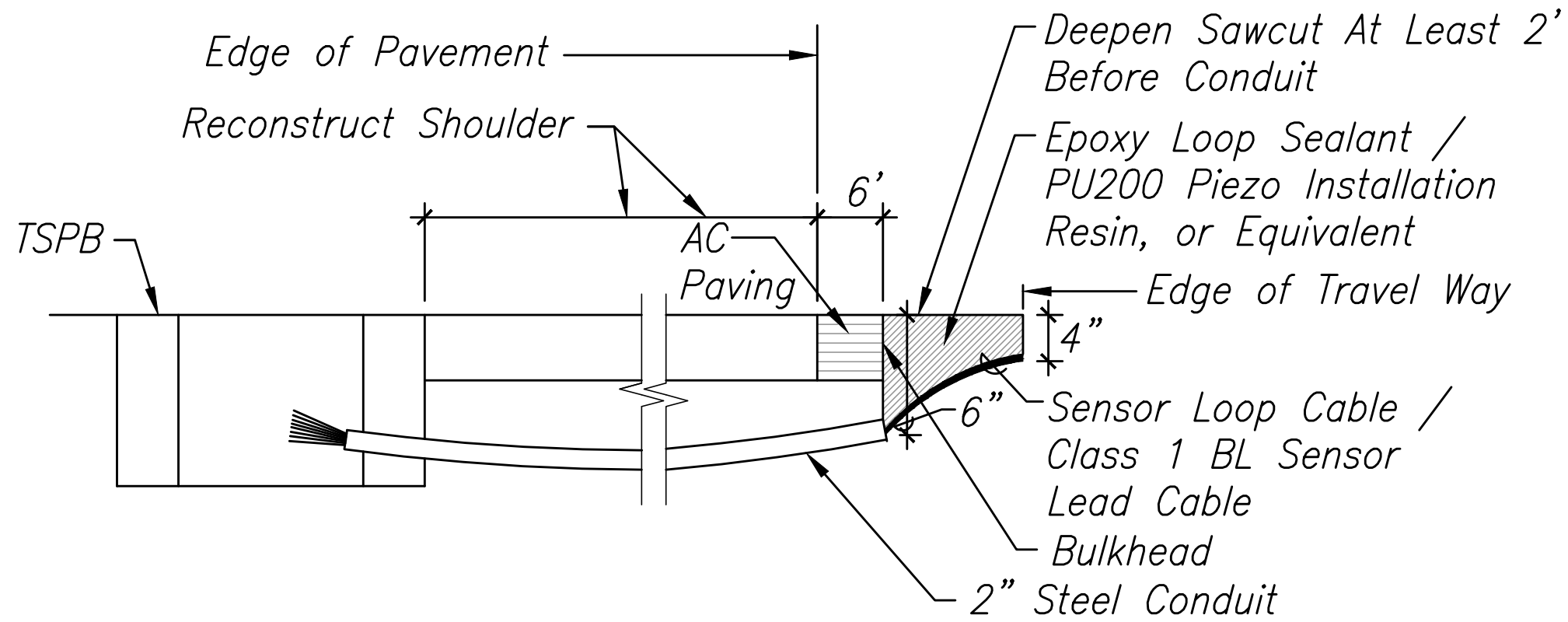
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| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO.     | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|---------------|--------------|
| HAWAII              | HAW.  | NH-019-1(38)R      | 2016        | 444S-2<br>453 | 522<br>528   |

