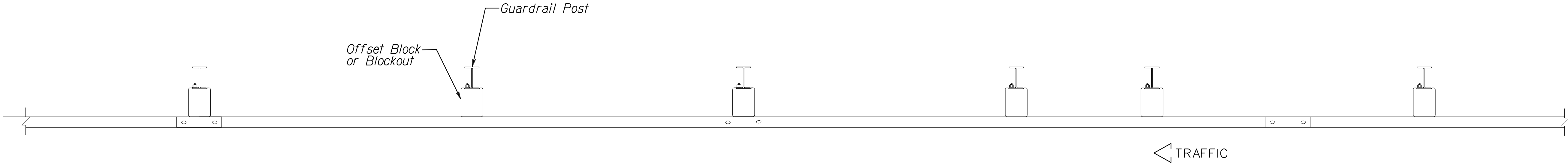
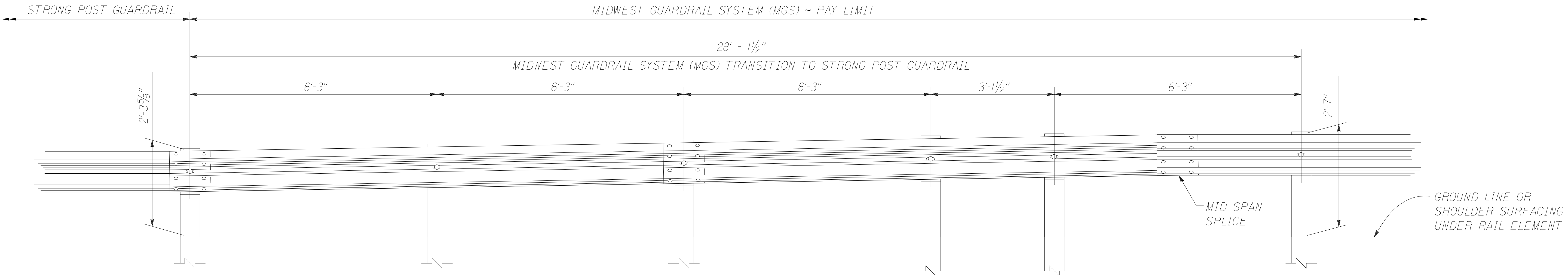


| FED. ROAD DIST. NO. | STATE | FED-AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | NH-063-1(025)     | 2022        | 30        | 60           |



PLAN



ELEVATION

|               |                   |       |
|---------------|-------------------|-------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE  |
| NOTE BOOK     | DRAWN BY          | X     |
| DESIGNED BY   | DESIGNED BY       | X     |
| CHECKED BY    | CHECKED BY        | Ns    |
|               |                   | X.dgn |

r09/06/16 D:\usr2\Ernest\standards\Traffic Guardrail Standards\mt7\_midwest.dgn

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**MGS TRANSITION TO  
STRONG POST GUARDRAIL**

LIKELIKE HIGHWAY  
SAFETY IMPROVEMENTS  
Emmeline Place to Kahekili Highway  
Federal Aid Project No. NH-063-1(025)  
Scale: Not To Scale Date: May, 2022

SHEET No. 5 OF 5 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | NH-063-1(025)      | 2022        | 31        | 60           |

ENHANCED VEHICLE CLASSIFICATION (EVC) SYSTEM NOTES

- The location of new sensors shall be staked out in the field by the Contractor and approved by the Engineer prior to installation.*
- The Contractor shall inform the Engineer at least three days prior to saw cutting pavement and installing sensors.*
- Highway crossing conduits shall be provided with a minimum of 36" cover and shall be concrete encased, per Standard Plan TE-36.*
- The Contractor shall verify the location of existing utilities and underground structures whether or not shown on the plans.*
- The Contractor shall assume that underground utilities not shown on the plans may exist. The Contractor shall be responsible for contacting the different utility companies for information and toning.*
- The Contractor shall be held liable for any damages incurred to existing utilities and underground structures as a result of operations. All damaged portions shall be replaced in accordance with the standards and specifications of the affected utility company at no cost to the State.*
- Changes to the contract plans and specifications will not be permitted, unless approved by the Engineer in writing.*
- Saw cuts shall be made by wet cutting only.*
- After saw cutting is done, the saw cuts shall be cleaned of dust, dirt, and refuse with water applied by pressure washer. Residual water within the saw cuts shall be vacuumed using a wet/dry vacuum. The saw cuts shall then be dried using an air compressor.*
- After saw cuts are dried, any remaining debris stuck within the cuts shall be removed. The saw cuts must be completely clean and dry before inserting the sensors and filling cuts and any voids surrounding the sensors or their lead cables with sealant.*
- The collected slurry shall be disposed of appropriately (i.e., either placed in a filter fabric-lined filtration box or a filter fabric-lined dug up retention/percolation basin). After filtration/percolation, the filter fabric and the retained sediments and any excavated pavement material shall be disposed of appropriately.*
- Sensor lead cables shall be pulled into conduits where indicated. Cables shall be tested for acceptance before and after installation into conduits.*
- Piezo sensor lead cables shall be continuous with no splices.*
- Sensor lead cables shall be terminated in the controller cabinet and shall have a minimum of 12" additional slack.*
- The Contractor shall restore all affected areas to their original condition or better. This item of work shall not be paid for separately, but shall be considered incidental to work of other paid items.*
- Poles for solar panel assemblies and excavation warning signs shall be located no more than 20 feet from controller cabinets.*

