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February 22, 2022

Mr. Jim Byers
VP of Community Development
Challenger Homes
8605 Explorer Drive, Suite 250
Colorado Springs, CO 80920

RE: Bradley Heights Filings 3 and 4 Traffic Impact Analysis

Dear Mr. Byers:

This letter serves as a summary of the traffic impacts that will be produced by the development of Bradley Heights Filings 3 and 4, herein referred to as "the site", in the northwest portion of the Bradley Heights development. This area was analyzed before in the *Bradley Heights Master Development Traffic Impact Study* dated September 14, 2021. The previous study focused on the sizing of the internal collector roads and the external intersections along Powers Boulevard, Bradley Road, and Marksheffel Road. This analysis will compare the refined land development assumptions for Filings 3 and 4 to what was assumed in the Master Traffic Impact Study (MTIS) and determine the configurations for the access intersections for Filings 3 and 4. This study will focus on the horizon year (2045) conditions with the project.

Area Conditions

Study Area Land Use

The project site for Filings 3 and 4 is in southeast Colorado Springs and is generally bounded by Bradley Road on the north, Legacy Hill Road on the south, Bradley Landing Boulevard to the east and the Trails at Aspen Ridge development in El Paso County to the west as shown in Figure 1.

Site Accessibility

The existing roadway system consists of the following major roadways:

Bradley Road – Bradley Road is currently a 4-lane divided roadway with a posted speed of 50 miles-per-hour. It is classified as a Minor Arterial by El Paso County to the west of the project site and as an Expressway by the City of Colorado Springs in its current Major Thoroughfares Plan.

Powers Boulevard – Powers Boulevard is currently a 4-lane divided roadway maintained as State Highway 21 by the Colorado Department of Transportation (CDOT). It has a posted speed of 65 miles-per-hour between Fontaine Boulevard and Bradley Road. Powers Boulevard is classified as a Freeway (F-W) for access control but has a functional classification as a principal arterial.

Marksheffel Road – Marksheffel Road is currently a 4-lane divided roadway along most of the eastern project boundary transitioning to a 3-lane road with a posted speed of 45 miles-per-hour in the City-maintained portions and a posted speed of 55 miles-per-hour in the portions maintained by El Paso County. The City classifies Marksheffel Road as a Freeway due to its alignment matching the previously envisioned Banning Lewis Parkway. However, it functions as a Minor Arterial with existing volumes along the south end of the study area of approximately 5,000 vehicles-per-day and volumes along the north end of the study area at approximately 10,600 vehicles-per-day.

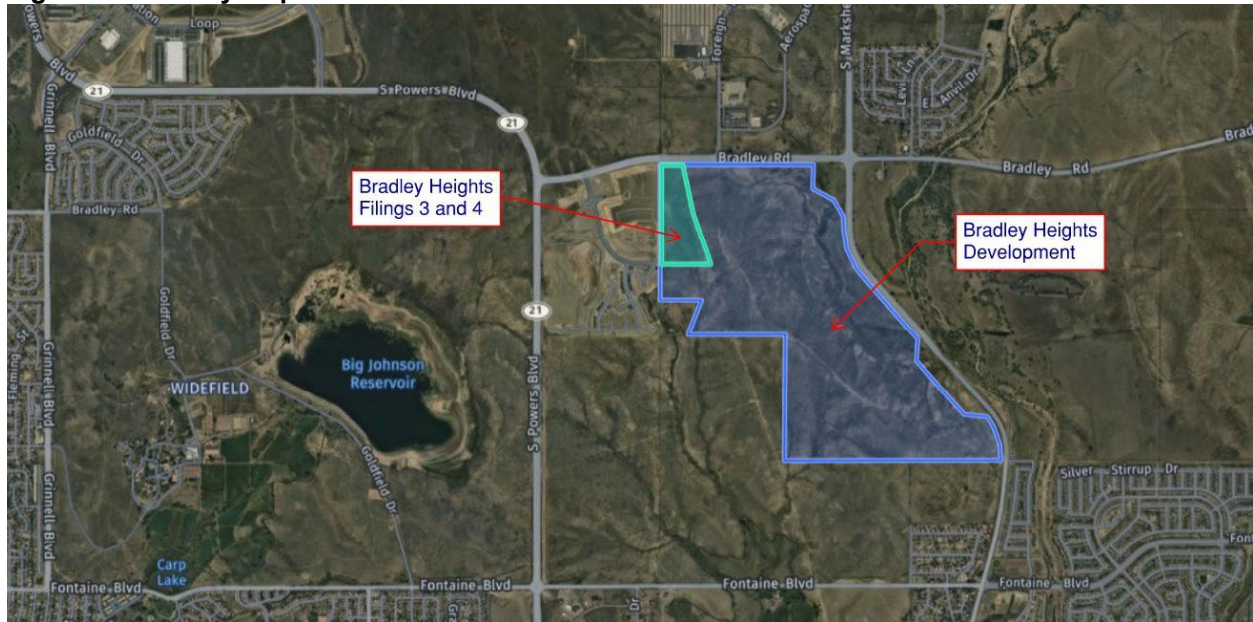
Bradley Landing Boulevard – Bradley Landing Boulevard is a proposed three-lane collector roadway that will be constructed within the Bradley Heights development connecting Bradley Road on the north to Bradley Ridge in the southern portion of the Bradley Heights development.

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Legacy Hill Drive – Legacy Hill Drive is a proposed east/west three-lane collector roadway within the Bradley Heights development. The roadway continues to the west through the Trails at Aspen Ridge development and has a signalized intersection with Bradley Road at its northern terminus.

Figure 1 – Vicinity Map



Proposed Development

Bradley Heights Filings 3 and 4 consists of 170 single-family detached dwelling units in the northwest portion of the overall Bradley Heights development as shown in the project site plan, Figure 2 below. This development was analyzed as Parcel 1 at 161 single-family detached dwelling units in the MTIS. However, the MTIS had internal trip capture and pass-by trips factored in due to the multiple land-use nature of the overall development. Since this study is only analyzing the trips from the site and the site is all residential land use, there are not any opportunities to deduct for internal trip capture or pass-by trips. The trip generation table from the MTIS is shown as Table 1 and the trip generation table for just Filings 3 and 4 is shown as Table 2.

The site has two points of access to the roadway network. The northern access point is a right-in/right-out only two-way stop-controlled intersection at Bradley Road. The southern point of access is a full movement two-way stop-controlled intersection at Legacy Hill Drive.

