

CEEn-2019CPST-013

MCDONALD BUILDING PARKING PROJECT

ThiNK

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Introduction

Before

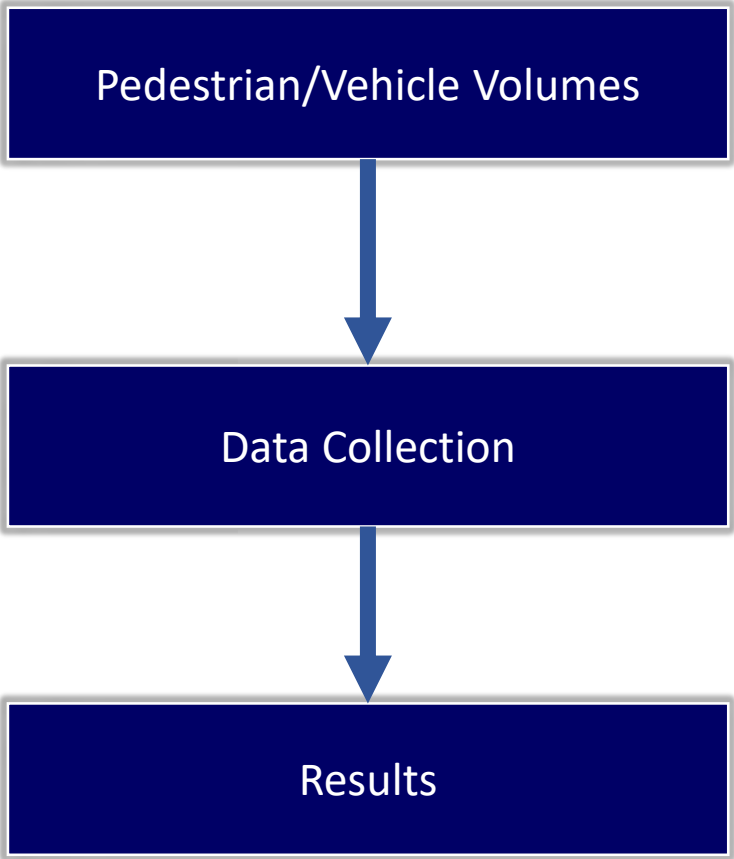
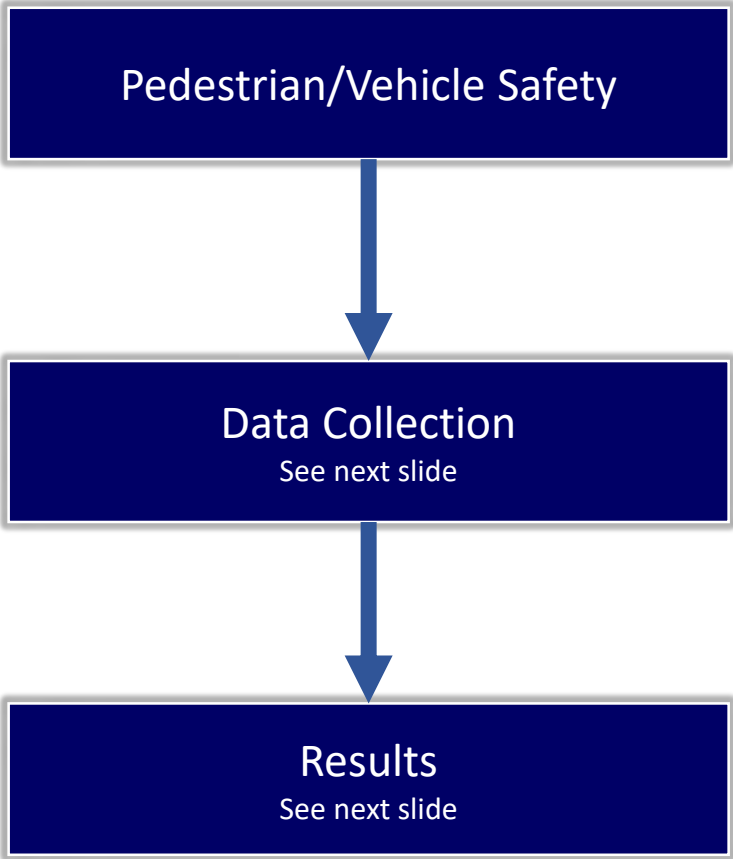


After



- With the new adjustments, pedestrians are left unprotected in the lot.
- The purpose of this study is to find new measures to improve pedestrian safety in the lot and to restore comfortable vehicular flow.