LOOP SENSOR LAYOUT NOTES

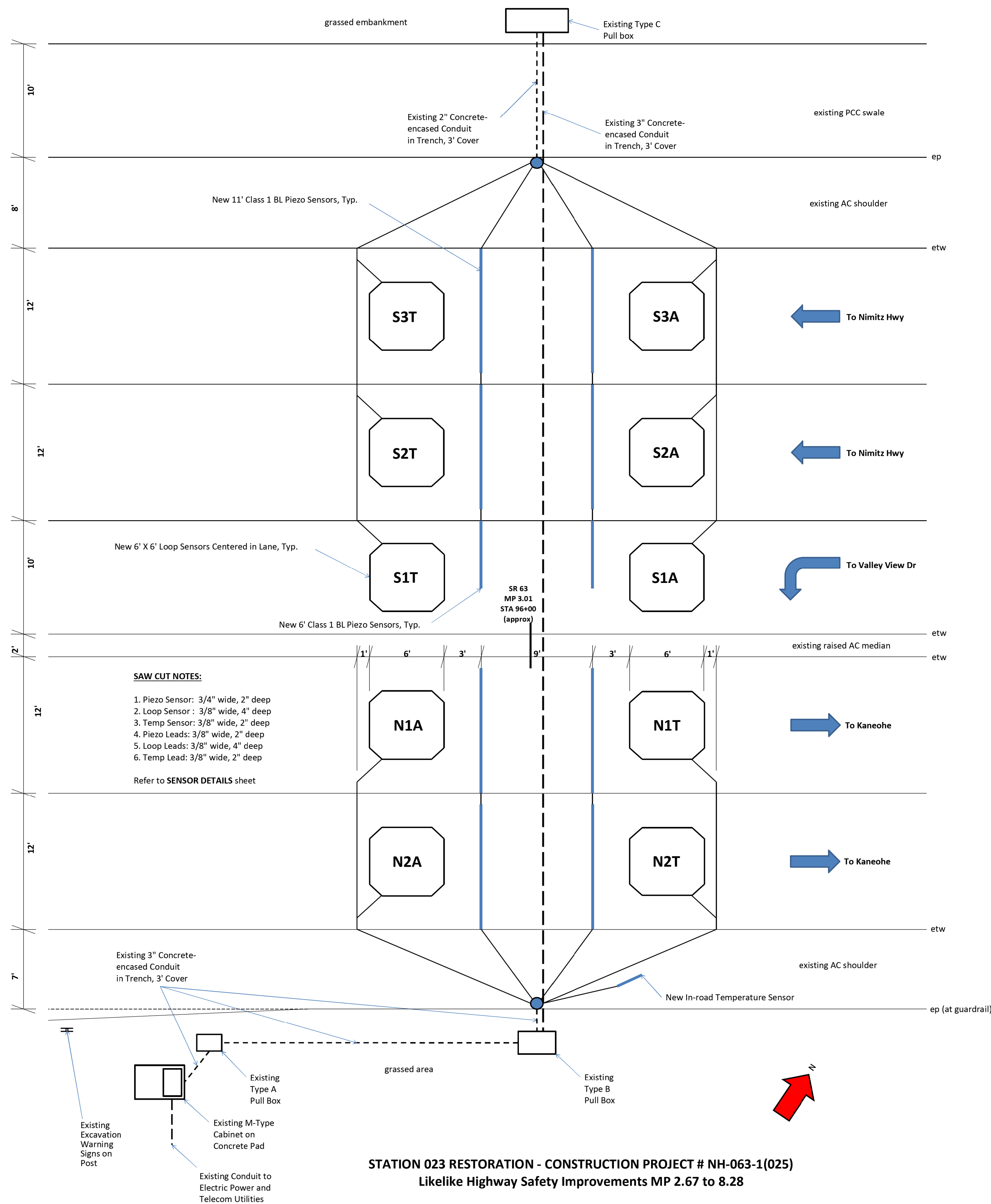
- Loop sensors shall consist of four turns of 1C #14 cable (meeting IMSA Spec 51-3 or equivalent) embedded in a 3/8" wide by 4" deep saw cut, except as noted. Loop sensors shall be provided a minimum of 2' cover.*
- Loop sensors shall be staggered on roadways with lanes that are less than 12 feet in width, as shown on contract plans or by direction of the Engineer.*
- After laying the loop sensor cable in four (4) turns within the 4" deep cut, 1"-long pieces of backer rod shall be pressed in each foot of the loop and the loop lead saw cut, to anchor the wire in the bottom of the cut before applying the loop sealant. Backer rod shall be embedded at least 2" below the top of pavement. The backer rod shall be pressed 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 press the backer rod into the saw cuts.*
- Loop sensor 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 end of the saw cut at the roadway edge to the pull box. Do not twist one loop pair with another loop pair.*
- Continuity of loop sensors and lead cables shall be tested and warrantied for one year from the date of acceptance by the Engineer.*
- Loop sensor lead cables shall be spliced only at the closest pull box to the loop. Splices shall be made by use of a splice kit. Splice points of cables shall be suspended near the top of the pull box with a j-hook.*
- The Contractor shall label the loop and piezo sensor leads clearly to identify traffic direction, lane number, and sequence of loop and piezo sensors in each lane in each direction.*
- The left-most lane in the direction of traffic flow is designated as Lane 1, and the next lane to its right as Lane 2, and so on, as indicated on plans.*

|  |                         |            |
|--|-------------------------|------------|
| ORIGINAL<br>PLAN<br>NOTE BOOK<br>No. _____ | SURVEY PLOTTED BY _____ | DATE _____ |
|  | DRAWN BY _____          | _____      |
|  | DESIGNED BY _____       | _____      |
|  | CHECKED BY _____        | _____      |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EVC TRAFFIC COUNTING**  
**SYSTEM NOTES**  
**LIKELIKE HIGHWAY**  
**SAFETY IMPROVEMENTS**  
*Emmeline Place to Kahekili Highway*  
*Federal Aid Project No. NH-063-1(025)*  
*Date: May, 2022*

SHEET No. 1 OF 5 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | NH-063-1(025)      | 2022        | 32        | 60           |



BOUNDARY LABEL LEGEND

ep = edge of pavement  
etw = edge of travelway

LOOP LABEL LEGEND

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

N | T  
├┤ Indicates approaching or trailing loop  
├┤ Indicates lane number  
└┘ Indicates direction

NOTES:

1. All dimensions and callouts are typical unless otherwise noted on plan.
2. Contractor shall not disturb existing connections to electrical and communication service.
3. Loop lead cable pairs shall be twisted five twists per foot prior to insertion into conduits.
4. Existing conduits, controller cabinet, concrete pad, and pull boxes shall remain and be reused.
5. Existing excavation warning signs and post shall be replaced with new signs and post.
6. Existing pull box covers shall be replaced with new covers labeled TRAFFIC MONITORING.

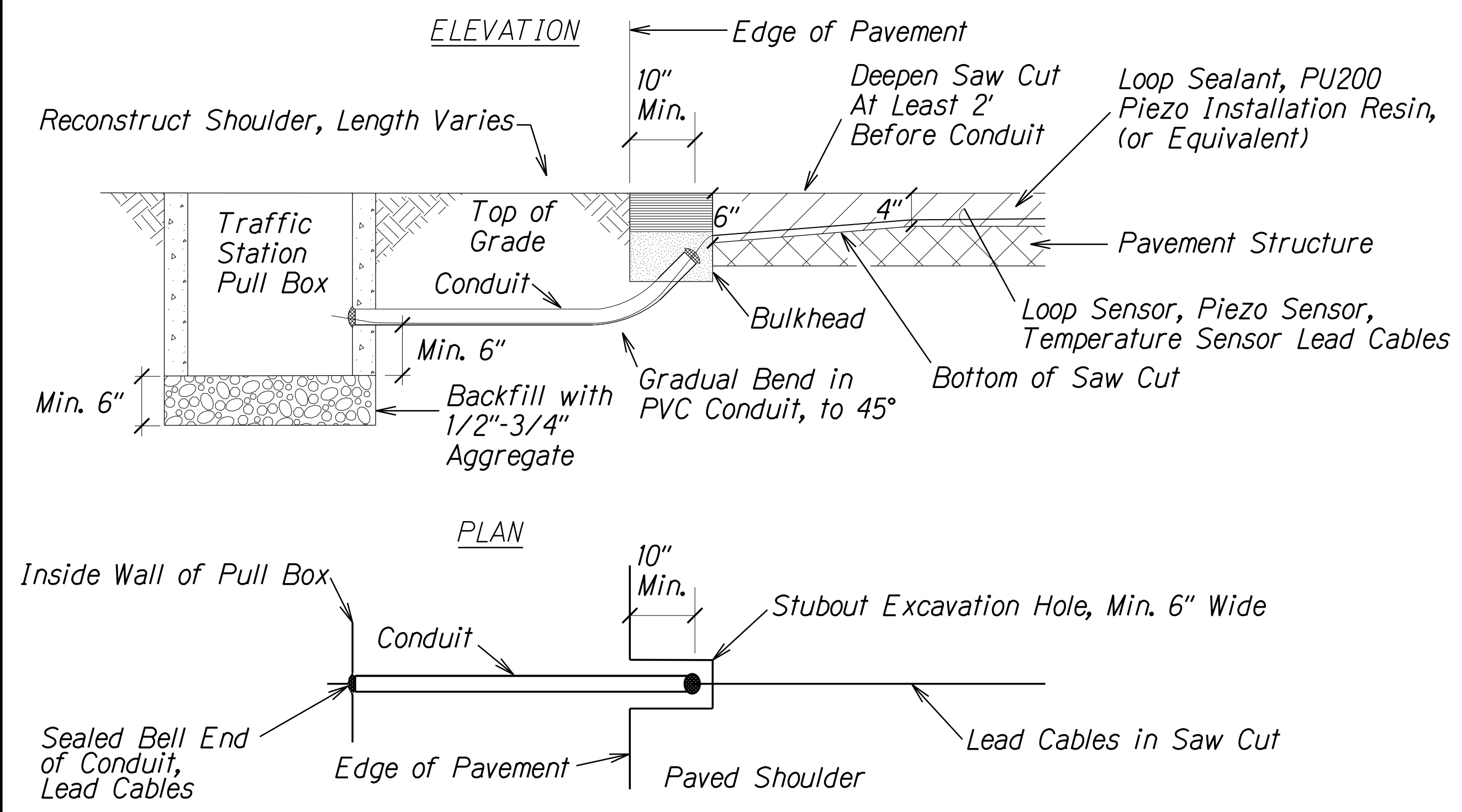
|                   |      |
|-------------------|------|
| SURVEY PLOTTED BY | DATE |
| DRAWN BY          |      |
| DESIGNED BY       |      |
| CHECKED BY        |      |
| ORIGINAL PLAN     |      |
| NOTE BOOK         |      |
| N <sub>o.</sub>   |      |

