T2 CONNECT

Implementing T2 HTS LPR
The Texas A&M Story

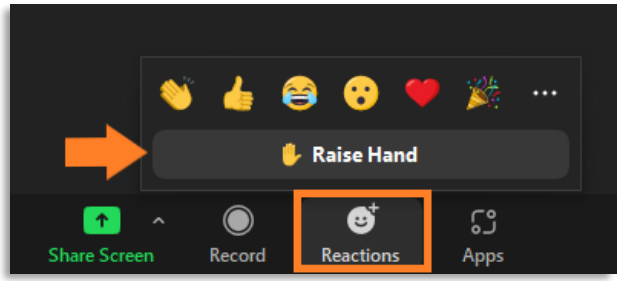
Dell Hamilton, Manager

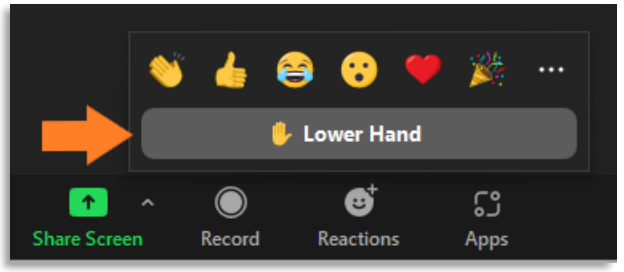
Texas A&M University – Transportation Services

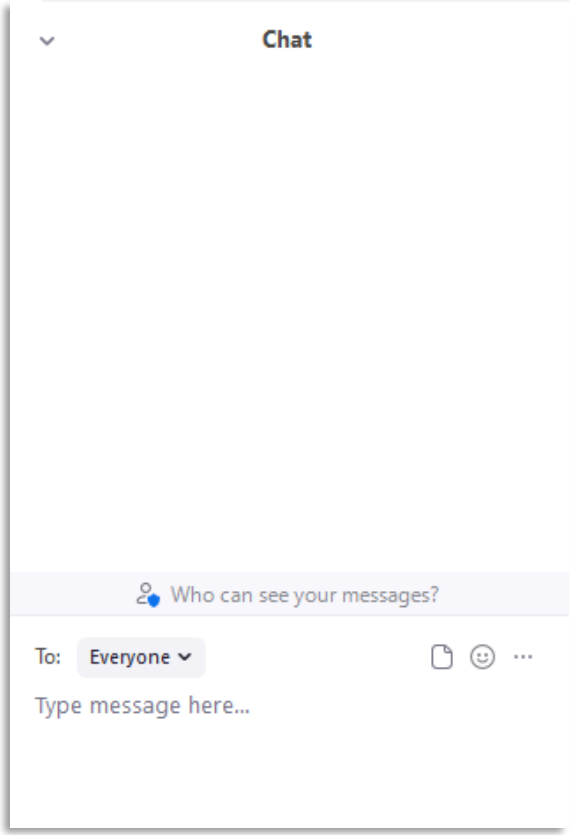
BACK TO THE FUTURE

Ground Rules

- You have the power to unmute and ask questions!
  - If you have a question, navigate to Reactions > Raise Hand at the bottom of the Zoom window. We can then call on you to unmute to ask your question.
  - After asking your question, please mute yourself in Zoom and lower your hand.
- You can ask questions in the Chat area!
  - The moderator will do their best to answer or relay question back to presenter.
- Have fun!







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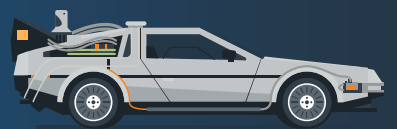
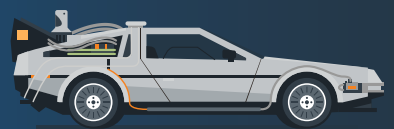


Agenda / Table of Contents

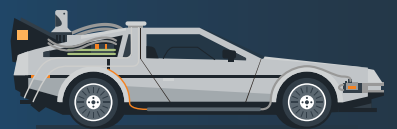
- Introduction
- Overview of the Project
- Planning & Design
- Installation
- Configuration
- Performance
- Lessons Learned
- Questions



Introduction: Dell Hamilton

TEXAS A&M UNIVERSITY
Transportation Services

- Texas A&M University
  - Transportation Services
    - IT Services
- 36 years with the university
- 22 years in position
- Responsible for PARCS, LPR, surveillance
- Staff of 4 IT FTEs and 1 student



Overview of the Project

- Existing area was surface parking.
- Surrounding area is planned to be built-out.
- Campus master plan shows buildings and greenspace on existing surface parking.
- Need to get ahead of the buildings.

Planning

- June 2017 – POR completed
- Project included:
  - 1679 space garage
  - Adjacent building:
    - Transportation Services offices
    - Satellite Rec Center
    - Five dining concepts
- April 2019 – final construction drawings issued

US States

Alabama	57	Michigan	66	Texas	105,145
Alaska	16	Minnesota	79	Utah	19
Arizona	65	Mississippi	34	Vermont	13
Arkansas	103	Missouri	92	Virginia	282
California	527	Montana	154	Washington	28
Colorado	107	Nebraska	15	West Virginia	1
Connecticut	95	Nevada	46	Wisconsin	106
Delaware	38	New Hampshire	19	Wyoming	15
Florida	393	New Jersey	160		
Georgia	163	New Mexico	349		
Hawaii	6	New York	133		
Idaho	34	North Carolina	81		
Illinois	224	North Dakota	12		
Indiana	112	Ohio	72		
Iowa	47	Oklahoma	1,753		
Kansas	30	Oregon	58		
Kentucky	2	Pennsylvania	16		
Louisiana	404	Rhode Island	13		
Maine	4	South Carolina	17		
Maryland	14	South Dakota	16		
Massachusetts	45	Tennessee	114		

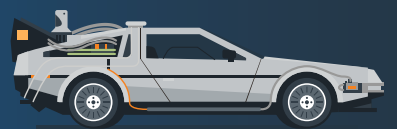
Total Plate Read Over A Four Week Period: 261,755

Canadian Provinces

British Columbia	10
Manitoba	9
New Brunswick	1
Nova Scotia	4
Ontario	4
Saskatchewan	23
Yukon	3

Other

Not Identified	150,294
District of Columbia	5
US Government	8

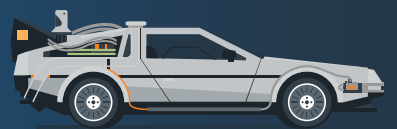


Planning

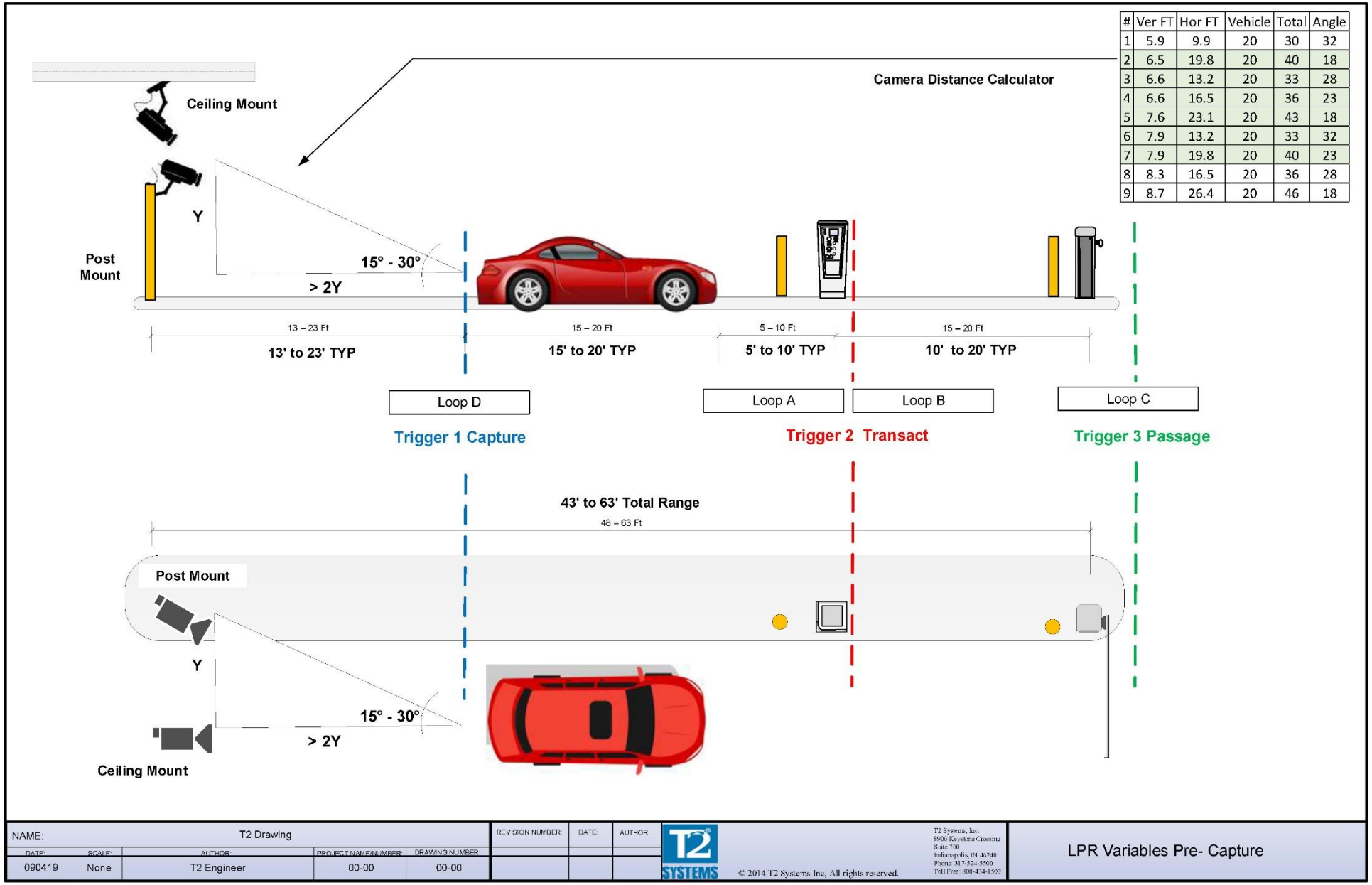
- We knew we needed to go with a rear-capture option.
- Post-entry capture might have been an option, except…
- We wanted to use pre-entry capture so LP-as-a-credential could be implemented.

