Appendices

A. Fox Farm Intersection Decision Matrix

B. 35% Design Plans

C. Construction Cost Estimate Information

D. Electric Transmission Line Easements and Guidelines

E. Transportation Operations Report

F. Storm Drainage Study

G. Public Involvement Materials

H. Steering Committee Meeting Minutes

I. Resolutions

Appendix A

Fox Farm Intersection Decision Matrix

Fox Farm and Walterscheid Intersection

Updated 8-22

Criteria	Configuration		
	4-Way Stop	**Signalized with added lanes (4" asphalt pavement on 6" base)**[1]	**Roundabout with NBRT (8" concrete pavement on 4" base)**[1]
Overall Level of Service, Peak	F	C	C
Eastbound Cue Length, max.	450 feet (PM peak)	225 feet (PM peak)	200 feet (PM peak)
Overall Delay at Intersection	> 2 minutes (AM peak) 69 seconds (off peak) > 2 minutes (PM peak)	28 seconds (AM peak) 24 seconds (off peak) 28 seconds (PM peak)	20 seconds (AM peak) 8 seconds (off peak) 18 seconds (PM peak)
Additional Right-of-Way	No change	3709 SF along SE leg (hotel is under construction) in a 50' wide pipeline easement with two gas lines in the easement.	509 SF at SE corner (owner dedicated 20' x 20' triangle on site plan), 1203 SF at NE corner, 1587 SF at NW corner (city-owned property), and 510 SF at SW corner (city-owned property).
Additional Right-of-Way Cost	$0	$ 33,390	$ 18,864
Utility Impacts	No Change	Relocate four power poles, relocate one overhead light, adjust underground utilities at new surface. Horizontally adjust water main.	Relocate two power poles, relocate one overhead light, adjust underground utilities at new surface, adjust guy wire.
Pedestrian use	No marked crossings, missing sidewalks	Marked crosswalks, stop bars, sidewalk, greenway.	Marked crosswalks, yield arrows, sidewalk, greenway, refuge islands.
Construction Costs	$ 0	$ 791,687.50	$ 888,731.00
Operation and Maintenance Costs[2]	$ 0	$ 269,500 (total) $ 10,780 (annually)	$ 69,375 (total) $ 2,775 (annually)
Access to Fire Station	No change	West approach to be constructed, east approach to be closed.	West approach to be constructed, east approach to be closed.
Use during emergency	No change	Pre-emptive clearing via signal controls.	Warning signage, other educational outreach, pre-emptive signal.
Safety	See table below for Fatality Data from FHWA.	See table below for Fatality Data from FHWA.	Studies of intersections in the United States converted from traffic signals or stop signs to roundabouts have found reductions in injury crashes of 72-80 percent and reductions in all crashes of 35-47 percent.[3]
Crash Cost Estimate[4]	$ 2,105,726	$ 7,150,995	$ 2,100,436
Expandability	No Change	Location of signal placement.	Additional ROW and utility relocations.

Notes:

1. Pavement section assumed and based on other projects in the area, geotechnical investigation to be completed in future phases.
2. Operation and Maintenance Cost details $1,500 annually for electricity and routine maintenance $8,000 annually. Signal controller upgrade $10,000 every 10 years. Routine traffic signal time updates $3,000, every three to five years. Sources: https://www.howmuchisit.org/traffic-light-cost/ (updated 8-15-18) and https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/215f723db93d293c8525725f00786fd8 (dated 1-19-2007). Assumed 25-year life for signal post and arms.
3. Source: https://www.iihs.org/topics/roundabouts
4. From *Fox Farm Road at Walterscheid Avenue Supplement Analysis Life Cycle Benefit/Cost of Intersection Improvement Alternatives,* Western Research and Development, 2017. Value is 2016 Present Value through 2040.

No adjustment for inflation has been included in the O&M costs.
Assumed pavement maintenance and signage upgrade/replacement is comparable for all intersection options.

From: https://safety.fhwa.dot.gov/intersection/about/

Fatalities at Unsignalized Intersections

Year	Total Traffic Fatalities	Traffic Fatalities Involving an Intersection	Fatalities Involving an Unsignalized Intersection	Pedestrian Fatalities Involving an Unsignalized Intersection	Bicyclist Fatalities Involving an Unsignalized Intersection
2015	35,484	9,664	6,741	885	218
2016	37,806	10,414	7,116	1,009	205
2017	37,133	10,301	7,030	983	198
2018	36,835	10,011	6,737	979	220
2019	36,096	10,180	TBD	TBD	TBD

Fatalities at Signalized Intersections

Year	Total Traffic Fatalities	Traffic Fatalities Involving an Intersection	Traffic Fatalities Involving a Signalized Intersection	Traffic Fatalities Involving Red–Light Running at a Signalized Intersection	Pedestrian Fatalities Involving a Signalized Intersection	Bicyclist Fatalities Involving a Signalized Intersection	Pedestrian and Bicyclist Fatalities Involving Red–Light Running at a Signalized Intersection
2015	35,484	9,664	2,923	786	750	119	52
2016	37,806	10,414	3,298	826	795	160	47
2017	37,133	10,301	3,271	890	800	125	46
2018	36,835	10,011	3,274	846	792	135	53
2019	36,096	10,180	TBD	TBD	TBD	TBD	TBD

Appendix B

35% Design Plans

WALTERSCHEID BOULEVARD RECONSTRUCTION 35% PLANS

OWNER:
CHEYENNE METROPOLITAN PLANNING ORGANIZATION
2101 O'NEIL AVE, ROOM 302
CHEYENNE, WYOMING 82001

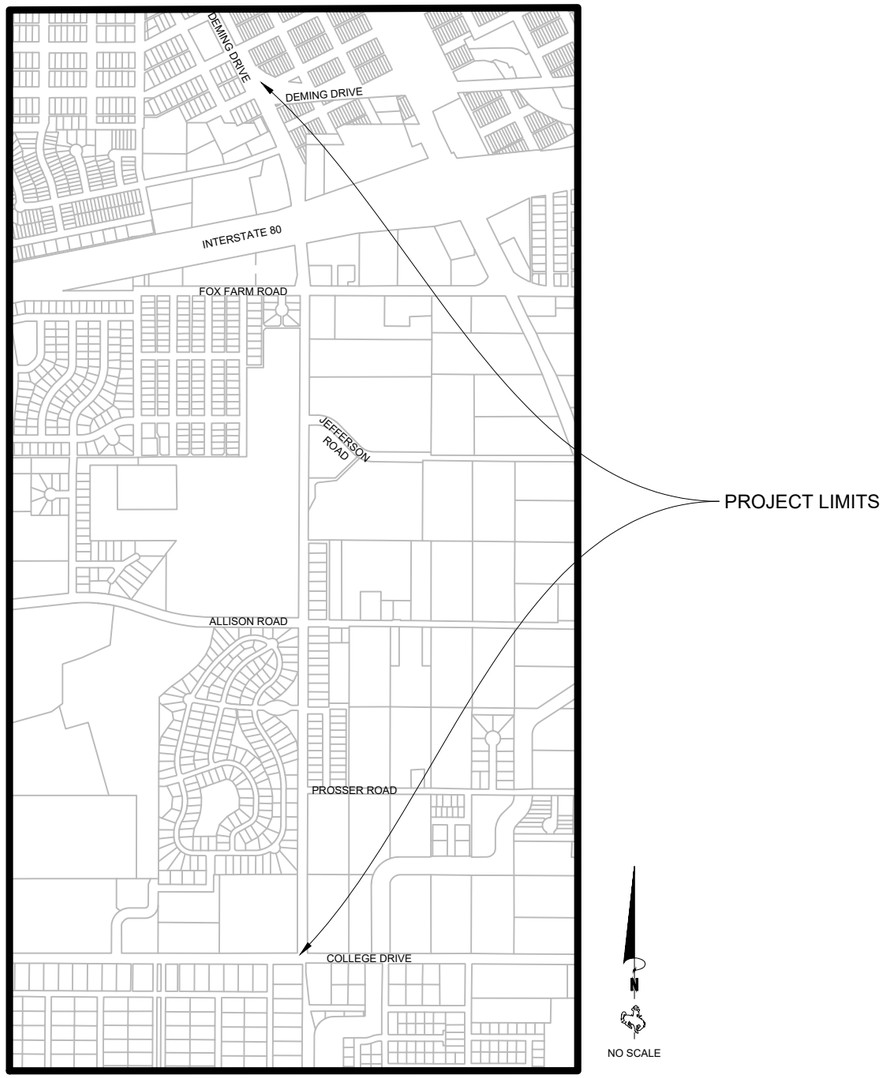
ENGINEER:
BENCHMARK ENGINEERS, PC
1920 THOMES AVENUE, SUITE 320
CHEYENNE, WYOMING 82001
307-634-9064
WWW.BENCHMARKENGINEERS.COM

IN ASSOCIATION WITH:

FELSBURG HOLT & ULLEVIG
CENTENNIAL, COLORADO

AND

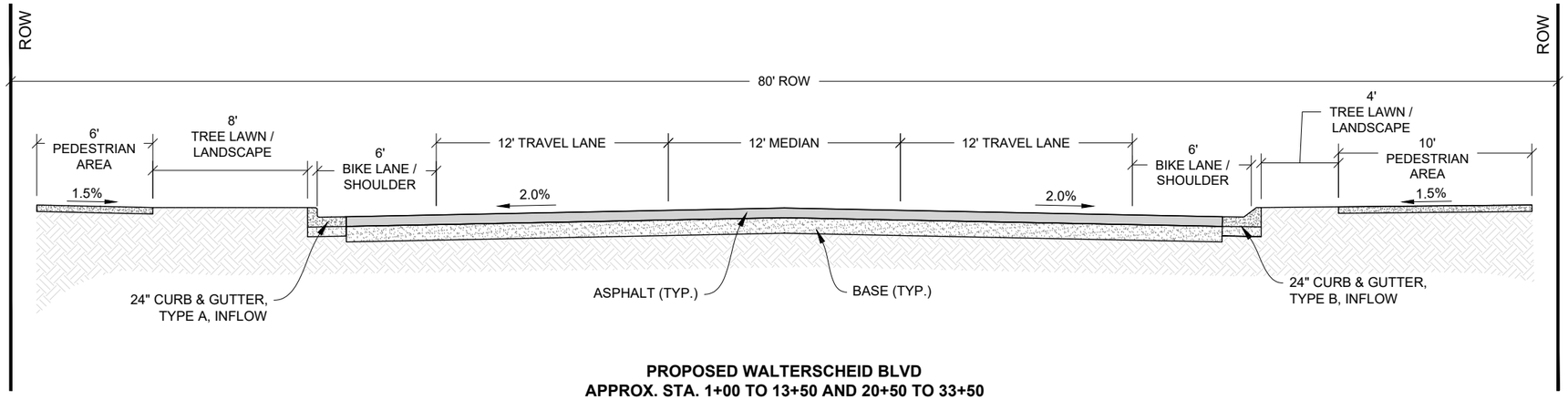
GLM DESIGN
CHEYENNE, WYOMING



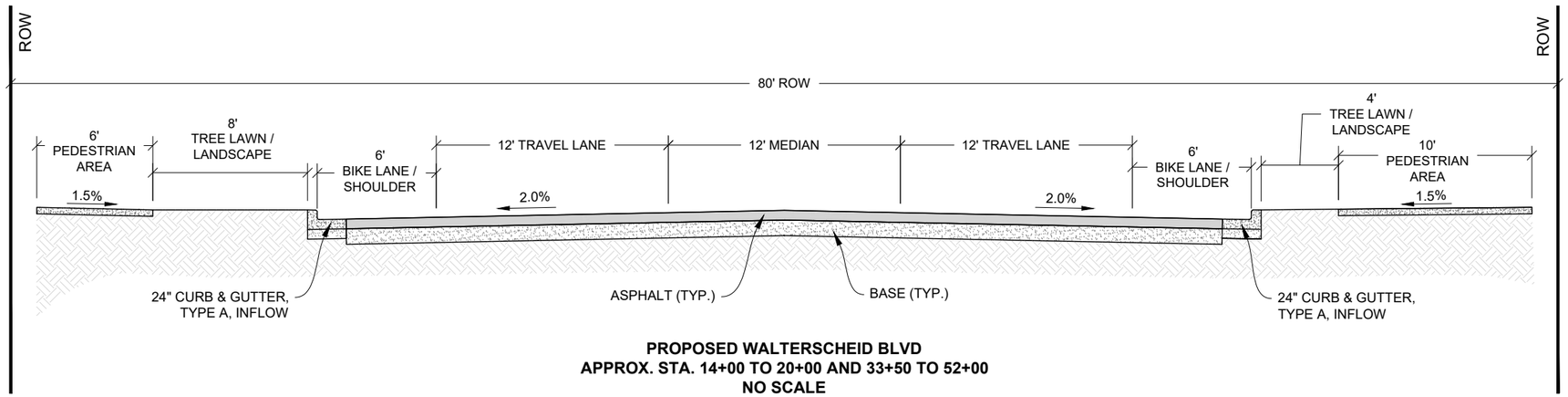
SHEET INDEX

Wyoming - ONE - CALL 811 Stop-Call Before you Dig!

OUT OF STATE CALL: 1-800-849-2476



PROPOSED WALTERSCHEID BLVD
APPROX. STA. 1+00 TO 13+50 AND 20+50 TO 33+50
NO SCALE



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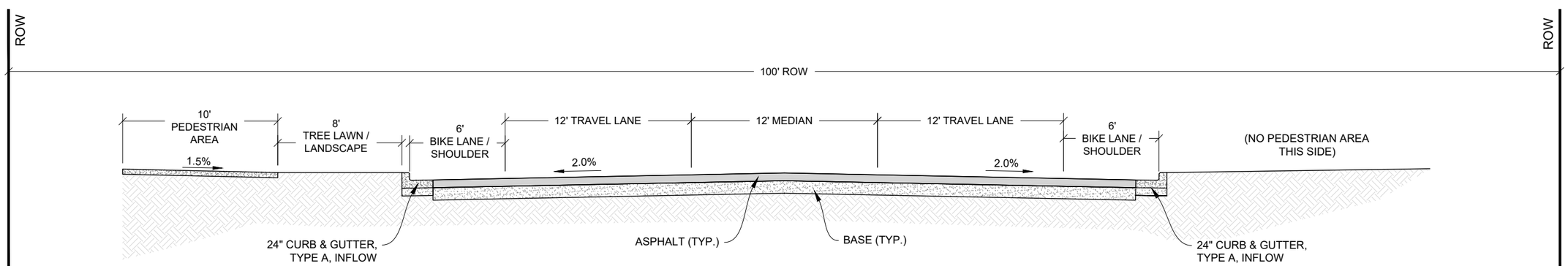
NO SCALE



PROPOSED WALTERSCHEID BLVD
APPROX. STA. 55+50 TO 57+30 AND 60+50 TO 67+75
NO SCALE

NOTES:

CROSS SECTION ARE TYPICAL, MAINLINE SECTIONS. AUXILLIARY TURN LANES ARE NOT SHOWN. RIGHTS-OF-WAY TO BE VERIFIED.

PAVEMENT AND BASE COURSE THICKNESS TO BE DETERMINED BY GEOTECHNICAL INVESTIGATION IN A LATER PHASE.

Project No. 2104.04
Design By: EG
Check By: SL
Drawn By: RR, EM
File:

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WALTERSCHEID BLVD RECONSTRUCTION
TYPICAL CROSS SECTIONS

CHEYENNE, LARAMIE COUNTY, WYOMING

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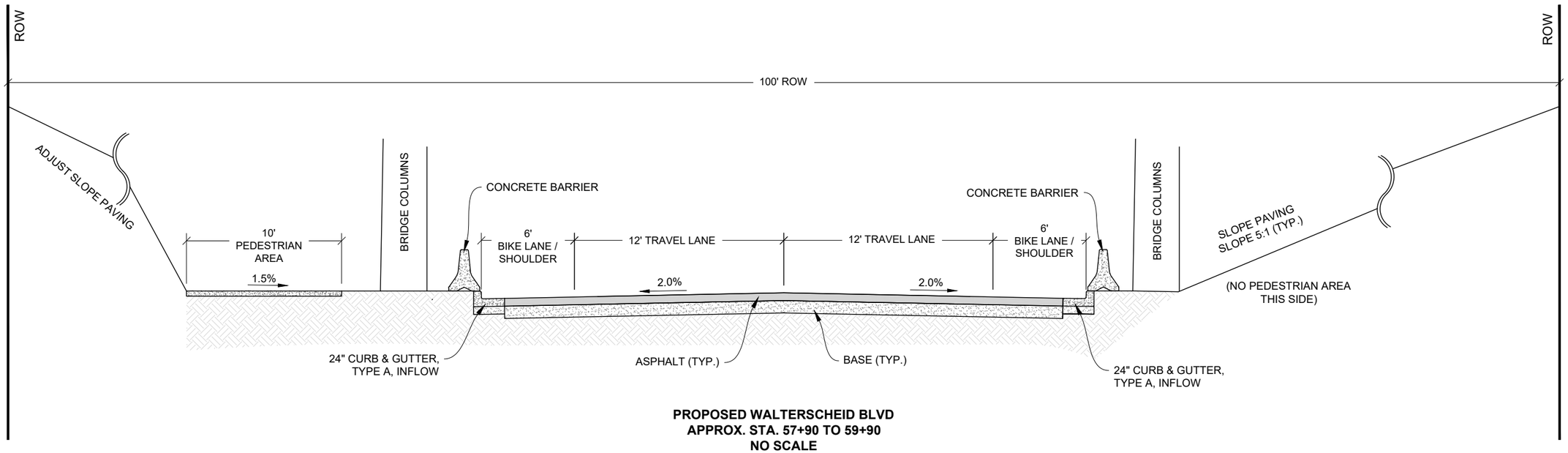
01



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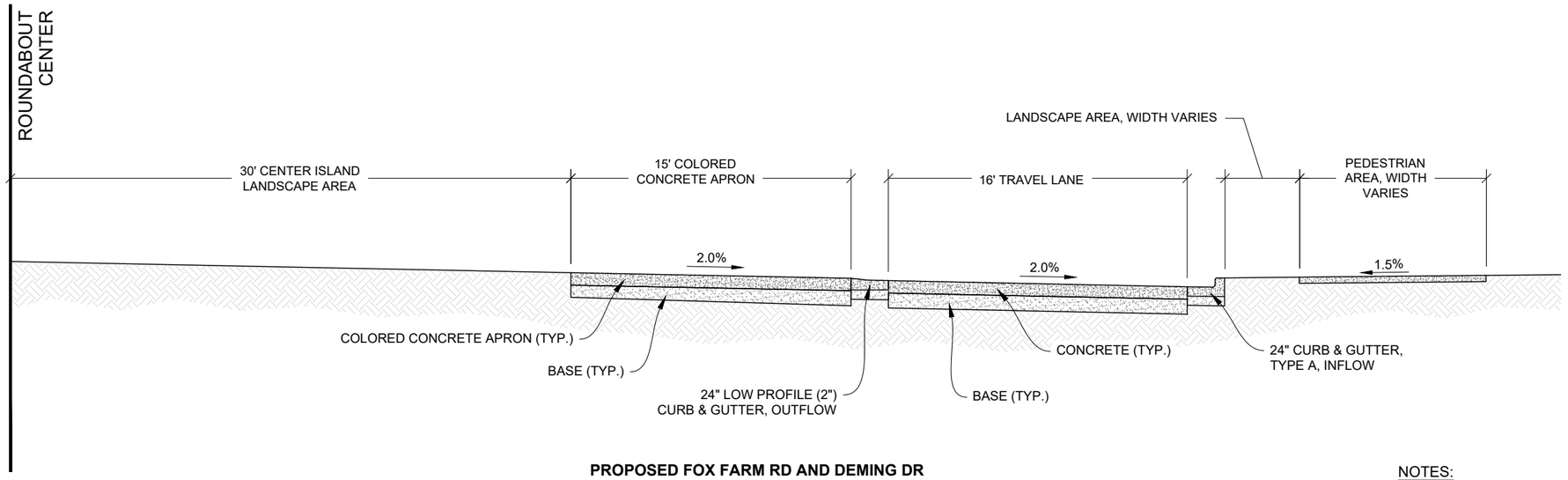

PROPOSED FOX FARM RD AND DEMING DR
ROUNDABOUT HALF SECTION
NO SCALE

NOTES:

CROSS SECTION ARE TYPICAL, MAINLINE SECTIONS. AUXILLIARY TURN LANES ARE NOT SHOWN. RIGHTS-OF-WAY TO BE VERIFIED.

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TYPICAL CROSS SECTIONS

CHEYENNE, LARAMIE COUNTY, WYOMING

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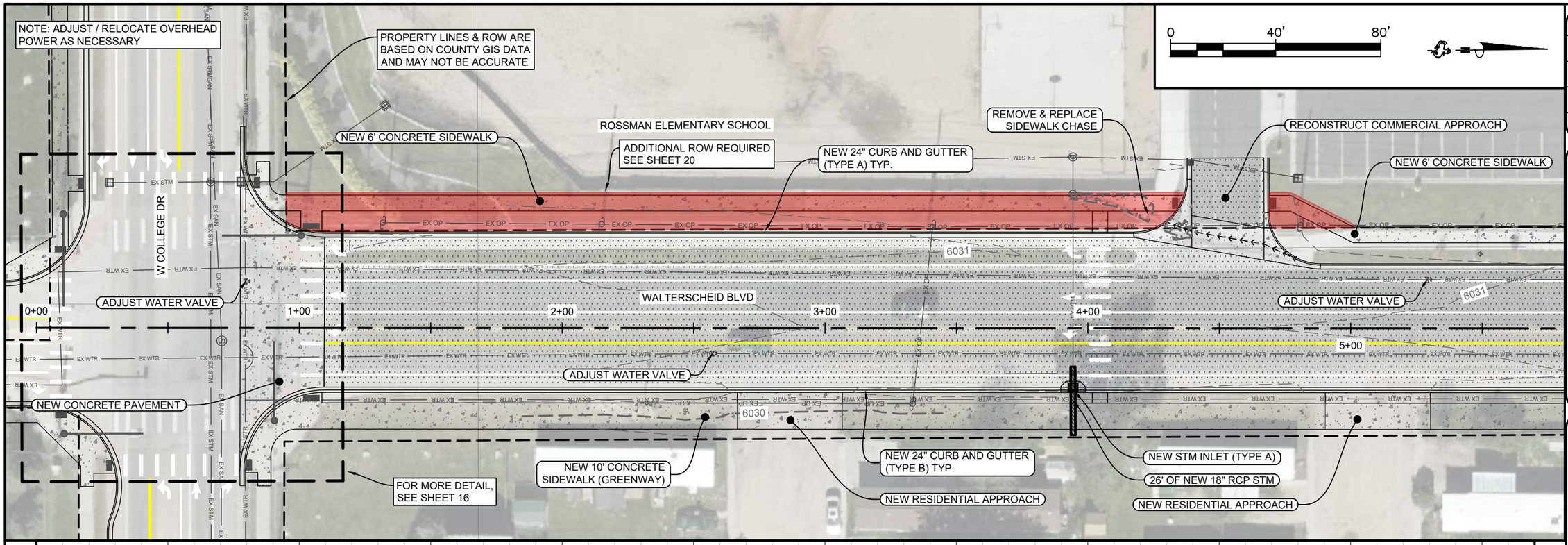

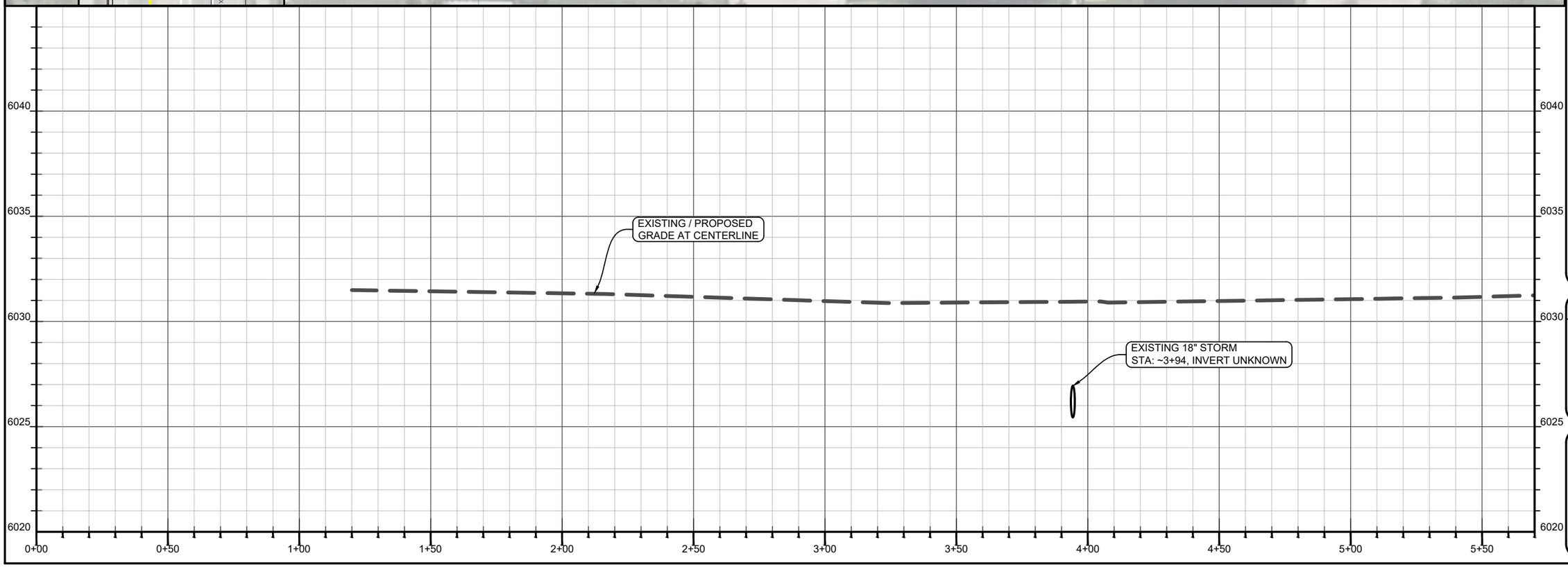

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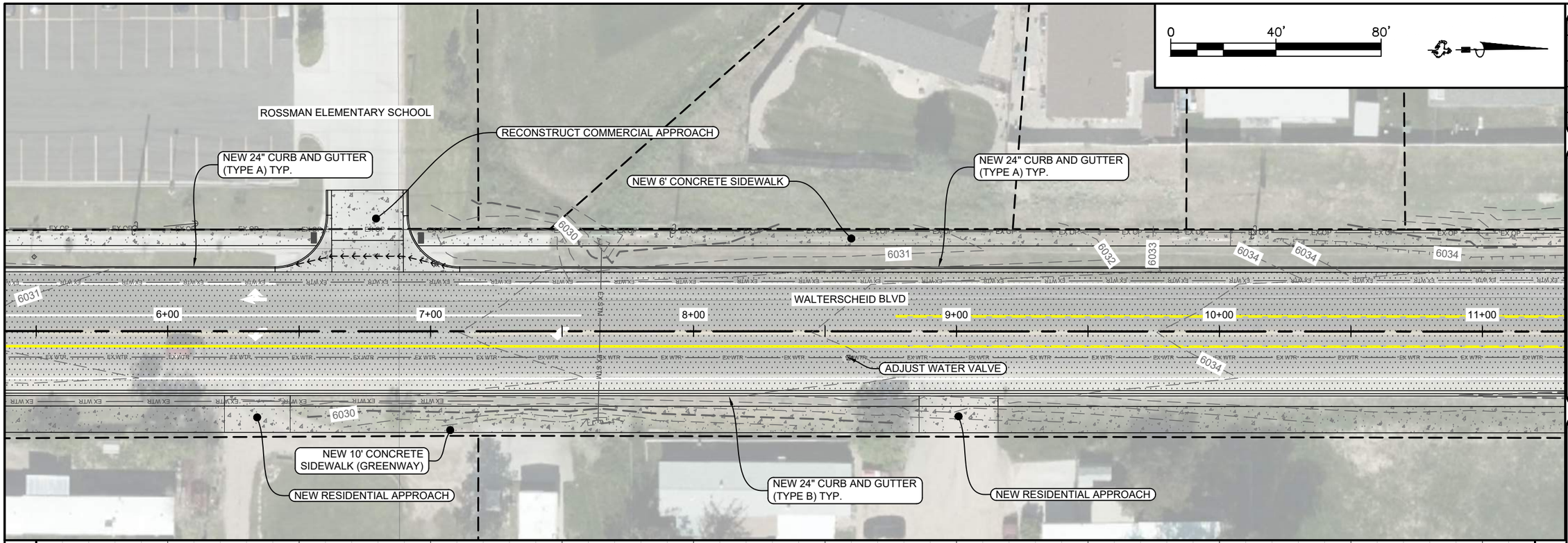

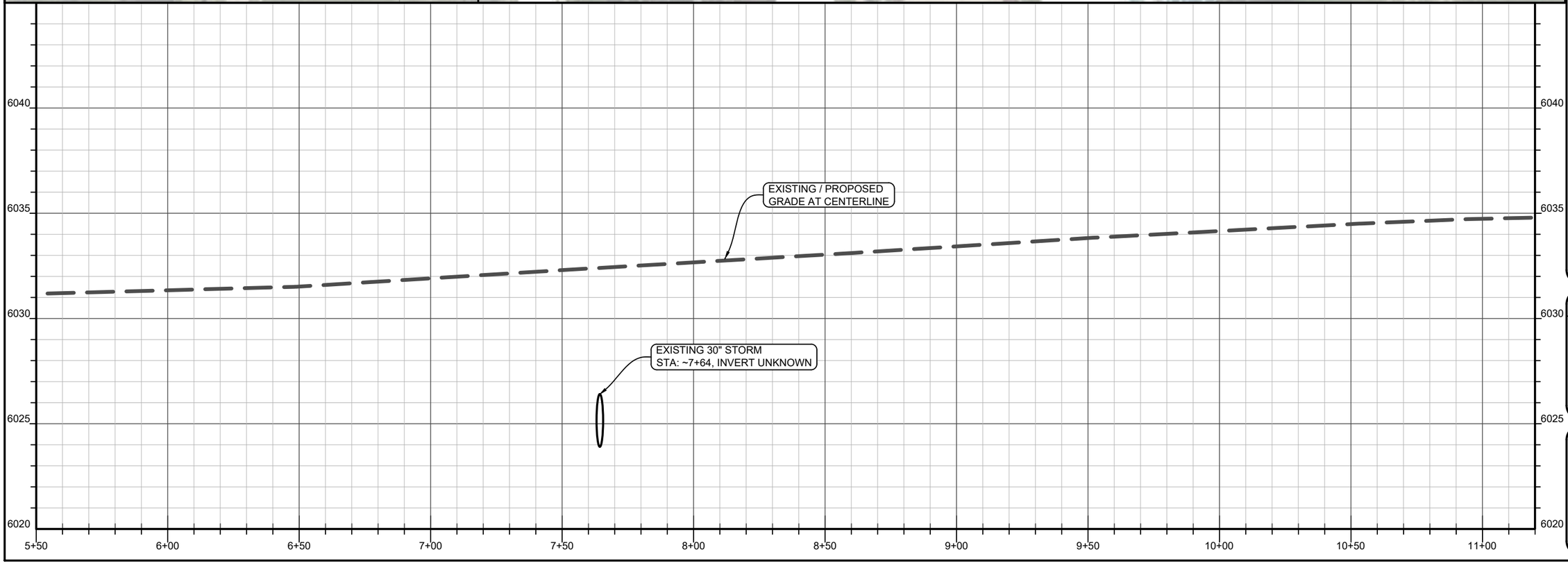

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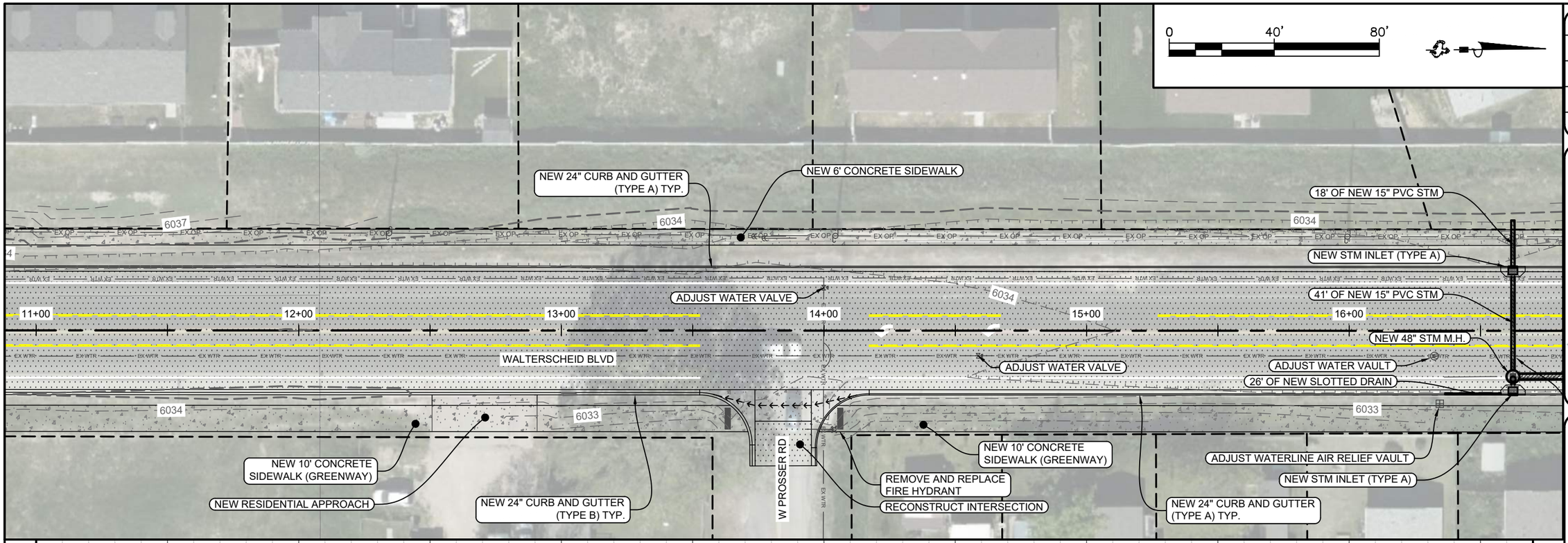

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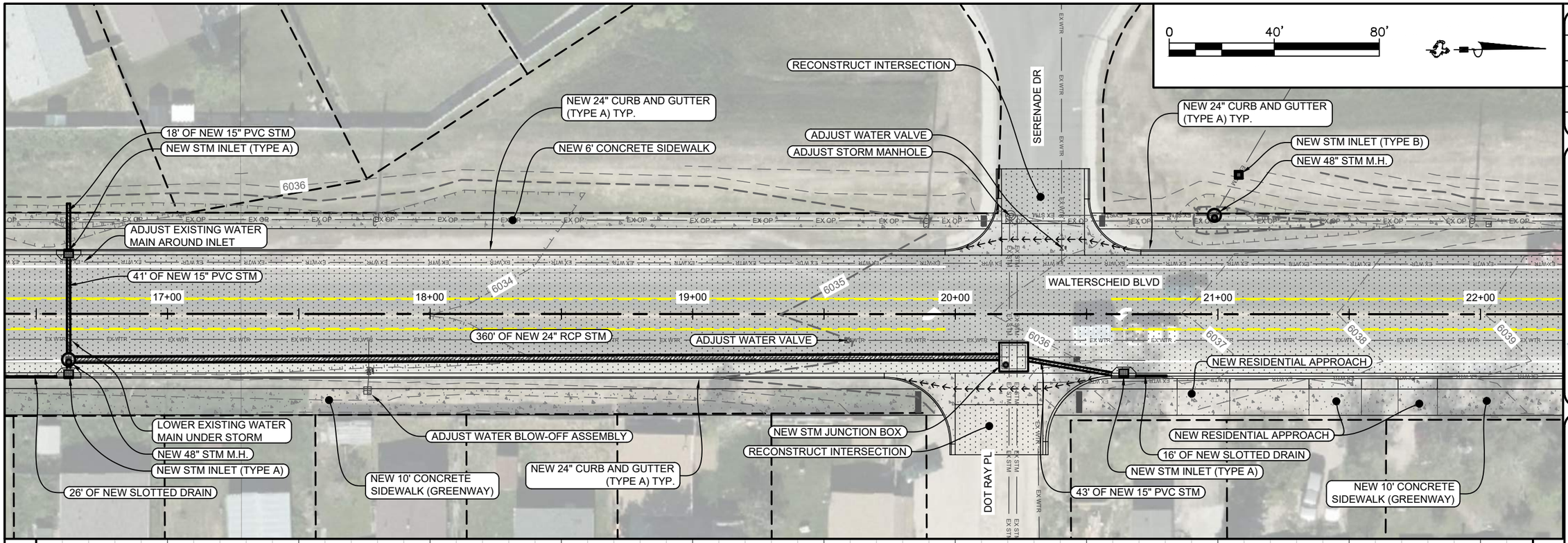

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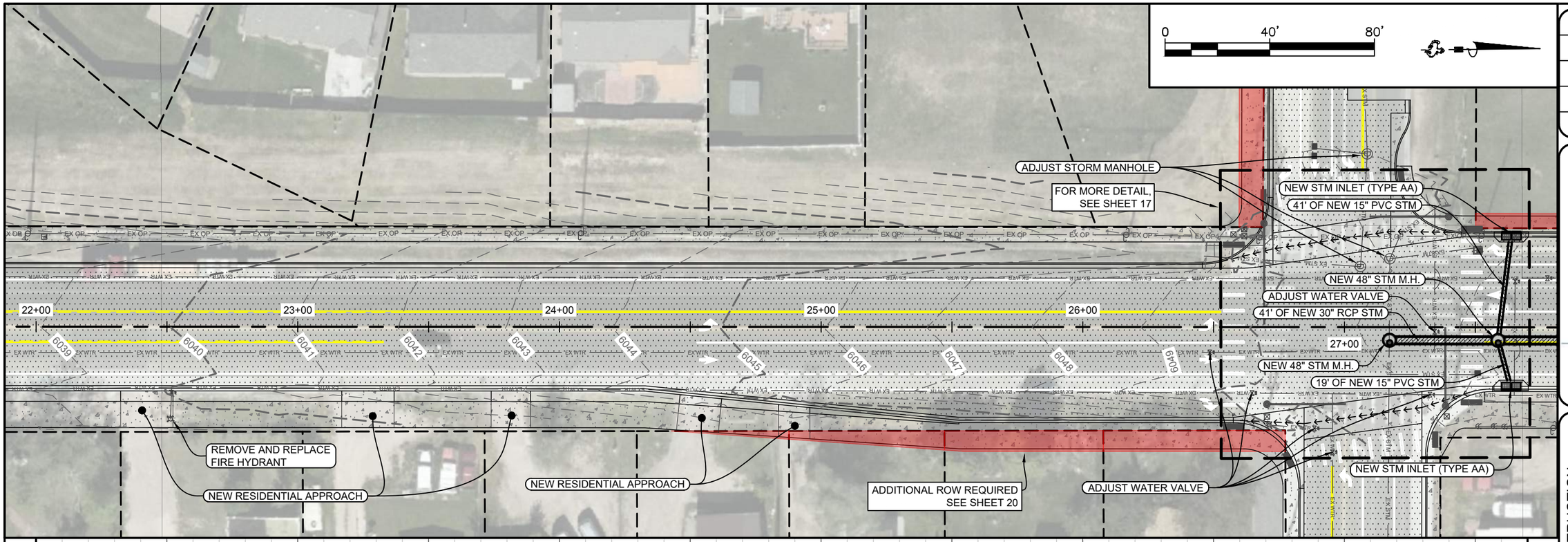

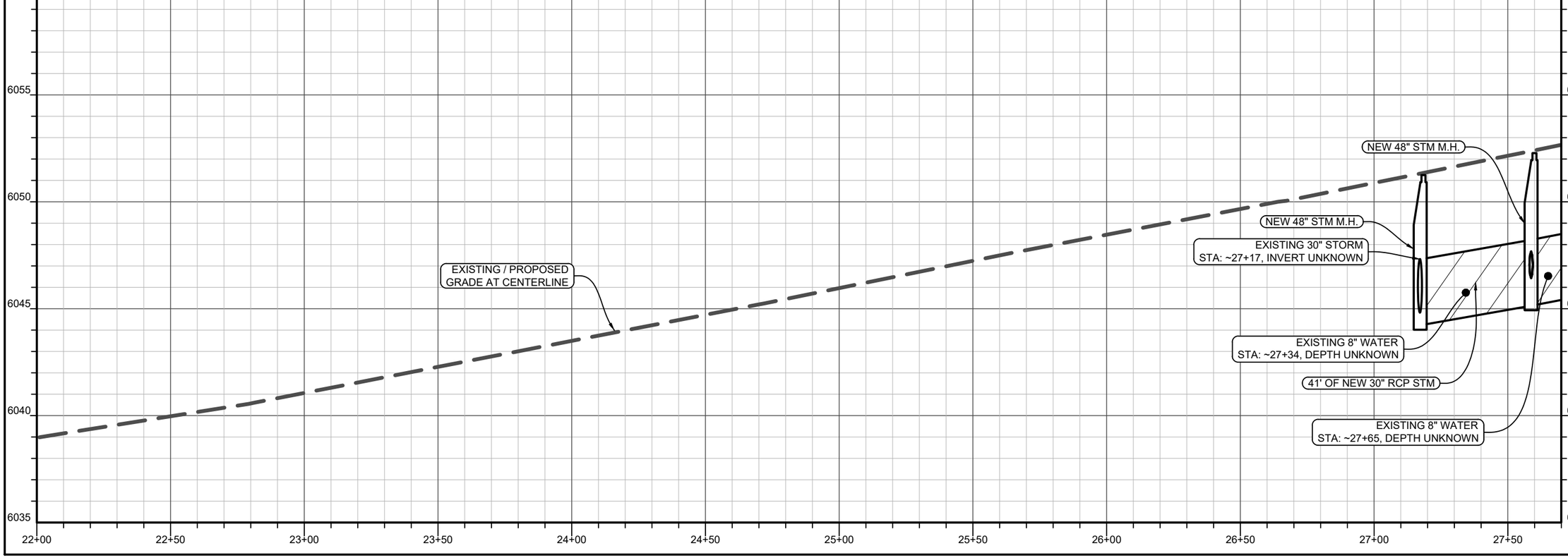

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PLAN & PROFILE STA. 22+00 TO 27+50

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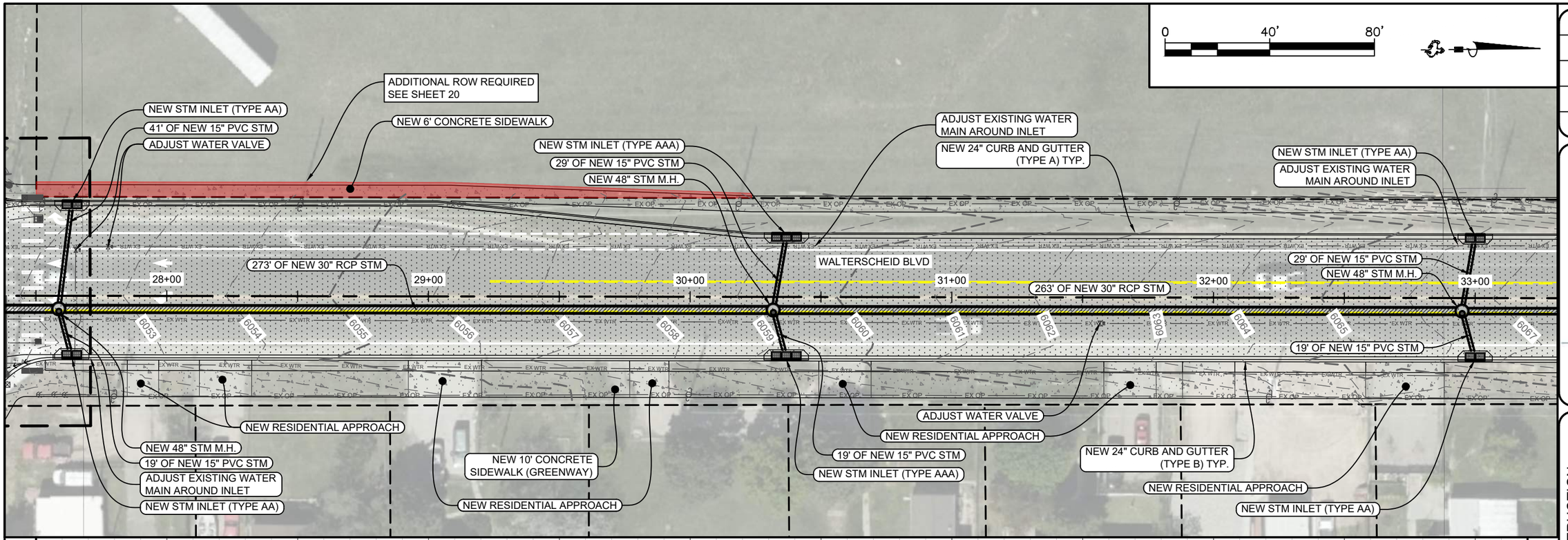

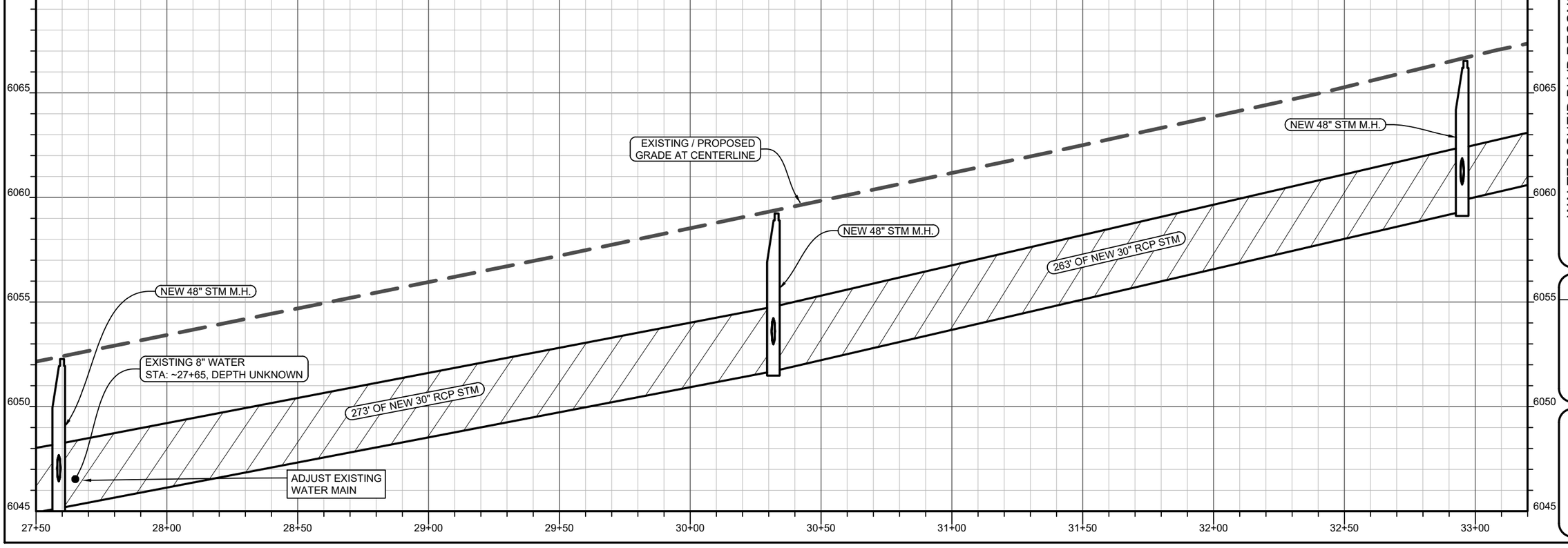

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PLAN & PROFILE STA. 27+50 TO 33+00

CHEYENNE, LARAMIE COUNTY, WYOMING

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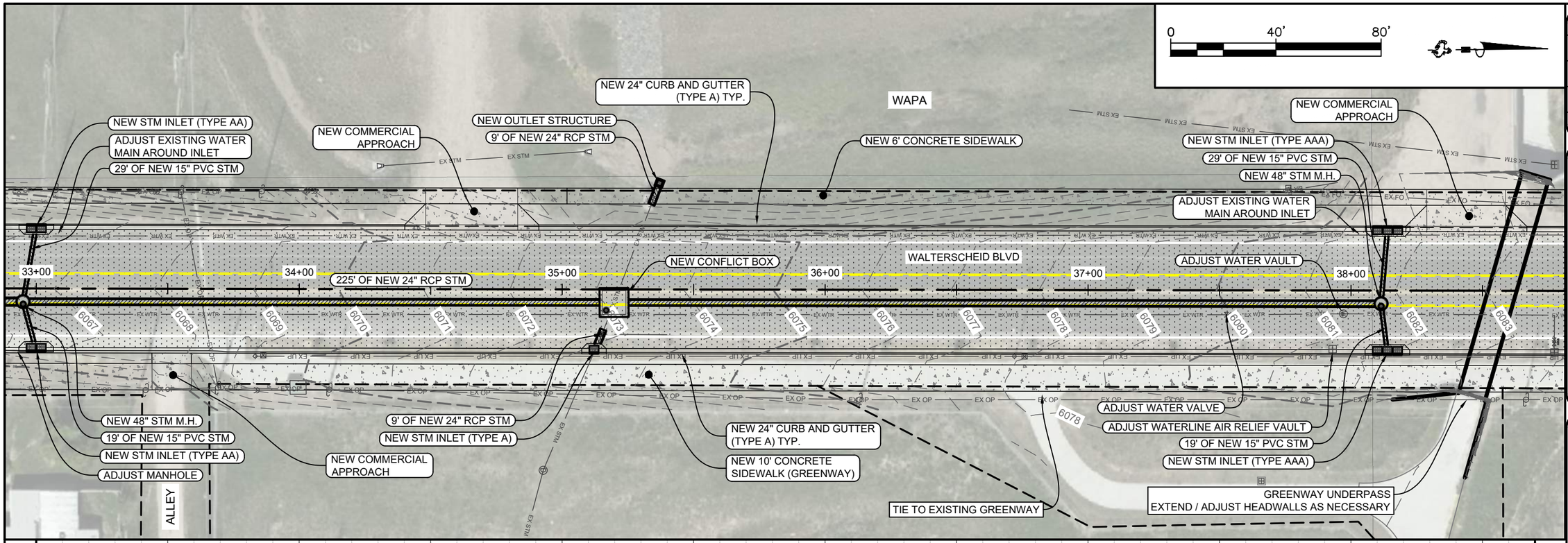

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WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 33+00 TO 38+50

CHEYENNE, LARAMIE COUNTY, WYOMING

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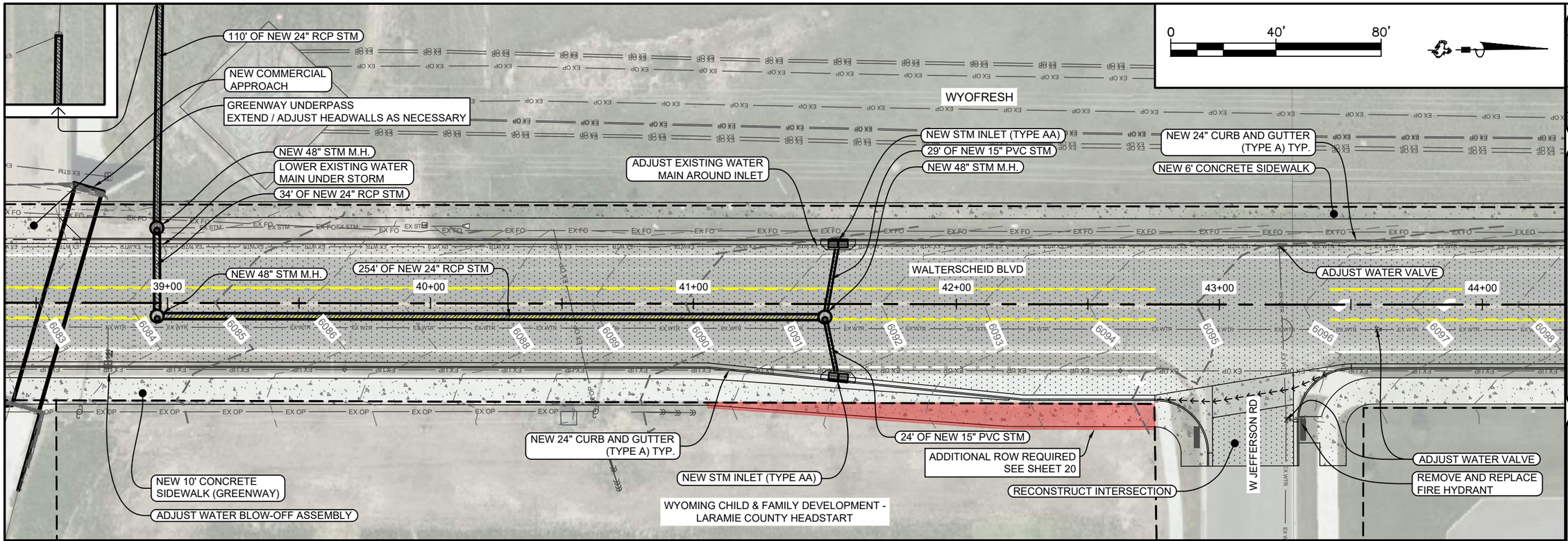

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WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 38+50 TO 44+00

CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.

10

0 40’ 80’

NEW 6' CONCRETE SIDEWALK
WYOFRESH
NEW 24" CURB AND GUTTER (TYPE A) TYP.
NEW COMMERCIAL APPROACH
NEW STM INLET (TYPE AA)
NEW 24" CURB AND GUTTER (TYPE A) TYP.
ADJUST EXISTING WATER MAIN AROUND INLET
ADJUST WATER VALVE
WALTERSCHEID BLVD
44+00 45+00 46+00 47+00 48+00 49+00
6098 6099 6100 6101 6102 6103 6104 6105 6106 6107 6108 6109 6110 6111
NEW 24" CURB AND GUTTER (TYPE A) TYP.
9' OF NEW 24" RCP STM
NEW STM INLET (TYPE AA)
RECONSTRUCT COMMERCIAL APPROACH
ADJUST WATER VALVE
NEW 10' CONCRETE SIDEWALK (GREENWAY)
RECONSTRUCT COMMERCIAL APPROACH
SUNDANCE APARTMENTS
ACCESS

6115 6110 6105 6100 6095

EXISTING / PROPOSED GRADE AT CENTERLINE
EXISTING FIBER OPTIC STA: ~45+93, DEPTH UNKNOWN
EXISTING 8" WATER STA: ~46+13, DEPTH UNKNOWN
EXISTING 24" STORM STA: ~47+14, INVERT UNKNOWN
EXISTING 8" WATER STA: ~49+18, DEPTH UNKNOWN

44+00 44+50 45+00 45+50 46+00 46+50 47+00 47+50 48+00 48+50 49+00 49+50

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WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 44+00 TO 49+50
CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.
11

0 40' 80'

CAUTION: TOWER LEG ENCROACHES INTO ROW

NEW 6' CONCRETE SIDEWALK

NEW 24" CURB AND GUTTER (TYPE A) TYP.

CITY-OWNED PROPERTY (DEMOLISHED)

ADDITIONAL ROW REQUIRED SEE SHEET 20

FIRE STATION 2

FOX FARM ROUNDABOUT SEE SHEET 18

ADJUST WATER VALVE

ADJUST SEWER MANHOLE

WALTERSCHEID BLVD

FOX FARM RD

NEW 10' CONCRETE SIDEWALK (GREENWAY)

NEW 24" CURB AND GUTTER (TYPE A) TYP.

EXISTING / PROPOSED GRADE AT CENTERLINE

EXISTING FIBER OPTIC STA: ~53+02, DEPTH UNKNOWN

EXISTING FIBER OPTIC STA: ~53+08, DEPTH UNKNOWN

EXISTING 12" WATER STA: ~53+15, DEPTH UNKNOWN

EXISTING GAS STA: ~53+69, DEPTH UNKNOWN

EXISTING 10" WATER STA: ~53+55, DEPTH UNKNOWN

EXISTING SANITARY MANHOLE STA: ~53+40

EXISTING GAS STA: ~53+20, DEPTH UNKNOWN

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WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 49+50 TO 55+00

CHEYENNE, LARAMIE COUNTY, WYOMING

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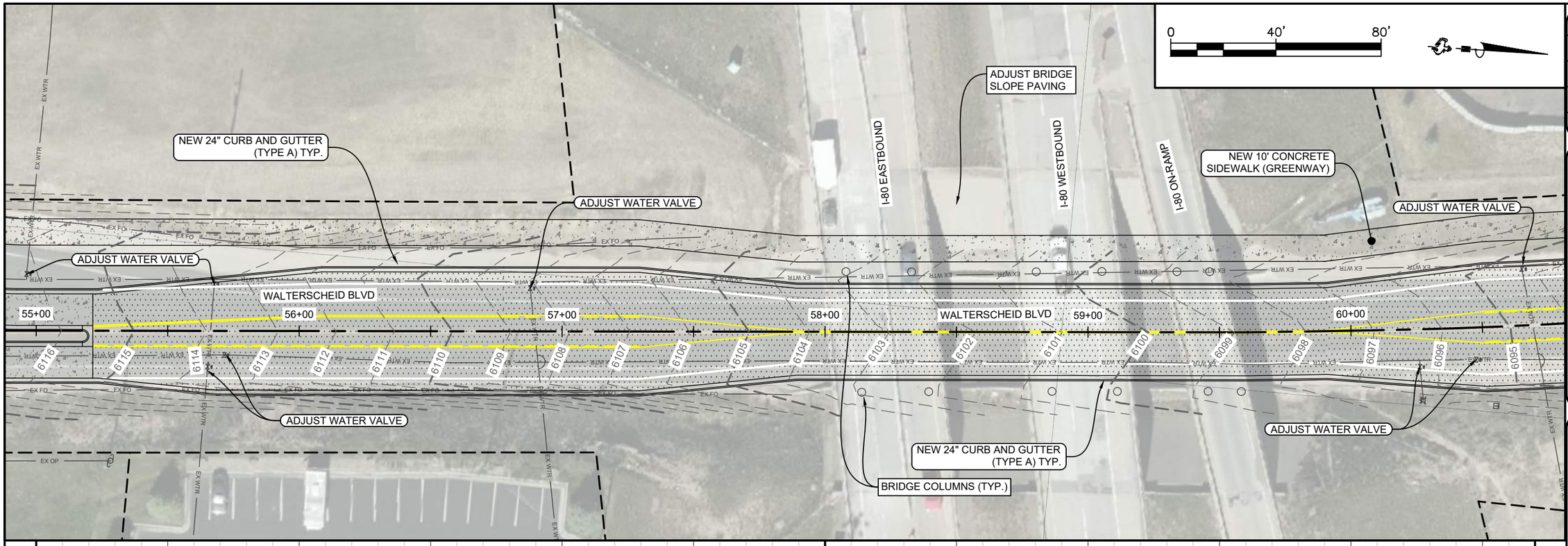

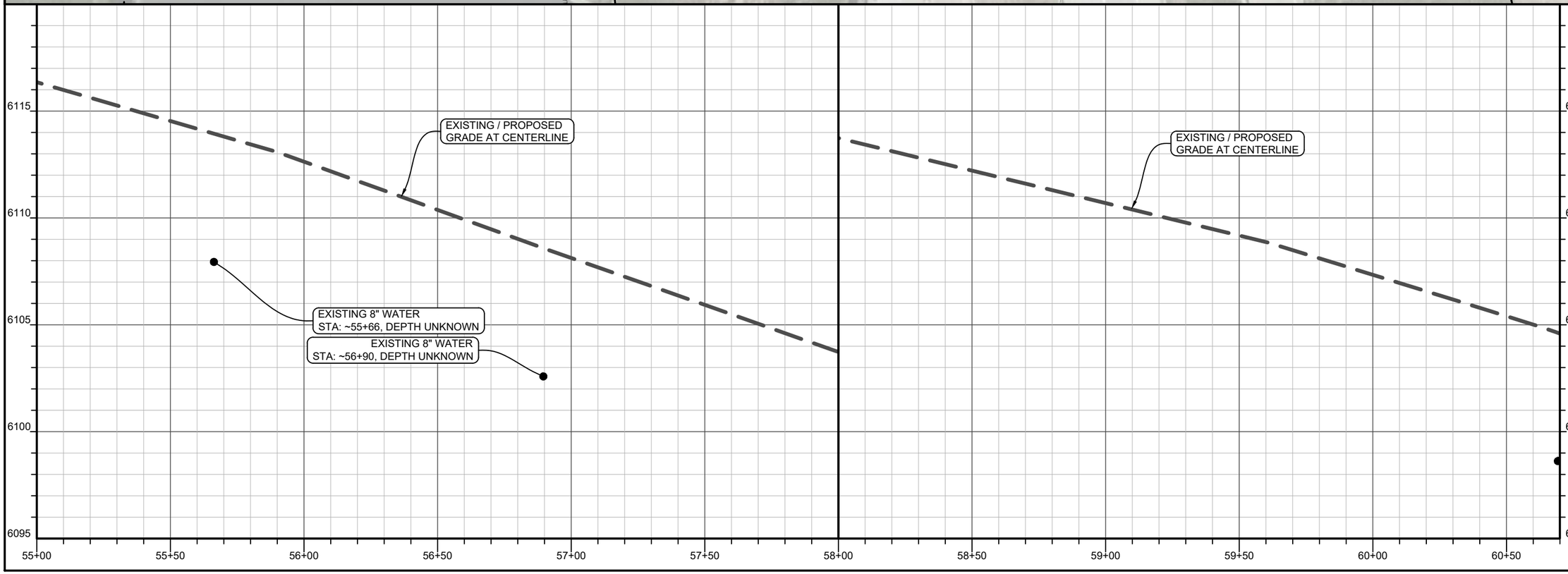

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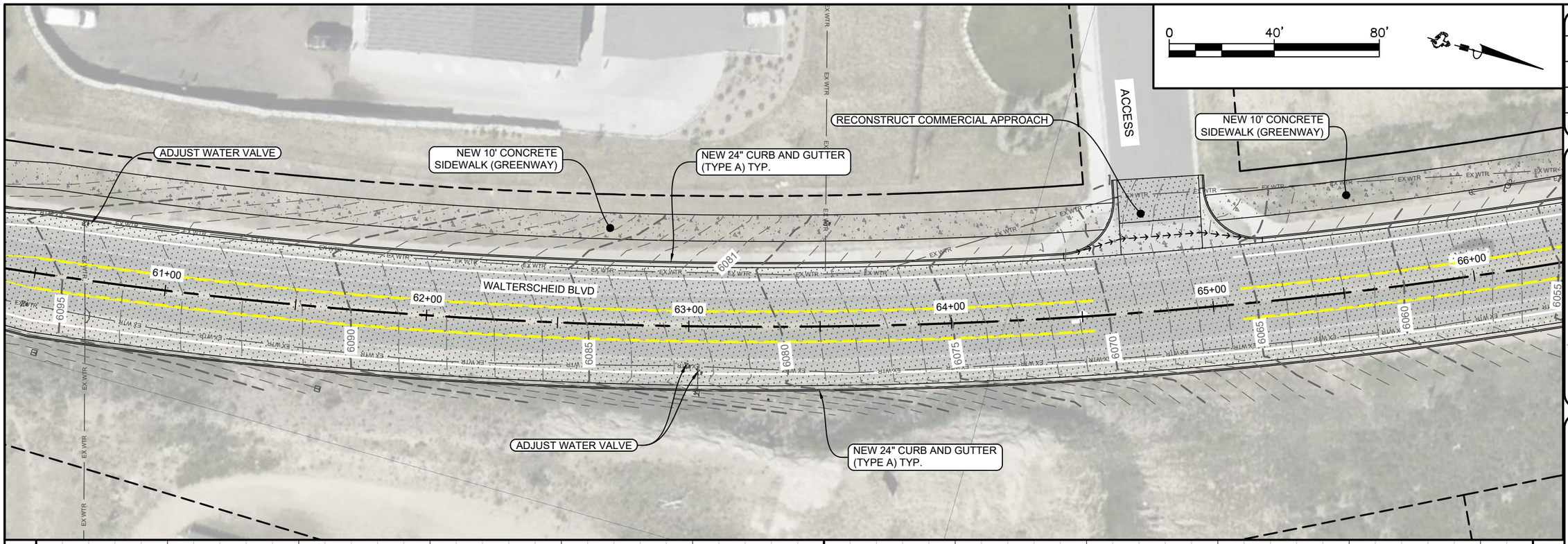
WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 55+00 TO 60+50

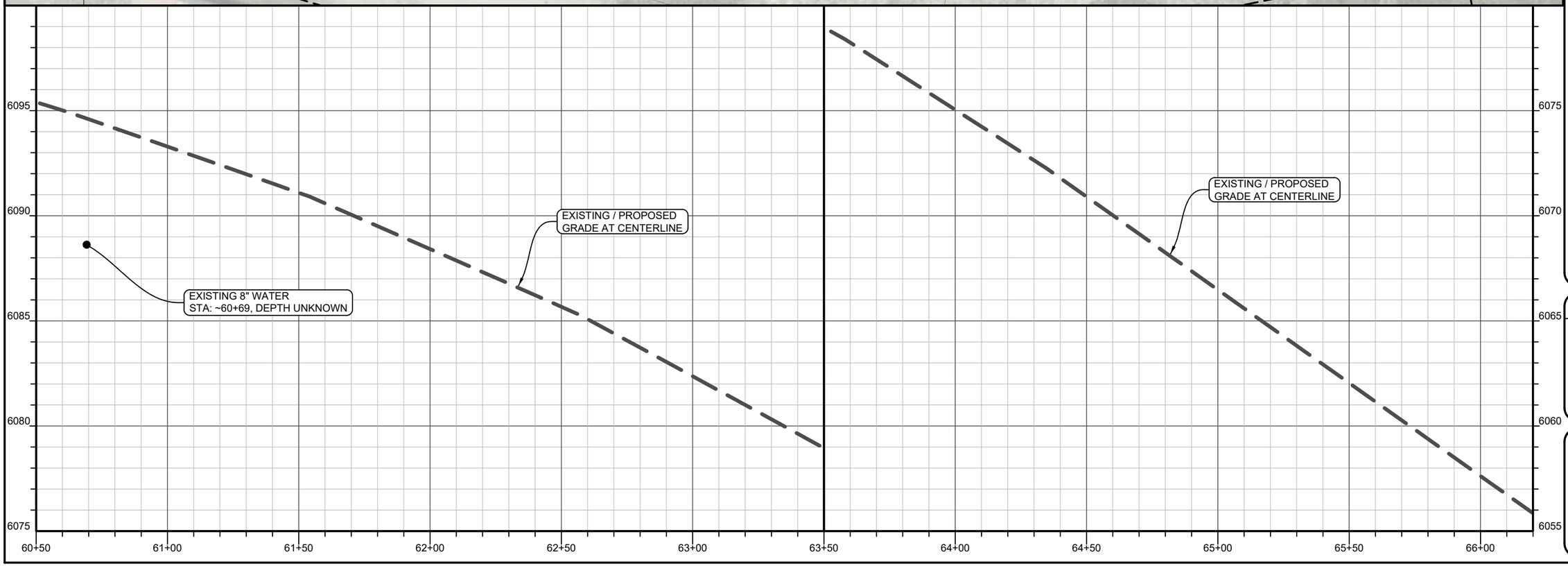
CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.

13





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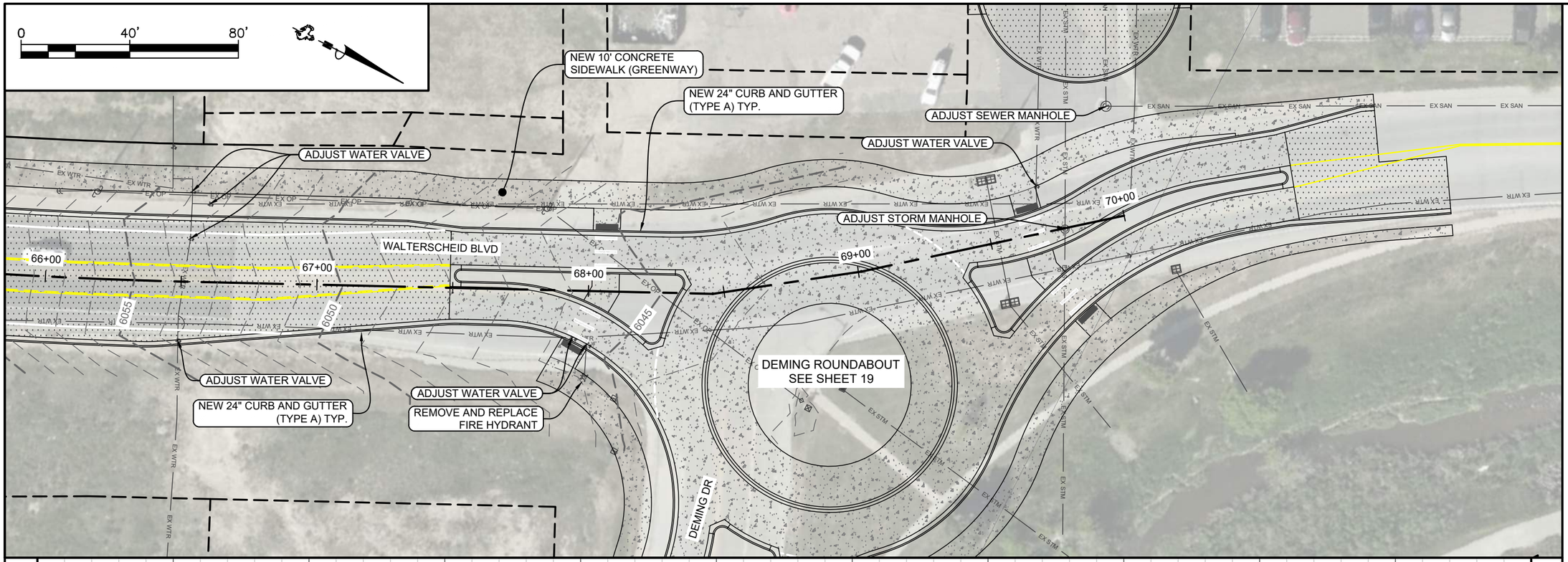
WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 60+50 TO 66+00

CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.