EVC TRAFFIC COUNTING SYSTEM LAYOUT AND LABELING  
STATION 023 - LIKELIKE HIGHWAY SR 63 MP 3.00

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EVC TRAFFIC COUNTING**  
**SYSTEM LAYOUT**  
**LIKELIKE HIGHWAY**  
**SAFETY IMPROVEMENTS**  
Emmeline Place to Kahekili Highway  
Federal Aid Project No. NH-063-1(025)  
Scale: Not To Scale Date: May, 2022  
SHEET No. 2 OF 5 SHEETS



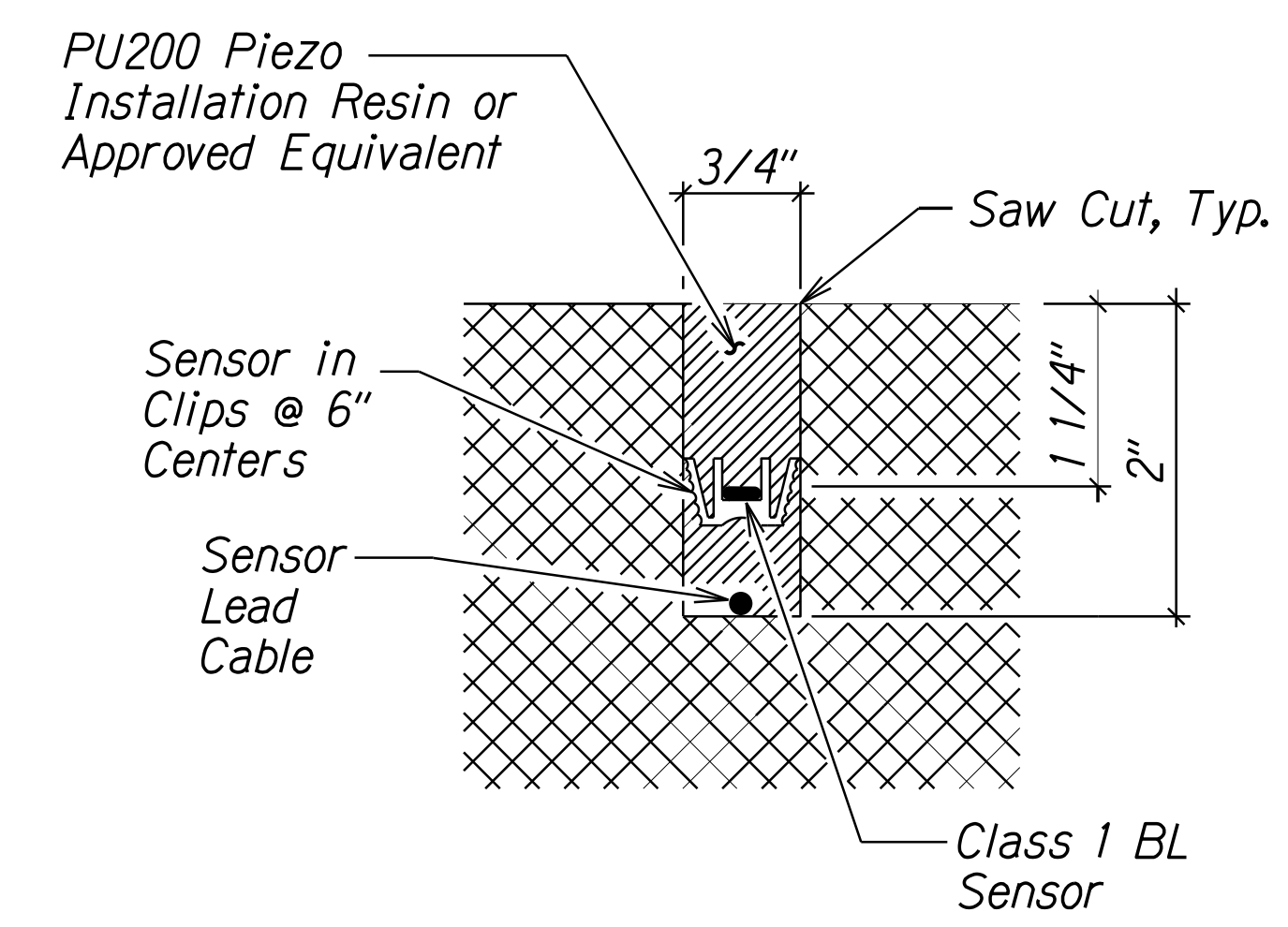
| FED. ROAD DIST. NO. | STATE | PROJ. NO.     | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|---------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | NH-063-1(025) | 2022        | 33        | 60           |