Planning

- Worked with T2 to determine requirements
  - Loop count and placement
  - Camera placement
  - Required hardware
  - Interconnectivity (hard-wiring, network)



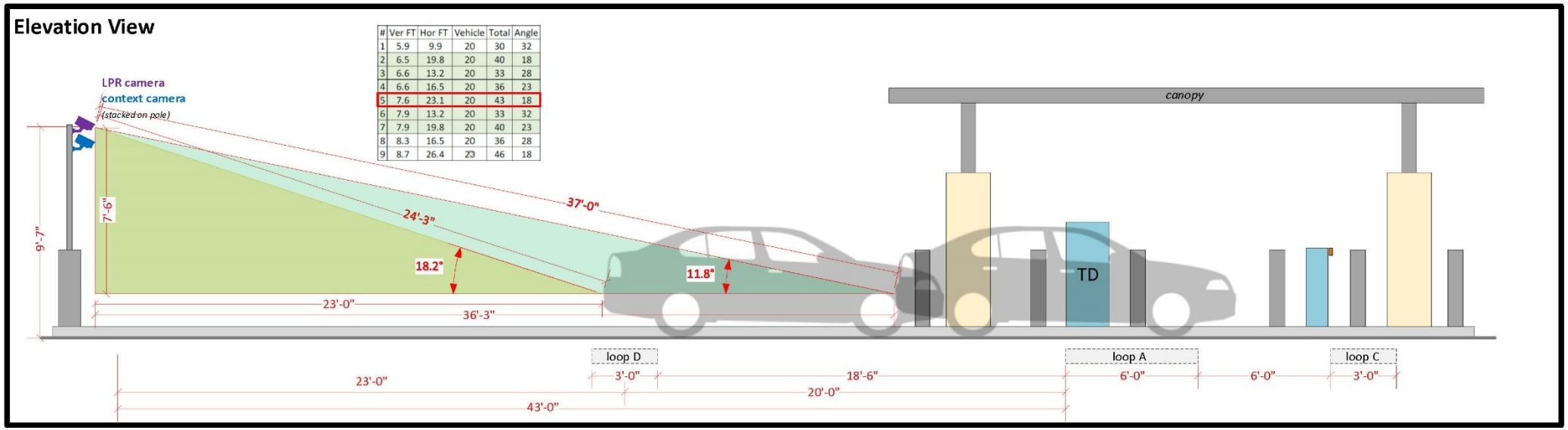
Planning



#	Ver FT	Hor FT	Vehicle	Total	Angle
1	5.9	9.9	20	30	32
2	6.5	19.8	20	40	18
3	6.6	13.2	20	33	28
4	6.6	16.5	20	36	23
5	7.6	23.1	20	43	18
6	7.9	13.2	20	33	32
7	7.9	19.8	20	40	23
8	8.3	16.5	20	36	28
9	8.7	26.4	20	46	18

T2 CONNECT

Entry Camera Layout



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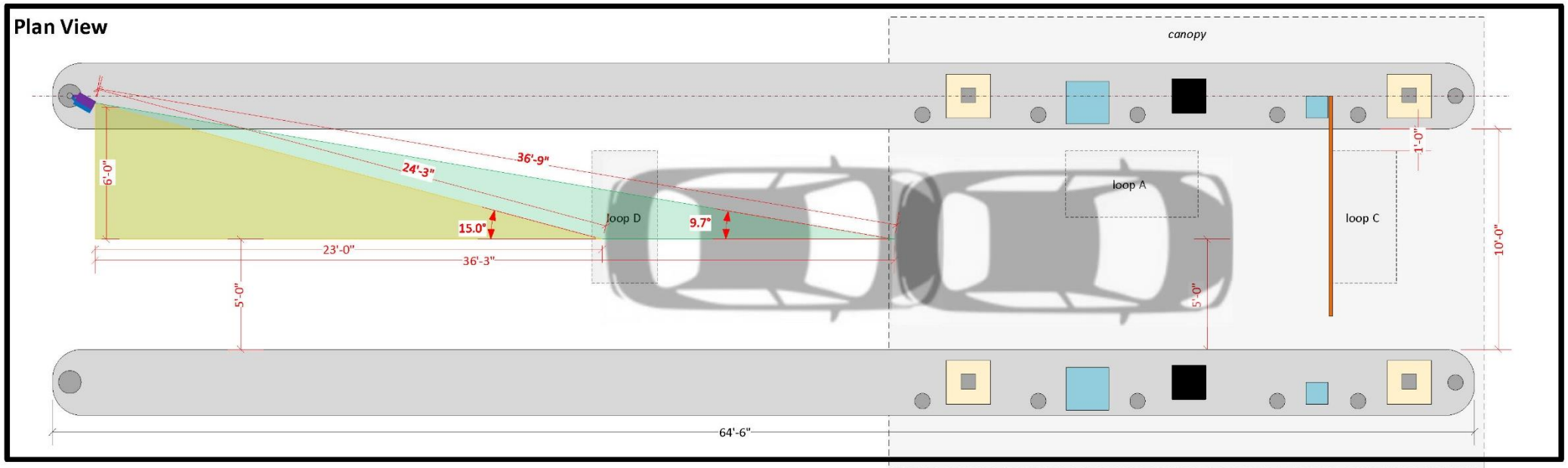

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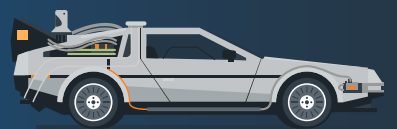
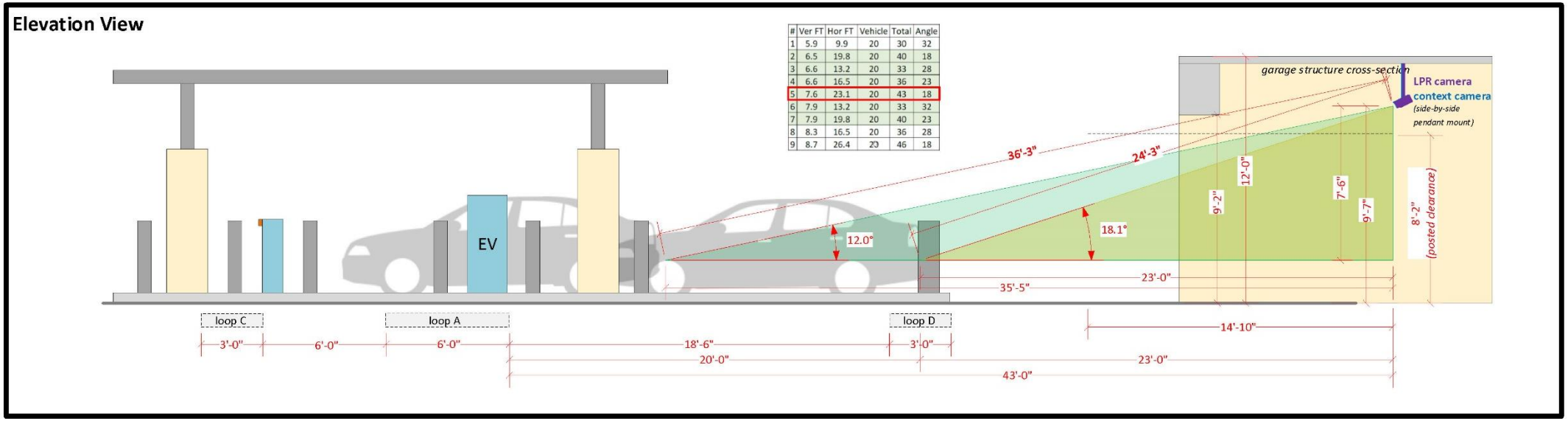


Exit Camera Layout



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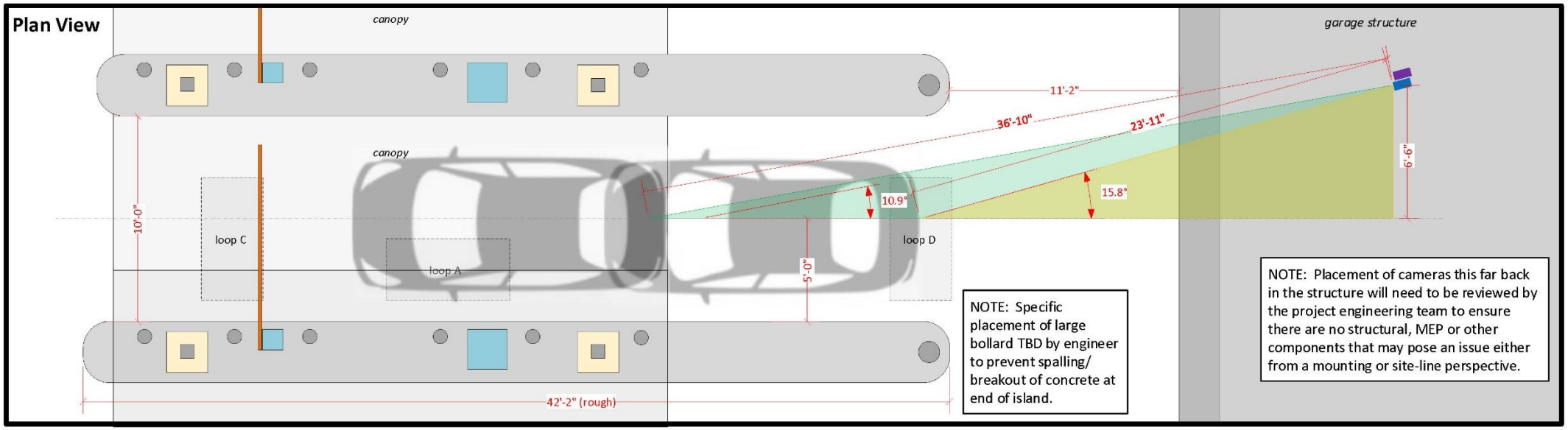