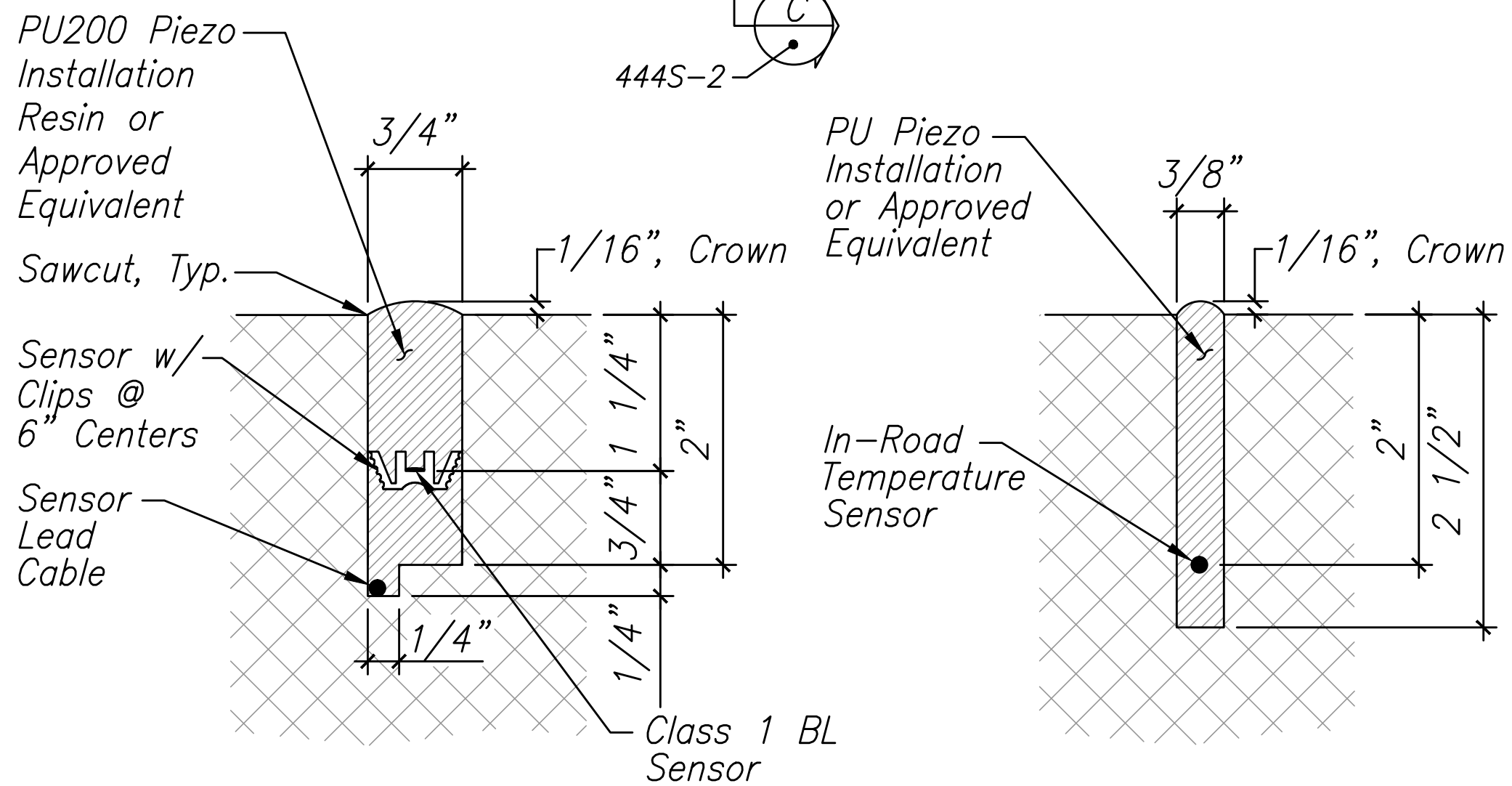
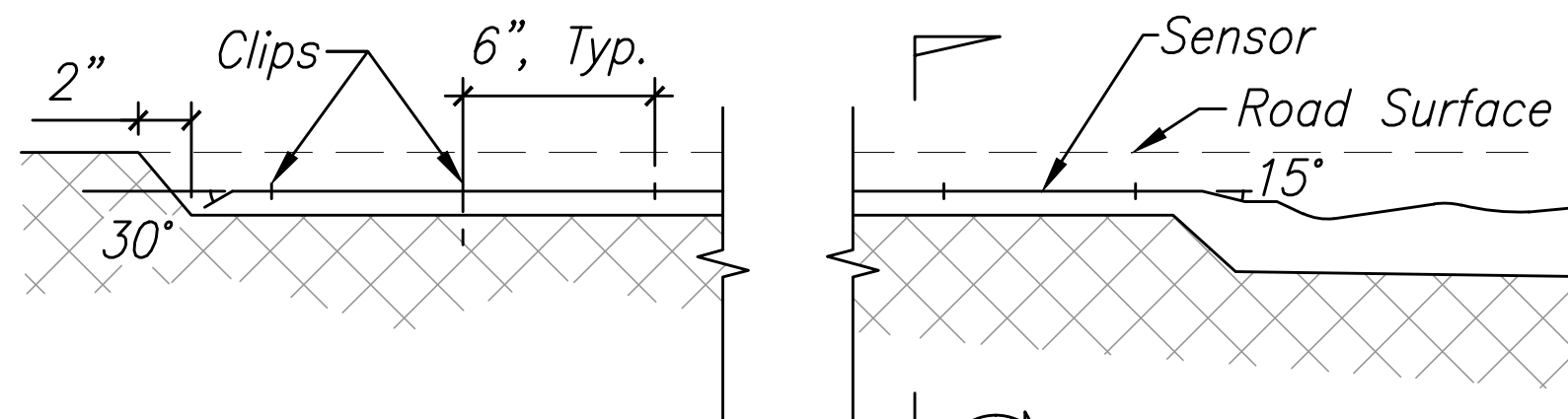


NOTES ON CONSTRUCTION AT END OF SAWCUT:

1. Seal roadway of conduit after installation of conductor.
2. Install bulkhead across conduit trench.
3. Place Epoxy Loop Sealant of PU200 Piezo Installation Resin or Equivalent in sawcut.
4. Backfill over conduit with new AC.
5. Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP/CLASS 1 BL SENSOR AT EDGE OF ROADWAY