14



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WALTERSCHEID BLVD RECONSTRUCTION
PLAN & PROFILE STA. 66+00 TO 70+00

CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

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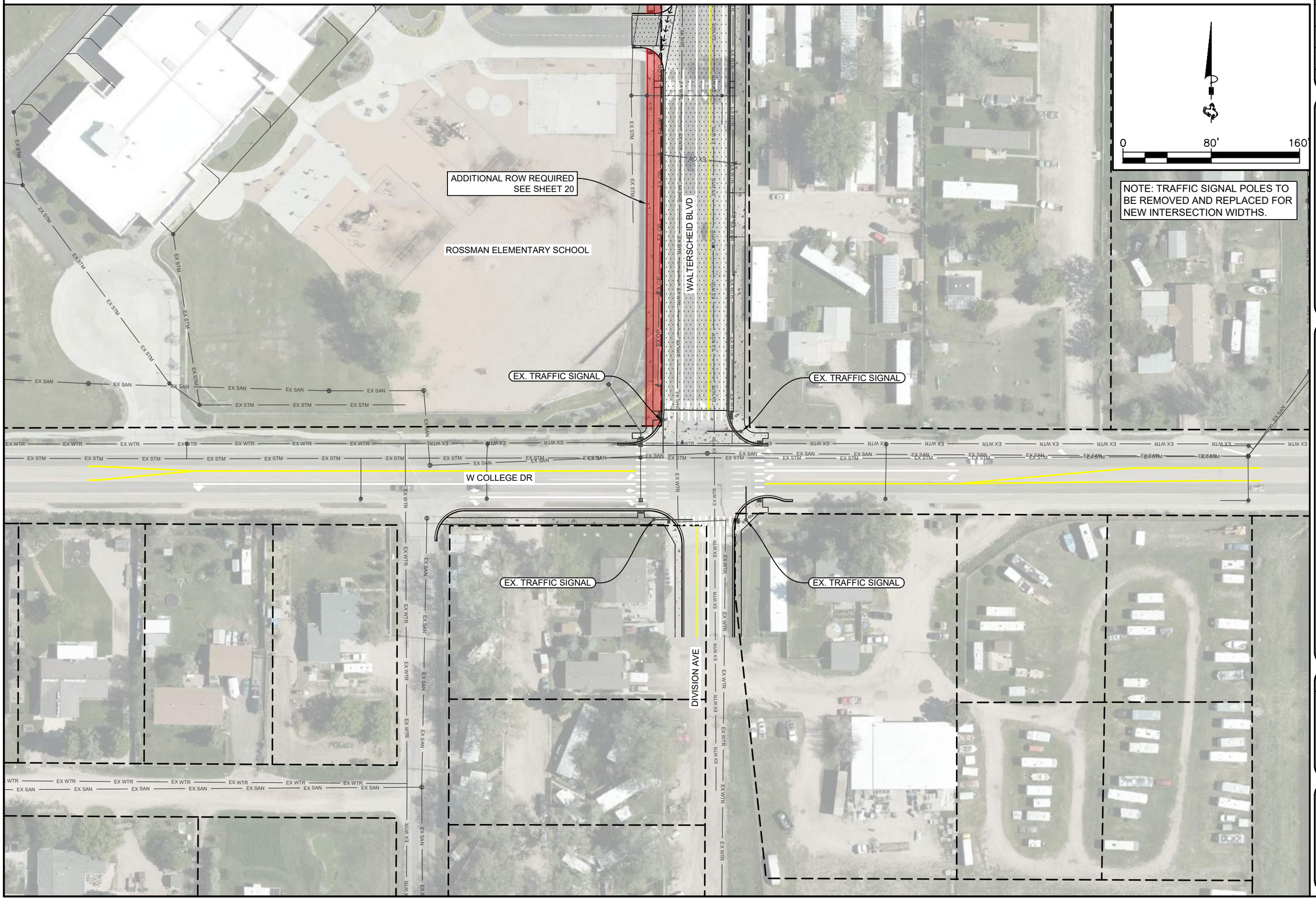
15

COLLEGE DRIVE INTERSECTION



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WALTERSCHEID BLVD RECONSTRUCTION
COLLEGE DRIVE INTERSECTION

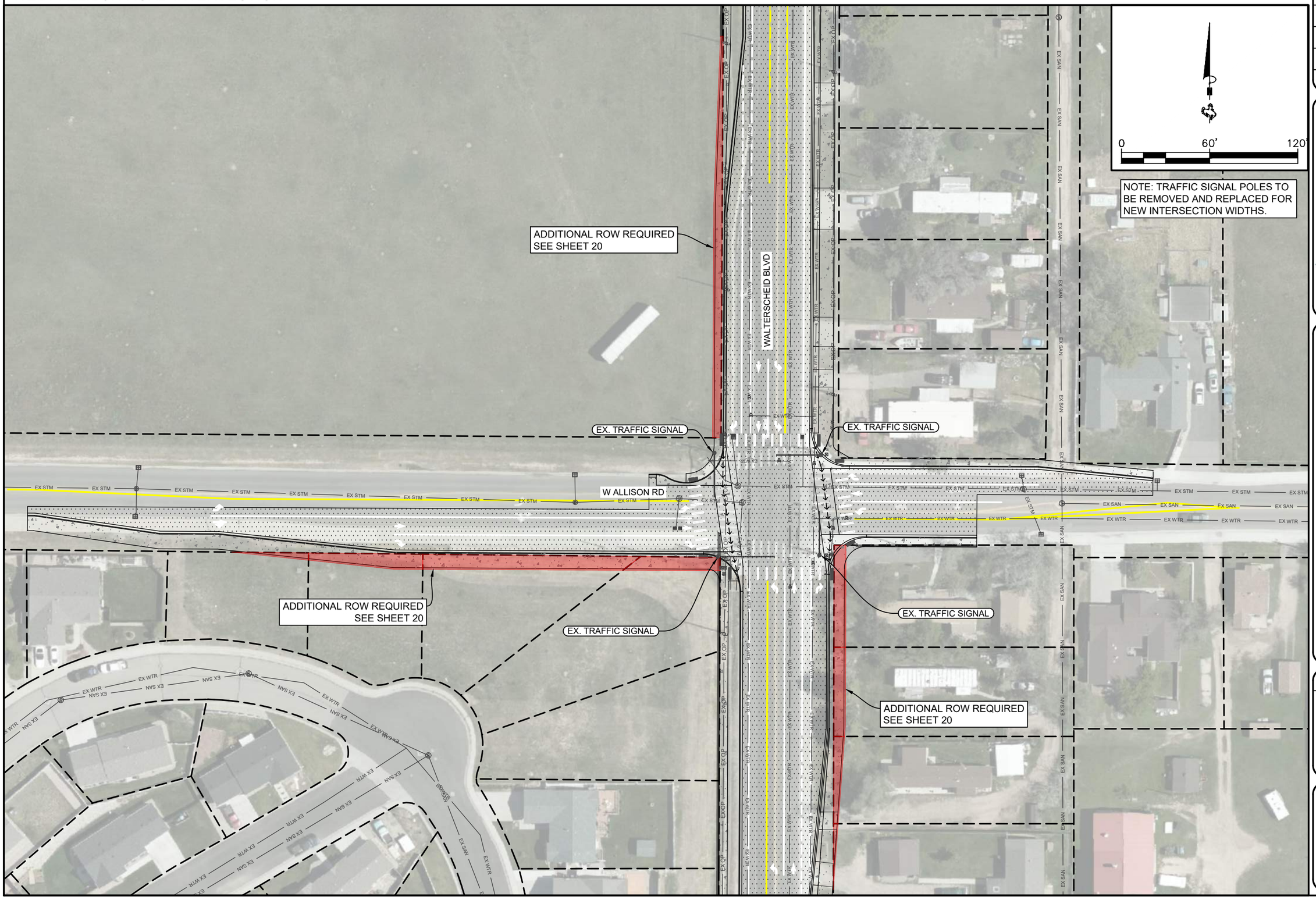
CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.

16

WEST ALLISON ROAD INTERSECTION



Project No. 2104.04

Design By: EG

Check By: SL

Drawn By: RR, EM

File:

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Cheyenne, Wyoming 82001
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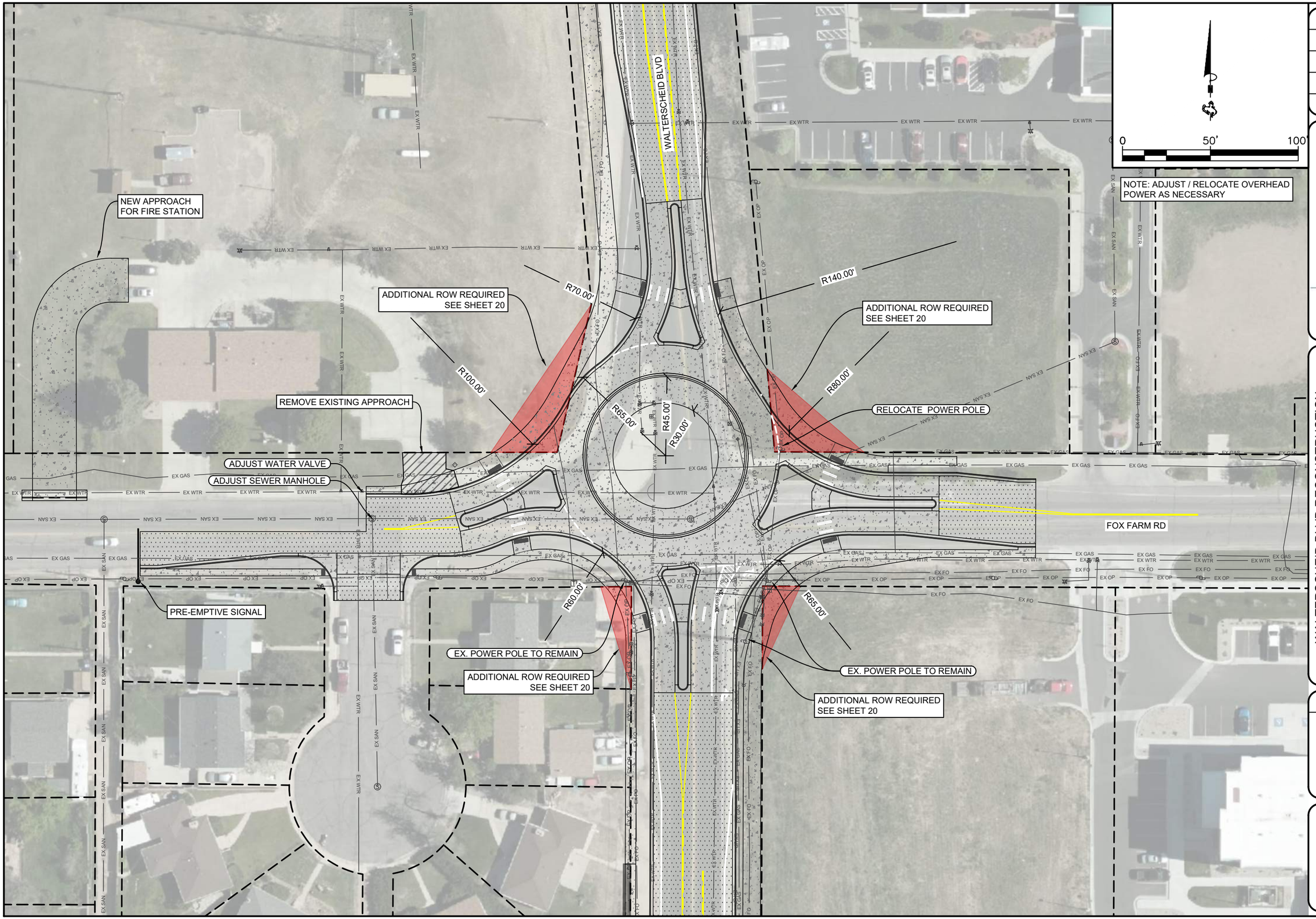
WALTERSCHEID BLVD RECONSTRUCTION
WEST ALLISON ROAD INTERSECTION

CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.

17



Project No. 2104.04

Design By: EG

Check By: SL

Drawn By: RR, EM

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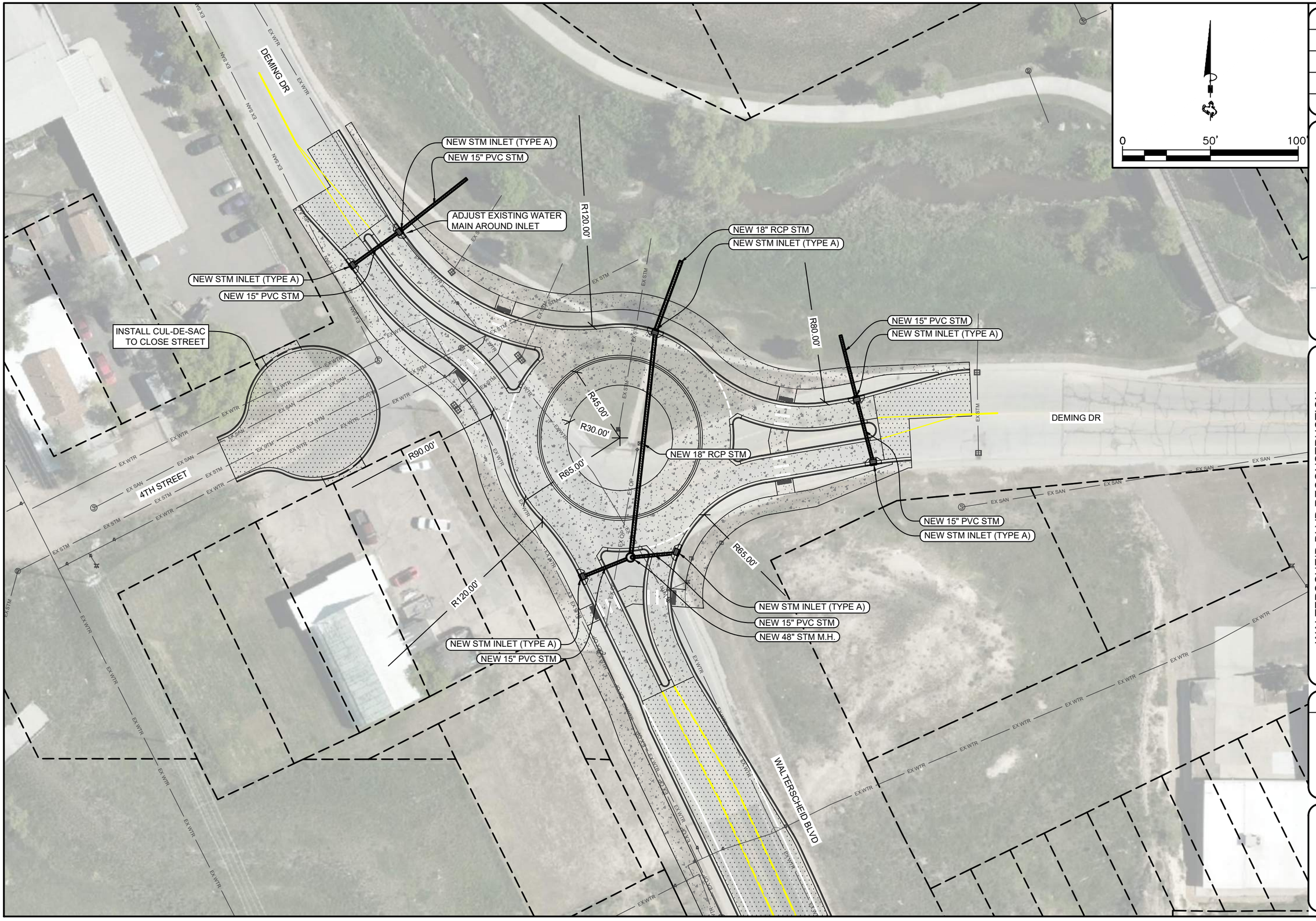
WALTERSCHEID BLVD RECONSTRUCTION FOX FARM ROUNDABOUT

CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.

18



Project No. 2104.04

Design By: EG

Check By: SL

Drawn By: RR, EM

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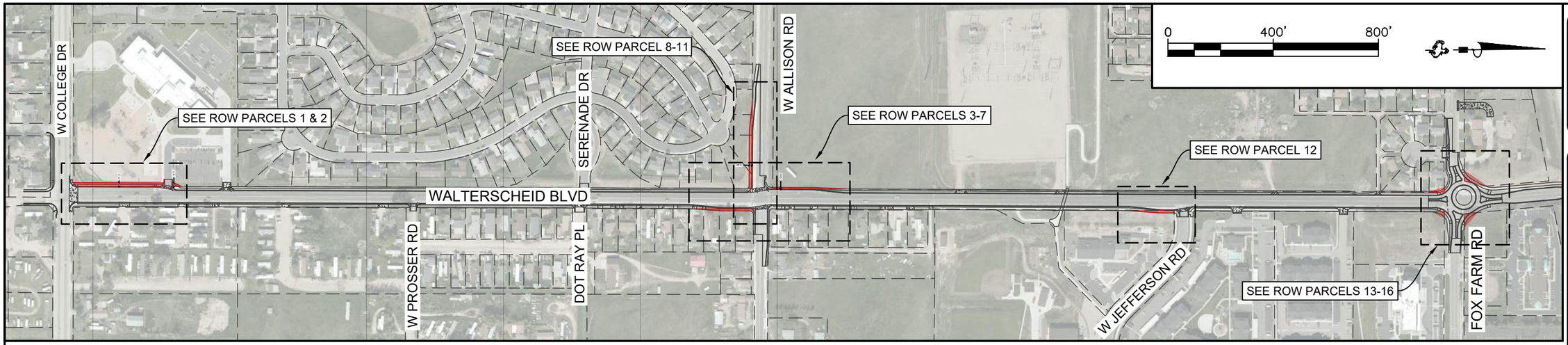
WALTERSCHEID BLVD RECONSTRUCTION
DEMING ROUNDABOUT

CHEYENNE, LARAMIE COUNTY, WYOMING

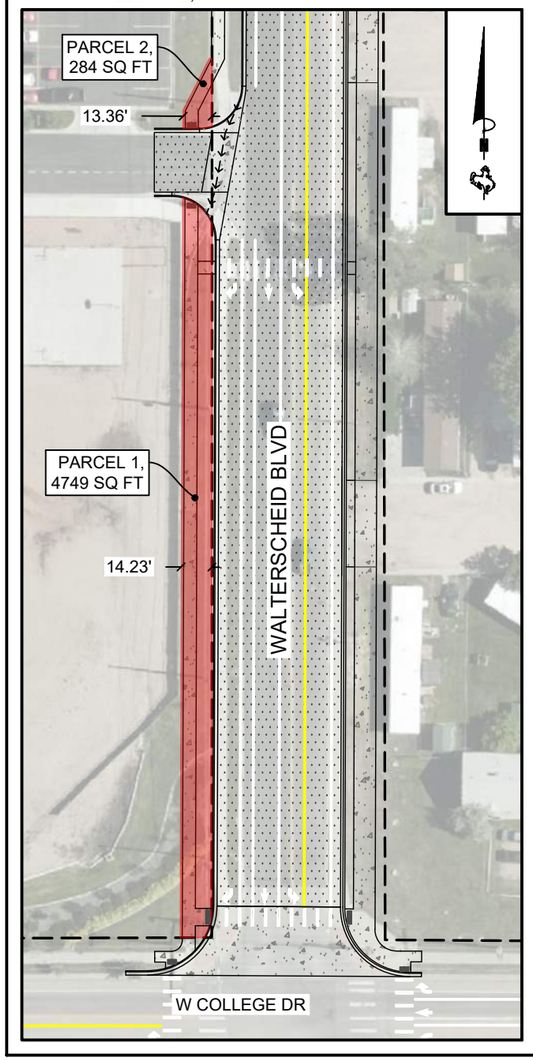
Plan Set:

Sheet No.

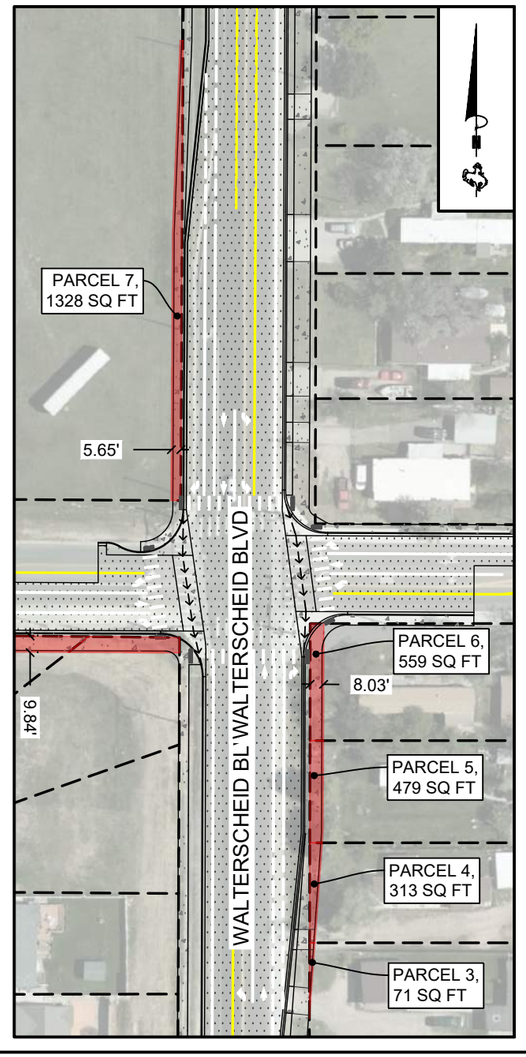
19



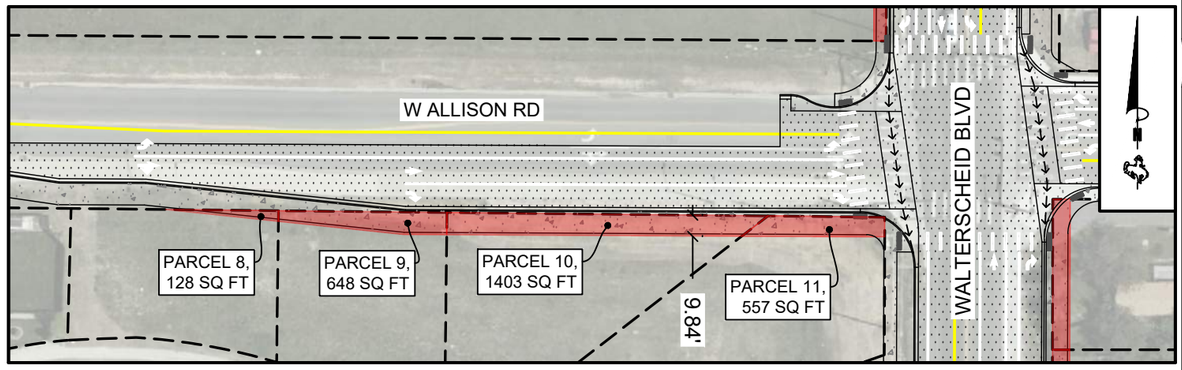
ROW PARCELS 1 & 2, 1" = 70'



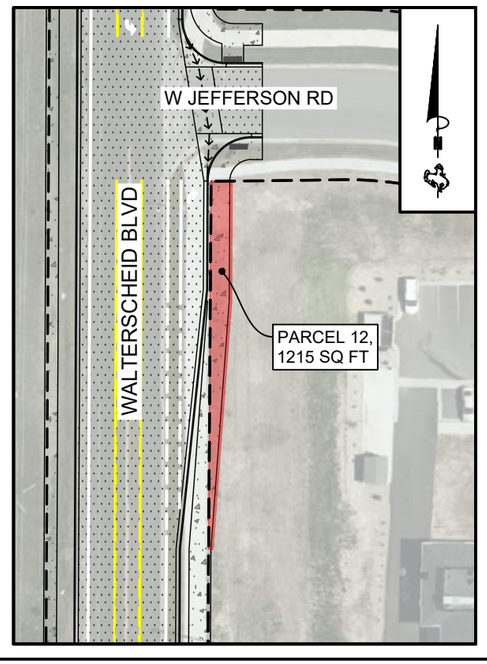
ROW PARCELS 3-7, 1" = 90'



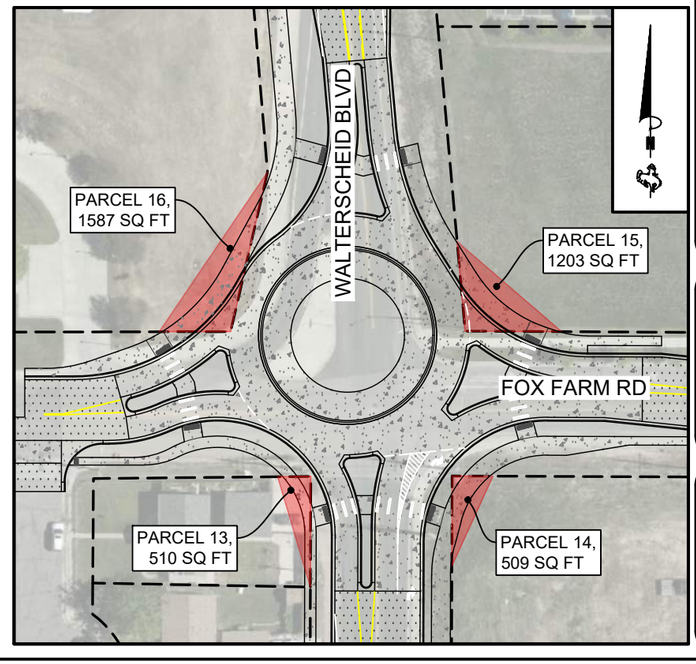
ROW PARCEL 8-11, 1" = 70'



ROW PARCEL 12, 1" = 70'



ROW PARCELS 13-16, 1" = 80'



Project No. 2104.04
Design By: EG
Check By: SL
Drawn By: RR, EM
File:

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Cheyenne, Wyoming 82001
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WALTERSCHEID BLVD RECONSTRUCTION
ROW ACQUISITION
CHEYENNE, LARAMIE COUNTY, WYOMING

Plan Set:

Sheet No.
20

Appendix C

Construction Cost Estimate Information

Walterscheid Boulevard Construction Estimate

Item No.	City Spec Section	Description	Unit	Estimated Quantity	Unit Price	Total Cost
1	TBD	Mobilization	LS	1	$628,400.00	$628,400.00
2	TBD	Bonds and Insurance	LS	1	$157,100.00	$157,100.00
3	01050	Traffic Control	LS	1	$314,200.00	$314,200.00
4	01563	Erosion Control and Stormwater Management	LS	1	$131,000.00	$131,000.00
5	02050	Removal of pipe (storm sewer/culverts)	LF	1,060	$20.00	$21,200.00
6	02050	Remove storm inlets	EA	17	$250.00	$4,250.00
7	02075	Remove Asphalt Pavement	SY	36,660	$4.00	$146,640.00
8	02075	Remove Concrete Pavement (incl. approaches, sidewalks, curb and gutter, etc.)	SY	11,700	$5.50	$64,350.00
9	02110	Clearing and Grubbing	LS	1	$35,000.00	$35,000.00
10	02206	Potholing	EA	25	$350.00	$8,750.00
11	02210	Unclassified Excavation	LS	1	$20,000.00	$20,000.00
12	02227	Alley and Gravel Street Restoration	SY	700	$7.50	$5,250.00
13	02231	Crushed Base, Grading W, 6"	SY	59,760	$7.50	$448,200.00
14	02512	Plant Mix Bituminous Pavement, Type II, 1/2" mix, 4"	SY	36,600	$22.00	$805,200.00
15	02570	Adjust Sewer Manhole	EA	9	$250.00	$2,250.00
16	02570	Adjust Water Valve Box	EA	55	$400.00	$22,000.00
17	02570	Adjust Water Manway/Meter Pit	EA	2	$2,500.00	$5,000.00
18	02570	Adjust Water Blow-off Assembly	EA	2	$10,000.00	$20,000.00
19	02645	Remove and Replace Fire Hydrant Assembly	EA	5	$7,800.00	$39,000.00
20	02665	Adjust Water Main	EA	11	$6,000.00	$66,000.00
21	02725	Storm Pipe, PVC, 15"	LF	590	$90.00	$53,100.00
22	02725	Storm Pipe, RCP, 18"	LF	210	$120.00	$25,200.00
23	02725	Storm Pipe, RCP, 24"	LF	1,310	$150.00	$196,500.00
24	02725	Storm Pipe, RCP, 30"	LF	580	$180.00	$104,400.00
25	02725	Storm Manhole	EA	11	$6,000.00	$66,000.00
26	02725	Storm Drain Inlet, Type A	EA	12	$3,200.00	$38,400.00
27	02725	Storm Drain Inlet, Type AA	EA	8	$5,000.00	$40,000.00
28	02725	Storm Drain Inlet, Type AAA	EA	4	$6,800.00	$27,200.00
29	02775	Storm Drain Inlet, Type B	EA	2	$3,200.00	$6,400.00
30	02725	Sidewalk Chase	SF	16	$50.00	$800.00
31	02775	Slotted Drain	LF	50	$65.00	$3,250.00
32	02775	Storm Conflict Box	EA	1	$21,000.00	$21,000.00
33	02775	Storm Junction Box	EA	1	$21,000.00	$21,000.00
34	02805	Remove and Reset Ex. Sign	EA	20	$225.00	$4,500.00
35	02805	Signs (new, allowance)	LS	1	$10,000.00	$10,000.00
36	02805	Remove and Reset Ex. Sign with Flashers	EA	2	$600.00	$1,200.00
37	02900	Landscaping	LS	1	$25,000.00	$25,000.00
38	03320	Concrete Pavement, 8"	SY	3,970	$108.00	$428,760.00
39	03330	Curb and Gutter, Type A, 24"	LF	12,020	$23.00	$276,460.00
40	03330	Curb and Gutter, Type B, 24"	LF	3,280	$23.00	$75,440.00
41	03330	Curb and Gutter, Type B, 24", modified	LF	2,840	$23.00	$65,320.00
42	03340	Curb Turn Fillets	SF	3,550	$8.00	$28,400.00
43	03340	Concrete Valley Pan	SF	4,000	$8.00	$32,000.00
44	03340	New Concrete Sidewalk, 6' wide, 4"	SF	37,670	$7.00	$263,690.00
45	03340	New Concrete Sidewalk, 10' wide, 4"	SF	73,230	$7.00	$512,610.00
46	03340	Drive Approach, 6"	SF	7,250	$9.00	$65,250.00
47	03340	Drive Approach, 8"	SF	3,390	$12.00	$40,680.00
48	03340	Slope Paving (reinforced)	SF	3,500	$14.00	$49,000.00
49	03340	Detectable Warning Plates	SF	600	$180.00	$108,000.00
50	03480	Colored Concrete Apron	SF	7,200	$7.50	$54,000.00
51	TBD	Quality Control Testing (incl. concrete)	LS	1	$157,100.00	$157,100.00
52	TBD	Concrete Barrier	LF	750	$210.00	$157,500.00
53	TBD	Extend Headwalls	EA	2	$15,000.00	$30,000.00
54	TBD	Pavement Striping	LF	26,200	$0.40	$10,480.00
55	TBD	Pavement Markings (arrows)	EA	42	$500.00	$21,000.00
56	TBD	Pavement Markings (SCHOOL)	LS	2	$800.00	$1,600.00
57	TBD	Pavement Markings (crosswalks)	SF	1,044	$30.00	$31,320.00
58	TBD	Traffic Signal System (College intersection)	LS	1	$65,000.00	$65,000.00
59	TBD	Electrical for Signals (College intersection)	LS	1	$5,000.00	$5,000.00
60	TBD	Traffic Signal System (Allison intersection)	LS	1	$225,000.00	$225,000.00
61	TBD	Electrical for Signals (Allison intersection)	LS	1	$15,000.00	$15,000.00
62	TBD	Traffic Signal System (pre-emption)	LS	1	$65,000.00	$65,000.00
63	TBD	Electrical for Signals (pre-emption)	LS	1	$3,000.00	$3,000.00
64	TBD	Force Account	$	250,000	$1.00	$250,000.00

Construction Total: $6,624,350.00

Walterscheid Boulevard and Fox Farm Intersection with Roundabout

Item No.	City Spec Section	Description	Unit	Estimated Quantity	Unit Price	Total Cost
1	TBD	Mobilization	LS	1	$84,400.00	$84,400.00
2	TBD	Bonds and Insurance	LS	1	$21,100.00	$21,100.00
3	01050	Traffic Control	LS	1	$42,200.00	$42,200.00
4	01563	Erosion Control and Stormwater Management	LS	1	$17,600.00	$17,600.00
7	02075	Remove Asphalt Pavement	SY	4,700	$4.00	$18,800.00
8	02075	Remove Concrete Pavement (incl. approaches, sidewalks, curb and gutter, etc.)	SY	1,390	$5.50	$7,645.00
9	02110	Clearing and Grubbing	LS	1	$1,750.00	$1,750.00
10	02206	Potholing	EA	5	$350.00	$1,750.00
11	02210	Unclassified Excavation	LS	1	$2,000.00	$2,000.00
13	02231	Crushed Base, Grading W, 6"	SY	6,940	$7.50	$52,050.00
14	02512	Plant Mix Bituminous Pavement, Type II, 1/2" mix, 4"	SY	2,440	$22.00	$53,680.00
15	02570	Adjust Sewer Manhole	EA	2	$250.00	$500.00
16	02570	Adjust Water Valve Box	EA	14	$400.00	$5,600.00
17	02570	Adjust Water Manway/Meter Pit	EA	1	$2,500.00	$2,500.00
34	02805	Remove and Reset Ex. Sign	EA	6	$225.00	$1,350.00
35	02805	Signs (new, allowance)	LS	1	$3,000.00	$3,000.00
37	02900	Landscaping	LS	1	$2,500.00	$2,500.00
38	03320	Concrete Pavement, 8"	SY	1,740	$108.00	$187,920.00
39	03330	Curb and Gutter, Type A, 24"	LF	1,110	$23.00	$25,530.00
40	03330	Curb and Gutter, Type B, 24"	LF	290	$23.00	$6,670.00
41	03330	Curb and Gutter, Type B, 24", modified	LF	1,520	$23.00	$34,960.00
42	03340	Curb Turn Fillets	SF	310	$8.00	$2,480.00
43	03340	Concrete Valley Pan	SF	440	$8.00	$3,520.00
44	03340	New Concrete Sidewalk, 6' wide, 4"	SF	4,100	$7.00	$28,700.00
45	03340	New Concrete Sidewalk, 10' wide, 4"	SF	10,300	$7.00	$72,100.00
47	03340	Drive Approach, 8"	SF	240	$12.00	$2,880.00
49	03340	Detectable Warning Plates	SF	160	$180.00	$28,800.00
50	03480	Colored Concrete Apron	SF	3,600	$7.50	$27,000.00
51	TBD	Quality Control Testing (incl. concrete)	LS	1	$21,100.00	$21,100.00
54	TBD	Pavement Striping	LF	1,440	$0.40	$576.00
55	TBD	Pavement Markings (arrows)	EA	2	$500.00	$1,000.00
57	TBD	Pavement Markings (crosswalks)	SF	312	$30.00	$9,360.00
62	TBD	Traffic Signal System (pre-emption)	LS	1	$65,000.00	$65,000.00
63	TBD	Electrical for Signals (pre-emption)	LS	1	$3,000.00	$3,000.00
64	TBD	Force Account	$	50,000	$1.00	$50,000.00

Construction Total: $889,021.00

Appendix D

Electric Transmission Line Easements and Guidelines

BOOK 690 OCT 12 1960 AT 3:45 O'CLOCK P M

RECORDED ..... LESTER R. GOPP, Recorder

RECEPTION NO. 917103

Contract No. 14-06-703-1190
Cheyenne-Sidney Transmission Line

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MISSOURI RIVER BASIN PROJECT

CONTRACT AND GRANT OF ELECTRIC TRANSMISSION LINE EASEMENT

THIS CONTRACT, made this 28th day of September 1960, pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388) and acts amendatory thereof or supplementary thereto, between the UNITED STATES OF AMERICA, hereinafter referred to as United States and represented by the officer executing this instrument, his duly appointed successor, or his duly authorized representative, hereinafter called the contracting officer, and JOHN C. ARP and MILDRED K. ARP, Husband and Wife hereinafter collectively referred to as vendor:

WITNESSETH:

The following grant and the following mutual covenants by and between the parties:

1. For the consideration hereinafter expressed, vendor does hereby grant unto the United States, its successors and assigns, a perpetual easement ~~75 feet in width measured at right angles from the following described center line,~~ together with the right and privilege to construct, reconstruct, operate, inspect, and maintain one electric transmission line, consisting of a single line of structures supporting one or more electrical power circuits, together with all poles, towers, crossarms, cables, wires, guys, supports, fixtures and such other structures, installation and facilities used or useful in the construction, operation and maintenance of said transmission line, including the right to permit the attachment of wires of others thereto, across the following described land: County of Laramie, State of Wyoming.

A part of Blocks 74, 75, 76, the alleys through said blocks, Colorado Avenue, Wyoming Avenue, Kansas Avenue, and Seventh Street adjoining said blocks of the Interior Heights Addition, a subdivision of the SE¼NE¼ Section 7, Township 13 North, Range 66 West of the 6th Principal Meridian, as shown by the plat of Interior Heights Addition to the City of Cheyenne, dated February 28, 1890, and filed of record March 3, 1890, in Book 1 of plats at Pages 46 and 47 of the land records of Laramie County, Wyoming. Containing 1.35 acres, more or less, and being more particularly described as follows:

All that part of Colorado Ave. which lies west of Lots 46, 47, and 48 in said Block 76; Lots 2, 3, 46, 47 and that part of the alley adjoining Lots 1, 2, 3, 46, 47, and 48 in said Block 76; that part of Wyoming Ave. that lies between Lots 1, 2, and 3 of said Block 76 and Lots 46, 47 and 48 in said Block 75; Lots 2, 3, 46, 47 and that part of the alley adjoining Lots 1, 2, 3, 46, 47, 48 in said Block 75; that part of Kansas Ave. that lies between Lots 1, 2 and 3 of said Block 75 and Lots 46, 47 and 48 in said Block 74; Lots 2, 3, 46, 47 and that part of the alley adjoining Lots 1, 2, 3, 46, 47, 48 in said Block 74; All that part of

Checked as to engineering data:
By Office Engineer, Bureau of Reclamation

Seventh Street that lies north of the east 75 feet of said Block 74.

2. Said transmission line and every part thereof shall, where it crosses vendor's land, be confined to the area granted under this easement except that the United States shall have the right and privilege of placing and maintaining guys and anchorages at greater distance from said center line where necessary to support said transmission line. However, in the event the installation of such additional guys and/or anchorages is determined to be necessary by the contracting officer, additional payment based upon an appropriate appraisal approved by the Secretary of the Interior or his duly authorized representative will be made to the vendor.

3. The grant of easement herein contained shall include the perpetual right to enter upon said premises, construct, reconstruct, operate, maintain, and make necessary replacements in connection with said transmission line and to permit the attachment of wires of others, together with the present and future right to clear said right-of-way or to trim orchard trees to the extent deemed necessary by the contracting officer to protect the rights and privileges herein granted, and to keep the same clear of brush, timber, inflammable structures and fire hazards, provided that fire hazards shall not be interpreted to include growing crops. All brush, timber or inflammable structures removed pursuant to the terms hereof shall become the property of the United States and may be disposed of by sale, burning, or otherwise; Provided, That said rights shall only be exercised in such a manner that no fire hazard shall be created hereby. The grant of easement shall not preclude the right to cultivate, use and occupy said premises for any purposes which will not, in the determination of the contracting officer, constitute a hazard to life or limb, interfere with any of the rights and privileges herein granted to the United States, or endanger any of its property, but said right of cultivation, use and occupancy shall not extend to or include the erection of any structure, including the drilling of wells, or permission to the public to use any part thereof, without advance written permission of the contracting officer. The United States shall exercise due care and diligence in the exercise of the rights and privileges herein granted to it. In case of permanent abandonment of said right-of-way, the title and interest herein granted shall end, cease and determine.

4. The grant of easement herein contained is subject to the rights-of-way of any nature whatsoever of record and in use.

5. It is a condition precedent to the payment to the vendor of the sum named herein that the title to the premises described herein shall be vested in the vendor, subject only to the interest of the United States hereunder and to the matters set out in Article 4 hereof and to such other defects, interests, or encumbrances as may be acceptable to the United States.

6. It is understood and agreed that if the Secretary of the Interior determines that the interest acquired hereunder by the United States should also be the subject of acquisition through judicial procedure, either to procure a safe title or for any other reason, then the compensation to be claimed by the vendor and the award to be made for said interest in said proceeding shall be upon the basis of the consideration herein provided.

7. Vendor warrants that no person or agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial agencies maintained by the vendor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to require the vendor to pay, in addition to the contract price or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

8. As complete consideration for the above grant of easement, the United States agrees to pay vendor the sum of **Nine Hundred Eighty and No/100 - - - - - -** Dollars ($ **980.00**) and if damage occurs to crops, trees, vines, seedlings, or improvements within the said right-of-way as a result of and during construction of the transmission line, payment will be made by the United States on basis of an appraisal approved by the Secretary of the Interior or his duly authorized agent.

9. No member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed the day and year first above written.

John C. Arp
John C. Arp

Mildred K. Arp
Mildred K. Arp

UNITED STATES OF AMERICA

By Lloyd C. Bauman
Acting Projects Manager

CERTIFICATE OF ACKNOWLEDGMENT

STATE OF Wyoming) ss.
COUNTY OF Laramie)

On this 28 day of September, 19 60, before me personally appeared **JOHN C. ARP and MILDRED K. ARP, Husband and Wife**

known to me to be the person**s** described in and who executed the foregoing instrument and acknowledged to me that **they** executed the same.

Witness my hand and seal the day and year last above written.

FRANK HORIS NOTARY PUBLIC LARAMIE COUNTY

My Commission expires: Jan. 23, 1964

Frank Horis
Notary Public

917103

The State of Wyoming } SS
County of Laramie }

This instrument was filed for record at 3:45 o'clock P. M. on the 17 day of Oct. A. D. 1960 and duly recorded in Book 670 on page 141-143

Jessie P. [illegible]

County Clerk & Ex-Officio Register of Deeds

By Dorothy Shultz Deputy

Cheyenne Abstract & Title Co.
21452

18

RECORDED DEC 22 1960 AT 4:25 O'CLOCK P.M.

RECEPTION No. 925425 LESTER R. GOPP, Recorder

Contract No. 14-06-703-1224

BOOK 693

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MISSOURI RIVER BASIN PROJECT

CONTRACT AND GRANT OF ELECTRIC TRANSMISSION LINE EASEMENT

THIS CONTRACT, made this 19th day of December, 1960, pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388) and acts amendatory thereof or supplementary thereto, between the UNITED STATES OF AMERICA, hereinafter referred to as the United States and represented by the officer executing this instrument, his duly appointed successor, or his duly authorized representative, hereinafter called the contracting officer, and CHARLES H. LEISHER, a widower, hereinafter referred to as vendor:

WHEREAS, the vendor conveyed to the United States a right-of-way for transmission line purposes under Grant of Easement No. I35r-150 dated July 12, 1938, recorded at page 158, book 343, of the records of Laramie County, Wyoming, over and across the lands of the vendor and,

WHEREAS, the United States in the operation and enlargement of said transmission line requires 25 feet of additional right-of-way; and,

WHEREAS, it is the intention of the parties hereto by this instrument to enlarge and define the right-of-way occupied and to be occupied by the United States,

NOW THEREFORE WITNESSETH:

In consideration of the foregoing premises, the following grant and the following mutual covenants by and between the parties:

1. For the consideration hereinafter expressed, vendor does hereby grant unto the United States, its successors and assigns, a perpetual easement 75 feet in width, being 37½ feet left of and 37½ feet right of the following described center line, together with the right and privilege to construct, reconstruct, operate, inspect, and maintain one electric transmission line, consisting of a single line of structures supporting one or more electrical power circuits, together with all poles, towers, crossarms, cables, wires, guys, supports, fixtures and such other structures, installations and facilities used or useful in the construction, operation and maintenance of said transmission line, across the following described land situated in the County of Laramie, State of Wyoming, to wit:

Beginning at a point on the south boundary of the NE¼NE¼ of Section 7, T. 13 N., R. 66 W., 6th P. M., said

Checked as to engineering data:
By ..... Office Engineer, Bureau of Reclamation

point being situate 70.2 feet more or less, westerly from the southeast corner of said NE¼NE¼ of Section 7; thence N. 1°32' E. a distance of 969.4 feet, more or less, to a point; thence S. 88°58' E. a distance of 59 feet, more or less, to a point on the east boundary of said NE¼NE¼ of Section 7, said point being situate southerly 349 feet, more or less, from the northeast corner of said Section 7, containing 1.77 acres, more or less.

2. Said transmission line and every part thereof shall, where it crosses vendor's land, be confined to the area granted under this easement.

3. The grant of easement herein contained shall include the perpetual right to enter upon said premises, construct, reconstruct, operate, maintain, and make necessary replacements in connection with said transmission line, together with the present and future right to clear said right-of-way or to trim trees to the extent deemed necessary by the contracting officer to protect the rights and privileges herein granted, and to keep the same clear of brush, timber, inflammable structures and fire hazards, provided that fire hazards shall not be interpreted to include growing crops. All brush, timber or inflammable structures removed pursuant to the terms hereof shall become the property of the United States and may be disposed of by sale, burning, or otherwise; Provided, That said rights shall only be exercised in such a manner that no fire hazard shall be created hereby. The grant of easement shall not preclude the right to cultivate, use and occupy said premises for any purposes which will not, by the determination of the contracting officer, constitute a hazard to life or limb, interfere with any of the rights and privileges herein granted to the United States, or endanger any of its property, but said right of cultivation, use and occupancy shall not extend to or include the erection of any structure, including the drilling of wells, or permission to the public to use any part thereof, without advance written permission of the contracting officer. The United States shall exercise due care and diligence in the exercise of the rights and privileges herein granted to it. In case of permanent abandonment of said right-of-way, the title and interest herein granted shall end, cease and determine.

4. The grant of easement herein contained is subject to the rights-of-way of any nature whatsoever of record and in use.

5. It is a condition precedent to the payment to the vendor of the sum named herein that the title to the premises described herein shall be vested in the vendor, subject only to the interest of the United States hereunder and to the matters set out in Article 4 hereof and to such other defects, interests, or encumbrances as may be acceptable to the United States.

6. It is understood and agreed that if the Secretary of the Interior determines that the interest acquired hereunder by the United States should also be the subject of acquisition through judicial procedure, either to procure a safe title or for any other reason, then the compensation to be claimed by the vendor and the award to be made for said interest in said proceeding shall be upon the basis of the consideration herein provided.

7. Vendor warrants that no person or agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial agencies maintained by the vendor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to require the vendor to pay, in addition to the contract price or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

8. As complete consideration for the above grant of easement, the United States agrees to pay vendor the sum of Seven Hudred Fifty and no/100 Dollars ($750.00) and if damage occurs to crops, trees, vines, seedlings, or improvements within the said right-of-way as a result of and during construction of the transmission line, payment will be made by the United States on basis of an appraisal approved by the Secretary of the Interior or his duly authorized agent.

9. No member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed the day and year first above written.

UNITED STATES OF AMERICA

By R M. Sensintaffar

Title Project Manager

Charles H Leisher

Charles H. Leisher (Vendor)

CERTIFICATE OF ACKNOWLEDGMENT

STATE OF Wyoming)
) ss.
COUNTY OF Laramie)

On this 19" day of December, 1961, before me personally appeared Charles H. Leisher, a widower known to me to be the person described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

In Witness my hand and seal the day and year last written above.

MARSHALL S. REYNOLDS UNITED STATES COMMISSIONER DISTRICT OF WYOMING

Marshall S. Reynolds
~~Notary Public~~ UNITED STATES COMMISSIONER

My Commission expires May 5, 1962

My Commission expires:

925425

Photostated
Indexed
Abstracted

The State of Wyoming }
County of Laramie } SS

This instrument was filed for record
at 4:25 o'clock P. M. on the
22 day of Dec.
A. D. 1960 and duly recorded in
Book 693 on page 151

County Clerk & Ex-Officio Register of Deeds
By Barbara Carson Deputy

Cheyenne Abstract & Title.

21641

WESTERN AREA POWER ADMINISTRATION
GENERAL GUIDELINES CONCERNING THE USE OF
ELECTRIC TRANSMISSION LINE RIGHTS-OF-WAY

Rights usually reserved to the landowner include the right to cultivate, occupy, and use the land for any purpose that does not conflict with WAPA's use of its easement. To avoid potential conflicts, it is WAPA's policy to review all proposed uses within the transmission line easement. We consider (1) Safety of the public, (2) Safety of our Employees, (3) Restrictions covered in the easement, (4) WAPA's maintenance requirements, and (5) Protection of the transmission line structures and (6) Road or street crossings.

The outline below lists the considerations covered in the review. Please note that some items may overlap. This outline has been prepared only as a guide; each right-of-way encroachment is evaluated on an individual basis.

1. **Safety Of The Public**

   A. Approval depends, to a large extent, on the type and purpose of the development. WAPA takes our obligation to public safety very seriously. To insure our obligation, any use of the easement that will endanger the public will not be allowed or strongly discouraged (e.g., kite flying is prohibited).

   B. Metal fences must be grounded in accordance with applicable safety codes.

   C. Lighting standards shall not exceed a maximum height of 15 feet and not placed directly under the conductors (wires). All lighting standards must be grounded.

   D. All vegetation on the easement shall not exceed a maximum height of **3 feet** at maturity. No vegetation planted within **37 feet** of structures.

   E. Structures are not allowed on the easement. Structures include, but are not limited to, buildings, sheds, swimming pools, basketball courts, tennis courts, gazebos, etc.

   F. No ground elevation changes are allowed which would reduce the ground to conductor clearance below 30 feet.

2. **Safety Of Our Employees**

   Vegetation and encroachments into our right-of-way requires our crews to take action, which places them at risk. Therefore, any vegetation or encroachments that present a risk to our employees will not be allowed.

3. **Restrictions Covered In The Easement**

   The easement prohibits the following: (1) any use that will interfere with or damage the equipment of the United States, (2) digging or drilling of a well, (3) erecting buildings or

structures, (4) placing or piling up material within the easement boundaries. The easement gives WAPA the right to remove trees, brush or other objects interfering with the safe operation and maintenance of the line.

4. **Maintenance Requirements**

   A. Berms shall not be placed next to the base of the transmission line tower.

   B. Any proposed improvements to the easement (including grading, parking lot, lighting, landscaping, fences, etc.), must be reviewed by WAPA to assure that they will not interfere with the safe operation and maintenance of the transmission line.

   C. A 16-foot gate is required in any fences that cut off access along our easement.

   D. Thirty (30) feet of unobstructed access is to be maintained around towers.

5. **Protection Of The Transmission Line Structure (Towers, Guy Wires, etc.)**

   A. If the proposed use increases the possibility of a motor vehicle hitting the transmission line structure, an appropriate guard rail shall be installed to protect the structure (e.g., parking lots or roads).

   B. Trench digging, which would weaken or damage the structure, is prohibited.

   C. No ground elevation changes are allowed within 37 feet of the structure, and in no case shall the conductor to ground clearance be reduced below code limitation.

6. **Roads Or Street Crossings**

   WAPA's policy is to have roads or streets cross the easement at right angles, or as nearly at right angles as possible, so that a minimum area of the road or street lies within the transmission line easement.

Requests for permission to use the transmission line right-of-way should be submitted to: Western Area Power Administration, Attn: Realty Specialist, P.O. Box 3700, Loveland, CO 80539. Or rogers@wapa.gov

Appendix E

Transportation Operations Report

TRANSPORTATION OPERATIONS REPORT

Walterscheid Boulevard Corridor Plan

Cheyenne, Wyoming

Prepared for:

BenchMark Engineers, PC
1920 Thomes Avenue, Ste 320
Cheyenne, WY 82001

Prepared by:

Felsburg Holt & Ullevig
6400 South Fiddlers Green Cir., Suite 1500
Greenwood Village, CO 80120
303.721.1440

Principal-In-Charge: Lyle DeVries, PE, PTOE

Project Engineer: Faith Kelley, EI (CO, VA)

FHU Reference No. 121011-01

September 2022

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1. INTRODUCTION

The Walterscheid Boulevard Corridor is an important north-south multimodal transportation connection for the southwest Cheyenne, Wyoming area. Running parallel to and west of the South Greeley Highway (US Highway 85) corridor, it currently serves as a minor arterial roadway connecting from College Drive north under Interstate 80 (I-80) to Deming Drive, which provides connectivity to downtown Cheyenne.

Walterscheid Boulevard is anticipated to experience significant growth in future years due to development activity and completion of additional transportation infrastructure in the area. While its current classification is minor arterial, it possesses numerous characteristics more consistent with a collector roadway. Given the projected increased traffic volumes and multimodal needs along this corridor and the need to update its design to better fit arterial standards, this roadway requires improvement.

The Cheyenne Metropolitan Planning Organization (MPO) has initiated a corridor planning effort to understand the infrastructure needs, develop analyses to quantify the needs, provide recommendations, and furnish preliminary design plans to set the stage for future construction. The corridor planning process includes public and stakeholder outreach to help inform the process and recommendations.

This report assesses existing and projected future corridor conditions along Walterscheid Boulevard and identifies improvements needed to maintain acceptable operational levels into the future.

Transportation Operations Analysis

Purpose of Analysis

This analysis of existing and projected future conditions outlines deficiencies of the corridor to inform needed improvements.

Scope of Analysis

This study included collecting the following data:

1. Intersection and corridor multimodal traffic volumes
2. Travel speeds
3. Multimodal facility characteristics
4. Surrounding land uses
5. Crash history
6. Travel demand model information

The above data were used to analyze existing conditions and develop future forecasts.. Using the forecasted data, various improvement alternatives were analyzed, and final recommendations are provided.

The following information is included in this report:

- **Existing Conditions** – This section describes existing infrastructure, vehicular information, and data collected.
- **Future No Action Conditions** – This section evaluates the anticipated volumes and operations assuming no improvements are made to the study corridor.
- **Alternative Analysis** – This section evaluates several proposed alternatives and summarizes the anticipated results of each.
- **Recommendations** – This section summarizes the final improvement recommendations for near term and ultimate improvement scenarios.

Methods and Assumptions

The study area will include the following intersections:

1. W College Drive
2. W Prosser Road
3. W Allison Road
4. W Jefferson Road
5. W Fox Farm Road
6. Deming Drive

Table 1 summarizes the parameters used for *Highway Capacity Manual* (HCM) 6th Edition analyses.

Table 1. Highway Capacity Manual Analysis Parameters

Intersection	Traffic Parameter			
	% Heavy Vehicles	Peak Hour Factor	Saturation Flow Rate (vehicles per hour per lane)	Queue Length Percentile
	AM(Off-Peak)[PM]	AM(Off-Peak)[PM]		
W College Dr	6%(3%)[5%]	0.76(0.86)[0.80]	1900	95th
W Prosser Rd	3%(2%)[3%]	0.72(0.82)[0.65]		
W Allison Rd	2%(2%)[2%]	0.64(0.73)[0.73]		
W Jefferson Rd	1%(2%)[2%]	0.71(0.79)[0.81]		
W Fox Farm Rd	2%(2%)[3%]	0.78(0.79)[0.82]		
Deming Dr	2%(2%)[3%]	0.80(0.81)[0.87]		

The measures of effectiveness for this effort will include the following:

- Intersection operations use Level of Service (LOS) per HCM as calculated by Synchro. Potential roundabout alternatives will also be analyzed using Rodel.
- Multimodal LOS (transit, bicycle, and pedestrian) use HCM 6th Edition methods.
- The primary mobility goal is LOS D or better for intersection operations. LOS C is the goal for all multimodal operations.

The full Methods and Assumptions document can be found in **Appendix A**.

II. EXISTING CONDITIONS

II.A. Roadway Network

Walterscheid Boulevard is a north-south minor arterial in Cheyenne, Wyoming. Currently, the roadway alignment exists as Division Avenue just south of E College Drive and turns into Deming Drive to the north of its underpass below Interstate 80 (I-80). It is currently a two-lane roadway with a speed limit of 35 miles per hour (mph) throughout the corridor until just north of Fox Farm Road, where the posted speed changes to 30 mph. A southbound left turn lane and northbound right turn lane are provided at its intersection with Deming Drive, and a southbound right turn lane is provided at its intersections with Allison Road and Fox Farm Road.

II.B. Surrounding Land Uses

The Walterscheid Boulevard corridor is mainly surrounded by residential land uses. Rossman Elementary School is located in the west of Walterscheid Boulevard north of E College Drive. South High School is proximate to the corridor, located west of Walterscheid Boulevard along Allison Road. Some area to the west of the roadway between Allison Road and Fox Farm Road is undeveloped. Walterscheid Boulevard is planned to connect further south via an improved Division Avenue, where there is significant potential for future development and/or redevelopment..

II.C. Traffic Volumes

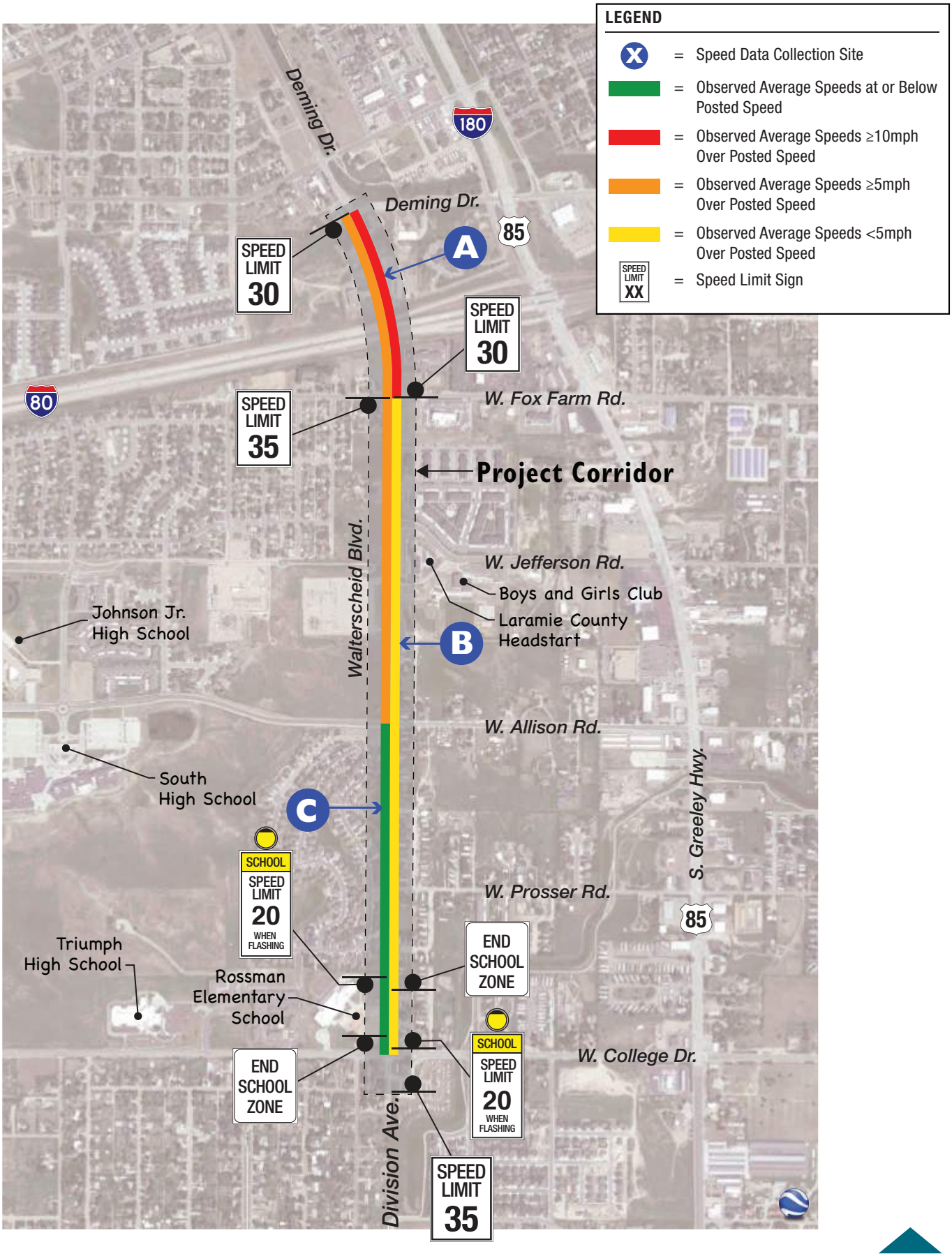
Traffic volumes at the intersections of Walterscheid Boulevard with W Prosser Road and E College Drive were collected on March 8 and 9, 2021. The remainder of the intersections were collected on February 22 and 23, 2021. The traffic count data can be found in **Appendix B**.

II.D. Travel Speeds

The posted speed limit in the majority of the corridor is 35 mph; however, just north of Fox Farm Road the posted speed limit changes to 30 mph. The roadway also has a school speed zone of 20 mph from W College Drive to just past the existing Rossman Elementary School. The majority of observed speeds were less than 5 mph over the speed limit; however, significant speeding was observed in the northbound (downhill) direction north of Fox Farm Road. The segment between Fox Farm Road and Deming Drive experienced average speeds of greater than 10 mph over the posted speed limit. **Figure 1** shows posted speed locations and observed speeding behavior. Speed data are provided in **Appendix C**.

II.E. Multimodal Conditions

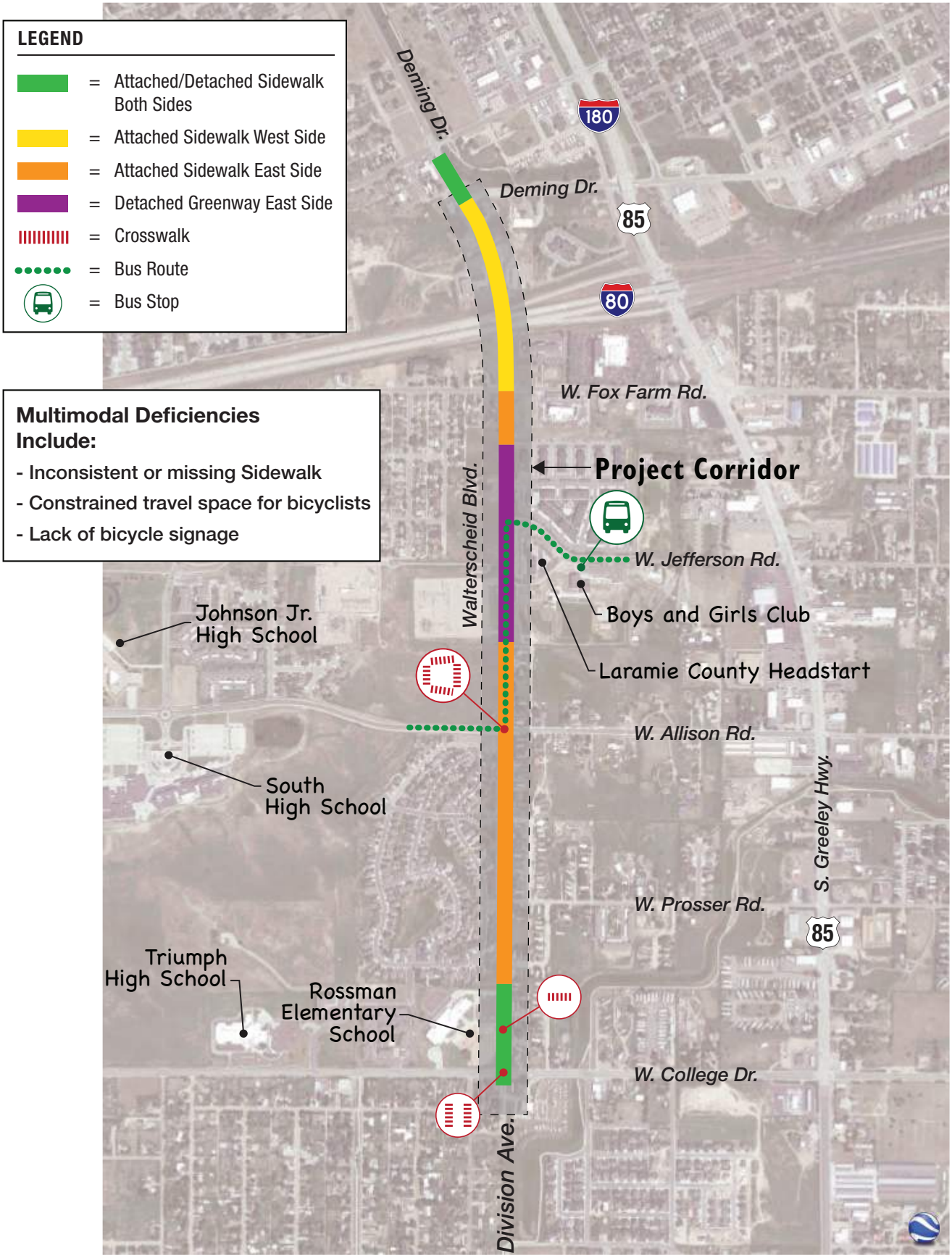
Pedestrian, bicycle, and transit facilities are present in this corridor but lack adequacy and continuity. Sidewalks in the area are inconsistent; specifically, the majority of pedestrian facilities exist on the east side of Walterscheid Boulevard. However, in between Fox Farm Road and Deming Drive, the sidewalk switches to the west side of the road without access to a crosswalk. The Cheyenne Greenway runs alongside the east edge of Walterscheid Boulevard and crosses below Waltersheid Boulevard west of Jefferson Road. **Figure 2** outlines existing multimodal facilities.



FELSBURG HOLT & ULLEVIG

Current Observed Traffic Speeds | FIGURE 1

Walterscheid Blvd. - Report 121-011-01 8/5/22



FELSBURG HOLT & ULLEVIG

Non-Motorized Travel Conditions | FIGURE 2

Walterscheid Blvd. - Report 121-011-01 8/5/22

II.F. Crash History

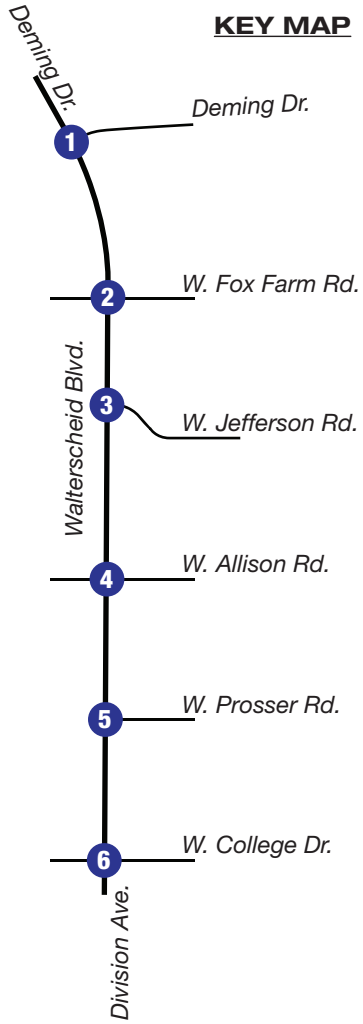
The Cheyenne MPO provided crash history along the Walterscheid Boulevard corridor for a 5-year timeframe, 2016–2020. The intersection of Allison Road with Walterscheid Boulevard shows the most crashes within this timeframe with the majority of those crashes being rear-end or angle crashes. The Walterscheid Boulevard/College Drive intersection also experienced a higher frequency of rear-end crashes; however, this is expected as these are the only signalized intersections along the segment and signalized intersections often experience a higher frequency of rear-end crashes. Allison Road also experienced the only two pedestrian/bike crashes in the entirety of the corridor. **Figure 3** shows the crash history along the corridor and any notable patterns. Supporting crash data can be found in **Appendix D**.

II.G. Traffic Operations

Traffic operations within the study area were evaluated according to techniques documented in the Transportation Research Board HCM, 6th Edition (2016). Level of service (LOS) is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. Levels of service are described by a letter designation ranging from LOS A to LOS F; with LOS A representing the best possible conditions and LOS F representing congested conditions. For unsignalized intersections, LOS is calculated for movements that must yield right-of-way to other traffic movements. For signalized traffic control, LOS represents an average of the delays for all movements at the intersection. Synchro traffic analysis software was used to develop the LOS calculations based on the HCM 6th Edition methodology.

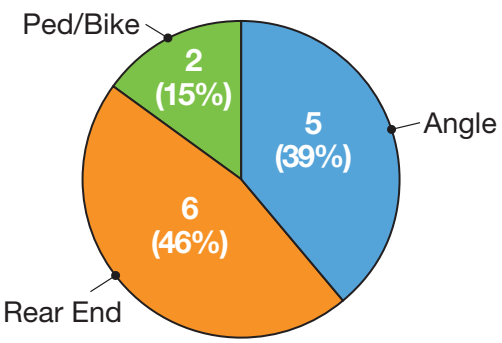
Existing traffic volumes collected and existing lane geometry were used to evaluate existing operations along the study corridor. Currently, all signalized intersections operate at LOS B or better for all peak periods. The majority of unsignalized movements operate at LOS D or better with the exception of the northbound movement at the intersection of Walterscheid Boulevard with Fox Farm Road, which is anticipated to operate at LOS E during the AM peak hour. **Figure 4** shows existing lane geometry, volumes, and operations. **Appendix E** provides the LOS worksheets for existing conditions.

Intersection #	Cross Street	Total Crashes, 2016-2020
1	Deming Drive	1
2	Fox Farm Road	11
3	Jefferson Road	2
4	Allison Road	13
5	Prosser Road	1
6	College Drive	8



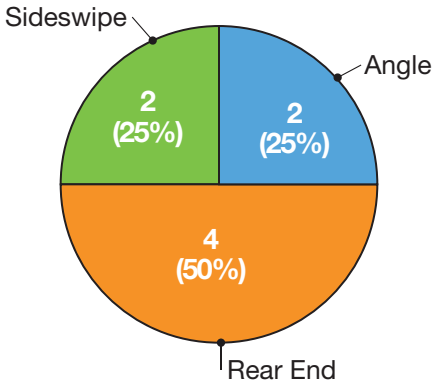
Crash Types at Higher Frequency Intersections

W. Allison Rd.



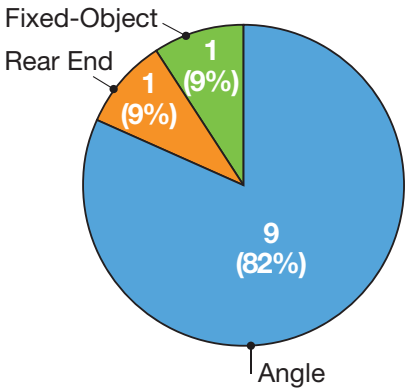
- Elevated angle crash pattern
- 2 reported ped/bike crashes (only ped/bike crashes reported on corridor)
- Limited sight distance looking south along Walterscheid may be contributing to crashes

W. College Dr.



- Rear-End type consistent with signalized intersection patterns
- Insufficient roadway striping may be contributing to sideswipe crashes

Fox Farm Rd.