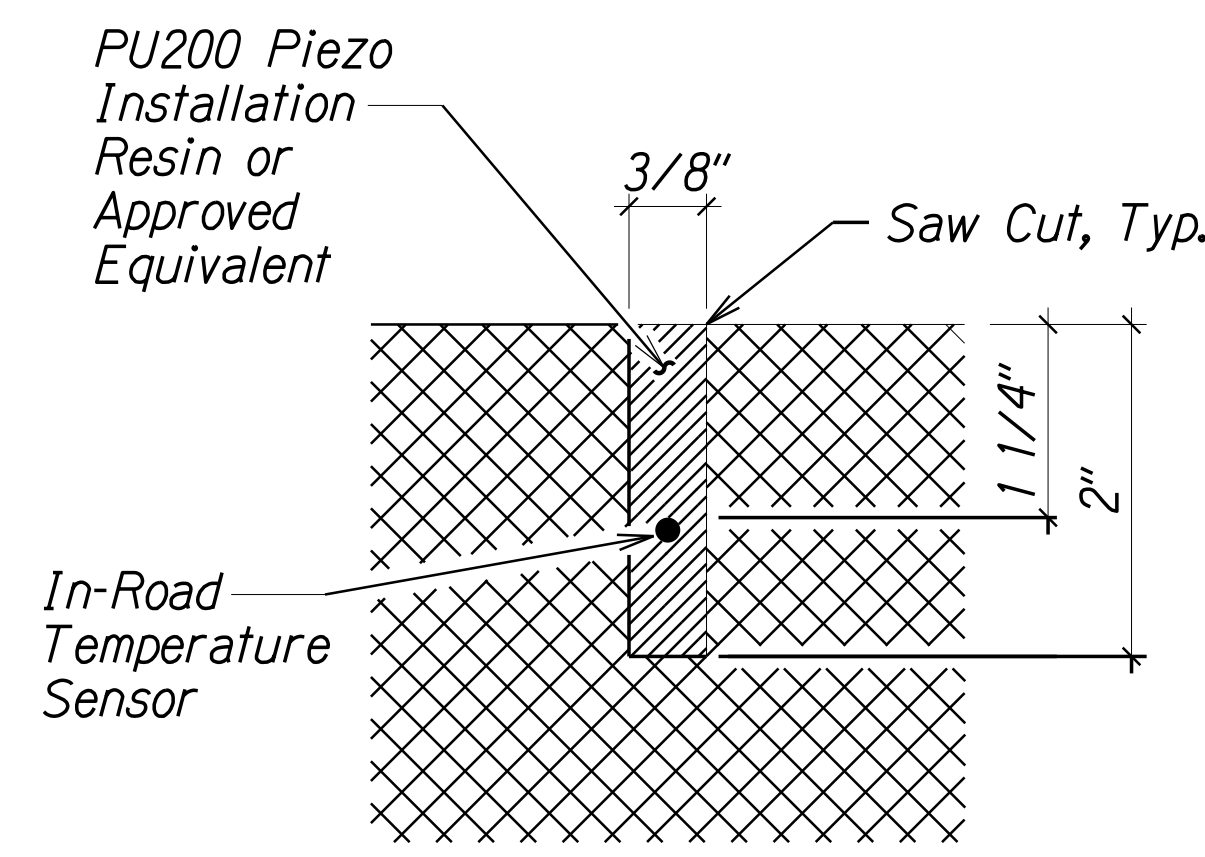
EDGE OF ROADWAY DETAILS  
Not to Scale

NOTES ON CONSTRUCTION AT END OF SAW CUT:

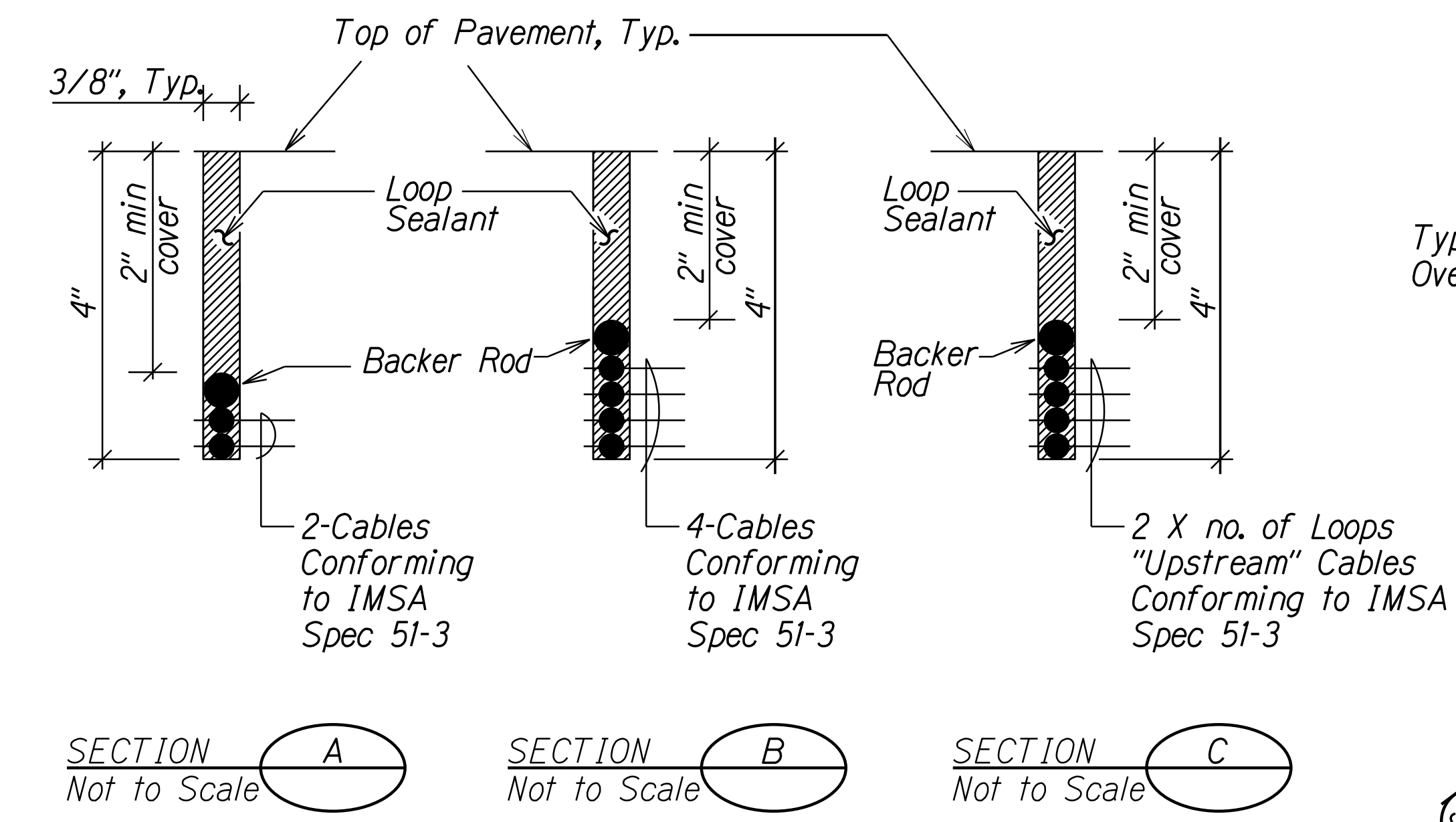
1. Install bell ends on conduit and seal with duct seal compound after installation of lead cables.
2. Install temporary bulkhead/dam across saw cut to keep sealant in saw cut as it is placed..
3. Place loop sealant, PU200 piezo installation resin (or equivalent) in saw cut.
4. Place sand to cover exposed lead cables and protect and separate them from backfill.
5. Backfill over sand with new A.C. cold mix in stubout excavation hole.
6. Reconstruct shoulder, curb, and gutter as required.
7. Conduit stubout should be installed at least 10 inches from the edge of pavement.  
If the depth of pavement is 4 inches or less at the edge, conduit stubout should be installed at least 12 inches from the edge of pavement.