Design and Analysis

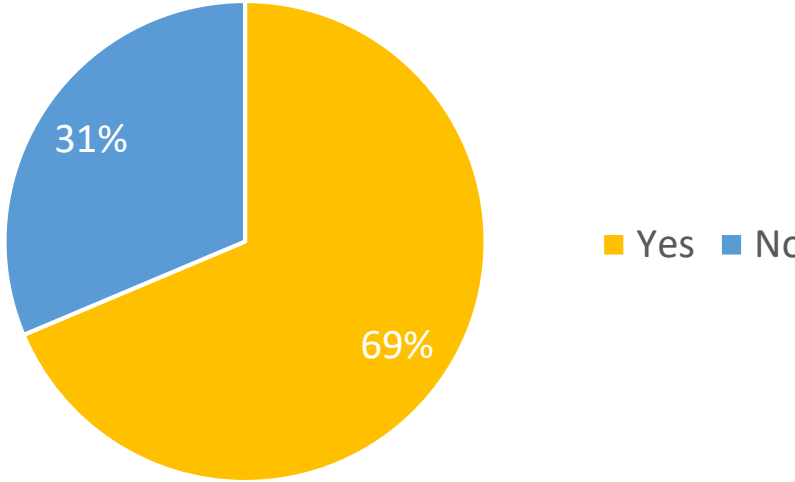
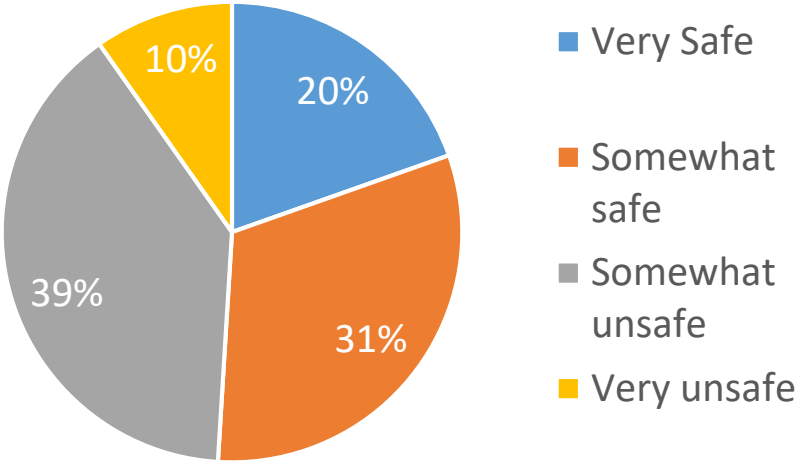