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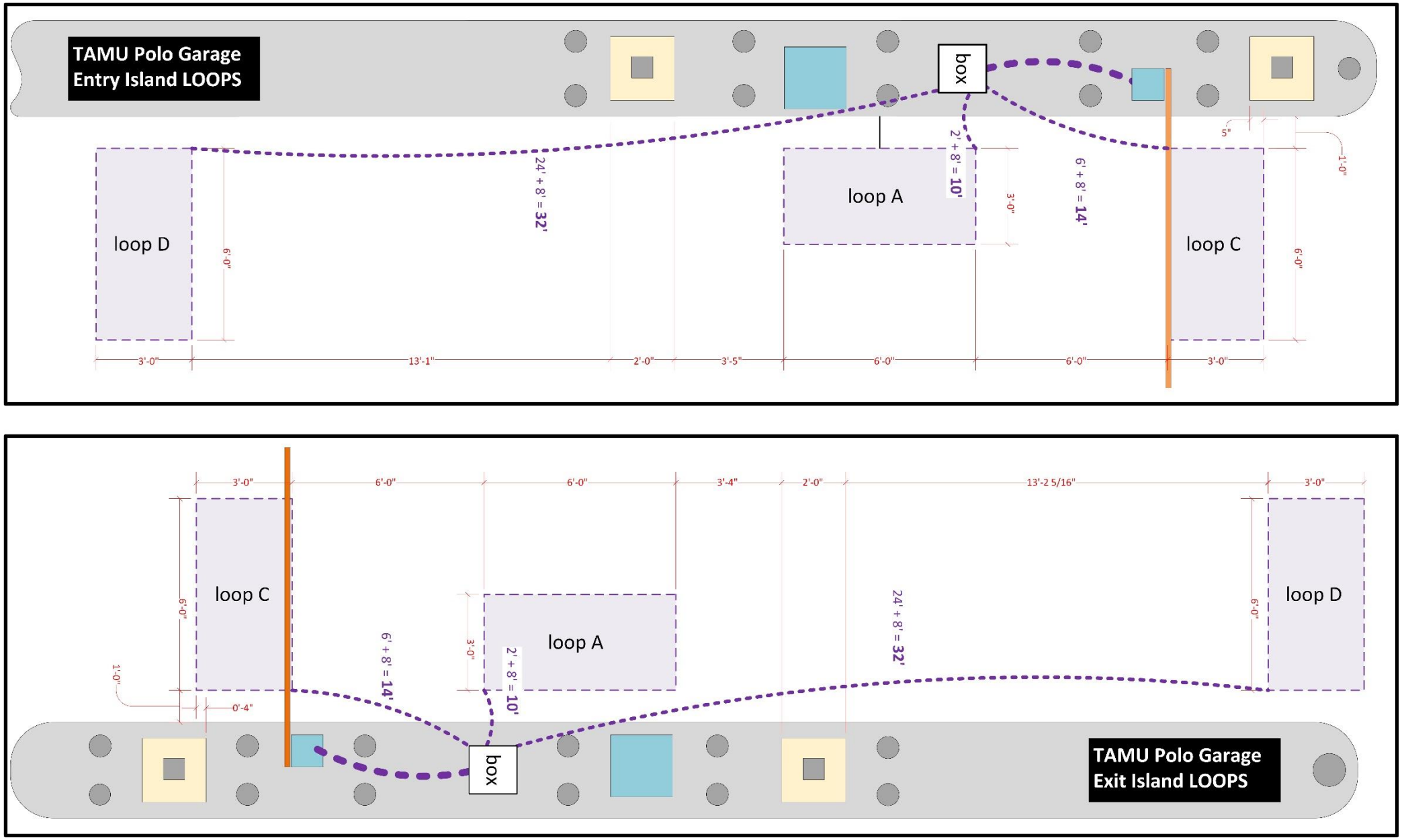
Loop Layout



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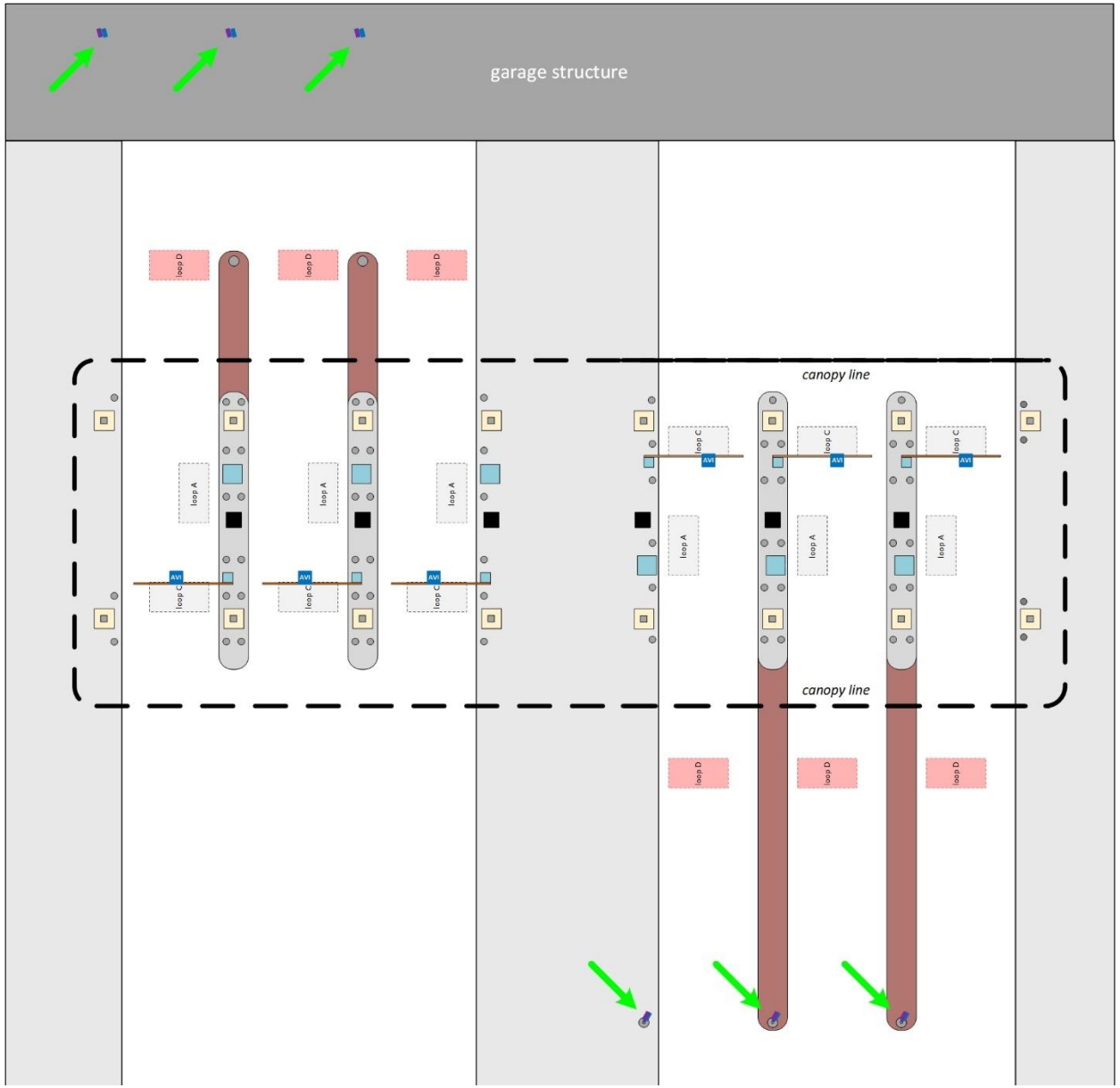
Design

- Original islands were not designed for LPR
- Lengthen islands
- Position additional loops
- Identify camera locations and mounting options



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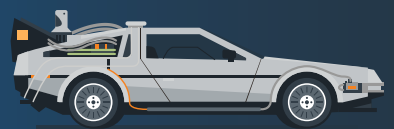
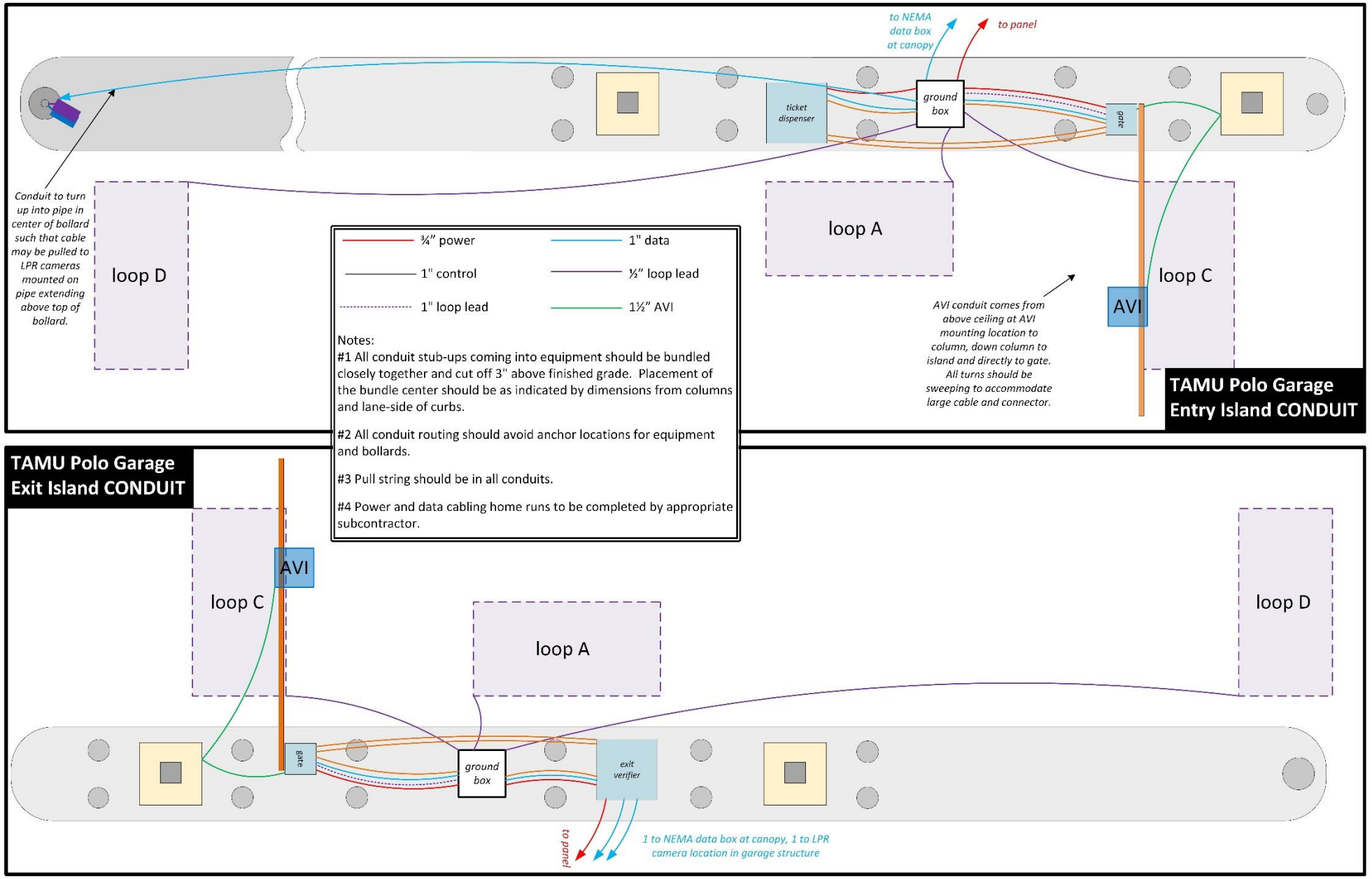