Table 1 – Bradley Heights MTIS Trip Generation Table

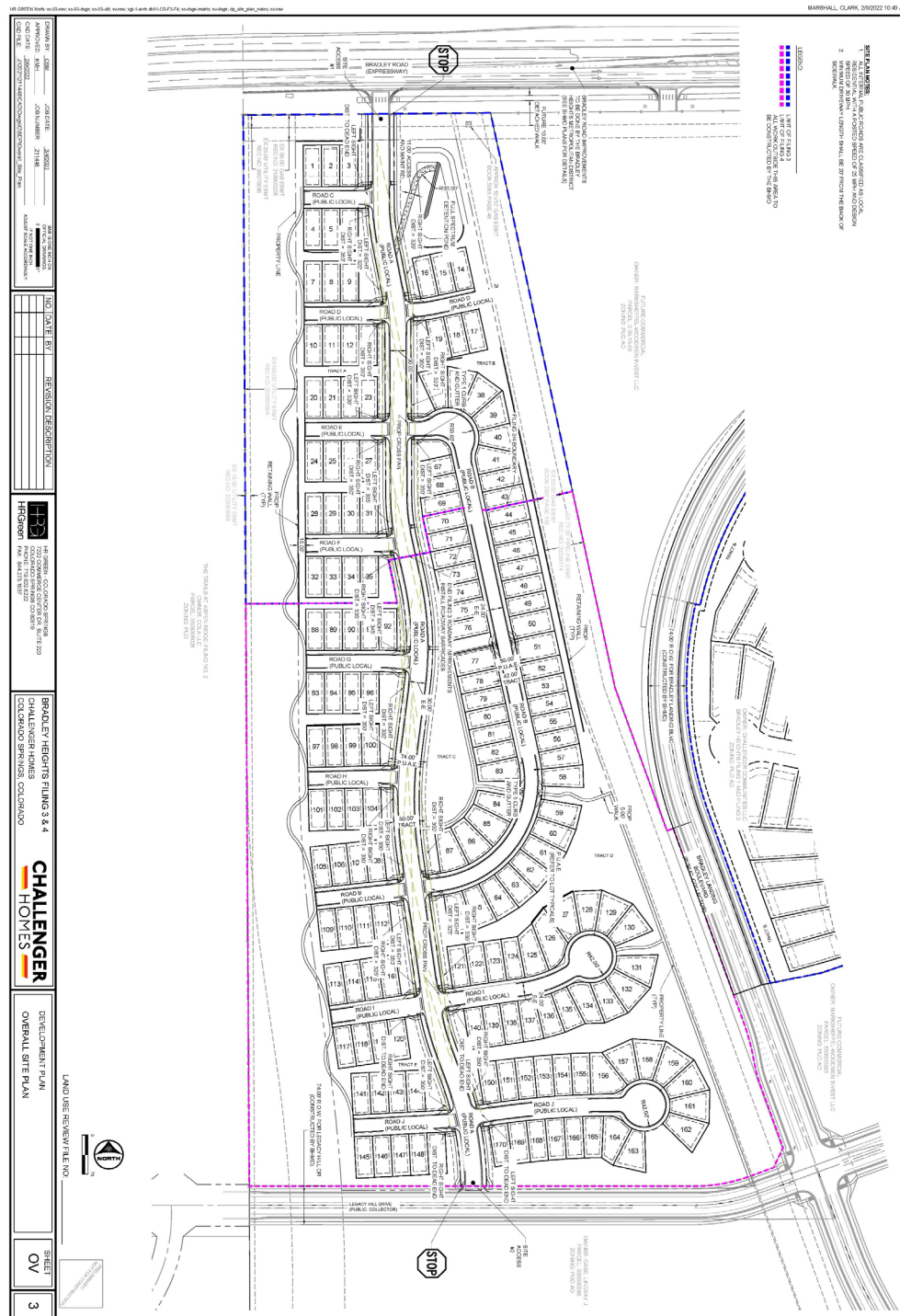
Land Use	Size (DUs, Seats, GFA)	AM Peak Hour			PM Peak Hour			Daily		
		Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total
210 - Single-Family Detached Housing	161	30	88	118	97	57	154	806	806	1612
Parcel 1 Subtotal		30	88	118	97	57	154	806	806	1612
820 - Shopping Center	78.5	101	69	170	72	73	145	2550	2550	5100
Parcel 2 Subtotal		101	69	170	72	73	145	2550	2550	5100
210(1) - Single-Family Detached Housing	166	31	91	122	100	59	159	829	829	1658
210(2) - Single-Family Detached Housing	196	36	107	143	117	70	187	966	966	1932
Parcel 3-8 Subtotal		67	198	265	217	129	346	1795	1795	3590
560 - Church	600	3	3	6	7	11	18	132	132	264
710 - General Office Building	87.6	90	11	101	11	67	78	467	467	934
Parcel 5A Subtotal		93	14	107	18	78	96	599	599	1198
210(3) - Single-Family Detached Housing	60	12	36	48	37	22	59	325	325	650
Parcel 5B Subtotal		12	36	48	37	22	59	325	325	650
520 - Elementary School	196	751	615	1366	121	148	269	1913	1913	3826
Parcel 9A&B Subtotal		751	615	1366	121	148	269	1913	1913	3826
210(4) - Single-Family Detached Housing	280	51	151	202	166	99	265	1341	1341	2682
Parcel 9C Subtotal (DUs)		51	151	202	166	99	265	1341	1341	2682
220 - Multifamily Housing (Low-Rise)	604	61	201	262	86	222	308	2263	2263	4526
Parcel 11 Subtotal		61	201	262	86	222	308	2263	2263	4526
210(5) - Single-Family Detached Housing	165	30	90	120	29	89	118	824	824	1648
Parcel 13 Subtotal		30	90	120	29	89	118	824	824	1648
210(6) - Single-Family Detached Housing	250	46	136	182	148	89	237	1208	1208	2416
Parcel 14 Subtotal		46	136	182	148	89	237	1208	1208	2416
210(7) - Single-Family Detached Housing	263	48	142	190	156	93	249	1266	1266	2532
Parcel 16 Subtotal		48	142	190	156	93	249	1266	1266	2532
220(1) - Multifamily Housing (Low-Rise)	341	35	117	152	106	63	169	1269	1269	2538
Parcel 17 Subtotal		35	117	152	106	63	169	1269	1269	2538
220(2) - Multifamily Housing (Low-Rise)	350	36	120	156	108	65	173	1303	1303	2606
Parcel 7 Subtotal		36	120	156	108	65	173	1303	1303	2606
Project Total		1361	1977	3338	1361	1227	2588	17462	17462	34924