Design and Analysis Cont'd

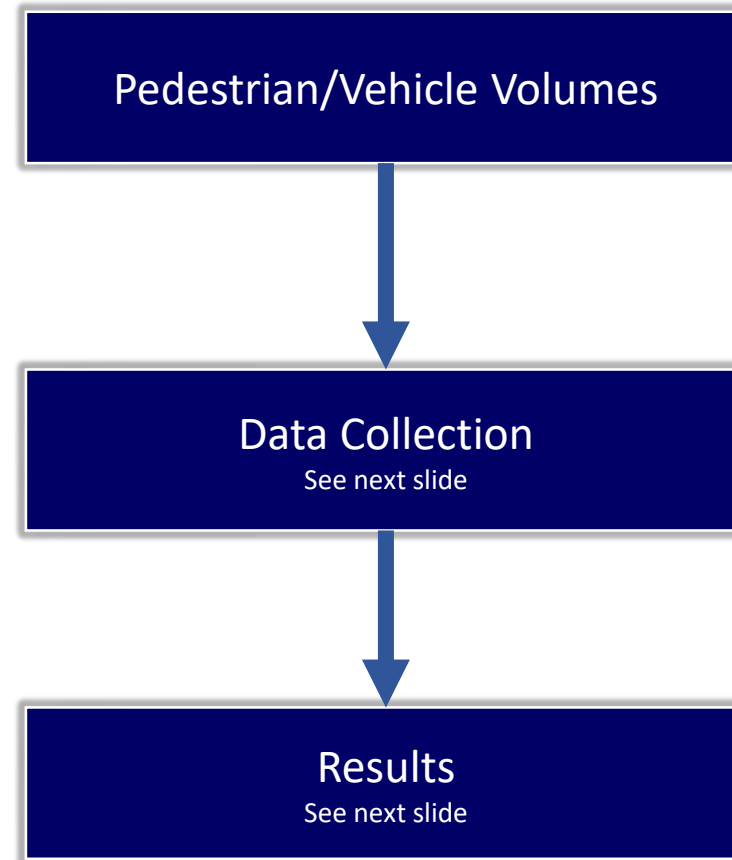
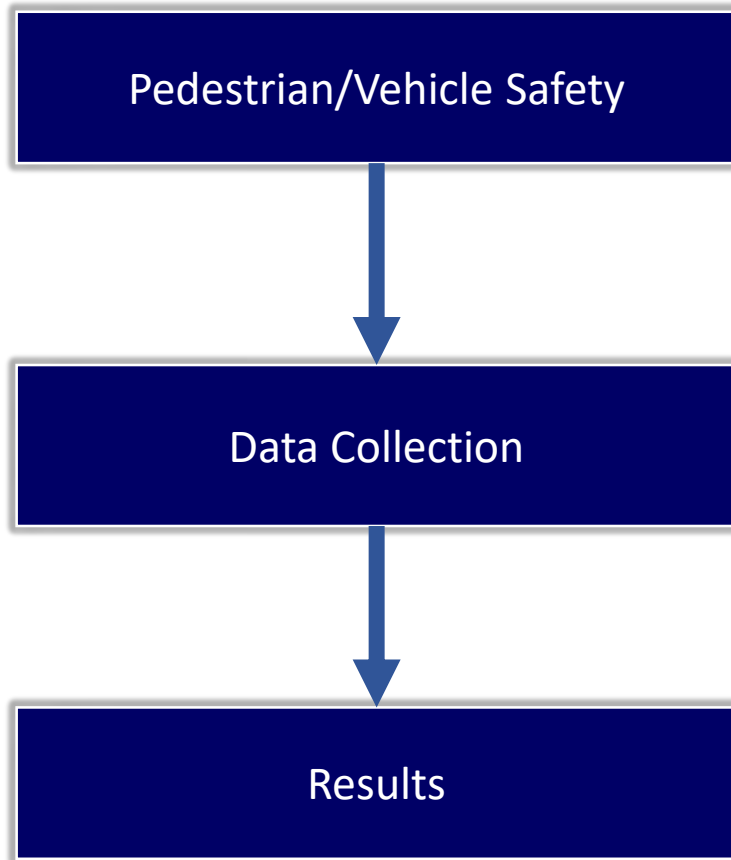
Surveys

Questions Asked:

- Where do you enter the lot from?
- When do you typically arrive at this lot on an average day?
- When do you typically leave this lot on an average day?
- **Have you ever felt your safety was at risk while walking through this lot (close calls with cars)?**
- **Have you ever had a close encounter with a car?**
- Do you wish there was a better/safer way to get to campus?
- section for extra comments