Not to Scale



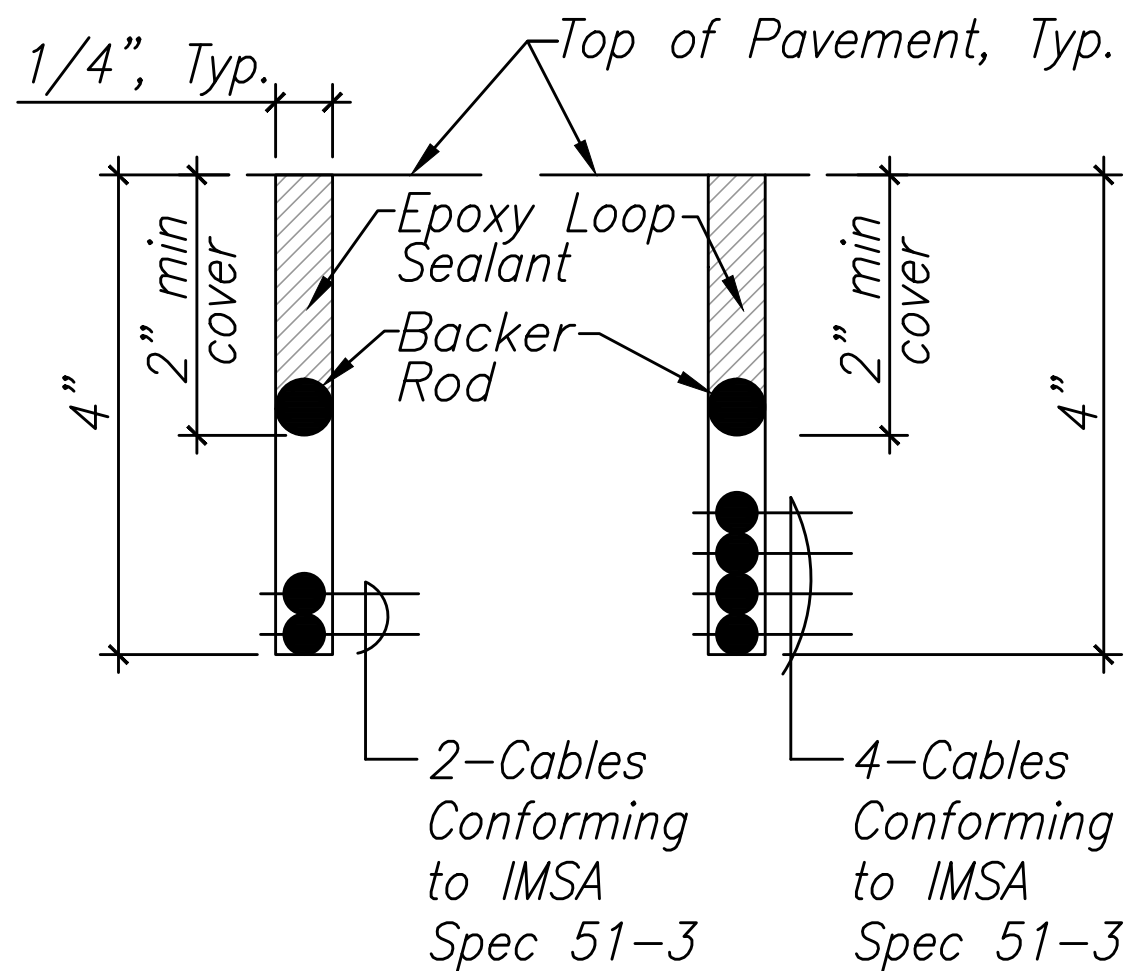
SECTION C  
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PIEZOELECTRIC SENSOR INSTALLATION DETAIL

