April 20, 2022

Submitted to:

Federal Highway Administration, Office of Transportation Operations
(Duane.Thomas@dot.gov, Kevin.Sylvester@dot.gov)

California Traffic Control Device Committee (CTCDC)
(johnny.bhullar@dot.ca.gov)

RE: Permission for Experimental IIRPMs in the City of Los Angeles (Van Nuys)

The Los Angeles County Metropolitan Transportation Authority (LACMTA) respectively requests permission to conduct a demonstration of internally illuminated raised pavement markers (IIRPMs) that would supplement the traffic signals along Van Nuys Boulevard adjacent to the rail tracks of the East San Fernando Valley (ESFV) Transit Corridor Project (Project), a Light Rail system to be operated by the LACMTA.

The California MUTCD Section 3B.12 – 3B.14 allows for IIRPMs with following requirements:

> 04 Retroreflective and internally illuminated raised pavement markers are available in mono-directional and bidirectional configurations. The bidirectional marker is capable of displaying the applicable color for each direction of travel.
>
> 06 When used, internally illuminated raised pavement markers shall be steadily illuminated and shall not be flashed.

The IIRPMs are designed to supplement the traffic signal's red turn phase, and further warn motorist from making illegal left turns in front of oncoming trains or opposing traffic on Van Nuys Boulevard in the City of Los Angeles. The IIRPMs will be installed only at intersections/crossings with light rail trains and in conjunction to traffic signals. Additionally, some crossings include both IIRPMs and Left Turn Gates (subject to separate CTC approval).

During 2014, CTCDC approved of similar configurations for LACMTA's Gold Line. Analysis supporting the effectiveness of the IIRPMs was presented to the CTCDC during the January 31, 2019 meeting (See weblinks below). LACMTA's Bus Rapid Transit Orange Line also incorporates IIRPMs in the alignment.
https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/ctcdc/ctcdc-01-31-19-a11y.pdf

https://www.flprite.org/uploads/4/8/0/1/48016965/iirpm_parr.pdf

During field reviews, several engineers, including the California Public Utilities Commission (CPUC), requested the IIRPMs to supplement traffic signals and MUTCD approved warning signs. The additional warning by the IIRPM is expected to decrease the frequency of

motorist turning against the red light and colliding with oncoming trains.

Background

The ESFV Project will provide light rail transit (LRT) service along the Van Nuys Boulevard to San Fernando Road. The alignment will include 11 at-grade stations. The Project also includes a Maintenance and Storage Facility (MSF).

The Project will extend north from the Van Nuys Metro Orange Line Station to the Sylmar/San Fernando Metrolink Station, a total of 6.7 miles. Metro LRT trains will operate in the median of Van Nuys Boulevard. The Project is scheduled for Revenue Service in 2028.

Exhibit 1 – LACMTA ESFV Project Map

Statement of Problem

The Project's new at-grade crossings will be incorporated into existing intersections, such that the movement of trains, motorists, and pedestrians are controlled by traffic signals, train control signals, striping, and signage. In accordance with the California Public Utilities Commission (CPUC) crossing approval process, diagnostic meetings were conducted for each crossing, including the IIRPM of proposed traffic signal.

During crossing diagnostic meetings, a team of engineers and representatives from LACMTA, CPUC, consultants, and City of Los Angeles reviewed preliminary designs for the crossings and supported IIRPMs (and Left Turn Gates). LACMTA raised concerns that motorist illegal left turn movements in front of oncoming trains account for over 70% of all light rail accidents. LACMTA noted the effectiveness of reducing illegal left turns for similar IIRPMs located at 1st St. and Mission Road, Los Angeles, CA (See Exhibit 4).

The engineering diagnostic team believes that alternate measures supplemental to standard California MUTCD approved signage should be considered to deter motorists from illegal left turns in front of oncoming trains. The team agreed upon the proposed demonstration for the IIRPMs.

Proposed Solution - IIRPMs

As shown in Exhibits 2 and 3, the proposed IIRPMs would provide illumination warning in addition to the standard traffic signal devices. The IIRPMs are approximately 6-inches diameter and installed within ¼-inch above pavement grade (See Exhibit 8 for details).