PIEZO SENSOR SAW CUT SECTION DETAIL  
Not to Scale



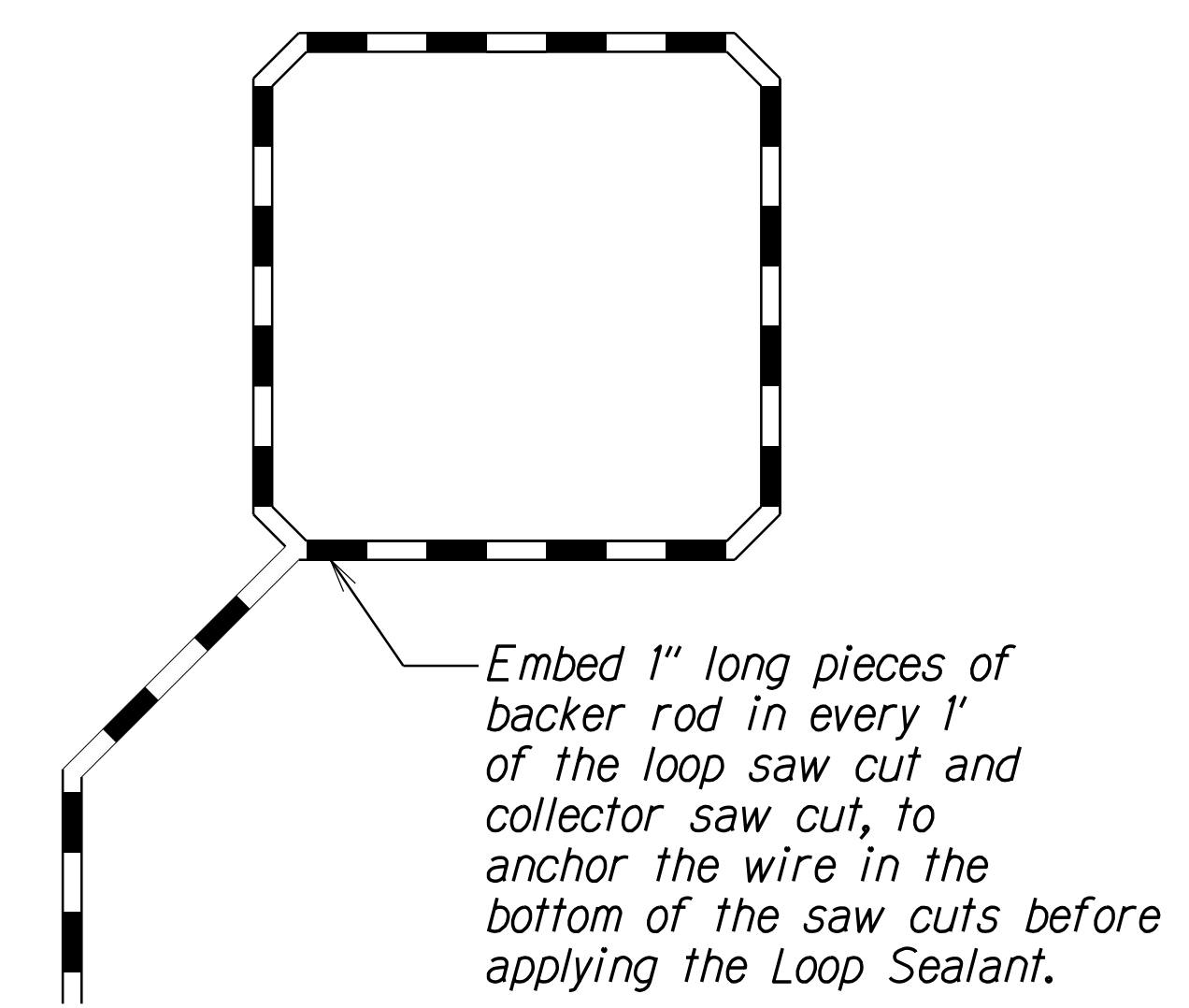
TEMPERATURE SENSOR SAW CUT SECTION DETAIL  
Not to Scale



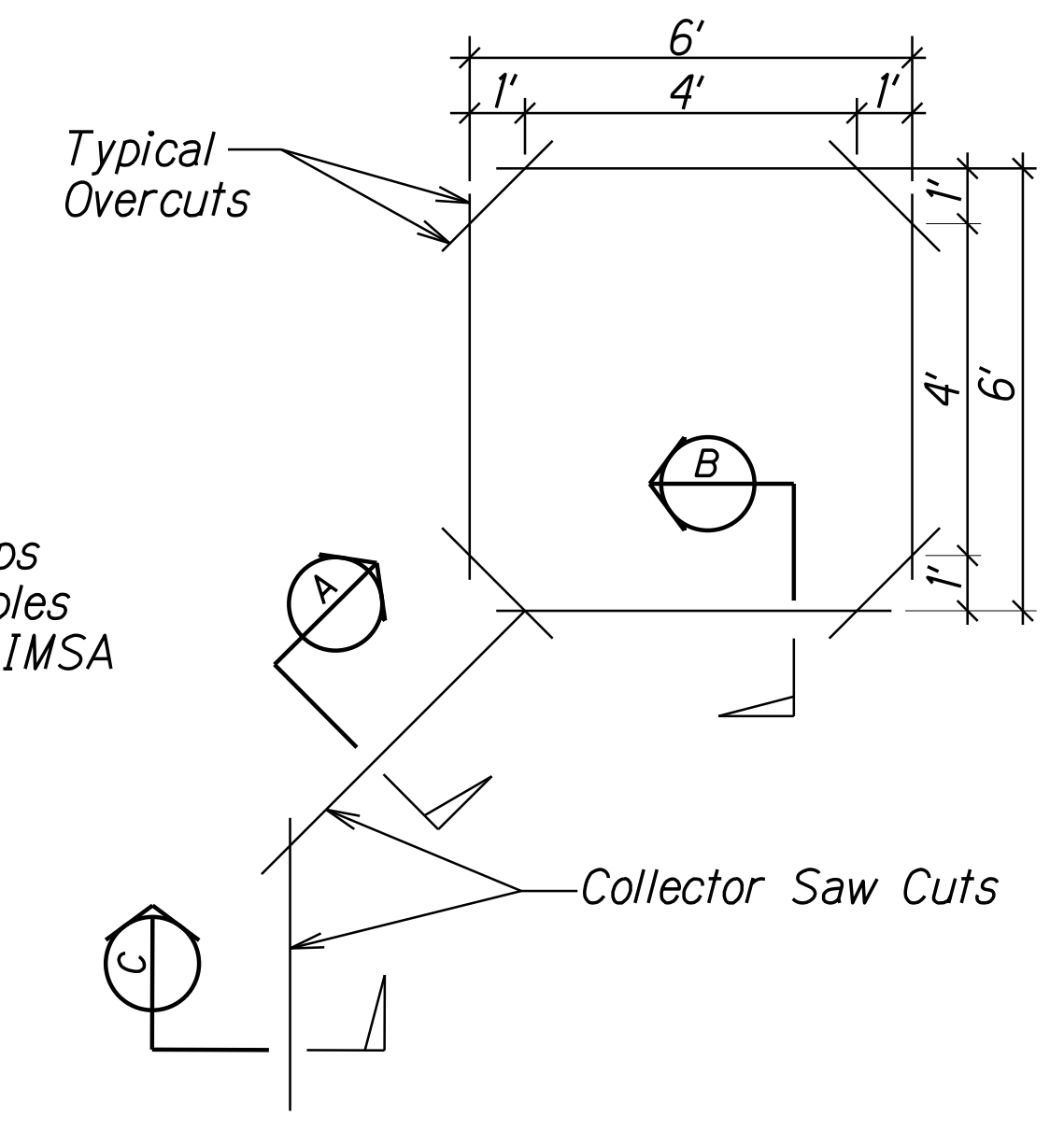
TYPICAL SECTIONS LOOP SENSORS  
Not to Scale

LOOP SENSOR SAW CUT NOTES:

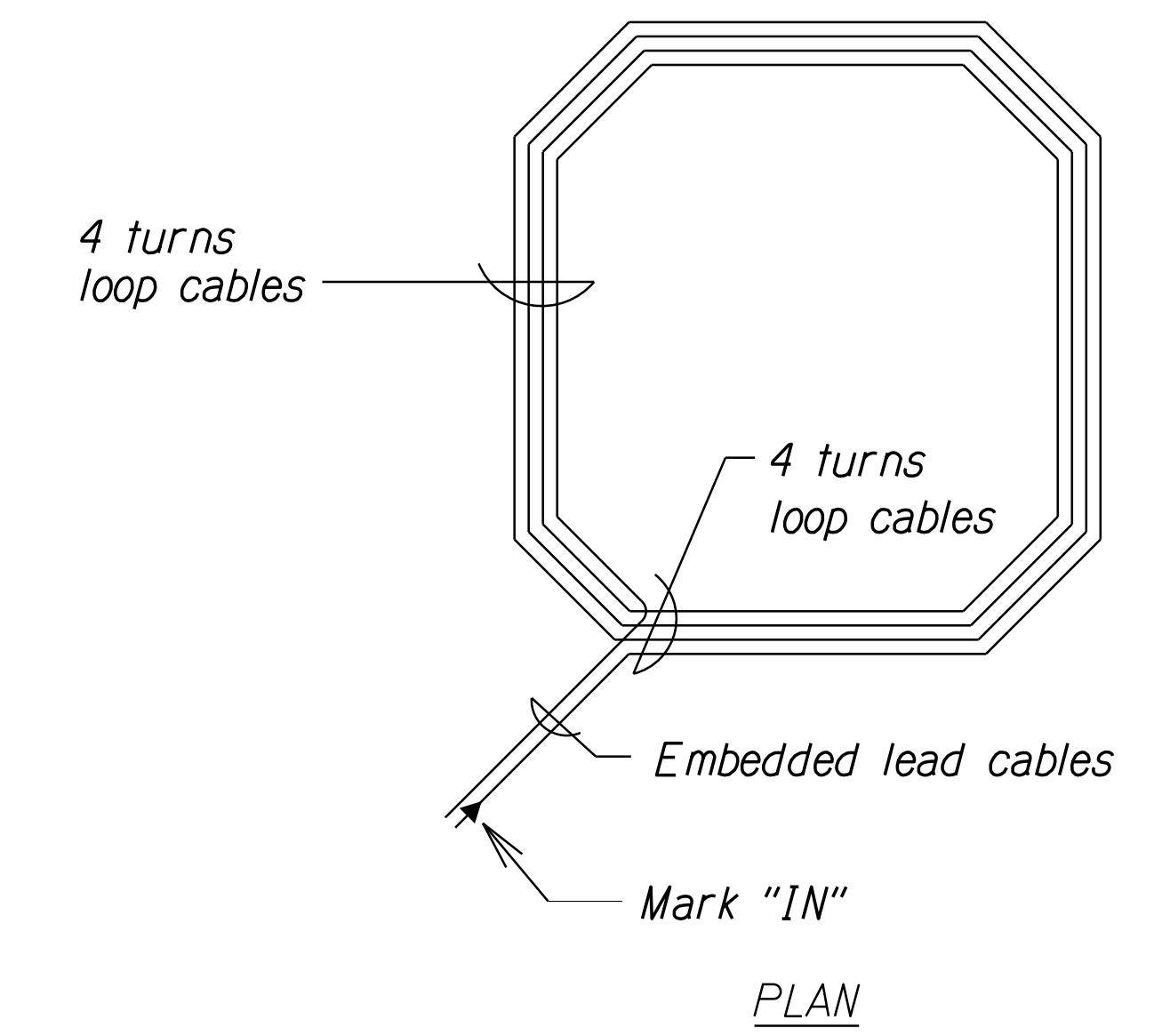
Length of overcuts shall be kept to a minimum. All overcuts shall be backfilled with Loop Sealant.



TYPICAL LOOP SENSOR BACKER ROD PLACEMENT DIAGRAM  
Not to Scale



TYPICAL LOOP SENSOR SAW CUT DETAIL  
Not to Scale

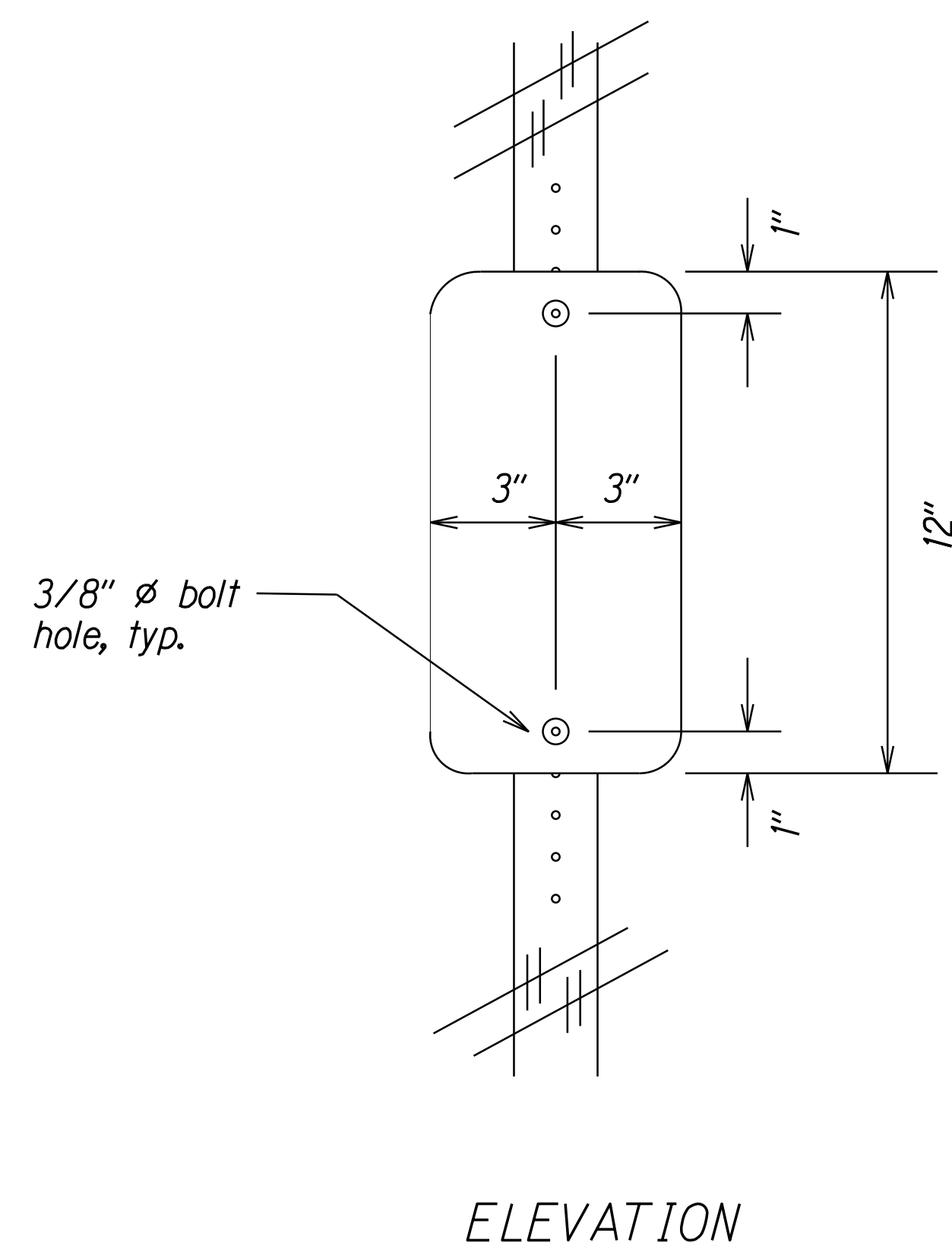
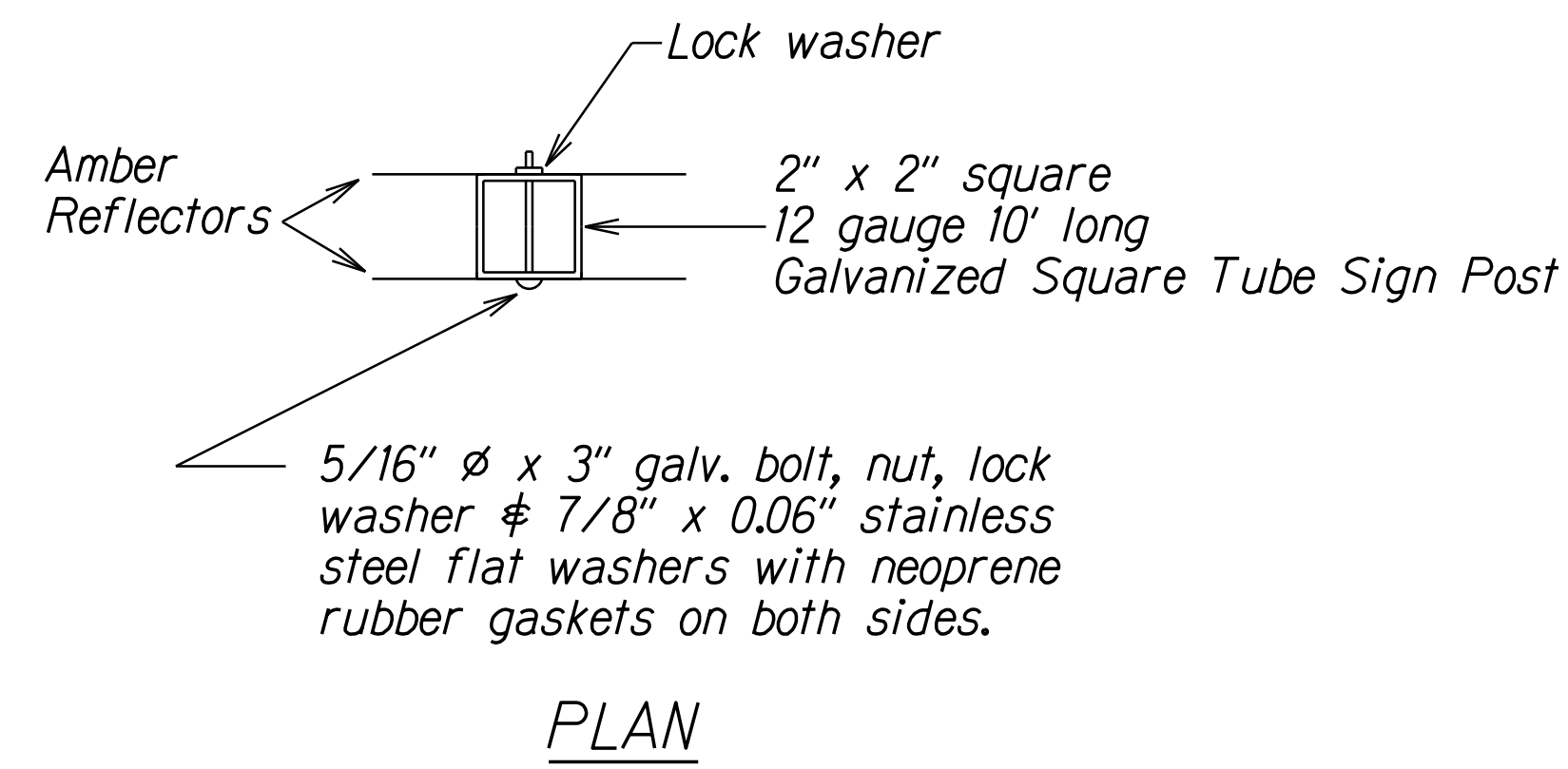