Not to Scale

IN-ROAD TEMPERATURE SENSOR INSTALLATION DETAIL

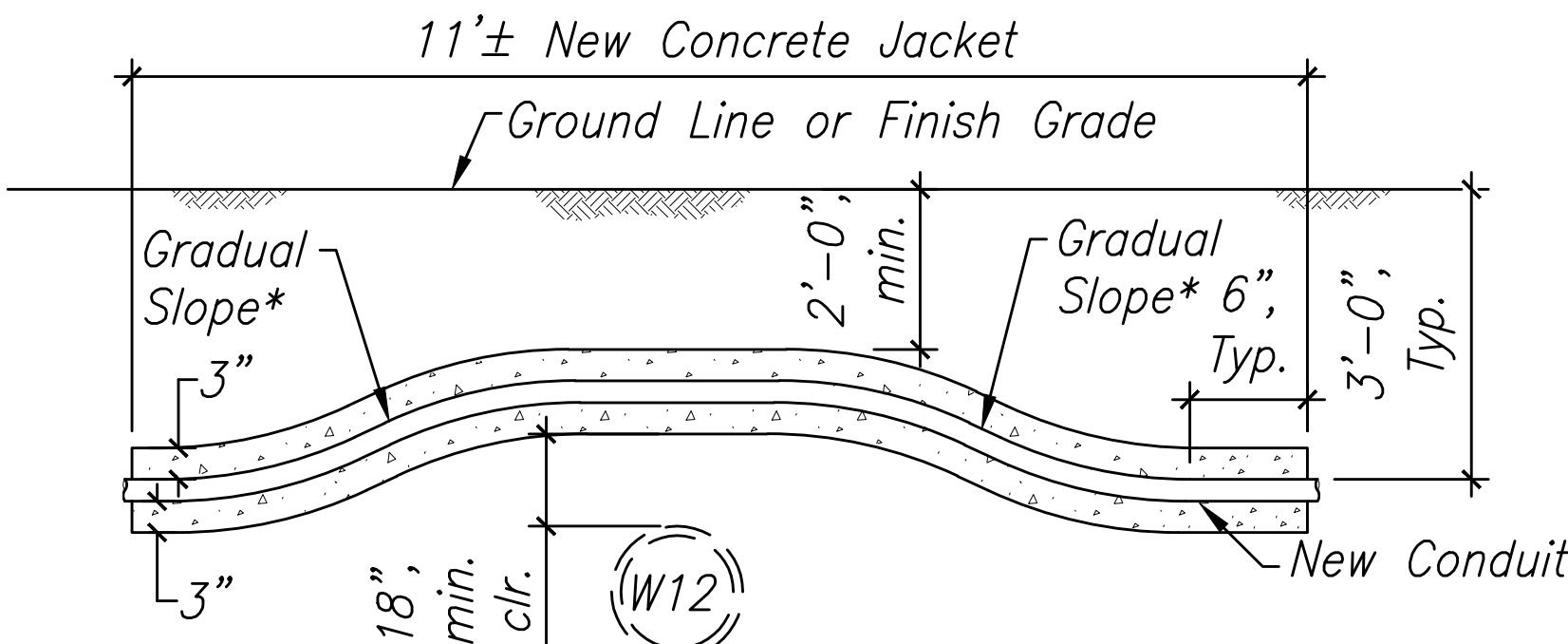
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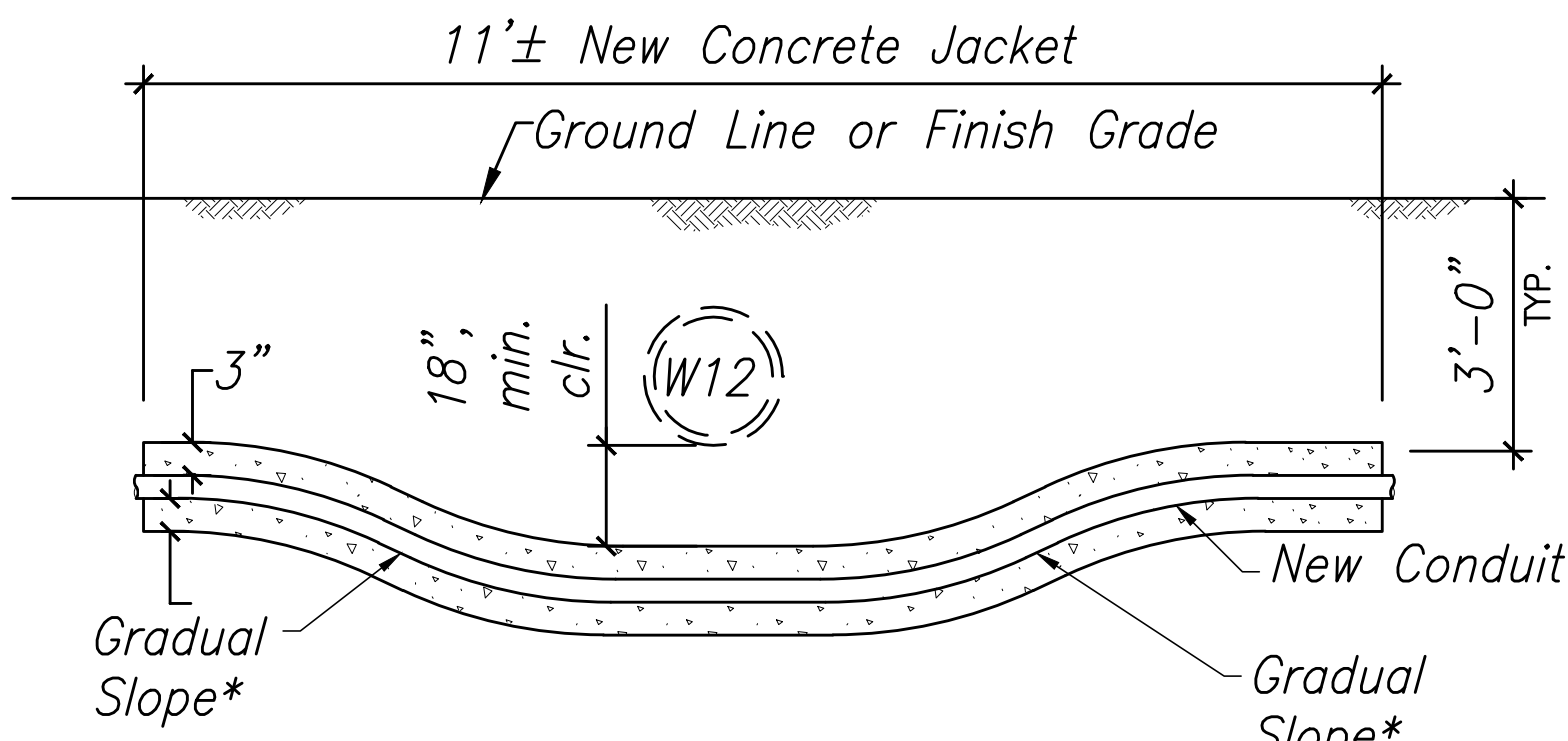
SECTION A  
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TYPICAL SECTION THROUGH SENSOR LOOP

Not to Scale



\*To be determined by County Electrical Inspector/Engineer.



