ITEM 630 – SIGNING, MISC.: SOLAR POWERED RADAR SPEED LIMIT FEEDBACK SIGN ASSEMBLY

THIS SPECIFICATION DESCRIBES THE MINIMUM ACCEPTABLE DESIGN AND PERFORMANCE REQUIREMENTS FOR THE SPEED LIMIT (R2-1-36) AND RADAR FEEDBACK SIGN ASSEMBLY. THE SIGN ASSEMBLY SHALL BE SELF-POWERED BY SOLAR PANELS AND BATTERIES WITH NO EXTERNAL ELECTRICAL POWER INSTALLATION. THE SPEED LIMIT SIGN SHALL BE MUTCD COMPLIANT.

THE FOLLOWING CRITERIA SHALL BE MET:

1. EACH SIGN ASSEMBLY SHALL BE A COMPLETE ASSEMBLY, CONSISTING OF BUT NOT LIMITED TO, SIGNAGE, SIGN MOUNTING HARDWARE, SOLAR EQUIPMENT, BATTERY, CABINET, CONTROLLER, STRAIN OR PEDESTAL POLE, TRANSFORMER BASE, AND FOUNDATION.
2. THE NEW UNIT SHALL ATTACH SECURELY TO THE PROPOSED SIGN SUPPORT USING A TAMPER RESISTANT FASTENING SYSTEM. SPECIAL TOOLS NEEDED FOR THE TAMPER RESISTANT FASTENING SYSTEM SHALL BE SUPPLIED WITH EACH SIGN.
3. EACH SIGN SHALL MEET THE REQUIREMENTS OF C&MS 630.
4. EACH SIGN UNIT SHALL BE IDENTIFIED WITH THE MANUFACTURER'S NAME, DATE OF MANUFACTURE, AND SERIAL NUMBER ON THE BACK SIDE.
5. THE SIGN UNIT SHALL BE VISIBLE AT A MINIMUM OF ¼ MI. DURING ALL CONDITIONS.
6. THE SIGN UNIT SHALL INCORPORATE CIRCUITRY AND A PHOTOCELL TO ENSURE THAT IS HAS BRIGHTNESS ADJUSTMENT DURING DAY, DUSK, AND AT NIGHT.
7. THE LENS OF THE LED UNIT SHALL BE CAPABLE OF WITHSTANDING ULTRAVIOLET LIGHT (DIRECT SUNLIGHT) EXPOSURE FOR A MINIMUM TIME PERIOD OF FIVE YEARS WITHOUT EXHIBITING EVIDENCE OF DETERIORATION.
8. THE LENSES SHALL WITHSTAND A 3 FOOT DROP TEST ONTO A HARD SURFACE AND SHALL BE A MINIMUM OF ¼ INCH THICK AND FREE OF BUBBLES AND IMPERFECTIONS. THE LENSES SHALL BE SMOOTH ON THE OUTSIDE, WITH NO EXTERNAL FACETS TO PREVENT DIRT AND DEBRIS BUILD-UP.
9. IF LENSES ARE TINTED, THEY SHALL MATCH THE WAVELENGTH (CHROMATICITY) OF THE LED.
10. THE INDIVIDUAL LED LIGHT SOURCES SHALL BE WIRED SO THAT A CATASTROPHIC FAILURE OF ONE LED LIGHT SOURCE WILL NOT RESULT IN THE LOSS OF MORE THAN ONE LED LIGHT SOURCE IN THE SIGN UNIT.
11. LED UNITS AND ASSOCIATED ON-BOARD CIRCUITRY SHALL CONFORM TO THE REQUIREMENTS IN FEDERAL COMMUNICATIONS COMMISSION (FCC) TITLE 47, SUB PART B, SECTION 15 REGULATIONS CONCERNING THE EMISSION OF ELECTRONIC NOISE.
12. LED'S SHALL BE RATED FOR USE IN THE AMBIENT OPERATING TEMPERATURE RANGE OF -40°F TO +166°F. (=-40°C TO +74°C)
13. THE LED'S WIRING SHALL BE SEALED WATERTIGHT TO ELIMINATE DIRT CONTAMINATION AND ALLOW FOR SAFE HANDLING IN ALL WEATHER CONDITIONS. THE LED'S SHALL BE SEALED AGAINST DUST AND MOISTURE INTRUSION AS PER THE REQUIREMENTS OF NEMA STANDARD 250-1991 FOR TYPE 4 ENCLOSURES AND TO PROTECT ALL INTERNAL LED AND ELECTRICAL COMPONENTS.
14. THE SIGN UNIT LED'S SHALL DISPLAY A MINIMUM OF 500,000 MCD FOR DAYTIME VISIBILITY.
15. THE UNIT SHALL BE CAPABLE OF RUNNING 14 DAYS WITHOUT SUNLIGHT.
16. THE SPEED LIMIT FEEDBACK SIGN SHALL BE WHITE IN COLOR.
17. THE DIGIT SIZE ON THE SPEED LIMIT FEEDBACK SIGN DISPLAY SHALL BE A MINIMUM OF 12 INCHES IN HEIGHT.