Conduit Plan



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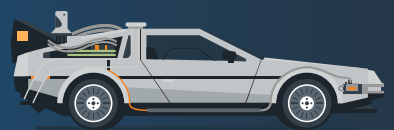
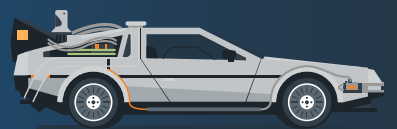
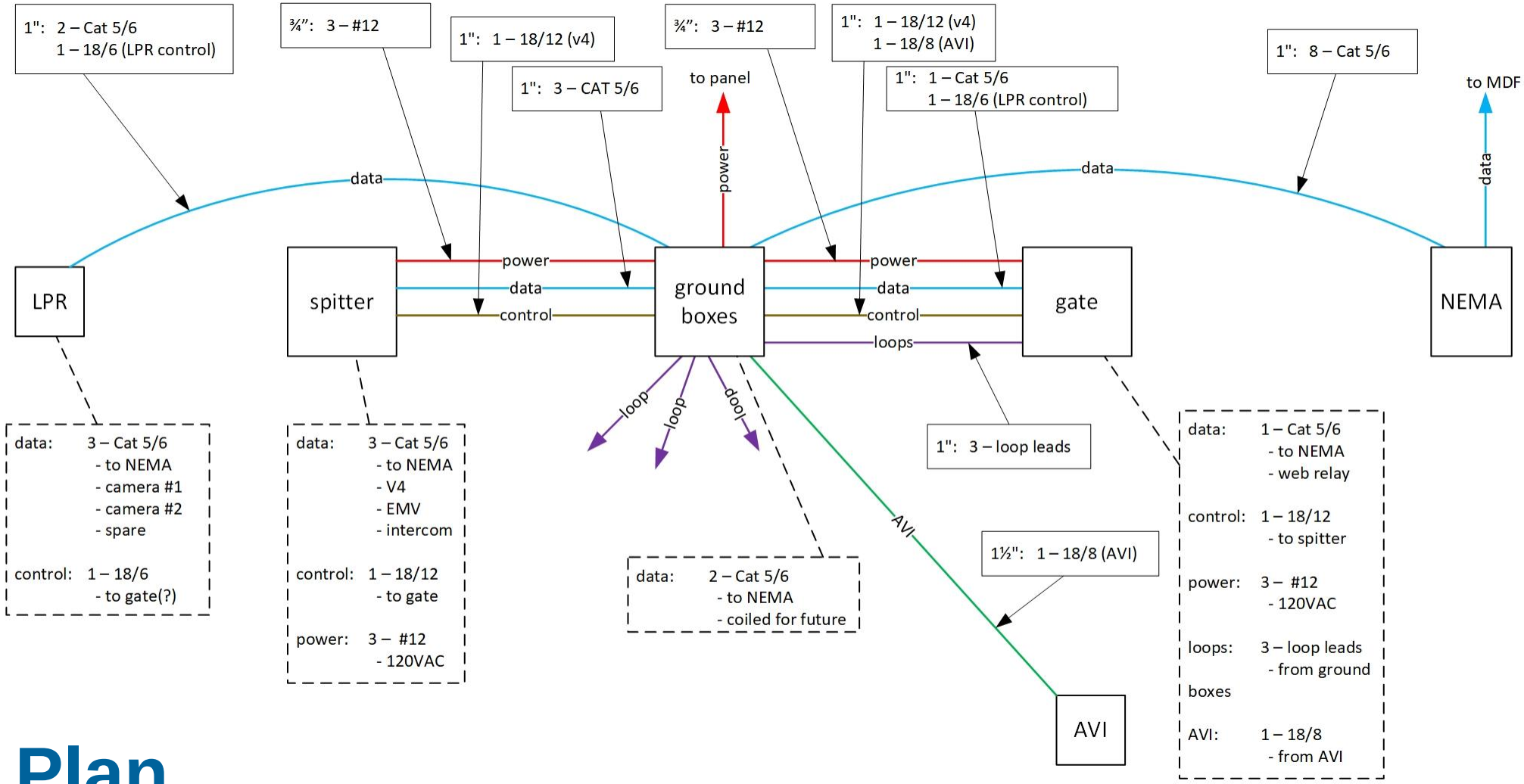


Installation

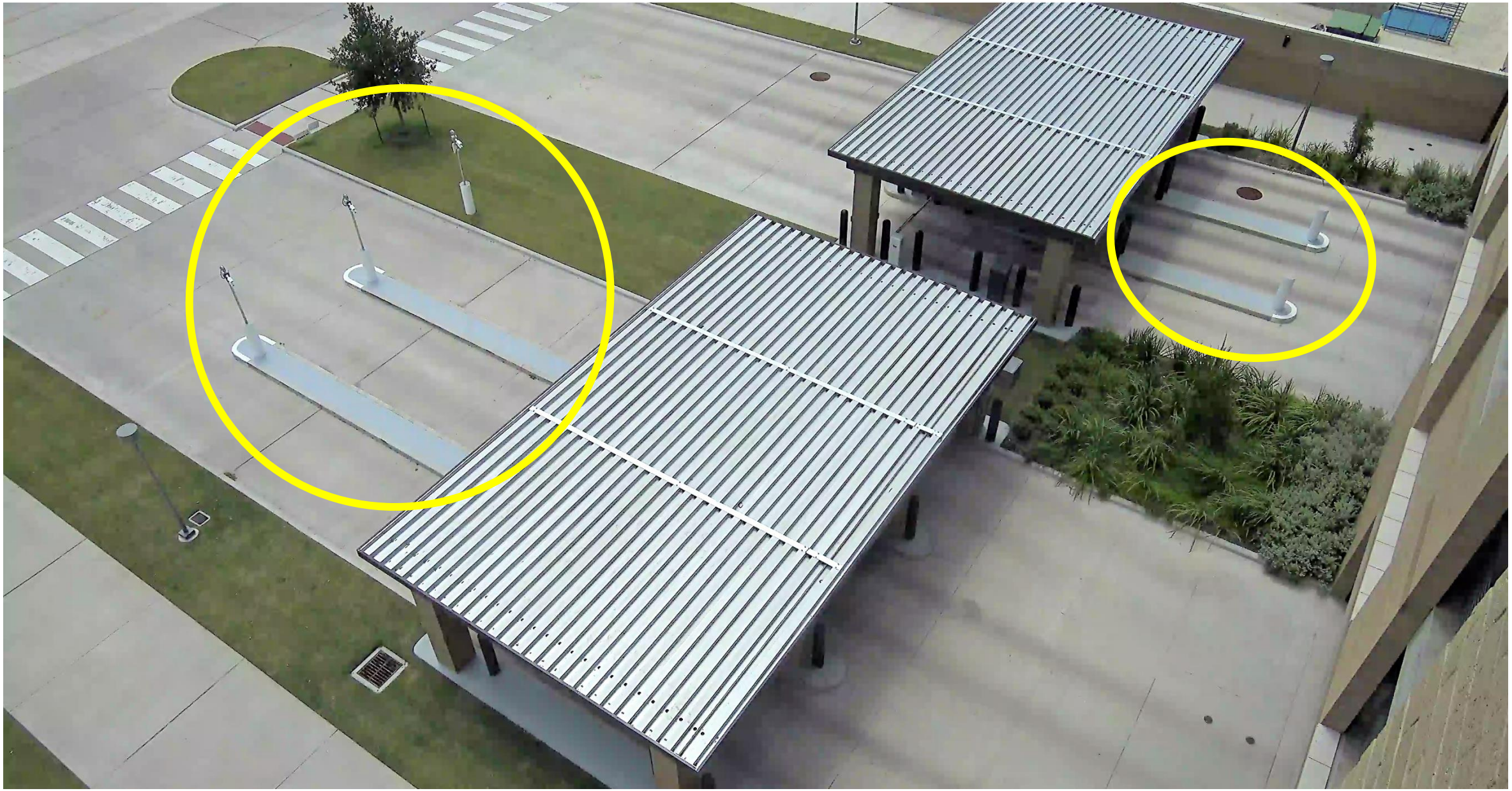
- The entire PARCS installation was performed in-house by our Transportation Services team.
  - 6 lanes with Logan transient equipment, gates, AVI, LPR
  - 4 automated pay stations

- Performed the work in a little over a week.
  - Set loops (done a couple of weeks prior)
  - Pulled and terminated all wire
  - Installed all equipment
  - Configured and tested all equipment