Table 2 – Bradley Heights Filings 3 and 4 Trip Generation Table

Bradley Heights Filings 3 and 4											
ITE Code and Land Use	Size	Units	Weekday			AM Peak Hour			PM Peak Hour		
			Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
210 - Single-Family Detached Housing	170	DU	822	822	1644	31	89	120	103	61	164

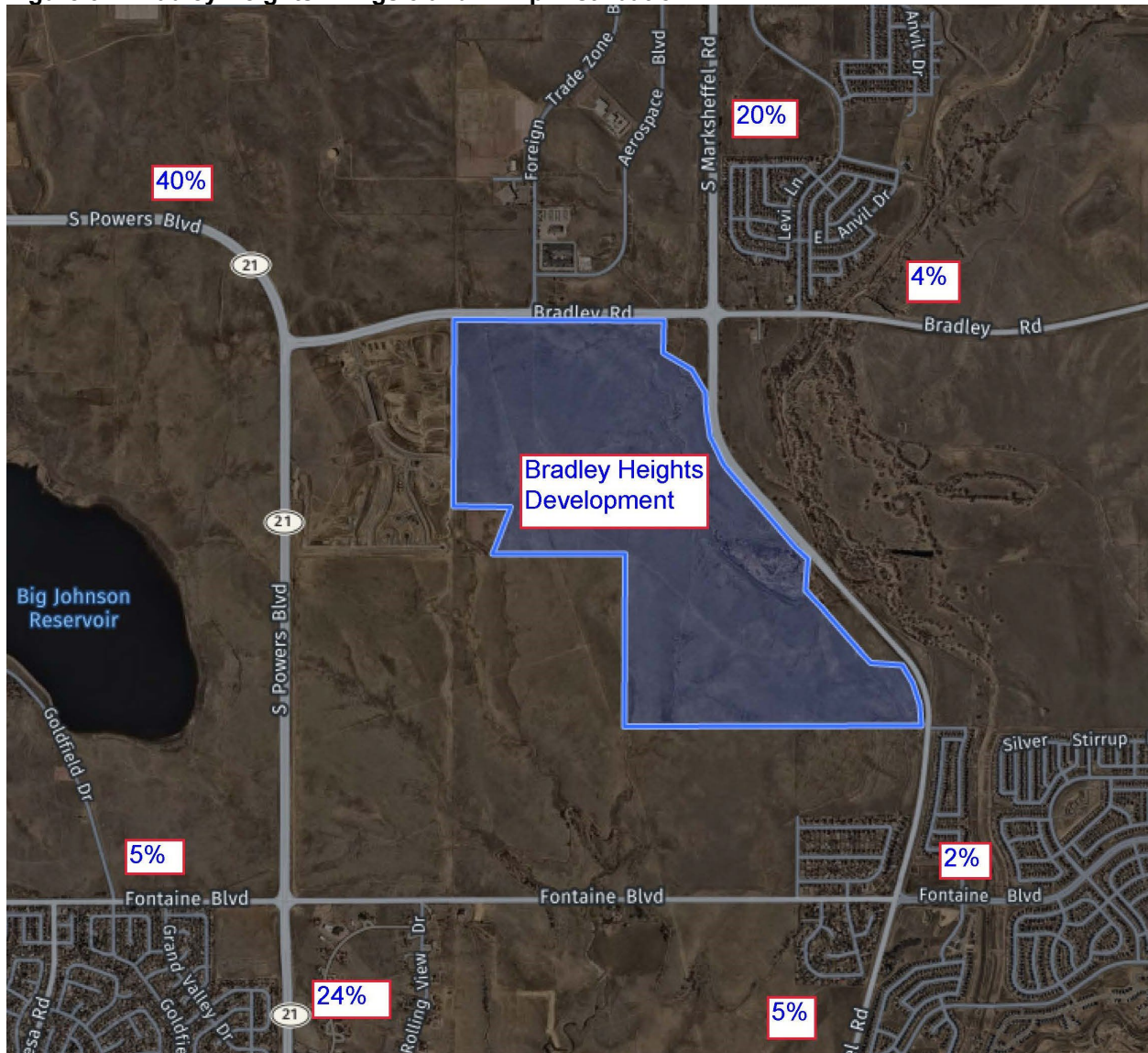
The increase in the number of units and elimination of any trip reductions increase the daily trip from 1612 trips to 1644 trips; the AM Peak Hour trips increased from 118 trips to 120 trips; and the PM Peak Hour Trips increased from 154 trips to 164 trips. This small increase in trips is not enough to change any of the overall analysis from the MTIS so the internal collector roads and external intersections along Powers Boulevard, Bradley Road and Marksheffel Road will remain the same.

Figure 2 – Bradley Heights Filings 3 and 4 Site Plan



The trips from the site will be distributed to the roadway network the same way they were in the MTIS and as shown in Figure 3.

Figure 3 – Bradley Heights Filings 3 and 4 Trip Distribution



The same *PTV Vistro* model used in the MTIS was used again for the analysis of the site traffic impacts with the trips generated changed to match the updated site plan. The site project trips will be assigned to the roadway network as shown in Figures 4 and 5 with all trips using the local road shown as Road A on the site plan (Figure 2) to access the network.

Figure 4 – Bradley Heights Filings 3 and 4 Site Trips (AM Peak Hour)