TYPICAL LOOP SENSOR WIRING DIAGRAM  
Not to Scale

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EVC TRAFFIC COUNTING**  
**SYSTEM SENSOR DETAILS**  
LIKELIKE HIGHWAY  
SAFETY IMPROVEMENTS  
Emmeline Place to Kahekili Highway  
Federal Aid Project No. NH-063-1(025)  
Scale: Not To Scale Date: May, 2022  
SHEET No. 3 OF 5 SHEETS

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

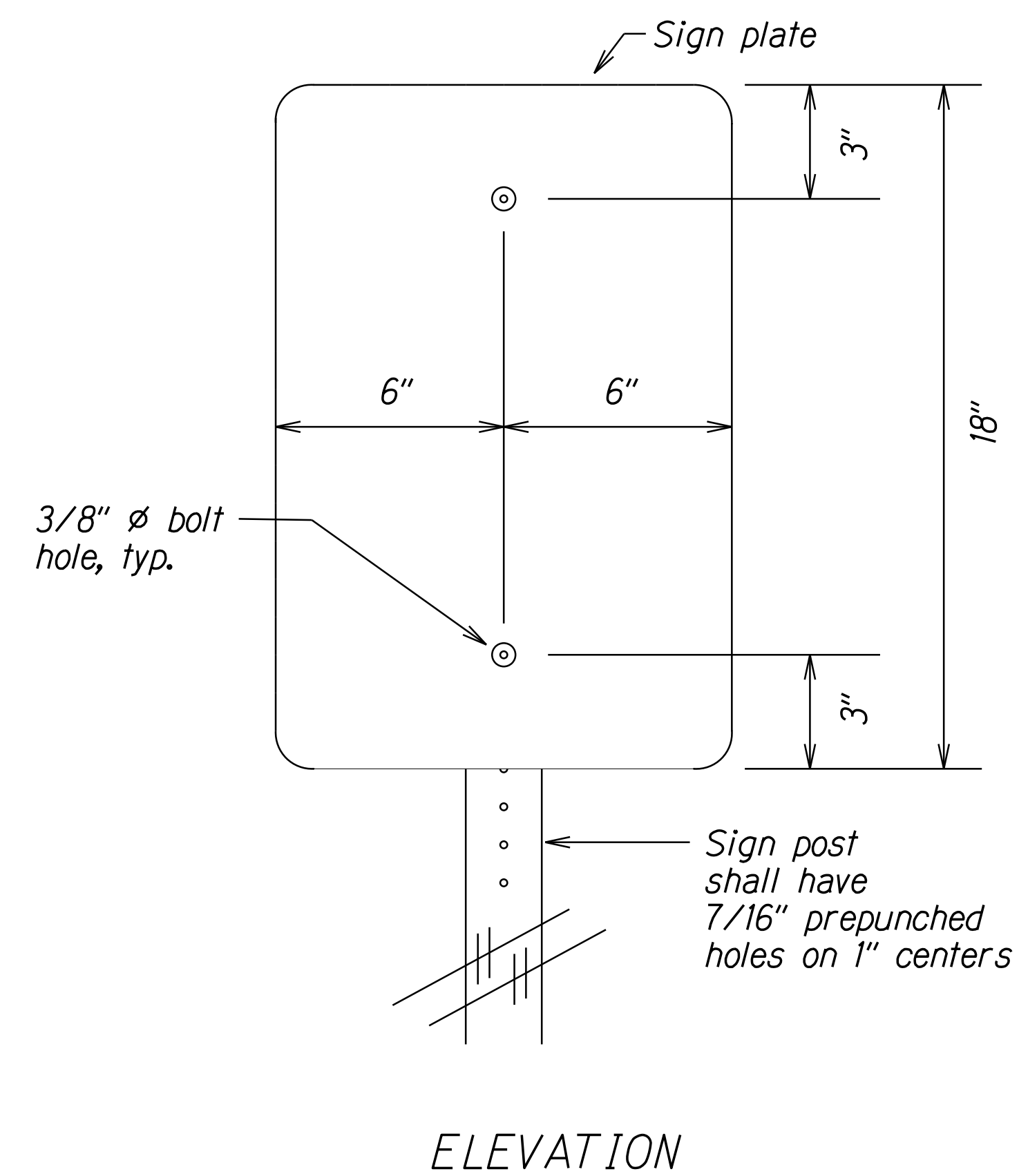
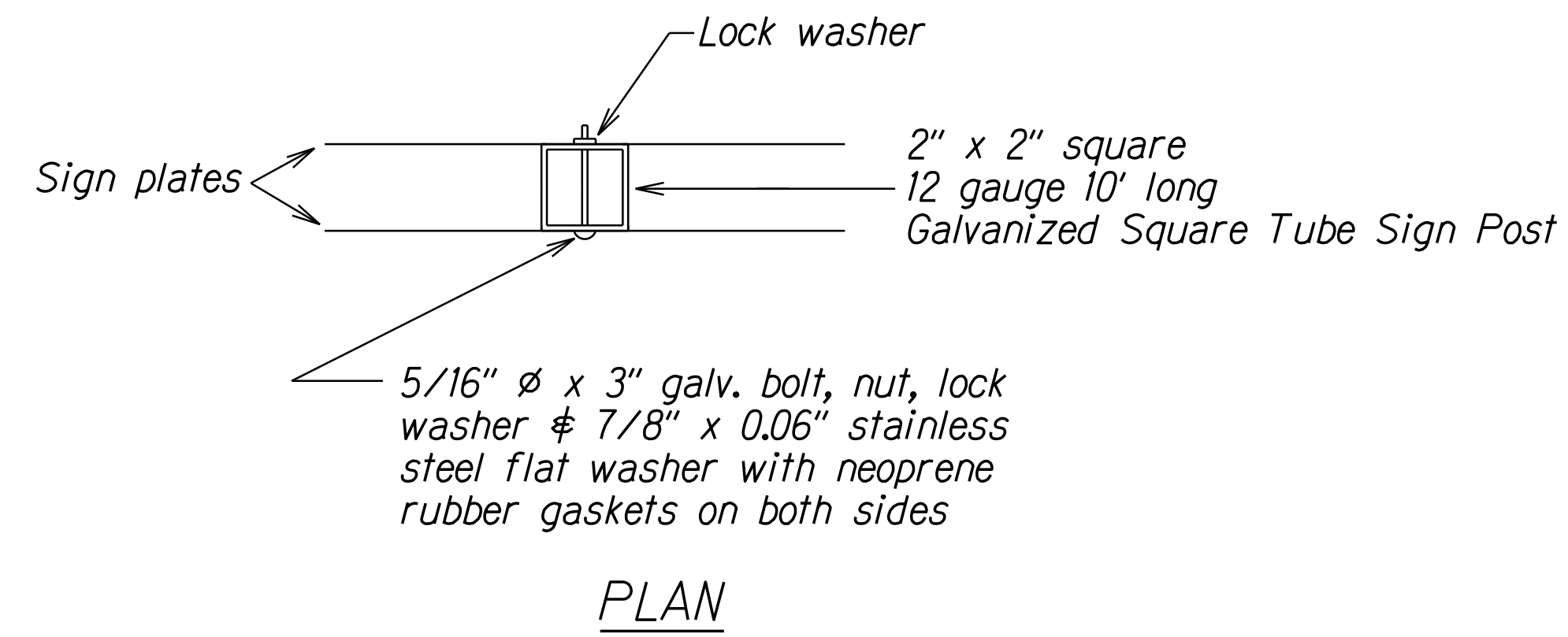
| FED. ROAD DIST. NO. | STATE | PROJ. NO.     | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|---------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | NH-063-1(025) | 2022        | 34        | 60           |