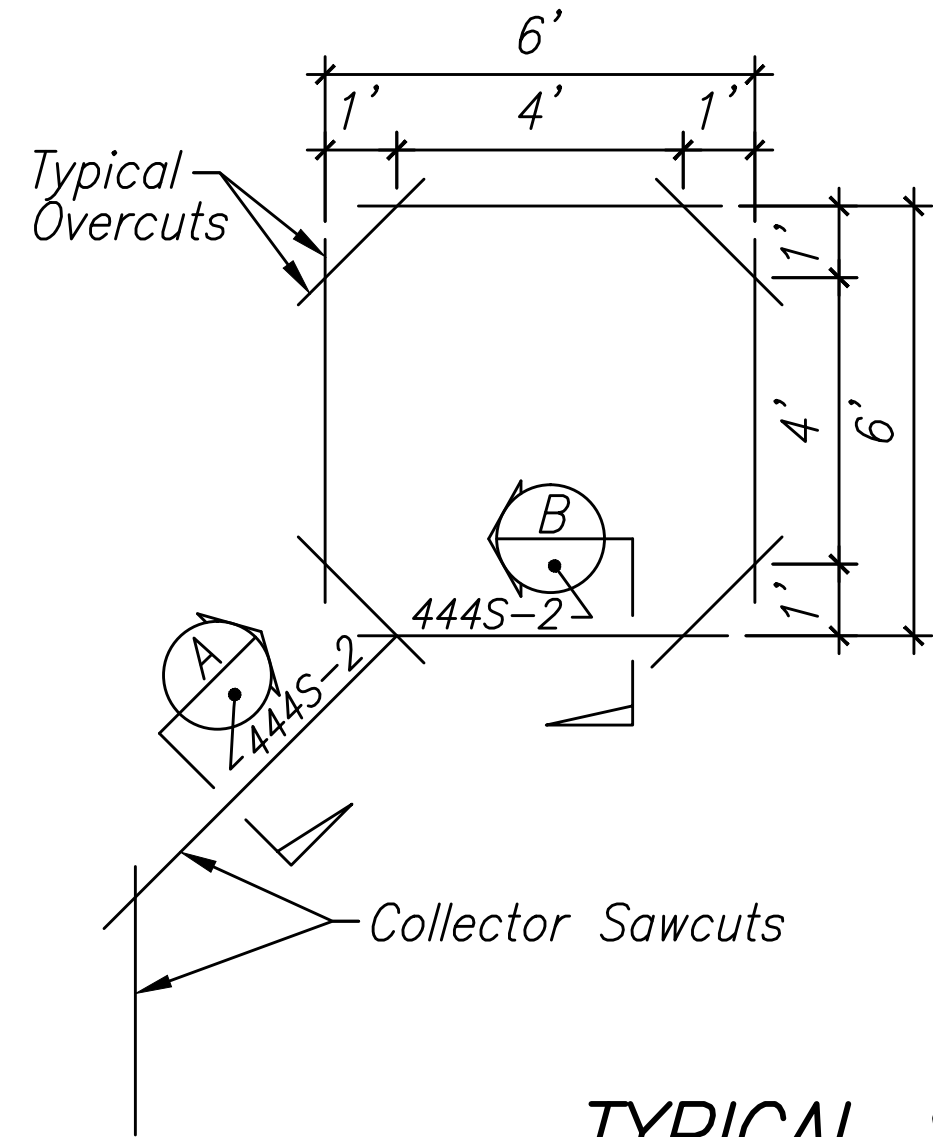
\*To be determined by County Electrical Inspector/Engineer.

NOTE:

18 inch minimum clearance shall be kept between the outside diameter of the existing waterline and the outside of the concrete jacket.

CONDUIT BY-PASS DETAIL AT WATERLINE IN UNPAVED MEDIAN

Not to Scale

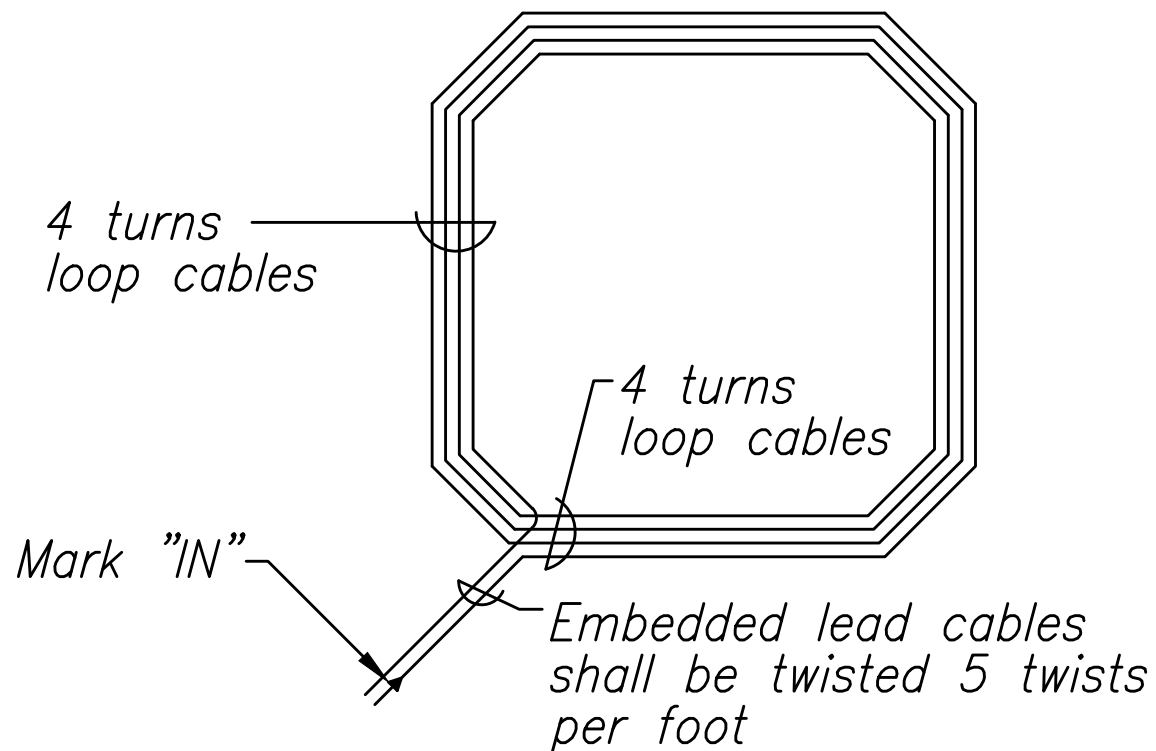


NOTES:

1. Length of overcuts shall be kept to a minimum. All overcuts shall be backfilled with Epoxy Loop Sealant.
2. All saw-cutting slurry shall be wet vacuumed, either simultaneous with or immediately after the saw-cutting operations, and the collected slurry disposed of appropriately (i.e., either, placed in a filter fabric lined filtration box or in a filter fabric lined dug up retention/percolation basin, and after filtration/percolation, the filter fabric and the retained sediments, disposed of appropriately).