- Angle crash pattern
- unfamiliar drivers may not anticipate the AWSC leading to angle crashes

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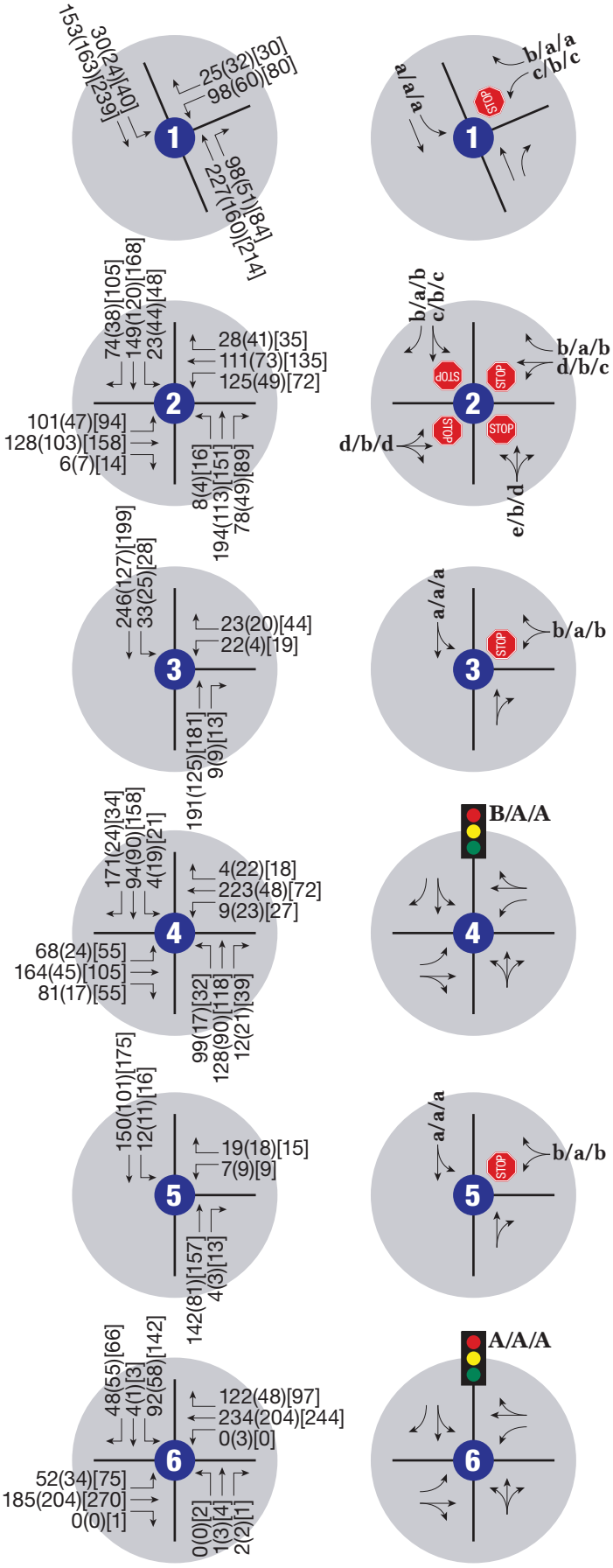
NOTE: Drawing Not to Scale

NORTH

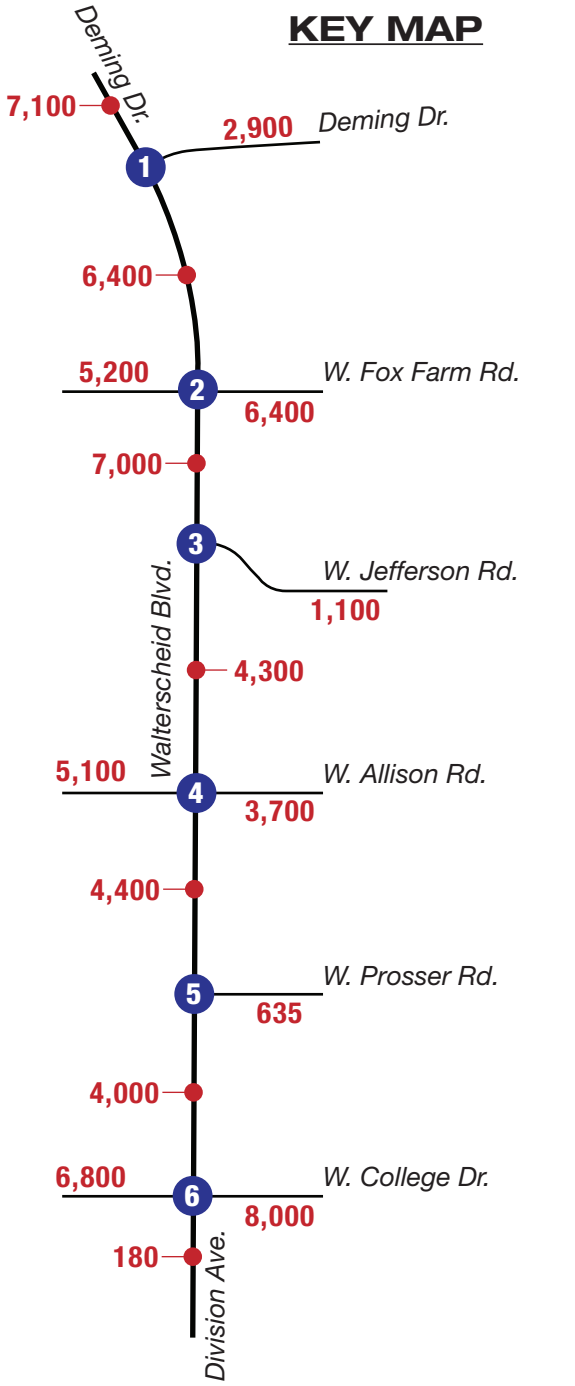
Reported Intersection Crashes 2016-2020

Walterscheid Blvd. - Report 121-011-01 8/5/22

FIGURE 3



KEY MAP



LEGEND

XXX(XXX)[XXX]	=	AM(Midday)[PM] Peak Hour Traffic Volumes
XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal

NORTH

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NOTE: Drawing Not to Scale

Existing (2021) Traffic Conditions

Walterscheid Blvd. - Report 121-011-01 8/5/22

FIGURE 4

III. FUTURE NO ACTION CONDITIONS

Year 2045 No Action conditions represent the anticipated traffic conditions given future growth, but no roadway or network improvements.

III.A. Travel Demand Forecasting

To develop future background volumes, a growth rate was applied to existing volumes (shown on **Figure 4**). The Year 2045 Cheyenne MPO Travel Demand Model (TDM) developed for the Connect2045 Regional Transportation Plan Update was used to develop traffic growth rates and forecasts for the study corridor. The Connect2045 future roadway plan includes widening of Walterscheid Boulevard to 5 lanes as a Tier 2 fiscally constrained project, and Walterscheid Boulevard is accordingly modeled as a 5 lane roadway through the project area in the TDM. Upon review of the initial modeling results and discussion with the project team, it was determined that the TDM configuration should be altered to reflect a 3-lane section rather than 5 lanes because:

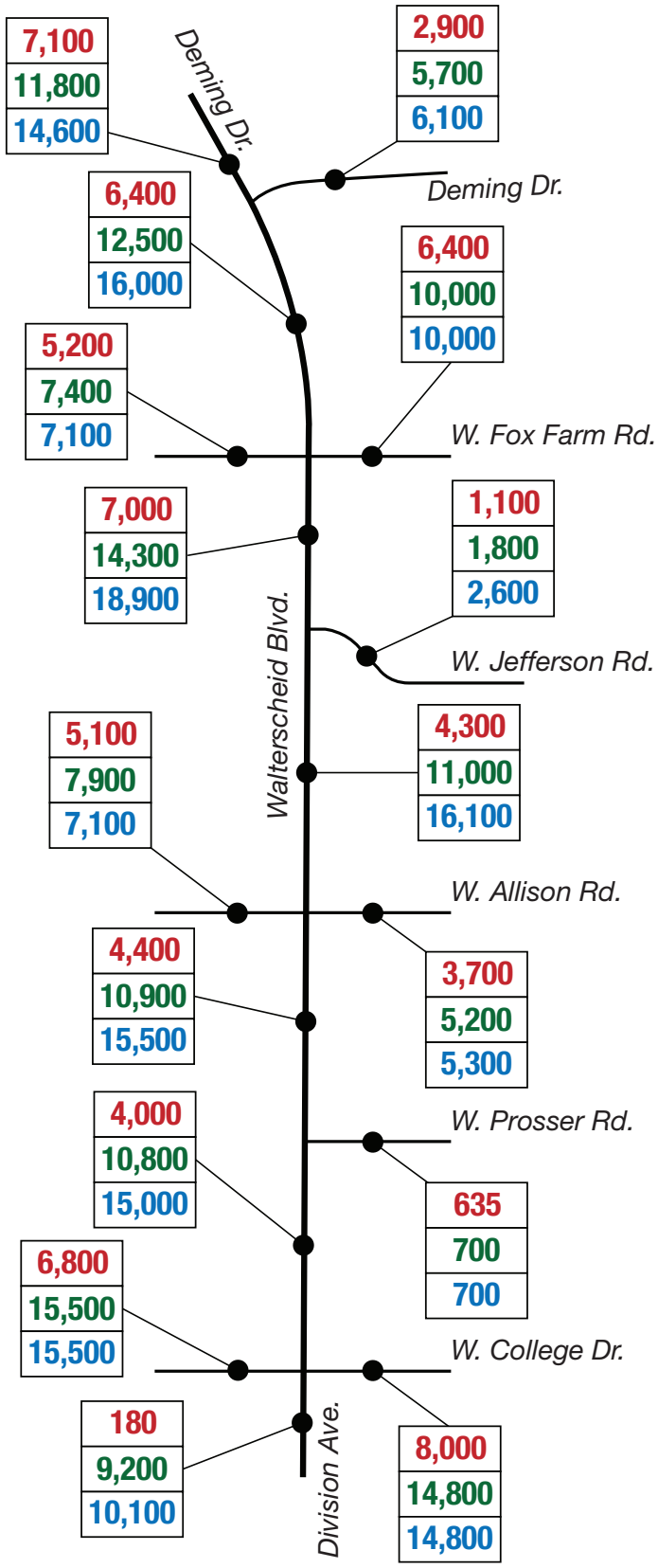
1. Forecasts coming out of the TDM based on a 5 lane Walterscheid Boulevard showed unrealistically high traffic volume growth rates for the corridor, as much as tripling current traffic volumes.

2. Widening Walterscheid Boulevard to 5 lanes is not physically feasible in the near term future given right-of-way constraints in the area.

Table 2 provides projected daily traffic volumes for the study area roadways based on a 3-lane Walterscheid. **Figure 6** shows projected year 2045 future volumes for 3 and 5 lane assumptions.

Table 2. Summary of Growth Forecasts

Roadway	Location	2019 Daily Volume	2045 Daily Volume
Walterscheid Boulevard	N/O Deming	7100	11,800
	N/O Fox Farm Road	6400	12,500
	N/O Jefferson Road	7000	14,300
	N/O Allison Road	4300	11,000
	N/O Prosser Road	4400	10,900
	N/O College Drive	4000	10,800
	S/O College Drive	180	9200
Deming Drive	E/O Walterscheid Boulevard	2900	5700
Fox Farm Road	W/O Walterscheid Boulevard	5200	7400
	E/O Walterscheid Boulevard	6400	10,000
Jefferson Road	E/O Walterscheid Boulevard	1100	1800
Allison Road	W/O Walterscheid Boulevard	5100	7900
	E/O Walterscheid Boulevard	3700	5200
Prosser Road	E/O Walterscheid Boulevard	635	700
College Drive	W/O Walterscheid Boulevard	6800	15,500
	E/O Walterscheid Boulevard	8000	14,800



LEGEND

XXXX	=	Daily Traffic Volumes (Base Year)
XXXX	=	2045 Daily Traffic Forecasts (3-Lane Walterscheid)
XXXX	=	2045 Daily Traffic Forecasts (5-Lane Walterscheid)

NORTH

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NOTE: Drawing Not to Scale

FIGURE 5
Daily Traffic Volume Forecasts

Walterscheid Blvd. 121-011-01 5/24/22

It should be noted that Walterscheid Boulevard south of College Drive, also known as Division Avenue, is expected to extend further south and provide more connectivity in the future. This connection will increase volumes south of College Drive.

Though not used as the basis for project forecasts, **Appendix H** provides information regarding the outcomes associated with the higher 5-lane based forecasts.

As shown on **Figure 6**, Walterscheid Boulevard is anticipated to carry a maximum daily traffic volume of about 14,300 vehicles per day (vpd) just south of Fox Farm Road. College Drive is anticipated to carry over 15,000 vpd west of Walterscheid Boulevard. Fox Farm Road is anticipated to grow to 10,000 vpd east of Walterscheid Boulevard. Jefferson Road is anticipated to experience 1,800 vpd.

III.B. Traffic Operations

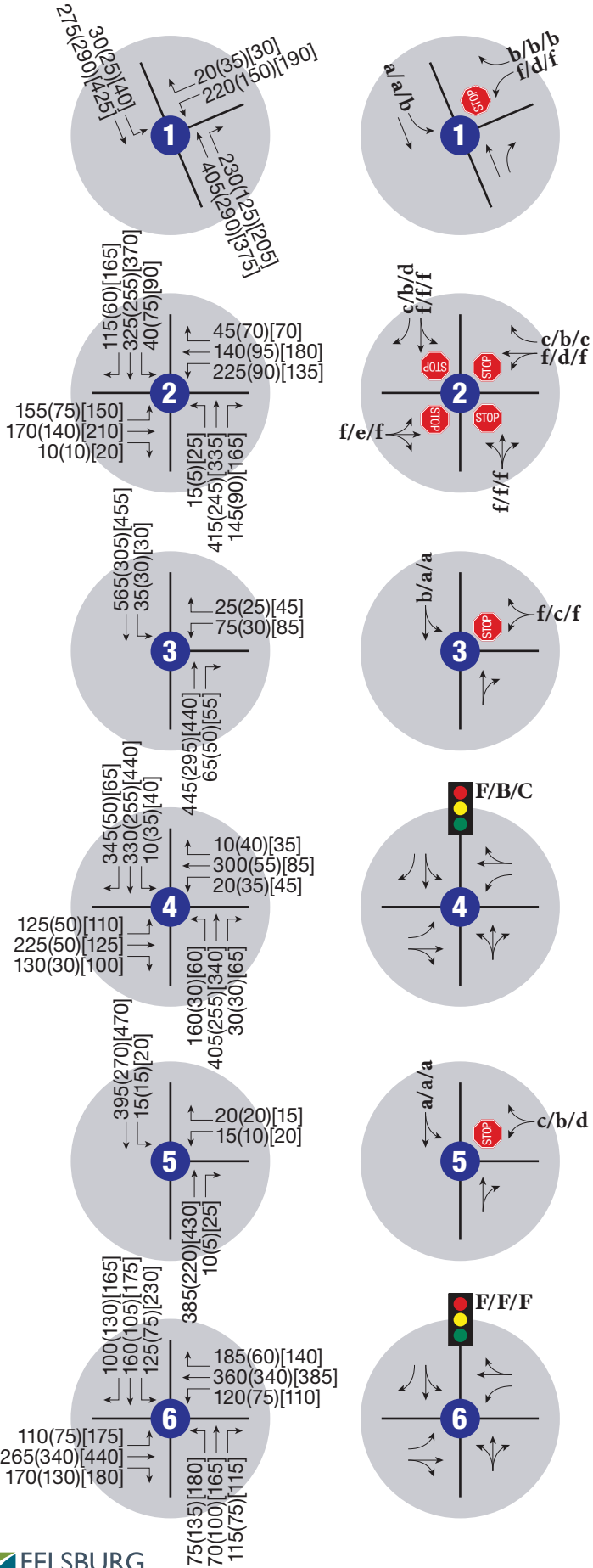
LOS traffic analysis procedures discussed previously were applied to the background volumes for the future planning horizon. **Figure 6** illustrates the capacity analyses for future background volumes with no geometry improvements. **Appendix F** contains the background LOS worksheets.

The following outlines projected LOS F conditions in the study area:

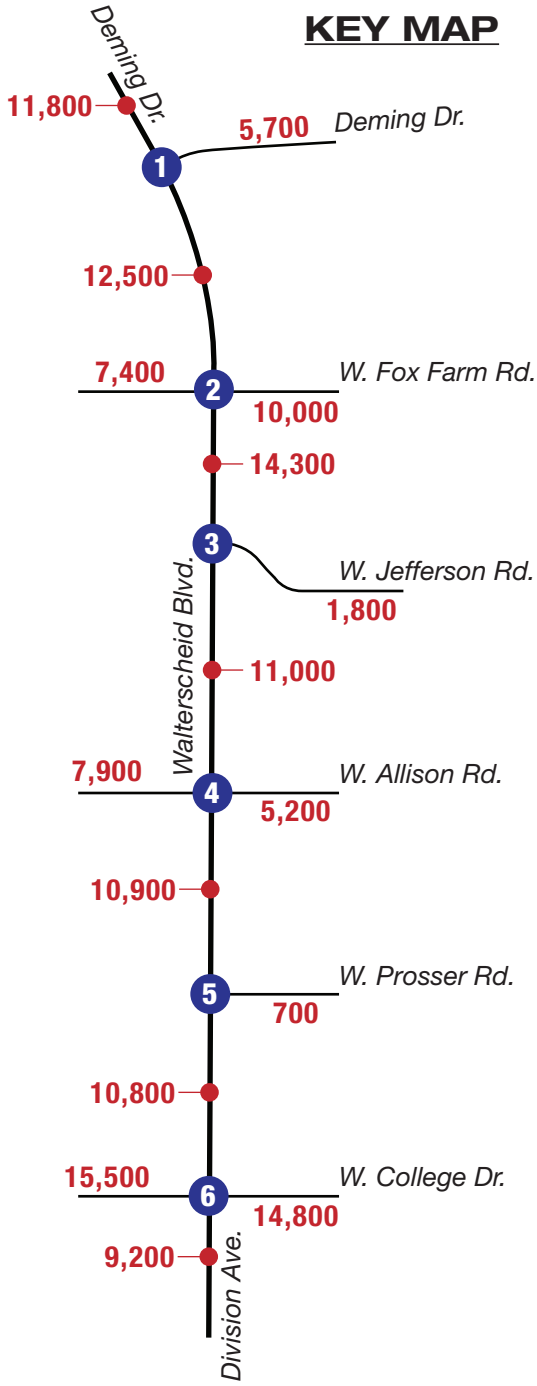
- College Avenue/Walterscheid Boulevard – Signalized
  - The entire intersection is anticipated to operate at LOS F for all peak hours.
- Allison Road/Walterscheid Boulevard – Signalized
  - The intersection would operate at overall LOS F during AM and PM peak hours.
- Jefferson Road/Walterscheid Boulevard – Two-Way Stop-Control
  - The westbound approach is anticipated to operate at LOS F during the AM and PM peak hours.
- Fox Farm Road/Walterscheid Boulevard – All-Way Stop-Control
  - The northbound movement is anticipated to be LOS F during all peak hours.
  - The southbound left/through movement is anticipated to be LOS F during all peak hours.
  - The eastbound movements is anticipated to be LOS F during the AM and PM peak hours and LOS E during the midday peak hour.
  - The westbound left/through movement is anticipated to be LOS F during the AM and PM peak hours.
- Deming Drive/Walterscheid Boulevard – Two-Way Stop-Control
  - The westbound left turn movement is anticipated to operate at LOS F during the AM and PM peak hours and LOS D during the midday peak hour.

III.C. Summary of Needs

Intersection improvements would be necessary to provide acceptable future traffic operations. Such improvements could include traffic control changes, added turn lanes, and/or additional through lanes along Walterscheid Boulevard.



KEY MAP



LEGEND

XXX(XXX)[XXX]	=	AM(Midday)[PM] Peak Hour Traffic Volumes
XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal

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NOTE: Drawing Not to Scale

NORTH

Walterscheid (2045) No Action Traffic Conditions | FIGURE 6

Walterscheid Blvd. - Public Meeting 121-011-01 8/5/22

IV. ANALYSIS OF ALTERNATIVES

The following subsections describe evaluated alternatives for both the Walterscheid Boulevard corridor and each study intersection along the corridor.

IV.A. Walterscheid Boulevard Section

As previously discussed, Walterscheid Boulevard has been identified in regional planning efforts as a future 5-lane roadway. Upon review and discussion with the project team, it was determined that widening Walterscheid Boulevard to a 5-lane roadway would not be feasible in the near-term future due to Right-of-Way constraints.

A three-lane cross-section was found to be the most feasible alternative for the corridor. Although the section will experience heavy volumes with one-lane in each direction, a Two-Way Left-Turn Lane (TWLTL) will be provided to serve north and southbound left turns at all intersections and to provide median storage for drivers making left turns from the minor roadway intersections.

It is recommended that all turn lanes be designed to meet Cheyenne Unified Development Code criteria.

IV.B. Intersection Alternatives

College Drive

While this intersection is already signalized, several additional auxiliary lanes are recommended to improve operations at this intersection. for the future condition. Exclusive left and right turn lanes should be provided along all approaches to best serve this intersection. However, even with these additions, the intersection would operate at undesirable levels in the AM and PM peak hours. This intersection should continue to be monitored for further evaluation in the future.

Prosser Road

The Prosser Road intersection is anticipated to operate at acceptable levels with the provision of an exclusive southbound left turn lane.

Allison Road

Similar to College Drive, the Allison Road intersection is currently signalized and would solely need additional auxiliary turn lanes to maintain acceptable operations in the future. This condition would require the implementation of northbound, eastbound, and westbound right turn lanes. The three-lane section along Walterscheid would also provide northbound and southbound left turn lanes at this intersection.

Jefferson Road

This intersection should implement a northbound exclusive right turn lane, and the three-lane cross-section would provide a southbound left turn lane as well. With these improvements, the westbound movement would still experience LOS F during the AM and PM peak hours; however, it is not uncommon for side-street stop-controlled movements to experience higher than average delays during peak hours. This intersection is not anticipated to meet signal warrant criteria. The future addition of a west leg to this intersection could be considered to serve development.

Fox Farm Road

Some movements at the current all-way stop controlled intersection are not operating acceptably, and this condition is expected to worsen into the future without improvements. Signalization is anticipated

to be warranted based on analysis of future year conditions. Signalization, along with the addition of north and southbound right and left turn lanes, an eastbound left turn lane and converting the existing westbound lane geometry from a shared left/through to a shared through/right, would result. These improvements would result in LOS C operations for all peak periods in the future scenario.

Installation of a roundabout has been evaluated as a potential alternative due to the high-volume nature of all approaches. A single lane roundabout, meaning one shared left/through/right lane for all approaches, would be adequate to provide acceptable operational levels for this intersection based on future volumes. This lane geometry would cause the overall intersection operations to be LOS C or better for all peak periods.

The signalization and roundabout options are roughly equivalent operationally. Therefore the decision to implement one or the other should be driven by other factors beyond traffic operations.

Deming Drive

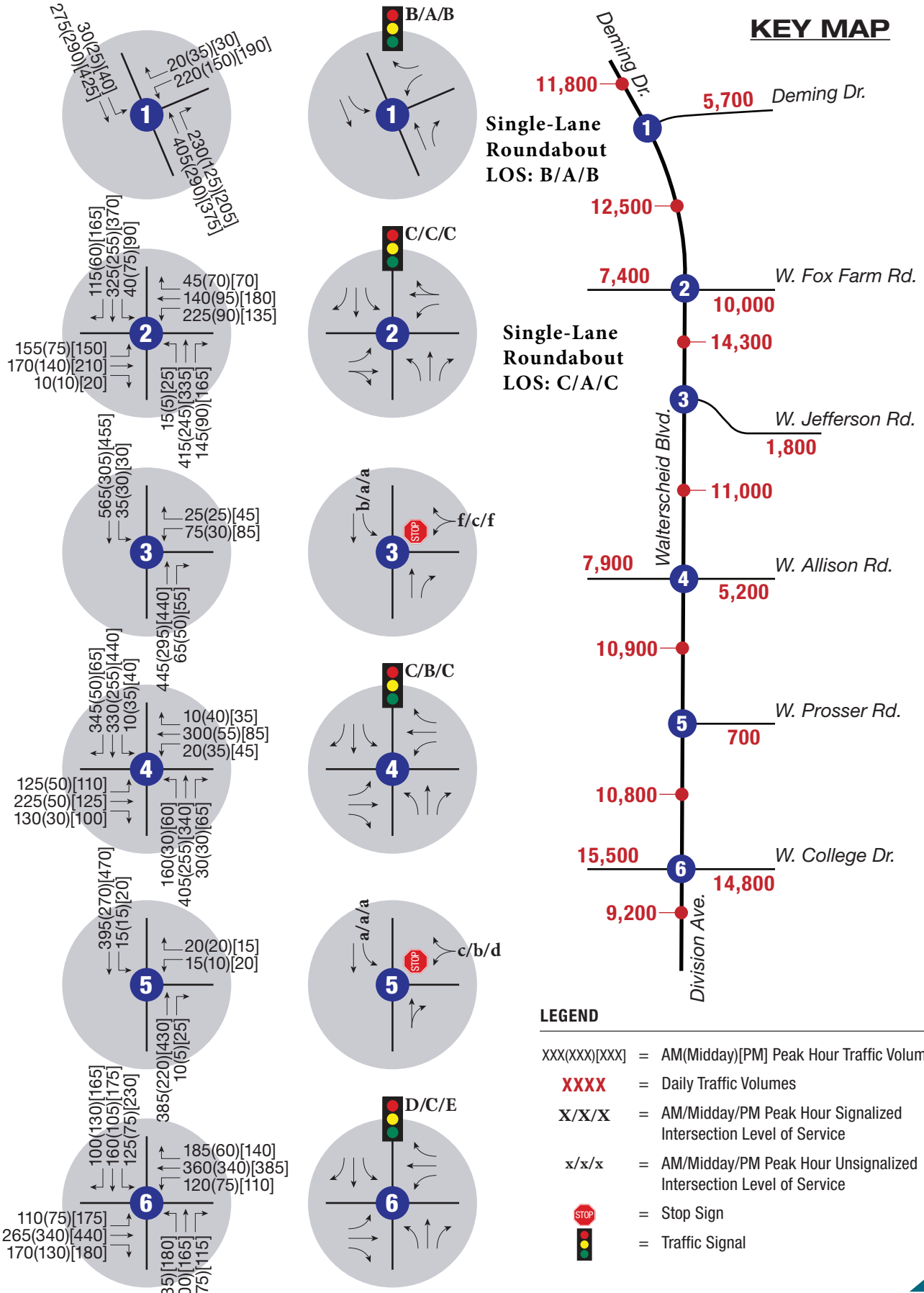
The Walterscheid Boulevard/Deming Drive intersection is currently unsignalized, with STOP sign control along the westbound approach. Analyses of Year 2045 conditions indicate that longer queues and operational concerns will worsen into the future without treatment. Signalized operations were tested and it was found that the intersection would operate at LOS B or better with the implementation of a signal in the future scenario.

Signal warrant analyses of projected future traffic volumes indicate that traffic volumes would not exceed warrant criteria unless the criteria are reduced because it is assumed that 85th percentile traffic speeds along Walterscheid Boulevard approaching the intersection exceed 40 miles per hour. While such a condition exists along northbound Walterscheid Boulevard approaching Deming Drive, it is unreasonable to assume this condition will persist into the long term future. Therefore, the intersection is not projected to meet signal warrant criteria by the Year 2045.

The Walterscheid Boulevard/Deming Drive intersection was also evaluated as a roundabout. Similar to the potential Fox Farm roundabout, this intersection was evaluated as a single lane roundabout with all shared approaches. This geometry would result in LOS B or better conditions for all peak periods in the future scenario.

It is recommended that once traffic volumes grow to the level of meeting signal warrants at this intersection, a roundabout be installed. The roundabout would operate acceptably and would serve as a traffic calming influence on speeding traffic in the area.

All evaluated alternatives and their respective operations are shown on **Figure 7**. LOS worksheets for the build alternatives are shown in **Appendix G**.



FELSBURG HOLT & ULLEVIG

NOTE: Drawing Not to Scale

Walterscheid (2045) Traffic Conditions (w/ Improvements)

FIGURE 7

Walterscheid Blvd. - Report 121-011-01 8/5/22

V. RECOMMENDATIONS

The following subsections describe the recommended alternatives for the Walterscheid Boulevard corridor and the respective intersections.

V.A. Corridor Section

Traffic volumes along the Walterscheid Boulevard corridor from College Drive to Deming Drive is anticipated to grow significantly in coming years. The roadway is anticipated to experience up to 14,300 vpd. The Walterscheid Boulevard corridor is recommended to provide a three-lane section, providing a Two-Way Left-Turn Lane (TWLTL) for the northbound and southbound directions.

Future widening to 5 lanes is not anticipated at this time.

V.B. Recommended Actions

As outlined in the alternatives analysis, the majority of intersections would warrant signalization and require additional auxiliary turn lanes by the future scenario. While the implementation of auxiliary turn lanes and signals are anticipated to address the majority of future poor operations in the study area, College Drive is anticipated to experience LOS E during the PM peak hour. This intersection is expected to continue to serve as a major junction in the area and would require additional improvements to operate at acceptable levels; however, current right-of-way constrains justifiable improvements.

The intersections of Deming Drive and Fox Farm Road with Walterscheid Boulevard have been outlined for potential roundabout installation. Both roundabouts would consist of all shared approaches and have one circulating lane. Both the signalized intersection and roundabout alternatives are anticipated to provide acceptable operations at these intersections. However, at the Deming Drive intersection a roundabout would provide traffic calming advantages and is, therefore, recommended.

Multimodal improvements should include continuous sidewalks or pedestrian friendly paths on at least one side of the roadway, as well as crosswalks at all study intersections. Bike lanes are recommended to be provided in both northbound and southbound directions along Walterscheid Boulevard.

APPENDIX A. METHODS & ASSUMPTIONS DOCUMENT

FELSBURG HOLT & ULLEVIG
connecting & enhancing communities

MEMORANDUM

TO: Chris Yaney

FROM: Charles Buck

DATE: April 27, 2021

SUBJECT: Methods and Assumptions – Traffic Engineering (Draft)
Walterscheid Boulevard Reconstruction Plan
FHU Reference No. 121011-01

This brief memorandum identifies the methods and assumptions for traffic engineering analysis in support of design efforts for the Walterscheid Boulevard (Blvd) Reconstruction Plan. The traffic analyses will be used to develop and refine potential improvement concepts for the proposed reconstruction. A preliminary traffic study will be prepared to support and inform the design efforts.

Study Area

The study area will be limited to the following intersections along Walterscheid Blvd:

- E College Drive
- W Prosser Road
- W Allison Road
- W Jefferson Road
- W Fox Farm Road
- Deming Drive

Traffic Volume Projections

Traffic volumes were recorded on March 8th and 9th, 2021 for the intersections of Walterscheid Blvd with W Prosser Road and E College Drive. Traffic volumes were recorded on February 22nd and 23rd, 2021 for the following intersections along Walterscheid Blvd:

- W Jefferson Road
- Deming Drive
- W Fox Farm Road
- Allison Road

The existing traffic volumes will establish a baseline for evaluation of future conditions. 2045 projections will be based on the Cheyenne MPO's regional travel demand model and vehicle trip estimates to be generated by known area developments.

Traffic Operations

Operational analyses will be conducted for existing and year 2045 conditions based on procedures documented in the *Highway Capacity Manual* (HCM) 6th Edition (Transportation Research Board, 2016). The 6th Edition HCM provides methods for multi-modal evaluation. Where appropriate, the following chapters of the HCM will be used to analyze specific operational conditions:

- Chapter 19 – Signalized Intersections
- Chapter 20 – Two-Way Stop Controlled Intersections
- Chapter 22 - Roundabouts

Highway Capacity Software (HCS) and Synchro will be used to develop basic lane requirements and geometric configurations. HCM 6th Edition analysis procedures require the use of certain parameters, summarized in **Table 1.**

Table 1. HCM Analysis Parameters

Intersection	Movement	Traffic Parameter			
		% Heavy Vehicles	Peak Hour Factor*	Saturation Flow Rate (vehicles per hour per lane)	Queue Length Percentile
		AM(Off-Peak)[PM]	AM(Off-Peak)[PM]		
E College Dr	EB	6%(3%)[6%]	0.76(0.86)[0.80]	1900	95th
	WB	6%(4%)[6%]			
	NB	0%(0%)[0%]			
	SB	5%(3%)[3%]			
W Prosser Rd	WB	4%(0%)[0%]	0.72(0.82)[0.65]		
	NB	2%(0%)[2%]			
	SB	4%(4%)[3%]			
W Allison Rd	EB	3%(1%)[4%]	0.64(0.73)[0.73]		
	WB	1%(2%)[1%]			
	NB	3%(2%)[2%]			
	SB	1%(3%)[2%]			
W Jefferson Rd	WB	0%(0%)[2%]	0.71(0.79)[0.81]		
	NB	2%(1%)[2%]			
	SB	1(3%)[1%]			
W Fox Farm Rd	EB	3%(1%)[4%]	0.78(0.79)[0.82]		
	WB	2%(1%)[1%]			
	NB	1%(2%)[2%]			
	SB	1%(4%)[4%]			
Deming Dr	WB	2%(5%)[2%]	0.80(0.81)[0.87]		
	NB	1%(1%)[2%]			
	SB	2%(3%)[4%]			

* average of all movements

Existing signalized intersection LOS analyses will utilize signal timing plans as provided by the City and MPO.

Measures of Effectiveness

The measures of effectiveness (MOE) for this effort will include the following:

- Intersection operations use Level of Service (LOS) per HCM as calculated by Synchro. Potential roundabout alternatives will also be analyzed using Rodel.
- Multi-modal LOS (transit, bicycle, and pedestrian) use HCM 6th Edition methods.
- The primary mobility goal is LOS D or better for intersection operations. LOS C is the goal for all multi-modal operations.

Documentation

A preliminary Traffic Analysis Technical Memorandum will be prepared to document conceptual-level alternatives and results. Following review and comment by MPO and City staff, the traffic analyses and documentation will be refined to identify a preferred alternative for design.

APPENDIX B. TRAFFIC COUNTS

OFF Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/22/2021	12:00	0	7	26	3	0	0	6	8	5	0	0	5	22	4	0	0	4	11	4	0	105	440
	12:15	0	8	29	9	0	0	4	8	5	0	0	4	26	7	0	0	6	6	0	0	112	
	12:30	0	2	20	7	0	0	10	14	5	0	0	2	19	5	0	0	4	12	9	0	109	
	12:45	0	2	15	5	0	0	3	18	7	0	0	6	23	5	0	0	10	16	4	0	114	
	Sub-Total	0	19	90	24	0	0	23	48	22	0	0	17	90	21	0	0	24	45	17	0		

Date and Time of Start of Count 1	02/22/2021 12:00:00
Date and Time of End of Count 1	02/22/2021 13:00:00

Walterscheid Blvd

Total Vehicles On Leg: 269

Vehicles Entering: 133 | Vehicles Exiting: 136

Southbound

Total					
24	90	19	0	0	

OFF Peak Volumes

Total					
0	0	17	90	21	

Northbound

Vehicles Entering: 128 | Vehicles Exiting: 130

Total Vehicles On Leg: 258

Walterscheid Blvd

Allison Rd

Total Vehicles on Leg: 175

Vehicles Entering Intersection: 86

Vehicles Exiting Intersection: 89

Eastbound

Total	
0	
0	
24	
45	
17	

Westbound

Total	
22	
48	
23	
0	
0	

Allison Rd

Total Vehicles on Leg: 178

Vehicles Entering Intersection: 93

Vehicles Exiting Intersection: 85

PM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/22/2021	15:00	0	4	34	8	0	0	3	21	3	0	0	5	25	11	0	0	27	55	18	0	214	734
	15:15	0	7	37	8	0	0	8	13	2	1	0	11	16	9	0	0	14	17	11	0	153	
	15:30	0	5	43	7	0	0	6	18	8	0	0	6	37	13	0	0	10	15	12	0	180	
	15:45	0	5	44	11	1	0	10	20	5	1	0	10	40	6	0	0	4	18	14	0	187	
	Sub-Total	0	21	158	34	1	0	27	72	18	2	0	32	118	39	0	0	55	105	55	0		

Date and Time of Start of Count 1	02/22/2021 15:00:00
Date and Time of End of Count 1	02/22/2021 16:00:00

Walterscheid Blvd

Total Vehicles On Leg: 404

Vehicles Entering: 213 | Vehicles Exiting: 191

Southbound

Total	34	158	21	0	1

Allison Rd

Total Vehicles on Leg: 353

Vehicles Entering Intersection: 215

Vehicles Exiting Intersection: 138

Eastbound

Total	
0	
0	
55	
105	
55	

PM Peak Volumes

Total	
18	
72	
27	
0	
2	

Westbound

Vehicles Entering Intersection: 117

Vehicles Exiting Intersection: 165

Total Vehicles on Leg: 282

Allison Rd

Total	0	0	32	118	39

Northbound

Vehicles Entering: 189 | Vehicles Exiting: 240

Total Vehicles On Leg: 429

Walterscheid Blvd

AM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/23/2021	7:00	0	0	19	40	0	0	1	35	1	0	0	18	19	1	0	0	9	24	16	0	183	1057
	7:15	0	0	17	53	0	0	0	76	2	0	0	38	21	4	0	0	17	38	23	0	289	
	7:30	0	0	27	62	0	0	2	88	1	0	0	37	42	1	0	0	34	75	31	0	400	
	7:45	0	4	31	16	0	0	6	24	0	0	0	6	46	6	0	0	8	27	11	0	185	
	Sub-Total	0	4	94	171	0	0	9	223	4	0	0	99	128	12	0	0	68	164	81	0		

Date and Time of Start of Count 1	02/23/2021 7:00:00
Date and Time of End of Count 1	02/23/2021 8:00:00

Walterscheid Blvd

Total Vehicles On Leg: 469

Vehicles Entering: 269 | Vehicles Exiting: 200

Southbound

Total	171	94	4	0	0

Allison Rd

Total Vehicles on Leg: 806

Vehicles Entering Intersection: 313

Vehicles Exiting Intersection: 493

Eastbound

Total	
0	
0	
68	
164	
81	

AM Peak Volumes

Total	
4	
223	
9	
0	
0	

Westbound

Vehicles Entering Intersection: 236

Vehicles Exiting Intersection: 180

Total Vehicles on Leg: 416

Allison Rd

Total	0	0	99	128	12

Northbound

Vehicles Entering: 239 | Vehicles Exiting: 184

Total Vehicles On Leg: 423

Walterscheid Blvd

Date and Time of Start of Count 1	03/8/2021	12:00:00
Date and Time of End of Count 1	03/9/2021	12:00:00

24 Hour Volumes

Walterscheid Blvd (Southbound)

Total Vehicles On Leg	3398
Vehicles Entering	1847
Vehicles Exiting	1551

Total	Right	Through	Left	U-turn	Bike/Ped
Total	734	30	1083	0	17

College Dr (Eastbound)

Total Vehicles on Leg	7312
Vehicles Entering Intersection	3668
Vehicles Exiting Intersection	3644

Movement	Total
Bike/Ped	13
U-turn	0
Left	609
Through	3047
Right	12

College Dr (Westbound)

Total Vehicles on Leg	7999
Vehicles Entering Intersection	3846
Vehicles Exiting Intersection	4153

Movement	Total
Right	911
Through	2901
Left	34
U-turn	0
Bike/Ped	10

Walterscheid Blvd (Northbound)

Total	Bike/Ped	U-turn	Left	Through	Right
Total	27	0	9	31	23

Vehicles Entering	63
Vehicles Exiting	76
Total Vehicles On Leg	139

OFF Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
03/8/2021	12:00	0	13	0	14	0	0	2	45	16	0	0	0	0	2	0	0	7	54	0	0	153	612
	12:15	0	15	0	12	2	0	1	44	14	0	0	0	0	0	0	0	12	48	0	0	146	
	12:30	0	16	0	16	0	0	0	60	8	0	0	0	0	0	0	0	3	50	0	0	153	
	12:45	0	14	1	13	0	0	0	55	10	1	0	0	3	0	1	0	12	52	0	0	160	
	Sub-Total	0	58	1	55	2	0	3	204	48	1	0	0	3	2	1	0	34	204	0	0		

Date and Time of Start of Count 1	03/8/2021 12:00:00
Date and Time of End of Count 1	03/8/2021 12:00:00

Walterscheid Blvd

Total Vehicles On Leg: 199

Vehicles Entering: 114 | Vehicles Exiting: 85

Southbound

Total	55	1	58	0	2

OFF Peak Volumes

	College Dr	Eastbound	Westbound	College Dr
Total				
0				48
0				204
34				3
204				0
0				1

Vehicles Entering Intersection: 238

Vehicles Exiting Intersection: 259

Total Vehicles on Leg: 497

Vehicles Entering Intersection: 255

Vehicles Exiting Intersection: 264

Total Vehicles on Leg: 519

Total	1	0	0	3	2

Northbound

Vehicles Entering: 5 | Vehicles Exiting: 4

Total Vehicles On Leg: 9

Walterscheid Blvd

PM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
03/8/2021	15:00	0	47	0	16	1	0	0	61	24	0	0	0	3	0	2	0	16	86	1	0	254	905
	15:15	0	22	1	10	0	0	0	59	36	0	0	2	1	0	0	0	24	59	0	0	214	
	15:30	0	50	0	23	1	0	0	63	16	0	0	0	0	1	3	0	19	65	0	3	237	
	15:45	0	23	2	17	0	0	0	61	21	0	0	0	0	0	0	0	16	60	0	3	200	
	Sub-Total	0	142	3	66	2	0	0	244	97	0	0	2	4	1	5	0	75	270	1	6		

Date and Time of Start of Count 1	03/8/2021 12:00:00
Date and Time of End of Count 1	03/8/2021 12:00:00

Walterscheid Blvd

Total Vehicles On Leg: 387

Vehicles Entering: 211 | Vehicles Exiting: 176

Southbound

Total	66	3	142	0	2

College Dr

Vehicles Entering Intersection: 346

Total Vehicles on Leg: 658

Vehicles Exiting Intersection: 312

Eastbound

Total	
6	
0	
75	
270	
1	

PM Peak Volumes

Total	
97	
244	
0	
0	
0	

Westbound

Vehicles Entering Intersection: 341

Total Vehicles on Leg: 754

Vehicles Exiting Intersection: 413

College Dr

Total	5	0	2	4	1

Northbound

Vehicles Entering: 7 | Vehicles Exiting: 4

Total Vehicles On Leg: 11

Walterscheid Blvd

AM Peak

Date	Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Crosswalk Crossings	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Crosswalk Crossings	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Crosswalk Crossings	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Crosswalk Crossings	Peak 15 Minutes	Peak Hour
03/9/2021	7:00	0	18	1	9	0	0	0	49	22	0	0	0	0	0	0	0	10	43	0	0	152	740
	7:15	0	18	1	9	1	0	0	59	43	0	0	0	1	0	0	0	10	26	0	0	167	
	7:30	0	34	1	18	0	0	0	68	30	0	0	0	0	0	0	0	18	62	0	0	231	
	7:45	0	22	1	12	2	0	0	58	27	0	0	0	0	2	0	0	14	54	0	0	190	
	Sub-Total	0	92	4	48	3	0	0	234	122	0	0	0	1	2	0	0	52	185	0	0		

Date and Time of Start of Count 1	03/9/2021	12:00:00
Date and Time of End of Count 1	03/9/2021	12:00:00

Walterscheid Blvd

Total Vehicles On Leg 319
Vehicles Entering 144 | Vehicles Exiting 175

Southbound

Total	Right	Straight	Left	U-Turn	Crosswalk
Total	48	4	92	0	3

College Dr — Total Vehicles on Leg 519; Vehicles Entering Intersection 237; Vehicles Exiting Intersection 282

Eastbound

Movement	Total
Crosswalk	0
U-Turn	0
Left	52
Straight	185
Right	0

AM Peak Volumes

Westbound

Movement	Total
Right	122
Straight	234
Left	0
U-Turn	0
Crosswalk	0

College Dr — Total Vehicles on Leg 635; Vehicles Entering Intersection 356; Vehicles Exiting Intersection 279

	Crosswalk	U-Turn	Left	Straight	Right
Total	0	0	0	1	2

Northbound

Vehicles Entering 3 | Vehicles Exiting 4
Total Vehicles On Leg 7

Walterscheid Blvd

Date and Time of Start of Count 1	02/22/2020	12:00:00
Date and Time of End of Count 1	02/23/2020	12:00:00

Walterscheid Blvd

Total Vehicles On Leg	5757		
Vehicles Entering	2920	Vehicles Exiting	2837

Southbound

Total	0	2567	352	1	1

Eastbound

Total Vehicles on Leg	0
Vehicles Entering Intersection	0
Vehicles Exiting Intersection	0

Total
0
0
0
0
0

24 Hour Volumes

Westbound — **Deming Dr**

Total
405
0
895
0
2

Vehicles Entering Intersection	1300
Vehicles Exiting Intersection	1062
Total Vehicles on Leg	2362

Northbound

Total	1	1	0	2431	710

Vehicles Entering	3142	Vehicles Exiting	3463
Total Vehicles On Leg	6605		

Deming Dr

OFF Peak

Date	Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Crosswalk Crossings	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Crosswalk Crossings	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Crosswalk Crossings	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/22/2021	12:00	0	4	46	0	0	0	12	0	11	0	0	0	30	16	0	0	0	0	0	0	119	490
	12:15	0	3	39	0	0	0	22	0	7	0	0	0	48	15	0	0	0	0	0	0	134	
	12:30	0	7	34	0	0	0	17	0	7	0	0	0	40	7	0	0	0	0	0	0	112	
	12:45	0	10	44	0	0	0	9	0	7	0	0	0	42	13	0	0	0	0	0	0	125	
	Sub-Total	0	24	163	0	0	0	60	0	32	0	0	0	160	51	0	0	0	0	0	0		

Date and Time of Start of Count 1	02/22/2021	12:00:00
Date and Time of End of Count 1	02/22/2021	13:00:00

Walterscheid Blvd

Total Vehicles On Leg	379		
Vehicles Entering	187	Vehicles Exiting	192

Southbound

Total	0	163	24	0	0

Eastbound

Total Vehicles on Leg	0
Vehicles Entering Intersection	0
Vehicles Exiting Intersection	0

Total
0
0
0
0
0

OFF Peak Volumes

Westbound — **Deming Dr**

Total
32
0
60
0
0

Vehicles Entering Intersection	92
Vehicles Exiting Intersection	75
Total Vehicles on Leg	167

Northbound

Total	0	0	0	160	51

Vehicles Entering	211	Vehicles Exiting	223
Total Vehicles On Leg	434		

Deming Dr

PM Peak

Date	Time	Southbound					Westbound					Northbound					Eastbound					Peak 15 Minutes	Peak Hour
		U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings		
02/22/2021	15:00	0	12	53	0	0	0	19	0	10	0	0	0	59	21	0	0	0	0	0	0	174	687
	15:15	0	10	60	0	0	0	19	0	4	0	0	0	36	14	0	0	0	0	0	0	143	
	15:30	0	12	65	0	0	0	21	0	8	0	0	0	64	26	0	0	0	0	0	0	196	
	15:45	0	6	61	0	0	0	21	0	8	0	0	0	55	23	0	0	0	0	0	0	174	
	Sub-Total	0	40	239	0	0	0	80	0	30	0	0	0	214	84	0	0	0	0	0	0		

Date and Time of Start of Count 1	02/22/2021	15:00:00
Date and Time of End of Count 1	02/22/2021	16:00:00

Walterscheid Blvd

Total Vehicles On Leg	523				
Vehicles Entering	279	Vehicles Exiting	244		
Southbound					
Total	**0**	**239**	**40**	**0**	**0**

PM Peak Volumes

Eastbound	Total
Crosswalk	0
U Turns	0
Left Turns	0
Straight Through	0
Right Turns	0

Eastbound: Total Vehicles on Leg 0; Vehicles Entering Intersection 0; Vehicles Exiting Intersection 0

Westbound	Total
Right Turns	30
Straight Through	0
Left Turns	80
U Turns	0
Crosswalk	0

Westbound (Deming Dr): Vehicles Entering Intersection 110; Vehicles Exiting Intersection 124; Total Vehicles on Leg 234

Total	**0**	**0**	**0**	**214**	**84**
Northbound					
Vehicles Entering	298	Vehicles Exiting	319		
Total Vehicles On Leg	617				

Deming Dr

AM Peak

Date	Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Crosswalk Crossings	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Crosswalk Crossings	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Crosswalk Crossings	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/23/2021	7:00	0	5	22	0	0	0	20	0	2	0	0	0	43	14	0	0	0	0	0	0	106	631
	7:15	0	11	42	0	0	0	28	0	7	0	0	0	49	28	0	0	0	0	0	0	165	
	7:30	0	7	46	0	0	0	34	0	2	0	0	0	67	29	0	0	0	0	0	0	185	
	7:45	0	7	43	0	0	0	16	0	14	0	0	0	68	27	0	0	0	0	0	0	175	
	Sub-Total	0	30	153	0	0	0	98	0	25	0	0	0	227	98	0	0	0	0	0	0		

Date and Time of Start of Count 1	02/23/2021	7:00:00
Date and Time of End of Count 1	02/23/2021	8:00:00

Walterscheid Blvd

Total Vehicles On Leg 435

Vehicles Entering 183 | Vehicles Exiting 252

Southbound

Total	0	153	30	0	0

Eastbound

Total Vehicles on Leg 0

Vehicles Entering Intersection 0

Vehicles Exiting Intersection 0

Total
0
0
0
0
0

AM Peak Volumes

Westbound — **Deming Dr**

Total
25
0
98
0
0

Vehicles Entering Intersection 123

Vehicles Exiting Intersection 128

Total Vehicles on Leg 251

Total	0	0	0	227	98

Northbound

Vehicles Entering 325 | Vehicles Exiting 251

Total Vehicles On Leg 576

Deming Dr

Date and Time of Start of Count 1	02/22/2020	12:00:00
Date and Time of End of Count 1	02/23/2020	12:00:00

Walterscheid Blvd

Total Vehicles On Leg: 6514

Vehicles Entering Intersection: 3430 | Vehicles Exiting Intersection: 3084

Southbound

Total	976	1884	570	0	9

Fox Farm Rd	Total Vehicles on Leg: 4910	Vehicles Entering Intersection: 2516	Vehicles Exiting Intersection: 2394	Eastbound	Total	Westbound	Vehicles Entering Intersection: 2717	Total Vehicles on Leg: 5658	Vehicles Exiting Intersection: 2941	Fox Farm Rd
					6	Total				
					1	503				
					850	1290				
					1542	924				
					123	0				
						6				

24 Hour Volumes

Total	5	0	127	1731	829

Northbound

Vehicles Entering Intersection: 2687 | Vehicles Exiting Intersection: 2931

Total Vehicles On Leg: 5618

Walterscheid Blvd

OFF Peak

Date	Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Crosswalk Crossings	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Crosswalk Crossings	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Crosswalk Crossings	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/22/2020	12:00	0	11	32	0	0	0	11	21	7	0	0	3	26	9	0	0	9	23	3	0	155	
	12:15	0	13	37	12	0	0	12	17	7	0	0	1	38	10	0	0	13	24	4	0	188	688
	12:30	0	8	25	13	1	0	13	15	14	0	0	0	22	11	0	0	11	22	0	0	154	
	12:45	0	12	26	13	0	0	13	20	13	0	0	0	27	19	0	0	14	34	0	0	191	
	Sub-Total	0	44	120	38	1	0	49	73	41	0	0	4	113	49	0	0	47	103	7	0		

Date and Time of Start of Count 1	02/22/2020	12:00:00
Date and Time of End of Count 1	02/22/2020	13:00:00

Walterscheid Blvd

Total Vehicles On Leg: 403

Vehicles Entering: 202 | Vehicles Exiting: 201

Southbound

Total	38	120	44	0	1

Fox Farm Rd	Total Vehicles on Leg: 272	Vehicles Entering Intersection: 157	Vehicles Exiting Intersection: 115	Eastbound	Total	Westbound	Vehicles Entering Intersection: 163	Total Vehicles on Leg: 359	Vehicles Exiting Intersection: 196	Fox Farm Rd
					0	Total				
					0	41				
					47	73				
					103	49				
					7	0				
						0				

OFF Peak Volumes

Total	0	0	4	113	49

Northbound

Vehicles Entering: 166 | Vehicles Exiting: 176

Total Vehicles On Leg: 342

Walterscheid Blvd

PM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/22/2020	15:00	0	13	35	23	0	0	12	25	11	0	0	6	41	34	0	0	24	39	6	1	269	1085
	15:15	0	13	42	26	0	0	19	33	6	0	0	6	25	21	0	0	18	27	0	0	236	
	15:30	0	8	45	34	0	0	18	39	11	0	0	2	46	18	0	1	27	44	4	1	297	
	15:45	0	14	46	22	0	0	23	38	7	0	0	2	39	16	0	0	24	48	4	0	283	
	Sub-Total	0	48	168	105	0	0	72	135	35	0	0	16	151	89	0	1	93	158	14	2		

Date and Time of Start of Count 1	02/22/2020 15:00:00
Date and Time of End of Count 1	02/22/2020 16:00:00

Walterscheid Blvd

Total Vehicles On Leg: 600

Vehicles Entering: 321 | Vehicles Exiting: 279

Southbound

Total	105	168	48	0	0

Fox Farm Rd

Vehicles Entering Intersection: 266

Total Vehicles on Leg: 523

Vehicles Exiting Intersection: 257

Eastbound

Total	
2	
1	
93	
158	
14	

PM Peak Volumes

Westbound

Total	
35	
135	
72	
0	
0	

Vehicles Entering Intersection: 242

Total Vehicles on Leg: 537

Vehicles Exiting Intersection: 295

Fox Farm Rd

Total	0	0	16	151	89

Northbound

Vehicles Entering: 256 | Vehicles Exiting: 254

Total Vehicles On Leg: 510

Walterscheid Blvd

AM Peak

Date	Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Crosswalk Crossings	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Crosswalk Crossings	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Crosswalk Crossings	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/23/2020	7:00	0	1	25	12	1	0	33	23	8	0	0	1	32	14	0	0	14	19	0	0	182	1025
	7:15	0	3	37	27	0	0	37	35	5	0	0	1	42	15	0	0	30	35	1	0	268	
	7:30	0	9	48	23	0	0	37	34	8	0	0	1	59	22	0	0	28	42	3	0	314	
	7:45	0	10	39	12	0	0	18	19	7	0	0	5	61	27	0	0	29	32	2	0	261	
	Sub-Total	0	23	149	74	1	0	125	111	28	0	0	8	194	78	0	0	101	128	6	0		

Date and Time of Start of Count 1	02/23/2020	7:00:00
Date and Time of End of Count 1	02/23/2020	8:00:00

Walterscheid Blvd

Total Vehicles On Leg 569

Vehicles Entering 246 | Vehicles Exiting 323

Southbound

Total	74	149	23	0	1

AM Peak Volumes

Fox Farm Rd — Total Vehicles on Leg 428; Vehicles Entering Intersection 235; Vehicles Exiting Intersection 193

Eastbound

Total
0
0
101
128
6

Westbound

Total
28
111
125
0
0

Fox Farm Rd — Vehicles Entering Intersection 264; Vehicles Exiting Intersection 229; Total Vehicles on Leg 493

Total	0	0	8	194	78

Northbound

Vehicles Entering 280 | Vehicles Exiting 280

Total Vehicles On Leg 560

Walterscheid Blvd

Date and Time of Start of Count 1	02/22/2021	12:00:00
Date and Time of End of Count 1	02/23/2021	12:00:00

Wlaterscheid Blvd

Total Vehicles On Leg: 4916

Vehicles Entering: 2572 | Vehicles Exiting: 2344

Southbound

Total	0	2199	372	1	0

Eastbound

Total	
0	
0	
0	
0	
0	

Total Vehicles on Leg: 15

Vehicles Entering Intersection: 0

Vehicles Exiting Intersection: 15

24 Hour Volumes

Westbound

Total	
436	
0	
140	
0	
14	

Vehicles Entering Intersection: 576

Vehicles Exiting Intersection: 505

Total Vehicles on Leg: 1081

Jefferson Rd

Total	0	0	15	1907	133

Northbound

Vehicles Entering: 2055 | Vehicles Exiting: 2339

Total Vehicles On Leg: 4394

Wlaterscheid Blvd

OFF Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/22/2021	12:00	0	6	36	0	0	0	2	0	9	0	0	0	26	4	0	0	0	0	0	0	83	
	12:15	0	5	39	0	0	0	2	0	4	0	0	1	36	0	0	0	0	0	0	0	87	312
	12:30	0	6	27	0	0	0	0	0	5	0	0	0	26	2	0	0	0	0	0	0	66	
	12:45	0	8	25	0	0	0	0	0	2	0	0	1	37	3	0	0	0	0	0	0	76	
	Sub-Total	0	25	127	0	0	0	4	0	20	0	0	2	125	9	0	0	0	0	0	0		

Date and Time of Start of Count 1	02/22/2021	12:00:00
Date and Time of End of Count 1	02/22/2021	13:00:00

Wlaterscheid Blvd

Total Vehicles On Leg: 297

Vehicles Entering: 152 | Vehicles Exiting: 145

Southbound

Total	0	127	25	0	0

Eastbound

Total	
0	
0	
0	
0	
0	

Total Vehicles on Leg: 2

Vehicles Entering Intersection: 0

Vehicles Exiting Intersection: 2

OFF Peak Volumes

Westbound

Total	
20	
0	
4	
0	
0	

Vehicles Entering Intersection: 24

Vehicles Exiting Intersection: 34

Total Vehicles on Leg: 58

Jefferson Rd

Total	0	0	2	125	9

Northbound

Vehicles Entering: 136 | Vehicles Exiting: 131

Total Vehicles On Leg: 267

Wlaterscheid Blvd

PM Peak

Date	Time	Southbound					Westbound					Northbound					Eastbound					Peak 15 Minutes	Peak Hour
		U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings		
02/22/2021	15:00	0	9	39	0	0	0	6	0	11	0	0	1	54	3	0	0	0	0	0	0	123	486
	15:15	0	8	51	0	0	0	4	0	11	1	0	0	33	0	0	0	0	0	0	0	107	
	15:30	0	7	48	0	0	0	4	0	14	0	0	0	49	6	0	0	0	0	0	0	128	
	15:45	0	4	61	0	0	0	5	0	8	0	0	1	45	4	0	0	0	0	0	0	128	
	Sub-Total	0	28	199	0	0	0	19	0	44	1	0	2	181	13	0	0	0	0	0	0		

Date and Time of Start of Count 1	02/22/2021 15:00:00
Date and Time of End of Count 1	02/22/2021 16:00:00

Wlaterscheid Blvd

Total Vehicles On Leg: 452

Vehicles Entering: 227 | Vehicles Exiting: 225

Southbound

Total	0	199	28	0	0

PM Peak Volumes

Total		Total
0		44
0		0
0		19
0		0
0		1

Eastbound

Total Vehicles on Leg: 2

Vehicles Entering Intersection: 0

Vehicles Exiting Intersection: 2

Westbound

Vehicles Entering Intersection: 63

Vehicles Exiting Intersection: 41

Total Vehicles on Leg: 104

Jefferson Rd

Total	0	0	2	181	13

Northbound

Vehicles Entering: 196 | Vehicles Exiting: 218

Total Vehicles On Leg: 414

Wlaterscheid Blvd

AM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
02/23/2021	7:00	0	7	51	0	0	0	7	0	1	0	0	0	28	0	0	0	0	0	0	0	94	
	7:15	0	3	73	0	0	0	2	0	7	0	0	0	38	4	0	0	0	0	0	0	127	524
	7:30	0	10	77	0	0	0	8	0	9	0	0	0	75	4	0	0	0	0	0	0	183	
	7:45	1	12	45	0	0	0	5	0	6	0	0	0	50	1	0	0	0	0	0	0	120	
	Sub-Total	1	32	246	0	0	0	22	0	23	0	0	0	191	9	0	0	0	0	0	0		

Date and Time of Start of Count 1	02/23/2021 7:00:00
Date and Time of End of Count 1	02/23/2021 8:00:00

Wlaterscheid Blvd

Total Vehicles On Leg: 494

Vehicles Entering: 279 | Vehicles Exiting: 215

Southbound

Total	0	246	32	1	0

Eastbound

Total	Vehicles Entering Intersection	Total Vehicles on Leg	Vehicles Exiting Intersection
0	0	0	0

Total
0
0
0
0
0

AM Peak Volumes

Total
23
0
22
0
0

Westbound

Vehicles Entering Intersection	Total Vehicles on Leg	Vehicles Exiting Intersection
45	86	41

Jefferson Rd

Total	0	0	0	191	9

Northbound

Vehicles Entering: 200 | Vehicles Exiting: 268

Total Vehicles On Leg: 468

Wlaterscheid Blvd

Date and Time of Start of Count 1	03/8/2021	12:00:00
Date and Time of End of Count 1	03/9/2021	12:00:00

Walterscheid Blvd

Total Vehicles On Leg: 3555

Vehicles Entering: 1919 | Vehicles Exiting: 1636

Southbound

Total	0	1729	190	0	2

Total Vehicles on Leg	Vehicles Entering Intersection	Vehicles Exiting Intersection
0	0	0

Eastbound

Total
0
0
0
0
0

24 Hour Volumes

Total
186
0
99
2
20

Westbound

Vehicles Entering Intersection	Vehicles Exiting Intersection	Total Vehicles on Leg
287	284	571

Prosser Rd

Total	1	0	0	1450	92

Northbound

Vehicles Entering: 1542 | Vehicles Exiting: 1828

Total Vehicles On Leg: 3370

Walterscheid Blvd

OFF Peak

Date	Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Crosswalk Crossings	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Crosswalk Crossings	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Crosswalk Crossings	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Crosswalk Crossings	Peak 15 Minutes	Peak Hour
03/8/2021	12:00	0	3	21	0	0	0	3	0	2	0	0	0	21	2	0	0	0	0	0	0	52	223
	12:15	0	3	23	0	0	0	2	0	4	2	0	0	24	0	0	0	0	0	0	0	56	
	12:30	0	4	29	0	0	0	2	0	6	0	0	0	14	0	0	0	0	0	0	0	55	
	12:45	0	1	28	0	0	0	2	0	6	1	0	0	22	1	0	0	0	0	0	0	60	
	Sub-Total	0	11	101	0	0	0	9	0	18	3	0	0	81	3	0	0	0	0	0	0		

Date and Time of Start of Count 1	03/8/2021	12:00:00
Date and Time of End of Count 1	03/8/2021	13:00:00

Walterscheid Blvd

Total Vehicles On Leg: 211

Vehicles Entering: 112 | Vehicles Exiting: 99

Southbound

Total	0	101	11	0	0

Total Vehicles on Leg	Vehicles Entering Intersection	Vehicles Exiting Intersection
0	0	0

Eastbound

Total
0
0
0
0
0

OFF Peak Volumes

Total
18
0
9
0
3

Westbound

Vehicles Entering Intersection	Vehicles Exiting Intersection	Total Vehicles on Leg
27	14	41

Prosser Rd

Total	0	0	0	81	3

Northbound

Vehicles Entering: 84 | Vehicles Exiting: 110

Total Vehicles On Leg: 194

Walterscheid Blvd

PM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
03/8/2021	15:00	0	2	65	0	0	0	1	0	3	1	0	0	26	2	0	0	0	0	0	0	99	385
	15:15	0	5	40	0	0	0	5	0	5	0	0	0	31	0	0	0	0	0	0	0	86	
	15:30	0	3	33	0	0	0	2	0	5	3	0	0	60	9	0	0	0	0	0	0	112	
	15:45	0	6	37	0	2	0	1	0	2	1	0	0	40	2	1	0	0	0	0	0	88	
	Sub-Total	0	16	175	0	2	0	9	0	15	5	0	0	157	13	1	0	0	0	0	0		

Date and Time of Start of Count 1	03/8/2021 15:00:00
Date and Time of End of Count 1	03/8/2021 16:00:00

Walterscheid Blvd

Total Vehicles On Leg	363		
Vehicles Entering	191	Vehicles Exiting	172

Southbound

Total	0	175	16	0	2

Eastbound

Total	
0	
0	
0	
0	
0	

Vehicles Entering Intersection: 0

Total Vehicles on Leg: 0

Vehicles Exiting Intersection: 0

PM Peak Volumes

Westbound

Total
15
0
9
0
5

Vehicles Entering Intersection: 24

Total Vehicles on Leg: 53

Vehicles Exiting Intersection: 29

Prosser Rd

Northbound

Total	1	0	0	157	13

Vehicles Entering	170	Vehicles Exiting	184
Total Vehicles On Leg	354		

Walterscheid Blvd

AM Peak

		Southbound					Westbound					Northbound					Eastbound						
Date	Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Peak 15 Minutes	Peak Hour
03/9/2021	7:00	0	4	28	0	0	0	1	0	8	1	0	0	31	0	0	0	0	0	0	0	72	334
	7:15	0	3	33	0	0	0	0	0	5	0	0	0	45	1	0	0	0	0	0	0	87	
	7:30	0	4	54	0	0	0	3	0	3	0	0	0	36	1	0	0	0	0	0	0	101	
	7:45	0	1	35	0	0	0	3	0	3	0	0	0	30	2	0	0	0	0	0	0	74	
	Sub-Total	0	12	150	0	0	0	7	0	19	1	0	0	142	4	0	0	0	0	0	0		

Date and Time of Start of Count 1	03/9/2021 7:00:00
Date and Time of End of Count 1	03/9/2021 8:00:00

Walterscheid Blvd

Total Vehicles On Leg: 323

Vehicles Entering: 162 | Vehicles Exiting: 161

Southbound

Total					
	0	150	12	0	0

	Total
	0
	0
	0
	0
	0

AM Peak Volumes

Total
19
0
7
0
1

Eastbound

Total Vehicles on Leg: 0

Vehicles Entering Intersection: 0

Vehicles Exiting Intersection: 0

Westbound

Vehicles Entering Intersection: 26

Vehicles Exiting Intersection: 16

Total Vehicles on Leg: 42

Prosser Rd

Total					
	0	0	0	142	4

Northbound

Vehicles Entering: 146 | Vehicles Exiting: 157

Total Vehicles On Leg: 303

Walterscheid Blvd

APPENDIX C. SPEED DATA

ADT:
4,408

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Cheyenne
Street: Walterscheid Blvd
Location: South of Allison Rd

A study of vehicle traffic was conducted with the device having serial number 404091. The study was done in the Northbound lane at Walterscheid Blvd in Cheyenne, Wy in Laramie county. The study began on 03/08/2021 at 12:00 PM and concluded on 03/09/2021 at 12:00 PM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2,099 vehicles passed through the location with a peak volume of 74 on 03/08/2021 at [03:30 PM-03:45 PM] and a minimum volume of 0 on 03/09/2021 at [12:00 AM-12:15 AM]. The AADT count for this study was 2,099.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 35 - 40 MPH range or lower. The average speed for all classifed vehicles was 37 MPH with 58.36% vehicles exceeding the posted speed of 35 MPH. 3.04% percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 35MPH and the 85th percentile was 44.25 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >
3	12	8	84	281	476	576	379	133	60	28	13	3	1	18

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 695 which represents 34 percent of the total classified vehicles. The number of Vans & Pickups in the study was 1235 which represents 60 percent of the total classified vehicles. The number of Busses & Trucks in the study was 95 which represents 5 percent of the total classified vehicles. The number of Tractor Trailers in the study was 49 which represents 2 percent of the total classified vehicles.

< to 17	18 to 20	21 to 23	24 to 27	28 to 31	32 to 37	38 to 43	44 to >							
695	980	255	27	50	25	16	27							

CHART 2

HEADWAY

During the peak traffic period, on 03/08/2021 at [03:30 PM-03:45 PM] the average headway between vehicles was 12 seconds. During the slowest traffic period, on 03/09/2021 at [12:00 AM-12:15 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 32.00 and 93.00 degrees F.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Cheyenne
Street: Walterscheid Blvd
Location: South of Allison Rd

A study of vehicle traffic was conducted with the device having serial number 404061. The study was done in the Southbound lane at Walterscheid Blvd in Cheyenne, Wy in Laramie county. The study began on 03/08/2021 at 12:00 PM and concluded on 03/09/2021 at 12:00 PM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2,309 vehicles passed through the location with a peak volume of 82 on 03/08/2021 at [05:15 PM-05:30 PM] and a minimum volume of 0 on 03/09/2021 at [02:00 AM-02:15 AM]. The AADT count for this study was 2,309.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 30 - 35 MPH range or lower. The average speed for all classifed vehicles was 35 MPH with 40.88% vehicles exceeding the posted speed of 35 MPH. 1.28% percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 30MPH and the 85th percentile was 39.59 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >
1	1	2	77	344	917	639	213	35	12	5	3	8	6	7

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1629 which represents 72 percent of the total classified vehicles. The number of Vans & Pickups in the study was 555 which represents 24 percent of the total classified vehicles. The number of Busses & Trucks in the study was 56 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 30 which represents 1 percent of the total classified vehicles.

< to 17	18 to 20	21 to 23	24 to 27	28 to 31	32 to 37	38 to 43	44 to >							
1629	504	51	10	22	35	12	7							

CHART 2

HEADWAY

During the peak traffic period, on 03/08/2021 at [05:15 PM-05:30 PM] the average headway between vehicles was 10.843 seconds. During the slowest traffic period, on 03/09/2021 at [02:00 AM-02:15 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 34.00 and 90.00 degrees F.

ADT:
4,333

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Cheyenne
Street: Walterscheid Blvd
Location: South of Jefferson Rd

A study of vehicle traffic was conducted with the device having serial number 404022. The study was done in the Northbound lane at Walterscheid Blvd in Cheyenne, Wy in Laramie county. The study began on 02/22/2021 at 12:00 PM and concluded on 02/23/2021 at 12:00 PM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2,017 vehicles passed through the location with a peak volume of 91 on 02/22/2021 at [02:45 PM-03:00 PM] and a minimum volume of 0 on 02/23/2021 at [12:45 AM-01:00 AM]. The AADT count for this study was 2,017.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 30 - 35 MPH range or lower. The average speed for all classifed vehicles was 36 MPH with 45.09% vehicles exceeding the posted speed of 35 MPH. 4.27% percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 30MPH and the 85th percentile was 39.60 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >
0	3	4	35	158	841	619	122	13	20	7	39	4	12	19

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1286 which represents 68 percent of the total classified vehicles. The number of Vans & Pickups in the study was 493 which represents 26 percent of the total classified vehicles. The number of Busses & Trucks in the study was 71 which represents 4 percent of the total classified vehicles. The number of Tractor Trailers in the study was 46 which represents 2 percent of the total classified vehicles.

< to 17	18 to 20	21 to 23	24 to 27	28 to 31	32 to 37	38 to 43	44 to >							
1286	419	74	11	39	33	16	18							

CHART 2

HEADWAY

During the peak traffic period, on 02/22/2021 at [02:45 PM-03:00 PM] the average headway between vehicles was 9.783 seconds. During the slowest traffic period, on 02/23/2021 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 32.00 and 64.00 degrees F.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Cheyenne
Street: Walterscheid Blvd
Location: South of Jefferson Rd

A study of vehicle traffic was conducted with the device having serial number 404055. The study was done in the Southbound lane at Walterscheid Blvd in Cheyenne, Wy in Laramie county. The study began on 02/22/2021 at 12:00 PM and concluded on 02/23/2021 at 12:00 PM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2,316 vehicles passed through the location with a peak volume of 85 on 02/23/2021 at [07:30 AM-07:45 AM] and a minimum volume of 0 on 02/23/2021 at [12:45 AM-01:00 AM]. The AADT count for this study was 2,316.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 35 - 40 MPH range or lower. The average speed for all classifed vehicles was 40 MPH with 84.33% vehicles exceeding the posted speed of 35 MPH. 1.92% percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 35MPH and the 85th percentile was 45.11 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >
0	1	1	11	47	300	907	679	230	77	16	10	10	5	3

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1288 which represents 56 percent of the total classified vehicles. The number of Vans & Pickups in the study was 907 which represents 40 percent of the total classified vehicles. The number of Busses & Trucks in the study was 63 which represents 3 percent of the total classified vehicles. The number of Tractor Trailers in the study was 38 which represents 2 percent of the total classified vehicles.