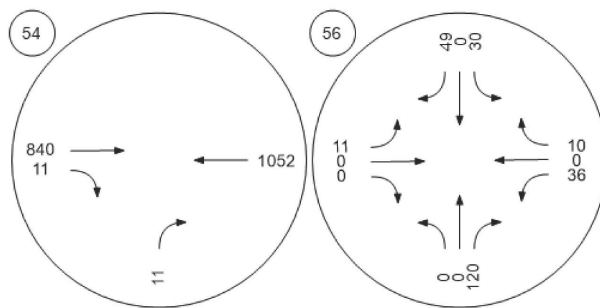
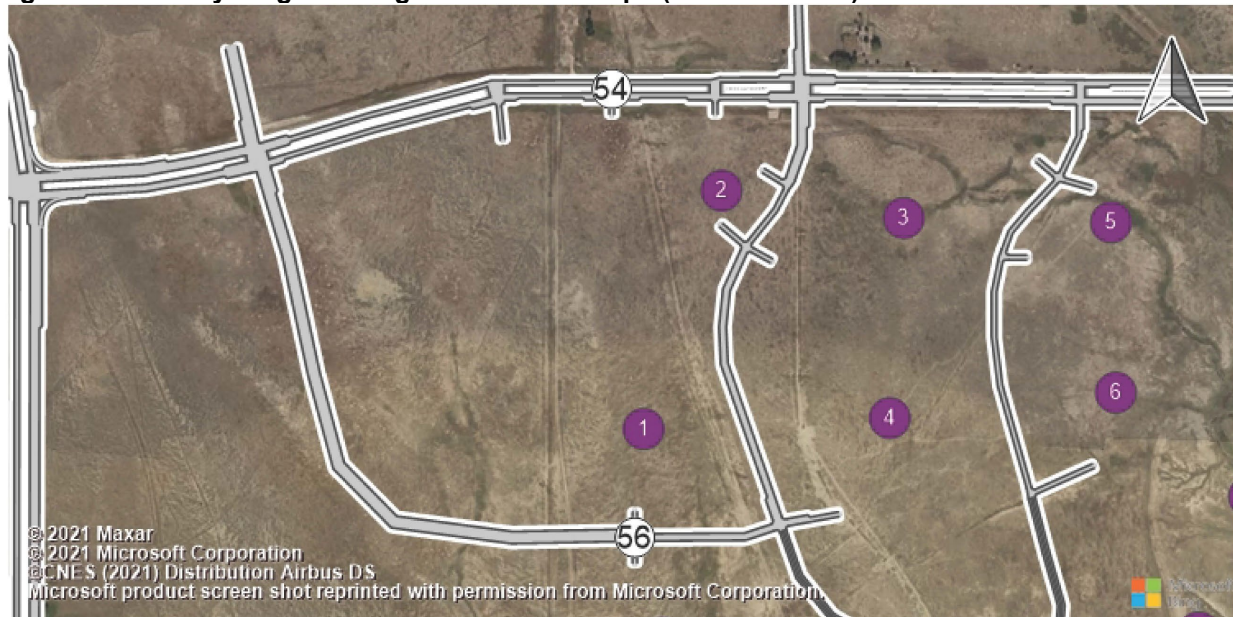
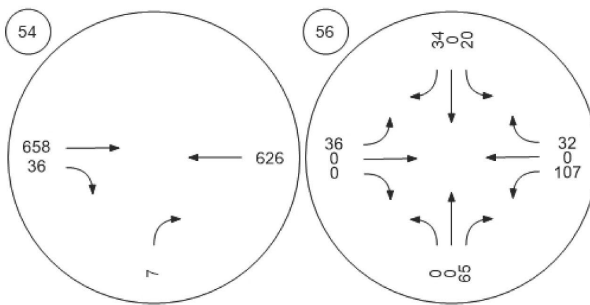
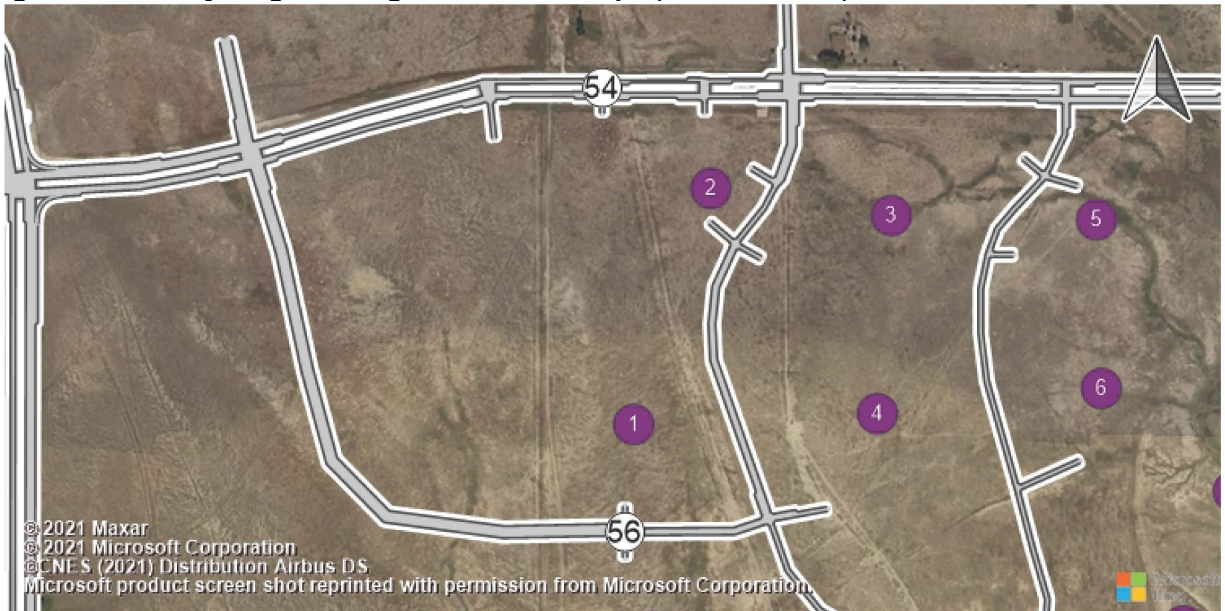


Figure 5 – Bradley Heights Filings 3 and 4 Site Trips (PM Peak Hour)