1": 2 – Cat 5/6
1 – 18/6 (LPR control)
¾": 3 – #12
1": 1 – 18/12 (v4)
1": 3 – CAT 5/6
to panel
¾": 3 – #12
1": 1 – 18/12 (v4)
1 – 18/8 (AVI)
1": 1 – Cat 5/6
1 – 18/6 (LPR control)
1": 8 – Cat 5/6
to MDF
data
power
data
data
LPR
spitter
power
data
control
ground boxes
power
data
control
loops
gate
NEMA
loop
loop
dool
AVI
1": 3 – loop leads
1½": 1 – 18/8 (AVI)
data: 3 – Cat 5/6
- to NEMA
- camera #1
- camera #2
- spare
control: 1 – 18/6
- to gate(?)
data: 3 – Cat 5/6
- to NEMA
- V4
- EMV
- intercom
control: 1 – 18/12
- to gate
power: 3 – #12
- 120VAC
data: 2 – Cat 5/6
- to NEMA
- coiled for future
data: 1 – Cat 5/6
- to NEMA
- web relay
control: 1 – 18/12
- to spitter
power: 3 – #12
- 120VAC
loops: 3 – loop leads
- from ground boxes
AVI: 1 – 18/8
- from AVI

Pull Plan



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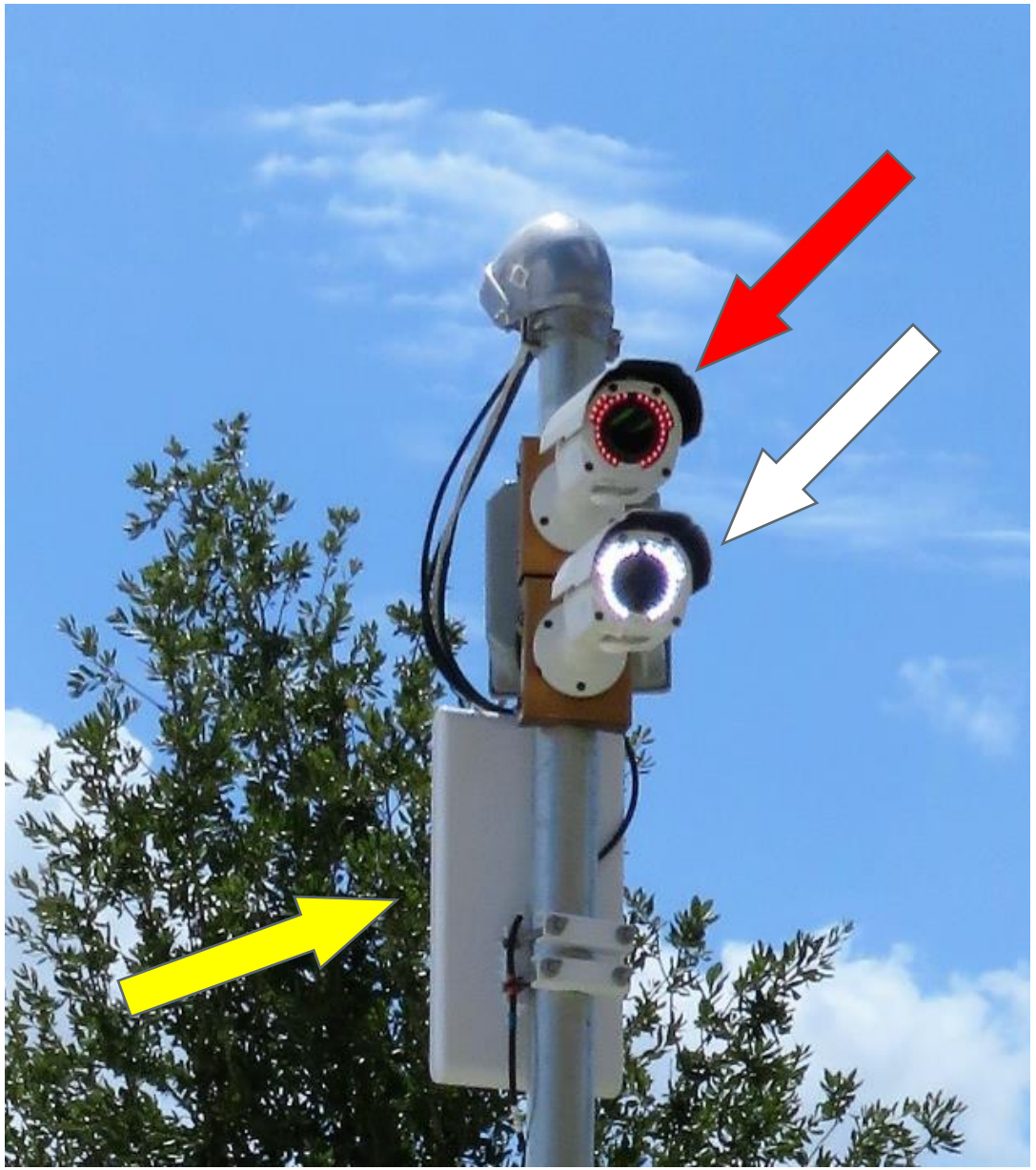

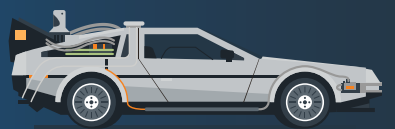

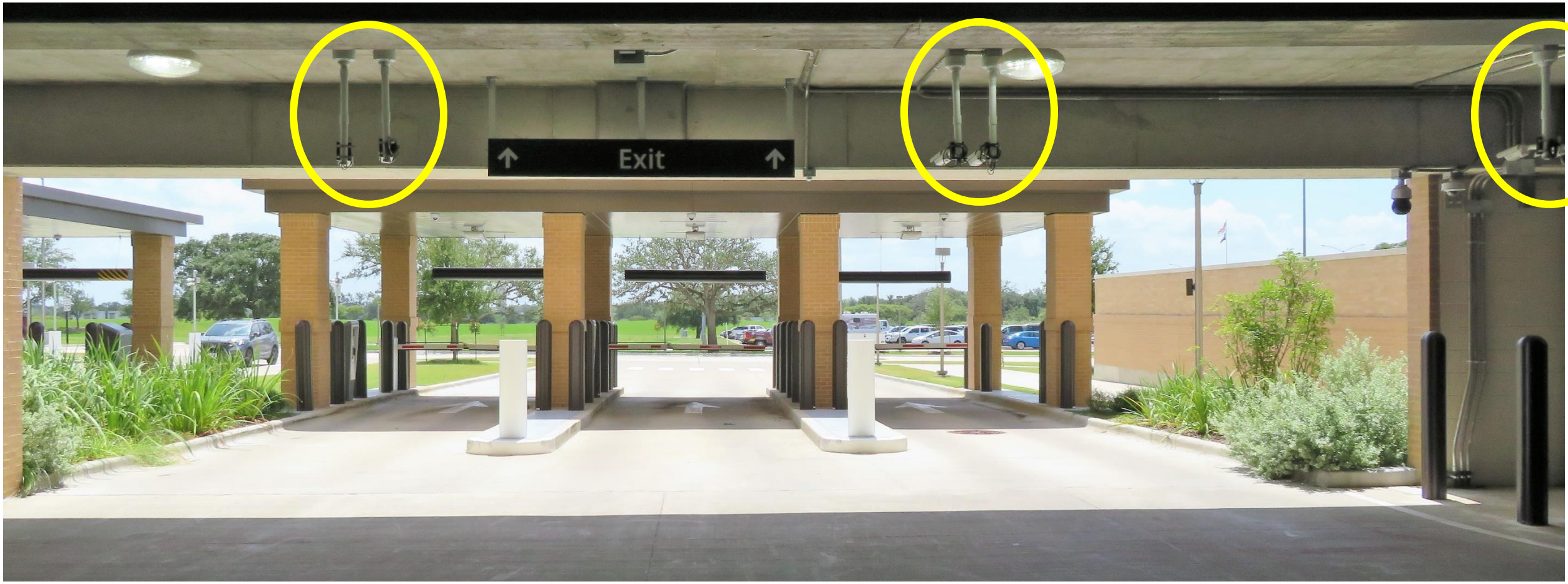

T2 CONNECT

power supplies

UPSs

lane controller

lane controller

server

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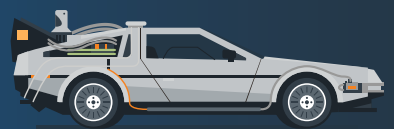