CONTROL CIRCUIT –

1. THE CONTROL CIRCUIT SHALL HAVE THE CAPABILITY OF INDEPENDENTLY FLASHING UP TO TWO INDEPENDENT OUTPUTS. THE LED LIGHT OUTPUTS AND FLASH PATTERN SHALL BE COMPLETELY PROGRAMMABLE.
2. THE CONTROL CIRCUIT SHALL BE SEALED WATERTIGHT TO ELIMINATE DIRT CONTAMINATION AND ALLOW FOR SAFE HANDLING IN ALL WEATHER CONDITIONS.
3. THE LEDS SHALL BE SEALED AGAINST DUST AND MOISTURE INTRUSION AS PER THE REQUIREMENTS OF NEMA STANDARD 250-1991 FOR TYPE 4 ENCLOSURE AND TO PROTECT ALL INTERNAL LED AND ELECTRICAL COMPONENTS.

SOLAR REQUIREMENTS –

1. BATTERY UNIT SHALL BE A 12VDC, 35 AHR MINIMUM, SEALED GEL OR AGM LEAD ACID BATTERY. BATTERIES SHALL HAVE A WRITTEN TWO YEAR FULL REPLACEMENT WARRANTY.
2. THE SOLAR PANEL SHALL PROVIDE A MINIMUM OF 40 WATTS PEAK TOTAL OUTPUT.
3. THE SOLAR PANEL SHALL BE MOUNTED TO AN ALUMINUM PLATE AND BRACKET AT AN ANGLE OF 45 DEGREES- 60 DEGREES TO PROVIDE MAXIMUM OUTPUT.
4. ALL FASTENERS USED SHALL BE ANTI-VANDAL.

SEE "GENERAL ELECTRICAL REQUIREMENTS FOR SOLAR-POWERED DEVICES" NOTE ON THIS SHEET FOR ADDITIONAL DETAILS.

PEDESTAL SHAFT AND BASE –

MOUNT ON A STANDARD 4.5-INCH O.D. ALUMINUM PEDESTAL POLE WITH A TRANSFORMER BASE ON A PELCO PB-5364 FOUNDATION ANCHOR ASSEMBLY OR EQUIVALENT AND INCLUDE ALL NECESSARY DRIVER ADAPTERS AND BOLT ASSEMBLIES. A 15-FOOT POLE SHALL BE PROVIDED AND FIELD ADJUSTED TO MAINTAIN THE PROPER SIGN MOUNTING HEIGHTS, UNLESS SPECIFIED OTHERWISE IN THE PLANS. POLE AND BASE MANUFACTURER SHALL BE LISTED ON ODOT'S QUALIFIED PRODUCTS LIST.

FOUNDATION –

FURNISH A FOUNDATION AND GROUND ROD PER THE DETAILS ON THE SIGNING DETAILS SHEETS. PAYMENT FOR THE FOUNDATION AND GROUND ROD SHALL BE INCLUDED IN THIS ITEM.

CONSTRUCTION –

THE SPEED LIMIT FEEDBACK SIGN ASSEMBLY SHALL BE ASSEMBLED AND CONSTRUCTED BY THE CONTRACTOR AS SHOWN AND SPECIFIED IN THE PLANS.

REQUIRED DOCUMENTATION -
EACH SIGN UNIT SHALL BE PROVIDED WITH THE FOLLOWING DOCUMENTATION EITHER IN HARD COPY OR AS A PDF.