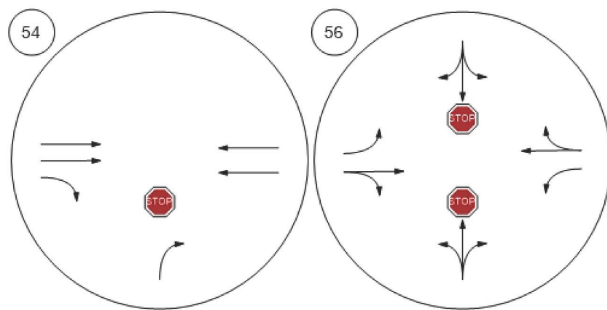
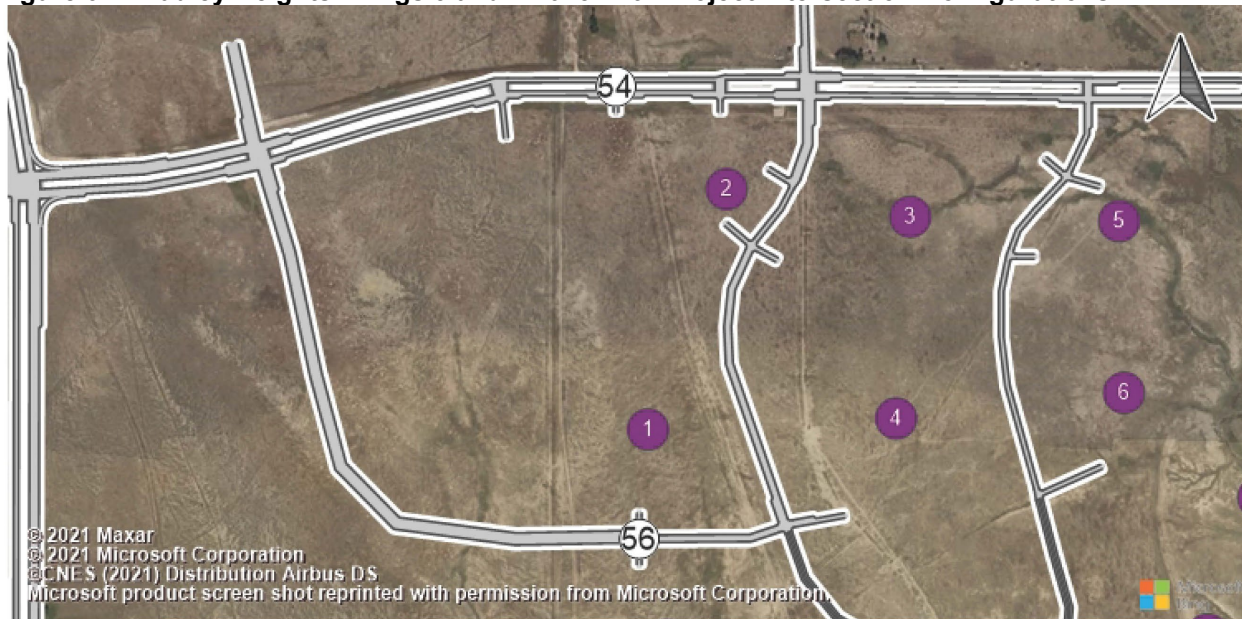


Traffic Analysis

Horizon Year (2045) With Project

The assumed intersection configurations for the Filings 3 and 4 access intersections (intersections 54 and 56 in the model) are shown in Figure 6.

Figure 6 – Bradley Heights Filings 3 and 4 2045 With Project Intersection Configurations



The total intersection volumes in the horizon year (2045) with the project are shown in Figure 7 and Figure 8 and the intersection level-of-service is shown in Tables 3 and 4.

Figure 7 – Horizon Year (2045) With Project Traffic Volumes (AM Peak Hour)

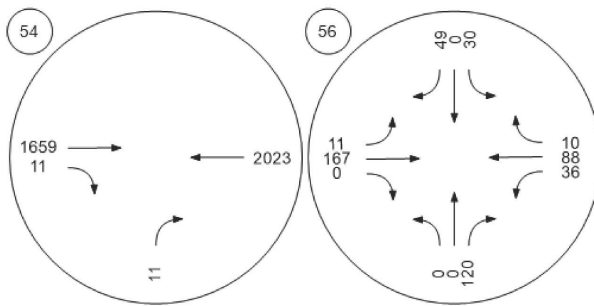
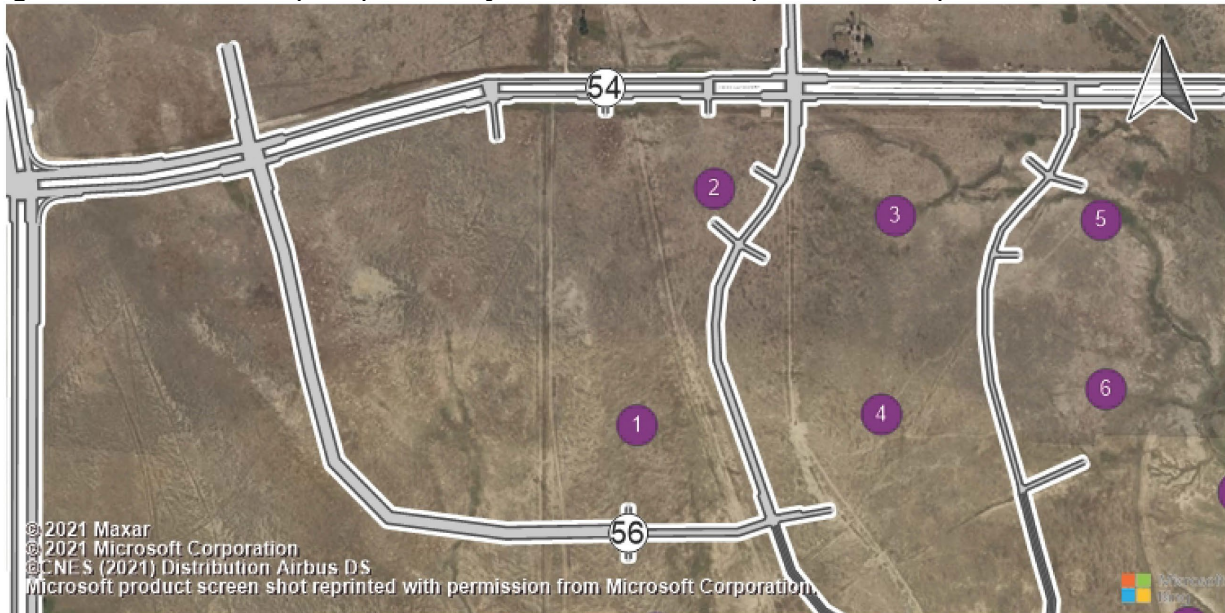


Table 3 – Horizon Year (2045) With Project Intersection Operations (AM Peak Hour)
Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
54	Bradley Rd/Road A	Two-way stop	HCM 6th Edition	NB Right	0.035	16.9	C
56	Legacy Hill Dr/Road A	Two-way stop	HCM 6th Edition	SB Left	0.065	13.5	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Figure 8 – Horizon Year (2045) With Project Traffic Volumes (PM Peak Hour)

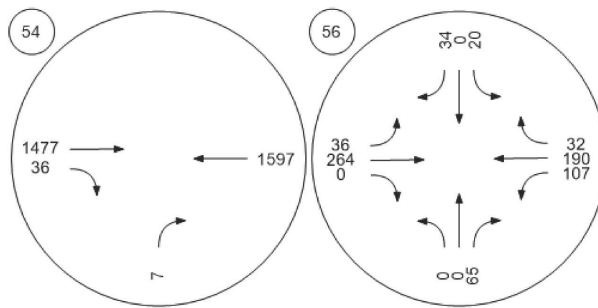


Table 4 – Horizon Year (2045) With Project Traffic Volumes (PM Peak Hour)
Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
54	Bradley Rd/Road A	Two-way stop	HCM 6th Edition	NB Right	0.019	15.2	C
56	Legacy Hill Dr/Road A	Two-way stop	HCM 6th Edition	SB Left	0.077	19.9	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Both project intersections will operate at acceptable level-of-service (LOS D or better) in the horizon year with the project.