< to 17	18 to 20	21 to 23	24 to 27	28 to 31	32 to 37	38 to 43	44 to >							
1288	831	76	16	27	27	23	9							

CHART 2

HEADWAY

During the peak traffic period, on 02/23/2021 at [07:30 AM-07:45 AM] the average headway between vehicles was 10.465 seconds. During the slowest traffic period, on 02/23/2021 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 32.00 and 68.00 degrees F.

ADT:
6,405

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Cheyenne
Street: Walterscheid Blvd
Location: South of Deming Dr

A study of vehicle traffic was conducted with the device having serial number 404091. The study was done in the Northbound lane at Walterscheid Blvd in Cheyenne, Wy in Laramie county. The study began on 02/22/2021 at 12:00 PM and concluded on 02/23/2021 at 12:00 PM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3,107 vehicles passed through the location with a peak volume of 97 on 02/23/2021 at [07:30 AM-07:45 AM] and a minimum volume of 0 on 02/23/2021 at [12:45 AM-01:00 AM]. The AADT count for this study was 3,107.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 35 - 40 MPH range or lower. The average speed for all classifed vehicles was 41 MPH with 97.67% vehicles exceeding the posted speed of 30 MPH. 3.04% percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 35MPH and the 85th percentile was 46.56 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >
0	1	4	9	58	422	1111	904	382	108	31	23	12	8	20

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 891 which represents 29 percent of the total classified vehicles. The number of Vans & Pickups in the study was 1972 which represents 64 percent of the total classified vehicles. The number of Busses & Trucks in the study was 175 which represents 6 percent of the total classified vehicles. The number of Tractor Trailers in the study was 54 which represents 2 percent of the total classified vehicles.

< to 17	18 to 20	21 to 23	24 to 27	28 to 31	32 to 37	38 to 43	44 to >							
891	1539	433	53	87	44	24	22							

CHART 2

HEADWAY

During the peak traffic period, on 02/23/2021 at [07:30 AM-07:45 AM] the average headway between vehicles was 9.184 seconds. During the slowest traffic period, on 02/23/2021 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 32.00 and 64.00 degrees F.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Cheyenne
Street: Walterscheid Blvd
Location: South of Deming Dr

A study of vehicle traffic was conducted with the device having serial number 404061. The study was done in the Southbound lane at Walterscheid Blvd in Cheyenne, Wy in Laramie county. The study began on 02/22/2021 at 12:00 PM and concluded on 02/23/2021 at 12:00 PM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3,298 vehicles passed through the location with a peak volume of 99 on 02/22/2021 at [05:15 PM-05:30 PM] and a minimum volume of 0 on 02/23/2021 at [02:00 AM-02:15 AM]. The AADT count for this study was 3,298.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 30 - 35 MPH range or lower. The average speed for all classifed vehicles was 35 MPH with 82.48% vehicles exceeding the posted speed of 30 MPH. 1.88% percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 30MPH and the 85th percentile was 39.42 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >
2	7	12	66	483	1439	856	229	67	31	12	10	11	5	23

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 2166 which represents 67 percent of the total classified vehicles. The number of Vans & Pickups in the study was 944 which represents 29 percent of the total classified vehicles. The number of Busses & Trucks in the study was 83 which represents 3 percent of the total classified vehicles. The number of Tractor Trailers in the study was 60 which represents 2 percent of the total classified vehicles.

< to 17	18 to 20	21 to 23	24 to 27	28 to 31	32 to 37	38 to 43	44 to >							
2166	850	94	25	37	29	30	22							

CHART 2

HEADWAY

During the peak traffic period, on 02/22/2021 at [05:15 PM-05:30 PM] the average headway between vehicles was 9 seconds. During the slowest traffic period, on 02/23/2021 at [02:00 AM-02:15 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 32.00 and 64.00 degrees F.

APPENDIX D. CRASH DATA

INTERSECTION CRASH HISTORY FOR WALTERSCHEID BLVD AND W. FOX FARM RD. (INTERSECTION ID 12784) LARAMIE COUNTY (2016 - 2020)

DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2016											
1/16/16 19:05	201600683	W FOX FARM RD WALTERSCHEID BLVD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	West North	Straight Ahead Straight Ahead	Dry	Disregarded Traffic Signs No Improper Driving
2/25/16 21:09	201603067	WALTERSCHEID BLVD 1.18 W FOX FARM RD	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	North North North	Straight Ahead Straight Ahead Slowing	Dry	No Improper Driving No Improper Driving Following too Close Other Improper Action
3/9/16 17:45	201603070	W FOX FARM RD WALTERSCHEID BLVD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	South West	Straight Ahead Straight Ahead	Dry	Disregarded Traffic Signs No Improper Driving
6/29/16 17:20	201607600	W FOX FARM RD 0.80 WALTERSCHEID BLVD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	West North	Straight Ahead Straight Ahead	Dry	Disregarded Traffic Signs No Improper Driving
2017											
2/4/17 18:40	201702193	WALTERSCHEID BLVD 1.18 W FOX FARM RD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	North West	Straight Ahead Straight Ahead	Dry	Failed to Yield ROW No Improper Driving
2/10/17 18:15	201704111	W FOX FARM RD 0.79 WALTERSCHEID BLVD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	West West	Turning Right Turning Left	Dry	Failed to Yield ROW No Improper Driving
2/14/17 15:29	201702396	WALTERSCHEID BLVD 1.19 W FOX FARM RD	1	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	South East	Straight Ahead Straight Ahead	Dry	Failed to Yield ROW No Improper Driving
3/11/17 13:44	201703820	W FOX FARM RD 0.80 WALTERSCHEID BLVD	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	West West	Straight Ahead Straight Ahead	Dry	Other Improper Action Following too Close

Created by: Lorie W. Chesnut, WYDOT Highway Safety | 307-777-3910 | lorie.chesnut1@wyo.gov

DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2018											
4/12/18 8:05	201803913	W FOX FARM RD 0.79 WALTERSCHEID BLVD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	West South	Straight Ahead Straight Ahead	Dry	Failed to Yield ROW No Improper Driving
7/27/18 13:07	201813584	W FOX FARM RD 0.77 WALTERSCHEID BLVD	0	0	Intersection Related	Not a Collision w/2 Vehicles in Transport	Fence (including Post)	Southwest	Turning Right	Dry	Improper Turn or No Signal Ran Off Road
2019											
3/6/19 7:30	201903088	WALTERSCHEID BLVD 1.18 W FOX FARM RD | CR 208-3	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	South East	Straight Ahead Straight Ahead	Wet	No Improper Driving No Improper Driving
8/15/19 12:17	201909699	WALTERSCHEID BLVD | CR 125-1 1.19	1	0	Intersection Related	Not a Collision w/2 Vehicles in Transport	Utility Pole/Light Support	South	Straight Ahead	Dry	Erratic/Reckless/Careless/Aggressive
10/30/19 8:39	201913742	WALTERSCHEID BLVD 1.18 W FOX FARM RD | CR 208-3	2	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	North West	Straight Ahead Straight Ahead	Ice/Frost	No Improper Driving No Improper Driving
12/11/19 17:32	201916153	WALTERSCHEID BLVD 1.18 W FOX FARM RD | CR 208-3	0	0	Intersection	Angle (Front to Side), Opposing Direction	Motor Vehicle in Transport on Roadway	West Unknown	Straight Ahead Straight Ahead	Dry	No Improper Driving Failed to Yield ROW

Created by: Lorie W. Chesnut, WYDOT Highway Safety | 307-777-3910 | lorie.chesnut1@wyo.gov

DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2020											
5/15/20 7:14	202004935	WALTERSCHEID BLVD 1.18 W FOX FARM RD | CR 208-3	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	West North	Straight Ahead Straight Ahead	Wet	Disregarded Traffic Signs No Improper Driving
6/20/20 13:13	202006631	WALTERSCHEID BLVD | CR 125-1 1.19	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	North North	Straight Ahead Stopped in Traffic	Dry	Other Improper Action No Improper Driving
11/6/20 15:10	202012252	WALTERSCHEID BLVD | CR 125-1 1.18 W FOX FARM RD | CR 208-3	0	0	Intersection	Angle Same Direction (Front to Side)	Motor Vehicle in Transport on Roadway	North East	Straight Ahead Straight Ahead	Dry	Disregarded Traffic Signs No Improper Driving
11/18/20 8:15	202012897	W FOX FARM RD | CR 208-3 0.81	1	0	Non-Junction	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	East East	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving
12/9/20 13:00	202013868	WALTERSCHEID BLVD 1.18 W FOX FARM RD | CR 208-3	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	South West	Straight Ahead Straight Ahead	Dry	Failed to Yield ROW No Improper Driving

Walterscheid Blvd & W. Fox Farm Rd. (INTERSECTION ID 12784)

YEAR	FATAL CRASHES	FATALITIES	INJURY CRASHES	INJURIES	PDO* CRASHES	TOTAL CRASHES
2016	0	0	0	0	4	4
2017	0	0	1	1	3	4
2018	0	0	0	0	2	2
2019	0	0	2	3	2	4
2020	0	0	1	1	4	5
TOTAL	**0**	**0**	**4**	**5**	**15**	**19**

*PDO = Property Damage Only

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INTERSECTION CRASH HISTORY FOR WALTERSCHEID BLVD AND W. JEFFERSON RD. (INTERSECTION ID 105664) (2016 - 2020)

DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2016											
7/17/16 17:19	201608489	WALTERSCHEID BLVD 1.44 W JEFFERSON RD	1	0	Intersection	Not a Collision w/2 Vehicles in Transport	Overturn/Rollover	North	Turning Right	Dry	Other Improper Action
2017											
4/14/17 17:58	201705474	WALTERSCHEID BLVD 1.37 W JEFFERSON RD	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	South South	Straight Ahead Slowing	Dry	Following too Close No Improper Driving
12/5/17 15:59	201715213	E JEFFERSON RD 99.58 WALTERSCHEID BLVD	0	0	Intersection Related	Angle (Front to Side), Opposing Direction	Motor Vehicle in Transport on Roadway	East West	Turning Left Stopped in Traffic	Dry	Improper Turn or No Signal Failed to Keep Proper Lane
12/11/17 14:20	201715492	WALTERSCHEID BLVD 1.35	0	0	Driveway Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	South South	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving
2018											
3/15/18 15:07	201803118	WALTERSCHEID BLVD 1.34 W FOX FARM RD	1	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	North North North	Straight Ahead Stopped in Traffic Stopped in Traffic	Dry	Following too Close No Improper Driving No Improper Driving
12/5/18 17:17	201816512	WALTERSCHEID BLVD | CR 125-1 1.31	0	0	Driveway Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	South South	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving

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DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP		INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2019												
3/6/19 10:24	201903089	WALTERSCHEID BLVD | CR 125-1 E JEFFERSON RD | CR 207-C	1.38	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	West South	Turning Left Straight Ahead	Dry	Failed to Yield ROW No Improper Driving
5/28/19 14:28	201906262	WALTERSCHEID BLVD | CR 125-1	1.32	0	0	Driveway Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	South South	Straight Ahead Straight Ahead	Wet	Following too Close No Improper Driving

Walterscheid Blvd & W. Jefferson Rd. (INTERSECTION ID 105664)

YEAR	FATAL CRASHES	FATALITIES	INJURY CRASHES	INJURIES	PDO* CRASHES	TOTAL CRASHES
2016	0	0	1	1	0	1
2017	0	0	0	0	3	3
2018	0	0	1	1	1	2
2019	0	0	0	0	2	2
TOTAL	**0**	**0**	**2**	**2**	**6**	**8**

*PDO = Property Damage Only

Created by: Lorie W. Chesnut, WYDOT Highway Safety | 307-777-3910 | lorie.chesnut1@wyo.gov

INTERSECTION CRASH HISTORY FOR
WALTERSCHEID BLVD. AND W. PROSSER RD. (INTERSECTION ID 12782)
LARAMIE COUNTY (2016 - 2020)

DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2017											
7/27/17 10:30	201708856	WALTERSCHEID BLVD	1	0	Driveway Related	Not a Collision w/2 Vehicles in Transport	Building or Other Structure Wall	North	Turning Right	Dry	Other Improper Action
2020											
7/12/20 6:20	202006980	WALTERSCHEID BLVD | CR 125-1 1.94	0	0	Intersection Related	Not a Collision w/2 Vehicles in Transport	Sign Support Single Post	North	Turning Right	Dry	Drove too Fast for Conditions

Walterscheid Blvd. & W. Prosser Rd. (INTERSECTION ID 12782)

YEAR	FATAL CRASHES	FATALITIES	INJURY CRASHES	INJURIES	PDO* CRASHES	TOTAL CRASHES
2017	0	0	1	1	0	1
2020	0	0	0	0	1	1
TOTAL	**0**	**0**	**1**	**1**	**1**	**2**

*PDO = Property Damage Only

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INTERSECTION CRASH HISTORY FOR WALTERSCHEID BLVD AND W. ALLISON RD. (INTERSECTION ID 12783) LARAMIE COUNTY (2016 - 2020)

DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
2016											
3/11/16 14:03	201603474	WALTERSCHEID BLVD 1.69 ALLISON RD	1	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	East North	Straight Ahead Straight Ahead	Dry	Ran Red Light No Improper Driving
4/4/16 11:26	201604045	ALLISON RD WALTERSCHEID BLVD	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	East East	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving
5/9/16 7:30	201605295	WALTERSCHEID BLVD 1.60 ALLISON RD	1	0	Intersection Related	Not a Collision w/2 Vehicles in Transport	Pedestrian	Northeast	Turning Left	Dry	Failed to Yield ROW
9/7/16 11:24	201610866	ALLISON RD WALTERSCHEID BLVD	0	0	Non-Junction	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	East East	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving
2017											
2/1/17 14:55	201702037	WALTERSCHEID BLVD 1.69 ALLISON RD	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	Unknown North	Straight Ahead Stopped in Traffic	Ice/Frost Snow	Erratic/Reckless/Careless/Aggressive No Improper Driving
2/7/17 11:26	201702173	ALLISON RD 1.00 WALTERSCHEID BLVD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	Northwest West	Turning Left Straight Ahead	Dry	Failed to Yield ROW No Improper Driving
5/3/17 7:04	201705624	WALTERSCHEID BLVD 1.69 ALLISON RD	1	0	Intersection	Angle (Front to Side), Opposing Direction	Motor Vehicle in Transport on Roadway	North Unknown	Turning Left Straight Ahead	Wet	No Improper Driving Unknown
10/2/17 7:15	201712308	WALTERSCHEID BLVD 1.69 ALLISON RD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	South North	Straight Ahead Turning Left	Wet	No Improper Driving Improper Turn or No Signal

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DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION
10/3/17 17:32	201712071	WALTERSCHEID BLVD 1.69 ALLISON RD	1	0	Intersection	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	South South	Straight Ahead Straight Ahead	Dry	No Improper Driving Following too Close
2018											
4/4/18 16:12	201804155	ALLISON RD 1.01 WALTERSCHEID BLVD	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	West West	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving
6/27/18 9:25	201807024	WALTERSCHEID BLVD 1.69 ALLISON RD	1	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	North East	Straight Ahead Straight Ahead	Dry	Ran Red Light No Improper Driving
2019											
7/28/19 21:28	201909466	WALTERSCHEID BLVD | CR 125-1 1.68	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	South South	Straight Ahead Stopped in Traffic	Dry	Ran Red Light No Improper Driving
9/25/19 8:35	201912543	WALTERSCHEID BLVD | CR 125-1 1.69 ALLISON DR / ALLISON RD	0	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	North East	Straight Ahead Straight Ahead	Dry	Ran Red Light No Improper Driving
9/25/19 16:14	201911546	WALTERSCHEID BLVD | CR 125-1 1.69	1	0	Intersection Related	Not a Collision w/2 Vehicles in Transport	Pedacycle	South	Turning Right	Dry	No Improper Driving
11/7/19 7:40	201913828	WALTERSCHEID BLVD | CR 125-1 1.70	1	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	North North North	Stopped in Traffic Stopped in Traffic Straight Ahead	Dry	No Improper Driving No Improper Driving Following too Close
2020											
3/11/20 16:18	202003133	WALTERSCHEID BLVD | CR 125-1 1.69	0	0	Intersection Related	Rear End (Front to Rear)	Motor Vehicle in Transport on Roadway	North North	Straight Ahead Stopped in Traffic	Dry	Following too Close No Improper Driving
10/8/20 14:11	202010886	WALTERSCHEID BLVD | CR 125-1 1.69 ALLISON DR / ALLISON RD	1	0	Intersection	Angle Right (Front to Side, includes Broadside)	Motor Vehicle in Transport on Roadway	Southeast North	Turning Left Straight Ahead	Dry	Failed to Yield ROW No Improper Driving

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DATE/TIME	REPORT NUMBER	CRASH LOCATION/MP	INJURIES	FATALITIES	JUNCTION RELATION	MANNER OF COLLISION	FIRST HARMFUL EVENT	TRAVEL DIRECTION	ACTIVITY PRIOR	ROAD CONDITION	DRIVER ACTION

Walterscheid Blvd & W. Allison Rd. (INTERSECTION ID 12783)

YEAR	FATAL CRASHES	FATALITIES	INJURY CRASHES	INJURIES	PDO* CRASHES	TOTAL CRASHES
2016	0	0	2	2	2	4
2017	0	0	2	2	3	5
2018	0	0	1	1	1	2
2019	0	0	2	2	2	4
2020	0	0	1	1	1	2
TOTAL	**0**	**0**	**8**	**8**	**9**	**17**

*PDO = Property Damage Only

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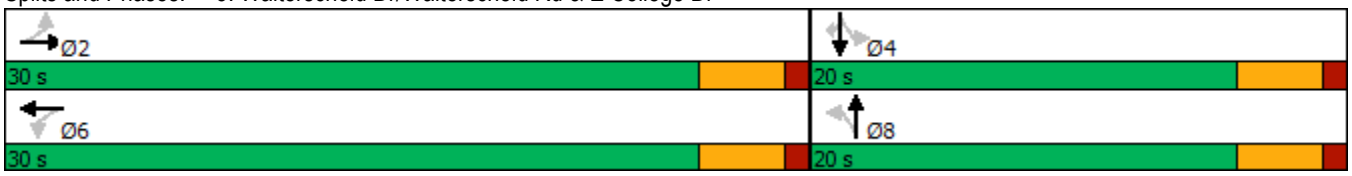
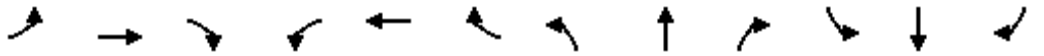
APPENDIX E. EXISTING CONDITIONS LEVEL OF SERVICE WORKSHEETS

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	52	185	234	1	92	4	48
Future Volume (vph)	52	185	234	1	92	4	48
Turn Type	Perm	NA	NA	NA	Perm	NA	Perm
Protected Phases		2	6	8		4	
Permitted Phases	2				4		4
Detector Phase	2	2	6	8	4	4	4
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.2	18.2	18.2	21.2	21.2	21.2	21.2
Total Split (s)	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.2	4.2
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	None	None	None	None
Act Effct Green (s)	16.0	16.0	16.0	6.9		6.9	6.9
Actuated g/C Ratio	0.56	0.56	0.56	0.24		0.24	0.24
v/c Ratio	0.14	0.25	0.44	0.03		0.44	0.17
Control Delay	6.1	6.0	6.5	6.3		13.8	4.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	6.1	6.0	6.5	6.3		13.8	4.2
LOS	A	A	A	A		B	A
Approach Delay		6.0	6.5	6.3		10.6	
Approach LOS		A	A	A		B	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 28.4	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 46.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	185	0	0	234	122	0	1	2	92	4	48
Future Volume (veh/h)	52	185	0	0	234	122	0	1	2	92	4	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	70	250	0	0	289	151	0	4	8	135	6	71
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	541	721	0	358	446	233	0	100	201	587	11	272
Arrive On Green	0.40	0.40	0.00	0.00	0.40	0.40	0.00	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	949	1781	0	1148	1102	576	0	565	1131	1333	59	1535
Grp Volume(v), veh/h	70	250	0	0	0	440	0	0	12	141	0	71
Grp Sat Flow(s),veh/h/ln	949	1781	0	1148	0	1678	0	0	1696	1392	0	1535
Q Serve(g_s), s	1.3	2.0	0.0	0.0	0.0	4.3	0.0	0.0	0.1	1.8	0.0	0.8
Cycle Q Clear(g_c), s	5.5	2.0	0.0	0.0	0.0	4.3	0.0	0.0	0.1	1.9	0.0	0.8
Prop In Lane	1.00		0.00	1.00		0.34	0.00		0.67	0.96		1.00
Lane Grp Cap(c), veh/h	541	721	0	358	0	679	0	0	301	598	0	272
V/C Ratio(X)	0.13	0.35	0.00	0.00	0.00	0.65	0.00	0.00	0.04	0.24	0.00	0.26
Avail Cap(c_a), veh/h	1375	2286	0	1367	0	2153	0	0	1333	1474	0	1206
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.1	4.1	0.0	0.0	0.0	4.8	0.0	0.0	6.8	7.6	0.0	7.1
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.3	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.1	4.3	0.0	0.0	0.0	5.2	0.0	0.0	6.9	7.7	0.0	7.3
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		320			440			12			212	
Approach Delay, s/veh		4.9			5.2			6.9			7.6	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.3		7.8		12.3		7.8				
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 26		* 16		* 26		* 16				
Max Q Clear Time (g_c+I1), s		7.5		3.9		6.3		2.1				
Green Ext Time (p_c), s		0.6		0.2		1.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	5.6	
HCM 6th LOS	A	

Notes

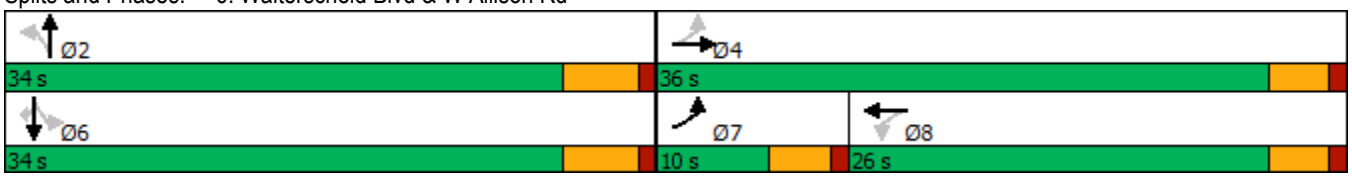
User approved pedestrian interval to be less than phase max green.

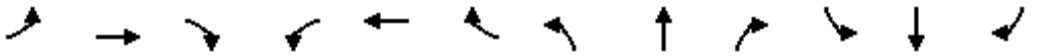
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	19.5		19.5	19.5		19.9	19.9		19.9	19.9	19.9
Total Split (s)	10.0	36.0		26.0	26.0		34.0	34.0		34.0	34.0	34.0
Total Split (%)	14.3%	51.4%		37.1%	37.1%		48.6%	48.6%		48.6%	48.6%	48.6%
Maximum Green (s)	5.8	31.8		21.8	21.8		29.1	29.1		29.1	29.1	29.1
Yellow Time (s)	3.2	3.2		3.2	3.2		3.9	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.2	4.2		4.2	4.2			4.9			4.9	4.9
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	2.0	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	0
Act Effct Green (s)	23.4	23.4		16.1	16.1			18.5			18.5	18.5
Actuated g/C Ratio	0.45	0.45		0.31	0.31			0.36			0.36	0.36
v/c Ratio	0.31	0.54		0.05	0.63			0.68			0.21	0.33
Control Delay	11.6	12.6		16.3	23.1			22.5			14.0	3.6
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	11.6	12.6		16.3	23.1			22.5			14.0	3.6
LOS	B	B		B	C			C			B	A
Approach Delay		12.4			22.8			22.5			7.4	
Approach LOS		B			C			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 52			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 15.8		Intersection LOS: B	
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	164	81	9	223	4	99	128	12	4	94	171
Future Volume (veh/h)	68	164	81	9	223	4	99	128	12	4	94	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	121	293	145	15	360	6	148	191	18	6	132	241
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	406	532	263	434	510	8	280	291	24	98	599	530
Arrive On Green	0.07	0.45	0.45	0.28	0.28	0.28	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1781	1181	584	966	1849	31	476	885	72	21	1822	1610
Grp Volume(v), veh/h	121	0	438	15	0	366	357	0	0	138	0	241
Grp Sat Flow(s),veh/h/ln	1781	0	1765	966	0	1880	1433	0	0	1843	0	1610
Q Serve(g_s), s	1.8	0.0	7.5	0.5	0.0	7.2	6.7	0.0	0.0	0.0	0.0	4.9
Cycle Q Clear(g_c), s	1.8	0.0	7.5	0.8	0.0	7.2	8.9	0.0	0.0	2.2	0.0	4.9
Prop In Lane	1.00		0.33	1.00		0.02	0.41		0.05	0.04		1.00
Lane Grp Cap(c), veh/h	406	0	795	434	0	518	595	0	0	697	0	530
V/C Ratio(X)	0.30	0.00	0.55	0.03	0.00	0.71	0.60	0.00	0.00	0.20	0.00	0.46
Avail Cap(c_a), veh/h	527	0	1361	679	0	994	1112	0	0	1379	0	1136
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	8.3	11.2	0.0	13.4	12.1	0.0	0.0	10.0	0.0	10.9
Incr Delay (d2), s/veh	0.2	0.0	0.7	0.0	0.0	2.1	1.2	0.0	0.0	0.2	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	0.0	3.9	0.2	0.0	5.0	4.2	0.0	0.0	1.3	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	0.0	9.0	11.2	0.0	15.6	13.2	0.0	0.0	10.2	0.0	11.7
LnGrp LOS	A	A	A	B	A	B	B	A	A	B	A	B
Approach Vol, veh/h		559			381			357			379	
Approach Delay, s/veh		9.1			15.4			13.2			11.1	
Approach LOS		A			B			B			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.5		22.8		18.5	7.2	15.6				
Change Period (Y+Rc), s		4.9		* 4.2		4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		29.1		* 32		29.1	* 5.8	* 22				
Max Q Clear Time (g_c+I1), s		10.9		9.5		6.9	3.8	9.2				
Green Ext Time (p_c), s		2.6		3.5		1.9	0.0	2.1				

Intersection Summary												
HCM 6th Ctrl Delay			11.9									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.7

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	227	98	30	153	98	25
Future Vol, veh/h	227	98	30	153	98	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	115	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	81	81	66	66
Heavy Vehicles, %	2	0	7	1	1	8
Mvmt Flow	270	117	37	189	148	38

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	387	0	533	270
Stage 1	-	-	-	-	270	-
Stage 2	-	-	-	-	263	-
Critical Hdwy	-	-	4.17	-	6.41	6.28
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.263	-	3.509	3.372
Pot Cap-1 Maneuver	-	-	1145	-	509	754
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	783	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1145	-	493	754
Mov Cap-2 Maneuver	-	-	-	-	493	-
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	758	-

Approach	NB	SB	SW
HCM Control Delay, s	0	1.4	14.3
HCM LOS			B

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1	SWLn2
Capacity (veh/h)	-	-	1145	-	493	754
HCM Lane V/C Ratio	-	-	0.032	-	0.301	0.05
HCM Control Delay (s)	-	-	8.2	-	15.4	10
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1.3	0.2

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	19	142	4	12	150
Future Vol, veh/h	7	19	142	4	12	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	12	32	182	5	17	214

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	433	185	0	0	187	0
Stage 1	185	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	584	850	-	-	1399	-
Stage 1	852	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	576	850	-	-	1399	-
Mov Cap-2 Maneuver	576	-	-	-	-	-
Stage 1	852	-	-	-	-	-
Stage 2	787	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	753	1399	-
HCM Lane V/C Ratio	-	-	0.059	0.012	-
HCM Control Delay (s)	-	-	10.1	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	22	23	191	9	1	32	246
Future Vol, veh/h	22	23	191	9	1	32	246
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-	0
Grade, %	0	-	0	-	-	-	0
Peak Hour Factor	66	66	63	63	78	78	78
Heavy Vehicles, %	0	0	2	0	0	0	1
Mvmt Flow	33	35	303	14	1	41	315

Major/Minor	Minor1		Major1		Major2		
Conflicting Flow All	707	310	0	0	-	317	0
Stage 1	310	-	-	-	-	-	-
Stage 2	397	-	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	2.2	-
Pot Cap-1 Maneuver	405	735	-	-	-	1255	-
Stage 1	748	-	-	-	-	-	-
Stage 2	683	-	-	-	-	-	-
Platoon blocked, %			-	-			-
Mov Cap-1 Maneuver	405	735	-	-	~ -34	~ -34	-
Mov Cap-2 Maneuver	405	-	-	-	-	-	-
Stage 1	748	-	-	-	-	-	-
Stage 2	683	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	526	+	-
HCM Lane V/C Ratio	-	-	0.13	-	-
HCM Control Delay (s)	-	-	12.9	-	-
HCM Lane LOS	-	-	B	-	-
HCM 95th %tile Q(veh)	-	-	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	26.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	101	128	6	125	111	28	8	194	78	23	149	74
Future Vol, veh/h	101	128	6	125	111	28	8	194	78	23	149	74
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Heavy Vehicles, %	1	5	0	2	2	4	0	1	1	0	1	0
Mvmt Flow	128	162	8	151	134	34	11	255	103	31	199	99
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

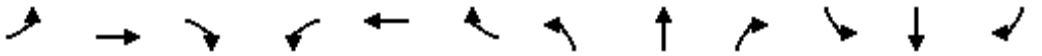
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	27.8	24.3	35.6	17.3
HCM LOS	D	C	E	C

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	43%	53%	0%	13%	0%
Vol Thru, %	69%	54%	47%	0%	87%	0%
Vol Right, %	28%	3%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	235	236	28	172	74
LT Vol	8	101	125	0	23	0
Through Vol	194	128	111	0	149	0
RT Vol	78	6	0	28	0	74
Lane Flow Rate	368	297	284	34	229	99
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.8	0.686	0.659	0.069	0.521	0.203
Departure Headway (Hd)	7.817	8.304	8.347	7.351	8.175	7.4
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	461	434	432	486	440	483
Service Time	5.884	6.377	6.115	5.118	5.947	5.171
HCM Lane V/C Ratio	0.798	0.684	0.657	0.07	0.52	0.205
HCM Control Delay	35.6	27.8	25.9	10.7	19.6	12.1
HCM Lane LOS	E	D	D	B	C	B
HCM 95th-tile Q	7.3	5	4.6	0.2	2.9	0.8

Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	34	204	3	204	3	58	1	55
Future Volume (vph)	34	204	3	204	3	58	1	55
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA	Perm
Protected Phases		2		6	8		4	
Permitted Phases	2		6			4		4
Detector Phase	2	2	6	6	8	4	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.2	18.2	18.2	18.2	21.2	21.2	21.2	21.2
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2	4.2		4.2	4.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
Act Effct Green (s)	15.7	15.7	15.7	15.7	5.3		5.3	5.3
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.22		0.22	0.22
v/c Ratio	0.05	0.18	0.01	0.26	0.05		0.16	0.16
Control Delay	4.6	4.5	4.3	4.4	6.0		8.3	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	4.6	4.5	4.3	4.4	6.0		8.3	3.7
LOS	A	A	A	A	A		A	A
Approach Delay		4.5		4.4	6.0		6.1	
Approach LOS		A		A	A		A	

Intersection Summary		
Cycle Length: 50		
Actuated Cycle Length: 24.1		
Natural Cycle: 40		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.26		
Intersection Signal Delay: 4.8	Intersection LOS: A	
Intersection Capacity Utilization 38.3%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	204	0	3	204	48	0	3	2	58	1	55
Future Volume (veh/h)	34	204	0	3	204	48	0	3	2	58	1	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1870	1900	1900	1826	1900	1900	1900	1900	1870	1900	1841
Adj Flow Rate, veh/h	37	224	0	4	246	58	0	12	8	66	1	62
Peak Hour Factor	0.91	0.91	0.91	0.83	0.83	0.83	0.25	0.25	0.25	0.88	0.88	0.88
Percent Heavy Veh, %	3	2	0	0	5	0	0	0	0	2	0	4
Cap, veh/h	645	606	0	722	463	109	0	161	107	645	3	236
Arrive On Green	0.32	0.32	0.00	0.32	0.32	0.32	0.00	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1067	1870	0	1175	1428	337	0	1063	709	1309	20	1560
Grp Volume(v), veh/h	37	224	0	4	0	304	0	0	20	67	0	62
Grp Sat Flow(s),veh/h/ln	1067	1870	0	1175	0	1765	0	0	1772	1329	0	1560
Q Serve(g_s), s	0.5	1.5	0.0	0.0	0.0	2.3	0.0	0.0	0.2	0.7	0.0	0.6
Cycle Q Clear(g_c), s	2.7	1.5	0.0	1.5	0.0	2.3	0.0	0.0	0.2	0.8	0.0	0.6
Prop In Lane	1.00		0.00	1.00		0.19	0.00		0.40	0.99		1.00
Lane Grp Cap(c), veh/h	645	606	0	722	0	572	0	0	268	648	0	236
V/C Ratio(X)	0.06	0.37	0.00	0.01	0.00	0.53	0.00	0.00	0.07	0.10	0.00	0.26
Avail Cap(c_a), veh/h	2019	3015	0	2236	0	2845	0	0	1750	1834	0	1540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.5	4.2	0.0	4.7	0.0	4.4	0.0	0.0	5.8	6.2	0.0	6.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.5	4.3	0.0	4.7	0.0	4.7	0.0	0.0	5.9	6.2	0.0	6.2
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		261			308			20			129	
Approach Delay, s/veh		4.5			4.7			5.9			6.2	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.4		6.6		9.4		6.6				
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 26		* 16		* 26		* 16				
Max Q Clear Time (g_c+I1), s		4.7		2.8		4.3		2.2				
Green Ext Time (p_c), s		0.5		0.1		0.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	4.9	
HCM 6th LOS	A	

Notes

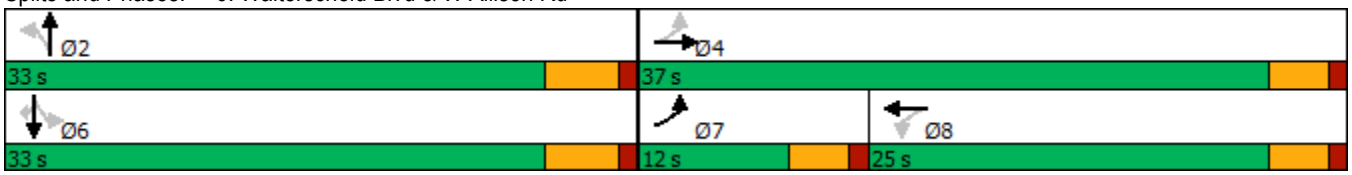
User approved pedestrian interval to be less than phase max green.

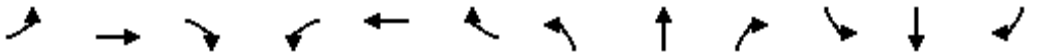
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	19.5		19.5	19.5		19.9	19.9		19.9	19.9	19.9
Total Split (s)	12.0	37.0		25.0	25.0		33.0	33.0		33.0	33.0	33.0
Total Split (%)	17.1%	52.9%		35.7%	35.7%		47.1%	47.1%		47.1%	47.1%	47.1%
Maximum Green (s)	7.8	32.8		20.8	20.8		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	3.2	3.2		3.2	3.2		3.9	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.2	4.2		4.2	4.2			4.9			4.9	4.9
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	2.0	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	0
Act Effct Green (s)	14.0	16.4		15.0	15.0			8.9			9.0	9.0
Actuated g/C Ratio	0.53	0.62		0.57	0.57			0.34			0.34	0.34
v/c Ratio	0.05	0.09		0.05	0.10			0.27			0.26	0.05
Control Delay	6.1	4.9		9.8	7.5			8.7			9.4	1.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	6.1	4.9		9.8	7.5			8.7			9.4	1.1
LOS	A	A		A	A			A			A	A
Approach Delay		5.2			8.1			8.7			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 26.5			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 29.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	45	17	23	48	22	17	90	21	19	90	24
Future Volume (veh/h)	24	45	17	23	48	22	17	90	21	19	90	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1870	1900	1900	1870	1841	1900	1870	1826	1900	1841	1900
Adj Flow Rate, veh/h	38	71	27	34	72	33	20	108	25	26	123	33
Peak Hour Factor	0.63	0.63	0.63	0.67	0.67	0.67	0.83	0.83	0.83	0.73	0.73	0.73
Percent Heavy Veh, %	0	2	0	0	2	4	0	2	5	0	4	0
Cap, veh/h	555	521	198	556	217	99	208	237	51	228	296	307
Arrive On Green	0.04	0.40	0.40	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1810	1291	491	1318	1214	556	139	1245	270	205	1555	1610
Grp Volume(v), veh/h	38	0	98	34	0	105	153	0	0	149	0	33
Grp Sat Flow(s),veh/h/ln	1810	0	1782	1318	0	1770	1655	0	0	1759	0	1610
Q Serve(g_s), s	0.3	0.0	0.8	0.5	0.0	1.2	0.3	0.0	0.0	0.0	0.0	0.4
Cycle Q Clear(g_c), s	0.3	0.0	0.8	0.5	0.0	1.2	1.9	0.0	0.0	1.6	0.0	0.4
Prop In Lane	1.00		0.28	1.00		0.31	0.13		0.16	0.17		1.00
Lane Grp Cap(c), veh/h	555	0	719	556	0	316	497	0	0	524	0	307
V/C Ratio(X)	0.07	0.00	0.14	0.06	0.00	0.33	0.31	0.00	0.00	0.28	0.00	0.11
Avail Cap(c_a), veh/h	1117	0	2608	1544	0	1643	2309	0	0	2328	0	2019
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.8	0.0	4.2	7.8	0.0	8.0	8.1	0.0	0.0	8.0	0.0	7.5
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.1	0.0	0.7	0.4	0.0	0.0	0.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.2	0.2	0.0	0.6	0.7	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.8	0.0	4.3	7.8	0.0	8.8	8.5	0.0	0.0	8.3	0.0	7.7
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		136			139			153			182	
Approach Delay, s/veh		4.7			8.5			8.5			8.2	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	9.2	13.2	9.2	5.0	8.2
Change Period (Y+Rc), s	4.9	* 4.2	4.9	* 4.2	* 4.2
Max Green Setting (Gmax), s	28.1	* 33	28.1	* 7.8	* 21
Max Q Clear Time (g_c+I1), s	3.9	2.8	3.6	2.3	3.2
Green Ext Time (p_c), s	0.9	0.6	1.1	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.9

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	160	51	24	163	60	32
Future Vol, veh/h	160	51	24	163	60	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	115	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	85	85	70	70
Heavy Vehicles, %	1	0	4	2	2	12
Mvmt Flow	195	62	28	192	86	46

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	257	0	443	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	248	-
Critical Hdwy	-	-	4.14	-	6.42	6.32
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.236	-	3.518	3.408
Pot Cap-1 Maneuver	-	-	1296	-	572	821
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	793	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1296	-	559	821
Mov Cap-2 Maneuver	-	-	-	-	559	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	776	-

Approach	NB	SB	SW
HCM Control Delay, s	0	1	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1	SWLn2
Capacity (veh/h)	-	-	1296	-	559	821
HCM Lane V/C Ratio	-	-	0.022	-	0.153	0.056
HCM Control Delay (s)	-	-	7.8	-	12.6	9.6
HCM Lane LOS	-	-	A	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	-	0.5	0.2

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	18	81	3	11	101
Future Vol, veh/h	9	18	81	3	11	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	83	83	85	85
Heavy Vehicles, %	0	0	0	0	0	4
Mvmt Flow	12	24	98	4	13	119

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	245	100	0	0	102	0
Stage 1	100	-	-	-	-	-
Stage 2	145	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	748	961	-	-	1503	-
Stage 1	929	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	741	961	-	-	1503	-
Mov Cap-2 Maneuver	741	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	879	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	874	1503	-
HCM Lane V/C Ratio	-	-	0.041	0.009	-
HCM Control Delay (s)	-	-	9.3	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	20	125	9	25	127
Future Vol, veh/h	4	20	125	9	25	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	55	55	82	82	81	81
Heavy Vehicles, %	0	0	2	0	0	4
Mvmt Flow	7	36	152	11	31	157

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	377	158	0	0	163	0
Stage 1	158	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	629	893	-	-	1428	-
Stage 1	875	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	614	893	-	-	1428	-
Mov Cap-2 Maneuver	614	-	-	-	-	-
Stage 1	875	-	-	-	-	-
Stage 2	802	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	830	1428	-
HCM Lane V/C Ratio	-	-	0.053	0.022	-
HCM Control Delay (s)	-	-	9.6	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	103	7	49	73	41	4	113	49	44	120	38
Future Vol, veh/h	47	103	7	49	73	41	4	113	49	44	120	38
Peak Hour Factor	0.77	0.77	0.77	0.86	0.86	0.86	0.70	0.70	0.70	0.82	0.82	0.82
Heavy Vehicles, %	0	2	0	2	1	0	0	3	0	4	4	0
Mvmt Flow	61	134	9	57	85	48	6	161	70	54	146	46
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

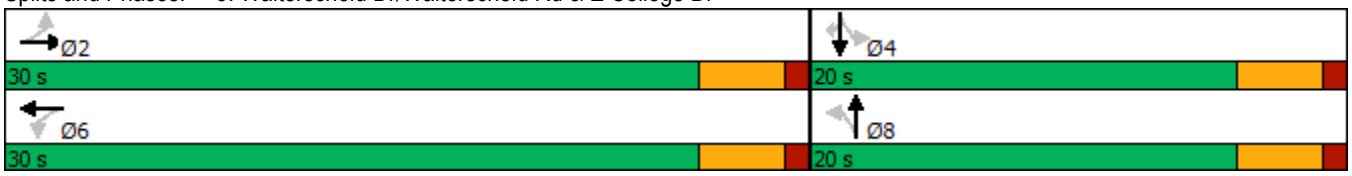
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	12.9	10.9	13	11.8
HCM LOS	B	B	B	B

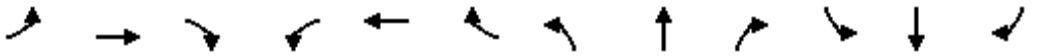
Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	30%	40%	0%	27%	0%
Vol Thru, %	68%	66%	60%	0%	73%	0%
Vol Right, %	30%	4%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	166	157	122	41	164	38
LT Vol	4	47	49	0	44	0
Through Vol	113	103	73	0	120	0
RT Vol	49	7	0	41	0	38
Lane Flow Rate	237	204	142	48	200	46
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.396	0.359	0.258	0.074	0.351	0.07
Departure Headway (Hd)	6.006	6.346	6.547	5.614	6.314	5.468
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	598	565	548	636	568	653
Service Time	4.06	4.402	4.305	3.372	4.068	3.221
HCM Lane V/C Ratio	0.396	0.361	0.259	0.075	0.352	0.07
HCM Control Delay	13	12.9	11.6	8.8	12.5	8.6
HCM Lane LOS	B	B	B	A	B	A
HCM 95th-tile Q	1.9	1.6	1	0.2	1.6	0.2

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	75	270	244	2	4	142	3	66
Future Volume (vph)	75	270	244	2	4	142	3	66
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2	6		8		4	
Permitted Phases	2			8		4		4
Detector Phase	2	2	6	8	8	4	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.2	18.2	18.2	21.2	21.2	21.2	21.2	21.2
Total Split (s)	30.0	30.0	30.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2		4.2		4.2	4.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	None	None	None	None	None
Act Effct Green (s)	14.2	14.2	14.2		7.9		7.9	7.9
Actuated g/C Ratio	0.51	0.51	0.51		0.29		0.29	0.29
v/c Ratio	0.19	0.38	0.42		0.05		0.53	0.19
Control Delay	7.6	8.1	7.5		7.4		14.2	3.6
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	7.6	8.1	7.5		7.4		14.2	3.6
LOS	A	A	A		A		B	A
Approach Delay		7.9	7.5		7.4		10.9	
Approach LOS		A	A		A		B	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 27.7	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 48.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	270	1	0	244	97	2	4	1	142	3	66
Future Volume (veh/h)	75	270	1	0	244	97	2	4	1	142	3	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1796	1900	1900	1796	1885	1900	1900	1900	1885	1900	1811
Adj Flow Rate, veh/h	96	346	1	0	277	110	7	13	3	200	4	93
Peak Hour Factor	0.78	0.78	0.78	0.88	0.88	0.88	0.30	0.30	0.30	0.71	0.71	0.71
Percent Heavy Veh, %	4	7	0	0	7	1	0	0	0	1	0	6
Cap, veh/h	560	711	2	344	486	193	274	229	42	661	6	310
Arrive On Green	0.40	0.40	0.40	0.00	0.40	0.40	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	981	1790	5	1050	1223	486	249	1136	208	1588	32	1535
Grp Volume(v), veh/h	96	0	347	0	0	387	23	0	0	204	0	93
Grp Sat Flow(s),veh/h/ln	981	0	1795	1050	0	1709	1593	0	0	1620	0	1535
Q Serve(g_s), s	1.8	0.0	3.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	1.1
Cycle Q Clear(g_c), s	5.5	0.0	3.0	0.0	0.0	3.7	2.1	0.0	0.0	2.1	0.0	1.1
Prop In Lane	1.00		0.00	1.00		0.28	0.30		0.13	0.98		1.00
Lane Grp Cap(c), veh/h	560	0	713	344	0	678	546	0	0	667	0	310
V/C Ratio(X)	0.17	0.00	0.49	0.00	0.00	0.57	0.04	0.00	0.00	0.31	0.00	0.30
Avail Cap(c_a), veh/h	1380	0	2213	1221	0	2106	1453	0	0	1456	0	1159
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.1	0.0	4.7	0.0	0.0	4.9	6.8	0.0	0.0	7.5	0.0	7.1
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.6	0.0	0.0	0.7	0.1	0.0	0.0	0.7	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.1	0.0	4.9	0.0	0.0	5.2	6.8	0.0	0.0	7.6	0.0	7.3
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		443			387			23			297	
Approach Delay, s/veh		5.4			5.2			6.8			7.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.5		8.4		12.5		8.4				
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 26		* 16		* 26		* 16				
Max Q Clear Time (g_c+I1), s		7.5		4.1		5.7		4.1				
Green Ext Time (p_c), s		0.8		0.3		0.9		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			5.9									
HCM 6th LOS			A									

Notes

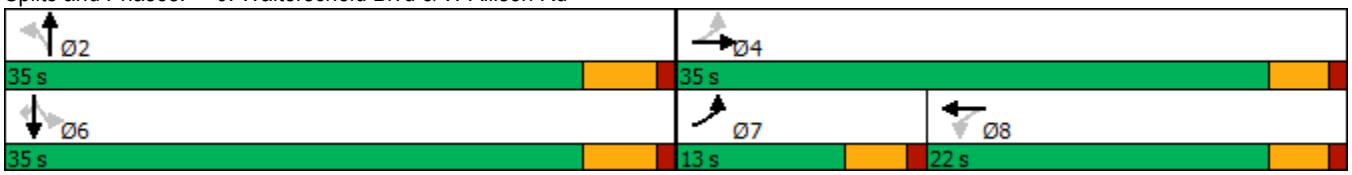
User approved pedestrian interval to be less than phase max green.

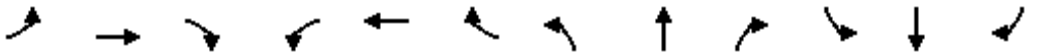
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.5	19.5		19.5	19.5		19.9	19.9		19.9	19.9	19.9
Total Split (s)	13.0	35.0		22.0	22.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	18.6%	50.0%		31.4%	31.4%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	8.8	30.8		17.8	17.8		30.1	30.1		30.1	30.1	30.1
Yellow Time (s)	3.2	3.2		3.2	3.2		3.9	3.9		3.9	3.9	3.9
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.2	4.2		4.2	4.2			4.9			4.9	4.9
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	2.0	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	0
Act Effct Green (s)	17.9	19.5		13.8	13.8			11.7			11.6	11.6
Actuated g/C Ratio	0.51	0.55		0.39	0.39			0.33			0.33	0.33
v/c Ratio	0.16	0.29		0.08	0.16			0.46			0.36	0.07
Control Delay	7.2	6.8		15.1	13.3			13.7			13.3	1.4
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	7.2	6.8		15.1	13.3			13.7			13.3	1.4
LOS	A	A		B	B			B			B	A
Approach Delay		6.9			13.7			13.7			11.4	
Approach LOS		A			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 35.3			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 10.6		Intersection LOS: B	
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	105	55	27	72	18	32	118	39	21	158	34
Future Volume (veh/h)	55	105	55	27	72	18	32	118	39	21	158	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1826	1870	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	98	188	98	35	94	23	43	159	53	24	184	40
Peak Hour Factor	0.56	0.56	0.56	0.77	0.77	0.77	0.74	0.74	0.74	0.86	0.86	0.86
Percent Heavy Veh, %	4	5	2	0	1	0	3	2	0	0	3	0
Cap, veh/h	535	447	233	448	233	57	204	307	92	178	442	421
Arrive On Green	0.08	0.40	0.40	0.16	0.16	0.16	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1753	1131	589	1110	1463	358	174	1172	353	103	1691	1610
Grp Volume(v), veh/h	98	0	286	35	0	117	255	0	0	208	0	40
Grp Sat Flow(s),veh/h/ln	1753	0	1720	1110	0	1821	1699	0	0	1794	0	1610
Q Serve(g_s), s	1.1	0.0	3.2	0.7	0.0	1.5	0.7	0.0	0.0	0.0	0.0	0.5
Cycle Q Clear(g_c), s	1.1	0.0	3.2	0.7	0.0	1.5	3.3	0.0	0.0	2.5	0.0	0.5
Prop In Lane	1.00		0.34	1.00		0.20	0.17		0.21	0.12		1.00
Lane Grp Cap(c), veh/h	535	0	680	448	0	290	603	0	0	621	0	421
V/C Ratio(X)	0.18	0.00	0.42	0.08	0.00	0.40	0.42	0.00	0.00	0.34	0.00	0.09
Avail Cap(c_a), veh/h	981	0	1998	1017	0	1223	2035	0	0	2137	0	1828
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.9	0.0	5.8	9.7	0.0	10.0	8.4	0.0	0.0	8.1	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.5	0.1	0.0	1.1	0.6	0.0	0.0	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	0.0	1.1	0.2	0.0	0.9	1.4	0.0	0.0	1.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.0	0.0	6.3	9.8	0.0	11.1	9.0	0.0	0.0	8.5	0.0	7.5
LnGrp LOS	A	A	A	A	A	B	A	A	A	A	A	A
Approach Vol, veh/h		384			152			255			248	
Approach Delay, s/veh		6.5			10.8			9.0			8.4	
Approach LOS		A			B			A			A	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		11.8		14.7		11.8	6.3	8.4				
Change Period (Y+Rc), s		4.9		* 4.2		4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		30.1		* 31		30.1	* 8.8	* 18				
Max Q Clear Time (g_c+I1), s		5.3		5.2		4.5	3.1	3.5				
Green Ext Time (p_c), s		1.8		2.2		1.6	0.0	0.7				

Intersection Summary												
HCM 6th Ctrl Delay			8.2									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.6

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑	↱	↰	↑	↰	↱
Traffic Vol, veh/h	214	84	40	239	80	30
Future Vol, veh/h	214	84	40	239	80	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	115	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	91	91	90	90
Heavy Vehicles, %	2	1	15	2	0	7
Mvmt Flow	258	101	44	263	89	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	359	0	609	258
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	351	-
Critical Hdwy	-	-	4.25	-	6.4	6.27
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.335	-	3.5	3.363
Pot Cap-1 Maneuver	-	-	1131	-	462	769
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	717	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1131	-	444	769
Mov Cap-2 Maneuver	-	-	-	-	444	-
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	689	-

Approach	NB	SB	SW
HCM Control Delay, s	0	1.2	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1	SWLn2
Capacity (veh/h)	-	-	1131	-	444	769
HCM Lane V/C Ratio	-	-	0.039	-	0.2	0.043
HCM Control Delay (s)	-	-	8.3	-	15.1	9.9
HCM Lane LOS	-	-	A	-	C	A
HCM 95th %tile Q(veh)	-	-	0.1	-	0.7	0.1

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	15	157	13	16	175
Future Vol, veh/h	9	15	157	13	16	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	64	64	63	63	67	67
Heavy Vehicles, %	0	0	2	0	0	3
Mvmt Flow	14	23	249	21	24	261

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	569	260	0	0	270	0
Stage 1	260	-	-	-	-	-
Stage 2	309	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	487	784	-	-	1305	-
Stage 1	788	-	-	-	-	-
Stage 2	749	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	476	784	-	-	1305	-
Mov Cap-2 Maneuver	476	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	733	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	631	1305	-
HCM Lane V/C Ratio	-	-	0.059	0.018	-
HCM Control Delay (s)	-	-	11.1	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	44	181	13	28	199
Future Vol, veh/h	19	44	181	13	28	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	79	79	81	81	81	81
Heavy Vehicles, %	0	2	1	8	0	2
Mvmt Flow	24	56	223	16	35	246

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	547	231	0	0	239	0
Stage 1	231	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Critical Hdwy	6.4	6.22	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	-	-	2.2	-
Pot Cap-1 Maneuver	502	808	-	-	1340	-
Stage 1	812	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	487	808	-	-	1340	-
Mov Cap-2 Maneuver	487	-	-	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	674	1340	-
HCM Lane V/C Ratio	-	-	0.118	0.026	-
HCM Control Delay (s)	-	-	11.1	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	24.3
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Vol, veh/h	1	93	158	14	72	135	35	16	151	89	48	168
Future Vol, veh/h	1	93	158	14	72	135	35	16	151	89	48	168
Peak Hour Factor	0.82	0.82	0.82	0.82	0.83	0.83	0.83	0.75	0.75	0.75	0.90	0.90
Heavy Vehicles, %	0	2	6	0	0	0	6	0	3	1	6	4
Mvmt Flow	1	113	193	17	87	163	42	21	201	119	53	187
Number of Lanes	0	0	1	0	0	1	1	0	1	0	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	29.7	19.9	29.7	17.7
HCM LOS	D	C	D	C

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	6%	35%	35%	0%	22%	0%
Vol Thru, %	59%	60%	65%	0%	78%	0%
Vol Right, %	35%	5%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	256	266	207	35	216	105
LT Vol	16	93	72	0	48	0
Through Vol	151	159	135	0	168	0
RT Vol	89	14	0	35	0	105
Lane Flow Rate	341	324	249	42	240	117
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.737	0.725	0.57	0.086	0.544	0.236
Departure Headway (Hd)	7.769	8.05	8.228	7.325	8.157	7.285
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	464	448	439	488	442	491
Service Time	5.83	6.113	5.99	5.086	5.92	5.047
HCM Lane V/C Ratio	0.735	0.723	0.567	0.086	0.543	0.238
HCM Control Delay	29.7	29.7	21.4	10.8	20.3	12.3
HCM Lane LOS	D	D	C	B	C	B
HCM 95th-tile Q	6	5.7	3.5	0.3	3.2	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBR
Lane Configurations	
Traffic Vol, veh/h	105
Future Vol, veh/h	105
Peak Hour Factor	0.90
Heavy Vehicles, %	0
Mvmt Flow	117
Number of Lanes	1

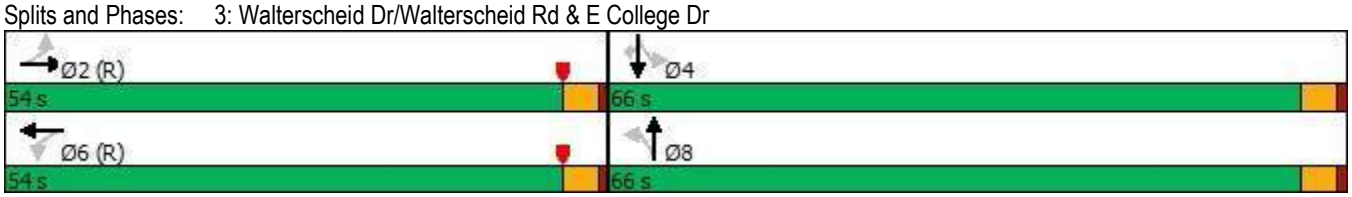
Approach	
Opposing Approach	
Opposing Lanes	
Conflicting Approach Left	
Conflicting Lanes Left	
Conflicting Approach Right	
Conflicting Lanes Right	
HCM Control Delay	
HCM LOS	

APPENDIX F. FUTURE (2045) NO ACTION LEVEL OF SERVICE WORKSHEETS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	110	265	120	360	175	170	125	160	100
Future Volume (vph)	110	265	120	360	175	170	125	160	100
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		8		4	
Permitted Phases	2		6		8		4		4
Detector Phase	2	2	6	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.2	18.2	18.2	18.2	21.2	21.2	21.2	21.2	21.2
Total Split (s)	54.0	54.0	54.0	54.0	66.0	66.0	66.0	66.0	66.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.2		4.2	4.2
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
Act Effct Green (s)	49.8	49.8	49.8	49.8		61.8		61.8	61.8
Actuated g/C Ratio	0.42	0.42	0.42	0.42		0.52		0.52	0.52
v/c Ratio	1.94	0.81	1.06	0.93		3.48		0.86	0.18
Control Delay	489.0	39.4	130.8	53.5		1137.5		48.8	13.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	489.0	39.4	130.8	53.5		1137.5		48.8	13.7
LOS	F	D	F	D		F		D	B
Approach Delay		130.3		67.4		1137.5		39.7	
Approach LOS		F		E		F		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 3.48	
Intersection Signal Delay: 572.0	Intersection LOS: F
Intersection Capacity Utilization 91.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	265	170	120	360	185	175	170	115	125	160	100
Future Volume (veh/h)	110	265	170	120	360	185	175	170	115	125	160	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	149	358	230	148	444	228	700	680	460	184	235	147
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	79	421	270	140	460	236	125	81	55	292	325	790
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.51	0.51	0.51	0.17	0.17	0.17
Sat Flow, veh/h	766	1013	651	841	1109	570	163	158	107	483	630	1535
Grp Volume(v), veh/h	149	0	588	148	0	672	1840	0	0	419	0	147
Grp Sat Flow(s),veh/h/ln	766	0	1664	841	0	1679	427	0	0	1113	0	1535
Q Serve(g_s), s	2.9	0.0	38.4	11.4	0.0	46.9	19.1	0.0	0.0	0.0	0.0	9.9
Cycle Q Clear(g_c), s	49.8	0.0	38.4	49.8	0.0	46.9	61.8	0.0	0.0	42.7	0.0	9.9
Prop In Lane	1.00		0.39	1.00		0.34	0.38		0.25	0.44		1.00
Lane Grp Cap(c), veh/h	79	0	691	140	0	697	261	0	0	617	0	790
V/C Ratio(X)	1.89	0.00	0.85	1.06	0.00	0.96	7.04	0.00	0.00	0.68	0.00	0.19
Avail Cap(c_a), veh/h	79	0	691	140	0	697	261	0	0	617	0	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.6	0.0	31.8	56.7	0.0	34.2	52.0	0.0	0.0	41.7	0.0	28.2
Incr Delay (d2), s/veh	444.4	0.0	12.6	91.5	0.0	26.4	2725.5	0.0	0.0	2.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	21.8	0.0	24.4	12.8	0.0	31.7	341.0	0.0	0.0	19.1	0.0	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	504.0	0.0	44.3	148.3	0.0	60.7	2777.5	0.0	0.0	44.2	0.0	28.3
LnGrp LOS	F	A	D	F	A	E	F	A	A	D	A	C
Approach Vol, veh/h		737			820			1840			566	
Approach Delay, s/veh		137.3			76.5			2777.5			40.1	
Approach LOS		F			E			F			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		54.0		66.0		54.0		66.0				
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 50		* 62		* 50		* 62				
Max Q Clear Time (g_c+I1), s		51.8		44.7		51.8		63.8				
Green Ext Time (p_c), s		0.0		2.3		0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	1336.6	
HCM 6th LOS	F	

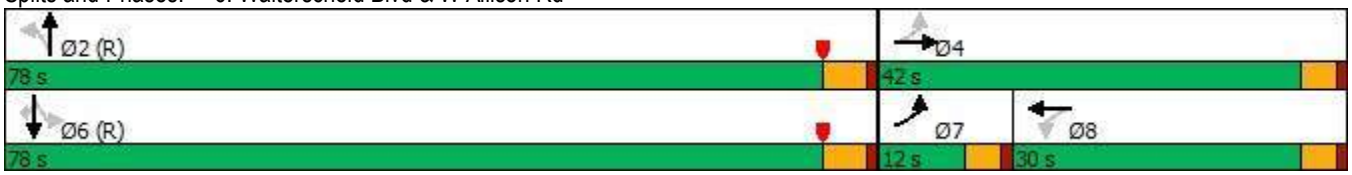
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	125	225	20	300	160	405	10	330	345
Future Volume (vph)	125	225	20	300	160	405	10	330	345
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	19.5	19.5	19.5	19.9	19.9	19.9	19.9	19.9
Total Split (s)	12.0	42.0	30.0	30.0	78.0	78.0	78.0	78.0	78.0
Total Split (%)	10.0%	35.0%	25.0%	25.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.9	3.9	3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.9		4.9	4.9
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	Min	Min	Min	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	37.8	37.8	25.8	25.8		73.1		73.1	73.1
Actuated g/C Ratio	0.32	0.32	0.22	0.22		0.61		0.61	0.61
v/c Ratio	1.26	1.12	0.51	1.24		1.26		0.44	0.44
Control Delay	185.7	111.8	71.5	167.7		142.6		14.1	5.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	185.7	111.8	71.5	167.7		142.6		14.1	5.8
LOS	F	F	E	F		F		B	A
Approach Delay		131.0		162.0		142.6		9.9	
Approach LOS		F		F		F		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 103.2	Intersection LOS: F
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	225	130	20	300	10	160	405	30	10	330	345
Future Volume (veh/h)	125	225	130	20	300	10	160	405	30	10	330	345
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	223	402	232	32	484	16	239	604	45	14	465	486
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	176	350	202	60	390	13	188	393	29	44	1085	981
Arrive On Green	0.07	0.31	0.31	0.22	0.22	0.22	1.00	1.00	1.00	0.61	0.61	0.61
Sat Flow, veh/h	1781	1113	642	806	1814	60	245	646	48	22	1781	1610
Grp Volume(v), veh/h	223	0	634	32	0	500	888	0	0	479	0	486
Grp Sat Flow(s),veh/h/ln	1781	0	1755	806	0	1874	939	0	0	1802	0	1610
Q Serve(g_s), s	7.8	0.0	37.8	0.0	0.0	25.8	56.8	0.0	0.0	0.0	0.0	20.3
Cycle Q Clear(g_c), s	7.8	0.0	37.8	25.8	0.0	25.8	73.1	0.0	0.0	16.3	0.0	20.3
Prop In Lane	1.00		0.37	1.00		0.03	0.27		0.05	0.03		1.00
Lane Grp Cap(c), veh/h	176	0	553	60	0	403	610	0	0	1129	0	981
V/C Ratio(X)	1.27	0.00	1.15	0.53	0.00	1.24	1.46	0.00	0.00	0.42	0.00	0.50
Avail Cap(c_a), veh/h	176	0	553	60	0	403	610	0	0	1129	0	981
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.1	0.0	41.1	60.0	0.0	47.1	9.9	0.0	0.0	12.4	0.0	13.1
Incr Delay (d2), s/veh	157.9	0.0	85.7	10.1	0.0	127.8	214.2	0.0	0.0	1.2	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.2	0.0	41.6	2.1	0.0	38.7	70.0	0.0	0.0	11.0	0.0	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	197.0	0.0	126.8	70.1	0.0	174.9	224.0	0.0	0.0	13.5	0.0	14.9
LnGrp LOS	F	A	F	E	A	F	F	A	A	B	A	B
Approach Vol, veh/h		857			532			888			965	
Approach Delay, s/veh		145.1			168.6			224.0			14.2	
Approach LOS		F			F			F			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		78.0		42.0		78.0	12.0	30.0				
Change Period (Y+Rc), s		4.9		* 4.2		4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		73.1		* 38		73.1	* 7.8	* 26				
Max Q Clear Time (g_c+I1), s		75.1		39.8		22.3	9.8	27.8				
Green Ext Time (p_c), s		0.0		0.0		7.2	0.0	0.0				

Intersection Summary		
HCM 6th Ctrl Delay	131.6	
HCM 6th LOS	F	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	28.6

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	405	230	30	275	220	20
Future Vol, veh/h	405	230	30	275	220	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	115	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	81	81	66	66
Heavy Vehicles, %	2	0	7	1	1	8
Mvmt Flow	482	274	37	340	333	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	756	0	896	482
Stage 1	-	-	-	-	482	-
Stage 2	-	-	-	-	414	-
Critical Hdwy	-	-	4.17	-	6.41	6.28
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.263	-	3.509	3.372
Pot Cap-1 Maneuver	-	-	833	-	~ 312	572
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	833	-	~ 298	572
Mov Cap-2 Maneuver	-	-	-	-	~ 298	-
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	640	-

Approach	NB	SB	SW
HCM Control Delay, s	0	0.9	116.7
HCM LOS			F

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1	SWLn2
Capacity (veh/h)	-	-	833	-	298	572
HCM Lane V/C Ratio	-	-	0.044	-	1.119	0.053
HCM Control Delay (s)	-	-	9.5	-	126.2	11.6
HCM Lane LOS	-	-	A	-	F	B
HCM 95th %tile Q(veh)	-	-	0.1	-	13.6	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	20	385	10	15	395
Future Vol, veh/h	15	20	385	10	15	395
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	25	34	494	13	21	564

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1107	501	0	0	507	0
Stage 1	501	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	207	679	-	-	1068	-
Stage 1	665	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	201	679	-	-	1068	-
Mov Cap-2 Maneuver	201	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	554	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	336	1068	-
HCM Lane V/C Ratio	-	-	0.177	0.02	-
HCM Control Delay (s)	-	-	18	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	38.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	75	25	445	65	35	565
Future Vol, veh/h	75	25	445	65	35	565
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	63	63	78	78
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	114	38	706	103	45	724

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1572	758	0	0	809	0
Stage 1	758	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 78	445	-	-	738	-
Stage 1	461	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	~ 70	445	-	-	738	-
Mov Cap-2 Maneuver	~ 70	-	-	-	-	-
Stage 1	461	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 440.1	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	89	738	-
HCM Lane V/C Ratio	-	-	1.702	0.061	-
HCM Control Delay (s)	-	-	$ 440.1	10.2	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	12.4	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	282.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	155	170	10	225	140	45	15	415	145	40	325	115
Future Vol, veh/h	155	170	10	225	140	45	15	415	145	40	325	115
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Heavy Vehicles, %	1	5	0	2	2	4	0	1	1	0	1	0
Mvmt Flow	196	215	13	271	169	54	20	546	191	53	433	153
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

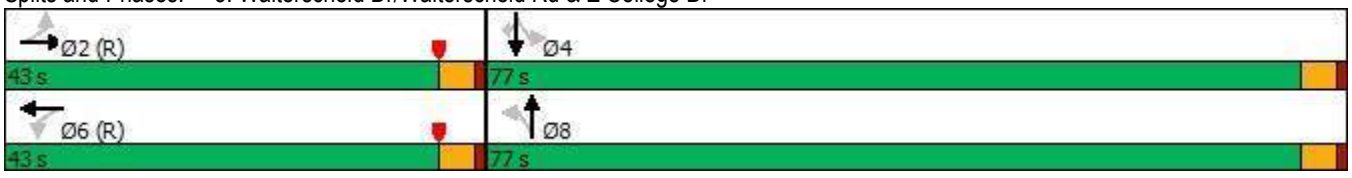
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	168	151.4	536.6	159.9
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	46%	62%	0%	11%	0%
Vol Thru, %	72%	51%	38%	0%	89%	0%
Vol Right, %	25%	3%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	575	335	365	45	365	115
LT Vol	15	155	225	0	40	0
Through Vol	415	170	140	0	325	0
RT Vol	145	10	0	45	0	115
Lane Flow Rate	757	424	440	54	487	153
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	2.11	1.211	1.226	0.136	1.318	0.384
Departure Headway (Hd)	12.076	15.103	13.669	12.588	13.664	12.873
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	310	246	268	287	273	282
Service Time	10.076	13.103	11.369	10.288	11.364	10.573
HCM Lane V/C Ratio	2.442	1.724	1.642	0.188	1.784	0.543
HCM Control Delay	536.6	168	167.9	17.3	202.9	23.4
HCM Lane LOS	F	F	F	C	F	C
HCM 95th-tile Q	46.4	14	15.3	0.5	17.8	1.7

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	75	340	75	340	135	100	75	105	130
Future Volume (vph)	75	340	75	340	135	100	75	105	130
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		8		4	
Permitted Phases	2		6		8		4		4
Detector Phase	2	2	6	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.2	18.2	18.2	18.2	21.2	21.2	21.2	21.2	21.2
Total Split (s)	43.0	43.0	43.0	43.0	77.0	77.0	77.0	77.0	77.0
Total Split (%)	35.8%	35.8%	35.8%	35.8%	64.2%	64.2%	64.2%	64.2%	64.2%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.2		4.2	4.2
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
Act Effct Green (s)	38.8	38.8	38.8	38.8		72.8		72.8	72.8
Actuated g/C Ratio	0.32	0.32	0.32	0.32		0.61		0.61	0.61
v/c Ratio	1.10	1.12	1.48	0.87		1.57		0.45	0.19
Control Delay	163.1	112.5	314.1	55.3		287.4		19.4	6.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	163.1	112.5	314.1	55.3		287.4		19.4	6.0
LOS	F	F	F	E		F		B	A
Approach Delay		119.4		96.3		287.4		13.7	
Approach LOS		F		F		F		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.57	
Intersection Signal Delay: 168.0	Intersection LOS: F
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	340	130	75	340	60	135	100	75	75	105	130
Future Volume (veh/h)	75	340	130	75	340	60	135	100	75	75	105	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	101	459	176	93	420	74	540	400	300	110	154	191
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	109	397	152	60	477	84	302	192	144	342	464	931
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.61	0.61	0.61	0.20	0.20	0.20
Sat Flow, veh/h	903	1226	470	805	1475	260	426	316	237	494	765	1535
Grp Volume(v), veh/h	101	0	635	93	0	494	1240	0	0	264	0	191
Grp Sat Flow(s),veh/h/ln	903	0	1697	805	0	1735	979	0	0	1259	0	1535
Q Serve(g_s), s	6.5	0.0	38.8	0.0	0.0	32.3	52.3	0.0	0.0	0.0	0.0	12.5
Cycle Q Clear(g_c), s	38.8	0.0	38.8	38.8	0.0	32.3	72.8	0.0	0.0	20.5	0.0	12.5
Prop In Lane	1.00		0.28	1.00		0.15	0.44		0.24	0.42		1.00
Lane Grp Cap(c), veh/h	109	0	549	60	0	561	637	0	0	806	0	931
V/C Ratio(X)	0.93	0.00	1.16	1.55	0.00	0.88	1.95	0.00	0.00	0.33	0.00	0.21
Avail Cap(c_a), veh/h	109	0	549	60	0	561	637	0	0	806	0	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	40.6	60.0	0.0	38.4	35.6	0.0	0.0	26.5	0.0	23.9
Incr Delay (d2), s/veh	68.8	0.0	89.9	314.1	0.0	17.8	431.4	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.9	0.0	42.3	12.7	0.0	23.0	157.4	0.0	0.0	11.7	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	127.3	0.0	130.5	374.1	0.0	56.2	467.0	0.0	0.0	26.6	0.0	23.9
LnGrp LOS	F	A	F	F	A	E	F	A	A	C	A	C
Approach Vol, veh/h		736			587			1240			455	
Approach Delay, s/veh		130.0			106.6			467.0			25.5	
Approach LOS		F			F			F			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.0		77.0		43.0		77.0				
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 39		* 73		* 39		* 73				
Max Q Clear Time (g_c+I1), s		40.8		22.5		40.8		74.8				
Green Ext Time (p_c), s		0.0		0.9		0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		248.2
HCM 6th LOS		F