ONE SCHEMATIC DIAGRAM SHALL BE PROVIDED FOR THE SIGN UNIT ALONG WITH ANY NECESSARY INSTALLATION INSTRUCTIONS.

1. THE LED MANUFACTURERS NAME, BRAND, AND MODEL NUMBER.

WARRANTY -

1. THE SIGN UNIT SHALL BE REPAIRED OR REPLACED BY THE MANUFACTURER IF IT EXHIBITS A FAILURE DUE TO WORKMANSHIP OR MATERIAL DEFECTS WITHIN 2 YEARS OF FIELD OPERATION.
2. THE MANUFACTURER SHALL PROVIDE A WRITTEN WARRANTY AGAINST DEFECTS IN MATERIALS, WORKMANSHIP, AND LUMINOUS INTENSITY FOR THE SIGN UNIT FOR A PERIOD OF 2 YEARS AFTER INSTALLATION. A REPLACEMENT SIGN UNIT SHALL BE PROVIDED WITHIN 10 DAYS AFTER RECEIPT OF FAILED UNIT AT NO COST, EXCEPT THE COST OF SHIPPING THE FAILED UNIT.

PAYMENT -

PAYMENT FOR ITEM 630, SIGNING MISC., SOLAR POWERED RADAR SPEED LIMIT FEEDBACK SIGN ASSEMBLY SHALL BE MADE AT THE CONTRACT BID PRICE, EACH, COMPLETELY INSTALLED IN PLACE AND FULLY FUNCTIONAL INCLUDING ALL MATERIAL, LABOR, AND EQUIPMENT REQUIRED TO FURNISH THE SIGN ASSEMBLY AND MOUNT THE SOLAR UNIT TO THE SIGN SUPPORT AS PER THE SIGN DETAIL.

GENERAL ELECTRICAL REQUIREMENTS FOR SOLAR-POWERED DEVICES (TEM 442-50)

RUN REQUIREMENTS OF THIS DEVICE ARE 24 HOURS PER DAY, 7 DAYS PER WEEK.

UTILIZE ENVIRONMENTALLY SEALED, HIGH-EFFICIENCY LED LIGHT SOURCES FOR THIS SOLAR-POWERED APPLICATION.

HOUSE THE SOLAR POWER SUPPLY CONTROLLER AND BATTERY IN ONE OR TWO STAINLESS STEEL OR ALUMINUM ENCLOSURES WITH A MINIMUM NEMA 3 OR 3X RATING.

IF THE EXTERIOR SIZE OF THE ENCLOSURE NECESSARY TO MEET THE REQUIREMENTS BELOW IS LESS THAN 1000 CUBIC INCHES, A SINGLE POLYMER ENCLOSURE RATED NEMA 4 AND LISTED AS SUNLIGHT-RESISTANT MAY BE INSTALLED, WITH APPROVAL OF THE ENGINEER.

SEAL ENCLOSURE CONDUIT ENTRIES TO PREVENT INSECT AND/OR RODENT ENTRY. PROVIDE METAL ENCLOSURES WITH AN EXTERIOR OF BARE OR POWDER-COATED ALUMINUM, OR STAINLESS STEEL.

PROVIDE A LOCKING ENCLOSURE USING EITHER AN INTEGRATED LOCKING MECHANISM OR A PADLOCK PER C&MS 631.06.

SMALL ENCLOSURES OF 300 CUBIC INCHES OR LESS (EXTERIOR) MAY BE PROVIDED WITH SECURITY FASTENERS IN LIEU OF A LOCKING MECHANISM OR PADLOCK.

SEPARATE THE CONTROL ELECTRONICS AND BATTERY, IF CONTAINED WITHIN A SINGLE ENCLOSURE, TO PREVENT DAMAGE TO THE CONTROL ELECTRONICS IF THE BATTERY ENVELOPE IS COMPROMISED.

PROVIDE SEALED GEL-CELL OR AGM (ABSORBED GLASS MAT) LEAD-ACID BATTERIES FOR ALL INSTALLATIONS WITH INSTANTANEOUS LOAD REQUIREMENTS OF 4 WATTS OR ABOVE, REGARDLESS OF DUTY CYCLE.