TYPICAL SENSOR LOOP SAWCUT DETAIL

Not to Scale

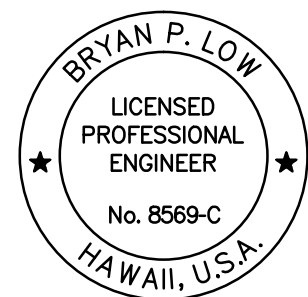


PLAN

TYPICAL SENSOR LOOP WIRING DIAGRAM

Not to Scale

| LEGEND FOR AS-BUILT POSTINGS |                                     |
|------------------------------|-------------------------------------|
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|                              | Double line for as-built deletion   |
| Roadway                      | Text for as-built posting           |



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|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| 01/22/16                                                             | Added Sheet       |
| DATE                                                                 | REVISION          |
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION |                   |
| TRAFFIC COUNTING<br>STATION DETAILS                                  |                   |
| QUEEN KAAHUMANU HIGHWAY WIDENING                                     |                   |
| Kealahou Pkwy. To Keahole Airport Rd. (Ph. 2)                        |                   |
| Federal Aid Project No. NH-019-1(38)R                                |                   |
| Scale: AS SHOWN                                                      | Date: AUGUST 2016 |
| SHEET No. 42 OF 43 SHEETS                                            |                   |