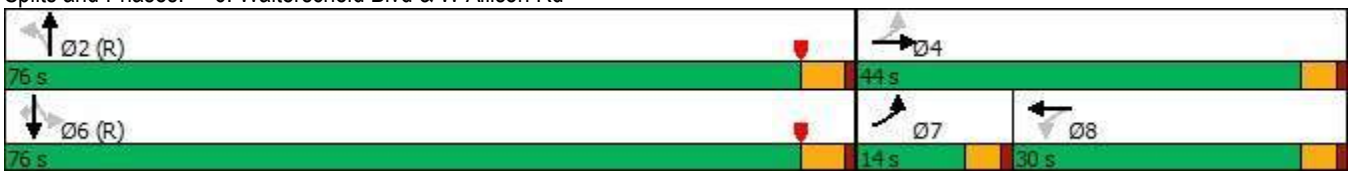
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	50	50	35	55	30	255	35	255	50
Future Volume (vph)	50	50	35	55	30	255	35	255	50
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	19.5	19.5	19.5	19.9	19.9	19.9	19.9	19.9
Total Split (s)	14.0	44.0	30.0	30.0	76.0	76.0	76.0	76.0	76.0
Total Split (%)	11.7%	36.7%	25.0%	25.0%	63.3%	63.3%	63.3%	63.3%	63.3%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.9	3.9	3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.9		4.9	4.9
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	Min	Min	Min	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	27.4	27.4	14.4	14.4		83.5		83.5	83.5
Actuated g/C Ratio	0.23	0.23	0.12	0.12		0.70		0.70	0.70
v/c Ratio	0.41	0.34	0.37	0.65		0.39		0.35	0.06
Control Delay	41.5	32.1	53.9	53.1		8.5		9.2	2.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	41.5	32.1	53.9	53.1		8.5		9.2	2.4
LOS	D	C	D	D		A		A	A
Approach Delay		35.7		53.4		8.5		8.2	
Approach LOS		D		D		A		A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 53.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	50	30	35	55	40	30	255	30	35	255	50
Future Volume (veh/h)	50	50	30	35	55	40	30	255	30	35	255	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	89	89	54	56	89	65	45	381	45	49	359	70
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	192	220	134	200	112	82	124	1032	119	154	1106	1162
Arrive On Green	0.06	0.20	0.20	0.11	0.11	0.11	1.00	1.00	1.00	0.72	0.72	0.72
Sat Flow, veh/h	1781	1090	661	1265	1013	740	126	1430	164	166	1532	1610
Grp Volume(v), veh/h	89	0	143	56	0	154	471	0	0	408	0	70
Grp Sat Flow(s),veh/h/ln	1781	0	1751	1265	0	1752	1721	0	0	1698	0	1610
Q Serve(g_s), s	5.2	0.0	8.5	4.9	0.0	10.3	0.0	0.0	0.0	0.0	0.0	1.5
Cycle Q Clear(g_c), s	5.2	0.0	8.5	4.9	0.0	10.3	0.0	0.0	0.0	9.4	0.0	1.5
Prop In Lane	1.00		0.38	1.00		0.42	0.10		0.10	0.12		1.00
Lane Grp Cap(c), veh/h	192	0	354	200	0	194	1275	0	0	1260	0	1162
V/C Ratio(X)	0.46	0.00	0.40	0.28	0.00	0.80	0.37	0.00	0.00	0.32	0.00	0.06
Avail Cap(c_a), veh/h	236	0	581	332	0	377	1275	0	0	1260	0	1162
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.7	0.0	41.6	49.7	0.0	52.0	0.0	0.0	0.0	5.9	0.0	4.9
Incr Delay (d2), s/veh	0.7	0.0	0.9	0.9	0.0	8.6	0.8	0.0	0.0	0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	0.0	6.8	2.9	0.0	8.6	0.5	0.0	0.0	6.2	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.4	0.0	42.5	50.6	0.0	60.6	0.8	0.0	0.0	6.6	0.0	4.9
LnGrp LOS	D	A	D	D	A	E	A	A	A	A	A	A
Approach Vol, veh/h		232			210			471			478	
Approach Delay, s/veh		42.8			58.0			0.8			6.4	
Approach LOS		D			E			A			A	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		91.5		28.5		91.5	11.0	17.5				
Change Period (Y+Rc), s		4.9		* 4.2		4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		71.1		* 40		71.1	* 9.8	* 26				
Max Q Clear Time (g_c+I1), s		2.0		10.5		11.4	7.2	12.3				
Green Ext Time (p_c), s		4.3		1.0		3.9	0.0	1.0				

Intersection Summary												
HCM 6th Ctrl Delay			18.4									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	6.6

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	290	125	25	290	150	35
Future Vol, veh/h	290	125	25	290	150	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	115	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	81	81	66	66
Heavy Vehicles, %	2	0	7	1	1	8
Mvmt Flow	345	149	31	358	227	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	494	0	765	345
Stage 1	-	-	-	-	345	-
Stage 2	-	-	-	-	420	-
Critical Hdwy	-	-	4.17	-	6.41	6.28
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.263	-	3.509	3.372
Pot Cap-1 Maneuver	-	-	1044	-	373	684
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	665	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1044	-	362	684
Mov Cap-2 Maneuver	-	-	-	-	362	-
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	645	-

Approach	NB	SB	SW
HCM Control Delay, s	0	0.7	26.6
HCM LOS			D

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1	SWLn2
Capacity (veh/h)	-	-	1044	-	362	684
HCM Lane V/C Ratio	-	-	0.03	-	0.628	0.078
HCM Control Delay (s)	-	-	8.6	-	30.3	10.7
HCM Lane LOS	-	-	A	-	D	B
HCM 95th %tile Q(veh)	-	-	0.1	-	4.1	0.3

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	20	220	5	15	270
Future Vol, veh/h	10	20	220	5	15	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	17	34	282	6	21	386

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	713	285	0	0	288	0
Stage 1	285	-	-	-	-	-
Stage 2	428	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	411	834	-	-	1307	-
Stage 1	813	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	403	834	-	-	1307	-
Mov Cap-2 Maneuver	403	-	-	-	-	-
Stage 1	813	-	-	-	-	-
Stage 2	684	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	615	1307	-
HCM Lane V/C Ratio	-	-	0.083	0.016	-
HCM Control Delay (s)	-	-	11.4	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	25	295	50	30	305
Future Vol, veh/h	30	25	295	50	30	305
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	63	63	78	78
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	45	38	468	79	38	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	975	508	0	0	547	0
Stage 1	508	-	-	-	-	-
Stage 2	467	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	269	636	-	-	1011	-
Stage 1	635	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	256	636	-	-	1011	-
Mov Cap-2 Maneuver	256	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	605	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	351	1011	-
HCM Lane V/C Ratio	-	-	0.237	0.038	-
HCM Control Delay (s)	-	-	18.4	8.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-

Intersection	
Intersection Delay, s/veh	61.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	140	10	90	95	70	5	245	90	75	255	60
Future Vol, veh/h	75	140	10	90	95	70	5	245	90	75	255	60
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Heavy Vehicles, %	1	5	0	2	2	4	0	1	1	0	1	0
Mvmt Flow	95	177	13	108	114	84	7	322	118	100	340	80
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

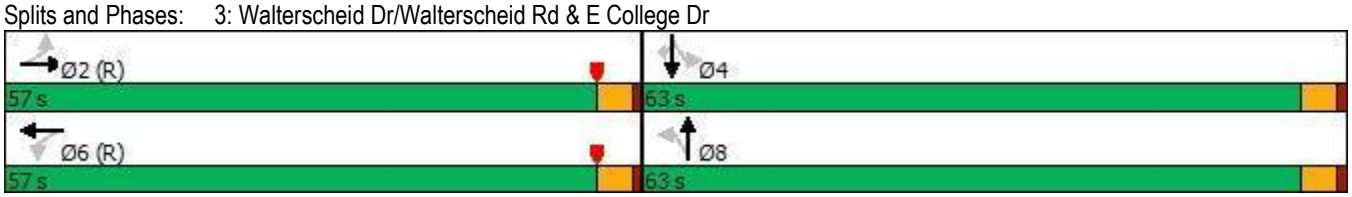
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	35.9	22.1	93.7	72
HCM LOS	E	C	F	F

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	1%	33%	49%	0%	23%	0%
Vol Thru, %	72%	62%	51%	0%	77%	0%
Vol Right, %	26%	4%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	340	225	185	70	330	60
LT Vol	5	75	90	0	75	0
Through Vol	245	140	95	0	255	0
RT Vol	90	10	0	70	0	60
Lane Flow Rate	447	285	223	84	440	80
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	1.068	0.737	0.581	0.198	1.031	0.17
Departure Headway (Hd)	8.753	9.823	9.837	8.85	8.813	7.984
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	416	370	370	408	414	452
Service Time	6.753	7.823	7.537	6.55	6.513	5.684
HCM Lane V/C Ratio	1.075	0.77	0.603	0.206	1.063	0.177
HCM Control Delay	93.7	35.9	25.3	13.7	82.8	12.3
HCM Lane LOS	F	E	D	B	F	B
HCM 95th-tile Q	14.7	5.7	3.5	0.7	13.4	0.6

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	175	440	110	385	180	165	230	175	165
Future Volume (vph)	175	440	110	385	180	165	230	175	165
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		8		4	
Permitted Phases	2		6		8		4		4
Detector Phase	2	2	6	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	18.2	18.2	18.2	18.2	21.2	21.2	21.2	21.2	21.2
Total Split (s)	57.0	57.0	57.0	57.0	63.0	63.0	63.0	63.0	63.0
Total Split (%)	47.5%	47.5%	47.5%	47.5%	52.5%	52.5%	52.5%	52.5%	52.5%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.2		4.2	4.2
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
Act Effct Green (s)	52.8	52.8	52.8	52.8		58.8		58.8	58.8
Actuated g/C Ratio	0.44	0.44	0.44	0.44		0.49		0.49	0.49
v/c Ratio	1.90	1.09	2.16	0.85		5.68		1.34	0.31
Control Delay	459.2	91.8	592.2	41.1		2121.9		197.5	16.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	459.2	91.8	592.2	41.1		2121.9		197.5	16.7
LOS	F	F	F	D		F		F	B
Approach Delay		172.6		136.7		2121.9		145.1	
Approach LOS		F		F		F		F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 5.68	
Intersection Signal Delay: 952.0	Intersection LOS: F
Intersection Capacity Utilization 101.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	440	180	110	385	140	180	165	115	230	175	165
Future Volume (veh/h)	175	440	180	110	385	140	180	165	115	230	175	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	236	595	243	136	475	173	720	660	460	338	257	243
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	134	529	216	60	548	200	42	0	0	328	214	752
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.49	0.49	0.49	0.16	0.16	0.16
Sat Flow, veh/h	783	1202	491	666	1246	454	0	0	0	573	436	1535
Grp Volume(v), veh/h	236	0	838	136	0	648	1840	0	0	595	0	243
Grp Sat Flow(s),veh/h/ln	783	0	1693	666	0	1700	0	0	0	1009	0	1535
Q Serve(g_s), s	11.4	0.0	52.8	0.0	0.0	41.4	0.0	0.0	0.0	0.0	0.0	16.8
Cycle Q Clear(g_c), s	52.8	0.0	52.8	52.8	0.0	41.4	58.8	0.0	0.0	58.8	0.0	16.8
Prop In Lane	1.00		0.29	1.00		0.27	0.39		0.25	0.57		1.00
Lane Grp Cap(c), veh/h	134	0	745	60	0	748	42	0	0	541	0	752
V/C Ratio(X)	1.76	0.00	1.12	2.27	0.00	0.87	44.08	0.00	0.00	1.10	0.00	0.32
Avail Cap(c_a), veh/h	134	0	745	60	0	748	42	0	0	541	0	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	56.8	0.0	33.6	60.0	0.0	30.4	60.0	0.0	0.0	52.9	0.0	32.7
Incr Delay (d2), s/veh	369.0	0.0	73.0	619.4	0.0	12.9	19431.4	0.0	0.0	68.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	32.0	0.0	50.0	21.9	0.0	26.4	372.2	0.0	0.0	39.1	0.0	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	425.9	0.0	106.6	679.4	0.0	43.3	19491.4	0.0	0.0	121.4	0.0	32.8
LnGrp LOS	F	A	F	F	A	D	F	A	A	F	A	C
Approach Vol, veh/h		1074			784			1840			838	
Approach Delay, s/veh		176.7			153.6			19491.4			95.7	
Approach LOS		F			F			F			F	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		57.0		63.0		57.0		63.0				
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 53		* 59		* 53		* 59				
Max Q Clear Time (g_c+I1), s		54.8		60.8		54.8		60.8				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	7992.7	
HCM 6th LOS	F	

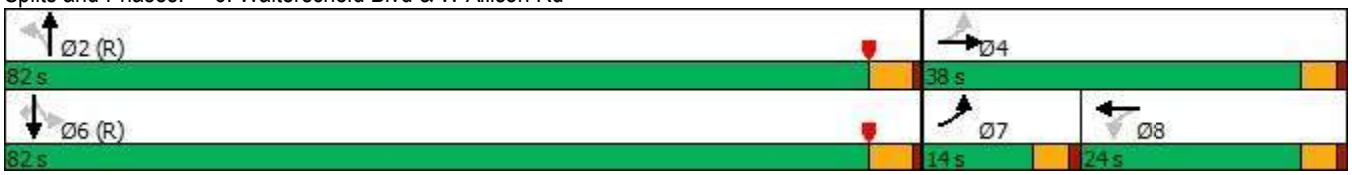
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	110	125	45	85	60	340	40	440	65
Future Volume (vph)	110	125	45	85	60	340	40	440	65
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	19.5	19.5	19.5	19.9	19.9	19.9	19.9	19.9
Total Split (s)	14.0	38.0	24.0	24.0	82.0	82.0	82.0	82.0	82.0
Total Split (%)	11.7%	31.7%	20.0%	20.0%	68.3%	68.3%	68.3%	68.3%	68.3%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.9	3.9	3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2		4.9		4.9	4.9
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	Min	Min	Min	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	31.2	31.2	17.2	17.2		79.7		79.7	79.7
Actuated g/C Ratio	0.26	0.26	0.14	0.14		0.66		0.66	0.66
v/c Ratio	0.84	0.85	0.90	0.71		0.77		0.61	0.08
Control Delay	67.4	55.9	124.8	59.7		14.6		15.0	3.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	67.4	55.9	124.8	59.7		14.6		15.0	3.8
LOS	E	E	F	E		B		B	A
Approach Delay		59.7		77.5		14.6		13.6	
Approach LOS		E		E		B		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 33.0	Intersection LOS: C
Intersection Capacity Utilization 81.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	125	100	45	85	35	60	340	65	40	440	65
Future Volume (veh/h)	110	125	100	45	85	35	60	340	65	40	440	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	196	223	179	73	137	56	90	507	97	56	620	92
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	282	271	217	124	210	86	108	571	105	84	836	1035
Arrive On Green	0.08	0.28	0.28	0.17	0.17	0.17	1.00	1.00	1.00	0.64	0.64	0.64
Sat Flow, veh/h	1781	961	771	998	1272	520	115	889	163	80	1302	1610
Grp Volume(v), veh/h	196	0	402	73	0	193	694	0	0	676	0	92
Grp Sat Flow(s),veh/h/ln	1781	0	1732	998	0	1792	1168	0	0	1382	0	1610
Q Serve(g_s), s	9.8	0.0	26.1	7.7	0.0	12.1	44.8	0.0	0.0	0.0	0.0	2.6
Cycle Q Clear(g_c), s	9.8	0.0	26.1	19.8	0.0	12.1	77.1	0.0	0.0	32.3	0.0	2.6
Prop In Lane	1.00		0.45	1.00		0.29	0.13		0.14	0.08		1.00
Lane Grp Cap(c), veh/h	282	0	488	124	0	296	784	0	0	920	0	1035
V/C Ratio(X)	0.70	0.00	0.82	0.59	0.00	0.65	0.89	0.00	0.00	0.73	0.00	0.09
Avail Cap(c_a), veh/h	282	0	488	124	0	296	784	0	0	920	0	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	40.3	56.6	0.0	46.9	9.2	0.0	0.0	12.5	0.0	8.1
Incr Delay (d2), s/veh	6.1	0.0	11.2	7.7	0.0	5.4	13.9	0.0	0.0	5.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.0	0.0	18.3	4.5	0.0	9.8	18.4	0.0	0.0	16.3	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	0.0	51.5	64.3	0.0	52.3	23.2	0.0	0.0	17.7	0.0	8.3
LnGrp LOS	D	A	D	E	A	D	C	A	A	B	A	A
Approach Vol, veh/h		598			266			694			768	
Approach Delay, s/veh		49.4			55.6			23.2			16.5	
Approach LOS		D			E			C			B	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		82.0		38.0		82.0	14.0	24.0				
Change Period (Y+Rc), s		4.9		* 4.2		4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		77.1		* 34		77.1	* 9.8	* 20				
Max Q Clear Time (g_c+I1), s		79.1		28.1		34.3	11.8	21.8				
Green Ext Time (p_c), s		0.0		1.4		7.5	0.0	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	33.5

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	375	205	40	425	190	30
Future Vol, veh/h	375	205	40	425	190	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	115	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	81	81	66	66
Heavy Vehicles, %	2	0	7	1	1	8
Mvmt Flow	446	244	49	525	288	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	690	0	1069	446
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	623	-
Critical Hdwy	-	-	4.17	-	6.41	6.28
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.263	-	3.509	3.372
Pot Cap-1 Maneuver	-	-	882	-	~ 246	600
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	537	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	882	-	~ 232	600
Mov Cap-2 Maneuver	-	-	-	-	~ 232	-
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	507	-

Approach	NB	SB	SW
HCM Control Delay, s	0	0.8	159.1
HCM LOS			F

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1	SWLn2
Capacity (veh/h)	-	-	882	-	232	600
HCM Lane V/C Ratio	-	-	0.056	-	1.241	0.076
HCM Control Delay (s)	-	-	9.3	-	182.4	11.5
HCM Lane LOS	-	-	A	-	F	B
HCM 95th %tile Q(veh)	-	-	0.2	-	14.5	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	15	430	25	20	470
Future Vol, veh/h	20	15	430	25	20	470
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	34	25	551	32	29	671

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1296	567	0	0	583	0
Stage 1	567	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	140	618	-	-	979	-
Stage 1	611	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	134	618	-	-	979	-
Mov Cap-2 Maneuver	134	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	463	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30.1	0	0.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	202	979	-
HCM Lane V/C Ratio	-	-	0.294	0.029	-
HCM Control Delay (s)	-	-	30.1	8.8	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-

Intersection	
Int Delay, s/veh	34.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	85	45	440	55	30	455
Future Vol, veh/h	85	45	440	55	30	455
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	63	63	78	78
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	129	68	698	87	38	583

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1401	742	0	0	785	0
Stage 1	742	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 111	459	-	-	761	-
Stage 1	472	-	-	-	-	-
Stage 2	518	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	~ 102	459	-	-	761	-
Mov Cap-2 Maneuver	~ 102	-	-	-	-	-
Stage 1	472	-	-	-	-	-
Stage 2	480	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	279.3	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	140	761	-
HCM Lane V/C Ratio	-	-	1.407	0.051	-
HCM Control Delay (s)	-	-	279.3	10	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	12.9	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	277
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	150	210	20	135	180	70	25	335	165	90	370	165
Future Vol, veh/h	150	210	20	135	180	70	25	335	165	90	370	165
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Heavy Vehicles, %	1	5	0	2	2	4	0	1	1	0	1	0
Mvmt Flow	190	266	25	163	217	84	33	441	217	120	493	220
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	225.3	92.2	454.2	262.8
HCM LOS	F	F	F	F

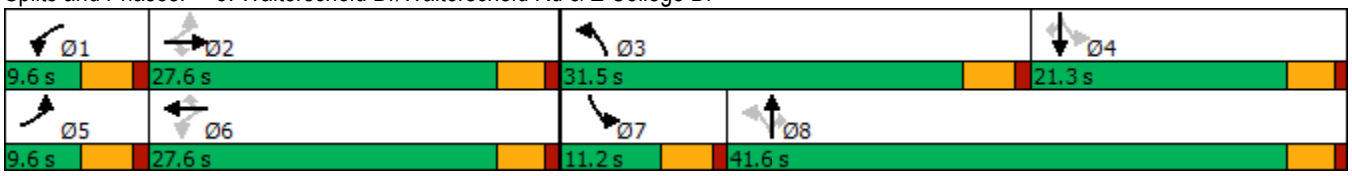
Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	5%	39%	43%	0%	20%	0%
Vol Thru, %	64%	55%	57%	0%	80%	0%
Vol Right, %	31%	5%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	525	380	315	70	460	165
LT Vol	25	150	135	0	90	0
Through Vol	335	210	180	0	370	0
RT Vol	165	20	0	70	0	165
Lane Flow Rate	691	481	380	84	613	220
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	1.921	1.37	1.047	0.211	1.668	0.551
Departure Headway (Hd)	12.373	14.101	13.836	12.856	13.243	12.407
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	304	265	266	282	282	293
Service Time	10.373	12.101	11.536	10.556	10.943	10.107
HCM Lane V/C Ratio	2.273	1.815	1.429	0.298	2.174	0.751
HCM Control Delay	454.2	225.3	108.5	19	346.6	29.3
HCM Lane LOS	F	F	F	C	F	D
HCM 95th-tile Q	38.9	18.8	10.9	0.8	28.6	3.1

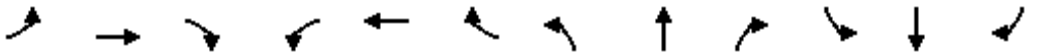
APPENDIX G. FUTURE (2045) BUILD ALTERNATIVES LEVEL OF SERVICE WORKSHEETS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	265	170	120	360	185	175	170	115	125	160	100
Future Volume (vph)	110	265	170	120	360	185	175	170	115	125	160	100
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	18.2	18.2	9.5	18.2	18.2	9.5	21.2	21.2	9.5	21.2	21.2
Total Split (s)	9.6	27.6	27.6	9.6	27.6	27.6	31.5	41.6	41.6	11.2	21.3	21.3
Total Split (%)	10.7%	30.7%	30.7%	10.7%	30.7%	30.7%	35.0%	46.2%	46.2%	12.4%	23.7%	23.7%
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.2	4.2	4.5	4.2	4.2	4.5	4.2	4.2	4.5	4.2	4.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	27.9	23.1	23.1	27.9	23.1	23.1	45.3	34.3	34.3	20.4	14.0	14.0
Actuated g/C Ratio	0.32	0.27	0.27	0.32	0.27	0.27	0.52	0.40	0.40	0.24	0.16	0.16
v/c Ratio	0.79	0.76	0.38	0.61	0.95	0.39	1.06	0.90	0.56	0.85	0.77	0.37
Control Delay	52.7	42.5	5.9	33.1	64.4	6.0	75.8	42.1	9.1	52.7	51.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	42.5	5.9	33.1	64.4	6.0	75.8	42.1	9.1	52.7	51.8	5.9
LOS	D	D	A	C	E	A	E	D	A	D	D	A
Approach Delay		33.1			42.5			46.7			40.2	
Approach LOS		C			D			D			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 42.4	Intersection LOS: D
Intersection Capacity Utilization 57.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	265	170	120	360	185	175	170	115	125	160	100
Future Volume (veh/h)	110	265	170	120	360	185	175	170	115	125	160	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	149	358	230	148	444	228	700	680	460	184	235	147
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	212	478	432	265	478	425	689	735	623	246	280	226
Arrive On Green	0.06	0.27	0.27	0.06	0.27	0.27	0.32	0.39	0.39	0.08	0.15	0.15
Sat Flow, veh/h	1781	1781	1610	1810	1781	1585	1810	1900	1610	1753	1900	1535
Grp Volume(v), veh/h	149	358	230	148	444	228	700	680	460	184	235	147
Grp Sat Flow(s),veh/h/ln	1781	1781	1610	1810	1781	1585	1810	1900	1610	1753	1900	1535
Q Serve(g_s), s	5.1	15.6	10.3	5.1	20.6	10.4	27.0	28.9	20.8	6.7	10.2	7.7
Cycle Q Clear(g_c), s	5.1	15.6	10.3	5.1	20.6	10.4	27.0	28.9	20.8	6.7	10.2	7.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	212	478	432	265	478	425	689	735	623	246	280	226
V/C Ratio(X)	0.70	0.75	0.53	0.56	0.93	0.54	1.02	0.93	0.74	0.75	0.84	0.65
Avail Cap(c_a), veh/h	212	492	445	265	492	438	689	839	711	246	384	310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	28.4	26.4	22.5	30.2	26.5	19.6	24.8	22.3	30.2	35.1	34.1
Incr Delay (d2), s/veh	10.0	5.3	0.5	2.6	23.3	0.6	38.3	13.9	2.8	12.0	8.7	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.8	11.5	6.9	4.1	17.1	6.9	24.5	21.2	12.3	7.0	9.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	33.7	27.0	25.1	53.5	27.1	57.8	38.7	25.1	42.2	43.8	35.2
LnGrp LOS	C	C	C	C	D	C	F	D	C	D	D	D
Approach Vol, veh/h		737			820			1840			566	
Approach Delay, s/veh		31.7			41.0			42.6			41.1	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	26.9	31.5	16.7	9.6	26.9	11.2	37.0
Change Period (Y+Rc), s	4.5	* 4.2	4.5	* 4.2	4.5	* 4.2	4.5	* 4.2
Max Green Setting (Gmax), s	5.1	* 23	27.0	* 17	5.1	* 23	6.7	* 37
Max Q Clear Time (g_c+I1), s	7.1	17.6	29.0	12.2	7.1	22.6	8.7	30.9
Green Ext Time (p_c), s	0.0	0.6	0.0	0.3	0.0	0.2	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	40.0
HCM 6th LOS	D

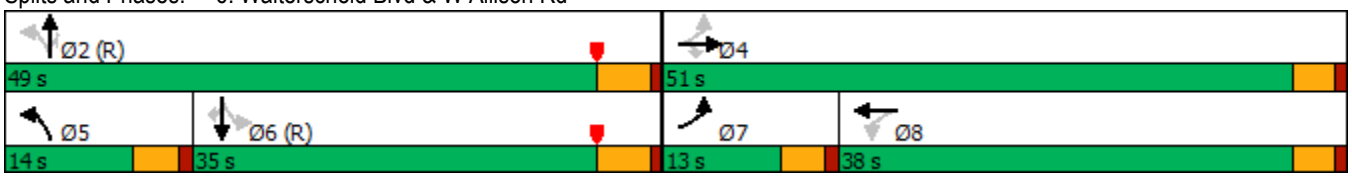
Notes

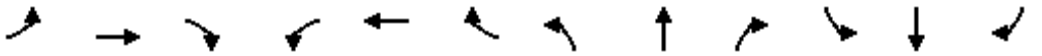
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	125	225	130	20	300	160	405	30	10	330	345
Future Volume (vph)	125	225	130	20	300	160	405	30	10	330	345
Turn Type	pm+pt	NA	Perm	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8	5	2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	19.5	19.5	19.5	19.5	9.5	19.9	19.9	19.9	19.9	19.9
Total Split (s)	13.0	51.0	51.0	38.0	38.0	14.0	49.0	49.0	35.0	35.0	35.0
Total Split (%)	13.0%	51.0%	51.0%	38.0%	38.0%	14.0%	49.0%	49.0%	35.0%	35.0%	35.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.5	3.9	3.9	3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2	4.2	4.5	4.9	4.9	4.9	4.9	4.9
Lead/Lag	Lead			Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	Min	Min	Min	Min	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	43.8	43.8	43.8	30.8	30.8	47.5	47.1	47.1	31.7	31.7	31.7
Actuated g/C Ratio	0.44	0.44	0.44	0.31	0.31	0.48	0.47	0.47	0.32	0.32	0.32
v/c Ratio	0.97	0.49	0.29	0.10	0.87	0.77	0.69	0.06	0.07	0.80	0.70
Control Delay	75.5	22.0	3.1	24.2	48.4	37.5	26.7	3.2	26.3	43.7	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	22.0	3.1	24.2	48.4	37.5	26.7	3.2	26.3	43.7	19.5
LOS	E	C	A	C	D	D	C	A	C	D	B
Approach Delay		30.8			46.9		28.4			31.3	
Approach LOS		C			D		C			C	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 32.9	Intersection LOS: C
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	225	130	20	300	10	160	405	30	10	330	345
Future Volume (veh/h)	125	225	130	20	300	10	160	405	30	10	330	345
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	223	402	232	32	484	16	239	604	45	14	465	486
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	265	797	665	289	538	18	312	903	777	260	636	552
Arrive On Green	0.09	0.43	0.43	0.30	0.30	0.30	0.09	0.48	0.48	0.34	0.34	0.34
Sat Flow, veh/h	1781	1870	1560	806	1814	60	1767	1870	1610	795	1856	1610
Grp Volume(v), veh/h	223	402	232	32	0	500	239	604	45	14	465	486
Grp Sat Flow(s),veh/h/ln	1781	1870	1560	806	0	1874	1767	1870	1610	795	1856	1610
Q Serve(g_s), s	8.5	15.7	10.0	3.0	0.0	25.6	8.5	24.7	1.5	1.4	22.0	28.4
Cycle Q Clear(g_c), s	8.5	15.7	10.0	5.7	0.0	25.6	8.5	24.7	1.5	12.0	22.0	28.4
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	797	665	289	0	555	312	903	777	260	636	552
V/C Ratio(X)	0.84	0.50	0.35	0.11	0.00	0.90	0.77	0.67	0.06	0.05	0.73	0.88
Avail Cap(c_a), veh/h	265	875	730	323	0	634	312	903	777	260	636	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	21.0	19.3	27.8	0.0	33.8	21.7	19.8	13.8	29.7	28.8	30.9
Incr Delay (d2), s/veh	20.0	0.6	0.4	0.2	0.0	15.1	10.9	3.9	0.1	0.4	7.3	18.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.6	11.1	6.5	1.1	0.0	19.8	7.6	16.5	1.0	0.5	16.0	19.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	21.6	19.7	28.0	0.0	48.9	32.6	23.7	13.9	30.1	36.1	49.0
LnGrp LOS	D	C	B	C	A	D	C	C	B	C	D	D
Approach Vol, veh/h		857			532			888			965	
Approach Delay, s/veh		27.2			47.6			25.6			42.5	
Approach LOS		C			D			C			D	

Timer - Assigned Phs		2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s		53.2		46.8	14.0	39.2	13.0	33.8				
Change Period (Y+Rc), s		4.9		* 4.2	4.5	4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		44.1		* 47	9.5	30.1	* 8.8	* 34				
Max Q Clear Time (g_c+I1), s		26.7		17.7	10.5	30.4	10.5	27.6				
Green Ext Time (p_c), s		4.6		4.4	0.0	0.0	0.0	2.0				

Intersection Summary		
HCM 6th Ctrl Delay		34.6
HCM 6th LOS		C

Notes

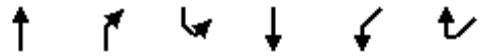
User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	405	230	30	275	220	20
Future Volume (vph)	405	230	30	275	220	20
Turn Type	NA	pm+ov	Perm	NA	Prot	Prot
Protected Phases	2	8		6	8	8
Permitted Phases		2	6			
Detector Phase	2	8	6	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	51.0	39.0	51.0	51.0	39.0	39.0
Total Split (%)	56.7%	43.3%	56.7%	56.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	None	Max	Max	None	None
Act Effct Green (s)	46.8	75.0	46.8	46.8	19.2	19.2
Actuated g/C Ratio	0.62	1.00	0.62	0.62	0.26	0.26
v/c Ratio	0.42	0.17	0.08	0.29	0.73	0.07
Control Delay	9.6	0.2	7.8	8.3	35.2	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	0.2	7.8	8.3	35.2	8.0
LOS	A	A	A	A	D	A
Approach Delay	6.2			8.3	32.9	
Approach LOS	A			A	C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 13.2	Intersection LOS: B
Intersection Capacity Utilization 44.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Walterscheid Blvd & Deming Dr



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	405	230	30	275	220	20
Future Volume (veh/h)	405	230	30	275	220	20
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1900	1796	1885	1885	1781
Adj Flow Rate, veh/h	482	274	37	340	333	30
Peak Hour Factor	0.84	0.84	0.81	0.81	0.66	0.66
Percent Heavy Veh, %	2	0	7	1	1	8
Cap, veh/h	1222	1407	464	1231	396	333
Arrive On Green	0.65	0.65	0.65	0.65	0.22	0.22
Sat Flow, veh/h	1870	1610	680	1885	1795	1510
Grp Volume(v), veh/h	482	274	37	340	333	30
Grp Sat Flow(s),veh/h/ln	1870	1610	680	1885	1795	1510
Q Serve(g_s), s	8.6	1.8	1.9	5.4	12.6	1.1
Cycle Q Clear(g_c), s	8.6	1.8	10.5	5.4	12.6	1.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1222	1407	464	1231	396	333
V/C Ratio(X)	0.39	0.19	0.08	0.28	0.84	0.09
Avail Cap(c_a), veh/h	1222	1407	464	1231	870	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.8	0.7	8.2	5.2	26.6	22.1
Incr Delay (d2), s/veh	1.0	0.3	0.3	0.6	4.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.2	2.6	0.5	3.3	9.6	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.7	1.0	8.6	5.8	31.4	22.2
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	756			377	363	
Approach Delay, s/veh	4.6			6.1	30.7	
Approach LOS	A			A	C	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	51.0				51.0	20.2
Change Period (Y+Rc), s	4.5				4.5	4.5
Max Green Setting (Gmax), s	46.5				46.5	34.5
Max Q Clear Time (g_c+I1), s	10.6				12.5	14.6
Green Ext Time (p_c), s	4.5				2.6	1.1

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	6.3
Intersection LOS	A

Approach	NB	SB	SW
Entry Lanes	2	2	2
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	756	377	363
Demand Flow Rate, veh/h	766	383	368
Vehicles Circulating, veh/h	40	336	492
Vehicles Exiting, veh/h	679	524	314
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.4	6.5	7.9
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	L	TR	L	TR
Assumed Moves	LT	R	L	TR	L	TR
RT Channelized						
Lane Util	0.642	0.358	0.104	0.896	0.913	0.087
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.544	4.544
Entry Flow, veh/h	492	274	40	343	336	32
Cap Entry Lane, veh/h	1369	1369	1046	1046	908	908
Entry HV Adj Factor	0.980	1.000	0.925	0.990	0.991	0.938
Flow Entry, veh/h	482	274	37	340	333	30
Cap Entry, veh/h	1342	1369	968	1036	899	851
V/C Ratio	0.359	0.200	0.038	0.328	0.370	0.035
Control Delay, s/veh	6.0	4.3	4.1	6.8	8.2	4.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	1	0	1	2	0

MOVEMENT SUMMARY

Site: 1 [Deming & Walterscheid 2045 AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Walterscheid														
8	T1	405	2.0	482	2.0	0.578	9.3	LOS A	5.3	132.9	0.28	0.11	0.28	33.0
18	R2	230	0.0	274	0.0	0.578	9.3	LOS A	5.3	132.9	0.28	0.11	0.28	32.1
Approach		635	1.3	756	1.3	0.578	9.3	LOS A	5.3	132.9	0.28	0.11	0.28	32.7
East: Fox Farm														
1	L2	220	1.0	333	1.0	0.442	10.0	LOS A	2.7	68.5	0.67	0.72	0.82	30.6
16	R2	20	8.0	30	8.0	0.442	10.3	LOS B	2.7	68.5	0.67	0.72	0.82	29.6
Approach		240	1.6	364	1.6	0.442	10.0	LOS B	2.7	68.5	0.67	0.72	0.82	30.5
North: Walterscheid														
7	L2	30	7.0	37	7.0	0.391	8.3	LOS A	2.1	53.4	0.57	0.49	0.57	33.3
4	T1	275	1.0	340	1.0	0.391	8.0	LOS A	2.1	53.4	0.57	0.49	0.57	33.4
Approach		305	1.6	377	1.6	0.391	8.1	LOS A	2.1	53.4	0.57	0.49	0.57	33.4
All Vehicles		1180	1.4	1496	1.4	0.578	9.2	LOS A	5.3	132.9	0.45	0.35	0.49	32.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Operational Results

2045 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Deming Drive	None	247		145		353	851		0.2904	
2	Walterscheid Blvd	None	533		24		368	908		0.5873	
3	Deming Drive	None	158		340		217	745		0.2125	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Deming Drive	None	8.27		8.27	1.25		A		A
2	Walterscheid Blvd	None	13.46		13.46	4.65		B		B
3	Deming Drive	None	8.04		8.04	0.84		A		A

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	20	385	10	15	395
Future Vol, veh/h	15	20	385	10	15	395
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	25	34	494	13	21	564

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1107	501	0	0	507	0
Stage 1	501	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	208	564	-	-	1068	-
Stage 1	613	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	204	564	-	-	1068	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.7	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	321	1068	-
HCM Lane V/C Ratio	-	-	0.185	0.02	-
HCM Control Delay (s)	-	-	18.7	8.4	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Intersection	
Int Delay, s/veh	28.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	75	25	445	65	35	565
Future Vol, veh/h	75	25	445	65	35	565
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	63	63	78	78
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	114	38	706	103	45	724

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1520	706	0	0	809	0
Stage 1	706	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 88	485	-	-	741	-
Stage 1	497	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	~ 83	485	-	-	741	-
Mov Cap-2 Maneuver	~ 83	-	-	-	-	-
Stage 1	497	-	-	-	-	-
Stage 2	412	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 318.4	0	0.6
HCM LOS	F		

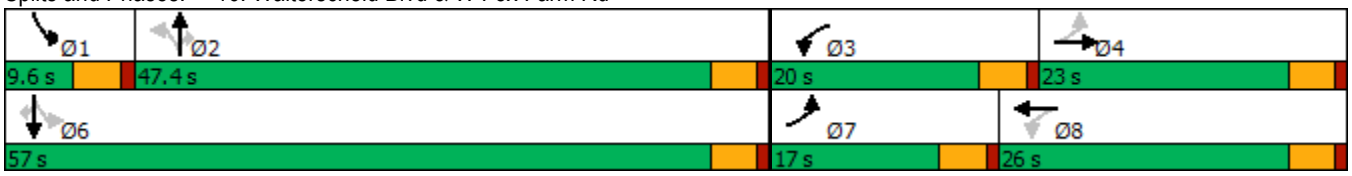
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	105	741	-
HCM Lane V/C Ratio	-	-	1.443	0.061	-
HCM Control Delay (s)	-	-	$ 318.4	10.2	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	11	0.2	-

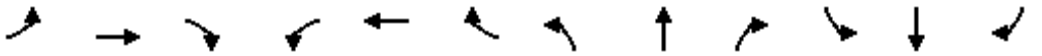
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	155	170	225	140	15	415	145	40	325	115
Future Volume (vph)	155	170	225	140	15	415	145	40	325	115
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	17.0	23.0	20.0	26.0	47.4	47.4	47.4	9.6	57.0	57.0
Total Split (%)	17.0%	23.0%	20.0%	26.0%	47.4%	47.4%	47.4%	9.6%	57.0%	57.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	Max	Max	Max	None	Max	Max
Act Effct Green (s)	27.3	15.9	32.9	18.7	45.1	45.1	45.1	52.6	52.6	52.6
Actuated g/C Ratio	0.28	0.17	0.34	0.19	0.47	0.47	0.47	0.55	0.55	0.55
v/c Ratio	0.55	0.77	0.74	0.62	0.04	0.62	0.22	0.16	0.42	0.17
Control Delay	28.4	55.4	36.8	41.4	17.0	24.8	3.4	12.6	15.2	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	55.4	36.8	41.4	17.0	24.8	3.4	12.6	15.2	6.5
LOS	C	E	D	D	B	C	A	B	B	A
Approach Delay		42.9		38.9		19.2			12.9	
Approach LOS		D		D		B			B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 96.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 26.0	Intersection LOS: C
Intersection Capacity Utilization 63.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Walterscheid Blvd & W Fox Farm Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	170	10	225	140	45	15	415	145	40	325	115
Future Volume (veh/h)	155	170	10	225	140	45	15	415	145	40	325	115
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1900	1870	1870	1841	1900	1885	1885	1900	1885	1900
Adj Flow Rate, veh/h	196	215	13	271	169	54	20	546	191	53	433	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Percent Heavy Veh, %	1	5	0	2	2	4	0	1	1	0	1	0
Cap, veh/h	359	255	15	370	251	80	492	889	753	336	1054	
Arrive On Green	0.11	0.15	0.15	0.15	0.18	0.18	0.47	0.47	0.47	0.04	0.56	0.00
Sat Flow, veh/h	1795	1704	103	1781	1358	434	970	1885	1598	1810	1885	1610
Grp Volume(v), veh/h	196	0	228	271	0	223	20	546	191	53	433	0
Grp Sat Flow(s),veh/h/ln	1795	0	1807	1781	0	1792	970	1885	1598	1810	1885	1610
Q Serve(g_s), s	8.5	0.0	11.5	11.7	0.0	10.9	1.1	20.2	6.7	1.3	12.3	0.0
Cycle Q Clear(g_c), s	8.5	0.0	11.5	11.7	0.0	10.9	5.2	20.2	6.7	1.3	12.3	0.0
Prop In Lane	1.00		0.06	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	359	0	270	370	0	331	492	889	753	336	1054	
V/C Ratio(X)	0.55	0.00	0.84	0.73	0.00	0.67	0.04	0.61	0.25	0.16	0.41	
Avail Cap(c_a), veh/h	396	0	356	402	0	410	492	889	753	362	1054	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	38.9	27.7	0.0	35.6	15.7	18.5	14.9	13.4	11.8	0.0
Incr Delay (d2), s/veh	1.3	0.0	13.2	6.2	0.0	3.1	0.2	3.2	0.8	0.2	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	10.1	9.3	0.0	8.6	0.5	13.9	4.6	0.9	8.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	52.0	33.9	0.0	38.7	15.8	21.6	15.7	13.6	13.0	0.0
LnGrp LOS	C	A	D	C	A	D	B	C	B	B	B	
Approach Vol, veh/h		424			494			757			486	
Approach Delay, s/veh		42.0			36.1			20.0			13.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	8.2	48.8	18.3	18.5		57.0	15.0	21.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	42.9	15.5	18.5		52.5	12.5	21.5				
Max Q Clear Time (g_c+I1), s	3.3	22.2	13.7	13.5		14.3	10.5	12.9				
Green Ext Time (p_c), s	0.0	4.2	0.2	0.5		3.0	0.1	0.8				

Intersection Summary	
HCM 6th Ctrl Delay	26.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	424	494	757	639
Demand Flow Rate, veh/h	437	504	764	643
Vehicles Circulating, veh/h	766	769	477	468
Vehicles Exiting, veh/h	192	472	726	805
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	21.4	29.1	11.5	10.6
Approach LOS	C	D	B	B

Lane	Left	Left	Left	Right	Left	Bypass
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						Yield
Lane Util	1.000	1.000	0.747	0.253	1.000	
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	153
Entry Flow, veh/h	437	504	571	193	490	1134
Cap Entry Lane, veh/h	632	630	920	920	856	1.000
Entry HV Adj Factor	0.971	0.979	0.990	0.990	0.991	153
Flow Entry, veh/h	424	494	566	191	486	1134
Cap Entry, veh/h	613	617	911	910	849	0.135
V/C Ratio	0.692	0.800	0.621	0.210	0.572	4.3
Control Delay, s/veh	21.4	29.1	13.3	6.0	12.6	A
LOS	C	D	B	A	B	0
95th %tile Queue, veh	5	8	4	1	4	

MOVEMENT SUMMARY

Site: 1 [Fox Farm & Walterscheid 2045 AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Walterscheid														
3	L2	15	0.0	19	0.0	0.607	12.9	LOS B	5.8	145.8	0.74	0.91	1.20	31.4
8	T1	415	1.0	532	1.0	0.607	12.9	LOS B	5.8	145.8	0.74	0.91	1.20	31.3
18	R2	145	1.0	186	1.0	0.205	6.0	LOS A	0.9	21.5	0.52	0.47	0.52	33.4
Approach		575	1.0	737	1.0	0.607	11.2	LOS B	5.8	145.8	0.69	0.80	1.03	31.8
East: Fox Farm														
1	L2	225	2.0	288	2.0	0.843	33.3	LOS D	11.3	286.9	0.95	1.45	2.49	23.8
6	T1	140	2.0	179	2.0	0.843	33.3	LOS D	11.3	286.9	0.95	1.45	2.49	23.8
16	R2	45	4.0	58	4.0	0.843	33.4	LOS D	11.3	286.9	0.95	1.45	2.49	23.3
Approach		410	2.2	526	2.2	0.843	33.3	LOS D	11.3	286.9	0.95	1.45	2.49	23.8
North: Walterscheid														
7	L2	40	0.0	51	0.0	0.745	19.6	LOS C	10.4	261.4	0.90	1.23	1.78	28.6
4	T1	325	1.0	417	1.0	0.745	19.7	LOS C	10.4	261.4	0.90	1.23	1.78	28.5
14	R2	115	0.0	147	0.0	0.745	19.6	LOS C	10.4	261.4	0.90	1.23	1.78	27.9
Approach		480	0.7	615	0.7	0.745	19.7	LOS C	10.4	261.4	0.90	1.23	1.78	28.4
West: Fox Farm														
5	L2	155	1.0	199	1.0	0.700	21.8	LOS C	6.3	160.1	0.86	1.13	1.71	27.2
2	T1	170	5.0	218	5.0	0.700	22.0	LOS C	6.3	160.1	0.86	1.13	1.71	27.1
12	R2	10	0.0	13	0.0	0.700	21.8	LOS C	6.3	160.1	0.86	1.13	1.71	26.5
Approach		335	3.0	429	3.0	0.700	21.9	LOS C	6.3	160.1	0.86	1.13	1.71	27.1
All Vehicles		1800	1.6	2308	1.6	0.843	20.5	LOS C	11.3	286.9	0.83	1.12	1.69	27.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Operational Results

2045 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Walterscheid Blvd	None	374		296		480	775		0.4831	
2	Fox Farm Rd	None	261		460		211	652		0.4007	
3	Walterscheid Blvd	None	449		285		437	1023		0.4382	
4	Fox Farm Rd	None	320		456		277	677		0.4722	

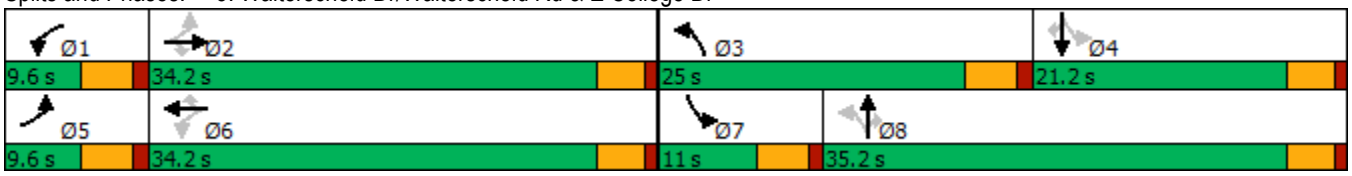
Delays, Queues and Level of Service

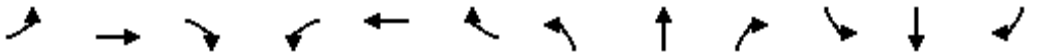
Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Walterscheid Blvd	None	12.45		12.45	3.12		B		B
2	Fox Farm Rd	None	11.87		11.87	2.15		B		B
3	Walterscheid Blvd	None	11.54		11.54	3.41		B		B
4	Fox Farm Rd	None	13.28		13.28	3.00		B		B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	340	130	75	340	60	135	100	75	75	105	130
Future Volume (vph)	75	340	130	75	340	60	135	100	75	75	105	130
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	18.2	18.2	9.5	18.2	18.2	9.5	21.2	21.2	9.5	21.2	21.2
Total Split (s)	9.6	34.2	34.2	9.6	34.2	34.2	25.0	35.2	35.2	11.0	21.2	21.2
Total Split (%)	10.7%	38.0%	38.0%	10.7%	38.0%	38.0%	27.8%	39.1%	39.1%	12.2%	23.6%	23.6%
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.2	4.2	4.5	4.2	4.2	4.5	4.2	4.2	4.5	4.2	4.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	25.6	22.2	22.2	25.6	22.2	22.2	33.8	26.1	26.1	16.3	9.9	9.9
Actuated g/C Ratio	0.35	0.31	0.31	0.35	0.31	0.31	0.47	0.36	0.36	0.23	0.14	0.14
v/c Ratio	0.39	0.85	0.28	0.39	0.78	0.12	0.85	0.58	0.39	0.38	0.59	0.52
Control Delay	18.7	41.2	4.9	19.0	35.2	0.4	32.6	26.9	4.5	19.9	42.7	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	41.2	4.9	19.0	35.2	0.4	32.6	26.9	4.5	19.9	42.7	11.9
LOS	B	D	A	B	D	A	C	C	A	B	D	B
Approach Delay		29.4			28.3			24.0			24.2	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 26.2	Intersection LOS: C
Intersection Capacity Utilization 47.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	340	130	75	340	60	135	100	75	75	105	130
Future Volume (veh/h)	75	340	130	75	340	60	135	100	75	75	105	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	101	459	176	93	420	74	540	400	300	110	154	191
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	263	511	462	235	509	453	661	659	559	334	287	232
Arrive On Green	0.06	0.29	0.29	0.06	0.29	0.29	0.27	0.35	0.35	0.07	0.15	0.15
Sat Flow, veh/h	1781	1781	1610	1810	1781	1585	1810	1900	1610	1753	1900	1535
Grp Volume(v), veh/h	101	459	176	93	420	74	540	400	300	110	154	191
Grp Sat Flow(s),veh/h/ln	1781	1781	1610	1810	1781	1585	1810	1900	1610	1753	1900	1535
Q Serve(g_s), s	2.9	18.2	6.4	2.6	16.2	2.6	17.3	12.8	11.0	3.8	5.5	8.9
Cycle Q Clear(g_c), s	2.9	18.2	6.4	2.6	16.2	2.6	17.3	12.8	11.0	3.8	5.5	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	511	462	235	509	453	661	659	559	334	287	232
V/C Ratio(X)	0.38	0.90	0.38	0.40	0.83	0.16	0.82	0.61	0.54	0.33	0.54	0.82
Avail Cap(c_a), veh/h	281	728	658	256	728	648	684	802	680	364	440	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	25.1	20.9	19.2	24.5	19.7	16.9	19.8	19.2	23.7	28.8	30.2
Incr Delay (d2), s/veh	0.9	8.4	0.2	1.1	3.6	0.1	7.5	0.3	0.3	0.6	0.6	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.1	13.1	4.1	2.0	11.2	1.6	12.2	9.0	6.9	2.8	4.4	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	33.5	21.1	20.3	28.1	19.7	24.3	20.2	19.5	24.3	29.4	35.3
LnGrp LOS	B	C	C	C	C	B	C	C	B	C	C	D
Approach Vol, veh/h		736			587			1240			455	
Approach Delay, s/veh		28.6			25.8			21.8			30.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	25.3	24.1	15.3	8.9	25.2	9.7	29.7
Change Period (Y+Rc), s	4.5	* 4.2	4.5	* 4.2	4.5	* 4.2	4.5	* 4.2
Max Green Setting (Gmax), s	5.1	* 30	20.5	* 17	5.1	* 30	6.5	* 31
Max Q Clear Time (g_c+I1), s	4.6	20.2	19.3	10.9	4.9	18.2	5.8	14.8
Green Ext Time (p_c), s	0.0	0.9	0.3	0.2	0.0	0.8	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

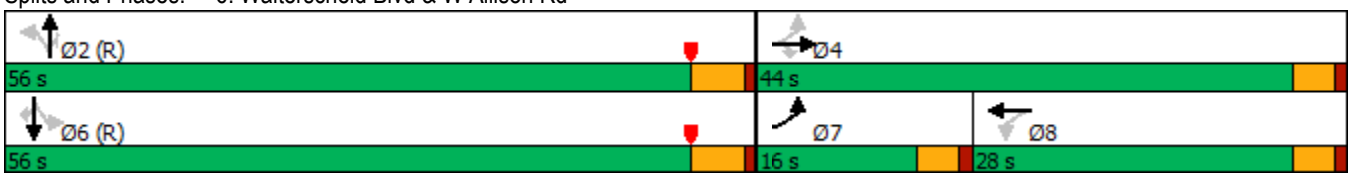
Notes

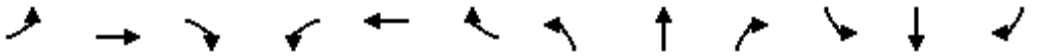
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	50	50	30	35	55	30	255	30	35	255	50
Future Volume (vph)	50	50	30	35	55	30	255	30	35	255	50
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	8	8	2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	19.5	19.5	19.5	19.5	19.9	19.9	19.9	19.9	19.9	19.9
Total Split (s)	16.0	44.0	44.0	28.0	28.0	56.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	16.0%	44.0%	44.0%	28.0%	28.0%	56.0%	56.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2	4.2	4.9	4.9	4.9	4.9	4.9	4.9
Lead/Lag	Lead			Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes						
Recall Mode	None	Min	Min	Min	Min	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	23.9	23.9	23.9	12.6	12.6	67.0	67.0	67.0	67.0	67.0	67.0
Actuated g/C Ratio	0.24	0.24	0.24	0.13	0.13	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.35	0.20	0.13	0.34	0.61	0.07	0.31	0.04	0.08	0.29	0.06
Control Delay	31.1	28.1	7.5	43.7	41.3	8.6	9.3	1.9	8.7	9.2	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	28.1	7.5	43.7	41.3	8.6	9.3	1.9	8.7	9.2	2.5
LOS	C	C	A	D	D	A	A	A	A	A	A
Approach Delay		24.5			41.9		8.5			8.1	
Approach LOS		C			D		A			A	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 16.1	Intersection LOS: B
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	50	30	35	55	40	30	255	30	35	255	50
Future Volume (veh/h)	50	50	30	35	55	40	30	255	30	35	255	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	89	89	54	56	89	65	45	381	45	49	359	70
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	211	401	335	217	116	85	663	1299	1118	674	1289	1118
Arrive On Green	0.06	0.21	0.21	0.11	0.11	0.11	0.69	0.69	0.69	0.69	0.69	0.69
Sat Flow, veh/h	1781	1870	1560	1265	1013	740	951	1870	1610	977	1856	1610
Grp Volume(v), veh/h	89	89	54	56	0	154	45	381	45	49	359	70
Grp Sat Flow(s),veh/h/ln	1781	1870	1560	1265	0	1752	951	1870	1610	977	1856	1610
Q Serve(g_s), s	4.2	3.9	2.8	4.1	0.0	8.5	1.9	7.8	0.9	2.0	7.3	1.4
Cycle Q Clear(g_c), s	4.2	3.9	2.8	4.1	0.0	8.5	9.2	7.8	0.9	9.8	7.3	1.4
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	211	401	335	217	0	201	663	1299	1118	674	1289	1118
V/C Ratio(X)	0.42	0.22	0.16	0.26	0.00	0.76	0.07	0.29	0.04	0.07	0.28	0.06
Avail Cap(c_a), veh/h	319	744	621	373	0	417	663	1299	1118	674	1289	1118
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.9	32.4	32.0	41.0	0.0	42.9	7.5	5.9	4.8	7.8	5.8	4.9
Incr Delay (d2), s/veh	0.5	0.3	0.3	0.7	0.0	7.1	0.2	0.6	0.1	0.2	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.3	3.3	2.0	2.4	0.0	7.3	0.7	5.0	0.5	0.8	4.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	32.7	32.2	41.7	0.0	50.0	7.7	6.4	4.9	8.0	6.3	5.0
LnGrp LOS	D	C	C	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		232			210			471			478	
Approach Delay, s/veh		33.6			47.8			6.4			6.3	
Approach LOS		C			D			A			A	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		74.3		25.7		74.3	10.0	15.7				
Change Period (Y+Rc), s		4.9		* 4.2		4.9	* 4.2	* 4.2				
Max Green Setting (Gmax), s		51.1		* 40		51.1	* 12	* 24				
Max Q Clear Time (g_c+I1), s		11.2		5.9		11.8	6.2	10.5				
Green Ext Time (p_c), s		3.5		0.8		3.5	0.0	1.0				

Intersection Summary												
HCM 6th Ctrl Delay			17.2									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	290	125	25	290	150	35
Future Volume (vph)	290	125	25	290	150	35
Turn Type	NA	pm+ov	Perm	NA	Prot	Prot
Protected Phases	2	8		6	8	8
Permitted Phases		2	6			
Detector Phase	2	8	6	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	51.0	39.0	51.0	51.0	39.0	39.0
Total Split (%)	56.7%	43.3%	56.7%	56.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	None	Max	Max	None	None
Act Effct Green (s)	47.4	70.4	47.4	47.4	14.0	14.0
Actuated g/C Ratio	0.67	1.00	0.67	0.67	0.20	0.20
v/c Ratio	0.28	0.09	0.05	0.28	0.64	0.16
Control Delay	5.9	0.1	5.2	6.0	34.2	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	0.1	5.2	6.0	34.2	8.2
LOS	A	A	A	A	C	A
Approach Delay	4.2			5.9	29.2	
Approach LOS	A			A	C	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 70.4			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 36.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Walterscheid Blvd & Deming Dr

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	290	125	25	290	150	35
Future Volume (veh/h)	290	125	25	290	150	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1900	1796	1885	1885	1781
Adj Flow Rate, veh/h	345	149	31	358	227	53
Peak Hour Factor	0.84	0.84	0.81	0.81	0.66	0.66
Percent Heavy Veh, %	2	0	7	1	1	8
Cap, veh/h	1312	1392	658	1322	292	246
Arrive On Green	0.70	0.70	0.70	0.70	0.16	0.16
Sat Flow, veh/h	1870	1610	867	1885	1795	1510
Grp Volume(v), veh/h	345	149	31	358	227	53
Grp Sat Flow(s),veh/h/ln	1870	1610	867	1885	1795	1510
Q Serve(g_s), s	4.5	0.9	0.9	4.6	8.0	2.0
Cycle Q Clear(g_c), s	4.5	0.9	5.4	4.6	8.0	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1312	1392	658	1322	292	246
V/C Ratio(X)	0.26	0.11	0.05	0.27	0.78	0.22
Avail Cap(c_a), veh/h	1312	1392	658	1322	934	786
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.6	0.7	4.6	3.6	26.6	24.1
Incr Delay (d2), s/veh	0.5	0.2	0.1	0.5	4.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.3	0.9	0.3	2.4	6.5	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	4.1	0.8	4.7	4.2	31.0	24.5
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	494			389	280	
Approach Delay, s/veh	3.1			4.2	29.8	
Approach LOS	A			A	C	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	51.0				51.0	15.3
Change Period (Y+Rc), s	4.5				4.5	4.5
Max Green Setting (Gmax), s	46.5				46.5	34.5
Max Q Clear Time (g_c+I1), s	6.5				7.4	10.0
Green Ext Time (p_c), s	2.8				2.6	0.8

Intersection Summary						
HCM 6th Ctrl Delay			9.9			
HCM 6th LOS			A			

Intersection	
Intersection Delay, s/veh	5.2
Intersection LOS	A

Approach	NB	SB	SW
Entry Lanes	2	2	2
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	494	389	280
Demand Flow Rate, veh/h	501	395	286
Vehicles Circulating, veh/h	33	229	352
Vehicles Exiting, veh/h	591	409	182
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.4	6.0	5.4
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	L	TR	L	TR
Assumed Moves	LT	R	L	TR	L	TR
RT Channelized						
Lane Util	0.703	0.297	0.084	0.916	0.801	0.199
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.544	4.544
Entry Flow, veh/h	352	149	33	362	229	57
Cap Entry Lane, veh/h	1378	1378	1153	1153	1031	1031
Entry HV Adj Factor	0.980	1.000	0.939	0.990	0.991	0.930
Flow Entry, veh/h	345	149	31	358	227	53
Cap Entry, veh/h	1351	1378	1083	1142	1022	958
V/C Ratio	0.255	0.108	0.029	0.314	0.222	0.055
Control Delay, s/veh	4.9	3.5	3.6	6.2	5.6	4.3
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	0	0	1	1	0

MOVEMENT SUMMARY

Site: 1 [Deming & Walterscheid 2045 MD (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Walterscheid														
8	T1	290	1.0	354	1.0	0.381	6.3	LOS A	2.5	62.8	0.17	0.06	0.17	34.6
18	R2	125	0.0	152	0.0	0.381	6.3	LOS A	2.5	62.8	0.17	0.06	0.17	33.6
Approach		415	0.7	506	0.7	0.381	6.3	LOS A	2.5	62.8	0.17	0.06	0.17	34.3
East: Fox Farm														
1	L2	150	2.0	214	2.0	0.286	6.8	LOS A	1.4	34.9	0.53	0.45	0.53	32.1
16	R2	35	12.0	50	12.0	0.286	7.2	LOS A	1.4	34.9	0.53	0.45	0.53	31.0
Approach		185	3.9	264	3.9	0.286	6.9	LOS A	1.4	34.9	0.53	0.45	0.53	31.9
North: Walterscheid														
7	L2	25	4.0	29	4.0	0.343	6.8	LOS A	1.9	47.4	0.46	0.33	0.46	34.1
4	T1	290	2.0	341	2.0	0.343	6.8	LOS A	1.9	47.4	0.46	0.33	0.46	34.1
Approach		315	2.2	371	2.2	0.343	6.8	LOS A	1.9	47.4	0.46	0.33	0.46	34.1
All Vehicles		915	1.8	1141	1.9	0.381	6.6	LOS A	2.5	62.8	0.35	0.24	0.35	33.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Operational Results

2045 OFF Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Deming Drive	None	268		105		262	862		0.3107	
2	Walterscheid Blvd	None	340		21		352	919		0.3703	
3	Deming Drive	None	130		238		124	761		0.1701	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Deming Drive	None	8.39		8.39	1.14		A		A
2	Walterscheid Blvd	None	8.99		8.99	1.51		A		A
3	Deming Drive	None	7.09		7.09	0.51		A		A

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	20	220	5	15	270
Future Vol, veh/h	10	20	220	5	15	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	17	34	282	6	21	386

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	713	285	0	0	288	0
Stage 1	285	-	-	-	-	-
Stage 2	428	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	419	747	-	-	1286	-
Stage 1	768	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	413	747	-	-	1286	-
Mov Cap-2 Maneuver	413	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	588	1286	-
HCM Lane V/C Ratio	-	-	0.086	0.017	-
HCM Control Delay (s)	-	-	11.7	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	25	295	50	30	305
Future Vol, veh/h	30	25	295	50	30	305
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	63	63	78	78
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	45	38	468	79	38	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	935	468	0	0	547	0
Stage 1	468	-	-	-	-	-
Stage 2	467	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	288	672	-	-	1011	-
Stage 1	665	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	277	672	-	-	1011	-
Mov Cap-2 Maneuver	277	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	611	-	-	-	-	-

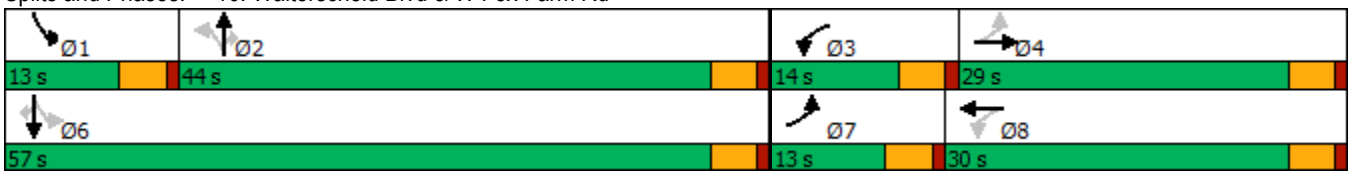
Approach	WB	NB	SB
HCM Control Delay, s	17.2	0	0.8
HCM LOS	C		

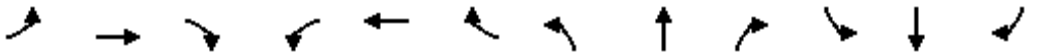
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	378	1011	-
HCM Lane V/C Ratio	-	-	0.22	0.038	-
HCM Control Delay (s)	-	-	17.2	8.7	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	75	140	90	95	5	245	90	75	255	60
Future Volume (vph)	75	140	90	95	5	245	90	75	255	60
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	13.0	29.0	14.0	30.0	44.0	44.0	44.0	13.0	57.0	57.0
Total Split (%)	13.0%	29.0%	14.0%	30.0%	44.0%	44.0%	44.0%	13.0%	57.0%	57.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	Max	Max	Max	None	Max	Max
Act Effct Green (s)	20.7	14.4	22.0	15.0	43.7	43.7	43.7	53.1	53.1	53.1
Actuated g/C Ratio	0.24	0.17	0.25	0.17	0.50	0.50	0.50	0.61	0.61	0.61
v/c Ratio	0.33	0.64	0.36	0.60	0.01	0.34	0.14	0.17	0.30	0.08
Control Delay	25.3	43.9	25.9	35.6	16.2	17.8	3.9	9.8	10.6	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	43.9	25.9	35.6	16.2	17.8	3.9	9.8	10.6	3.8
LOS	C	D	C	D	B	B	A	A	B	A
Approach Delay		37.7		32.2		14.1			9.4	
Approach LOS		D		C		B			A	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 87	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 46.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 16: Walterscheid Blvd & W Fox Farm Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	140	10	90	95	70	5	245	90	75	255	60
Future Volume (veh/h)	75	140	10	90	95	70	5	245	90	75	255	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1900	1870	1870	1841	1900	1885	1885	1900	1885	1900
Adj Flow Rate, veh/h	95	177	13	108	114	84	7	322	118	100	340	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Percent Heavy Veh, %	1	5	0	2	2	4	0	1	1	0	1	0
Cap, veh/h	239	230	17	253	145	107	639	986	835	594	1190	
Arrive On Green	0.06	0.14	0.14	0.07	0.14	0.14	0.52	0.52	0.52	0.05	0.63	0.00
Sat Flow, veh/h	1795	1680	123	1781	1000	737	1057	1885	1598	1810	1885	1610
Grp Volume(v), veh/h	95	0	190	108	0	198	7	322	118	100	340	0
Grp Sat Flow(s),veh/h/ln	1795	0	1804	1781	0	1738	1057	1885	1598	1810	1885	1610
Q Serve(g_s), s	3.7	0.0	8.5	4.3	0.0	9.1	0.3	8.2	3.2	1.9	6.8	0.0
Cycle Q Clear(g_c), s	3.7	0.0	8.5	4.3	0.0	9.1	0.3	8.2	3.2	1.9	6.8	0.0
Prop In Lane	1.00		0.07	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	239	0	247	253	0	252	639	986	835	594	1190	
V/C Ratio(X)	0.40	0.00	0.77	0.43	0.00	0.79	0.01	0.33	0.14	0.17	0.29	
Avail Cap(c_a), veh/h	312	0	531	332	0	533	639	986	835	681	1190	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.7	0.0	34.6	28.3	0.0	34.3	9.5	11.4	10.2	7.7	6.9	0.0
Incr Delay (d2), s/veh	1.1	0.0	5.0	1.1	0.0	5.4	0.0	0.9	0.4	0.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.9	0.0	7.1	3.3	0.0	7.5	0.1	6.0	2.0	1.2	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.7	0.0	39.7	29.5	0.0	39.7	9.6	12.3	10.6	7.8	7.5	0.0
LnGrp LOS	C	A	D	C	A	D	A	B	B	A	A	
Approach Vol, veh/h		285			306			447			440	
Approach Delay, s/veh		36.4			36.1			11.8			7.6	
Approach LOS		D			D			B			A	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	9.0	48.0	10.3	15.9		57.0	9.6	16.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	8.5	39.5	9.5	24.5		52.5	8.5	25.5				
Max Q Clear Time (g_c+I1), s	3.9	10.2	6.3	10.5		8.8	5.7	11.1				
Green Ext Time (p_c), s	0.1	2.4	0.1	0.8		2.3	0.0	0.9				

Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	285	306	447	520
Demand Flow Rate, veh/h	295	313	451	523
Vehicles Circulating, veh/h	553	428	382	233
Vehicles Exiting, veh/h	123	405	466	508
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.5	8.1	6.4	7.0
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Right	Left	Bypass
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						Yield
Lane Util	1.000	1.000	0.736	0.264	1.000	
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	80
Entry Flow, veh/h	295	313	332	119	443	1217
Cap Entry Lane, veh/h	785	892	1003	1003	1088	1.000
Entry HV Adj Factor	0.967	0.977	0.990	0.992	0.992	80
Flow Entry, veh/h	285	306	329	118	440	1217
Cap Entry, veh/h	759	871	993	995	1080	0.066
V/C Ratio	0.376	0.351	0.331	0.119	0.407	3.5
Control Delay, s/veh	9.5	8.1	7.1	4.7	7.6	A
LOS	A	A	A	A	A	0
95th %tile Queue, veh	2	2	1	0	2	

MOVEMENT SUMMARY

Site: 1 [Fox Farm & Walterscheid 2045 MD (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Walterscheid														
3	L2	5	0.0	6	0.0	0.328	7.0	LOS A	1.5	38.9	0.52	0.45	0.52	34.2
8	T1	245	3.0	314	3.0	0.328	7.1	LOS A	1.5	38.9	0.52	0.45	0.52	34.1
18	R2	90	0.0	115	0.0	0.115	4.6	LOS A	0.5	11.5	0.44	0.34	0.44	34.2
Approach		340	2.2	436	2.2	0.328	6.5	LOS A	1.5	38.9	0.50	0.42	0.50	34.1
East: Fox Farm														
1	L2	90	2.0	115	2.0	0.370	8.3	LOS A	1.9	47.5	0.61	0.56	0.61	32.6
6	T1	95	1.0	122	1.0	0.370	8.3	LOS A	1.9	47.5	0.61	0.56	0.61	32.6
16	R2	70	0.0	90	0.0	0.370	8.2	LOS A	1.9	47.5	0.61	0.56	0.61	31.7
Approach		255	1.1	327	1.1	0.370	8.3	LOS A	1.9	47.5	0.61	0.56	0.61	32.4
North: Walterscheid														
7	L2	75	4.0	96	4.0	0.482	9.1	LOS A	3.0	75.9	0.56	0.44	0.56	32.7
4	T1	255	4.0	327	4.0	0.482	9.1	LOS A	3.0	75.9	0.56	0.44	0.56	32.6
14	R2	60	0.0	77	0.0	0.482	9.0	LOS A	3.0	75.9	0.56	0.44	0.56	31.8
Approach		390	3.4	500	3.4	0.482	9.1	LOS A	3.0	75.9	0.56	0.44	0.56	32.5
West: Fox Farm														
5	L2	75	0.0	96	0.0	0.374	9.2	LOS A	1.9	48.1	0.66	0.68	0.72	32.3
2	T1	140	2.0	179	2.0	0.374	9.3	LOS A	1.9	48.1	0.66	0.68	0.72	32.2
12	R2	10	0.0	13	0.0	0.374	9.2	LOS A	1.9	48.1	0.66	0.68	0.72	31.4
Approach		225	1.2	288	1.2	0.374	9.3	LOS A	1.9	48.1	0.66	0.68	0.72	32.2
All Vehicles		1210	2.2	1551	2.2	0.482	8.2	LOS A	3.0	75.9	0.57	0.50	0.58	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Operational Results