Design and Analysis Cont'd

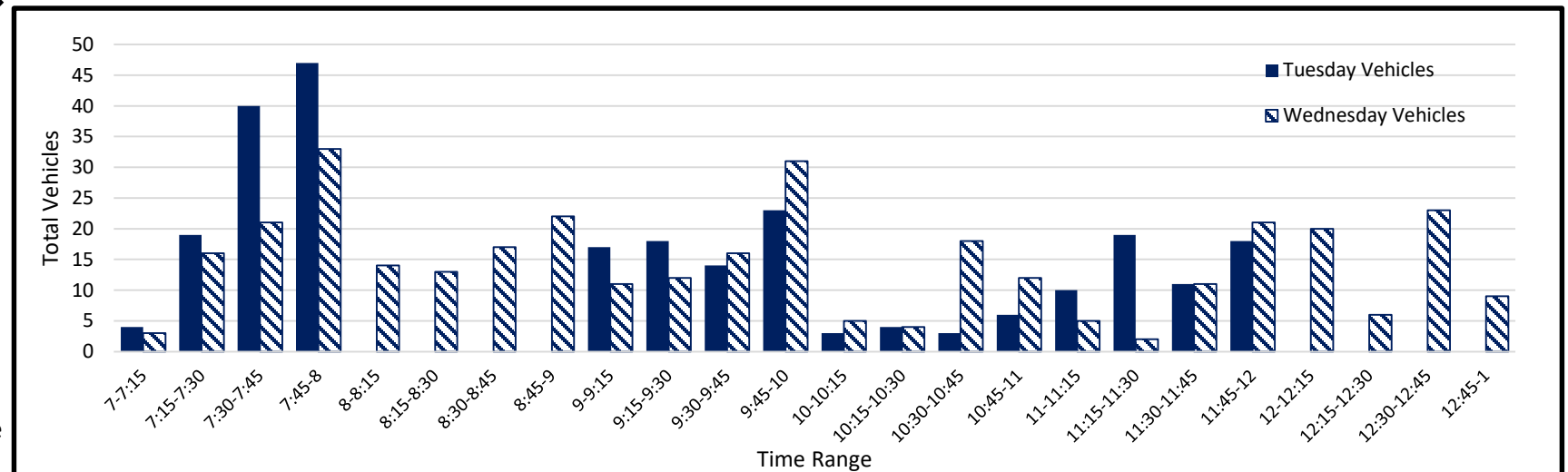
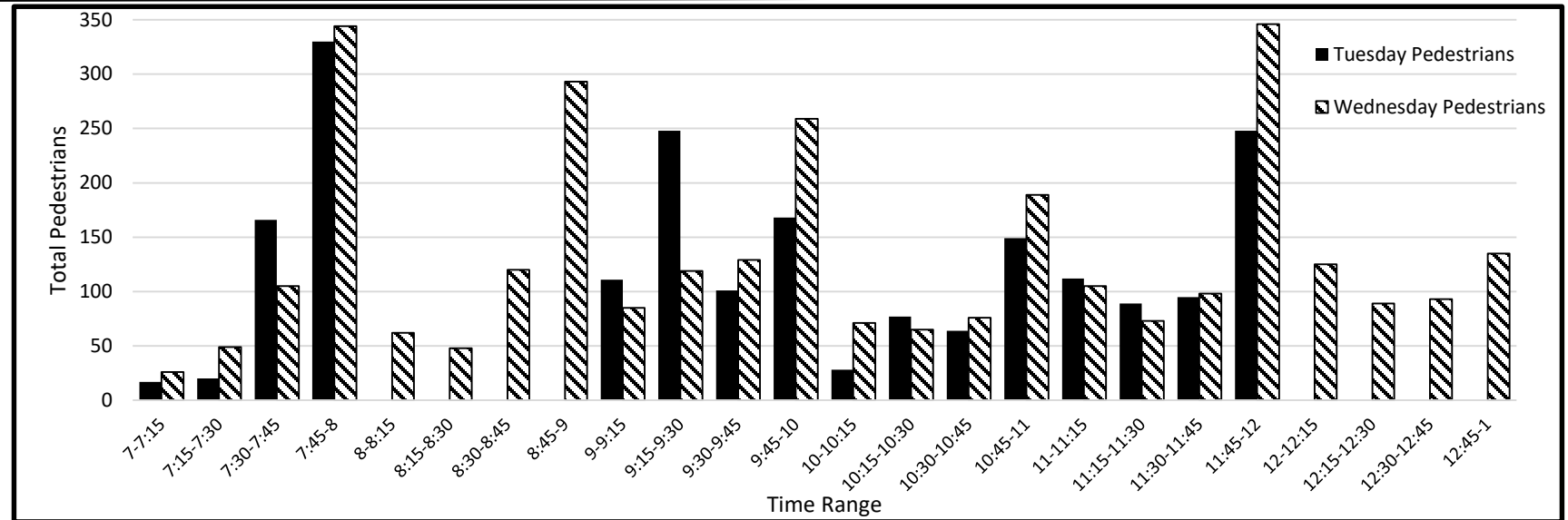