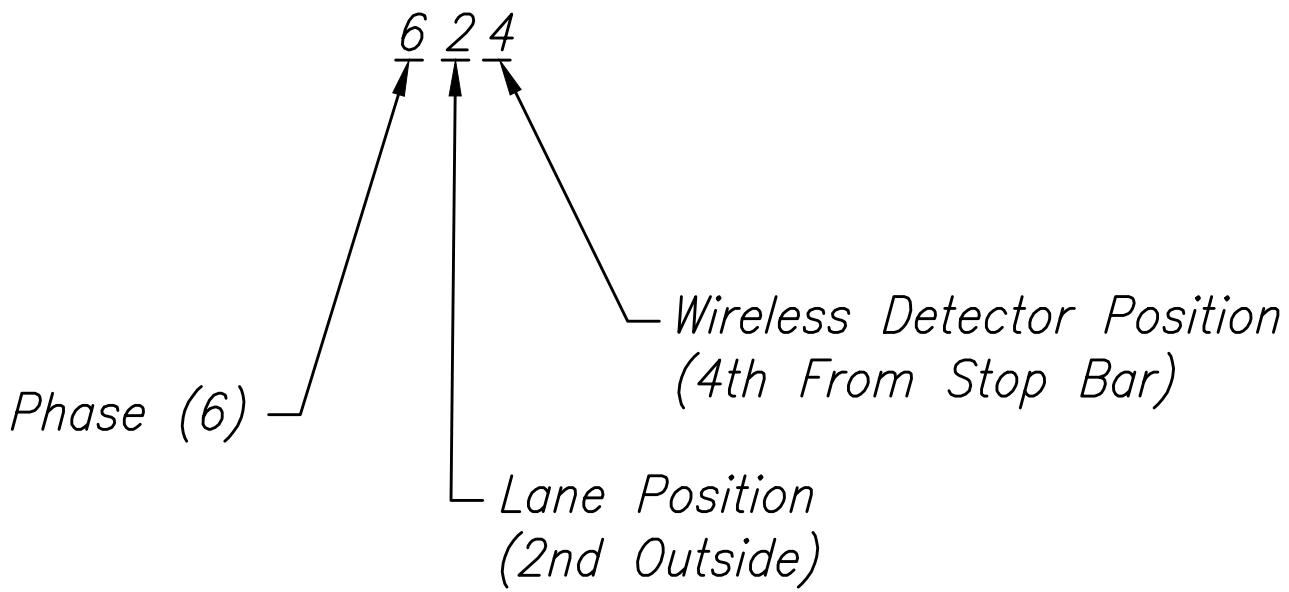
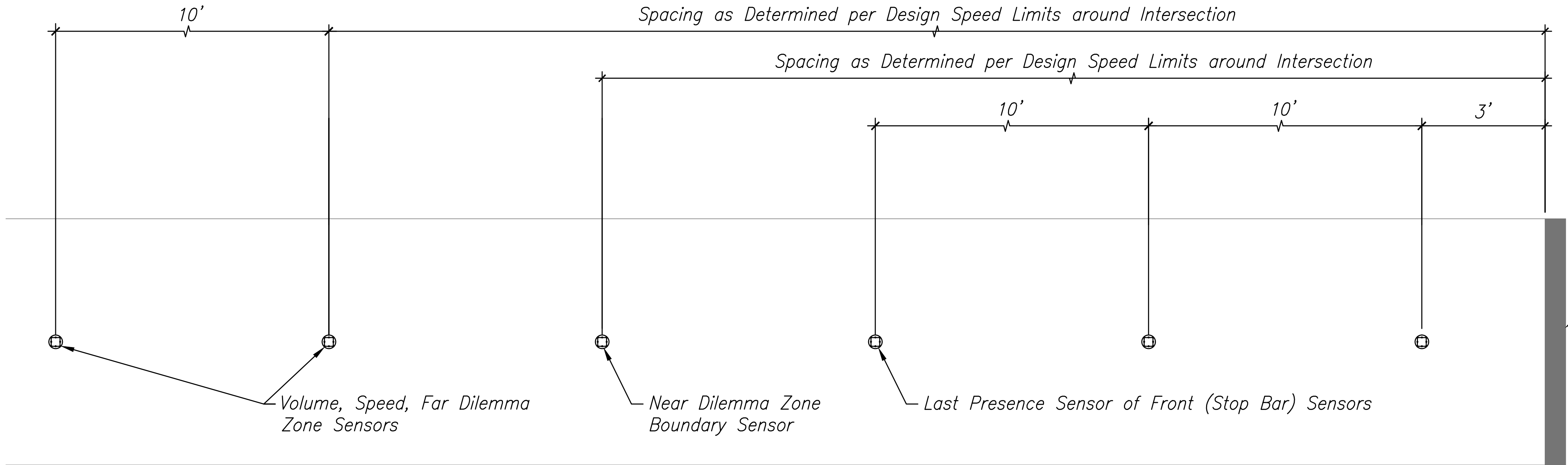
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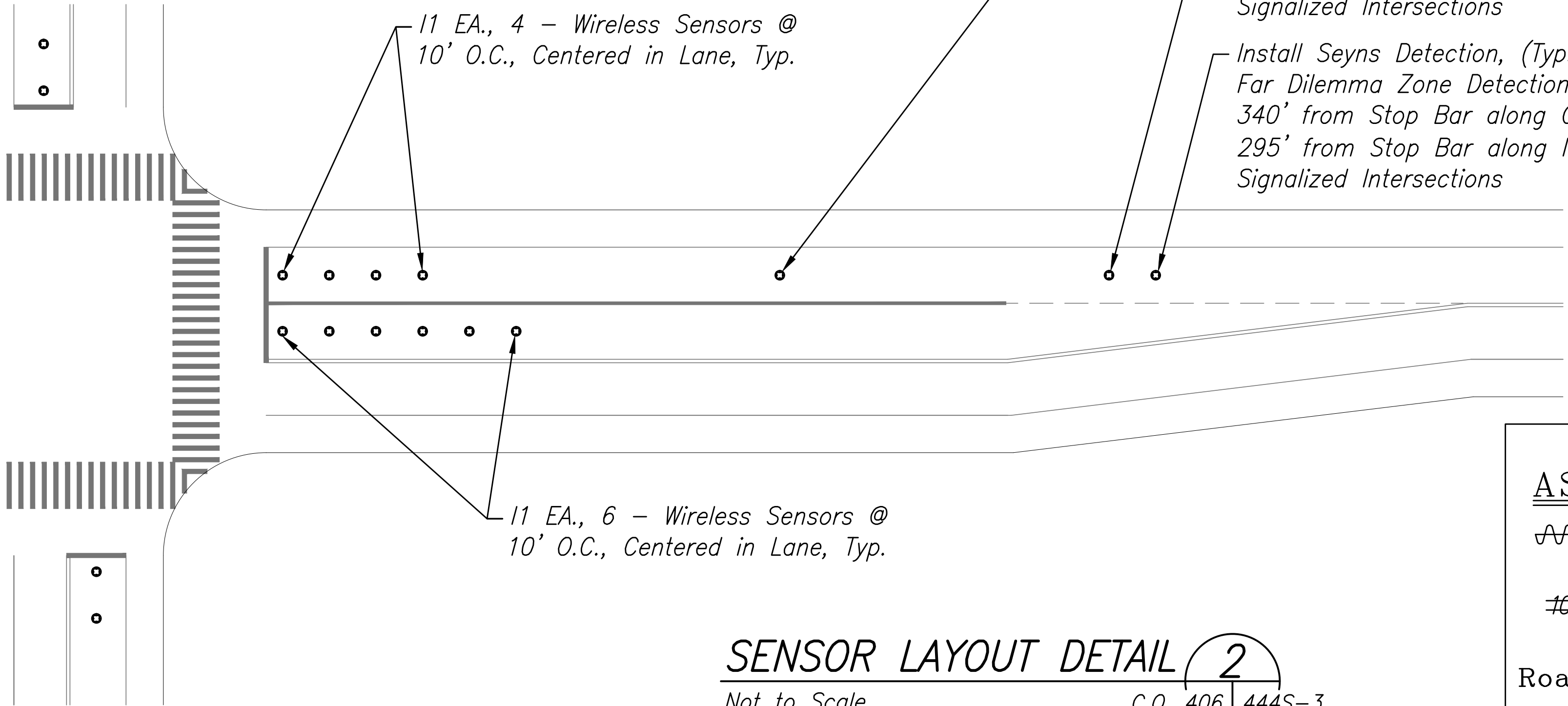
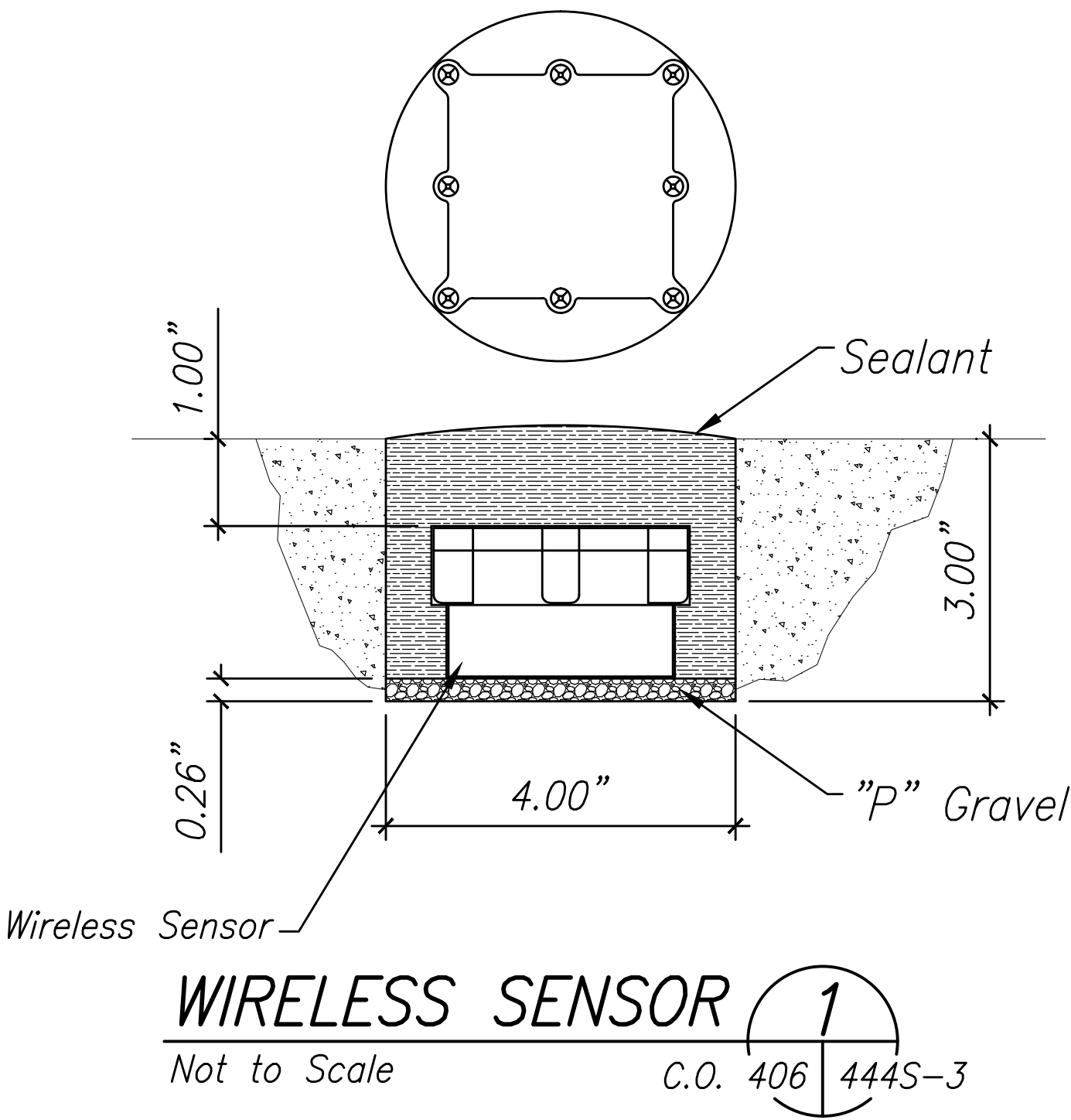
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO.     | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|---------------|--------------|
| HAWAII              | HAW.  | NH-019-1(38)R      | 2016        | 444S-3<br>453 | 522<br>528   |