2045 OFF Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Walterscheid Blvd	None	304		148		304	815		0.3733	
2	Fox Farm Rd	None	176		328		125	744		0.2357	
3	Walterscheid Blvd	None	265		226		277	1058		0.2507	
4	Fox Farm Rd	None	199		254		238	797		0.2495	

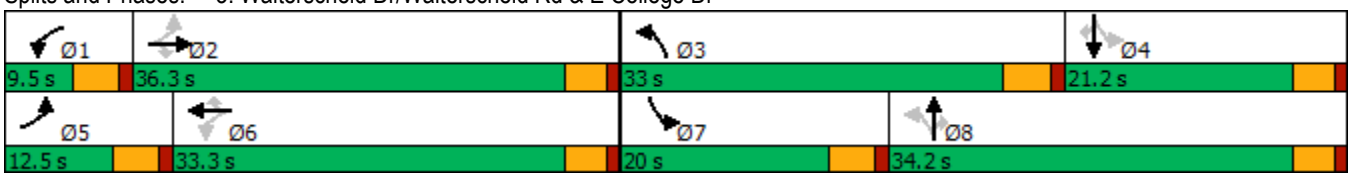
Delays, Queues and Level of Service

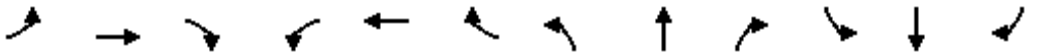
Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Walterscheid Blvd	None	9.51		9.51	1.48		A		A
2	Fox Farm Rd	None	8.39		8.39	0.80		A		A
3	Walterscheid Blvd	None	8.21		8.21	1.15		A		A
4	Fox Farm Rd	None	8.15		8.15	0.86		A		A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	440	180	110	385	140	180	165	115	230	175	165
Future Volume (vph)	175	440	180	110	385	140	180	165	115	230	175	165
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	18.2	18.2	9.5	18.2	18.2	9.5	21.2	21.2	9.5	21.2	21.2
Total Split (s)	12.5	36.3	36.3	9.5	33.3	33.3	33.0	34.2	34.2	20.0	21.2	21.2
Total Split (%)	12.5%	36.3%	36.3%	9.5%	33.3%	33.3%	33.0%	34.2%	34.2%	20.0%	21.2%	21.2%
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.2	4.2	4.5	4.2	4.2	4.5	4.2	4.2	4.5	4.2	4.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	39.8	32.1	32.1	33.8	29.1	29.1	49.7	30.0	30.0	32.2	17.0	17.0
Actuated g/C Ratio	0.40	0.32	0.32	0.34	0.29	0.29	0.50	0.30	0.30	0.32	0.17	0.17
v/c Ratio	1.10	1.05	0.36	0.82	0.93	0.30	1.21	1.16	0.74	0.99	0.80	0.62
Control Delay	115.0	87.6	5.2	60.0	61.5	5.7	134.0	123.0	25.6	77.2	59.1	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.0	87.6	5.2	60.0	61.5	5.7	134.0	123.0	25.6	77.2	59.1	21.6
LOS	F	F	A	E	E	A	F	F	C	E	E	C
Approach Delay		75.0			48.9			103.0			55.5	
Approach LOS		E			D			F			E	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 78.2	Intersection LOS: E
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Walterscheid Dr/Walterscheid Rd & E College Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	440	180	110	385	140	180	165	115	230	175	165
Future Volume (veh/h)	175	440	180	110	385	140	180	165	115	230	175	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1781	1900	1900	1781	1870	1900	1900	1900	1841	1900	1811
Adj Flow Rate, veh/h	236	595	243	136	475	173	720	660	460	338	257	243
Peak Hour Factor	0.74	0.74	0.74	0.81	0.81	0.81	0.25	0.25	0.25	0.68	0.68	0.68
Percent Heavy Veh, %	2	8	0	0	8	2	0	0	0	4	0	6
Cap, veh/h	241	572	517	162	518	461	624	570	483	344	323	261
Arrive On Green	0.08	0.32	0.32	0.05	0.29	0.29	0.28	0.30	0.30	0.16	0.17	0.17
Sat Flow, veh/h	1781	1781	1610	1810	1781	1585	1810	1900	1610	1753	1900	1535
Grp Volume(v), veh/h	236	595	243	136	475	173	720	660	460	338	257	243
Grp Sat Flow(s),veh/h/ln	1781	1781	1610	1810	1781	1585	1810	1900	1610	1753	1900	1535
Q Serve(g_s), s	8.0	32.1	12.1	5.0	25.8	8.7	28.5	30.0	28.0	15.5	13.0	15.6
Cycle Q Clear(g_c), s	8.0	32.1	12.1	5.0	25.8	8.7	28.5	30.0	28.0	15.5	13.0	15.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	241	572	517	162	518	461	624	570	483	344	323	261
V/C Ratio(X)	0.98	1.04	0.47	0.84	0.92	0.38	1.15	1.16	0.95	0.98	0.80	0.93
Avail Cap(c_a), veh/h	241	572	517	162	518	461	624	570	483	344	323	261
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	34.0	27.1	29.0	34.3	28.2	24.0	35.0	34.3	30.1	39.8	40.9
Incr Delay (d2), s/veh	52.6	48.6	0.2	30.1	20.7	0.2	86.3	89.4	28.9	43.9	12.0	37.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.9	29.5	8.0	6.5	20.0	5.8	37.8	39.4	20.6	16.1	11.3	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.1	82.5	27.4	59.0	55.0	28.4	110.3	124.4	63.2	74.0	51.8	78.1
LnGrp LOS	F	F	C	E	E	C	F	F	E	E	D	E
Approach Vol, veh/h		1074			784			1840			838	
Approach Delay, s/veh		70.0			49.8			103.6			68.4	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	36.3	33.0	21.2	12.5	33.3	20.0	34.2
Change Period (Y+Rc), s	4.5	* 4.2	4.5	* 4.2	4.5	* 4.2	4.5	* 4.2
Max Green Setting (Gmax), s	5.0	* 32	28.5	* 17	8.0	* 29	15.5	* 30
Max Q Clear Time (g_c+I1), s	7.0	34.1	30.5	17.6	10.0	27.8	17.5	32.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	79.8
HCM 6th LOS	E

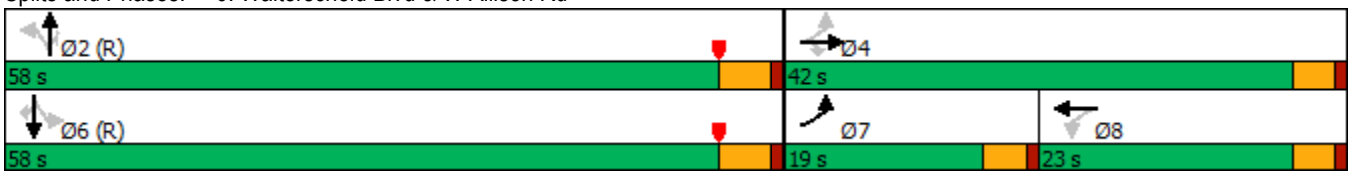
Notes

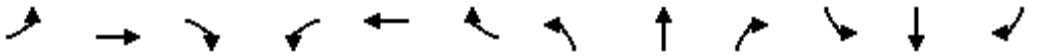
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	110	125	100	45	85	60	340	65	40	440	65
Future Volume (vph)	110	125	100	45	85	60	340	65	40	440	65
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	8	8	2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	19.5	19.5	19.5	19.5	19.9	19.9	19.9	19.9	19.9	19.9
Total Split (s)	19.0	42.0	42.0	23.0	23.0	58.0	58.0	58.0	58.0	58.0	58.0
Total Split (%)	19.0%	42.0%	42.0%	23.0%	23.0%	58.0%	58.0%	58.0%	58.0%	58.0%	58.0%
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.2	4.2	4.2	4.9	4.9	4.9	4.9	4.9	4.9
Lead/Lag	Lead			Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes						
Recall Mode	None	Min	Min	Min	Min	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	32.4	32.4	32.4	15.0	15.0	58.5	58.5	58.5	58.5	58.5	58.5
Actuated g/C Ratio	0.32	0.32	0.32	0.15	0.15	0.58	0.58	0.58	0.58	0.58	0.58
v/c Ratio	0.58	0.37	0.29	0.41	0.68	0.27	0.47	0.10	0.13	0.57	0.09
Control Delay	31.7	26.8	4.5	44.8	48.2	14.8	14.7	2.7	12.2	16.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	26.8	4.5	44.8	48.2	14.8	14.7	2.7	12.2	16.8	5.2
LOS	C	C	A	D	D	B	B	A	B	B	A
Approach Delay		21.7			47.2		13.0			15.1	
Approach LOS		C			D		B			B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 19.9	Intersection LOS: B
Intersection Capacity Utilization 54.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Walterscheid Blvd & W Allison Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	125	100	45	85	35	60	340	65	40	440	65
Future Volume (veh/h)	110	125	100	45	85	35	60	340	65	40	440	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1841	1900	1885	1900	1856	1870	1900	1900	1856	1900
Adj Flow Rate, veh/h	196	223	179	73	137	56	90	507	97	56	620	92
Peak Hour Factor	0.56	0.56	0.56	0.62	0.62	0.62	0.67	0.67	0.67	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	4	0	1	0	3	2	0	0	3	0
Cap, veh/h	304	536	447	205	169	69	389	1164	1002	471	1155	1002
Arrive On Green	0.11	0.29	0.29	0.13	0.13	0.13	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	1781	1870	1560	998	1272	520	732	1870	1610	829	1856	1610
Grp Volume(v), veh/h	196	223	179	73	0	193	90	507	97	56	620	92
Grp Sat Flow(s),veh/h/ln	1781	1870	1560	998	0	1792	732	1870	1610	829	1856	1610
Q Serve(g_s), s	9.1	9.7	9.2	6.8	0.0	10.5	7.9	14.0	2.4	3.8	18.9	2.3
Cycle Q Clear(g_c), s	9.1	9.7	9.2	6.8	0.0	10.5	26.9	14.0	2.4	17.8	18.9	2.3
Prop In Lane	1.00		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	304	536	447	205	0	238	389	1164	1002	471	1155	1002
V/C Ratio(X)	0.64	0.42	0.40	0.36	0.00	0.81	0.23	0.44	0.10	0.12	0.54	0.09
Avail Cap(c_a), veh/h	369	707	590	260	0	337	389	1164	1002	471	1155	1002
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	28.9	28.8	40.5	0.0	42.1	18.3	9.8	7.6	14.4	10.7	7.6
Incr Delay (d2), s/veh	1.4	0.6	0.7	1.3	0.0	10.5	1.4	1.2	0.2	0.5	1.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.1	7.8	6.3	3.1	0.0	9.1	2.6	9.4	1.5	1.3	11.9	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	29.5	29.5	41.8	0.0	52.6	19.7	11.0	7.8	14.9	12.5	7.7
LnGrp LOS	C	C	C	D	A	D	B	B	A	B	B	A
Approach Vol, veh/h		598			266			694			768	
Approach Delay, s/veh		30.6			49.7			11.7			12.1	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	67.1	32.9	67.1	15.3	17.5
Change Period (Y+Rc), s	4.9	* 4.2	4.9	* 4.2	* 4.2
Max Green Setting (Gmax), s	53.1	* 38	53.1	* 15	* 19
Max Q Clear Time (g_c+I1), s	28.9	11.7	20.9	11.1	12.5
Green Ext Time (p_c), s	5.3	2.4	6.5	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	21.0
HCM 6th LOS	C

Notes

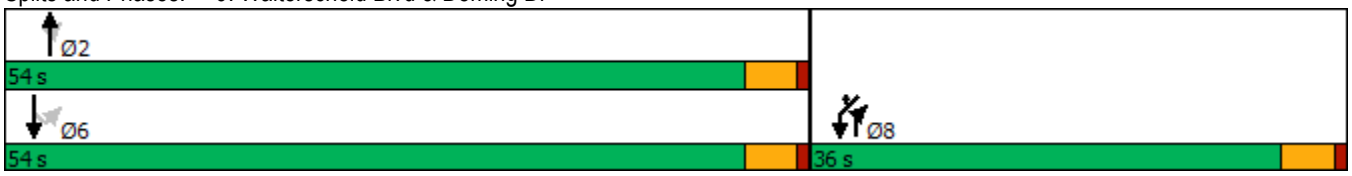
User approved pedestrian interval to be less than phase max green.

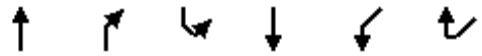
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	375	205	40	425	190	30
Future Volume (vph)	375	205	40	425	190	30
Turn Type	NA	pm+ov	Perm	NA	Prot	Prot
Protected Phases	2	8		6	8	8
Permitted Phases		2	6			
Detector Phase	2	8	6	6	8	8
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	54.0	36.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	40.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	None	Max	Max	None	None
Act Effct Green (s)	49.7	76.2	49.7	49.7	17.4	17.4
Actuated g/C Ratio	0.65	1.00	0.65	0.65	0.23	0.23
v/c Ratio	0.37	0.15	0.09	0.43	0.71	0.12
Control Delay	8.0	0.2	6.8	8.6	36.7	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	0.2	6.8	8.6	36.7	8.0
LOS	A	A	A	A	D	A
Approach Delay	5.2			8.5	32.8	
Approach LOS	A			A	C	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 76.2			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 12.1		Intersection LOS: B	
Intersection Capacity Utilization 45.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Walterscheid Blvd & Deming Dr





Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	375	205	40	425	190	30
Future Volume (veh/h)	375	205	40	425	190	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1900	1796	1885	1885	1781
Adj Flow Rate, veh/h	446	244	49	525	288	45
Peak Hour Factor	0.84	0.84	0.81	0.81	0.66	0.66
Percent Heavy Veh, %	2	0	7	1	1	8
Cap, veh/h	1275	1411	520	1285	349	293
Arrive On Green	0.68	0.68	0.68	0.68	0.19	0.19
Sat Flow, veh/h	1870	1610	723	1885	1795	1510
Grp Volume(v), veh/h	446	244	49	525	288	45
Grp Sat Flow(s),veh/h/ln	1870	1610	723	1885	1795	1510
Q Serve(g_s), s	7.2	1.6	2.2	8.9	11.2	1.8
Cycle Q Clear(g_c), s	7.2	1.6	9.4	8.9	11.2	1.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1275	1411	520	1285	349	293
V/C Ratio(X)	0.35	0.17	0.09	0.41	0.83	0.15
Avail Cap(c_a), veh/h	1275	1411	520	1285	779	655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.8	0.7	6.8	5.1	28.1	24.3
Incr Delay (d2), s/veh	0.8	0.3	0.4	1.0	5.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	2.0	0.6	5.2	8.8	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.6	0.9	7.2	6.1	33.0	24.5
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	690			574	333	
Approach Delay, s/veh	3.9			6.2	31.9	
Approach LOS	A			A	C	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	54.0				54.0	18.6
Change Period (Y+Rc), s	4.5				4.5	4.5
Max Green Setting (Gmax), s	49.5				49.5	31.5
Max Q Clear Time (g_c+I1), s	9.2				11.4	13.2
Green Ext Time (p_c), s	4.1				4.3	0.9

Intersection Summary	
HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	6.7
Intersection LOS	A

Approach	NB	SB	SW
Entry Lanes	2	2	2
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	690	574	333
Demand Flow Rate, veh/h	699	582	340
Vehicles Circulating, veh/h	52	291	455
Vehicles Exiting, veh/h	821	504	296
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.2	8.5	6.8
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	L	TR	L	TR
Assumed Moves	LT	R	L	TR	L	TR
RT Channelized						
Lane Util	0.651	0.349	0.089	0.911	0.856	0.144
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.544	4.544
Entry Flow, veh/h	455	244	52	530	291	49
Cap Entry Lane, veh/h	1354	1354	1090	1090	939	939
Entry HV Adj Factor	0.980	1.000	0.942	0.990	0.990	0.918
Flow Entry, veh/h	446	244	49	525	288	45
Cap Entry, veh/h	1328	1354	1027	1079	929	862
V/C Ratio	0.336	0.180	0.048	0.486	0.310	0.052
Control Delay, s/veh	5.8	4.1	3.9	8.9	7.2	4.7
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	1	0	3	1	0

MOVEMENT SUMMARY

Site: 1 [Deming & Walterscheid 2045 PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Walterscheid														
8	T1	375	2.0	452	2.0	0.542	8.8	LOS A	4.5	114.0	0.30	0.13	0.30	33.3
18	R2	205	1.0	247	1.0	0.542	8.7	LOS A	4.5	114.0	0.30	0.13	0.30	32.4
Approach		580	1.6	699	1.6	0.542	8.8	LOS A	4.5	114.0	0.30	0.13	0.30	33.0
East: Fox Farm														
1	L2	190	0.0	211	0.0	0.286	7.3	LOS A	1.3	33.9	0.59	0.54	0.59	31.9
16	R2	30	7.0	33	7.0	0.286	7.6	LOS A	1.3	33.9	0.59	0.54	0.59	30.8
Approach		220	1.0	244	1.0	0.286	7.3	LOS A	1.3	33.9	0.59	0.54	0.59	31.7
North: Walterscheid														
7	L2	40	15.0	44	15.0	0.474	9.1	LOS A	3.0	76.0	0.52	0.38	0.52	32.8
4	T1	425	2.0	467	2.0	0.474	8.6	LOS A	3.0	76.0	0.52	0.38	0.52	33.2
Approach		465	3.1	511	3.1	0.474	8.7	LOS A	3.0	76.0	0.52	0.38	0.52	33.1
All Vehicles		1265	2.1	1454	2.0	0.542	8.5	LOS A	4.5	114.0	0.43	0.29	0.43	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Operational Results

2045 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Deming Drive	None	423		171		338	813		0.5203	
2	Walterscheid Blvd	None	481		36		558	893		0.5392	
3	Deming Drive	None	198		311		207	767		0.2581	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Deming Drive	None	12.34		12.34	3.39		B		B
2	Walterscheid Blvd	None	12.23		12.23	3.72		B		B
3	Deming Drive	None	8.53		8.53	1.09		A		A

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	15	430	25	20	470
Future Vol, veh/h	20	15	430	25	20	470
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	78	78	70	70
Heavy Vehicles, %	0	5	1	25	0	5
Mvmt Flow	34	25	551	32	29	671

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1296	567	0	0	583	0
Stage 1	567	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	137	517	-	-	1001	-
Stage 1	572	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	133	517	-	-	1001	-
Mov Cap-2 Maneuver	133	-	-	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	470	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	31.3	0	0.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	195	1001	-
HCM Lane V/C Ratio	-	-	0.304	0.029	-
HCM Control Delay (s)	-	-	31.3	8.7	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-

Intersection	
Int Delay, s/veh	25.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	85	45	440	55	30	455
Future Vol, veh/h	85	45	440	55	30	455
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	63	63	78	78
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	129	68	698	87	38	583

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1357	698	0	0	785	0
Stage 1	698	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 124	493	-	-	763	-
Stage 1	503	-	-	-	-	-
Stage 2	518	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	~ 118	493	-	-	763	-
Mov Cap-2 Maneuver	~ 118	-	-	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	492	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	202.6	0	0.6
HCM LOS	F		

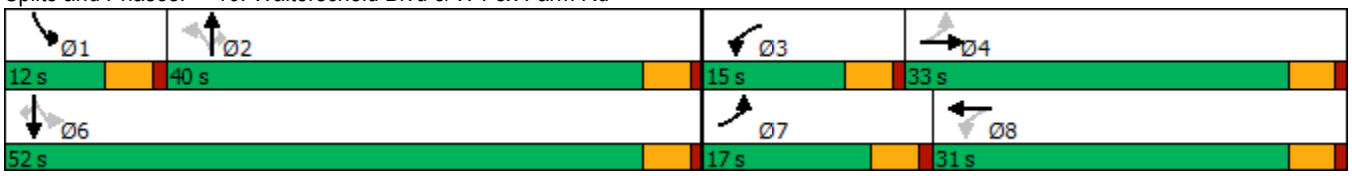
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	160	763	-
HCM Lane V/C Ratio	-	-	1.231	0.05	-
HCM Control Delay (s)	-	-	202.6	10	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	11.2	0.2	-

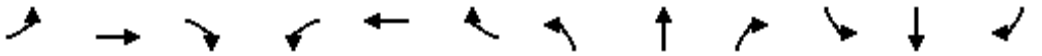
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	150	210	135	180	25	335	165	90	370	165
Future Volume (vph)	150	210	135	180	25	335	165	90	370	165
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	17.0	33.0	15.0	31.0	40.0	40.0	40.0	12.0	52.0	52.0
Total Split (%)	17.0%	33.0%	15.0%	31.0%	40.0%	40.0%	40.0%	12.0%	52.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	Max	Max	Max	None	Max	Max
Act Effct Green (s)	32.1	20.9	29.1	19.4	36.0	36.0	36.0	47.7	47.7	47.7
Actuated g/C Ratio	0.35	0.23	0.32	0.21	0.39	0.39	0.39	0.52	0.52	0.52
v/c Ratio	0.58	0.71	0.50	0.77	0.09	0.60	0.29	0.32	0.50	0.25
Control Delay	26.7	42.0	24.6	46.0	21.3	28.0	4.2	15.4	18.0	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	42.0	24.6	46.0	21.3	28.0	4.2	15.4	18.0	8.8
LOS	C	D	C	D	C	C	A	B	B	A
Approach Delay		36.0		38.5		20.2			15.2	
Approach LOS		D		D		C			B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 91.9	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 25.0	Intersection LOS: C
Intersection Capacity Utilization 60.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Walterscheid Blvd & W Fox Farm Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	210	20	135	180	70	25	335	165	90	370	165
Future Volume (veh/h)	150	210	20	135	180	70	25	335	165	90	370	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1826	1900	1870	1870	1841	1900	1885	1885	1900	1885	1900
Adj Flow Rate, veh/h	190	266	25	163	217	84	33	441	217	120	493	0
Peak Hour Factor	0.79	0.79	0.79	0.83	0.83	0.83	0.76	0.76	0.76	0.75	0.75	0.75
Percent Heavy Veh, %	1	5	0	2	2	4	0	1	1	0	1	0
Cap, veh/h	312	349	33	314	257	99	429	819	694	388	1019	
Arrive On Green	0.11	0.21	0.21	0.09	0.20	0.20	0.43	0.43	0.43	0.05	0.54	0.00
Sat Flow, veh/h	1795	1644	154	1781	1284	497	918	1885	1598	1810	1885	1610
Grp Volume(v), veh/h	190	0	291	163	0	301	33	441	217	120	493	0
Grp Sat Flow(s),veh/h/ln	1795	0	1798	1781	0	1781	918	1885	1598	1810	1885	1610
Q Serve(g_s), s	7.2	0.0	13.4	6.3	0.0	14.3	2.0	15.2	7.8	3.0	14.3	0.0
Cycle Q Clear(g_c), s	7.2	0.0	13.4	6.3	0.0	14.3	7.0	15.2	7.8	3.0	14.3	0.0
Prop In Lane	1.00		0.09	1.00		0.28	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	0	382	314	0	356	429	819	694	388	1019	
V/C Ratio(X)	0.61	0.00	0.76	0.52	0.00	0.85	0.08	0.54	0.31	0.31	0.48	
Avail Cap(c_a), veh/h	378	0	583	360	0	537	429	819	694	443	1019	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.1	0.0	32.5	25.2	0.0	33.8	17.6	18.3	16.2	13.2	12.5	0.0
Incr Delay (d2), s/veh	2.0	0.0	3.2	1.3	0.0	7.7	0.3	2.5	1.2	0.4	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.7	0.0	10.0	4.8	0.0	11.1	0.8	11.0	5.3	2.2	10.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	0.0	35.7	26.5	0.0	41.6	18.0	20.9	17.4	13.6	14.2	0.0
LnGrp LOS	C	A	D	C	A	D	B	C	B	B	B	
Approach Vol, veh/h		481			464			691			613	
Approach Delay, s/veh		32.3			36.3			19.6			14.1	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	9.3	42.7	12.7	23.2		52.0	13.8	22.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	35.5	10.5	28.5		47.5	12.5	26.5				
Max Q Clear Time (g_c+I1), s	5.0	17.2	8.3	15.4		16.3	9.2	16.3				
Green Ext Time (p_c), s	0.1	3.4	0.1	1.4		3.5	0.2	1.3				

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	481	464	691	833
Demand Flow Rate, veh/h	496	474	697	838
Vehicles Circulating, veh/h	784	670	591	420
Vehicles Exiting, veh/h	254	618	689	724
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	29.6	19.2	11.2	13.1
Approach LOS	D	C	B	B

Lane	Left	Left	Left	Right	Left	Bypass
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						Yield
Lane Util	1.000	1.000	0.686	0.314	1.000	
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	220
Entry Flow, veh/h	496	474	478	219	618	1065
Cap Entry Lane, veh/h	620	697	829	829	899	1.000
Entry HV Adj Factor	0.969	0.978	0.991	0.991	0.992	220
Flow Entry, veh/h	481	464	474	217	613	1065
Cap Entry, veh/h	601	682	822	822	892	0.207
V/C Ratio	0.800	0.680	0.576	0.264	0.687	5.3
Control Delay, s/veh	29.6	19.2	13.0	7.3	15.8	A
LOS	D	C	B	A	C	1
95th %tile Queue, veh	8	5	4	1	6	

MOVEMENT SUMMARY

Site: 1 [Fox Farm & Walterscheid 2045 PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Walterscheid														
3	L2	25	0.0	30	0.0	0.536	11.9	LOS B	3.9	99.2	0.71	0.84	1.08	31.8
8	T1	335	3.0	409	3.0	0.536	12.0	LOS B	3.9	99.2	0.71	0.84	1.08	31.6
18	R2	165	1.0	201	1.0	0.241	6.9	LOS A	1.0	25.3	0.57	0.55	0.57	33.0
Approach		525	2.2	640	2.2	0.536	10.4	LOS B	3.9	99.2	0.67	0.75	0.92	32.0
East: Fox Farm														
1	L2	135	0.0	165	0.0	0.659	17.5	LOS C	6.2	155.9	0.84	1.07	1.51	28.9
6	T1	180	0.0	220	0.0	0.659	17.5	LOS C	6.2	155.9	0.84	1.07	1.51	28.8
16	R2	70	6.0	85	6.0	0.659	17.8	LOS C	6.2	155.9	0.84	1.07	1.51	28.0
Approach		385	1.1	470	1.1	0.659	17.6	LOS C	6.2	155.9	0.84	1.07	1.51	28.7
North: Walterscheid														
7	L2	90	6.0	110	6.0	0.870	29.0	LOS D	20.8	534.2	1.00	1.61	2.55	25.4
4	T1	370	4.0	451	4.0	0.870	28.9	LOS D	20.8	534.2	1.00	1.61	2.55	25.4
14	R2	165	0.0	201	0.0	0.870	28.8	LOS D	20.8	534.2	1.00	1.61	2.55	24.9
Approach		625	3.2	762	3.2	0.870	28.9	LOS D	20.8	534.2	1.00	1.61	2.55	25.3
West: Fox Farm														
5	L2	150	2.0	183	2.0	0.751	25.0	LOS C	7.6	196.9	0.88	1.23	1.93	26.3
2	T1	210	6.0	256	6.0	0.751	25.2	LOS D	7.6	196.9	0.88	1.23	1.93	26.2
12	R2	20	0.0	24	0.0	0.751	24.9	LOS C	7.6	196.9	0.88	1.23	1.93	25.7
Approach		380	4.1	463	4.1	0.751	25.1	LOS D	7.6	196.9	0.88	1.23	1.93	26.2
All Vehicles		1915	2.7	2335	2.7	0.870	20.8	LOS C	20.8	534.2	0.85	1.19	1.77	27.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Operational Results

2045 PM Peak - 60 minutes

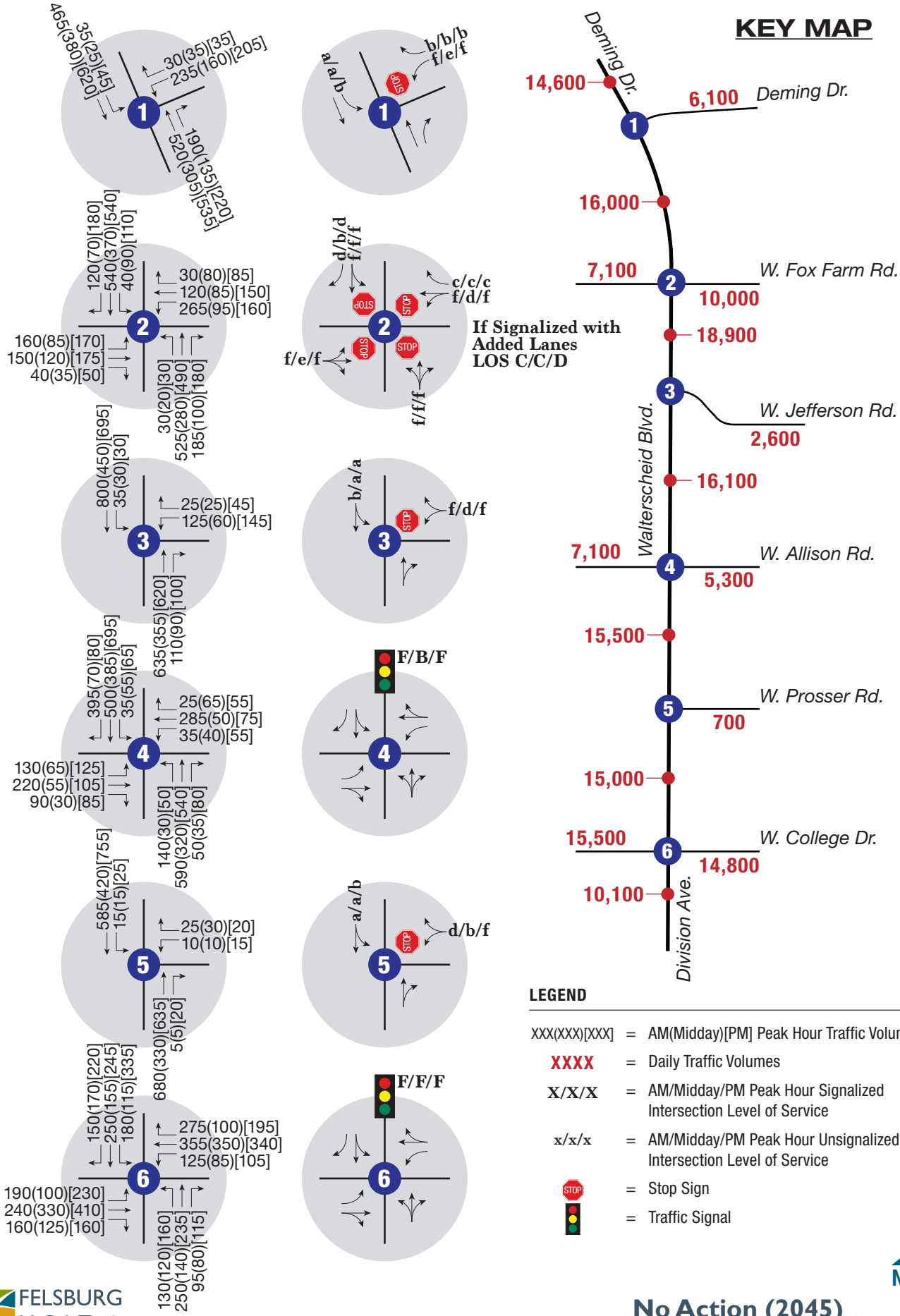
Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Walterscheid Blvd	None	513		279		455	749		0.6838	
2	Fox Farm Rd	None	312		488		303	623		0.5003	
3	Walterscheid Blvd	None	431		369		430	925		0.4653	
4	Fox Farm Rd	None	316		418		381	708		0.4456	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Walterscheid Blvd	None	19.08		19.08	7.41		C		C
2	Fox Farm Rd	None	14.46		14.46	3.28		B		B
3	Walterscheid Blvd	None	13.78		13.78	4.18		B		B
4	Fox Farm Rd	None	12.40		12.40	2.70		B		B

APPENDIX H. PEAK HOUR FORECASTS AND NO ACTION LOS FOR 5-LANE TRAVEL DEMAND MODEL SCENARIO



FELSBURG HOLT & ULLEVIG

NOTE: Drawing Not to Scale

No Action (2045) Traffic Conditions

Walterscheid Blvd. - Public Meeting 121-011-01 3/10/22

FIGURE 5

Appendix F

Storm Drainage Study

Final Walterscheid Corridor Storm Drainage Study

Prepared for:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 320
Cheyenne, Wyoming 82001

September 2, 2022

P.O. Box 20505 | Cheyenne, WY 82003 | 307.214.7065 |
gene@glmdesigngroup.com

September 9, 2022

Ms. Erin Gates, PE
Project Manager
BenchMark Engineers, PC
1920 Thomes Avenue, Suite 320
Cheyenne, WY 82001

RE: Final Drainage Study for the Walterscheid Corridor

Dear Erin:

GLM Design Group, LLC is pleased to submit the final drainage study for the Walterscheid Boulevard Reconstruction Plan. The final study provides a conceptual drainage plan for the Walterscheid corridor and contributing drainage basins. We have also evaluated downstream discharge points for both the existing and proposed conditions.

The intent of this report is to provide a practical direction stormwater conveyance for the Walterscheid corridor along with a discussion of constraints and potential downstream impacts.

If you should have any questions or comments as you review this report, please feel free to contact me atyour convenience.

Sincerely,

Gene L. MacDonald, PE
Managing Principal
GLM Design Group, LLC

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APPENDICES

I. General Location and Description

A. Location

Storm drainage has been an issue within the Walterscheid Blvd. corridor due, in large measure, to a lack of good conveyance paths to Allison Draw. Older residential neighborhoods to the east of Harmony Meadows have been impacted by poor drainage for decades, with the problem being exacerbated by an increase in storm drainage from Harmony Meadows.

Figure 1. Vicinity Map

Description of Project Corridor

Currently, borrow ditches in the County section of the project area are not well maintained and do not have effective discharge points when they are flowing. Effective conveyance of stormwater runoff to the receiving Allison Draw drainage is problematic for the existing conditions. The conceptual design efforts by default, have included an evaluation of effective conveyance routes to Allison Draw as appropriate for the proposed reconstruction of the corridor.

Over the last two decades, the developments of Harmony Meadows located on the west side of the corridor and Gateway South located on the east side have had a significant impact on storm drainage. Harmony Meadows has exacerbated poor conveyance conditions to Allison Draw while the Gateway South development constructed a new conveyance element to Allison Draw to discharge its stormwater runoff. The Gateway South developer coordinated with the County Public Works Director at the time of site design to ensure that an effective conveyance route was also built to convey flow into Allison Draw. The Harmony Meadows developer relied on an existing drainage easement which lacked capacity for the additional developed discharge.

The following is a summary of the existing conditions:

Grades – In general, the corridor drains to the south along moderate to shallow to moderate grades. Much of the corridor consists of borrow ditches that are not well maintained.
Soil Type – in general, NRCS hydrologic soil group B is the predominant soil condition. The project area generally consists of Allison Draw loamy sands with a ridge line of sandstone running along the northern perimeter. Bedrock is generally located 5' to 8' below the channel bottom of Allison Draw.

Storm Drainage Facilities – The adjacent Gateway South development has an extensive storm drainage system designed to address on-site and contributing off-site storm water drainage. The system consists of multiple detention facilities and storm sewers with an outfall system to Allison Draw. There is a WYDOT storm sewer system in Allison Road intercepting drainage from the west and from a portion of the Walterscheid Blvd. corridor that connects into the Gateway South outfall system. Further to the south of the corridor, there is an undersized and il-maintained county storm sewer that conveys drainage from the adjacent Harmony Meadows. This system requires an upgrade to be an effective conveyance element.

B. Description of Overall Project Improvements

The project corridor is proposed to be updated to a minor arterial between Deming Drive and College Drive including a conversion to a complete streets design. Additional curb and gutter are being proposed as well with limited storm drain to connect into the WYDOT Allison Road system. An improved outfall to Allison Draw is also proposed for the lower end of the corridor to improve storm drainage conveyance between Allison Road and College Drive. There is an existing Greenway path on the east side of the corridor adjacent to the Gateway South development. Additional sidewalk and landscaped ROW is recommended with the planned updates to the corridor.

II. Drainage Basins and Sub-Basins

A. Major Basin Description

The project area is in the Allison Draw Drainage Basin. Allison Draw is a tributary of Crow Creek and has an upstream drainage area of approximately 18.0 square miles. The historic low-flow channel in this area of the basin has been realigned and improved by the County over recent decades. There is adequate capacity within the Allison Draw channel at this location for stormwater discharge from the project corridor and adjacent sub-basins. The existing constraint revolves around insufficient conveyance capacities for outfalls to Allison Draw. The SWMM, Version 5.1.015 software model was used to model both the existing and proposed conditions for the Walterscheid corridor and adjacent drainage sub-basins.

B. Pre-Project Drainage Patterns (see attached Existing Conditions Drainage Plan Map)

The Allison Draw Flood Control improvements by the County have improved flood conveyance through this reach of Allison Draw. There remains significant "bottle necks" downstream that do impact conveyance capacities but outfall discharge from the proposed corridor improvements should not exacerbate downstream conditions.

Runoff from adjacent sub-basins and an estimate of existing conditions for the various design points from the SWMM analysis are shown with Table 1. Design point M-1 is the main outfall into Allison Draw for the entire corridor and adjacent sub-basins; Design point M-2 is the confluence of north and south conveyance elements located just upstream of the Draw, east of the corridor and Harmony Meadows; Design point M-4 is the outfall for Harmony Meadows; Design point Mh4 is the confluence with the Gateway South outfall; Design point A-1 is located at the north end of the Gateway South outfall ditch at Allison Road; Design Point B-3 is located at the north end of the Tri-State detention storage adjacent to the Walterscheid ROW; and Design Point LP-Walt is located at the southern end of the corridor at College Drive.

Table 1. Existing Conditions Runoff Summary

Catchment / Point	Tributary Area (Acres)	Basin Number	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 Design (cfs)
M-1	216.7	Allison Draw Outfall			157.86	191.40
M-2	194.6	Upstream Confluence	68.08	97.09	128.07	193.55
M-4	6.44	Harmony Meadows Outfall	21.11	30.66	39.77	52.95
Mh4	46.12	Allison Road	39.86	50.80	72.41	115.79
A-1	112.3	North Ditch	39.86	51.45	75.92	121.25
B-3	28.6	North Offsite, Basin 1	21.90	32.93	45.52	59.36
LP-Walt	By-Pass	College Drive By-Pass	0.00	0.00	0.00	7.56

Discharges for the 4-hr. storm are about 65% that of the 2-hr. runoff totals. The existing conditions SWMM model shows drainage issues for the Harmony Meadows outfall to Allison Draw; inflow into the Tri-State detention storage from an off-site basin; Excess discharge from the Tri-State storage into Gateway South, and additional issues at the northern end of Wyo-Fresh from adjacent off-site drainage.

III. Drainage Design Criteria

A. Guidelines for Corridor Update

Our design approach meets the proposed design standards as set forth for the Walterscheid corridor update by the BenchMark Engineer's project team. We are basing our proposed conditions model on

an existing 80' ROW with a 48' back-of-curb to back-of-curb roadway section. The proposed model incorporates curb and gutter along with limited storm sewer in the corridor.

B. Development of Design Models

We are incorporating the EPA SWMM, Version 5.1.015 modeling software to model both the existing and proposed conditions for the corridor and adjacent sub-basins.

C. Hydrological Criteria

Development (Type): Infrastructure

Minor Storm Design: 10-Year

Major Storm Design: 100-Year

The proposed new conveyance elements, including water quality allowances and downstream mitigation, will be designed using the US EPA Stormwater Management Model (SWMM, ver. 5.1.015) software along with UD-Culvert and HEC-RAS where appropriate.

- HEC-RAS will be incorporated if needed to model the Gateway South open channel and the Harmony Meadows County conveyance element.
- UD-Culvert will be incorporated to develop rating curves for an improved Harmony Meadows conveyance element for use in the EPA SWMM model.
- EPA SWMM, Version 5.0.15 will be used to evaluate alternative culvert options and storage volumes.

EPA SWMM sub-catchment rainfall-to-runoff algorithms. Dynamic wave routing within the SWMM model was used to address interconnections and interactions between all collection, conveyance, storage, and regulatory elements.

IV. Drainage Facility Design

A. Preliminary Drainage Plan Overview

The design approach for selecting cost-efficient storm drainage facilities for the proposed conditions was to incorporate, to the extent possible, existing infrastructure. The Gateway South outfall system was purposely over designed to accept future storm water runoff from Allison Road. The existing WYDOT Allison Road storm sewer connects to the Gateway South outfall system to Allison Draw. Our SWMM modeling indicates that for proposed corridor conditions, we can intercept additional stormwater into the Allison Road system and efficiently convey stormwater runoff from the corridor, upstream of Allison Road, into the Allison Road storm sewer system. In conjunction with an improvement to the Harmony Meadows outfall Conveyance, stormwater runoff can then be effectively conveyed through the updated corridor and into Allison Draw. Our conceptual plan is for a 100-year design.

Table 2. Proposed Conditions Runoff Summary						
Catchment / Point	**Tributary Area (Acres)**	**Basin Number**	**Q10 (cfs)**	**Q25 (cfs)**	**Q50 (cfs)**	**Q100 (cfs)**
M-1	216.7	Allison Draw Outfall		157.86	175.85	225.91
M-2	194.6	Confluence	104.36	138.97	179.07	226.47
M-4	6.44	Harmony Meadows Outfall	25.75	34.29	43.75	56.92
Mh4	46.12	Allison Road	65.59	85.71	107.54	139.56
A-1	112.3	North Ditch	67.97	90.48	116.06	139.56
B-3	28.6	North Offsite, Basin 1	26.90	34.33	38.01	38.3
LP-Walt	By-Pass	College Drive By-Pass	6.35	8.17	10.05	15.09

B. Detention System Design

The existing detention systems for the Gateway South development and the Tri-State facility will benefit from our proposed improvements for the corridor. ***The maximum volume of storage occurring within the Gateway facility will be reduced from the 3.74 ac-ft for existing conditions to 3.5 ac-ft for improved conditions. The maximum volume of storage occurring within the Tri-State facility will also be reduced from the 1.74 ac-ft for the existing conditions to 1.49 ac-ft for improved conditions.*** We are recommending that additional consideration be given to improving the drainage conditions for the adjacent Wyo-Fresh property as a part of the corridor improvements. Offsite flow coming onto the Wyo-Fresh property can be directed into the proposed corridor storm sewer at the upstream end of the property; and offsite flow coming onto the property at the south end can be more efficiently directed into the Tri-State facility.

C. Spillway Design

The Gateway South spillway will benefit from less storage occurring in the facility. There will be added freeboard for the Gateway South facility with the proposed corridor improvements.

D. Impacts on Downstream Facilities.

As previously outlined, the design intent is to mitigate for an increase in the historic runoff patterns for the full range of return periods. There will be slight increases in discharge to Allison Draw with the proposed corridor improvements, but this will be offset by the elimination of existing drainage issues within the corridor. The existing inefficient outfall to Allison Draw will be improved resulting in better conveyance of stormwater runoff to the receiving catchment. Downstream impacts within Allison Draw are expected to be negligible and should not exacerbate the existing constraint downstream in the channel.

V. Sediment/Erosion Control

The site falls under the requirements the Wyoming Discharge Pollutant Prevention Discharge (WYPDES) program for a large construction site (> 5 acres). A formal state notice of coverage is not required but the site will require a Storm Water Pollution Prevention Plan (SWPPP) developed to follow the requirements of the general state permit. The SWPPP will include more detailed information on sediment and erosion control items for this project. A short summary of the recommended temporary BMPs for the site to control on-site erosion and prevent sediment from traveling off-site during construction include:

- Silt Fence – a woven synthetic fabric that filters runoff. The silt fence is a temporary barrier that is placed at the base of a disturbed area. This feature is proposed for the west, south, and east sides of the site.

- Vehicle Tracking Control – a stabilized stone pad or prefabricated metal (rattle mat) located at points of ingress and egress on a construction site. The pad is designed to reduce the amount of mud transported onto public roads by construction traffic.

- Inlet Protection – acts as a sediment filter. It is a temporary BMP and requires proper installation and regular maintenance to ensure their performance.

- The proposed detention facility would be available for temporary sediment containment if excavated with the initial grading on the site.

The contractor should store all construction materials and equipment and provide maintenance and fueling of equipment in confined areas on-site from which runoff will be contained and filtered. The temporary Best Management Practices (BMP's) are required to be inspected by the contractor at a minimum of once every two weeks and after each significant storm event.

Construction activities including excavation often increase compaction which reduces both soil hydraulic conductivity and porosity which result in standing water. Landscape planting in the base of the detention ponds should specify a tolerance for highly saturated soil conditions. As mentioned earlier in the report, permitting through state and federal agencies will be discussed in the final report with recommendations as to proceeding with design and construction.

VI. Conclusions

A. Compliance with Standards

Storm drainage calculations have followed the guidelines provided by the applicable sections of the City of Cheyenne Unified Development Code. The design approach is fully compliant with the restrictions and constraints of the City and County.

B. Drainage Plan

The drainage system is designed to more efficiently convey stormwater runoff from the corridor and contributing offsite basins to the receiving catchment, Allison Draw. As shown in Appendix B, we are proposing storm sewer upstream (north) of the greenway underpass to convey stormwater more efficiently into the existing Tri-State storage facility. This facility takes stormwater runoff from the west borrow ditch currently. We are proposing to intercept flow in the curb and gutter with Type AA

inlets on both the east and west side of the road and convey this discharge into the Tri-State facility. For less frequent events, there will be by-pass flow that will be intercepted immediately downstream of the greenway crossing by Type AAA inlets on both sides of the street. We are proposing a 24-inch trunkline for 400-feet connected to a 30-inch trunkline for an additional 300-feet to the intersection with W. Allison Rd. We are proposing four sets of Type AA inlets and two sets of Type AAA inlets to be evenly placed on either side of the road and connected to the 30-inch storm sewer for intercepting street runoff.

Stormwater runoff from the proposed Walterscheid system will be combined with runoff from an adjoining subcatchment area to the west and conveyed into the recently constructed WYDOT system in W. Allison Road. The WYDOT system connects to the existing Gateway South Outfall system in W. Allison Road. and is then conveyed to Allison Draw. Stormwater runoff from the Tri-State storage facility and from the Gateway South development are jointly conveyed through this same system.

We are further proposing new 24-inch storm sewer south of Dot Ray Place. to convey street flow to a secondary outfall alignment to Allison Draw. We are recommending three new Type A inlets along with slotted drain to intercept street drainage upstream of W. Prosser Road. There will remain runoff that will flow to the existing WYDOT storm sewer in W. College Drive. from W. Prosser Road. south within the Walterscheid corridor. This is primarily street runoff with adequate curb and gutter capacity. The secondary outfall alignment is an existing system that will require maintenance and/or pipe replacement. Additionally, a drainage easement should be recorded for this alignment.

We have not included in our conceptual plan a drainage design for the proposed roundabout for the Fox Farm/Walterscheid Boulevard intersection because it is planned to be reconstructed well before the Walterscheid Boulevard corridor is reconstructed. At present, drainage from this intersection is directed in three directions – north, east, and south. We would ideally recommend that storm sewer convey this flow to the south, however, a storm sewer system would need to be in place to convey this flow. Complicating the matter further is the fact that the greenway tunnel at the Boys and Girls Club presents a conflict. Therefore we are using the Tri-State facility in our conceptual plan to intercept street runoff and runoff from adjacent Subcatchments to the west. There is potential to incorporate additional storage on the WyoFresh property for attenuation and conveyance of flow from a future Fox Farm Road/Walterscheid Boulevard roundabout. Short of that, our recommendation is to maintain the present drainage patterns while limiting the increase in peak discharges to the extent possible.

We have provided a cost-effective approach for re-configuring the conveyance elements for the corridor while maintaining the performance of existing storage for the Gateway South and Tri-State facilities. Conceptual construction details for the proposed storm sewer for the corridor along with our proposed improvements for the Harmony Meadows outfall system are included in Appendix B to this report.

VII. References

1. Urban Storm Drainage Criteria Manuals 2 and 3, Urban Drainage and Flood Control District,Denver, Colorado, November 2010 as currently (Feb 2018) amended.

2. Storm Water Management Model, Reference Manual Volume I, Hydrology, U.S. Environmental Protection Agency, January 2016.

3. Storm Water Management Model, Reference Manual Volume II, Hydraulics, U.S. Environmental Protection Agency, May 2017.

4. Conversion of Natural Watershed to Kinematic Wave Cascading Plane, Guo, J.C.Y. and Urbonas, B., Journal of Hydrologic Engineering, Vol. 14, No. 8, pp. 839-846, July/August 2009.

5. CH2M HILL 2 1988: CH2M HILL & States West Water Resources Corporation: Drainage Master Plan – Dry Creek.

6. U.S.G.S 1988: U.S. Geological Survey: Precipitation Records and Flood-Producing Storms in Cheyenne, Wyoming, Water-Resources Investigations Report 87-4225, 1988.

VIII. Certification

"I hereby attest that the Preliminary Drainage Report for the proposed Walterscheid corridor improvements plan was prepared by me, or under my direct supervision, in accordance with the provisions of City of Cheyenne Unified Development Code for the responsible parties thereof and that I am a duly registered ProfessionalEngineer under the laws of the State of Wyoming. I understand that the City of Cheyenne does not and shall not assume liability for drainage facilities designed by others."

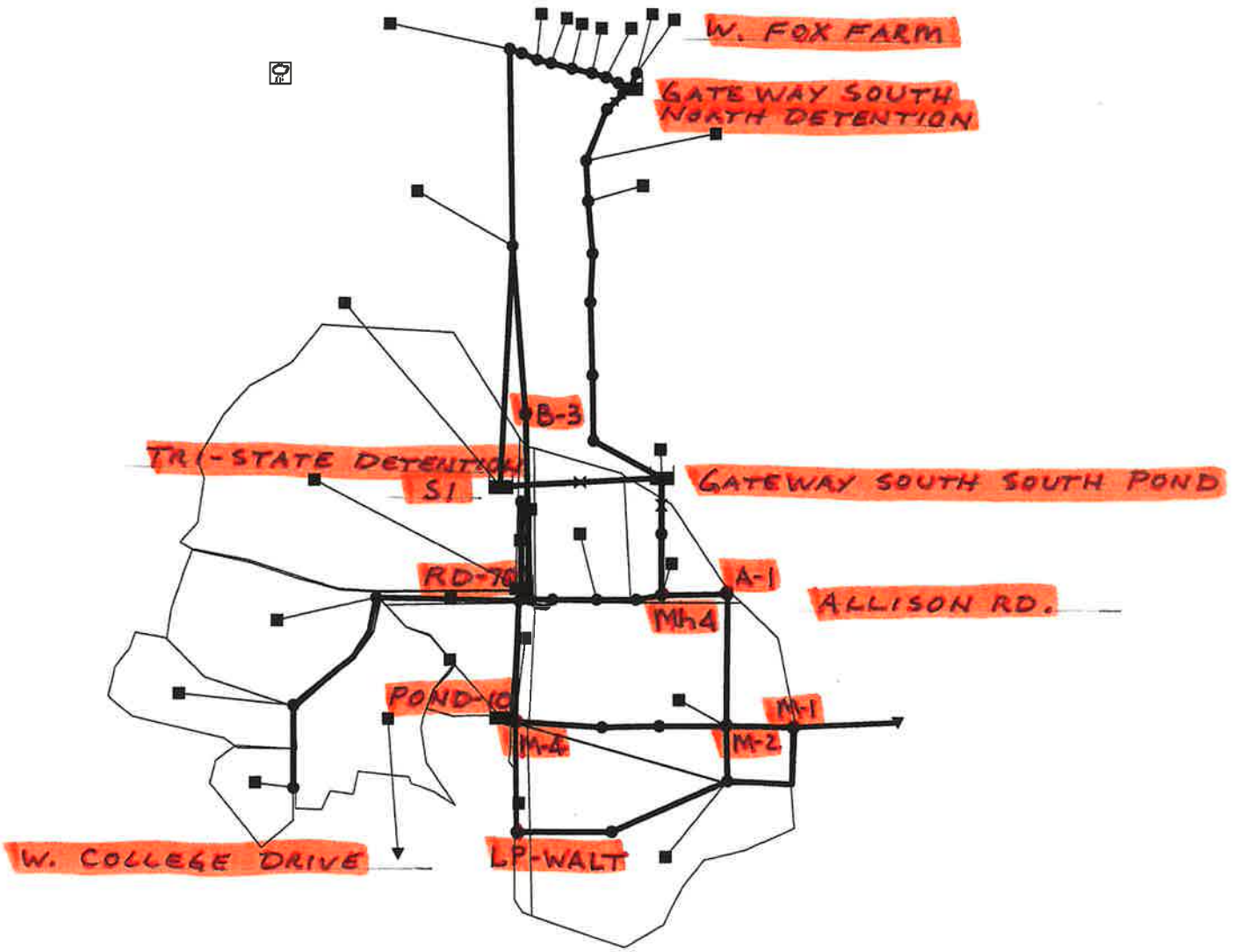
Gene L. MacDonald
Registered Professional EngineerState of Wyoming # 8891

APPENDIX A

SWMM Drainage Model Output Summaries

- SWMM Model Results Summary
  - Subcatchment Runoff
  - Storage Volume
  - Link Flow

WALTERSCHEID CORRIDOR MODEL



SWMM EXISTING MODEL RESULTS SUMMARY
10-YEAR, 2-HOUR DESIGN STORM

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	1.65	0.00	0.00	0.56	1.01	0.00	1.01	0.31	21.45
ALLISON-C_1	1.65	0.00	0.00	1.51	0.29	0.02	0.12	0.08	7.16
ALLISON-C_3	1.65	0.00	0.00	1.49	0.29	0.04	0.14	0.02	1.72
ALLISON-C_4	1.65	0.00	0.00	1.49	0.29	0.04	0.14	0.03	3.00
ALLISON-NW	1.65	0.00	0.00	1.59	0.14	0.02	0.05	0.06	5.97
BASIN-34	1.65	0.00	0.00	0.98	0.85	0.61	0.61	0.02	2.64
B-HM-D	1.65	0.00	0.00	0.87	0.68	0.05	0.73	0.22	26.68
B-HM-DIV-A	1.65	0.00	0.00	1.59	0.03	0.06	0.06	0.01	1.00
B-HM-DIV-B	1.65	0.00	0.00	1.61	0.03	0.04	0.04	0.01	1.04
HM-DIV-C	1.65	0.00	0.00	1.46	0.16	0.03	0.18	0.06	7.59
HM-NE	1.65	0.00	0.00	0.75	0.93	0.14	0.84	0.15	15.92
North_Offsite_Basin	1.65	0.00	0.00	1.02	0.56	0.00	0.56	0.26	10.72
PROSSER-W	1.65	0.00	0.00	1.40	0.40	0.02	0.22	0.13	11.87
S2	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S3	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S4	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
S5	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S6	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.05	4.77
South_Offsite_Basin	1.65	0.00	0.00	0.56	1.00	0.00	1.01	0.62	37.77
Sub-Basin_A	1.65	0.00	0.00	0.24	1.31	0.01	1.32	0.36	31.67
Sub-Basin_Aa	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.04	4.31
Sub-Basin_B	1.65	0.00	0.00	0.57	0.99	0.00	1.00	0.14	9.41
Sub-Basin_B2	1.65	0.00	0.00	0.57	1.00	0.01	1.01	0.19	17.33
Sub-Basin_C	1.65	0.00	0.00	0.79	0.80	0.00	0.80	0.38	26.46

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	37.771	29	0	0	64.200	50	0	01:50	10.13
POND-10	0.077	1	0	0	1.087	8	0	00:52	13.98
RD-70	1.784	6	0	0	2.216	8	0	04:54	2.32
S1	2.353	2	0	0	11.922	12	0	01:18	21.04
South_Pond	17.086	6	0	0	50.666	19	0	01:21	39.35

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
2	CONDUIT	0.00	0	00:00	0.00	0.00	0.06
3	CONDUIT	2.89	0	00:55	3.41	0.03	0.27
4	CONDUIT	2.48	0	00:55	0.95	0.03	0.47
A-1	CONDUIT	39.85	0	01:18	3.73	0.05	0.31
A-2	CONDUIT	39.86	0	01:17	10.23	0.45	0.35
A-3	CONDUIT	39.35	0	01:22	9.71	0.40	0.44
A-4	CONDUIT	30.07	0	00:51	6.12	0.71	0.51
A-5	CONDUIT	29.89	0	00:50	12.75	0.19	0.29
A-6	CONDUIT	29.82	0	00:55	12.73	0.19	0.29
A-7	CONDUIT	29.82	0	00:55	9.19	0.45	0.47
A-9	CONDUIT	14.37	0	00:55	3.48	0.01	0.06
B-2	CONDUIT	2.32	0	01:00	0.60	0.02	0.28
B-3	CONDUIT	19.40	0	00:57	2.27	0.04	0.52
B-4	CONDUIT	0.62	0	00:57	0.41	0.01	0.24
C1	CONDUIT	27.25	0	01:05	5.57	0.24	1.00

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C-1	CONDUIT	12.93	0	00:55	9.44	0.37	0.45
C2	CONDUIT	9.77	0	00:57	9.39	0.24	0.38
C3	CONDUIT	14.92	0	00:55	10.70	0.46	0.46
C4	CONDUIT	17.02	0	00:50	10.34	0.26	0.37
C5	CONDUIT	19.40	0	00:50	8.28	0.33	0.59
C6	CONDUIT	21.72	0	00:51	8.60	0.46	0.92
C7	CONDUIT	34.97	0	00:51	3.26	0.28	0.60
C8	CONDUIT	6.65	0	01:51	9.83	0.28	0.27
CULV-2	CONDUIT	20.98	0	00:56	5.44	0.70	0.42
CULV-3	CONDUIT	13.98	0	00:52	5.48	0.58	0.80
D-1	CONDUIT	65.61	0	01:02	2.49	0.03	0.30
D-2	CONDUIT	20.90	0	00:56	3.44	0.03	0.15
D-2a	CONDUIT	20.68	0	00:57	1.20	0.03	0.40
D-4	CONDUIT	7.54	0	00:56	3.25	0.02	0.22
D-5	CONDUIT	6.62	0	00:50	4.66	0.01	0.18
D-6	CONDUIT	0.64	0	01:07	0.54	0.01	0.14
D-7	CONDUIT	0.82	0	01:01	0.67	0.01	0.15

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
D-DS	CONDUIT	8.93	0	00:57	0.88	0.03	0.34
Diversion_North	CONDUIT	9.77	0	00:57	7.79	1.04	0.67
D-O	CONDUIT	157.86	0	00:01	3.29	0.06	0.49
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.43
DS-2	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
DS-3	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
DS-4	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
R-99	CONDUIT	29.82	0	00:55	9.41	0.00	0.05
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	0.00	0	00:00	0.00		

SWMM EXISTING MODEL RESULTS SUMMARY
25-YEAR, 2-HOUR DESIGN STORM

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	2.32	0.00	0.00	0.74	1.45	0.05	1.50	0.46	29.18
ALLISON-C_1	2.32	0.00	0.00	2.01	0.42	0.14	0.29	0.19	11.55
ALLISON-C_3	2.32	0.00	0.00	1.92	0.42	0.24	0.38	0.05	3.55
ALLISON-C_4	2.32	0.00	0.00	1.92	0.42	0.24	0.39	0.09	6.21
ALLISON-NW	2.32	0.00	0.00	2.11	0.20	0.15	0.20	0.22	15.82
BASIN-34	2.32	0.00	0.00	1.15	1.22	1.11	1.11	0.03	3.94
B-HM-D	2.32	0.00	0.00	1.10	0.98	0.20	1.17	0.35	35.46
B-HM-DIV-A	2.32	0.00	0.00	2.05	0.04	0.27	0.27	0.03	2.84
B-HM-DIV-B	2.32	0.00	0.00	2.12	0.04	0.20	0.20	0.04	3.16
HM-DIV-C	2.32	0.00	0.00	1.92	0.22	0.17	0.39	0.13	10.83
HM-NE	2.32	0.00	0.00	0.91	1.33	0.35	1.35	0.24	22.43
North_Offsite_Basin	2.32	0.00	0.00	1.42	0.81	0.02	0.83	0.39	15.25
PROSSER-W	2.32	0.00	0.00	1.83	0.58	0.17	0.46	0.27	17.12
S2	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S3	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S4	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
S5	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S6	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.07	6.02
South_Offsite_Basin	2.32	0.00	0.00	0.75	1.44	0.04	1.48	0.91	52.02
Sub-Basin_A	2.32	0.00	0.00	0.31	1.88	0.04	1.92	0.52	41.42
Sub-Basin_Aa	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.06	5.44
Sub-Basin_B	2.32	0.00	0.00	0.76	1.43	0.05	1.48	0.21	12.86
Sub-Basin_B2	2.32	0.00	0.00	0.74	1.44	0.07	1.51	0.29	22.69
Sub-Basin_C	2.32	0.00	0.00	1.07	1.14	0.05	1.19	0.56	35.99

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	49.069	38	0	0	80.464	63	0	01:32	13.91
POND-10	0.162	1	0	0	2.441	17	0	00:51	17.76
RD-70	7.233	25	0	0	9.149	32	0	04:53	7.74
S1	6.403	7	0	0	23.981	25	0	01:19	24.35
South_Pond	33.023	12	0	0	78.784	30	0	01:39	47.86

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
2	CONDUIT	0.00	0	00:00	0.00	0.00	0.09
3	CONDUIT	6.06	0	00:50	3.42	0.06	0.35
4	CONDUIT	5.65	0	00:51	1.22	0.08	0.54
A-1	CONDUIT	50.77	0	01:05	4.00	0.06	0.37
A-2	CONDUIT	51.45	0	01:04	11.03	0.58	0.40
A-3	CONDUIT	47.86	0	01:39	10.21	0.48	0.49
A-4	CONDUIT	39.16	0	00:50	6.71	0.92	0.59
A-5	CONDUIT	39.18	0	00:50	13.76	0.24	0.34
A-6	CONDUIT	39.17	0	00:50	13.76	0.24	0.34
A-7	CONDUIT	39.16	0	00:50	9.83	0.59	0.55
A-9	CONDUIT	18.36	0	00:50	4.05	0.01	0.07
B-2	CONDUIT	7.74	0	00:55	0.92	0.06	0.62
B-3	CONDUIT	29.31	0	00:53	2.23	0.06	0.64
B-4	CONDUIT	4.81	0	00:53	1.69	0.04	0.36
C1	CONDUIT	26.84	0	00:46	5.65	0.24	1.00

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C-1	CONDUIT	14.95	0	00:46	9.66	0.43	0.49
C2	CONDUIT	10.02	0	01:08	9.78	0.25	0.40
C3	CONDUIT	17.89	0	00:46	11.15	0.55	0.51
C4	CONDUIT	20.89	0	00:45	10.85	0.32	0.41
C5	CONDUIT	23.89	0	00:45	8.73	0.40	0.67
C6	CONDUIT	26.85	0	00:46	9.06	0.57	1.00
C7	CONDUIT	45.76	0	00:46	3.48	0.36	0.67
C8	CONDUIT	13.91	0	01:33	11.72	0.59	0.40
CULV-2	CONDUIT	27.27	0	00:49	5.63	0.90	0.56
CULV-3	CONDUIT	17.76	0	00:50	5.68	0.74	1.00
D-1	CONDUIT	95.98	0	01:00	3.22	0.05	0.32
D-2	CONDUIT	27.05	0	00:50	3.78	0.04	0.17
D-2a	CONDUIT	26.66	0	00:51	1.28	0.04	0.48
D-4	CONDUIT	13.15	0	00:51	3.49	0.04	0.33
D-5	CONDUIT	10.12	0	00:50	4.65	0.02	0.23
D-6	CONDUIT	3.37	0	01:04	0.96	0.08	0.29
D-7	CONDUIT	2.74	0	00:54	0.93	0.05	0.30

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
D-DS	CONDUIT	13.80	0	00:54	1.00	0.04	0.42
Diversion_North	CONDUIT	10.03	0	01:08	7.79	1.07	0.73
D-O	CONDUIT	157.86	0	00:01	3.29	0.06	0.49
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.43
DS-2	CONDUIT	0.00	0	00:00	0.00	0.00	0.11
DS-3	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
DS-4	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
R-99	CONDUIT	39.16	0	00:50	10.41	0.01	0.06
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	0.00	0	00:00	0.00		

GLM Design Group

SWMM EXISTING MODEL RESULTS SUMMARY
50-YEAR, 2-HOUR DESIGN STORM

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	2.92	0.00	0.00	0.86	1.85	0.14	1.98	0.61	36.41
ALLISON-C_1	2.92	0.00	0.00	2.33	0.53	0.39	0.57	0.38	18.20
ALLISON-C_3	2.92	0.00	0.00	2.15	0.54	0.57	0.75	0.09	6.17
ALLISON-C_4	2.92	0.00	0.00	2.15	0.54	0.57	0.75	0.17	10.78
ALLISON-NW	2.92	0.00	0.00	2.42	0.25	0.42	0.49	0.54	31.65
BASIN-34	2.92	0.00	0.00	1.23	1.55	1.64	1.64	0.05	5.46
B-HM-D	2.92	0.00	0.00	1.25	1.24	0.38	1.62	0.49	47.04
B-HM-DIV-A	2.92	0.00	0.00	2.33	0.06	0.59	0.59	0.06	5.34
B-HM-DIV-B	2.92	0.00	0.00	2.43	0.06	0.49	0.49	0.09	6.18
HM-DIV-C	2.92	0.00	0.00	2.20	0.28	0.42	0.71	0.24	16.12
HM-NE	2.92	0.00	0.00	1.00	1.69	0.59	1.86	0.32	31.60
North_Offsite_Basin	2.92	0.00	0.00	1.74	1.04	0.07	1.10	0.52	20.65
PROSSER-W	2.92	0.00	0.00	2.10	0.73	0.43	0.80	0.48	24.49
S2	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S3	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S4	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
S5	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S6	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.09	7.24
South_Offsite_Basin	2.92	0.00	0.00	0.87	1.84	0.12	1.96	1.21	66.32
Sub-Basin_A	2.92	0.00	0.00	0.35	2.39	0.09	2.48	0.67	52.88
Sub-Basin_Aa	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.08	6.54
Sub-Basin_B	2.92	0.00	0.00	0.88	1.82	0.14	1.96	0.28	16.17
Sub-Basin_B2	2.92	0.00	0.00	0.84	1.83	0.18	2.01	0.38	29.20
Sub-Basin_C	2.92	0.00	0.00	1.25	1.46	0.16	1.61	0.76	45.22

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	55.087	43	0	0	90.639	71	0	01:18	20.67
POND-10	0.457	3	0	0	5.120	36	0	00:53	20.29
RD-70	12.886	45	0	0	17.120	59	0	01:29	15.46
S1	13.547	14	0	0	42.297	44	0	01:22	27.27
South_Pond	52.437	20	0	0	113.198	43	0	01:35	60.61

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	8.54	0	01:29	7.31	0.25	0.29
2	CONDUIT	8.54	0	01:30	7.93	0.08	0.21
3	CONDUIT	10.72	0	01:29	3.98	0.11	0.47
4	CONDUIT	10.74	0	01:29	1.76	0.15	0.69
A-1	CONDUIT	72.49	0	01:31	4.18	0.09	0.42
A-2	CONDUIT	75.92	0	01:30	12.56	0.86	0.49
A-3	CONDUIT	60.61	0	01:36	10.81	0.61	0.57
A-4	CONDUIT	50.49	0	00:45	7.36	1.19	0.67
A-5	CONDUIT	50.24	0	00:45	14.75	0.31	0.39
A-6	CONDUIT	50.05	0	00:45	14.72	0.31	0.38
A-7	CONDUIT	49.86	0	00:45	10.36	0.75	0.65
A-9	CONDUIT	25.43	0	01:08	4.75	0.01	0.08
B-2	CONDUIT	15.46	0	00:53	1.16	0.13	0.87
B-3	CONDUIT	41.11	0	00:52	2.23	0.08	0.67
B-4	CONDUIT	9.75	0	00:52	2.38	0.08	0.45
C1	CONDUIT	30.63	0	00:45	6.00	0.27	1.00

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C-1	CONDUIT	16.17	0	00:45	9.73	0.46	0.52
C2	CONDUIT	10.35	0	00:52	9.85	0.26	0.41
C3	CONDUIT	19.95	0	00:45	11.43	0.61	0.54
C4	CONDUIT	23.63	0	00:45	11.17	0.36	0.45
C5	CONDUIT	27.31	0	00:45	9.00	0.46	0.71
C6	CONDUIT	30.95	0	00:45	9.36	0.66	1.00
C7	CONDUIT	57.75	0	00:46	3.70	0.46	0.73
C8	CONDUIT	20.67	0	01:19	12.66	0.87	0.52
CULV-2	CONDUIT	30.91	0	01:02	5.64	1.02	0.59
CULV-3	CONDUIT	20.29	0	00:47	6.46	0.84	1.00
D-1	CONDUIT	126.88	0	01:00	3.85	0.06	0.34
D-2	CONDUIT	30.90	0	01:02	3.92	0.05	0.19
D-2a	CONDUIT	30.87	0	01:03	1.19	0.05	0.54
D-4	CONDUIT	21.27	0	00:56	3.68	0.07	0.59
D-5	CONDUIT	18.80	0	00:56	4.89	0.03	0.29
D-6	CONDUIT	7.55	0	01:02	1.25	0.17	0.40
D-7	CONDUIT	4.99	0	00:52	1.08	0.09	0.43

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
D-DS	CONDUIT	20.61	0	00:55	1.16	0.06	0.49
Diversion_North	CONDUIT	10.35	0	00:52	7.79	1.10	0.73
D-O	CONDUIT	157.86	0	00:01	3.29	0.06	0.50
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.44
DS-2	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
DS-3	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
DS-4	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
R-99	CONDUIT	49.60	0	00:45	11.35	0.01	0.07
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	8.54	0	01:29	0.23		