FOR INSTALLATIONS WITH INSTANTANEOUS LOAD REQUIREMENTS OF LESS THAN 4 WATTS, RECHARGEABLE NICD, LI-ION, OR NIMH BATTERIES MAY BE USED INSTEAD OF AGM OR GEL-CELL, IF APPROVED BY THE ENGINEER.

PROVIDE SIGNED COPIES FROM THE SOLAR PANEL AND/OR CONTROLLER MANUFACTURER OF ALL CALCULATIONS USED TO SIZE THE SOLAR PANEL AND BATTERIES.

INCLUDE IN THESE CALCULATIONS THE INSOLATION VALUE USED AND ITS REFERENCE SOURCE, THE SOLAR PANEL EFFICIENCY, CHARGER/CONTROLLER EFFICIENCY, INVERTER EFFICIENCY, PROPOSED LED LAMP AND/OR EQUIPMENT LOAD, AND A FIGURE REPRESENTING ANTICIPATED MISCELLANEOUS LOSSES.

SHOW CALCULATIONS DOCUMENTING A RESERVE CAPACITY OF TWO WEEKS OPERATION UNDER CONTINUOUS WORST-CASE (MINIMUM) INSOLATION FIGURES (USUALLY DECEMBER) FOR THE PROPOSED GEOGRAPHIC LOCATION, USING A PANEL ELEVATION ANGLE APPROPRIATE TO THE SITE, AT A SUSTAINED TEMPERATURE OF 25 DEGREES FAHRENHEIT (-4 DEGREES CELSIUS).

DELIVER A COPY OF THE CALCULATIONS TO THE ENGINEER AND ANOTHER COPY TO THE OFFICE OF ROADWAY ENGINEERING FOR APPROVAL.

PROVIDE DOCUMENTATION SHOWING THAT THE SOLAR PANEL MANUFACTURER TESTED THE PANEL ACCORDING TO IEC61215 OR EQUIVALENT APPROVED STANDARD.

PROVIDE DOCUMENTATION SHOWING THAT SOLAR PANEL MOUNTING IS RATED FOR 90 MPH DESIGN WIND AND DESIGNED TO RESIST VANDALISM.

ENSURE NEC GROUNDING AND BONDING REQUIREMENTS ARE MET IF VOLTAGES OVER 50V AC OR DC ARE PRESENT.

PROVIDE A TIMER (IF REQUIRED) THAT SATISFIES THE REQUIREMENTS OF C&MS 731.10 AND IS LISTED ON THE ODOT QUALIFIED PRODUCTS LIST.

PROVIDE COMPLETE PHOTO-CONTROLLER SPECIFICATIONS, INCLUDING ON/OFF PHOTOMETRIC SWITCH POINTS (TYPICALLY GIVEN IN FOOT-CANDLES), IF A PHOTO-CONTROLLER IS UTILIZED.