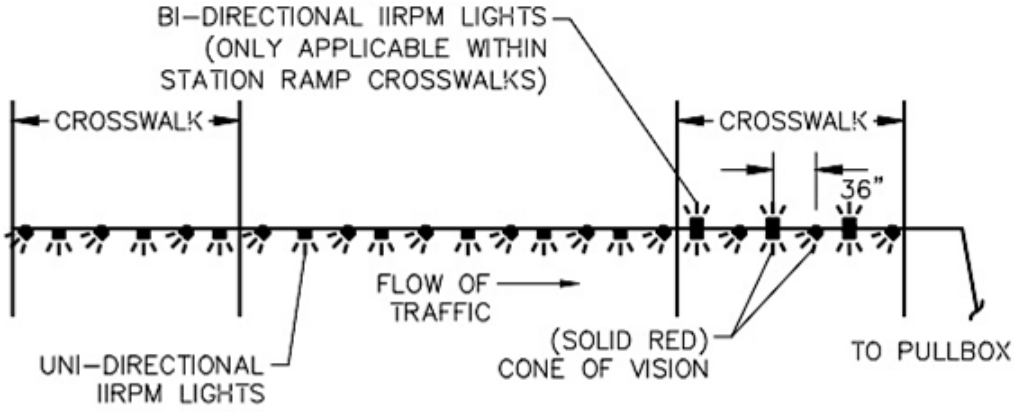

Exhibit 2 –Typical IIRPM Installation

The IIRPMs are installed 3-feet apart and illuminate steady-state Red. As shown in Exhibit 2, the IIRPM direction is alternating, directing to both left turn motorist and through traffic.

- IIRPMs facing the left turn lane (and bidirectional facing pedestrians) activates for Red Left Turn Phase Arrow and LRT on approach.

- IIRPMs facing through (cross street) traffic activates for LRT approach.
    - IIRPMs do not activate for the Red Through Phase without LRT approach
- IIRPMs will not be activate during Yellow or Green Phase of respective signal

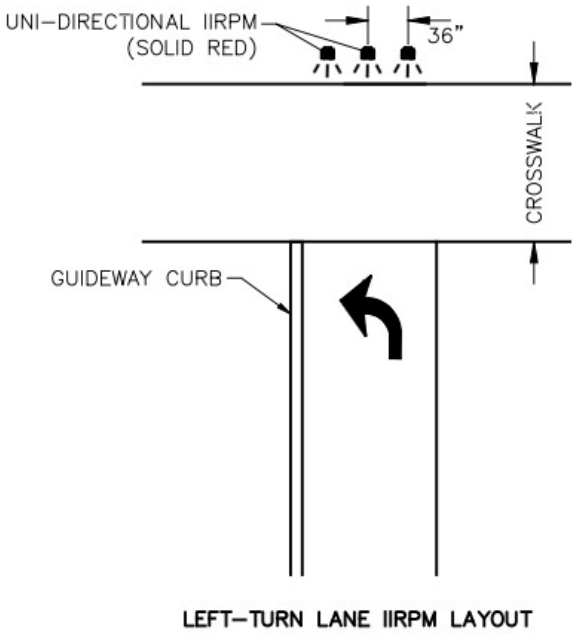

Exhibit 3 – Typical IIRPM Directed for Motorists in Left Turn Lane

The LACMTA light rail train signal system is interconnected to the traffic signal such that the train will proceed through during the restricted left turn phase with IIRPMs activated, further protecting motorist. The light rail train stops during the green left turn phase, to allow for motorist to safely proceed in front of the train.

In addition to the IIRPMs, Left Turn Gates also proposed and subject to separate CTCDC approval.

The maintenance and reliability of the IIRPMs is another factor that can limit the effectiveness of the warning system. LACMTA and City of Los Angeles will have a formal agreement to ensure IIRPMs are maintained and operating correctly. LACMTA noted that maintenance has not been an issue at the 1st St. and Mission Rd., Los Angeles location (See Exhibit 4 Below), and the IIRPM manufacturers have provided these lights for years with high reliability.