SWMM EXISTING MODEL RESULTS SUMMARY
100-YEAR, 2-HOUR DESIGN STORM

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	3.68	0.00	0.00	0.94	2.35	0.31	2.66	0.82	46.06
ALLISON-C_1	3.68	0.00	0.00	2.59	0.68	0.84	1.07	0.72	27.61
ALLISON-C_3	3.68	0.00	0.00	2.33	0.68	1.10	1.33	0.17	9.60
ALLISON-C_4	3.68	0.00	0.00	2.33	0.68	1.10	1.33	0.29	16.78
ALLISON-NW	3.68	0.00	0.00	2.67	0.32	0.92	1.00	1.11	53.90
BASIN-34	3.68	0.00	0.00	1.28	1.97	2.35	2.35	0.07	6.74
B-HM-D	3.68	0.00	0.00	1.36	1.57	0.70	2.28	0.68	60.76
B-HM-DIV-A	3.68	0.00	0.00	2.53	0.07	1.15	1.15	0.11	8.52
B-HM-DIV-B	3.68	0.00	0.00	2.67	0.07	1.01	1.01	0.18	10.30
HM-DIV-C	3.68	0.00	0.00	2.42	0.36	0.89	1.25	0.43	23.91
HM-NE	3.68	0.00	0.00	1.05	2.15	0.96	2.57	0.45	40.75
North_Offsite_Basin	3.68	0.00	0.00	2.08	1.33	0.21	1.53	0.72	26.62
PROSSER-W	3.68	0.00	0.00	2.31	0.93	0.88	1.34	0.81	34.43
S2	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S3	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S4	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
S5	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S6	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.11	8.41
South_Offsite_Basin	3.68	0.00	0.00	0.96	2.34	0.29	2.63	1.62	81.90
Sub-Basin_A	3.68	0.00	0.00	0.38	3.04	0.17	3.20	0.87	64.62
Sub-Basin_Aa	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.10	7.60
Sub-Basin_B	3.68	0.00	0.00	0.96	2.31	0.33	2.64	0.37	20.15
Sub-Basin_B2	3.68	0.00	0.00	0.91	2.32	0.38	2.70	0.51	36.39
Sub-Basin_C	3.68	0.00	0.00	1.38	1.85	0.38	2.23	1.05	57.24

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	61.267	48	0	0	103.553	81	0	01:10	29.81
POND-10	1.091	8	0	0	8.875	62	0	00:55	22.11
RD-70	13.805	48	0	0	19.658	68	0	01:10	33.70
S1	30.132	31	0	0	75.765	79	0	01:39	30.33
South_Pond	81.257	31	0	0	163.164	61	0	01:51	75.70

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	33.31	0	01:10	10.35	0.97	0.62
2	CONDUIT	33.16	0	01:10	11.64	0.31	0.42
3	CONDUIT	41.22	0	01:10	7.57	0.44	0.72
4	CONDUIT	43.26	0	01:06	4.74	0.59	0.92
A-1	CONDUIT	114.85	0	01:11	4.48	0.14	0.54
A-2	CONDUIT	121.25	0	01:24	15.22	1.37	0.63
A-3	CONDUIT	75.70	0	01:51	11.35	0.76	0.65
A-4	CONDUIT	62.68	0	00:45	8.02	1.48	0.76
A-5	CONDUIT	62.40	0	00:45	15.64	0.39	0.43
A-6	CONDUIT	62.16	0	00:45	15.61	0.39	0.43
A-7	CONDUIT	61.92	0	00:45	10.73	0.93	0.76
A-9	CONDUIT	38.45	0	01:01	5.48	0.02	0.10
B-2	CONDUIT	25.62	0	00:51	1.35	0.21	0.94
B-3	CONDUIT	54.59	0	00:52	2.24	0.11	0.69
B-4	CONDUIT	15.41	0	00:51	2.88	0.13	0.53
C1	CONDUIT	32.57	0	00:45	5.09	0.29	1.00

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C-1	CONDUIT	17.70	0	00:45	9.89	0.50	0.56
C2	CONDUIT	10.67	0	00:51	9.76	0.26	0.42
C3	CONDUIT	22.11	0	00:45	11.72	0.68	0.58
C4	CONDUIT	26.39	0	00:45	11.46	0.40	0.48
C5	CONDUIT	30.65	0	00:45	9.17	0.52	0.83
C6	CONDUIT	34.21	0	00:45	8.88	0.73	1.00
C7	CONDUIT	70.23	0	00:45	3.88	0.56	0.79
C8	CONDUIT	29.52	0	01:10	13.19	1.24	0.67
CULV-2	CONDUIT	35.76	0	01:03	5.82	1.18	0.60
CULV-3	CONDUIT	22.11	0	00:46	7.04	0.92	1.00
D-1	CONDUIT	191.40	0	01:10	4.84	0.10	0.39
D-2	CONDUIT	35.76	0	01:04	4.12	0.05	0.20
D-2a	CONDUIT	35.74	0	01:05	1.12	0.06	0.60
D-4	CONDUIT	34.80	0	00:56	3.83	0.11	0.71
D-5	CONDUIT	32.14	0	00:55	5.52	0.05	0.36
D-6	CONDUIT	13.36	0	01:00	1.50	0.30	0.51
D-7	CONDUIT	7.89	0	00:50	1.21	0.13	0.56

WALTERSCHEID BLVD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
D-DS	CONDUIT	29.94	0	00:56	1.36	0.09	0.59
Diversion_North	CONDUIT	10.67	0	00:51	7.78	1.14	0.73
D-O	CONDUIT	188.59	0	01:17	3.29	0.07	0.51
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.47
DS-2	CONDUIT	5.25	0	01:13	0.36	0.00	0.20
DS-3	CONDUIT	6.83	0	01:07	2.06	0.00	0.08
DS-4	CONDUIT	7.56	0	01:04	4.29	0.03	0.18
R-99	CONDUIT	61.66	0	00:45	12.28	0.01	0.08
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	33.18	0	01:10	0.56		

SWMM PROPOSED MODEL RESULTS SUMMARY
10-YEAR, 2-HOUR DESIGN STORM

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	1.65	0.00	0.00	0.41	1.15	0.00	1.15	0.35	23.22
ALLISON-C_2	1.65	0.00	0.00	1.49	0.29	0.04	0.14	0.03	2.83
ALLISON-C_3	1.65	0.00	0.00	1.49	0.29	0.04	0.14	0.02	1.72
ALLISON-C_4	1.65	0.00	0.00	1.51	0.29	0.02	0.12	0.07	6.92
ALLISON-C_5	1.65	0.00	0.00	0.30	1.39	0.78	1.26	0.02	2.12
ALLISON-C_6	1.65	0.00	0.00	0.27	1.39	0.82	1.29	0.04	5.30
ALLISON-NW_1	1.65	0.00	0.00	0.28	1.39	0.93	1.27	0.02	2.07
ALLISON-NW_2	1.65	0.00	0.00	1.59	0.14	0.02	0.05	0.06	5.92
BASIN-34	1.65	0.00	0.00	0.98	0.85	0.61	0.61	0.02	2.64
B-HM-D	1.65	0.00	0.00	0.87	0.68	0.05	0.73	0.22	26.68
B-HM-DIV-A	1.65	0.00	0.00	1.59	0.03	0.06	0.06	0.01	1.00
B-HM-DIV-B	1.65	0.00	0.00	1.61	0.03	0.04	0.04	0.01	1.04
HM-DIV-C	1.65	0.00	0.00	1.46	0.16	0.03	0.18	0.06	7.59
HM-NE	1.65	0.00	0.00	0.75	0.93	0.14	0.84	0.15	15.92
North_Offsite_Basin	1.65	0.00	0.00	1.02	0.56	0.00	0.56	0.26	10.72

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PROSSER-W_1	1.65	0.00	0.00	1.40	0.40	0.03	0.23	0.13	11.29
PROSSER-W_2	1.65	0.00	0.00	0.15	1.47	0.67	1.40	0.07	6.35
S2	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S3	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S4	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S5	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.02	2.52
S6	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.05	4.77
South_Offsite_Basin	1.65	0.00	0.00	0.56	1.00	0.00	1.01	0.62	37.77
Sub-Basin_A	1.65	0.00	0.00	0.24	1.31	0.01	1.32	0.36	31.67
Sub-Basin_Aa	1.65	0.00	0.00	0.53	1.05	0.00	1.05	0.04	4.31
Sub-Basin_B	1.65	0.00	0.00	0.57	0.99	0.00	1.00	0.14	9.41
Sub-Basin_B2	1.65	0.00	0.00	0.57	1.00	0.01	1.01	0.19	17.33
Sub-Basin_C	1.65	0.00	0.00	0.79	0.80	0.00	0.80	0.38	26.46

PROSSER ROAD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	21.661	17	0	0	45.158	35	0	01:29	20.91
POND-10	0.077	1	0	0	1.087	8	0	00:52	13.88
RD-70	1.767	6	0	0	2.194	8	0	04:55	2.30
S1	2.062	2	0	0	16.725	17	0	01:08	22.59
South_Pond	14.260	5	0	0	53.109	20	0	01:19	40.33

PROSSER ROAD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	29.05	0	00:57	10.11	0.84	0.57
2	CONDUIT	29.04	0	00:57	11.87	0.27	0.38
3	CONDUIT	31.27	0	00:57	8.32	0.33	0.53
4	CONDUIT	31.08	0	00:57	4.88	0.42	0.64
A-1	CONDUIT	65.51	0	01:01	3.95	0.08	0.40
A-2	CONDUIT	67.97	0	01:00	12.09	0.77	0.46
A-3	CONDUIT	40.33	0	01:20	9.77	0.41	0.44
A-4	CONDUIT	29.95	0	00:51	6.11	0.71	0.51
A-5	CONDUIT	29.77	0	00:50	12.73	0.19	0.29
A-6	CONDUIT	29.69	0	00:50	12.71	0.19	0.29
A-7	CONDUIT	29.62	0	00:55	9.17	0.44	0.47
A-9	CONDUIT	14.17	0	00:55	3.45	0.01	0.06
B-2	CONDUIT	2.30	0	01:00	0.60	0.02	0.28
C1	CONDUIT	21.43	0	01:00	4.36	0.19	0.97
C-1	CONDUIT	4.63	0	00:50	6.39	0.13	0.28

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C2	CONDUIT	1.29	0	01:01	4.06	0.03	0.16
C3	CONDUIT	7.11	0	00:50	8.23	0.22	0.32
C4	CONDUIT	9.53	0	00:50	8.44	0.14	0.28
C5	CONDUIT	11.94	0	00:50	7.01	0.20	0.38
C6	CONDUIT	14.30	0	00:50	7.70	0.30	0.64
C7	CONDUIT	34.97	0	00:51	3.26	0.28	0.60
C8	CONDUIT	5.98	0	01:31	9.45	0.25	0.27
CULV-2	CONDUIT	25.03	0	00:56	5.57	0.83	0.47
CULV-3	CONDUIT	13.88	0	00:52	5.05	0.58	0.86
D-1	CONDUIT	100.53	0	01:01	3.32	0.05	0.33
D-2	CONDUIT	24.97	0	00:56	3.65	0.04	0.16
D-2a	CONDUIT	24.80	0	00:57	1.24	0.04	0.48
D-4	CONDUIT	7.98	0	00:55	3.17	0.03	0.23
D-5	CONDUIT	6.62	0	00:50	4.66	0.01	0.18
D-6	CONDUIT	0.64	0	01:07	0.54	0.01	0.14
D-7	CONDUIT	0.82	0	01:01	0.67	0.01	0.15
D-DS	CONDUIT	11.11	0	01:00	0.78	0.03	0.42

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
Diversion_North	CONDUIT	1.29	0	01:01	4.64	0.14	0.22
D-O	CONDUIT	157.86	0	00:01	3.29	0.06	0.50
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.43
DS-2	CONDUIT	4.66	0	01:00	0.57	0.00	0.13
DS-3	CONDUIT	5.81	0	00:55	1.73	0.00	0.07
DS-4	CONDUIT	0.00	0	00:00	0.00	0.00	0.04
R-99	CONDUIT	29.62	0	00:55	9.39	0.00	0.05
5	CONDUIT	8.42	0	01:02	3.64	1.00	1.00
6	CONDUIT	26.90	0	00:55	4.79	0.69	0.93
7	CONDUIT	25.78	0	00:56	9.69	0.28	0.53
8	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
9	CONDUIT	4.40	0	00:55	6.44	0.08	0.60
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	0.00	0	00:00	0.00		

SWMM PROPOSED MODEL RESULTS SUMMARY
25-YEAR, 2-HOUR DESIGN STORM

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	2.32	0.00	0.00	0.54	1.65	0.04	1.69	0.52	31.68
ALLISON-C_2	2.32	0.00	0.00	1.91	0.42	0.25	0.39	0.08	5.98
ALLISON-C_3	2.32	0.00	0.00	1.92	0.42	0.24	0.38	0.05	3.55
ALLISON-C_4	2.32	0.00	0.00	2.01	0.42	0.15	0.29	0.18	11.22
ALLISON-C_5	2.32	0.00	0.00	0.32	1.99	1.22	1.90	0.04	2.80
ALLISON-C_6	2.32	0.00	0.00	0.29	2.00	1.26	1.94	0.06	6.71
ALLISON-NW_1	2.32	0.00	0.00	0.31	1.99	1.42	1.92	0.03	2.68
ALLISON-NW_2	2.32	0.00	0.00	2.11	0.20	0.15	0.20	0.22	15.76
BASIN-34	2.32	0.00	0.00	1.15	1.22	1.11	1.11	0.03	3.94
B-HM-D	2.32	0.00	0.00	1.10	0.98	0.20	1.17	0.35	35.46
B-HM-DIV-A	2.32	0.00	0.00	2.05	0.04	0.27	0.27	0.03	2.84
B-HM-DIV-B	2.32	0.00	0.00	2.12	0.04	0.20	0.20	0.04	3.16
HM-DIV-C	2.32	0.00	0.00	1.92	0.22	0.17	0.39	0.13	10.83
HM-NE	2.32	0.00	0.00	0.91	1.33	0.35	1.35	0.24	22.43
North_Offsite_Basin	2.32	0.00	0.00	1.42	0.81	0.02	0.83	0.39	15.25

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PROSSER-W_1	2.32	0.00	0.00	1.83	0.58	0.18	0.47	0.26	16.23
PROSSER-W_2	2.32	0.00	0.00	0.16	2.10	1.01	2.06	0.10	8.17
S2	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S3	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S4	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S5	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.04	3.17
S6	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.07	6.02
South_Offsite_Basin	2.32	0.00	0.00	0.75	1.44	0.04	1.48	0.91	52.02
Sub-Basin_A	2.32	0.00	0.00	0.31	1.88	0.04	1.92	0.52	41.42
Sub-Basin_Aa	2.32	0.00	0.00	0.74	1.51	0.00	1.51	0.06	5.44
Sub-Basin_B	2.32	0.00	0.00	0.76	1.43	0.05	1.48	0.21	12.86
Sub-Basin_B2	2.32	0.00	0.00	0.74	1.44	0.07	1.51	0.29	22.69
Sub-Basin_C	2.32	0.00	0.00	1.07	1.14	0.05	1.19	0.56	35.99

PROSSER ROAD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	40.923	32	0	0	68.608	53	0	01:33	9.50
POND-10	0.206	1	0	0	2.879	20	0	00:52	16.64
RD-70	7.179	25	0	0	9.079	32	0	04:54	7.71
S1	5.333	6	0	0	31.101	32	0	01:08	25.67
South_Pond	25.317	10	0	0	76.197	29	0	01:21	47.35

PROSSER ROAD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	39.24	0	00:51	11.19	1.14	0.67
2	CONDUIT	38.31	0	00:52	12.53	0.36	0.45
3	CONDUIT	43.56	0	00:52	9.09	0.46	0.65
4	CONDUIT	43.72	0	00:52	5.57	0.60	0.77
A-1	CONDUIT	85.27	0	00:55	4.17	0.10	0.46
A-2	CONDUIT	90.48	0	00:54	13.42	1.02	0.53
A-3	CONDUIT	47.35	0	01:22	10.18	0.48	0.49
A-4	CONDUIT	38.94	0	00:46	6.69	0.92	0.58
A-5	CONDUIT	38.94	0	00:50	13.74	0.24	0.34
A-6	CONDUIT	38.93	0	00:50	13.73	0.24	0.34
A-7	CONDUIT	38.92	0	00:50	9.81	0.58	0.55
A-9	CONDUIT	18.12	0	00:50	3.76	0.01	0.07
B-2	CONDUIT	7.71	0	00:55	0.92	0.06	0.62
C1	CONDUIT	26.18	0	00:56	4.55	0.23	1.00
C-1	CONDUIT	7.52	0	00:55	8.02	0.21	0.34

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C2	CONDUIT	5.10	0	00:57	7.39	0.13	0.27
C3	CONDUIT	9.48	0	00:50	9.20	0.29	0.37
C4	CONDUIT	12.14	0	00:45	9.11	0.18	0.32
C5	CONDUIT	15.19	0	00:45	7.51	0.26	0.60
C6	CONDUIT	21.06	0	00:56	8.21	0.45	0.96
C7	CONDUIT	45.76	0	00:46	3.48	0.36	0.67
C8	CONDUIT	8.09	0	01:34	10.10	0.34	0.30
CULV-2	CONDUIT	27.31	0	00:57	5.64	0.90	0.58
CULV-3	CONDUIT	16.64	0	00:45	5.36	0.69	1.00
D-1	CONDUIT	136.31	0	00:58	4.02	0.07	0.35
D-2	CONDUIT	27.29	0	00:57	3.84	0.04	0.17
D-2a	CONDUIT	27.25	0	00:58	1.22	0.04	0.55
D-4	CONDUIT	13.18	0	00:51	3.32	0.04	0.42
D-5	CONDUIT	10.12	0	00:50	4.65	0.02	0.23
D-6	CONDUIT	3.37	0	01:04	0.96	0.08	0.29
D-7	CONDUIT	2.74	0	00:54	0.93	0.05	0.30
D-DS	CONDUIT	17.68	0	00:56	0.96	0.05	0.50

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
Diversion_North	CONDUIT	5.10	0	00:57	6.88	0.54	0.44
D-O	CONDUIT	157.86	0	00:01	3.29	0.06	0.50
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.44
DS-2	CONDUIT	6.30	0	00:54	0.56	0.00	0.17
DS-3	CONDUIT	7.60	0	00:50	1.82	0.01	0.08
DS-4	CONDUIT	0.00	0	00:00	0.00	0.00	0.04
R-99	CONDUIT	38.92	0	00:50	10.39	0.01	0.06
5	CONDUIT	8.62	0	00:58	3.72	1.03	1.00
6	CONDUIT	34.33	0	00:50	5.59	0.88	0.98
7	CONDUIT	33.31	0	00:51	10.22	0.37	0.63
8	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
9	CONDUIT	5.44	0	00:50	6.47	0.10	0.61
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	0.00	0	00:00	0.00		

SWMM PROPOSED MODEL RESULTS SUMMARY
50-YEAR, 2-HOUR DESIGN STORM

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	2.92	0.00	0.00	0.62	2.10	0.11	2.21	0.68	39.67
ALLISON-C_2	2.92	0.00	0.00	2.14	0.54	0.58	0.76	0.15	10.43
ALLISON-C_3	2.92	0.00	0.00	2.15	0.54	0.57	0.75	0.09	6.17
ALLISON-C_4	2.92	0.00	0.00	2.32	0.54	0.40	0.58	0.37	17.80
ALLISON-C_5	2.92	0.00	0.00	0.34	2.53	1.62	2.48	0.05	3.47
ALLISON-C_6	2.92	0.00	0.00	0.31	2.54	1.66	2.52	0.08	8.06
ALLISON-NW_1	2.92	0.00	0.00	0.32	2.53	1.87	2.50	0.04	3.26
ALLISON-NW_2	2.92	0.00	0.00	2.42	0.25	0.43	0.49	0.54	31.53
BASIN-34	2.92	0.00	0.00	1.23	1.55	1.64	1.64	0.05	5.46
B-HM-D	2.92	0.00	0.00	1.25	1.24	0.38	1.62	0.49	47.04
B-HM-DIV-A	2.92	0.00	0.00	2.33	0.06	0.59	0.59	0.06	5.34
B-HM-DIV-B	2.92	0.00	0.00	2.43	0.06	0.49	0.49	0.09	6.18
HM-DIV-C	2.92	0.00	0.00	2.20	0.28	0.42	0.71	0.24	16.12
HM-NE	2.92	0.00	0.00	1.00	1.69	0.59	1.86	0.32	31.60
North_Offsite_Basin	2.92	0.00	0.00	1.74	1.04	0.07	1.10	0.52	20.65

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PROSSER-W_1	2.92	0.00	0.00	2.08	0.73	0.45	0.81	0.45	23.40
PROSSER-W_2	2.92	0.00	0.00	0.17	2.67	1.31	2.65	0.12	10.05
S2	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S3	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S4	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S5	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.05	3.82
S6	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.09	7.24
South_Offsite_Basin	2.92	0.00	0.00	0.87	1.84	0.12	1.96	1.21	66.32
Sub-Basin_A	2.92	0.00	0.00	0.35	2.39	0.09	2.48	0.67	52.88
Sub-Basin_Aa	2.92	0.00	0.00	0.93	1.91	0.00	1.91	0.08	6.54
Sub-Basin_B	2.92	0.00	0.00	0.88	1.82	0.14	1.96	0.28	16.17
Sub-Basin_B2	2.92	0.00	0.00	0.84	1.83	0.18	2.01	0.38	29.20
Sub-Basin_C	2.92	0.00	0.00	1.25	1.46	0.16	1.61	0.76	45.22

PROSSER ROAD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	48.193	38	0	0	85.041	66	0	01:14	16.12
POND-10	0.554	4	0	0	5.874	41	0	00:55	18.89
RD-70	12.874	45	0	0	17.089	59	0	01:29	15.44
S1	10.874	11	0	0	50.197	52	0	01:10	28.16
South_Pond	42.105	16	0	0	110.004	41	0	01:26	58.93

PROSSER ROAD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	43.15	0	00:50	11.38	1.25	0.72
2	CONDUIT	43.14	0	00:51	12.49	0.41	0.49
3	CONDUIT	53.30	0	00:50	9.54	0.57	0.76
4	CONDUIT	55.26	0	00:50	6.28	0.75	0.90
A-1	CONDUIT	106.03	0	00:56	4.39	0.13	0.51
A-2	CONDUIT	116.06	0	00:54	14.90	1.31	0.61
A-3	CONDUIT	58.93	0	01:27	10.74	0.59	0.56
A-4	CONDUIT	50.26	0	00:45	7.35	1.18	0.67
A-5	CONDUIT	50.00	0	00:45	14.73	0.31	0.38
A-6	CONDUIT	49.81	0	00:45	14.70	0.31	0.38
A-7	CONDUIT	49.63	0	00:45	10.35	0.74	0.64
A-9	CONDUIT	22.14	0	00:50	4.40	0.01	0.08
B-2	CONDUIT	15.44	0	00:53	1.16	0.13	0.87
C1	CONDUIT	24.01	0	00:47	4.64	0.21	1.00
C-1	CONDUIT	12.35	0	00:55	9.35	0.35	0.44

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C2	CONDUIT	9.49	0	00:57	9.20	0.23	0.37
C3	CONDUIT	14.50	0	00:50	10.56	0.45	0.45
C4	CONDUIT	17.19	0	00:50	10.25	0.26	0.37
C5	CONDUIT	19.91	0	00:50	8.03	0.34	0.69
C6	CONDUIT	23.09	0	00:49	8.69	0.49	1.00
C7	CONDUIT	57.75	0	00:46	3.70	0.46	0.73
C8	CONDUIT	16.12	0	01:15	11.96	0.68	0.45
CULV-2	CONDUIT	32.58	0	01:02	5.64	1.08	0.59
CULV-3	CONDUIT	18.89	0	00:46	6.01	0.78	1.00
D-1	CONDUIT	175.85	0	00:57	4.65	0.09	0.37
D-2	CONDUIT	32.57	0	01:02	3.99	0.05	0.19
D-2a	CONDUIT	32.55	0	01:03	1.08	0.05	0.60
D-4	CONDUIT	21.26	0	00:56	3.35	0.07	0.65
D-5	CONDUIT	18.80	0	00:56	4.72	0.03	0.29
D-6	CONDUIT	7.55	0	01:02	1.25	0.17	0.40
D-7	CONDUIT	4.99	0	00:52	1.08	0.09	0.43
D-DS	CONDUIT	26.01	0	00:56	1.16	0.08	0.57

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
Diversion_North	CONDUIT	9.49	0	00:57	7.79	1.01	0.65
D-O	CONDUIT	175.64	0	00:58	3.29	0.06	0.50
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.45
DS-2	CONDUIT	7.82	0	00:53	0.54	0.00	0.20
DS-3	CONDUIT	9.18	0	00:48	1.85	0.01	0.09
DS-4	CONDUIT	0.13	0	01:02	0.64	0.00	0.05
R-99	CONDUIT	49.36	0	00:45	11.33	0.01	0.07
5	CONDUIT	8.83	0	00:58	3.81	1.05	1.00
6	CONDUIT	38.01	0	00:45	5.92	0.98	1.00
7	CONDUIT	37.85	0	00:54	10.94	0.42	0.68
8	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
9	CONDUIT	8.57	0	00:50	6.50	0.16	0.63
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	8.30	0	01:29	0.22		

SWMM PROPOSED MODEL RESULTS SUMMARY
100-YEAR, 2-HOUR DESIGN STORM

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
1	3.68	0.00	0.00	0.68	2.67	0.24	2.91	0.89	49.35
ALLISON-C_2	3.68	0.00	0.00	2.31	0.68	1.12	1.35	0.27	16.20
ALLISON-C_3	3.68	0.00	0.00	2.33	0.68	1.10	1.33	0.17	9.60
ALLISON-C_4	3.68	0.00	0.00	2.57	0.68	0.86	1.09	0.69	27.10
ALLISON-C_5	3.68	0.00	0.00	0.35	3.21	2.14	3.23	0.06	4.14
ALLISON-C_6	3.68	0.00	0.00	0.31	3.22	2.18	3.27	0.11	9.36
ALLISON-NW_1	3.68	0.00	0.00	0.33	3.22	2.45	3.25	0.05	3.82
ALLISON-NW_2	3.68	0.00	0.00	2.66	0.32	0.93	1.01	1.10	53.65
BASIN-34	3.68	0.00	0.00	1.28	1.97	2.35	2.35	0.07	6.74
B-HM-D	3.68	0.00	0.00	1.36	1.57	0.70	2.28	0.68	60.76
B-HM-DIV-A	3.68	0.00	0.00	2.53	0.07	1.15	1.15	0.11	8.52
B-HM-DIV-B	3.68	0.00	0.00	2.67	0.07	1.01	1.01	0.18	10.30
HM-DIV-C	3.68	0.00	0.00	2.42	0.36	0.89	1.25	0.43	23.91
HM-NE	3.68	0.00	0.00	1.05	2.15	0.96	2.57	0.45	40.75
North_Offsite_Basin	3.68	0.00	0.00	2.08	1.33	0.21	1.53	0.72	26.62

PROSSER ROAD-ALLISON ROAD MODEL

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PROSSER-W_1	3.68	0.00	0.00	2.29	0.93	0.90	1.37	0.76	33.08
PROSSER-W_2	3.68	0.00	0.00	0.17	3.39	1.71	3.40	0.16	11.81
S2	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S3	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S4	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S5	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.06	4.44
S6	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.11	8.41
South_Offsite_Basin	3.68	0.00	0.00	0.96	2.34	0.29	2.63	1.62	81.90
Sub-Basin_A	3.68	0.00	0.00	0.38	3.04	0.17	3.20	0.87	64.62
Sub-Basin_Aa	3.68	0.00	0.00	1.18	2.43	0.00	2.43	0.10	7.60
Sub-Basin_B	3.68	0.00	0.00	0.96	2.31	0.33	2.64	0.37	20.15
Sub-Basin_B2	3.68	0.00	0.00	0.91	2.32	0.38	2.70	0.51	36.39
Sub-Basin_C	3.68	0.00	0.00	1.38	1.85	0.38	2.23	1.05	57.24

PROSSER ROAD-ALLISON ROAD MODEL

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Average Percent Full	Evap Percent Loss	Exfil Percent Loss	Maximum Volume 1000 ft3	Maximum Percent Full	Day of Maximum Volume	Hour of Maximum Volume	Maximum Outflow CFS
North_Detention_Pond	54.963	43	0	0	100.979	79	0	01:12	27.90
POND-10	1.193	8	0	0	9.764	68	0	00:56	20.59
RD-70	13.793	48	0	0	19.623	68	0	01:10	33.29
S1	23.659	25	0	0	79.833	83	0	01:16	30.61
South_Pond	67.553	25	0	0	159.610	60	0	01:39	74.38

PROSSER ROAD-ALLISON ROAD MODEL

Link Flow Summary

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
1	CONDUIT	58.81	0	01:09	13.65	1.71	0.82
2	CONDUIT	58.81	0	01:09	13.87	0.56	0.58
3	CONDUIT	66.49	0	01:08	10.76	0.71	0.82
4	CONDUIT	66.51	0	01:08	6.91	0.91	1.00
A-1	CONDUIT	139.52	0	01:10	4.68	0.17	0.58
A-2	CONDUIT	139.56	0	01:09	15.84	1.58	0.67
A-3	CONDUIT	74.38	0	01:40	11.31	0.75	0.65
A-4	CONDUIT	62.39	0	00:45	8.01	1.47	0.76
A-5	CONDUIT	62.10	0	00:45	15.62	0.39	0.43
A-6	CONDUIT	61.86	0	00:45	15.59	0.39	0.43
A-7	CONDUIT	61.62	0	00:45	10.73	0.92	0.76
A-9	CONDUIT	36.24	0	01:01	5.34	0.02	0.10
B-2	CONDUIT	25.59	0	00:51	1.36	0.21	0.94
C1	CONDUIT	31.06	0	00:52	4.45	0.28	1.00
C-1	CONDUIT	21.22	0	00:51	10.71	0.60	0.61

PROSSER ROAD-ALLISON ROAD MODEL

Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
C2	CONDUIT	16.36	0	00:50	10.64	0.40	0.50
C3	CONDUIT	24.11	0	00:51	12.18	0.74	0.61
C4	CONDUIT	27.27	0	00:51	11.49	0.41	0.50
C5	CONDUIT	28.50	0	00:51	8.63	0.48	0.80
C6	CONDUIT	31.06	0	00:52	8.57	0.66	1.00
C7	CONDUIT	70.23	0	00:45	3.88	0.56	0.79
C8	CONDUIT	27.72	0	01:12	12.94	1.17	0.67
CULV-2	CONDUIT	36.38	0	01:02	5.91	1.21	0.60
CULV-3	CONDUIT	20.59	0	00:46	6.55	0.85	1.00
D-1	CONDUIT	225.91	0	01:10	5.06	0.11	0.42
D-2	CONDUIT	36.37	0	01:02	4.14	0.05	0.21
D-2a	CONDUIT	36.36	0	01:03	1.14	0.06	0.61
D-4	CONDUIT	34.79	0	00:56	3.51	0.11	0.71
D-5	CONDUIT	32.14	0	00:55	5.52	0.05	0.36
D-6	CONDUIT	13.36	0	01:00	1.50	0.30	0.51
D-7	CONDUIT	7.89	0	00:50	1.21	0.13	0.56
D-DS	CONDUIT	36.56	0	00:56	1.39	0.11	0.66

PROSSER ROAD-ALLISON ROAD MODEL

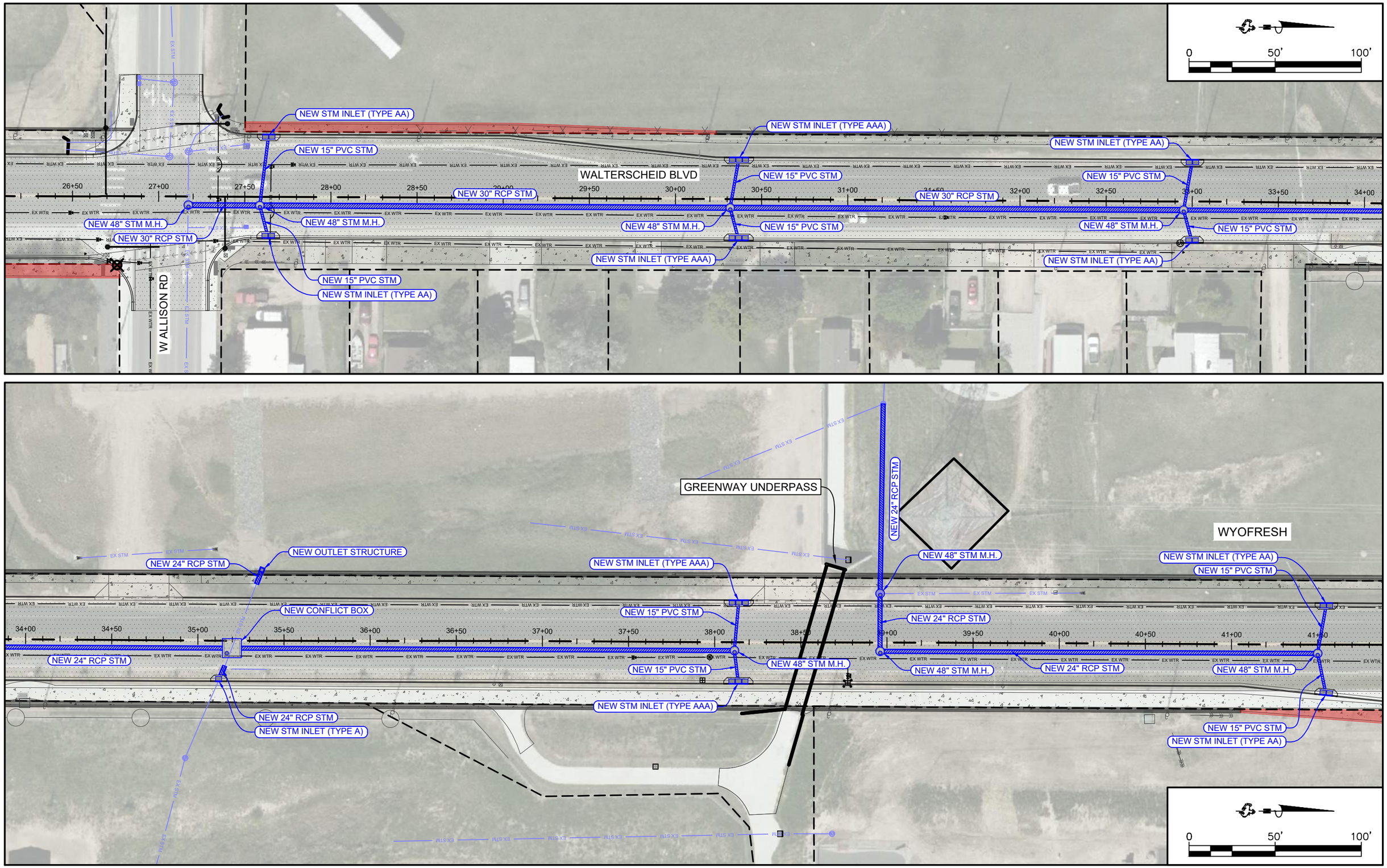
Link	Type	Maximum |Flow| CFS	Day of Maximum Flow	Hour of Maximum Flow	Maximum |Velocity| ft/sec	Max / Full Flow	Max / Full Depth
Diversion_North	CONDUIT	15.70	0	00:50	11.33	1.67	0.80
D-O	CONDUIT	223.25	0	01:14	3.29	0.08	0.52
DS-1	CONDUIT	0.00	0	00:00	0.00	0.00	0.50
DS-2	CONDUIT	13.76	0	01:06	0.62	0.01	0.26
DS-3	CONDUIT	14.81	0	01:03	2.00	0.01	0.12
DS-4	CONDUIT	11.64	0	01:02	4.52	0.05	0.23
R-99	CONDUIT	61.36	0	00:45	12.26	0.01	0.08
5	CONDUIT	10.95	0	00:50	4.73	1.30	1.00
6	CONDUIT	38.30	0	00:51	5.96	0.98	1.00
7	CONDUIT	38.25	0	00:54	10.91	0.42	0.73
8	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
9	CONDUIT	16.65	0	00:51	7.20	0.31	0.69
62	WEIR	0.00	0	00:00	0.00		
OF-1	WEIR	32.79	0	01:10	0.55		

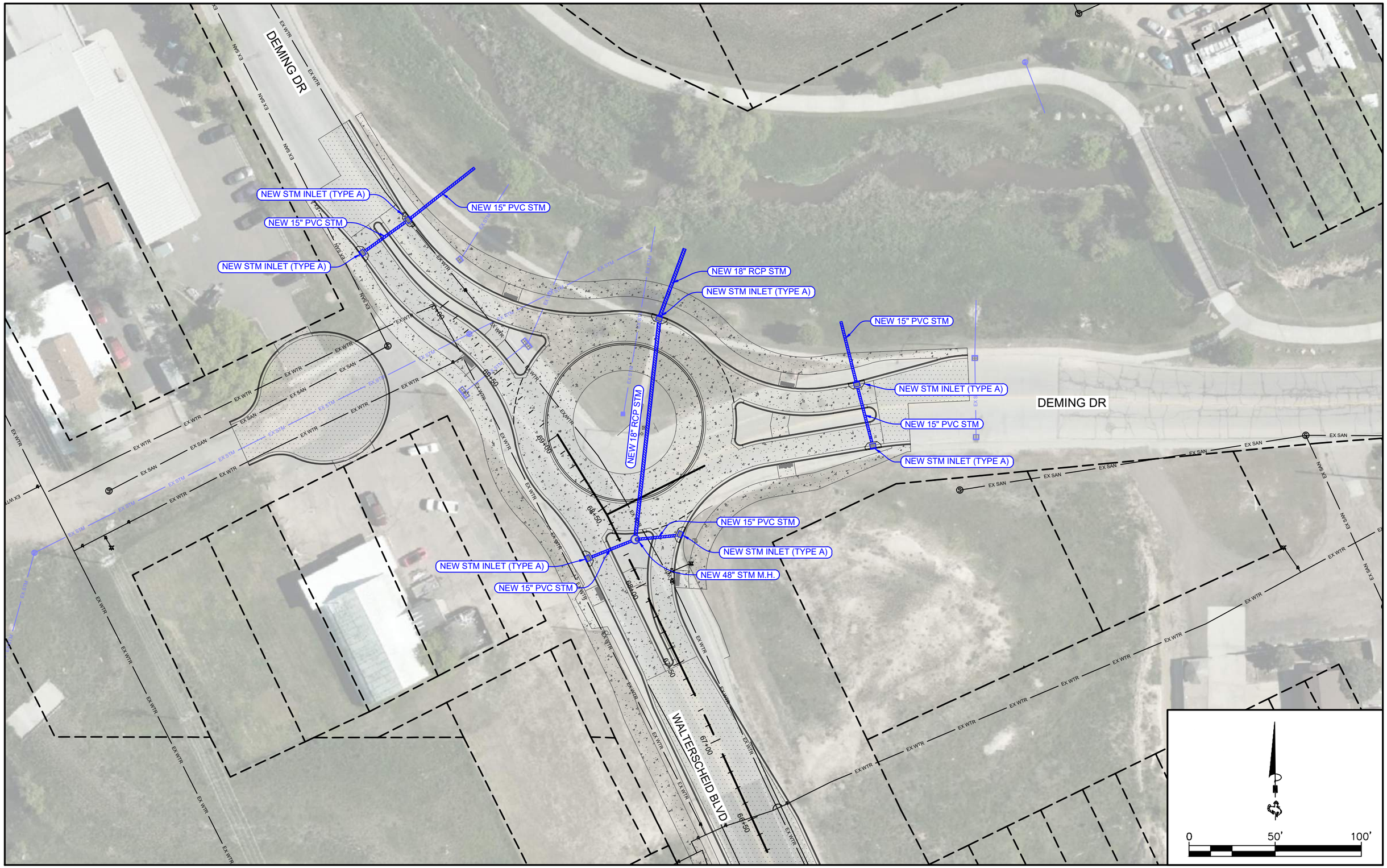
APPENDIX B

Conceptual Construction Details for the Walterscheid Corridor

- Conceptual Storm Sewer Plan

NEW 15" PVC STM
NEW STM INLET (TYPE A)
NEW 15" PVC STM
NEW 48" STM M.H.
NEW SLOTTED DRAIN
NEW 15" PVC STM
NEW STM INLET (TYPE A)
NEW 24" RCP STM
NEW 48" STM M.H.
NEW STM INLET (TYPE B)
NEW 48" STM M.H.
NEW SLOTTED DRAIN
NEW 15" PVC STM
NEW STM INLET (TYPE A)
SERENADE DR
WALTERSCHEID BLVD
DOT RAY PL
ACCESS
16+00
16+50
17+00
17+50
18+00
18+50
19+00
19+50
20+00
20+50
21+00
21+50
NEW STM INLET (TYPE AA)
NEW 24" RCP STM
NEW STM INLET (TYPE AA)
WALTERSCHEID BLVD
SUNDANCE APARTMENTS
46+50
47+00
47+50
48+00
48+50
49+00
49+50
0
40'
80'
0
40'
80'


NEW STM INLET (TYPE AA)
NEW 15" PVC STM
NEW 30" RCP STM
NEW 48" STM M.H.
NEW 15" PVC STM
NEW STM INLET (TYPE AA)
W ALLISON RD
WALTERSCHEID BLVD
NEW STM INLET (TYPE AAA)
NEW 48" STM M.H.
NEW 15" PVC STM
NEW 30" RCP STM
NEW STM INLET (TYPE AAA)
NEW STM INLET (TYPE AA)
NEW 15" PVC STM
NEW 48" STM M.H.
NEW 15" PVC STM
NEW STM INLET (TYPE AA)
0
50'
100'
GREENWAY UNDERPASS
NEW 24" RCP STM
NEW OUTLET STRUCTURE
NEW 24" RCP STM
NEW STM INLET (TYPE AAA)
NEW 48" STM M.H.
WYOFRESH
NEW STM INLET (TYPE AA)
NEW 15" PVC STM
NEW CONFLICT BOX
NEW 15" PVC STM
NEW 24" RCP STM
NEW 48" STM M.H.
NEW 24" RCP STM
NEW 48" STM M.H.
NEW 24" RCP STM
NEW STM INLET (TYPE A)
NEW STM INLET (TYPE AAA)
NEW 15" PVC STM
NEW STM INLET (TYPE AA)
0
50'
100'


DEMING DR
NEW STM INLET (TYPE A)
NEW 15" PVC STM
NEW 15" PVC STM
NEW STM INLET (TYPE A)
NEW 18" RCP STM
NEW STM INLET (TYPE A)
NEW 15" PVC STM
NEW STM INLET (TYPE A)
DEMING DR
NEW 15" PVC STM
NEW 18" RCP STM
NEW 15" PVC STM
NEW STM INLET (TYPE A)
NEW 48" STM M.H.
NEW STM INLET (TYPE A)
NEW 15" PVC STM
WALTERSCHEID BLVD
EX.WTR
EX.SAN
EX.STM
0
50'
100'

Appendix G

Public Involvement Materials

- First Public Meeting
- Second Public Meeting

You are invited to attend a
Public Open House for the

Walterscheid Boulevard Reconstruction Plan

Tuesday, May 25th from 5:30 pm to 7:00 pm at Rossman Elementary School (916 W. College Drive)

Meet with the design team and the Cheyenne Metropolitan Office (MPO) staff to learn about the Reconstruction Plan for Walterscheid Boulevard between Deming Drive and College Drive. Opportunities will be available for you to offer your insight and comments regarding this plan. The opening presentation will be streamed on the MPO's Facebook page: https://www.facebook.com/PlanCheyenne/

BenchMark ENGINEERS, PC

You are invited to a Public Open House for the Walterscheid Boulevard Reconstruction Plan on Tuesday, May 25th, 2021 at Rossman Elementary School (916 W. College Drive) from 5:30 pm to 7:00 pm.

Meet with the design team and Cheyenne Metropolitan Planning Office (MPO) staff to learn about this important project. The opening presentation of the meeting will also be streamed on the MPO's Facebook page: https://www.facebook.com/PlanCheyenne/

For more information contact the MPO at 307-638-4384.

Walterscheid Boulevard Plan

Design Team:

BME

BenchMark ENGINEERS, PC

FELSBURG HOLT & ULLEVIG
connecting & enhancing communities

GLM

Welcome

- Introductions
- Present the project
- Open House for the public to share their thoughts and insight
- Complete and return comment cards

Project Team

- Cheyenne Metropolitan Planning Organization
- BenchMark Engineers
- Felsburg Holt & Ullevig
- GLM Design Group
- In partnership with:
  - City of Cheyenne
  - Laramie County

Plan Goals

- Update to a Minor Arterial between Deming Drive and College Drive
  - Fox Farm intersection is not included
- Conversion to a Complete Street
- Create a plan to be used as a guide and template for future development
- Involve stakeholders, including the public, in our data collection and recommendations
- Be able to justify our recommendations

35% Design Plans

- Connect 2045 Master Transportation Plan calls for 5-lane Minor Arterial Roadway
- Consider changes to the horizontal and vertical alignments
- Intersection improvements
- Stormwater drainage improvements
- Utility upgrades
- Greenway and other pedestrian and bicycle movements

Roadway Classifications

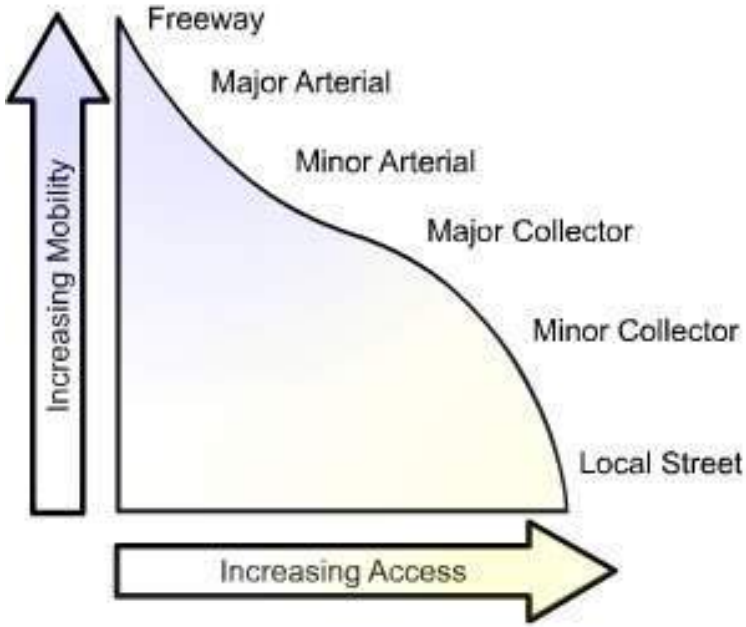
Table 4-8: Standard Design Types		
Design Type	***Context*** (Comprehensive Plan)	***Applicability*** (Functional Class)
Principal Arterial	Commercial and Industrial Land Use areas, or connectors between commercial and industrial areas and residential areas.	Principal Arterial
Minor Arterial	Connectors between commercial and industrial areas and residential areas	Minor Arterial
Collector (A, B, C)	Connectors between arterials and local streets in commercial, residential and industrial areas.	Collector
Commercial / Industrial Street	Commercial and Industrial Land Use Areas	Local
Residential Street (A & B)	Urban Transition Residential Urban Neighborhoods Rural / Low-Density Neighborhoods	Local
Alley	Residential	Residential Service
	Non-residential	Commercial Service

Table from UDC

Walterscheid is currently acting as a collector.

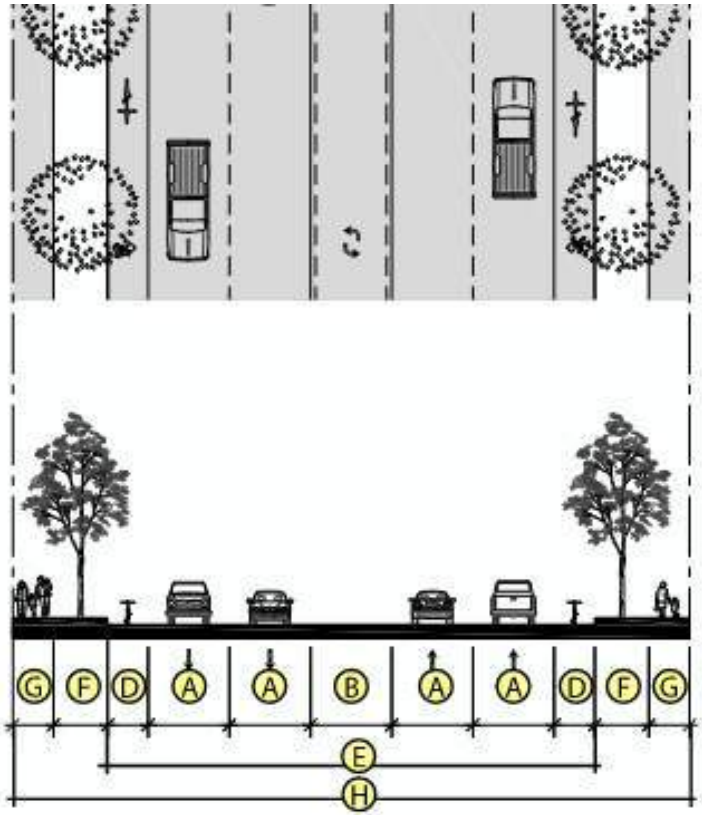
Roadway Classifications

- Principal Arterial – High speeds and long, uninterrupted travel
- Minor Arterial – Slower speeds than principal arterial, often provides connections to principal arterials
- Major and Minor Collectors – Collects traffic from local roads and distributes to arterials
- Local Street – Provides access to land, little or no through traffic



Minor Arterial Roadway Standards

- UDC has two standard options for a Minor Arterial Roadway
  - Provide regional continuity and accommodate moderate speeds and volumes
  - Traffic volumes
    - 7,500 – 18,000 for 2-lane
    - 15,000 – 32,000 for 4-lane
  - Speed Limits 35-40 MPH
  - Right-of-Way: 100’

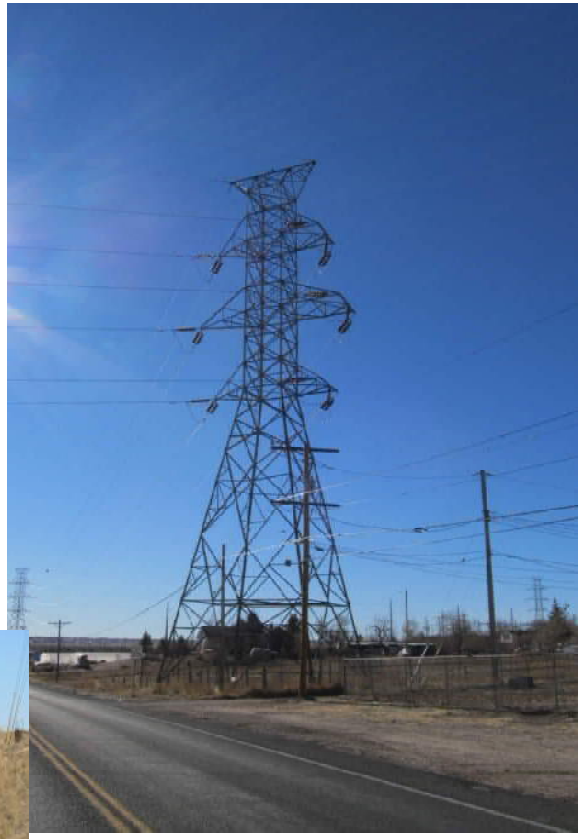


Complete Streets and Multi-Modal Designs

- Balanced designs to accommodate all potential users of the street
  - Vehicles
  - Pedestrians
  - Bicyclists
- Consideration of transit services
- Critical for Walterscheid due to number of schools and facilities providing services to youth

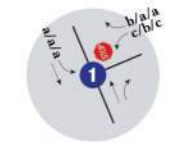
Physical Constraints

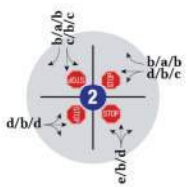
- 3 Bridges for I-80 that cross over the road
- 80’ Right-of-Way at many locations
- Greenway Underpass south of Jefferson
- Utility conflicts (overhead and underground)

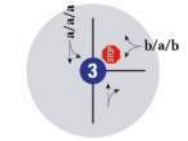


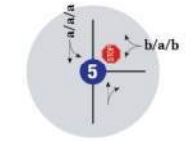
Existing Traffic Conditions

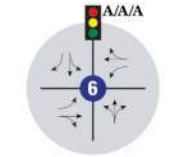
- Traffic Operations acceptable for all movements, except Fox Farm intersection
- Through traffic levels manageable for current two-lane section





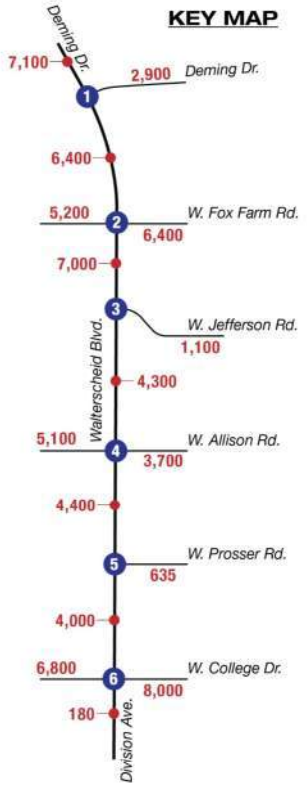






LEGEND

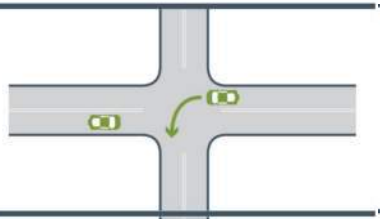
XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal



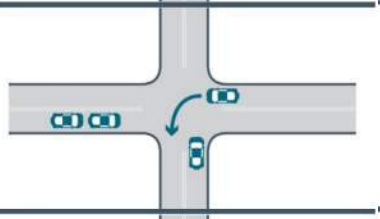
NORTH

Level of Service (LOS) at Intersections

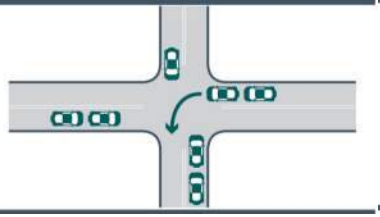
A No vehicle waits longer than one signal indication.



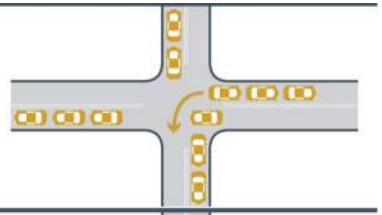
B On rare occasions vehicles wait through more than one signal indication.



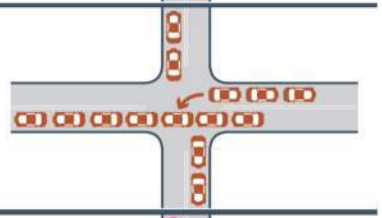
C Intermittently vehicles wait through more than one signal indication, occasionally backups may develop, traffic flow still stable and acceptable.



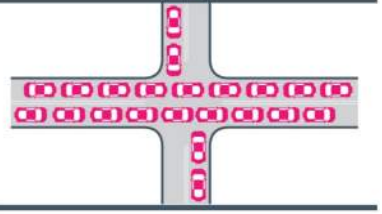
D Delays at intersections may become extensive, but enough cycles with lower demand occur to permit periodic clearance, preventing excessive backups. LOS D has historically been regarded as a desirable design objective inurban areas.



E Very long queues may create lengthy delays.

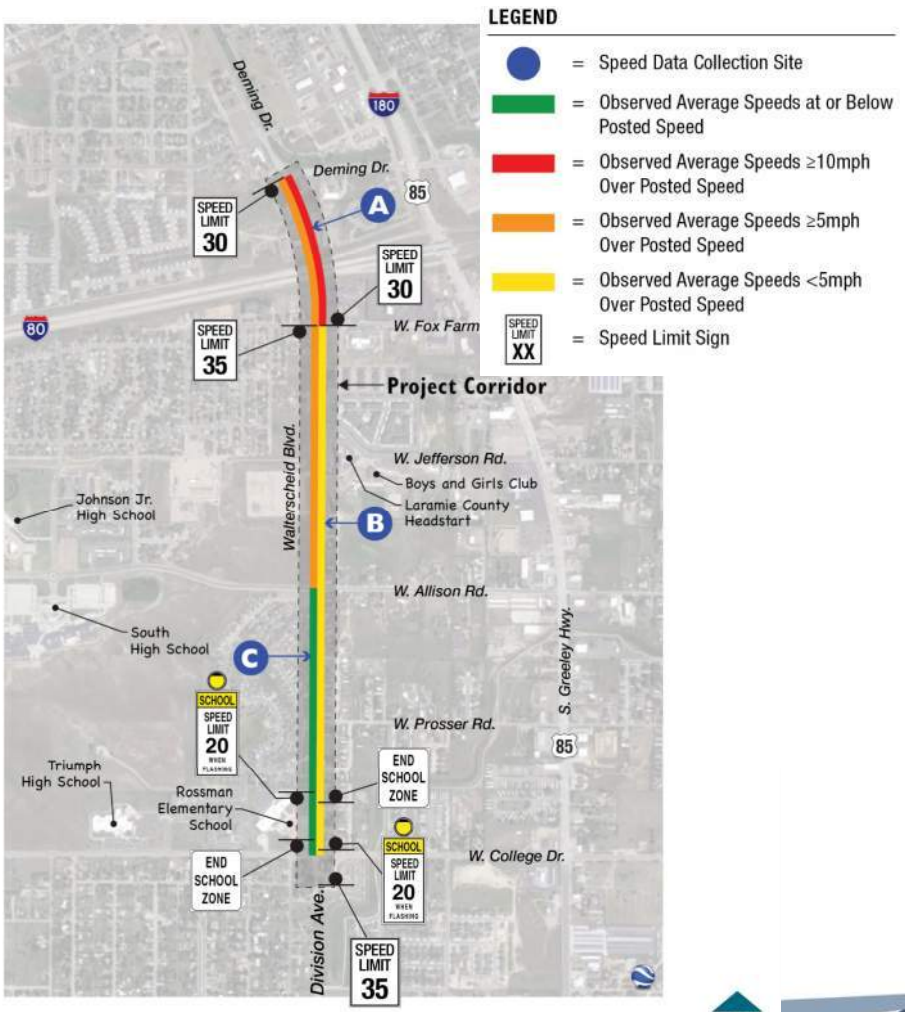


F Backups from locations downstream restrict or prevent movement of vehicles out of approach creating "gridlock" condition.



Travel Speeds

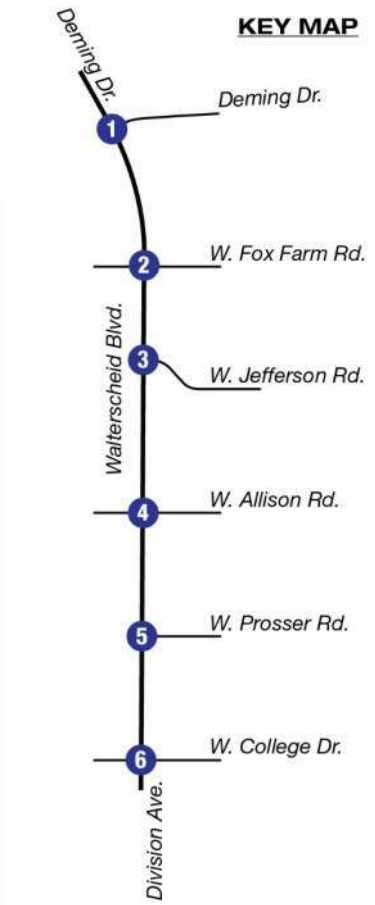
- Posted Speed varies from 30-35 mph – school zone excepted
- Travel speeds relative to posted increase northward, exceeding limit by 10+ mph northbound toward Deming Drive
- Speeding issues observed may require mitigation



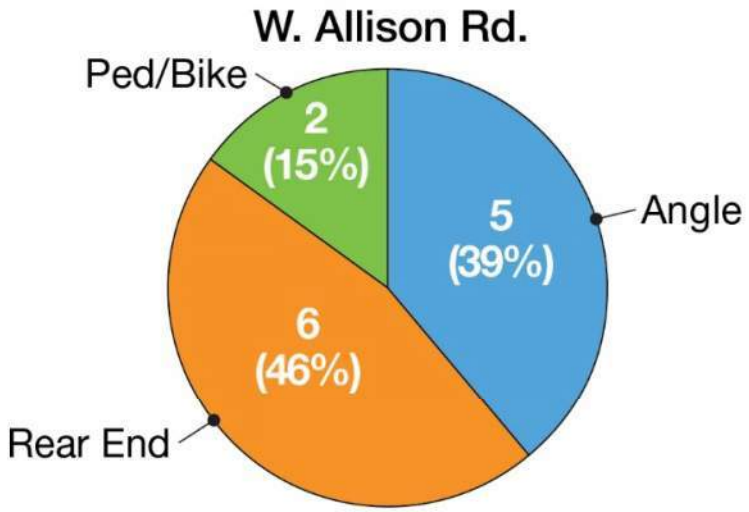
Crash History

Intersection #	Cross Street	Total Crashes, 2016-2020
1	Deming Drive	1
2	Fox Farm Road	11✱
3	Jefferson Road	2
4	Allison Road	13
5	Prosser Road	1
6	College Drive	8

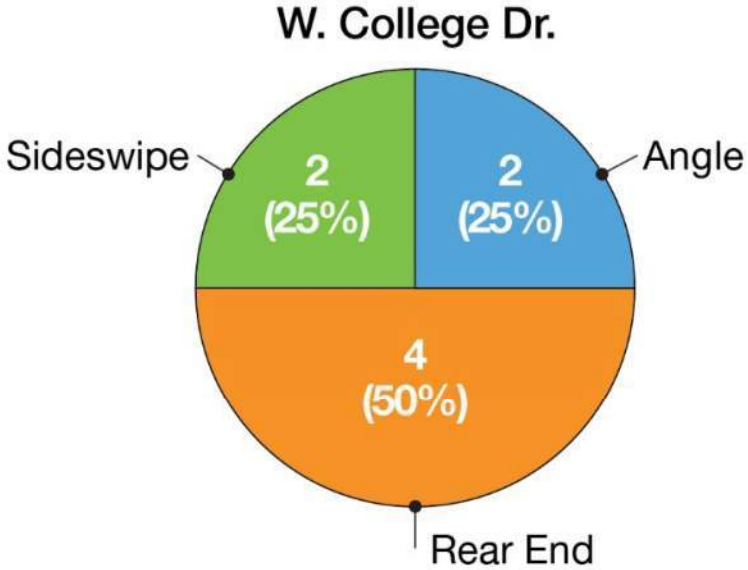
✱ Excluded from detailed crash analysis due to separate ongoing study



Crash Types at Higher Frequency Intersections



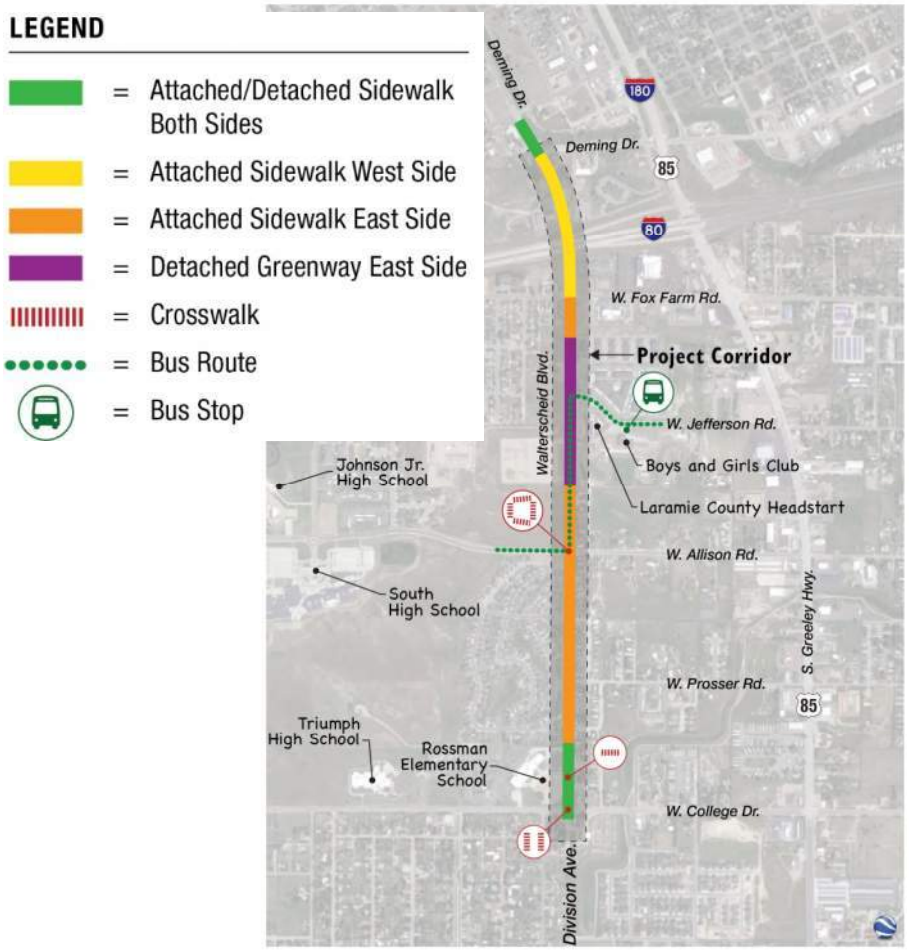
- Elevated angle crash pattern
- 2 reported ped/bike crashes (only ped/bike crashes reported on corridor)
- Limited sight distance looking south along Walterscheid may be contributing to crashes



- Rear-End type consistent with signalized intersection patterns
- Insufficient roadway striping may be contributing to sideswipe crashes

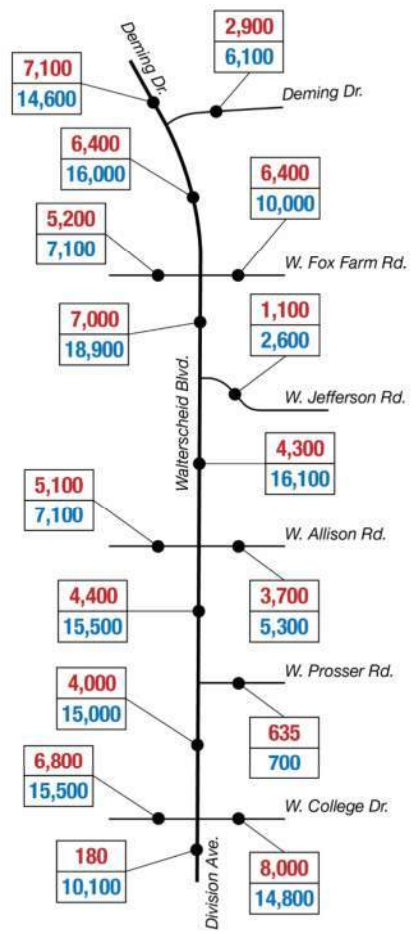
Existing Multimodal Conditions

- Deficiencies include:
  - Inconsistent or missing sidewalk
  - Constrained travel space for bicyclists
  - Lack of bicycle signage



Daily Traffic Volume Forecasts

- Aggressive Growth Anticipated, volumes tripling over existing at some locations
- Growth includes development along corridor and outside of study area



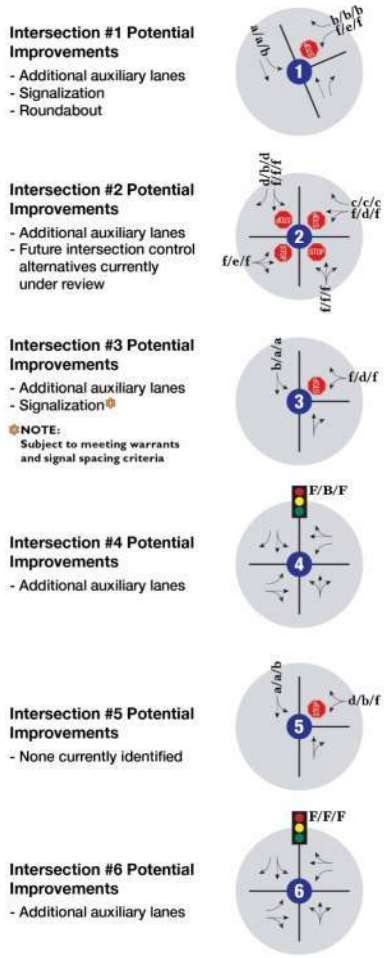
LEGEND

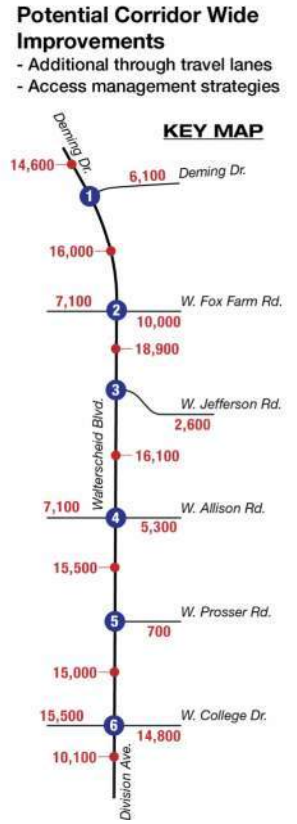
XXXX = Daily Traffic Volumes (Base Year)

XXXX = 2045 Daily Traffic Forecasts

Forecasted 2045 Conditions and Suggested Improvements

- As currently configured, the corridor will not provide adequate capacity for growth
- Potential improvements include added turn lanes, traffic control modifications and widening to provide additional through lanes





LEGEND

XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
	=	Stop Sign
	=	Traffic Signal

The Plan

- We are creating a plan for the area for short-term and long-term improvements.
  - This plan will also serve as a template for new development and redevelopment
- Currently there is no schedule to finalize the design plans or funds for construction

Moving Forward

- We need your insight as community members
  - What are your concerns?
  - What are your priorities?

Thank you for your time!

Please view the display boards and complete a comment card.

Welcome

Public Open House

Walterscheid Boulevard Plan

Project Goal: Determine the needs and create a plan for improvements along this roadway in the short-term and long-term for all users.

Project Basics:

- 35% Design Level for corridor between Deming Drive and West College Drive.
- Recommendation from Connect 2045 Master Transportation Plan is to upgrade the road to 5-lane roadway.
- Intersection at Fox Farm not included (this is a separate project by the City of Cheyenne).
- Construction is not funded or scheduled at this time.

We need your input for the plan!
Please sign-in and complete a comment card before you leave.

Thank you for attending.