Design and Analysis Cont'd

Counts

- A camera was set up and recorded for on a Tuesday and Wednesday for 12 hrs starting at 7 AM – 7 PM
- Coded an excel sheet using VBA to facilitate organization of the data
- Invited students in the Civil Engineering program to volunteer as counter in exchange for one service point

Results



Discussion of Results

Criteria Established

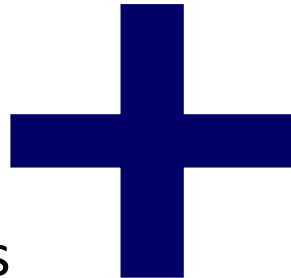
- Action must be taken if more than **60%** of people feel unsafe and there are at least **30 pedestrians** with **15 vehicles** circulating in a 15-minute interval walking through the parking lot. This must be satisfied at least 8 times during a 12-hour period.

or

- Action must be taken if more than **33%** of people have had a close encounter with a vehicle and there are at least **30 pedestrians** with **15 vehicles** in a 15-minute interval walking through the parking. This must be satisfied at least 8 times during a 12-hour period.

Discussion of Results Cont'd

- 39% of pedestrians feel somewhat unsafe
- 10% of pedestrians feel very unsafe



	Tuesday Peds	Wednesday Peds	Tuesday Vehicles	Wednesday Vehicles	Tuesday >30 peds	Wednesday >30 peds
7-7:15	17	26	4	3	0	0
7:15-7:30	20	49	19	16	0	X
7:30-7:45	166	105	40	21	X	X
7:45-8	330	344	47	33	X	X
8-8:15	0	62	0	14	0	0
8:15-8:30	0	48	0	13	0	0
8:30-8:45	0	120	0	17	0	X
8:45-9	0	293	0	22	0	X
9-9:15	111	85	17	11	X	0
9:15-9:30	248	119	18	12	X	0
9:30-9:45	101	129	14	16	0	X
9:45-10	168	259	23	31	X	X
10-10:15	28	71	3	5	0	0
10:15-10:30	77	65	4	4	0	0
10:30-10:45	64	76	3	18	0	X
10:45-11	149	189	6	12	0	0
11-11:15	112	105	10	5	0	0
11:15-11:30	89	73	19	2	X	0
11:30-11:45	95	98	11	11	0	0
11:45-12	248	346	18	21	X	X
12-12:15	0	125	0	20	0	X
12:15-12:30	0	89	0	6	0	0
12:30-12:45	0	93	0	23	0	X
12:45-1	0	135	0	9	0	0
1-1:15	170.1	78	64	7	X	0
1:15-1:30	113.4	68	0	7	0	0
1:30-1:45	113.4	78	0	5	0	0
1:45-2	170.1	147	0	3	0	0
2-2:15	58	0	7	0	0	0
2:15-2:30	69	0	7	0	0	0
2:30-2:45	59	0	6	0	0	0
2:45-3	121	0	18	0	X	0
3-3:15	129	136	15	7	0	0
3:15-3:30	152	161	10	4	0	0
3:30-3:45	120	107	18	9	X	0
3:45-4	170	163	21	18	X	X
4-4:15	131	139	10	22	0	X
4:15-4:30	193	160	12	10	0	0
4:30-4:45	183	141	15	21	0	X
4:45-5	201	177	34	30	X	X
5-5:15	95	95	21	31	X	X
5:15-5:30	111	109	13	19	0	X
5:30-5:45	23	58	1	15	0	0
5:45-6	87	87	15	22	0	X
6-6:15	92	111	20	4	X	0
6:15-6:30	127	122	5	2	0	0
6:30-6:45	63	123	10	12	0	0
6:45-7	101	137	20	21	X	X
Total					14	18



Criteria to take
action is met

Discussion of Results Cont'd

Mitigation Measures

Alternative 1



Pedestrians not
allowed in parking
lot. Use sidewalk.



x2

Alternative 2
(Preferred)