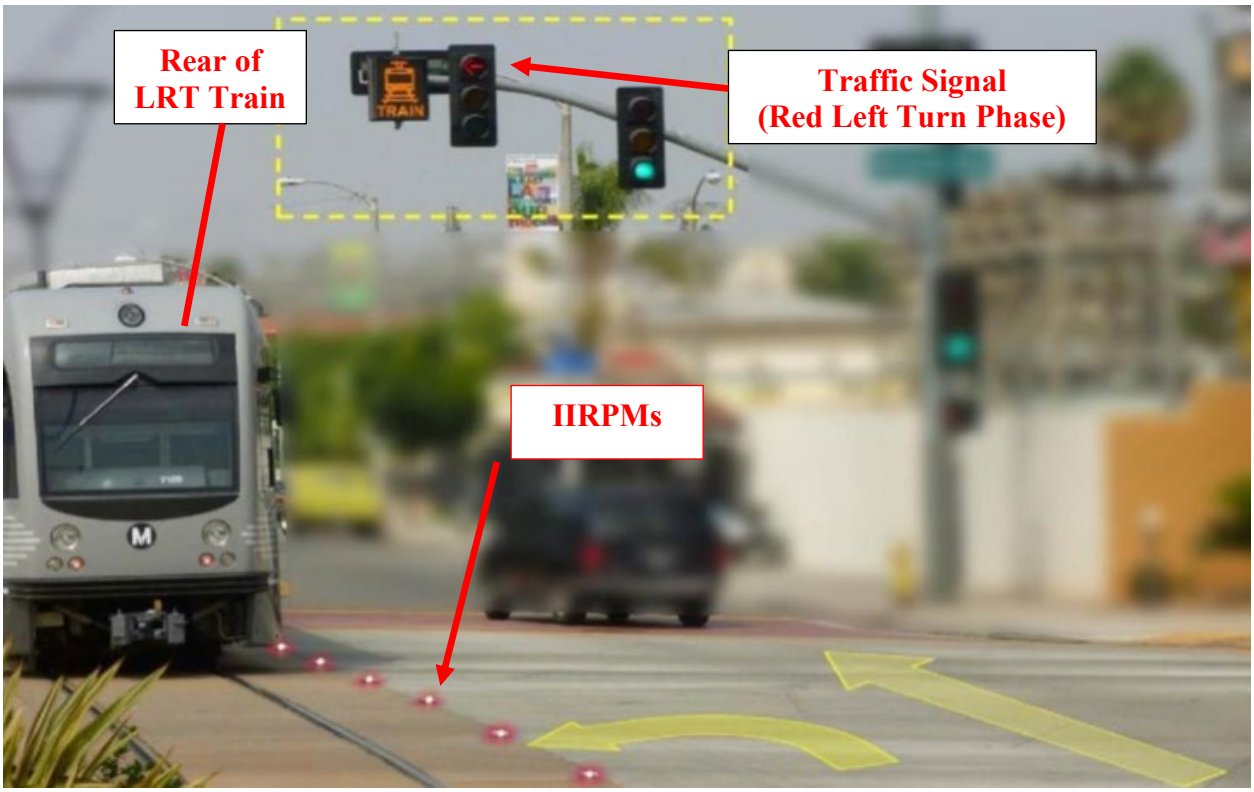

Exhibit 4 – Similar IIRPM Application for LACMTA Gold Line Train

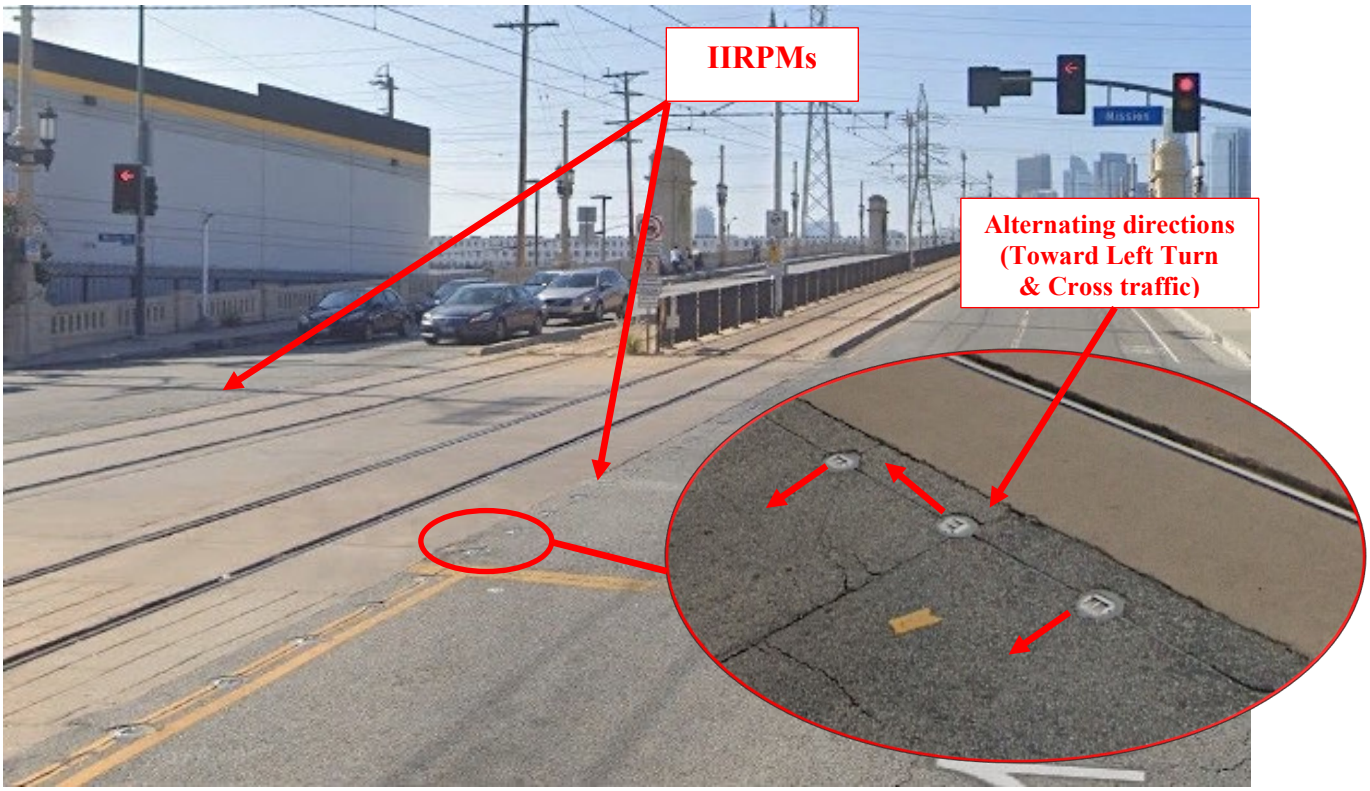

Exhibit 5 – Similar IIRPM for LACMTA Gold Line Train – Mission Rd and 1st St.

(Installed 2015)

A. Scope

- As shown in Exhibits 6 and 7, the IIRPMs are installed parallel to the train tracks, from nearest to furthest crosswalk lines.