NOTES:

1. Two (2) reflectors shall be mounted back to back, below the warning signs on the same sign post, perpendicular to the roadway and to the warning signs..
2. Bottom of reflectors shall be 4' above finished grade.

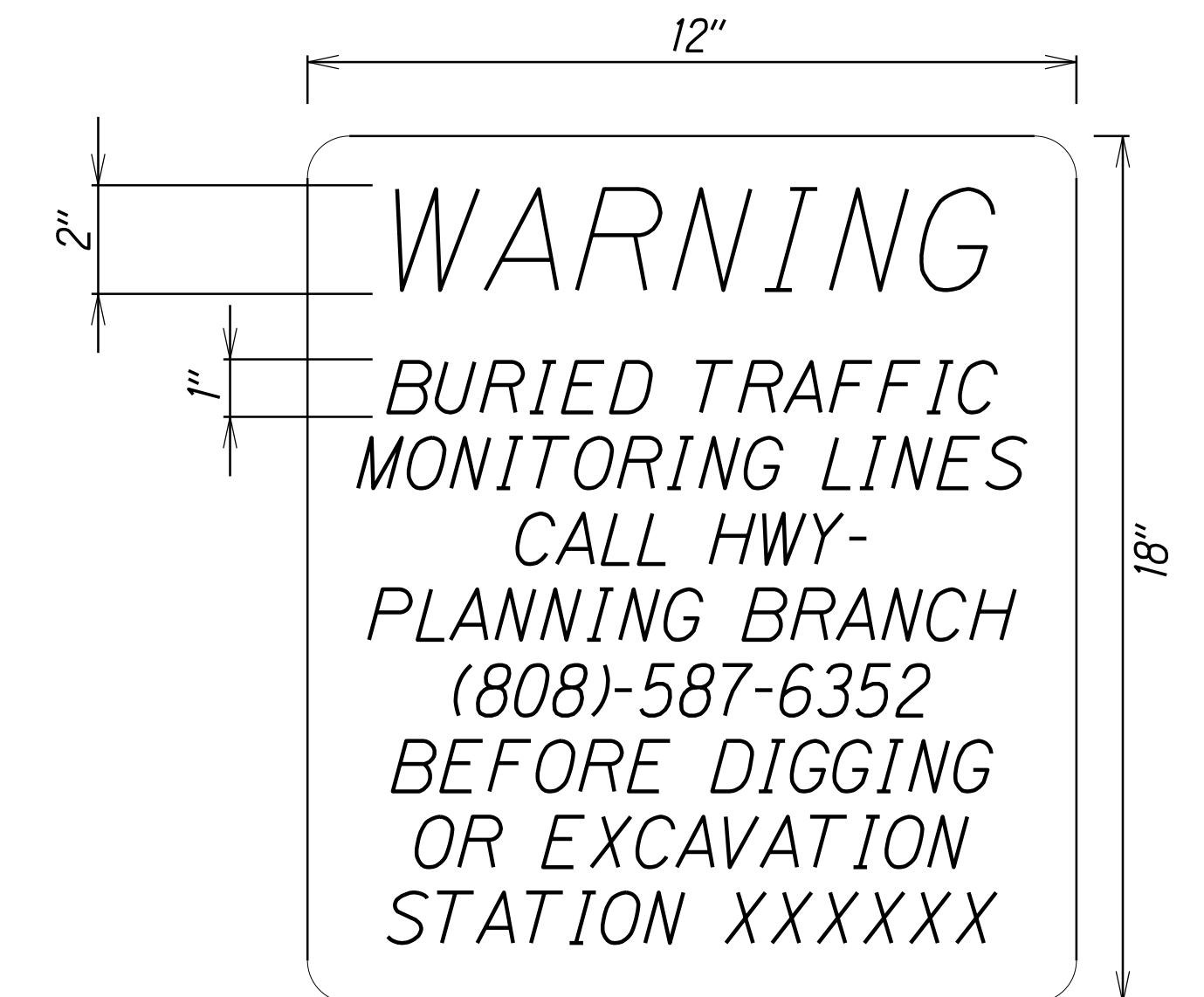
TYPE II OBJECT MARKER (REFLECTOR) MOUNTING  
Not to Scale



NOTES:

1. Two (2) warning sign plates shall be mounted back to back, parallel to the roadway.
2. Bottom of signs shall be 8' above finished grade.

WARNING SIGN MOUNTING  
Not to Scale



NOTES:

1. Two (2) warning signs shall be placed on each sign post back to back.
2. Text on sign shall be centered both ways and shall be black text on yellow non-retro reflective background.
3. Include existing station name in place of XXXXXX. For new stations, leave blank (name to be added later when assigned).

WARNING SIGN DETAIL  
Not to Scale

|               |                   |      |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK     | DRAWN BY          |      |
|               | DESIGNED BY       |      |
|               | CHECKED BY        |      |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EVC TRAFFIC COUNTING**  
**SYSTEM WARNING SIGN**  
LIKELIKE HIGHWAY  
SAFETY IMPROVEMENTS  
Emmeline Place to Kahekili Highway  
Federal Aid Project No. NH-063-1(025)  
Scale: Not to Scale Date: May, 2022  
SHEET No. 4 OF 5 SHEETS