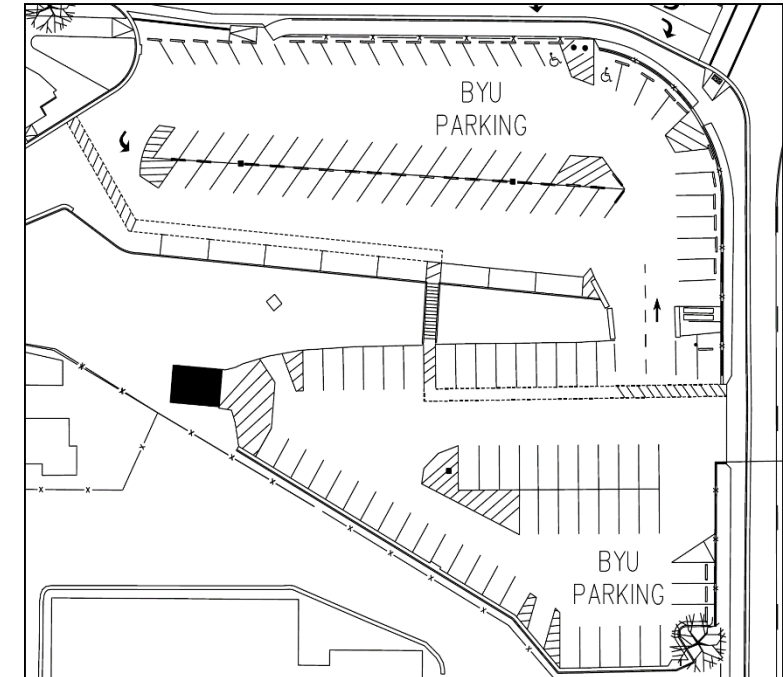
Pedestrians not
allowed in parking
lot. Use sidewalk.



x2



Alternative 3



Discussion of Results Cont'd

Alternative 1

Item	UOM	Quantity	Unit Price	Total
A-Frame Sign	Each	2	\$75	\$150
			Grand Total	\$150

Alternative 2—Preferred

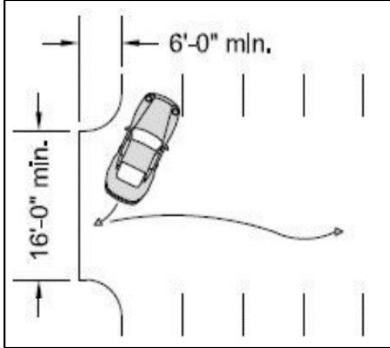
Item	UOM	Quantity	Unit Price	Total
A-Frame Sign	Each	2	\$75	\$150
Enforcement	Hour	520	\$10	\$5,200
			Grand Total	\$5,350

Alternative 3

Item	UOM	Quantity	Unit Price	Total
Pavement Parking Paint	Foot	764	\$0.63	\$481
Preliminary Engineering	Lump	1	\$1,000	\$1,000
MOB/TC	Lump	1	\$2,000	\$2,000
			Grand Total	\$3,481

Discussion of Results Cont'd

Geometric Design

Source	Standard	Existing Conditions in Parking Lot	Standard is Met/Not Met
ADA Standards	Max running slope: 8.33% Max cross slope: 2.08%	Existing running slope: 11% Existing cross slope: 2.23%	Not met
Provo City Code 14.37.113		Varies. Backup space in lower lot does not meet minimum lengths in multiple areas.	Not met

Conclusions

- The surveys revealed that 69% of pedestrians have had a close encounter with a vehicle. Furthermore, 49% of pedestrians have felt somewhat unsafe when walking across this parking lot.
- The peak 15-minute pedestrian volumes occurred at 7:45 AM-8:00 AM. During this time there were 228 pedestrians walking on areas designated for vehicles.
- The McDonald Parking lot receives massive waves of pedestrians that need to be accommodated to avoid conflicting interactions with circulating vehicles.

Recommendations

- **The purpose of this study was to increase pedestrian safety while maintaining vehicular flow in the lot.**
- **We have suggested three alternatives. Our preferred alternative to be implemented is Alternative 2 due to its potential to change student behavior permanently.**
- **We also analyzed the geometric design of the lot and noticed some aspects of the lot are do not meet standards. We recommend the design to be further analyzed.**

The End

Any Questions?