power supplies

UPSs

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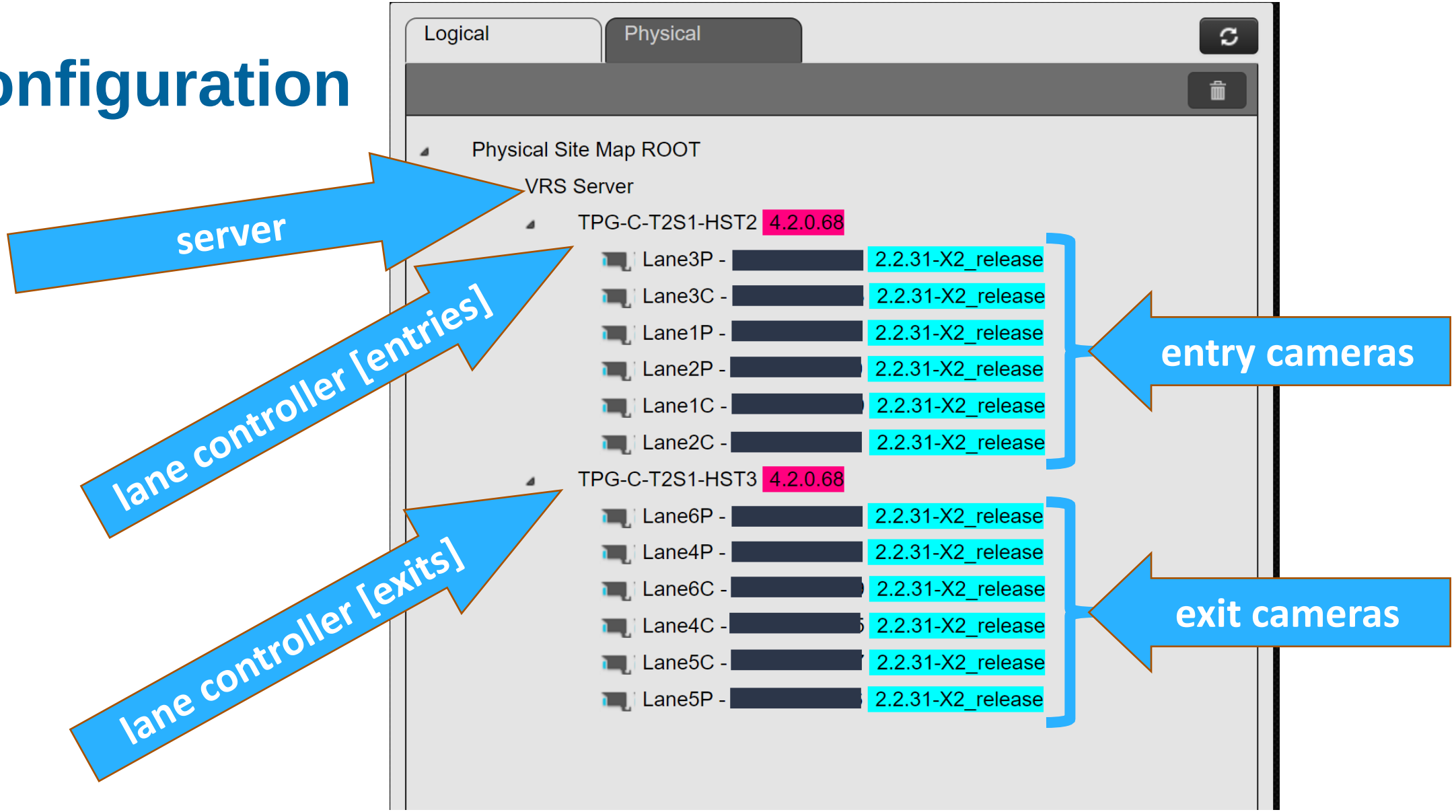
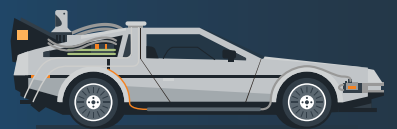
server

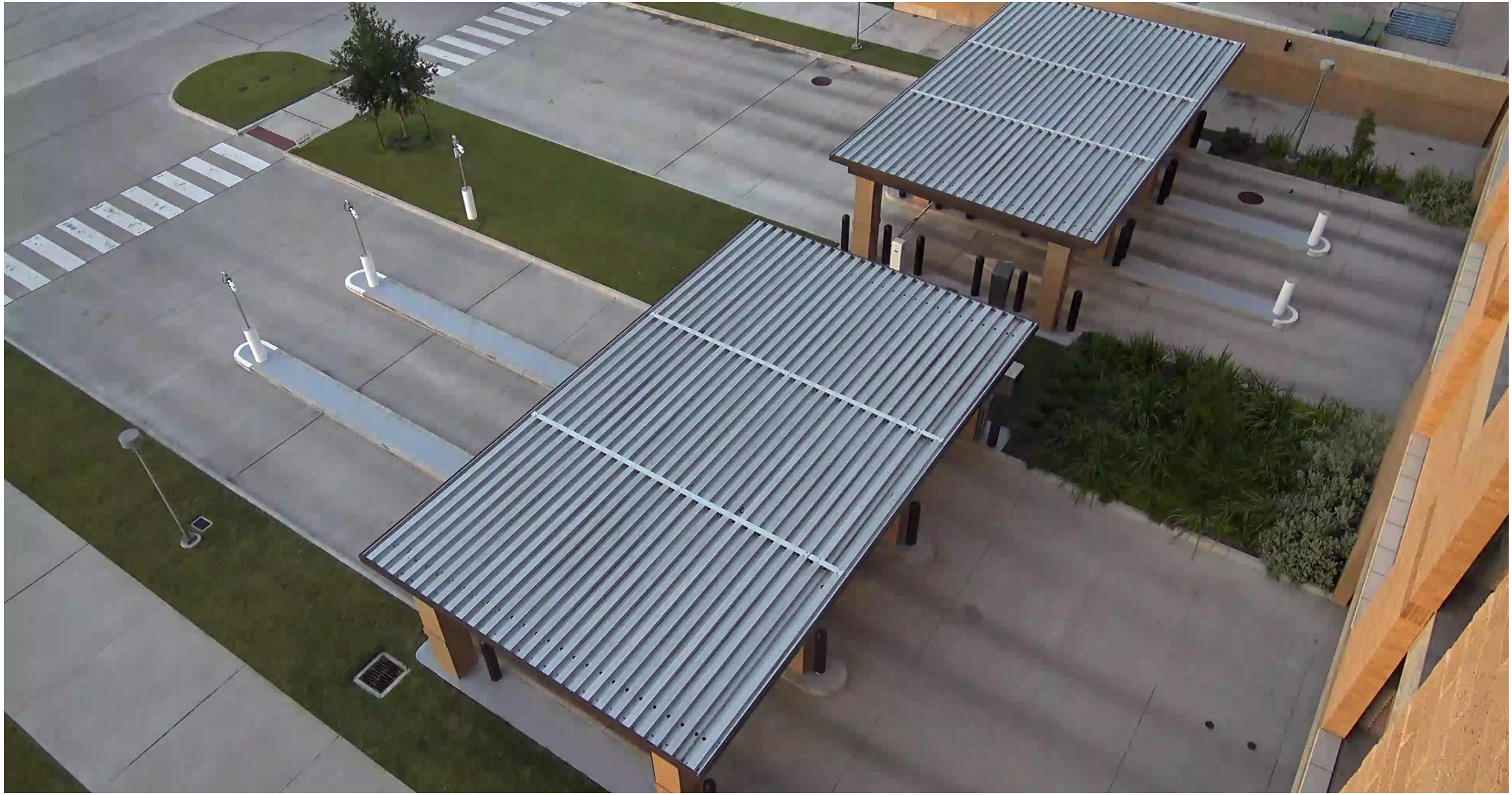
Configuration



Experience

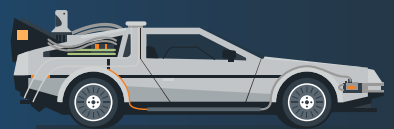
- Facility opened for customers August 20, 2020.
- There was no mad rush to fill it, as campus was nearly entirely virtual at that point.
- At best, we had 200 vehicles in the facility at any one time.





Experience

- Fall 2021 brings a whole new experience for this facility!
- Now running over 4,000 vehicles a day through the facility.
- This is giving a good test of the system.

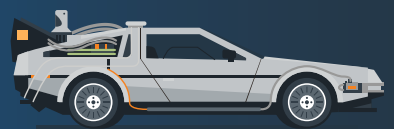


TEXAS
LVG-7828

Experience

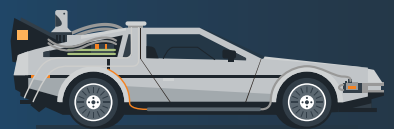
- Perceptually, the greater the traffic load, the greater the rate of ‘misread’.

- Began to see a gradual decline in accuracy.



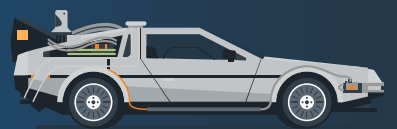
Experience

- Perceptually, the greater the traffic load, the greater the rate of ‘misread’.
- Began to see a gradual decline in accuracy.
- Accuracy plummeted primarily due to one camera having an issue.
- Correcting the issue and re-focusing all cameras brought us back up to our original perceived accuracy rate.