Conclusions and Recommendations

Development of Bradley Heights Filings 3 and 4 will not have any adverse impacts on the surrounding network and the impacts are similar to what was assumed in the MTIS. Each project intersection should have the following turn lane improvements:

- Bradley Road/Road A
 - Eastbound right-turn deceleration lane with a deceleration length of 265-feet and approach taper of 220-feet based on an assumed posted speed of 55 miles-per-hour with Bradley Road classified as an expressway
- Legacy Hill Drive/Road A
 - Eastbound left-turn deceleration lane with 50-feet of storage and a bay taper of 40-ft based on an anticipated posted speed of 30 miles-per-hour for the collector road.

Powers Boulevard/Bradley Road

It was determined in the MTIS that in buildout (2030) conditions, the overall Bradley Heights development could contribute 45.01% of the AM peak hour trips and 37.87% of the PM peak hour trips. Filings 3 and 4 (Parcel 1 in the MTIS) is responsible for 1.78% of the buildout trips during the AM peak hour and 2.50% of the project trips during the PM peak hour for an average contribution of 2.14% of the costs of constructing the ultimate intersection at Powers Boulevard and Bradley Road. The assumed intersection configuration and cost estimate is currently being developed by the Trails at Aspen Ridge development in coordination with the Colorado Department of Transportation (CDOT), El Paso County, and the City of Colorado Springs. This process will determine what the intersection improvement costs are and Bradley Heights Filings 3 and 4 will be responsible for 2.14% of that cost.

All other roadway network improvements are as outlined in the MTIS document.

If you have any questions, please feel free to contact me at Scott.Barnhart@matrixdesigngroup.com or at (719) 575-0100.

Sincerely,



Scott D. Barnhart, P.E., PTOE
Senior Associate of Transportation Services.

Appendix A

Trip Generation Calculations

PROJECT DETAILS

Project Name:	Bradley Heights Filings 3-4	Type of Project:	Private Development
Project No:	22.1208.09	City:	Colorado Springs
Country:	United States	Built-up Area(Sq.ft):	
Analyst Name:	Scott Barnhart	Clients Name:	Challenger Homes
Date:	2/18/2022	ZIP/Postal Code:	
State/Province:	Colorado	No. of Scenarios:	3
Analysis Region:			

SCENARIO SUMMARY

Scenarios	Name	No. of Land Uses	Phases of Development	No. of Years to Project Traffic	User Group	Estimated New Vehicle Trips		
						Entry	Exit	Total
Scenario - 1	Daily Trips	1	1	0		822	822	1644
Scenario - 2	AM Peak Hour	1	1	0		31	89	120
Scenario - 3	PM Peak Hour	1	1	0		103	61	164

Scenario - 1

Scenario Name: Daily Trips

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
210 - Single-Family Detached Housing	General Urban/Suburban	Dwelling Units	170	Weekday	Best Fit (LOG)	822	822	1644
Data Source: Trip Generation Manual, 11th Ed					$\ln(T) = 0.92\ln(X) + 2.68$	50%	50%	

VEHICLE TO PERSON TRIP CONVERSION**BASELINE SITE VEHICLE CHARACTERISTICS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
210 - Single-Family Detached Housing	100	100	1	1	50	50

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing	822	822	0	0	822	822
	1644		0		1644	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
210 - Single-Family Detached Housing	822	822	1644

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	822	822	1644
External Vehicle Trips	822	822	1644
New Vehicle Trips	822	822	1644

Scenario - 2

Scenario Name: AM Peak Hour

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
210 - Single-Family Detached Housing	General Urban/Suburban	Dwelling Units	170	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	31	89	120
Data Source: Trip Generation Manual, 11th Ed					$\ln(T) = 0.91\ln(X) + 0.12$	26%	74%	

VEHICLE TO PERSON TRIP CONVERSION**BASELINE SITE VEHICLE CHARACTERISTICS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
210 - Single-Family Detached Housing	100	100	1	1	26	74

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing	31	89	0	0	31	89
	120		0		120	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
210 - Single-Family Detached Housing	31	89	120

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	31	89	120
External Vehicle Trips	31	89	120
New Vehicle Trips	31	89	120

Scenario - 3

Scenario Name: PM Peak Hour

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
210 - Single-Family Detached Housing	General Urban/Suburban	Dwelling Units	170	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	103	61	164
Data Source: Trip Generation Manual, 11th Ed					$\ln(T) = 0.94\ln(X) + 0.27$	63%	37%	

VEHICLE TO PERSON TRIP CONVERSION**BASELINE SITE VEHICLE CHARACTERISTICS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
210 - Single-Family Detached Housing	100	100	1	1	63	37

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing	103	61	0	0	103	61
	164		0		164	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
210 - Single-Family Detached Housing	103	61	164

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	103	61	164
External Vehicle Trips	103	61	164
New Vehicle Trips	103	61	164

Appendix B

Horizon Year (2045) With Project Intersection Analysis



Intersection Level Of Service Report

Intersection 54: Bradley Rd/Road A

Control Type: Two-way stop
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 16.9
 Level Of Service: C
 Volume to Capacity (v/c): 0.035

Intersection Setup

Name	Road A		Bradley Rd		Bradley Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	30.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Road A		Bradley Rd		Bradley Rd	
Base Volume Input [veh/h]	0	0	574	0	0	681
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	11	840	11	0	1052
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	11	1659	11	0	2023
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	3	415	3	0	506
Total Analysis Volume [veh/h]	0	11	1659	11	0	2023
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.04	0.02	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	0.00	16.90	0.00	0.00	0.00	0.00
Movement LOS		C	A	A		A
95th-Percentile Queue Length [veh/ln]	0.00	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	2.72	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	16.90		0.00		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.05					
Intersection LOS	C					



Intersection Level Of Service Report Intersection 56: Legacy Hill Dr/Road A

Control Type: Two-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 13.5
Level Of Service: B
Volume to Capacity (v/c): 0.065