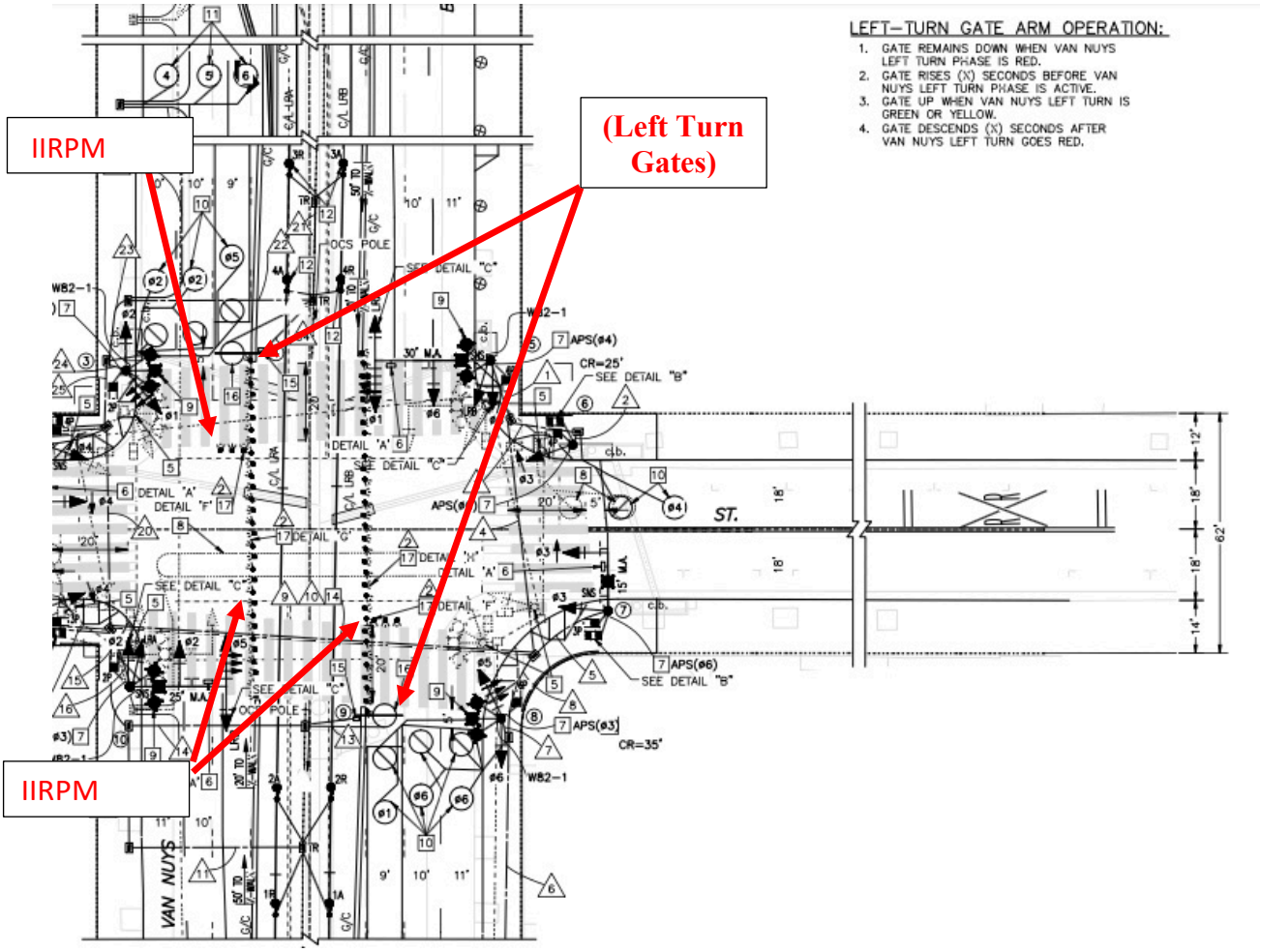

Exhibit 6 –Sample IIRPMs Traffic Drawing (Van Nuys Blvd & Kittridge St)

- The IIRPMs will be field installed and tested at 34 locations along Van Nuys Boulevard as shown in Table 1 below.

Table 1 – List of IIRPM Locations

#	Crossing at Van Nuys Blvd	LRT Milepost
1	Metro Orange Line Station Ped Crossing (Calvert)	84F-0.14-D
2	Sylvan St	84F-0.35
3	Victory Blvd	84F-0.49

Table 1 – List of IIRPM Locations		
#	**Crossing at Van Nuys Blvd**	**LRT Milepost**
4	Kittridge St	84F-0.77
5	Vanowen St	84F-0.99
6	Vanowen N. Station Ped Crossing	84F-1.14-D
7	Sherman Way S. Ped Crossing	84F-1.31-D
8	Vose St	84F-1.31
9	Sherman Way	84F-1.49
10	Valerio St	84F-1.74
11	Saticoy St	84F-1.99
12	Keswick St	84F-2.12
13	Arminta Rd	84F-2.33
14	Lanark St	84F-2.64
15	Roscoe Blvd	84F-2.89
16	Roscoe Station Ped Crossing	84F-3.01-D
17	Chase St	84F-3.12
18	Parthenia St/ Vesper	84F-3.29
19	N. Parthenia St	84F-3.41
20	Nordhoff St	84F-3.87
21	Nordoff Station South Ped Crossing	84F-3.95-D
22	Tupper St	84F-4.12
23	Plummer St	84F-4.37
24	Woodman Ave	84F-4.72
25	Woodman Station South Ped Crossing	84F-4.81-D
26	Woodman Station North Ped Crossing	84F – 4.96-D
27	Beachy Ave	84F-5.19
28	Arleta Ave	84F-5.45
29	Bartee Ave	84F-5.57
30	Laurel Canyon Blvd	84F-5.94
31	Laurel Canyon Station South Ped Crossing	84F-6.03-D
32	Laurel Canyon Station North Ped Crossing (Omelveny Ave)	84F-6.13-D
33	Kewen Ave	84F-6.32
34	El Dorado Ave/ Van Nuys Station	84F-6.58

B. Workplan

- Consistent with the City of Los Angeles traffic program, hazards, accidents, complaints and reported failures associated with the IIRPM will be investigated. The City's maintenance program includes periodic inspections of traffic signals to ensure proper function and efficiency. Other field inspections will be conducted as needed by LACMTA to ensure proper traffic signal and IIRPM function in connection with crossing equipment. This may include inspections from oversight agencies including CPUC.