SENSOR ID EXAMPLE

NOTES:

1. Cored Hole Shall Be 4" in Diameter x 2.5"-3" in Depth.
2. Clamshell Housing For Sensor Shall be Used.
3. P Gravel Shall Be Used at the Bottom of the Core Hole for Leveling of the Sensor. Fill Level 0.25".
4. The Sensor Shall Be Aligned with the Arrow on the Top of the Sensor Pointed in the Direction of Travel.
5. Sealant Type is Fabrick MP-55 Two (2) Component Polyurethane/Plyurea based Joint Sealant (or Equivalent).
6. Sensor Address Shall Be Compiled and Identified to Locations by the County of Hawaii, Travic Division Personnel Prior to Installation in the Roadway.
7. Presence Sensor Located Closest to Stop Bar Shall Be Located 3' Away from StopBar with 10' between Each Presence Sensor.
8. Near and Far Dilemma Zone Sensors Shall Be Located as Indicated Below.



SENSOR LAYOUT DETAIL 2

Not to Scale

C.O. 406 444S-3

LEGEND FOR AS-BUILT POSTINGS

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Roadway Text for as-built posting

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LICENSED PROFESSIONAL ENGINEER  
No. 8569-C  
HAWAII, U.S.A.

LICENSE EXPIRATION DATE 04/30/18

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Honolulu, Hawaii 96816

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

WIRELESS SENSOR DETAILS  
QUEEN KAAHUMANU HIGHWAY WIDENING  
Kealahoe Pkwy. To Keahole Airport Rd. (Ph. 2)  
Federal Aid Project No. NH-019-1(38)R  
Scale: AS SHOWN Date: AUGUST 2016

SHEET No. 43 OF 43 SHEETS

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| DESIGNED BY   | DATE |
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| ORIGINAL PLAN |      |
| NOTE BOOK     |      |
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"AS-BUILT"

Plotted: 3/9/2017 8:02 AM

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