GENERAL NOTES

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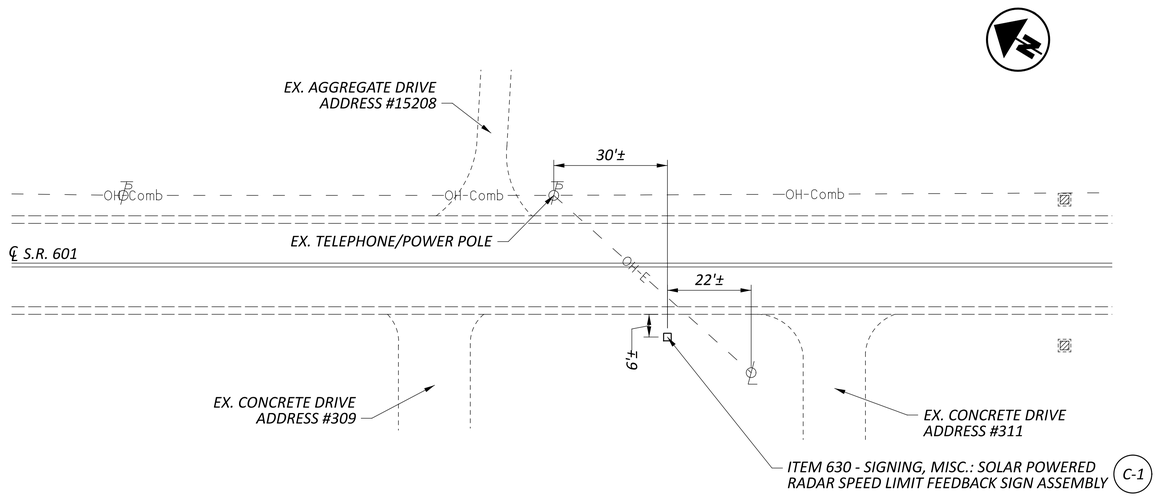
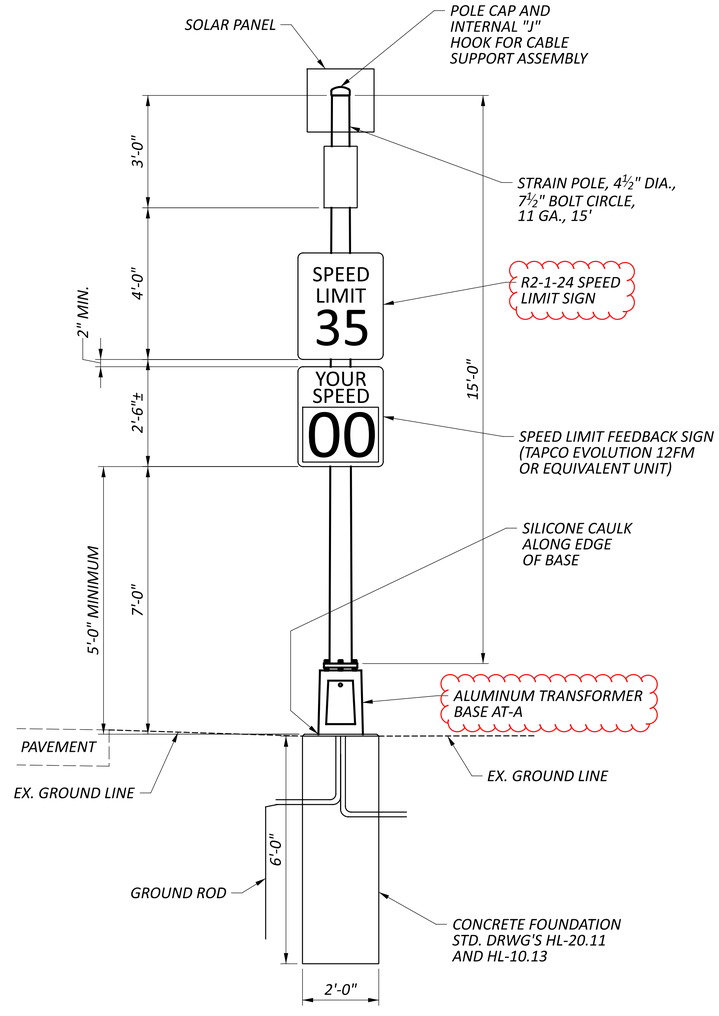
DESIGN AGENCY
DISTRICT 3
ENGINEERING TEAM THREE
DESIGNER ACM
REVIEWER JSR 11-14-23
PROJECT ID 108029
SHEET P.3A TOTAL 43



PLAN VIEW



15' STEEL POLE DETAIL

NOT TO SCALE

C-1

NOTES:
1) CONTACT BETWEEN ALUMINUM AND GALVANIZED PARTS SHALL BE PREVENTED WITH A MINIMUM 1/16" THICK CHLOROPRENE GASKET OR APPROVED SUBSTITUTE. GASKETS ARE NOT REQUIRED BETWEEN STAINLESS STEEL AND ALUMINUM.