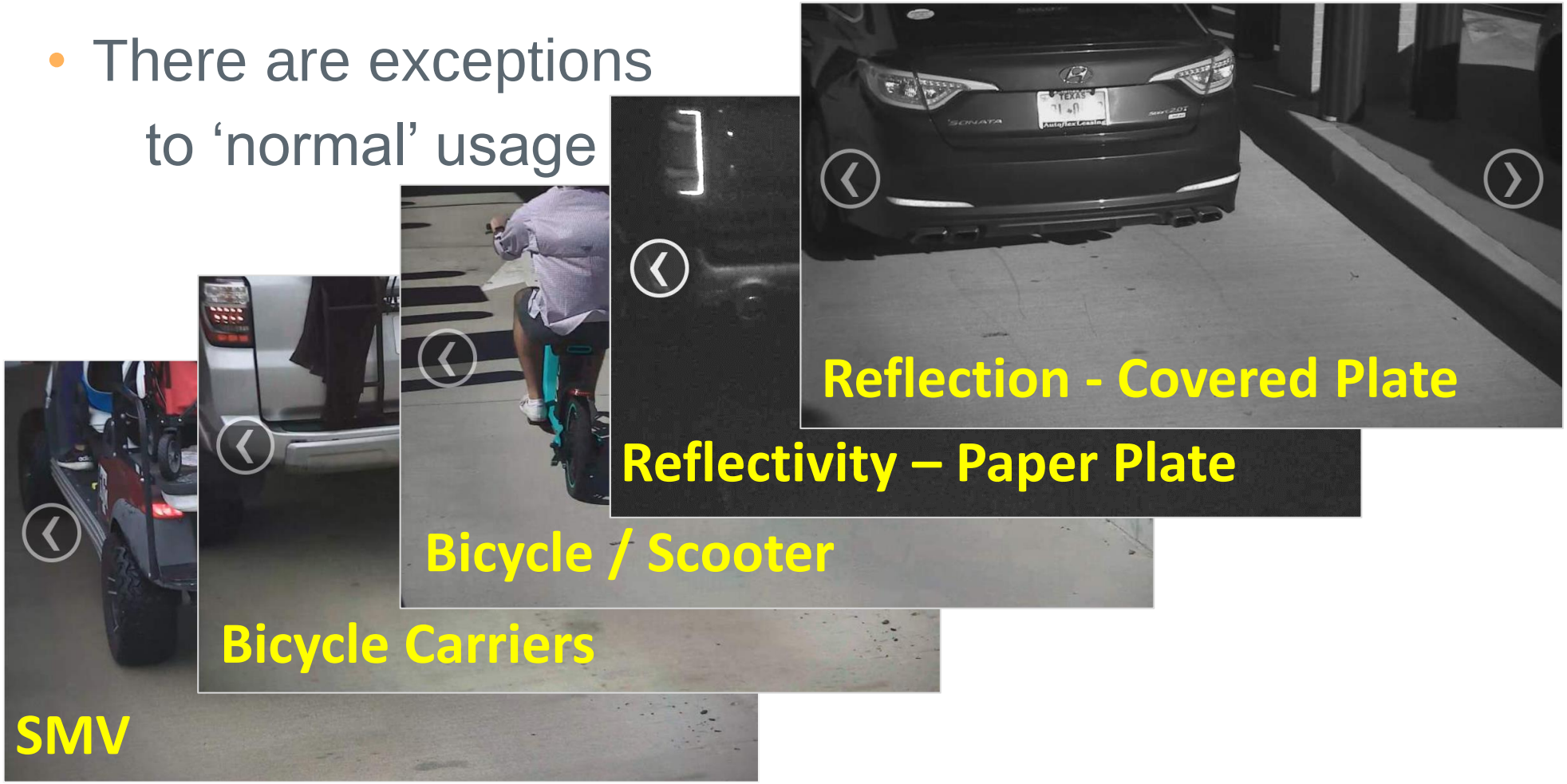
Experience

- Using real data instead of perception.
  - Prior to fix, 41% of reads were ‘low confidence’.
  - After fix, 6% of reads are ‘low confidence’.
  - The majority of these are still accurate and usable.
- Training should help us stay in this range or better.



Experience

- There are exceptions to ‘normal’ usage



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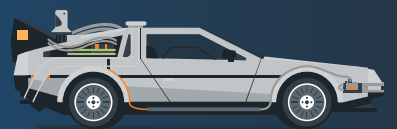

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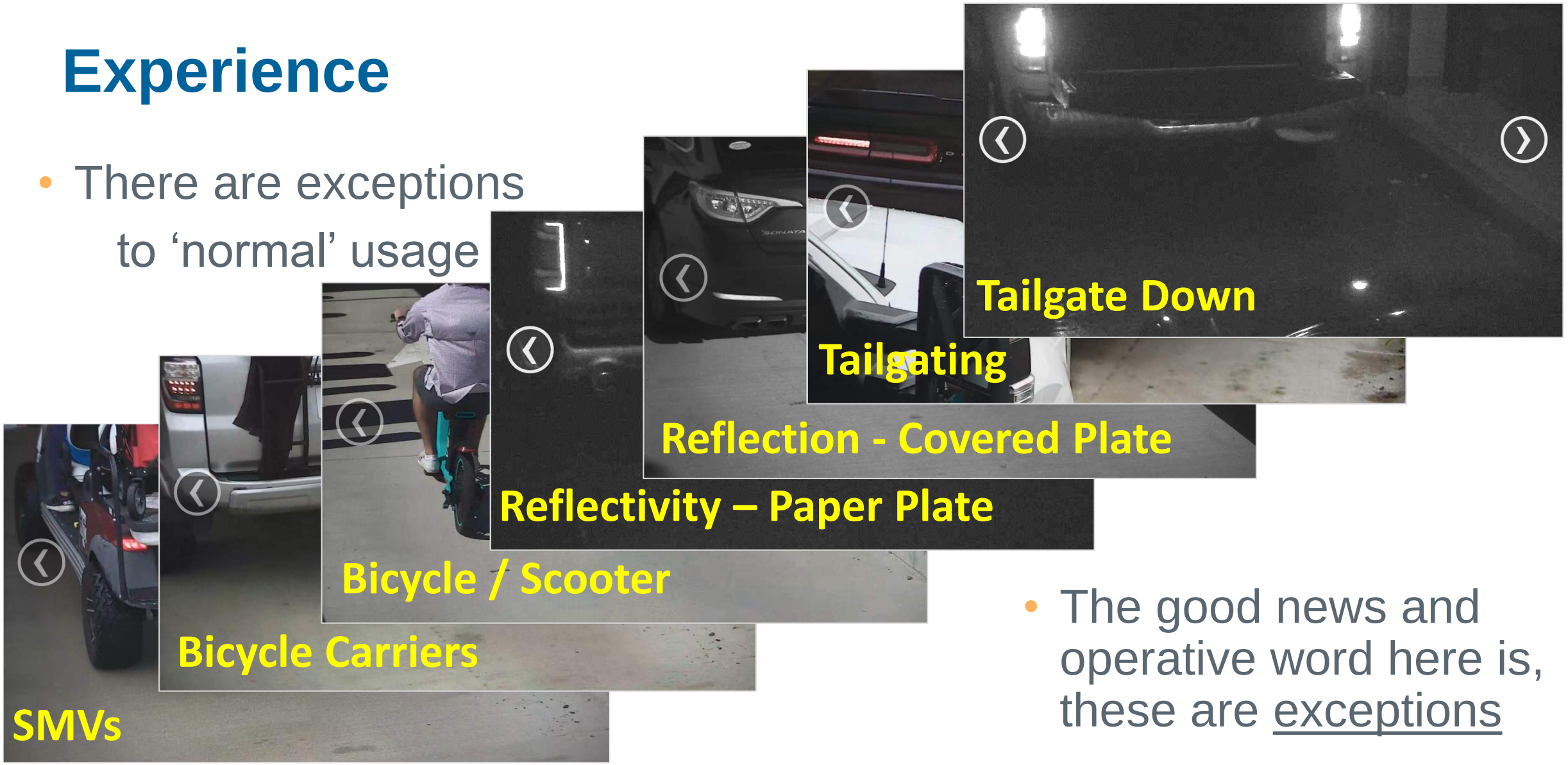
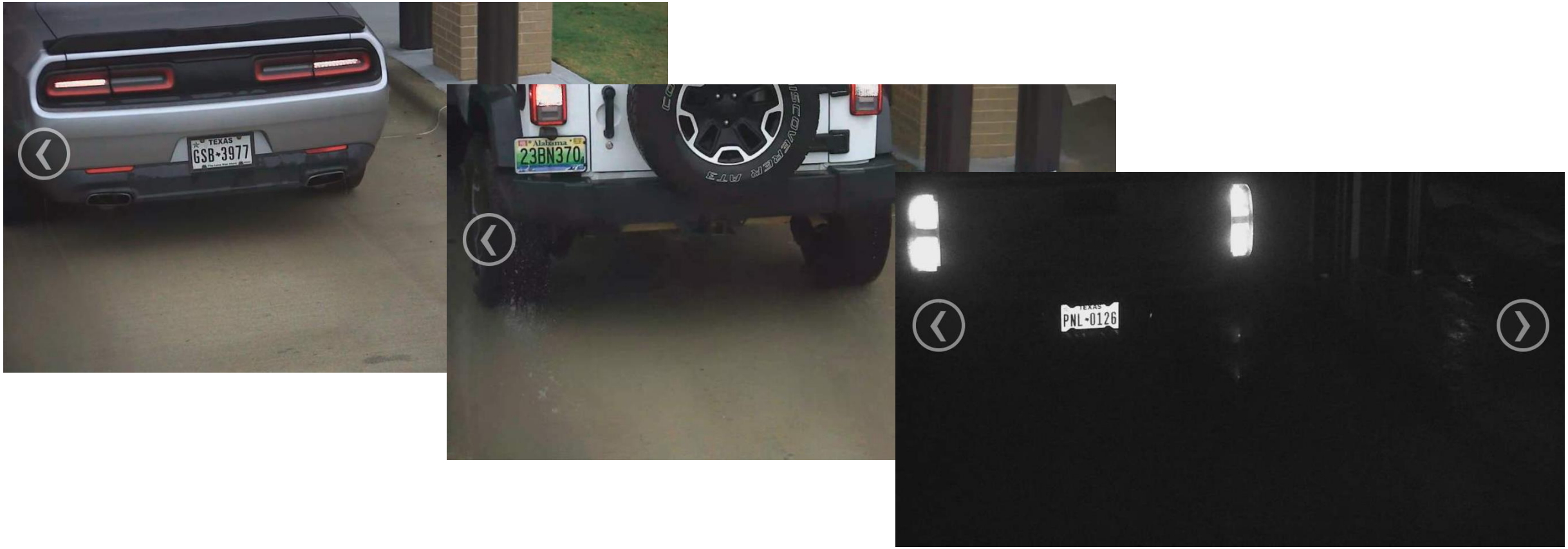


- The good news and operative word here is, these are <u>exceptions</u>

Experience

- The vast majority of reads are accurate.



T2 CONNECT

Experience

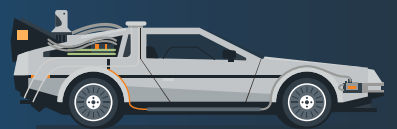
- Have been testing LP-as-a-credential with good results.