- LACMTA and the City of Los Angeles does not expect adverse effects on traffic or safety resulting from the IIRPMs. However, if the IIRPMs fails to meet expectations, the IIRPM is a supplemental measure to the proposed traffic signal and will be removed. The City of Los Angeles and/or LACMTA will determine if the IIRPM should be removed from service and will inform project stakeholders and CTCDC as necessary.

C. Time Periods

- The IIRPM demonstration period will last two years, and is expected between 2028 and 2030, depending on traffic signal installation schedule.
    - For the two-year demonstration period, the City of Los Angeles will conduct traffic observations of the IIRPMs to ensure proper functioning.
    - During the first three to six months of train operations (expected during 2028), LACMTA will have assigned personnel on-site at the IIRPM locations to observe operations, traffic and provide further safety warning.
    - At the end of the demonstration period estimated to occur in 2030, and if IIRPMs prove effective, LACMTA, in coordination with the City of Los Angeles, will notify CTCDC of the results, summarize the observations, and request that the IIRPMs remain permanently.

D. Evaluation Procedures

- The IIRPM evaluation will consist of:
    1) Service reliability measured by communication or electrical failures as a direct result of the active IIRPM.
    2) Complaints of IIRPM causing motorist confusion.
    3) Collisions contributed of the IIRPM operations.
    4) Observations of traffic compliance to the IIRPM.

E. Reporting

- LACMTA, in coordination with the City of Los Angeles, will develop a final report within 90 days of the two-year demonstration termination date (2031) and provide to the CTCDC. Status reports will be provided within prior to 2031 if the following issues arise:

- Experimentation of the IIRPM does not begin by 2028.
- Deviations from the IIRPM work plan or design.
- Significant safety hazards are associated with the IIRPM.
- Deviation from the 2028 anticipated conclusion of the IIRPM demonstration.

- The Two-Year Demonstration Report (expected in 2031) will summarize the following IIRPM activities:
  - LACMTA ambassador personnel observation reports from the initial three to six months of train operations (expected during 2028).
  - Field observations or concerns from City of LA, LACMTA, CPUC or other stakeholders.
  - Accident investigation reports involving the IIRPMs (if any).
  - Repair workorders and major maintenance activities of the IIRPMs.
  - Changes to designs, fit or functions of the IIRPMs.

F. Administration

LACMTA is the lead agency for the IIRPM experimentation with support from City of Los Angeles, registered traffic engineers, experienced traffic management staff, consultants and stakeholders supporting the City. The contacts for the IIRPM experimentation are:

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The LACMTA and the City of Los Angeles agree to restore the demonstration sites to a condition that complies with the provisions of the California MUTCD, including removal of IIRPM, if the demonstration determines that the IIRPM are ineffective or at the request of the CTCDC. We will also terminate the demonstration at any time if we determine that the experiment directly or indirectly imposes significant safety hazards. However, if the experiment demonstrates an improvement, the devices will remain in place as a request is made to update the California MUTCD and an official rulemaking action occurs.

Exhibit 7 – IIRPM Signal Drawing (Van Nuys Blvd and Kittridge St.)