HORIZONTAL SCALE IN FEET
0 10 20 40

ERI-601 SIGNING DETAILS
STA. 08+98

DESIGN AGENCY
DISTRICT 3
ENGINEERING TEAM THREE

DESIGNER	
ACM	
REVIEWER	
JSR	11-14-23
PROJECT ID	
108029	
SUBSET	TOTAL
1	1
SHEET	TOTAL
P.8	43

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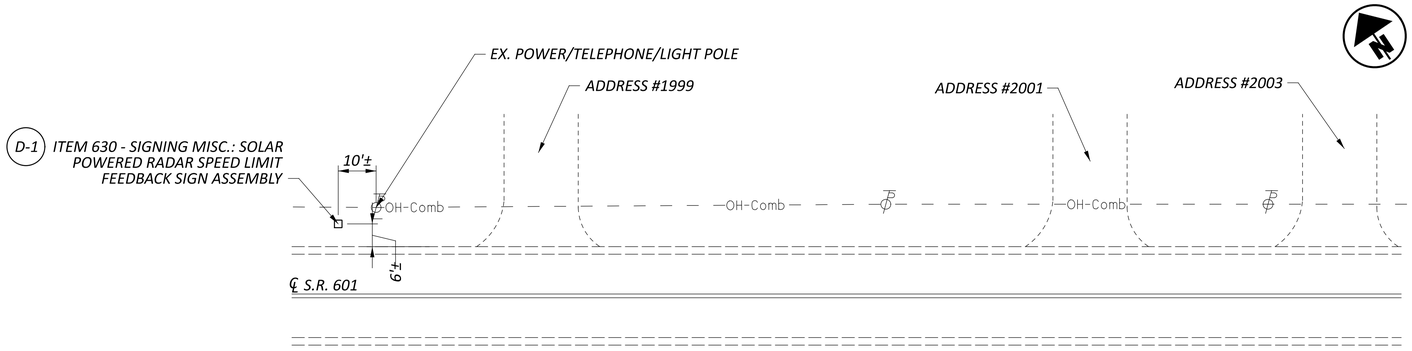

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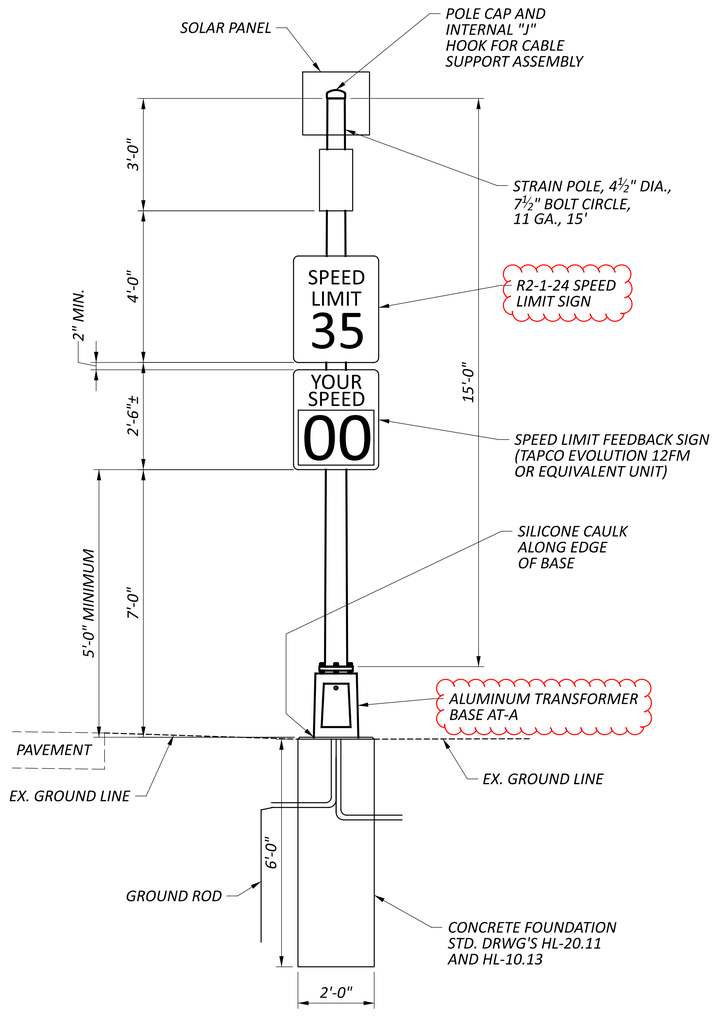

15' STEEL POLE DETAIL

NOT TO SCALE

D-1

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HORIZONTAL SCALE IN FEET
0 10 20 40

HUR-601 SIGNING DETAILS
STA. 261+36

DESIGN AGENCY
DISTRICT 3
ENGINEERING TEAM THREE

DESIGNER	ACM
REVIEWER	JSR 11-14-23
PROJECT ID	108029
SUBSET / TOTAL	1 / 1
SHEET / TOTAL	P.9 / 43

D03-SYSSIGN-FY2024

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