Intersection Setup

Name	Parcel 7 Access			Road A			Legacy Hill Dr			Legacy Hill Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Parcel 7 Access			Road A			Legacy Hill Dr			Legacy Hill Dr		
Base Volume Input [veh/h]	0	0	0	0	0	0	0	117	0	0	62	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	120	30	0	49	11	0	0	36	0	10
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	120	30	0	49	11	167	0	36	88	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	30	8	0	12	3	42	0	9	22	3
Total Analysis Volume [veh/h]	0	0	120	30	0	49	11	167	0	36	88	10
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.14	0.06	0.00	0.05	0.01	0.00	0.00	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	12.12	12.21	9.75	13.49	12.20	9.42	7.43	0.00	0.00	7.62	0.00	0.00
Movement LOS	B	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.47	0.47	0.47	0.39	0.39	0.39	0.02	0.00	0.00	0.08	0.00	0.00
95th-Percentile Queue Length [ft/ln]	11.83	11.83	11.83	9.77	9.77	9.77	0.56	0.00	0.00	1.96	0.00	0.00
d_A, Approach Delay [s/veh]	9.75			10.97			0.46			2.05		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	4.68											
Intersection LOS	B											



Intersection Level Of Service Report

Intersection 54: Bradley Rd/Road A

Control Type: Two-way stop
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 15.2
 Level Of Service: C
 Volume to Capacity (v/c): 0.019

Intersection Setup

Name	Road A		Bradley Rd		Bradley Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	30.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Road A		Bradley Rd		Bradley Rd	
Base Volume Input [veh/h]	0	0	574	0	0	681
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	7	658	36	0	626
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	7	1477	36	0	1597
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	369	9	0	399
Total Analysis Volume [veh/h]	0	7	1477	36	0	1597
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.02	0.01	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	0.00	15.20	0.00	0.00	0.00	0.00
Movement LOS		C	A	A		A
95th-Percentile Queue Length [veh/ln]	0.00	0.06	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	1.48	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	15.20		0.00		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.03					
Intersection LOS	C					



Intersection Level Of Service Report Intersection 56: Legacy Hill Dr/Road A

Control Type: Two-way stop
Analysis Method: HCM 6th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 19.9
Level Of Service: C
Volume to Capacity (v/c): 0.077

Intersection Setup

Name	Road A			Road A			Legacy Hill Dr			Legacy Hill Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			T			T		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Road A			Road A			Legacy Hill Dr			Legacy Hill Dr		
Base Volume Input [veh/h]	0	0	0	0	0	0	0	185	0	0	133	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261	1.4261
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	65	20	0	34	36	0	0	107	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	65	20	0	34	36	264	0	107	190	32
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	16	5	0	9	9	66	0	27	48	8
Total Analysis Volume [veh/h]	0	0	65	20	0	34	36	264	0	107	190	32
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.08	0.08	0.00	0.04	0.03	0.00	0.00	0.08	0.00	0.00
d_M, Delay for Movement [s/veh]	18.02	17.63	10.07	19.92	17.99	10.36	7.75	0.00	0.00	8.02	0.00	0.00
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.27	0.27	0.27	0.40	0.40	0.40	0.08	0.00	0.00	0.27	0.00	0.00
95th-Percentile Queue Length [ft/ln]	6.85	6.85	6.85	9.94	9.94	9.94	2.06	0.00	0.00	6.71	0.00	0.00
d_A, Approach Delay [s/veh]	10.07			13.90			0.93			2.61		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	3.40											
Intersection LOS	C											

March 31, 2022

Jim Byers
VP of Community Development
Challenger Homes
8605 Explorer Drive, Suite 250
Colorado Springs, CO 80920

RE: Challenger Homes Bradley Heights Developments – Powers Boulevard/Bradley Road Intersection Fair Share Contributions

Mr. Byers:

Matrix Design Group (Matrix) is currently working on an agreement with El Paso County and the Colorado Department of Transportation (CDOT) to determine the layout and cost estimate for the ultimate configuration of the Powers Boulevard/Bradley Road intersection that all Bradley Heights filings will contribute traffic to. The letter to El Paso County and CDOT with the proposed layout and cost estimate is attached for reference. The bottom line is that the estimated cost for the ultimate intersection configuration in 2022 dollars is \$1,360,692.26. The intersection layout and cost estimate are pending approval from El Paso County and CDOT.

The *Bradley Heights Master Development Traffic Impact Study* dated September 14, 2021 and produced by Matrix indicates that the overall Bradley Heights development will contribute approximately 41% of the traffic through the Powers Boulevard/Bradley Road intersection in the buildout (2030) conditions. Details are now known about the individual Bradley Heights filings owned by Challenger Homes and this letter will determine each development's fair share contribution towards the ultimate improvements at the Powers Boulevard/Bradley Road intersection.

There are three separate Challenger Homes owned developments within the overall Bradley Heights development. These are as follows:

1. Filings 1 and 2: 169 single-family dwelling units
2. Filings 3 and 4: 170 single-family dwelling units
3. Filings 5 and 6: 152 single-family dwelling units

The daily trip generation characteristics of each group of filings is as shown in Table 1.

Table 1 - Challenger Homes Daily Trip Generation

Filings	Land Use	Daily Trips
Filings 1 and 2	169 single-family dwelling units	1,635 trips
Filings 3 and 4	170 single-family dwelling units	1,644 trips
Filings 5 and 6	152 single-family dwelling units	1,484 trips

Figure 6 of the Master TIS indicates that 69% of project trips will travel through the Powers Boulevard/Bradley Road intersection with 40% traveling to/from the north along Powers Boulevard; 24% traveling to/from the south along Powers Boulevard and 5% traveling to/from the west along Fontaine Boulevard.

Figures 12 and 13 of the Master TIS (Intersection 1) show that there are a total of 4,533 vehicle trips through the Powers Boulevard/Bradley Road intersection during the AM peak hour and 4,272 vehicle trips through the same intersection during the PM peak hour in 2030 buildout conditions. It is assumed that both the AM peak hour volumes and PM peak hour volumes represent 10% of the daily traffic volumes.

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Therefore, it is assumed that there are 45,330 vehicle trips through the Powers Boulevard/Bradley Road intersection daily during the 2030 buildout conditions. Multiplying the daily trips generated by each of the Challenger Homes developments by the % of trips going through the Powers Boulevard/Bradley Road intersection and dividing that amount by the total daily trips in the intersection will provide the % Fair Share that each development should contribute towards the ultimate Powers Boulevard/Bradley Road intersection. These results are shown in Table 2.

Table 2 - Challenger Homes Fair Shares

Filings	Daily Trips	Daily Trips through Powers/Bradley Intersection (69%)	% Fair Share of Daily Trips
Filings 1 and 2	1,635 trips	1,128 trips	2.49%
Filings 3 and 4	1,644 trips	1,134 trips	2.50%
Filings 5 and 6	1,484 trips	1,024 trips	2.30%

When the fair share for each development is multiplied by the estimated intersection improvement costs, the financial responsibility for each development is as follows:

- Filings 1 and 2; 2.49% of buildout trips; \$33,881.24
- Filings 3 and 4; 2.50% of buildout trips; \$34,017.31
- Filings 5 and 6; 2.30% of buildout trips; \$31,295.92

If you have any questions, please feel free to contact me at scott.barnhart@matrixdesigngroup.com or at (719) 575-0100.