CTCDC Request – LACMTA
IIRPM

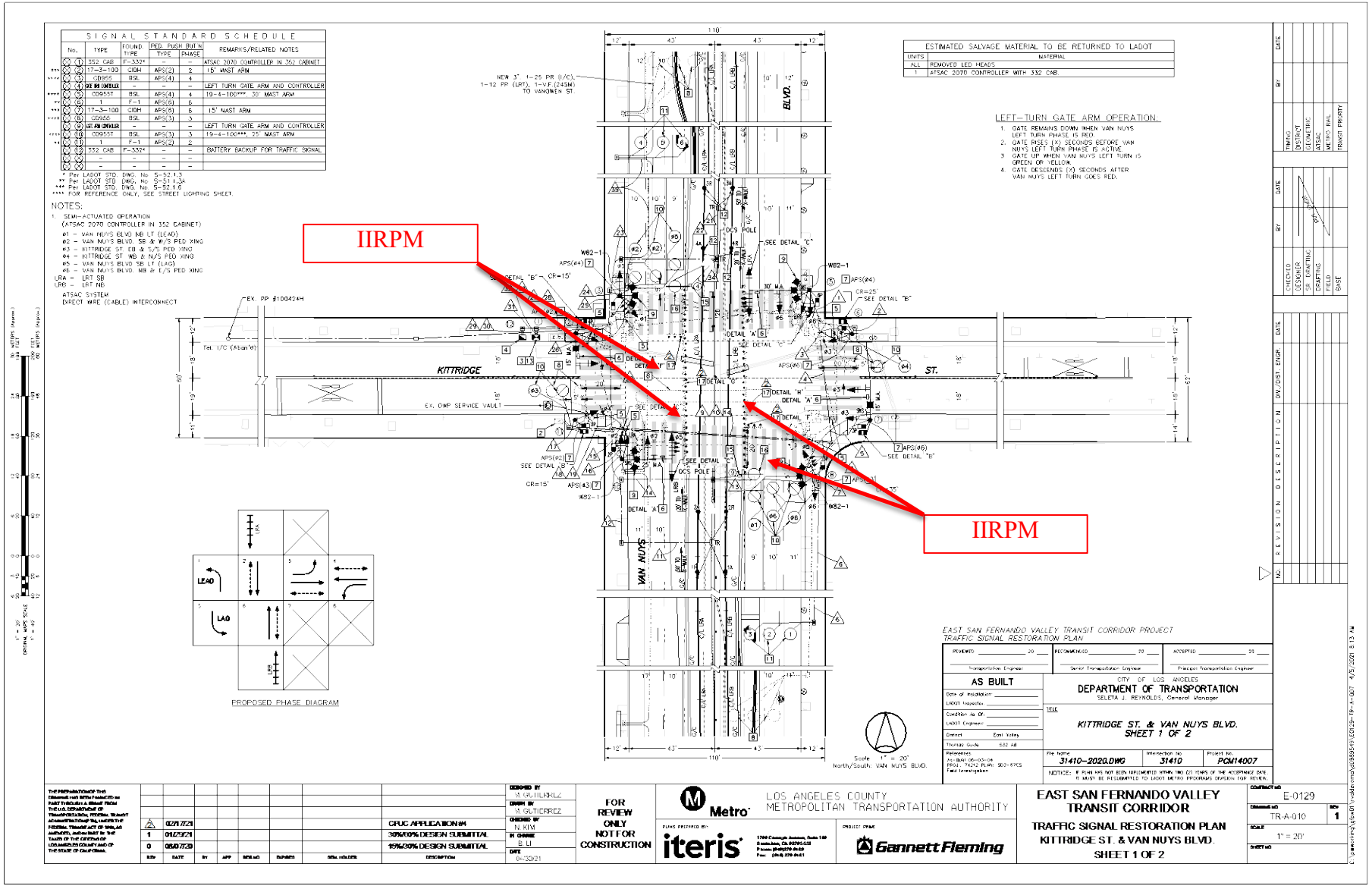
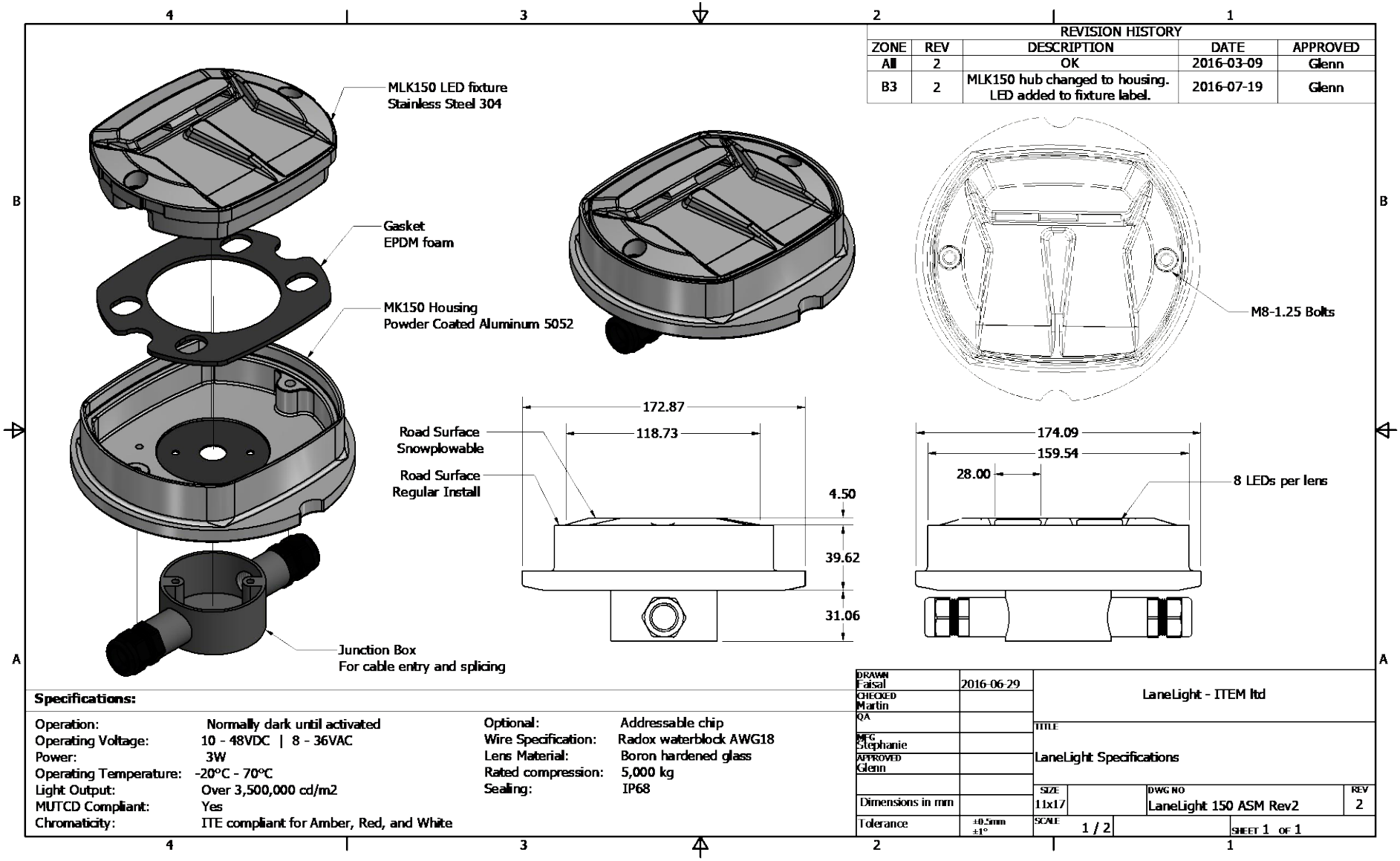


Exhibit 8 – IIRPM Details and Specification



REVISION HISTORY

ZONE	REV	DESCRIPTION	DATE	APPROVED
All	2	OK	2016-03-09	Glenn
B3	2	MLK150 hub changed to housing. LED added to fixture label.	2016-07-19	Glenn

Specifications:

Operation:	Normally dark until activated	Optional:	Addressable chip
Operating Voltage:	10 - 48VDC | 8 - 36VAC	Wire Specification:	Radox waterblock AWG18
Power:	3W	Lens Material:	Boron hardened glass
Operating Temperature:	-20°C - 70°C	Rated compression:	5,000 kg
Light Output:	Over 3,500,000 cd/m2	Sealing:	IP68
MUTCD Compliant:	Yes		
Chromaticity:	ITE compliant for Amber, Red, and White		

DRAWN Faisal	2016-06-29	LaneLight - ITEM ltd
CHECKED Martin		
QA		TITLE
MFG Stephanie		LaneLight Specifications
APPROVED Glenn		
Dimensions in mm		SIZE 11x17 / DWG NO LaneLight 150 ASM Rev2 / REV 2
Tolerance	±0.5mm ±1°	SCALE 1 / 2 / SHEET 1 OF 1