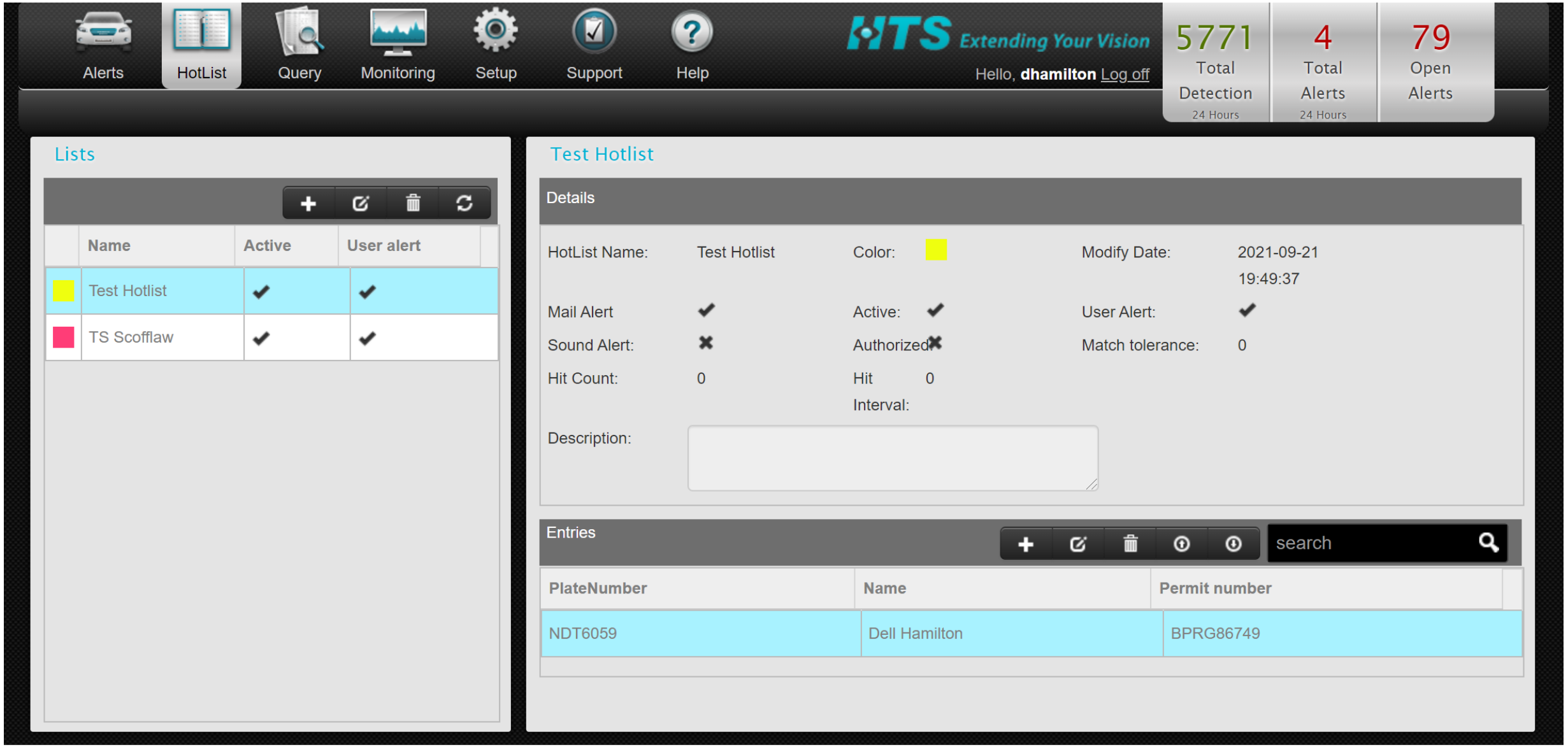
BPRG86749

Permit Number	BPRG86749
Status	Active
Is Neutral	Yes
Is Permit Nonrenew?	No
Driver License Num	NDT6059
Gate Card Num	601642100002875
AGGIE ID	6016426594756476
Alternate Hands Free	TEX02009777
Hands Free Device	TAMU00113110
Mag Stripe Num	AD1011657
Control Group	*2021-22 Polo Road Garage - NO RESIDENTS*

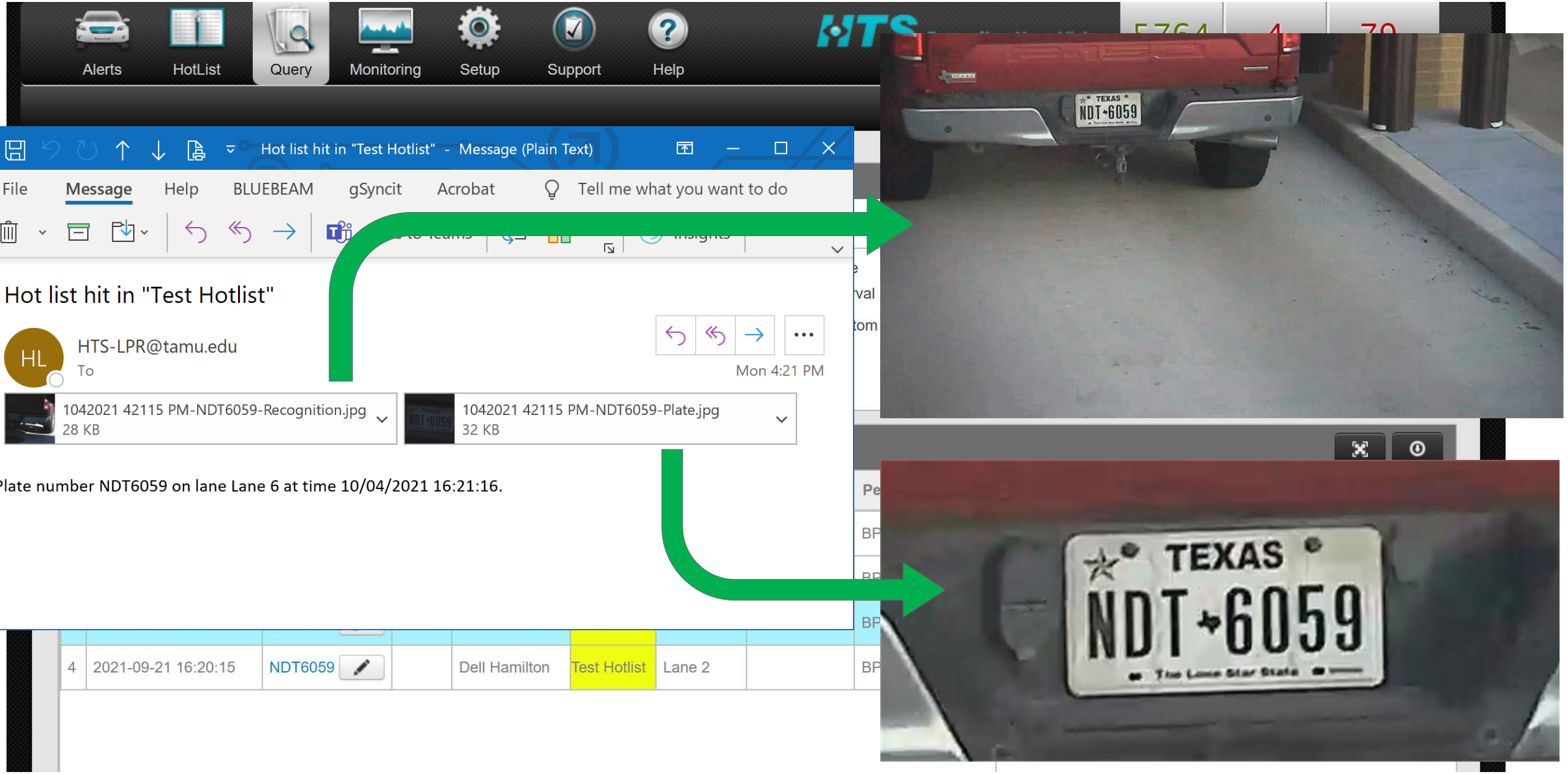
Parking Transaction 81314734

Entry Date	9/21/2021 8:37:54 AM
Exit Date	9/21/2021 10:57:43 AM
Parking Duration	2 Hours, 19 Minutes
Credential ID Type At Entry	Driver License Num
Credential ID Number At Entry	NDT6059
Credential ID Type At Exit	Hands Free Device
Credential ID Number At Exit	TAMU00113110 (#TAMU001131107A... $)
Type	Credential
Status	Closed




Alerts
HotList
Query
Monitoring
Setup
Support
Help
HTS Extending Your Vision
Hello, dhamilton Log off
5771 Total Detection 24 Hours
4 Total Alerts 24 Hours
79 Open Alerts
Lists
Name
Active
User alert
Test Hotlist
TS Scofflaw
Test Hotlist
Details
HotList Name: Test Hotlist
Color:
Modify Date: 2021-09-21 19:49:37
Mail Alert
Active:
User Alert:
Sound Alert:
Authorized
Match tolerance: 0
Hit Count: 0
Hit Interval: 0
Description:
Entries
search
PlateNumber
Name
Permit number
NDT6059
Dell Hamilton
BPRG86749

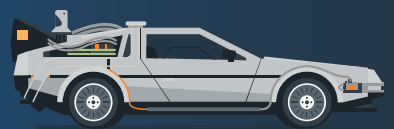
T2 CONNECT


Alerts
HotList
Query
Monitoring
Setup
Support
Help
HTS
Hot list hit in "Test Hotlist" - Message (Plain Text)
File
Message
Help
BLUEBEAM
gSyncit
Acrobat
Tell me what you want to do
Hot list hit in "Test Hotlist"
HL
HTS-LPR@tamu.edu
To
Mon 4:21 PM
1042021 42115 PM-NDT6059-Recognition.jpg
28 KB
1042021 42115 PM-NDT6059-Plate.jpg
32 KB
Plate number NDT6059 on lane Lane 6 at time 10/04/2021 16:21:16.
TEXAS
NDT 6059
4
2021-09-21 16:20:15
NDT6059
Dell Hamilton
Test Hotlist
Lane 2

T2 CONNECT

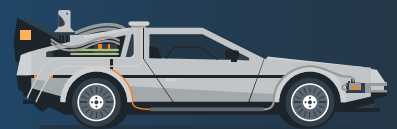
Take-Aways

- Build LPR into the design from the start.
- If possible, design such that moving cameras may be accomplished.



Conclusion

- The system was relatively simple to install and configure.
- Overall, the system functions well.
- LP-as-a-credential will be nice to have.
- Hotlist feature is useful.



T2 CONNECT

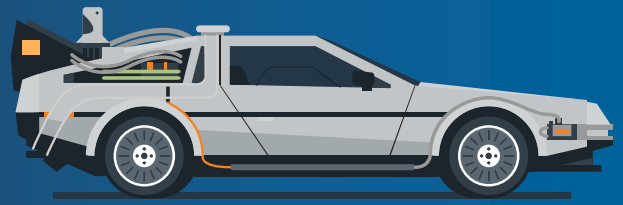
Q&A

Dell Hamilton – deh@tamu.edu

BACK TO THE FUTURE

T2 CONNECT

Thank You



BACK TO THE FUTURE