Thank you.

Respectfully,



Scott D. Barnhart, P.E., PTOE
Senior Associate of Transportation Services

Attachment 1: Trails at Aspen Ridge Access Permit – Powers Boulevard/Bradley Road Ultimate Intersection Configuration and Cost Estimate



February 17, 2022

Gilbert LaForce, P.E.
El Paso County Planning and Community Development Department
2880 International Circle, Suite 110
Colorado Springs, CO. 80910

RE: Trails at Aspen Ridge Access Permit – Powers Boulevard/Bradley Road Ultimate Intersection Configuration and Cost Estimate

Dear Mr. LaForce:

Matrix Design Group (Matrix) had developed a conceptual layout for the ultimate configuration of a four-legged, at-grade intersection for Powers Boulevard and Bradley Road. The configuration is based on a combination of the traffic impact study for Trails at Aspen Ridge, the State of Colorado State Highway Access Code and the El Paso County Engineering Criteria Manual. All turn lanes at the intersection of Powers Boulevard and Bradley Road are based on the State Highway Access Code and the turn lanes at the intersection of Bradley Road and Legacy Hill Drive are based on the El Paso County Engineering Criteria Manual.

Powers Boulevard is considered a Freeway by the State Highway Access Code. However, it still has at-grade intersections. Therefore, Powers Boulevard was considered as an Expressway for the purposes of determining the lengths of auxiliary lanes and tapers with a posted speed of 55 miles-per-hour (mph). Bradley Road was considered as an NR-A roadway. The west leg of the intersection and all auxiliary lanes into and out of the west leg will ultimately be paid for by the development to the west of Powers Boulevard. Therefore, the costs associated with those lanes (southbound right-turn, northbound left-turn, westbound through) are not part of the cost share calculation.

The conceptual layout can be found as Attachment 1 to this letter. The cost estimate for the shared portion of the intersection can be found as Attachment 2 and the cost estimate for the west leg and all auxiliary lanes into and out of the west leg (built by others) can be found as Attachment 3. The costs associated with construction of the west leg and all auxiliary lanes into and out of the west leg is \$1,715,515.97. These are shaded in blue in the exhibit. The addition of the two westbound through lanes to the east leg of the intersection, as well as the addition two eastbound left-turn lanes into a future north leg of Legacy Hill Drive (shaded in green in the exhibit) require the future roadway widening to the north (also shaded in green in the exhibit). All areas shaded blue and green in the exhibit are assumed to be costs to be borne by others as the west leg of Bradley Road and the north leg of Legacy Hill Drive are constructed by other developers. The cost of the ultimate Powers and Bradley Road intersection that should be shared is **\$1,360,692.26** (this does not include the west leg or any auxiliary lanes leading into or out of the west leg – green and blue shaded areas). All the Trails at Aspen Ranch filings should contribute a combined 7.89% of this total amount or \$107,391.60. This contribution should be broken up by each filing in the following way.

- Filing 1; 1.66% of horizon year trips; \$22,573.60
- Filing 2; 0.90% of horizon year trips; \$12,224.68
- Filing 3; 1.82% of horizon year trips; \$24,696.83
- Filing 4; 1.14% of horizon year trips; \$15,466.45
- Filing 5; 0.53% of horizon year trips; \$ 7,238.80
- Filing 6; 0.71% of horizon year trips; \$ 9,725.30
- Filing 7; 1.14% of horizon year trips; \$15,466.45

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If you have any questions, please feel free to contact me at scott.barnhart@matrixdesigngroup.com or at (719) 575-0100.

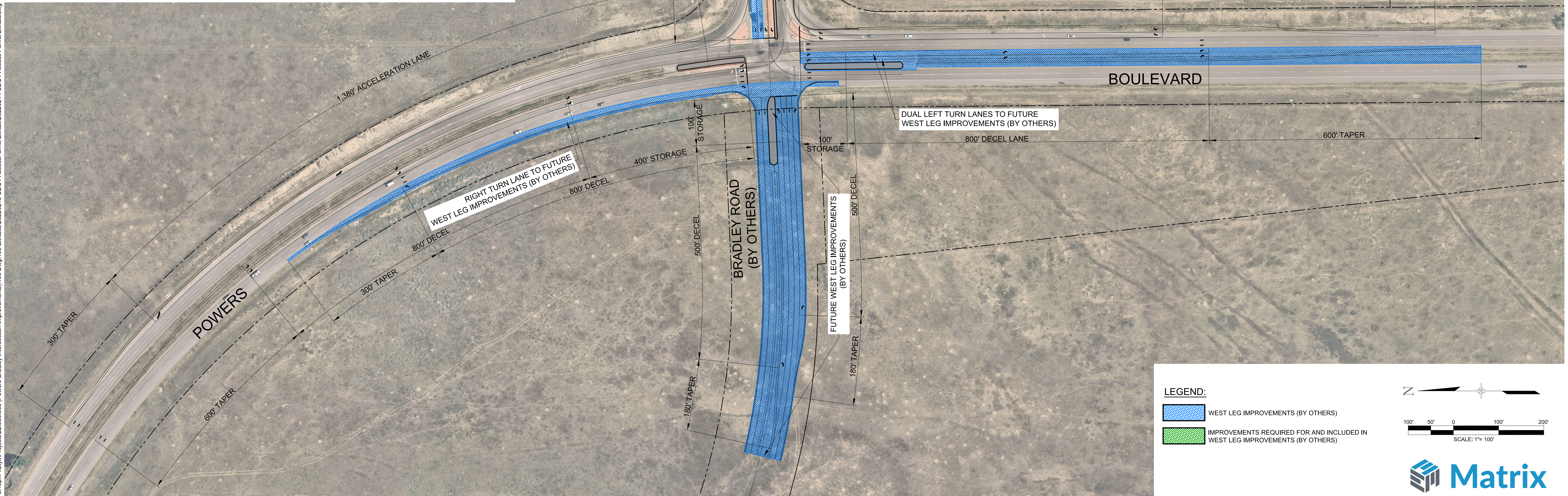
Thank you.

Respectfully,



Scott D. Barnhart, P.E., PTOE
Senior Associate of Transportation Services

- Attachment 1: Powers/Bradley Intersection Access Permit Exhibit
- Attachment 2: Project Cost Estimate
- Attachment 3: Future West Leg (By Others) Cost Estimate



2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100 Fax
719-575-0208