CHEYENNE MPO
BME BenchMark ENGINEERS, PC
FELSBURG HOLT & ULLEVIG connecting & enhancing communities
GLM

Existing Conditions in the Corridor

- Classified as a minor arterial, built more like a collector
- Two lanes for vehicles
- Some sidewalk, inconsistent

- Some curb and gutter
- Numerous overhead and buried utilities
- Three bridges cross over roadway at I-80

- Signalized intersections at Allison Road and College Drive
- Greenway underpass south of Jefferson Road
- Numerous schools and facilities serving young residents

Existing Physical Limitations

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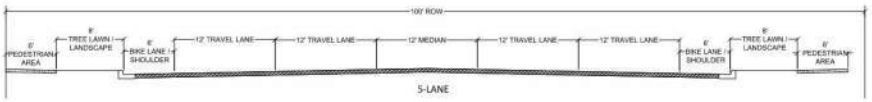
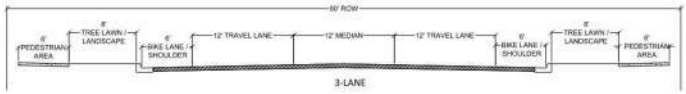
GLM

Existing Roadway Cross Sections

STANDARD ROADWAY: MINOR ARTERIAL
PER UDC
(NO SCALE)

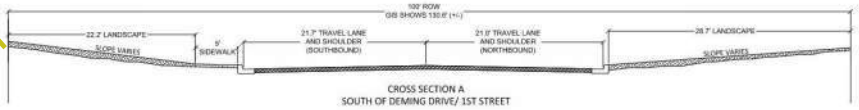


5-LANE

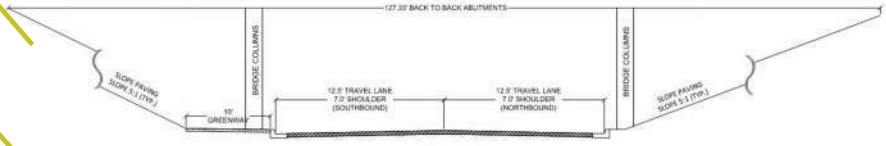


3-LANE

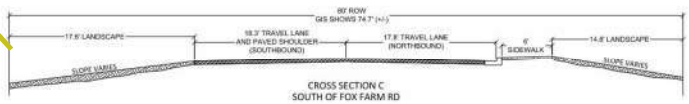
WALTERSCHEID BOULEVARD EXISTING SECTIONS
(NO SCALE)



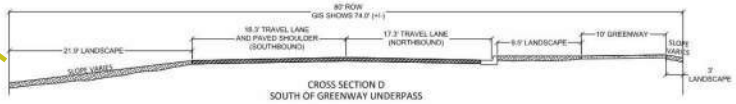
CROSS SECTION A
SOUTH OF DEMING DRIVE/ 1ST STREET



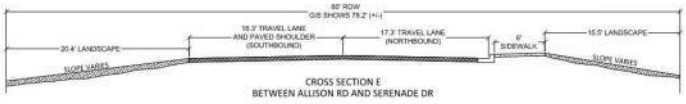
CROSS SECTION B
AT WYDOT BRIDGES



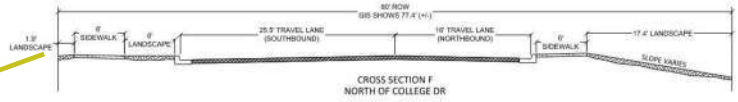
CROSS SECTION C
SOUTH OF FOX FARM RD



CROSS SECTION D
SOUTH OF GREENWAY UNDERPASS



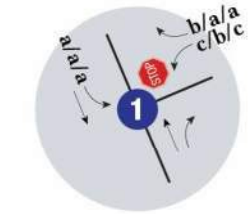
CROSS SECTION E
BETWEEN ALLISON RD AND SERENADE DR

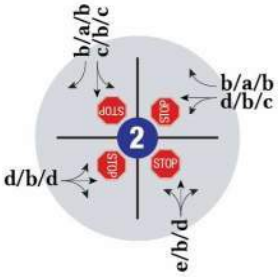


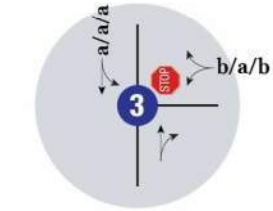
CROSS SECTION F
NORTH OF COLLEGE DR

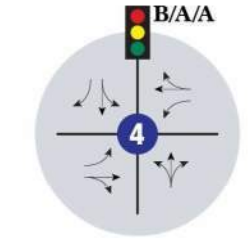
NORTH

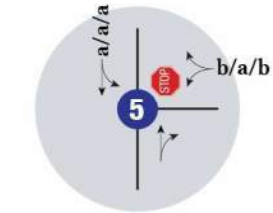
Current Traffic Volumes and Operations

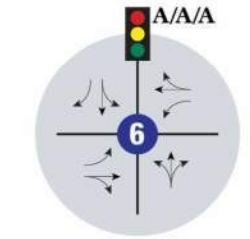


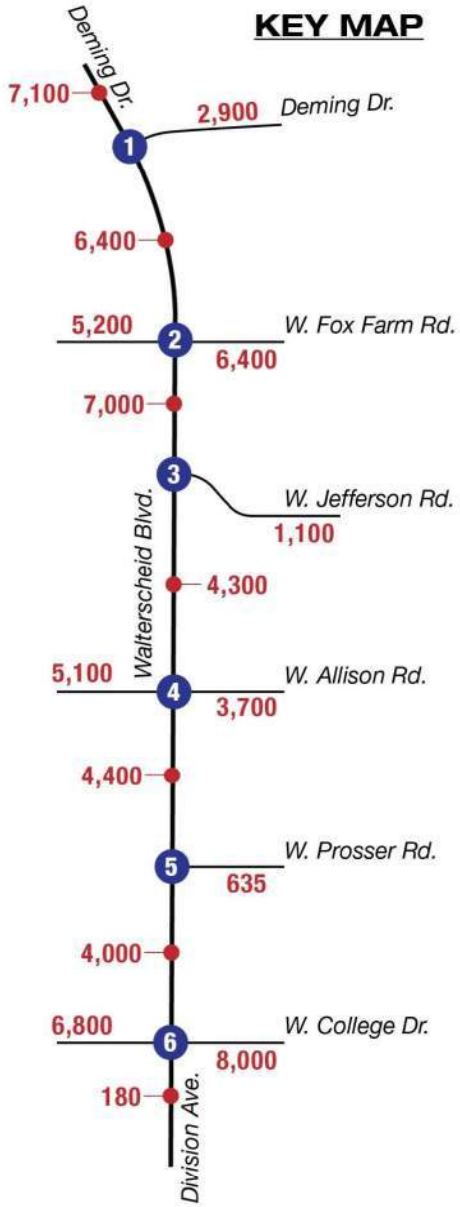












LEGEND

XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal

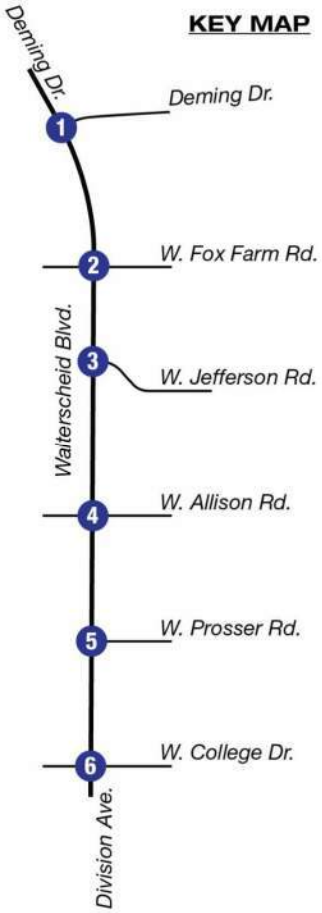
NORTH

Current Observed Traffic Speeds

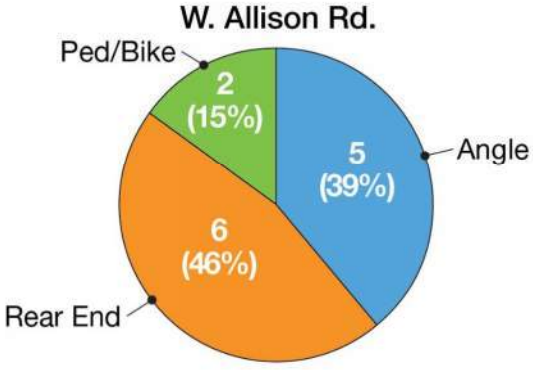
Reported Intersection Crashes 2016-2020

Intersection #	Cross Street	Total Crashes, 2016-2020
1	Deming Drive	1
2	Fox Farm Road	11*
3	Jefferson Road	2
4	Allison Road	13
5	Prosser Road	1
6	College Drive	8

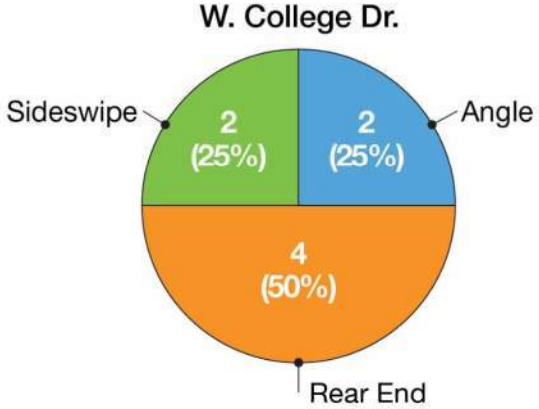
* Excluded from detailed crash analysis due to separate ongoing study



Crash Types at Higher Frequency Intersections



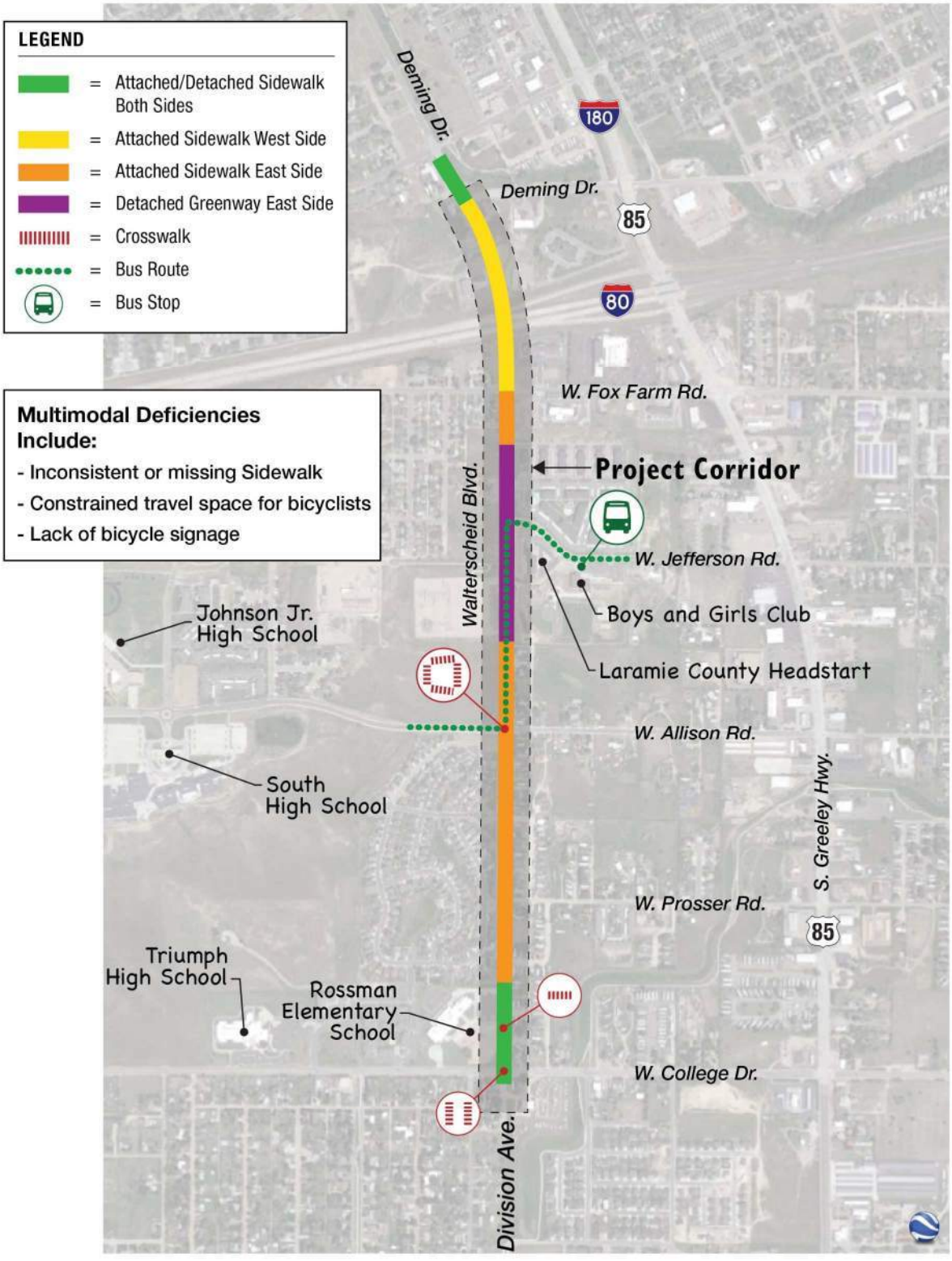
- Elevated angle crash pattern
- 2 reported ped/bike crashes (only ped/bike crashes reported on corridor)
- Limited sight distance looking south along Walterscheid may be contributing to crashes



- Rear-End type consistent with signalized intersection patterns
- Insufficient roadway striping may be contributing to sideswipe crashes

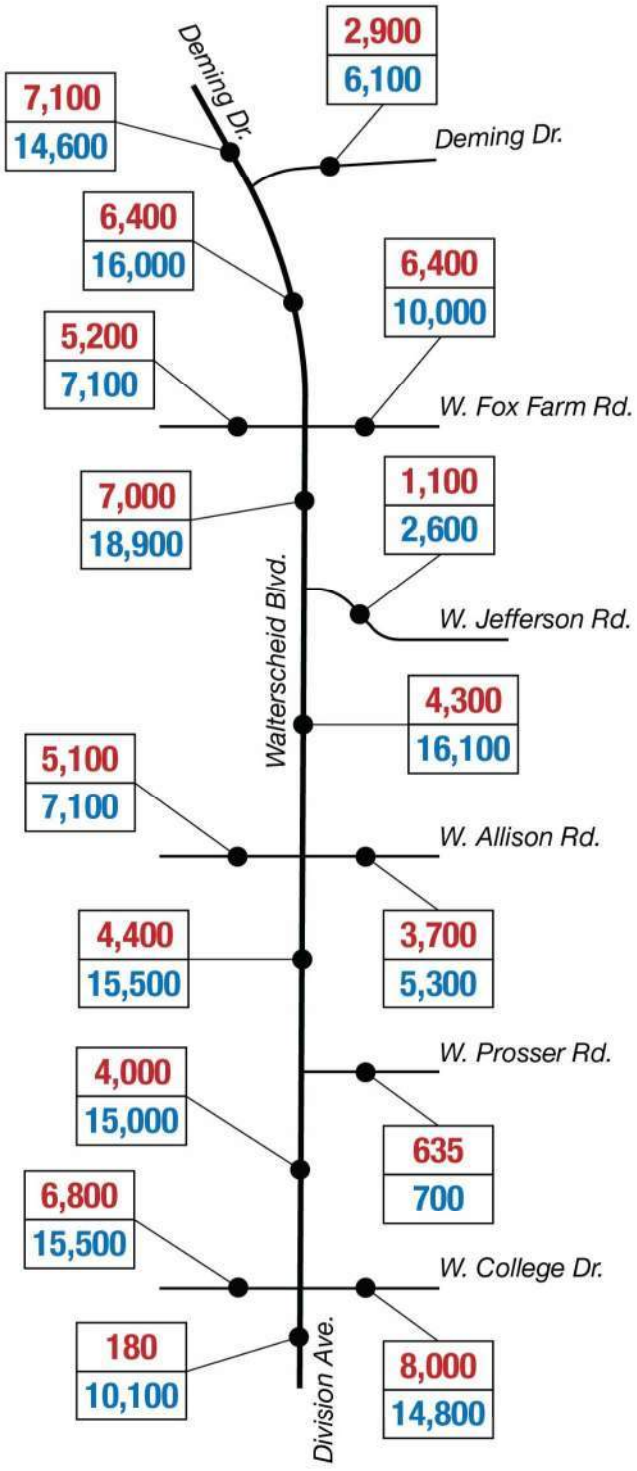
NORTH

Non-Motorized Travel Conditions



Daily Traffic Volume Forecasts

PRELIMINARY



LEGEND

XXXX	=	Daily Traffic Volumes (Base Year)
XXXX	=	2045 Daily Traffic Forecasts

NORTH

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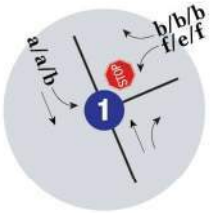
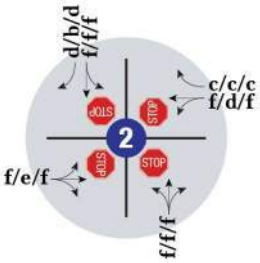
Long Term Future Traffic Conditions and Potential Improvements Types

Intersection #1 Potential Improvements
- Additional auxiliary lanes
- Signalization
- Roundabout

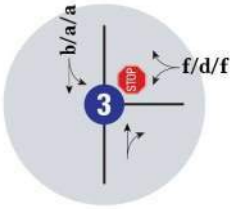


Intersection #2 Potential Improvements
- Additional auxiliary lanes
- Future intersection control alternatives currently under review

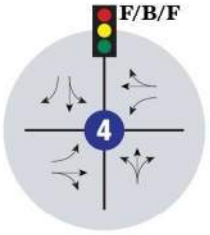


Intersection #3 Potential Improvements
- Additional auxiliary lanes
- Signalization❁

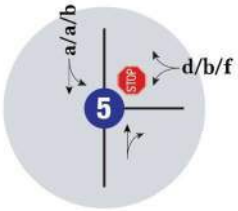
❁NOTE:
Subject to meeting warrants and signal spacing criteria



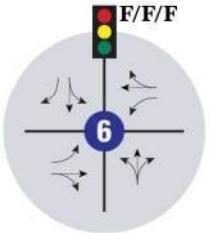
Intersection #4 Potential Improvements
- Additional auxiliary lanes



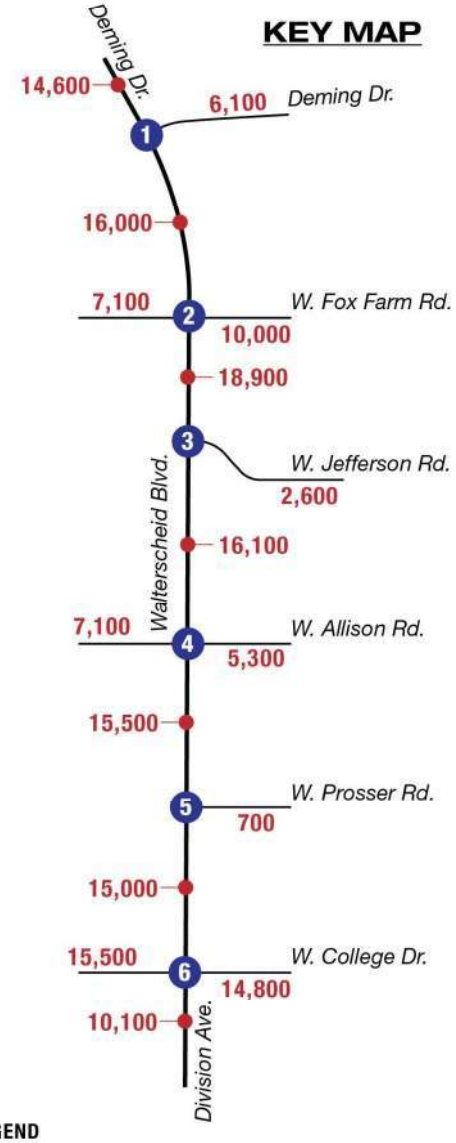
Intersection #5 Potential Improvements
- None currently identified



Intersection #6 Potential Improvements
- Additional auxiliary lanes



Potential Corridor Wide Improvements
- Additional through travel lanes
- Access management strategies



LEGEND

XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal

NORTH

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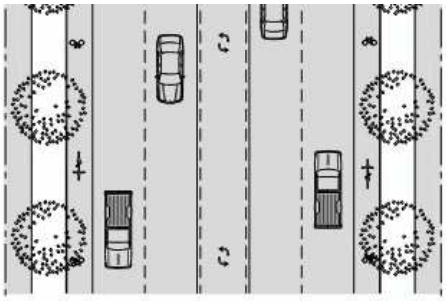
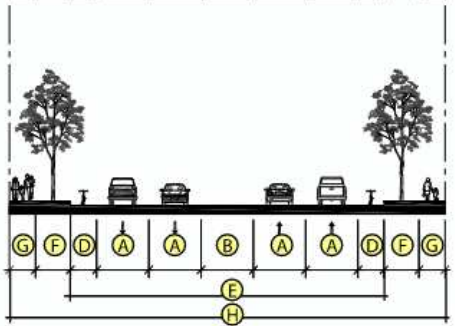
Opportunities for Improvements

- Traffic Safety
  - Speed Mitigation
  - Intersection Improvements



- Traffic Operations / Level of Service
  - Additional Turn Lanes at Intersections
  - Changes to Intersection Traffic Control
  - Additional Travel Lanes



- Multimodal / Complete Streets
  - Greenway Connections
  - Sidewalk Enhancements
  - On-Street Bicycle Accommodations

- Roadway Design
  - Update to Minor Arterial Standards

Geometric and Urban Design Standards

		Minor Arterial
A	Number of Lanes (Width)	2-4 (12')
B	Median Type (Width)	Painted (12') – may be raised if 4-lane
C	Parking	none
D	Bicycle Lane / Shoulder	6'
E	Roadway Width (BC-BC)	72' minimum (4-lane w/ median) 48' minimum (2-lane w/ median)
F	Tree Lawn / Landscape	8' minimum
G	Pedestrian Area	6' minimum
H	Right-of-Way Width*	100' minimum

* Added ROW allocated between additional landscape median, tree lawn or landscape area based on context, and to reconcile utility and landscape conflicts per Section 4.5.5.

- Infrastructure
  - Stormwater Drainage Enhancements
  - Coordinated Utility Improvements

- Other Opportunities?
  - Short-Term
  - Long-Term

Walterscheid Boulevard Plan
Sign-in Sheet, Public Open House
May 25, 2021

Name	Address	Phone	Email	Add me to an email list to receive updates
Peggy Bunsen	813 Walterscheid			
Alden Crom	//	634-1512	AoCrom1969@charter.net	
Shirley Roberts	907 Sonata Ln.	307-747-3296	Wyocoach@gmail.com	
Ed Ernste	Walterscheid	307.630.5845	ernste@mh6wy.com	
Hermit Johnson	P.O. Box 962 82003 1119 Dot Ray	3076306036	kjohnb114@aol.com	
Larry Gatlin	5907 Townsend Pl 82009	637-0681	Larry@SummitEngineeringWY.com	
Dustin Carruthers	1417 E 20th ST	421-4988	Dustin.Carruthers@gmail.com	✓

Walterscheid Boulevard Plan
Sign-in Sheet, Public Open House
May 25, 2021

Name	Address	Phone	Email	Add me to an email list to receive updates
Rolinda Sample	515 W. Jefferson Rd Cheyenne	778-6674	rsample@bgcheyorg	
Justin Pendleton	515 W. Jefferson	778-6674	JPendleton@bgcheyorg	
Brian Crozier	311 W Jefferson	640-2845	biobria1@yahoo.com	
L Stacy	1011 WAlterscheid	631.0336	—	
Wes Bybee	3550 Stampede Ranch Rd	(307) 637-5800	Wesley.Bybee@wya.gov	
Judi Heinzen	1172 Stephanie Ct 82007	307-760-2165	judi.heinzen@gmail.com	
Barbara Boyd	4608 Van Buren Ave #2009		blboyd7@msn.com	

Walterscheid Boulevard Plan
Sign-in Sheet, Public Open House
May 25, 2021

Name	Address	Phone	Email	Add me to an email list to receive updates
Jim Boyd	4608 Van Buren Ave #2009		jlboyd6@gmail.com	
Dave Henden	9617 Powderhouse		DMHenden@juno.com	
Charles Bloom	2101 O'Neil		cbloom@cheyenne—	
Ginger & Bill Sara	4 Sci Comanche Dr		bsara@bresnan.net	

Walterscheid Boulevard Plan
Sign-in Sheet, Public Open House
May 25, 2021

Name	Address	Phone	Email	Add me to an email list to receive updates
Karen Staples	1001 Senator	307-76[illegible]-.001	staplesk55@gmail.com	
Josh Ackerman	711 Walterscheid	307-286 9199	LICTW3278@gmail.com	
Molly Bennett	LCPW			
Tiffany Cornett	2210 51st Ave.	[illegible]	tnelson82007@yahoo.com	✓
David + Tommie Kniseley	200 Walterscheid Blvd	307-632-7637	wyfresh.farmers@gmail.com	✓
RYAN SHIELDS	WYDOT D1	307-760-4108	RYAN.SHIELDS@WYO.GOV	✓

Walterscheid Boulevard Plan
Open House Comment Card
May 25, 2021

Which of the following best describes you (check all the apply):

- [x] Resident (either owner or renter)
- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: LAURA Stacy Phone: 631-0336

Address: 1011 Walterscheid Email: kileestacy@aol.com

Reminder: The project area corridor extends from Deming Drive to West College Drive. The intersection at Fox Farm Road is not included from this project.

How long have you lived or worked along the corridor?

- [ ] less than 1 year
- [ ] 1 to 5 years
- [ ] 6 to 15 years
- [x] more than 15 years
- [ ] not applicable

1. What do you like about Walterscheid Boulevard and the overall project area? _____

2. What concerns do you have about traffic safely along Walterscheid Boulevard, and what safety improvements would you like to see? Need A turn lane to elevate congestion during peak hours But use the west side of the road for wideing

3. Are there areas of Walterscheid Boulevard where is it difficult for pedestrians and bicyclists to navigate and how could these be improved? somehow slow drivers / for them to observe speed limit

4. If you have additional comments, please share them here: concern about a forming sink hole in front of my house. Need street lights. lot of people walk @ night. My North neighbor gets drive flooded during storms. Snow plow blocks All drives on East side. All have to dig out

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by June 4th, 2021:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

BenchMark ENGINEERS, PC

Walterscheid Boulevard Plan
Open House Comment Card
May 25, 2021

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- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: JOSH ACKERMAN Phone: 307-286-9199

Address: 711 WALTERSCHEID BLVD Email: CLCTW3278@GMAIL.COM

Reminder: The project area corridor extends from Deming Drive to West College Drive. The intersection at Fox Farm Road is not included from this project.

How long have you lived or worked along the corridor?

- [ ] less than 1 year
- [ ] 1 to 5 years
- [x] 6 to 15 years
- [ ] more than 15 years
- [ ] not applicable

1. What do you like about Walterscheid Boulevard and the overall project area? RURAL - IN CITY QUALITIES, EASE OF DRIVING TO SHOPPING

2. What concerns do you have about traffic safely along Walterscheid Boulevard, and what safety improvements would you like to see? SPEEDING, DRAG RACING, THISTLE IN FIELDS GROW 6' TALL, POWER LINES OVERHEAD, SNOW PLOWING INTO MY DRIVEWAY LEFT FOR ME TO SHOVEL

3. Are there areas of Walterscheid Boulevard where is it difficult for pedestrians and bicyclists to navigate and how could these be improved? N/A

4. If you have additional comments, please share them here: N/A

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Cheyenne, WY 82001

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Walterscheid Boulevard Plan
Open House Comment Card
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- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: Stephanie Reeder Phone: 307 274 7164

Address: 711 Walterscheid Blvd Email: _____

Reminder: The project area corridor extends from Deming Drive to West College Drive. The intersection at Fox Farm Road is not included from this project.

How long have you lived or worked along the corridor?

- [ ] less than 1 year
- [x] 1 to 5 years
- [ ] 6 to 15 years
- [ ] more than 15 years
- [ ] not applicable

1. What do you like about Walterscheid Boulevard and the overall project area? Proximity to greenway & schools

2. What concerns do you have about traffic safely along Walterscheid Boulevard, and what safety improvements would you like to see? I notice a lot of people speed along this road. I would like to see a reduced speed limit & increased police presence

3. Are there areas of Walterscheid Boulevard where is it difficult for pedestrians and bicyclists to navigate and how could these be improved? The Greenway provides sufficient room for foot traffic

4. If you have additional comments, please share them here: _____

Thank you for your time, effort, and input on this important project.

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BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

Walterscheid Boulevard Plan
Open House Comment Card
May 25, 2021

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- ☒ Property owner (non-occupant or vacant land)
- ☐ Business Owner or Employee
- ☐ Corridor user
- ☐ Other _____

Please provide contact information so we may reach out to you:

Name: Kermit Johnson Phone: 307 630 6036

Address: P.O. Box 962 82003 Email: kdohn6114@aol.com

Reminder: The project area corridor extends from Deming Drive to West College Drive. The intersection at Fox Farm Road is not included from this project.

How long have you lived or worked along the corridor?

own & owned 4 properties

☐ less than 1 year ☐ 1 to 5 years ☒ 6 to 15 years ☐ more than 15 years ☐ not applicable

1. What do you like about Walterscheid Boulevard and the overall project area? It's growing fairly quickly

2. What concerns do you have about traffic safely along Walterscheid Boulevard, and what safety improvements would you like to see? Things are workable right now, however more growth equals more traffic

3. Are there areas of Walterscheid Boulevard where is it difficult for pedestrians and bicyclists to navigate and how could these be improved? Sidewalks or bike paths all the way.

4. If you have additional comments, please share them here: How about roundabout at Fox Farm

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by June 4th, 2021:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

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Walterscheid Boulevard Plan
Open House Comment Card
May 25, 2021

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- [x] Business Owner or Employee
- [ ] Corridor user
- [ ] Other ____________

Please provide contact information so we may reach out to you:

Name: Jodi Heinzen Phone: 307-760-2165

Address: 1172 Stephanie Ct Email: jodi.heinzen@gmail.com

Reminder: The project area corridor extends from Deming Drive to West College Drive. The intersection at Fox Farm Road is not included from this project.

How long have you lived or worked along the corridor?

- [ ] less than 1 year
- [ ] 1 to 5 years
- [x] 6 to 15 years
- [ ] more than 15 years
- [ ] not applicable

1. What do you like about Walterscheid Boulevard and the overall project area? [illegible] with cross walks well maintained

2. What concerns do you have about traffic safely along Walterscheid Boulevard, and what safety improvements would you like to see? Sidewalk on both sides with a cross walk for ped.

3. Are there areas of Walterscheid Boulevard where is it difficult for pedestrians and bicyclists to navigate and how could these be improved? a 4 lane, with Sidewalk curb/gutter

4. If you have additional comments, please share them here: ____________

Thank you for your time, effort, and input on this important project.

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BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

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Walterscheid Boulevard Plan
Open House Comment Card
May 25, 2021

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- ☐ Resident (either owner or renter)
- ☐ Property owner (non-occupant or vacant land)
- ☒ Business Owner or Employee
- ☒ Corridor user
- ☐ Other ______

Please provide contact information so we may reach out to you:

Name: Rolinda Sample Phone: 778-6674

Address: 515 W. Jefferson Rd Email: rsample@bgcchey.org

Reminder: The project area corridor extends from Deming Drive to West College Drive. The intersection at Fox Farm Road is not included from this project.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☒ 6 to 15 years ☐ more than 15 years ☐ not applicable

1. What do you like about Walterscheid Boulevard and the overall project area?

2. What concerns do you have about traffic safely along Walterscheid Boulevard, and what safety improvements would you like to see? sidewalks both sides of roadway
curb & gutter both sides of roadway
address the steep hill going south on Deming toward Fox Farm – icy & since roadway not cleared. – No traffic circle on Deming too many semis
need turn lane

3. Are there areas of Walterscheid Boulevard where is it difficult for pedestrians and bicyclists to navigate and how could these be improved?

4. If you have additional comments, please share them here: W. Jefferson to S. Greeley needs sidewalks on both sides – lots of pedestrians.
alley off of Walterscheid Between B&G Club and train/railroad living needs addressed
city needs to clean streets to reduce sediment in water drainage system

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by June 4th, 2021:

the electrical transformer Box on sidewalk south the eastside of Fox Farm needs to relocate

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

• multiple street lights are out on a continued basis makes it very dark

BenchMark ENGINEERS, PC

You are invited to attend a
Public Open House for the

Walterscheid Boulevard Reconstruction Plan

Tuesday, March 22, 2022
5:30 pm to 7:00 pm
Rossman Elementary School
916 W. College Drive

Meet with the design team and the Cheyenne Metropolitan Organization (MPO) staff to learn about the progress on the Reconstruction Plan for Walterscheid Boulevard between Deming Drive and College Drive. Opportunities will be available for comments regarding this project.

BME
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Walterscheid Boulevard Plan

Design Team:

BME

BenchMark ENGINEERS, PC

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Welcome

- Introductions
- Present project update
- Open House for the public to share their thoughts and insight
- Complete and return comment sheet

Project Team

- Cheyenne Metropolitan Planning Organization
- BenchMark Engineers
- Felsburg Holt & Ullevig
- GLM Design Group
- In partnership with:
  - City of Cheyenne
  - Laramie County
  - Wyoming Department of Transportation

Plan Goals

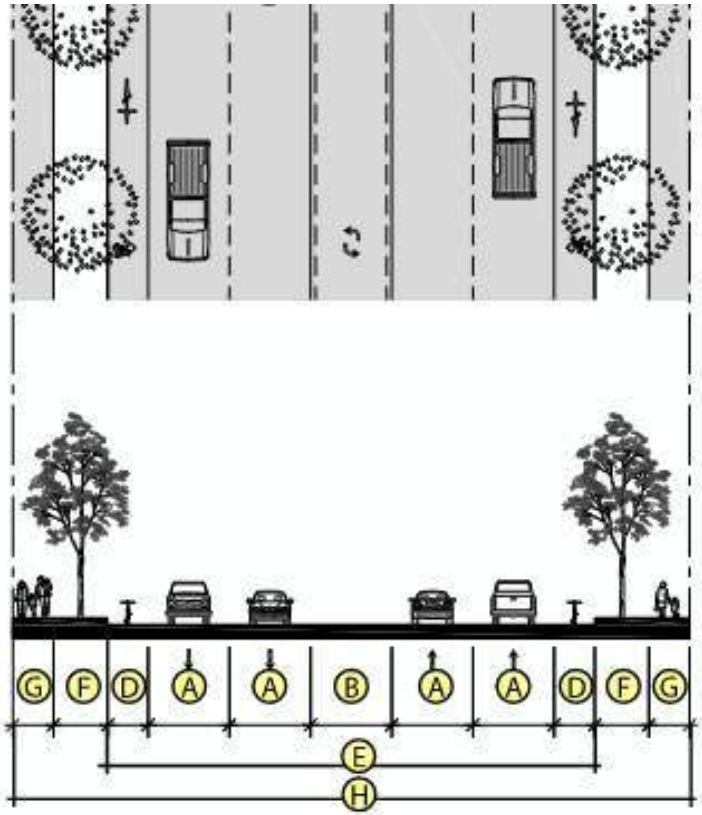
- Update to a Minor Arterial between Deming Drive and College Drive
  - Fox Farm intersection is now included
- Conversion to a Complete Street
- Create a plan to be used as a guide and template for future development
- Involve stakeholders with data collection and recommendations
- Be able to justify our recommendations

35% Design Plans

- *Connect 2045 Transportation Update* plan calls for 5-lane Minor Arterial Roadway
- Consider changes to the horizontal and vertical alignments
- Intersection improvements
- Stormwater drainage improvements
- Utility upgrades
- Greenway and other pedestrian and bicycle movements

Minor Arterial Roadway Standards

- UDC has two standard options for a Minor Arterial Roadway
  - Provide regional continuity and accommodate moderate speeds and volumes
  - Traffic volumes
    - 7,500 – 18,000 for 3-lane (with center turn)
    - 15,000 – 32,000 for 5-lane (with center turn)
  - Speed Limits 35-40 MPH
  - Right-of-Way: 100’

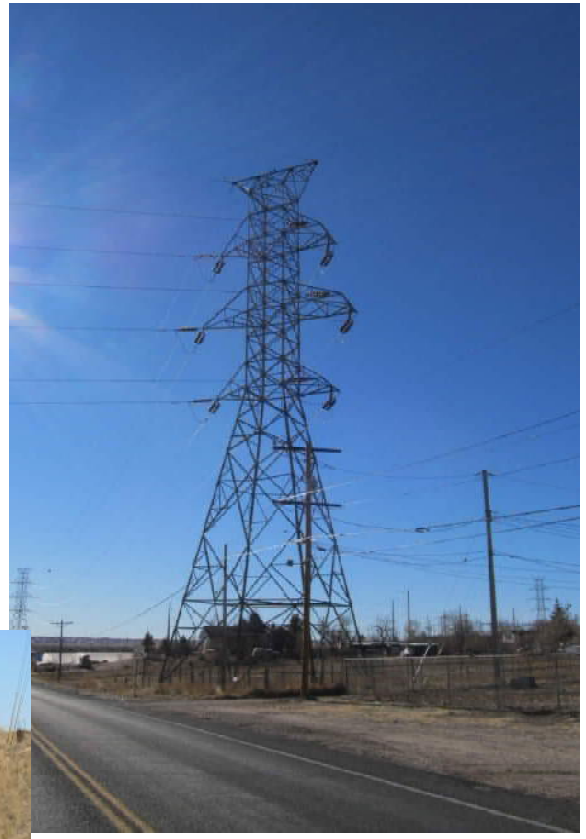


Complete Streets and Multi-Modal Designs

- Balanced designs to accommodate all potential users of the street
  - Vehicles
  - Pedestrians
  - Bicyclists
- Consideration of transit services
- Critical for Walterscheid due to number of schools and facilities providing services to youth

Physical Constraints

- 80’ Right-of-Way at many locations
- 3 Bridges for I-80 that cross over the road
- Greenway Underpass south of Jefferson
- Utility conflicts (overhead and underground)

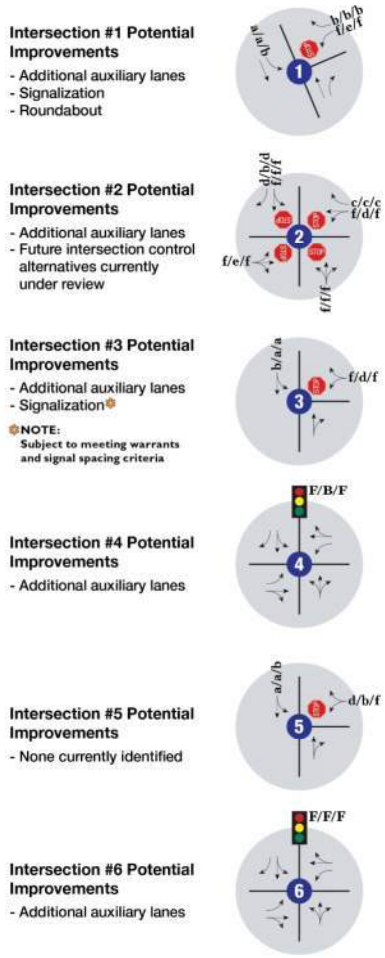


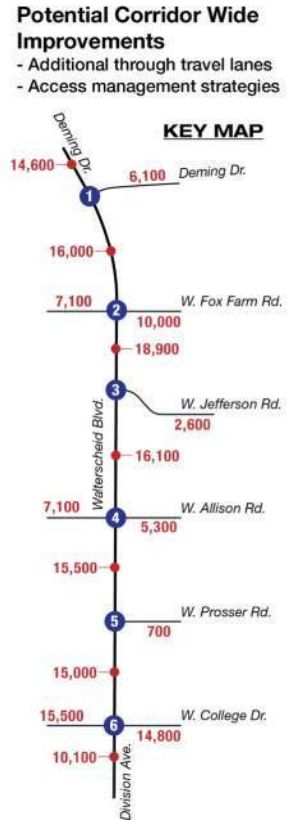
Traffic Operations and Safety Analysis

- Existing Conditions at intersections
- Travel Speeds
- Crash History, including types and frequency
- Existing multimodal conditions
- Daily Traffic Forecasted Volumes

Forecasted 2045 Conditions and Suggested Improvements

- As currently configured, the corridor will not provide adequate capacity for growth
- Potential improvements include added turn lanes, traffic control modifications and widening to provide additional through lanes



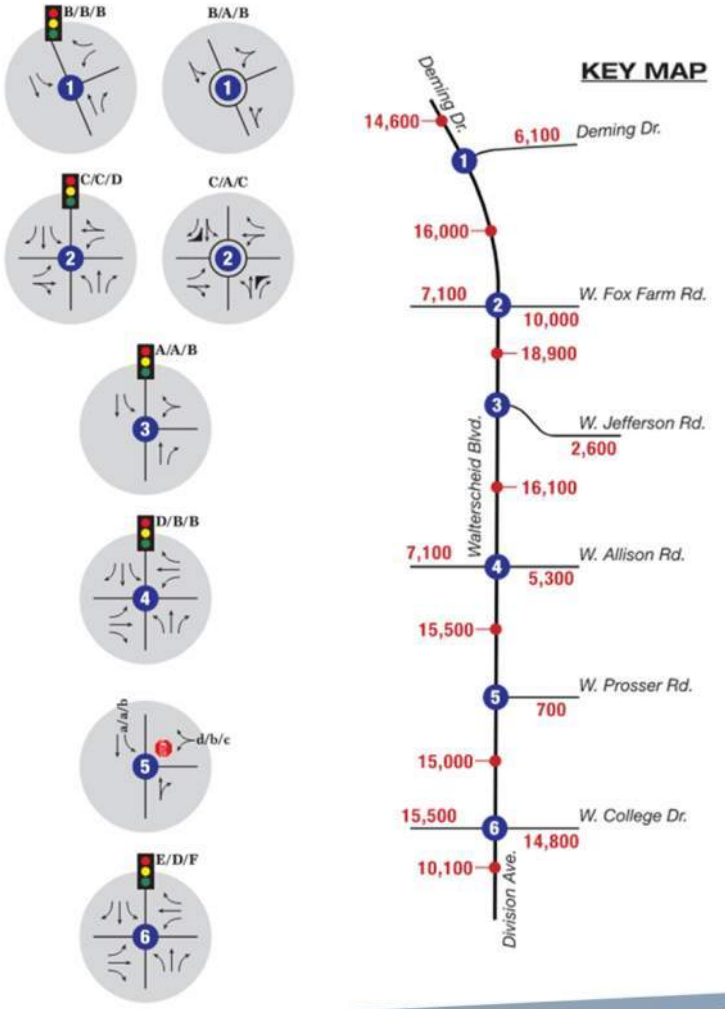


LEGEND

XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Intersection Level of Service
	=	Stop Sign
	=	Traffic Signal

Alternatives Analysis

- Evaluating roundabout options at Deming and Fox Farm intersections
- Signalization of Jefferson intersection likely
- Most intersections need exclusive right turn lanes plus center left turn lane



LEGEND

XXX(XXX)[XXX]	=	AM(Midday)[PM] Peak Hour Traffic Volumes
XXXX	=	Daily Traffic Volumes
X/X/X	=	AM/Midday/PM Peak Hour Overall Signalized Intersection Level of Service
x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Movement or Level of Service
	=	Stop Sign
	=	Traffic Signal

NORTH

Stormwater Drainage Analysis

- Fox Farm to College Drive
  - Excluded the area north of Fox Farm
- Area is in the Allison Draw Drainage Basin
  - Adequate capacity in the Allison Draw channel
  - Need to address conveying the flows to the channel

The Plan

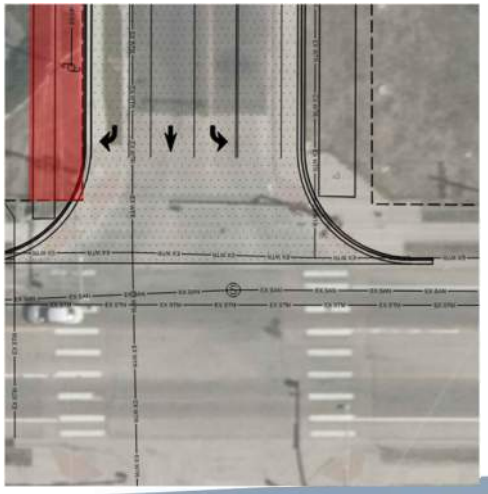
- Moving forward with 3-lane minor arterial in the 80-foot right-of-way
- Intersection Improvements
- Greenway and Sidewalks
- Drainage Improvements

The Plan - Roadway

- Moving forward with 3-lane minor arterial in the 80-foot right-of-way
  - Based on the UCD standard
  - 2-lane under the I-80 bridges
  - No parking on the street
  - Type B (rollover) curb at residential access
- Verify and obtain additional rights of way with new developments and re-developments
- Recommending street lighting

The Plan - Intersections

- Intersection Improvements
  - Auxiliary turn lanes
  - Signalization or roundabout at Fox Farm
  - Consider roundabout at Deming



The Plan – Pedestrians and Bicyclists

- Greenway
  - West side between Deming and Fox Farm
  - East side between Fox Farm and College
- Sidewalk
  - West side from Fox Farm to Rossman Elementary
- No pedestrian facilities on east side from Deming to Fox Farm
- Pedestrian Protection at the bridges
- On-Street bike lanes

The Plan – Stormwater Drainage

- Install approximately 1,000 LF of 36-inch pipe
- Inlets at key locations
- Replace culvert near Serenade and Dot Ray and extend the culvert to the Allison Channel

The Plan - Implementation

- We are creating a plan for the area for short-term and long-term improvements.
  - This plan will also serve as a template for new development and redevelopment
- Currently there is no schedule to finalize the design plans or funds for construction for the full roadway
  - The City intends to move forward with improvements to the Fox Farm intersection, separately, this is funded

The Plan – Phasing of Improvements

- Identify improvements that can be completed near-term
  - Pavement markings
  - Sidewalks
  - Intersections
- Intersection Improvements
- Template for development and re-development
- Obtain rights-of-way for the future
- Full build-out of remaining items

Finalizing the Plan

- We need your insight as community members
  - What do you like about the plan?
  - What are your concerns with the plan?
  - Are there items we missed?

Thank you for your time!

Please view the display boards and complete a comment sheet.

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Welcome

Second Public Open House

Walterscheid Boulevard Plan

Meeting Goal: Update you on the progress of the project.

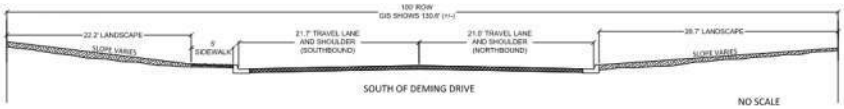
Project Goal: Determine the needs and create a plan for improvements along this roadway in the short-term and long-term for all users.

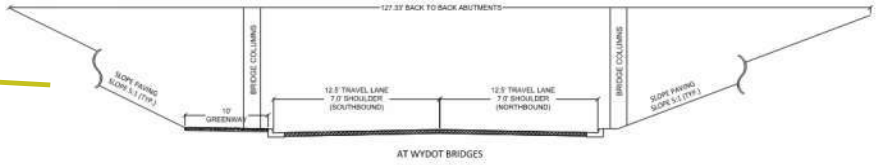
Project Basics:

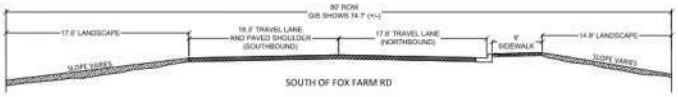
- 35% Design Level for corridor between Deming Drive and West College Drive.
- Complete Street improvements to the roadway, intersections, multimodal uses, and stormwater drainage.
- Construction is not funded or scheduled at this time.

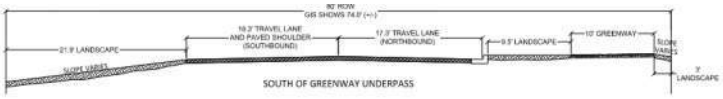
Please sign-in and complete a comment sheet before you leave. Thank you for attending.

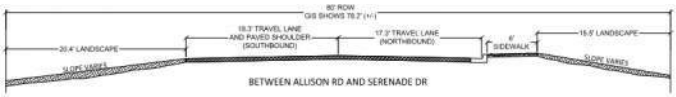
Existing Roadway Cross Sections

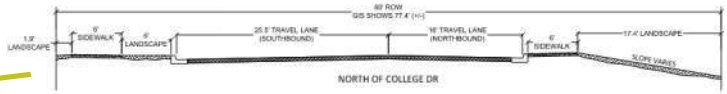






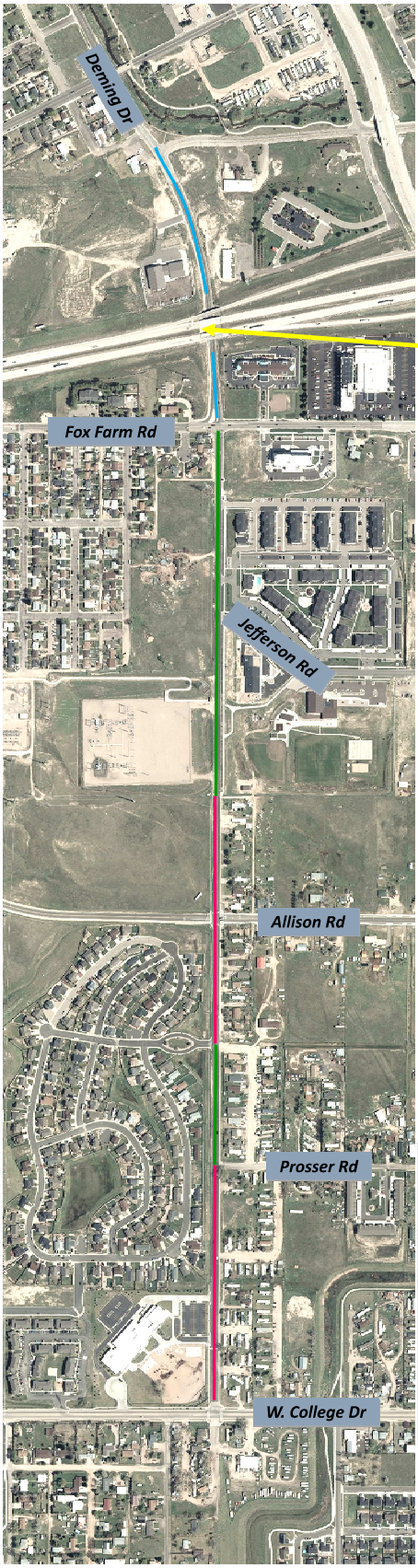


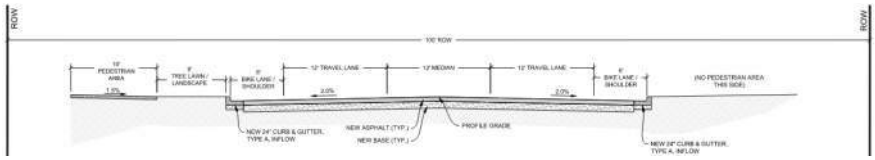


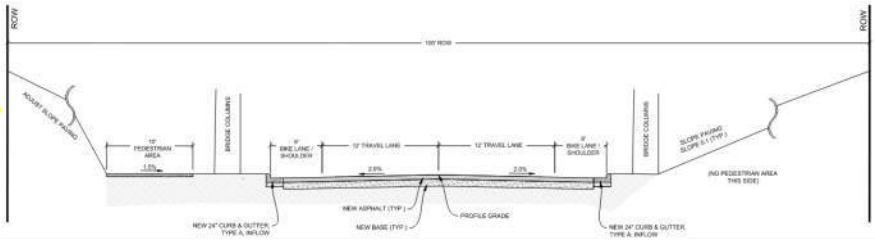


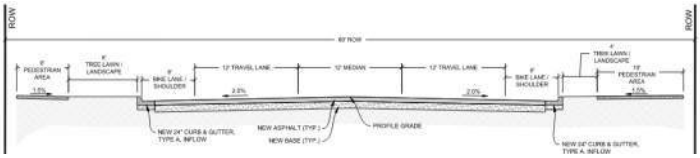
NORTH

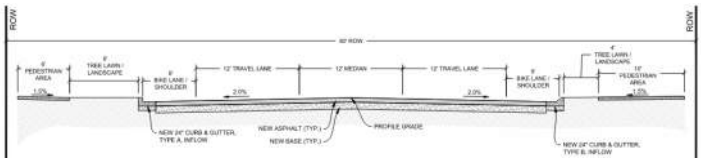
Proposed Roadway Cross Sections



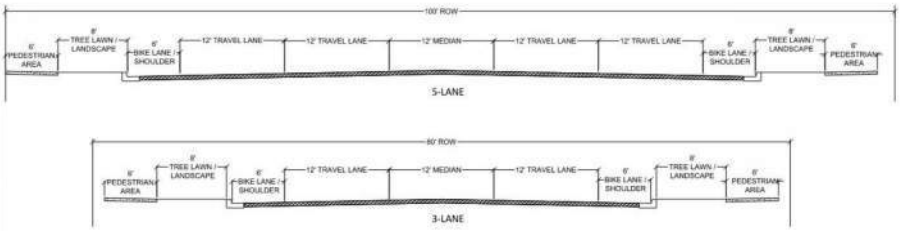






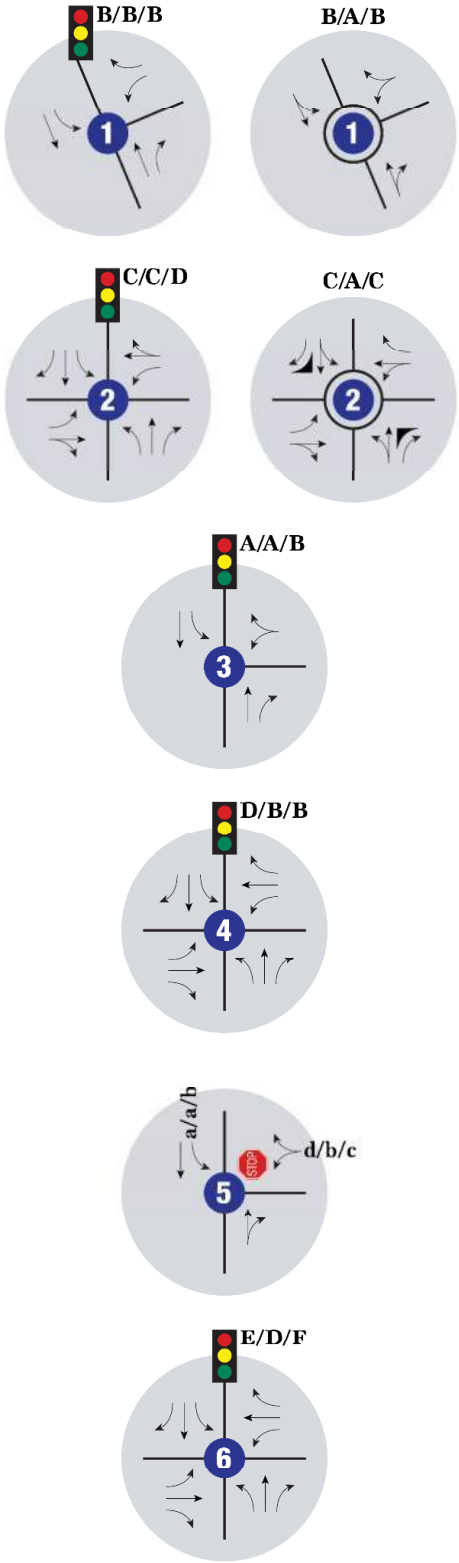


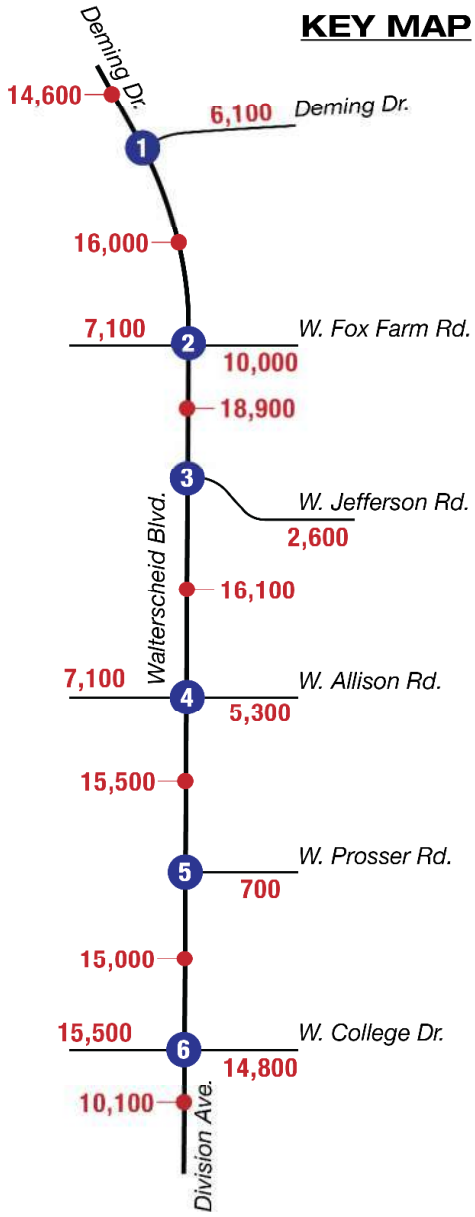
STANDARD ROADWAY: MINOR ARTERIAL
PER UDC
(NO SCALE)



NORTH

Build Alternatives
2045 Traffic Conditions





LEGEND

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x/x/x	=	AM/Midday/PM Peak Hour Unsignalized Movement or Level of Service
STOP	=	Stop Sign
	=	Traffic Signal

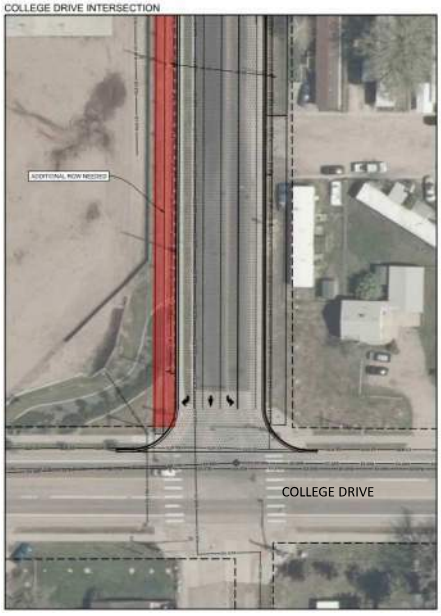
NORTH

Plan Improvements

- Roadway
  - 3-lane minor arterial in 80-foot right-of-way,
  - Additional right-of-way needed at select intersections
  - 2-lane at I-80 bridges
  - No parking on the street
  - Street lighting
- Intersections
  - Auxiliary turn lanes
  - Signalization or roundabout at Fox Farm
  - Consider roundabout at Deming
- Multimodal / Complete Streets
  - Greenway full length
  - Sidewalk Fox Farm to Rossman, maintain cross walk near Rossman
  - On-Street bike lane
  - Pedestrian protection at bridges
- Stormwater Drainage
  - Convey stormwater to the Allison Channel
  - Install pipe and inlets
  - Replace a culvert
- Phasing
  - Identify near-term improvements
- Other Opportunities?

Proposed Intersection Improvements

COLLEGE DRIVE INTERSECTION

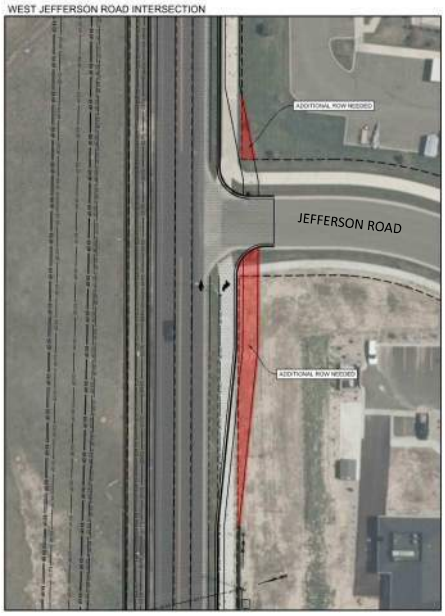


- Left, thru, and right lanes
- Signal remains
- ROW needed for wider roadway and replacement sidewalk next to playground
- Coordinate with Division Avenue Plan

WEST ALLISON ROAD INTERSECTION

- Left, thru, and right lanes
- Signal remains
- ROW needed for wider roadway and new greenway
- Greenway to cross Allison on east side of intersection

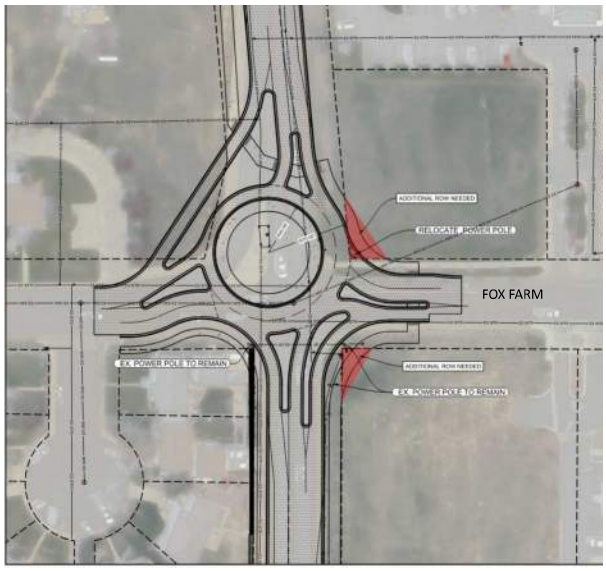
WEST JEFFERSON ROAD INTERSECTION



- Turn lanes for eastbound traffic
- May warrant signalization in future
- ROW needed for wider roadway and new greenway
- Greenway to cross Jefferson on east side of intersection

FOX FARM ROAD INTERSECTION

- Left, thru, and right lanes
- Numerous power poles to be relocated
- ROW needed for wider roadway and new greenway
- Greenway to cross Fox Farm on east side and Walterscheid on north side of intersection



- Single-lane roundabout with auxiliary lanes
- Three existing power poles behind proposed curb, one to be relocated
- ROW needed for wider roadway and new greenway
- Greenway to cross Fox Farm on east side and Walterscheid on north side of intersection

NORTH

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Walterscheid Boulevard Plan
Sign-in Public Open House
March 22, 2022

Name	Address	Phone	Email
Jirina Kokes	215 Walterscheid C103	307-274-1521	jirinakokes@netscape.net
Mark Smith	1716 PARK AVE		
Bryant Ginni Stevens	7224 Heritage Dr	303-269-3410	ginnistevens@gmail.com
Darlene Gallegos Flo Valdez	717 Walterscheid	778-2644	—
Cynthia Park	1207 Melody LN	307 221 6721	—

Walterscheid Boulevard Plan
Sign-in Public Open House
March 22, 2022

Name	Address	Phone	Email
Vicki Nemecek	City of Cheyenne Public Works	637-6259	Vnemecek@cheyennecity.org
Constance Larimore	1109 Dot Ray Place	365-9529	constancelarimore@yahoo.com
RYAN SHIELDS	3911 S 3RD LARAMIE	307-760-4108	RYAN.SHIELDS@WYO.GOV
Rita Kurtenbach	1421 W Jefferson Rd Cheyenne	307-635-2780	
JOHN LENTON SR	2010 SOUTH 2ND AVE CHEYENNE	307 635-5589	JOHNLOIS5@BRESNAN.NET
GLENN CONNOR	1304 BROKEN ARROW RD CHEYENNE WY.	307 637-4152	WYTLC@AOL.COM
Rick + Diana W. Williamson	Alvin Park Ave Cheyenne	307-635-2153	

Walterscheid Boulevard Plan
Sign-in Public Open House
March 22, 2022

Name	Address	Phone	Email
Bob Miller	909 W. College Dr. Lot N	307-221-5778	
Marceil Miller	909 W. College Dr. Lot N	307-221-5779	marceil.miller@bresnan.net
Valdez	717 Walterscheid	307-634-9124	
Jeff Barnes		314-346-0312	[illegible]@gmail.com
Taylor McCart	2518 Bent Ave	307.369.6955	
Earle Stewart	1917 S. Second Ave	307-632-2651	ewswyo@charter.net
Sandi Arnold	1115 Dot Ray Place	307-287-0899	arnoldsandi@charter.net

Walterscheid Boulevard Plan
Sign-in Public Open House
March 22, 2022

Name	Address	Phone	Email
Lloyd Thomas	1001 Walterscheid	307 421 9001	LloydCThomas@gmail.com

Walterscheid Boulevard Plan
Sign-in Public Open House
March 22, 2022

Name	Address	Phone	Email
Tom Norden	19025 5th Ave	637-5427	tnttcq@gmail.com

Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

Which of the following best describes you (check all the apply):

- [x] Resident (either owner or renter)
- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: Earl Stewart Phone: 632-2651

Address: 1917 S. Second Ave Email: cwsway@charter.net

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☐ 6 to 15 years ☒ more than 15 years ☐ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard? Don't like it definite answers to questions - is roundabout / time frame?

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard? Link to Walterscheid south of College Drive. Extent / time frame

3. Are there additional items that should be considered at this point in the process? Detours

4. If you have additional comments, please share them here: Storm water information lacks detail.

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by March 31, 2022:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

BenchMark ENGINEERS, PC

Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

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- [x] Resident (either owner or renter)
- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [x] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: Jirina Kokes Phone: 307-274-1521

Address: 215 Walterscheid C103 Email: jirinaKokes@netscape.net

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☒ 6 to 15 years ☐ more than 15 years ☐ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard? I like the proposed greenway and sidewalks.

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard? I don't like roundabout on Walterscheid & Fox Farm. Trafic signal would be much better and less confusing.

3. Are there additional items that should be considered at this point in the process? _____

4. If you have additional comments, please share them here: _____

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Cheyenne, WY 82001

BenchMark ENGINEERS, PC

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Second Open House Comment Form
March 22, 2022

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- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: Sandi Arnold Phone: 307-287-0899

Address: 1115 Dot Ray Place Email: arnoldsandi@charter.net

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

- [ ] less than 1 year
- [ ] 1 to 5 years
- [x] 6 to 15 years
- [ ] more than 15 years
- [ ] not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard?
3 lane with turns

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard?
greenway on east side plus bike lane isn't that duplicate

3. Are there additional items that should be considered at this point in the process?
Is excess traffic between Fox Farm & Jefferson due to apartments

4. If you have additional comments, please share them here: _____

Thank you for your time, effort, and input on this important project.

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Cheyenne, WY 82001

BenchMark
ENGINEERS, PC

Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

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- ☐ Property owner (non-occupant or vacant land)
- ☐ Business Owner or Employee
- ☒ Corridor user
- ☐ Other _____

Please provide contact information so we may reach out to you:

Name: JOHN LENTON Phone: 307-635-5589

Address: 2010 S. 2ND AVE CHEYENNE Email: JOHNLOCS5@BRESNAN.NET

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☐ 6 to 15 years ☐ more than 15 years ☒ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard? PREPARING FOR FUTURE DEVELOPMENT

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard? UNDERGROUND UTILITY'S PRIMARILY ELECTRICAL

3. Are there additional items that should be considered at this point in the process? ADDRESSING CONGESTION AT W. ALLISON

4. If you have additional comments, please share them here: _____

Thank you for your time, effort, and input on this important project.

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Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

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- [x] Resident (either owner or renter)
- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: MARK Smith Phone: 635-2780

Address: 1716 PARK AVE Email: _____

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☐ 6 to 15 years ☐ more than 15 years ☐ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard? Keeping the Public informed as project progresses.

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard? MAKING SURE WATER & SEWER utilities ARE Not hired to maintain. (MAIN lines)

3. Are there additional items that should be considered at this point in the process? _____

4. If you have additional comments, please share them here: _____

Thank you for your time, effort, and input on this important project.

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Cheyenne, WY 82001

Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

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- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [ ] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: Cynthia Park Phone: 307 221 6721

Address: 1207 Melody LN Cheyenne WY 82007 Email: seapark57@gmail.com

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☒ 6 to 15 years ☐ more than 15 years ☐ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard?
Turn lanes

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard?
Not sold on a round about @ Fox Farm

3. Are there additional items that should be considered at this point in the process?
Allison / Walterschield intersection before and after school (2 to 4) is always conjested.

4. If you have additional comments, please share them here:
Your O/B/B is not accurate. Johnson gets out @ 230 then South gets out 1/2 hr later. If you are heading West on Allison and need to turn left onto Walterschield, you are sitting in a turn multiple lights changes because there is no ~~turn~~ green turn arrow. Also N/S traffic on Walterschield wait to ~~turn~~ turn left.

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by March 31, 2022:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

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Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

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- ☒ Property owner (non-occupant or vacant land)
- ☐ Business Owner or Employee
- ☐ Corridor user
- ☐ Other _____

Please provide contact information so we may reach out to you:

Name: Florida Valdez Phone: 307-634-9124

Address: 717 Walterscheid Blvd. Email: flo.cheyenne@gmail.com

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor? (50 years ownership)

☐ less than 1 year ☐ 1 to 5 years ☐ 6 to 15 years ☒ more than 15 years ☐ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard? We like that the plan will make the area more pedestrian friendly, safer for pedestrians, and will alleviate traffic congestion (hopefully).

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard? Insure roundabout is well lit, sidewalks on both sides of Walterscheid, Easy access to my property and compensation for footage needed.

3. Are there additional items that should be considered at this point in the process? The trees planted roadside (Walterscheid) by the Boys and Girls Club look terrible. Please see for yourselves. Any trees that will go in with the new project must be quality trees that will be cared for in their first years. They should grow to be pretty.

4. If you have additional comments, please share them here: If any roundabouts go in, please set off the circular centers with a contrasting color so that they are not the same color as the roundabout itself. There should be that contrast for both aesthetic and safety reasons.

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by March 31, 2022:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

Walterscheid Boulevard Plan
Second Open House Comment Form
March 22, 2022

Which of the following best describes you (check all the apply):

- [x] Resident (either owner or renter)
- [ ] Property owner (non-occupant or vacant land)
- [ ] Business Owner or Employee
- [x] Corridor user
- [ ] Other _____

Please provide contact information so we may reach out to you:

Name: Rick Williamson Phone: 307-635-2153

Address: 2202 Park Ave. Email: _____

Reminder: The project area corridor extends from Deming Drive to West College Drive and now includes the intersection at Fox Farm Road.

How long have you lived or worked along the corridor?

☐ less than 1 year ☐ 1 to 5 years ☐ 6 to 15 years ☒ more than 15 years ☐ not applicable

1. What do you like about the proposed plan for Walterscheid Boulevard? adding turn lanes at Allison + College

2. Do you have any concerns with the proposed plan for Walterscheid Boulevard? yes adding roundabouts

3. Are there additional items that should be considered at this point in the process? _____

4. If you have additional comments, please share them here: _____

Thank you for your time, effort, and input on this important project.

If you prefer, you may mail or deliver this sheet to BenchMark Engineers by March 31, 2022:

BenchMark Engineers, PC
1920 Thomes Avenue, Suite 200
Cheyenne, WY 82001

BenchMark
ENGINEERS, PC

Appendix H

Steering Committee Meeting Minutes

MINUTES KICK-OFF MEETING

March 3, 2021
Via Teams®

Participants

- Cheyenne MPO – Jillian Harris, Tom Mason, and Christopher Yaney
- BenchMark Engineers – Scott Larson and Erin Gates
- FHU – Lyle DeVries and Charles Buck
- GLM Design – Gene MacDonald

Discussion

- The MPO is working on obtaining the existing traffic counts, crash data, and speed data. The MPO is expecting to have it available within the next few weeks.
- The existing plans, reports, and studies noted in the RFP should be reviewed. Plan Cheyenne was recently updated with critical information to this project.
- BME will provide a list of items to the MPO for requested data.
- Data collection, known projects, and foreseeable changes in the project area:
    - BME will reach out to the City for the Fox Farm / Walterscheid intersection plans or project update and for as-builts of the greenway underpass.
    - BME will reach out to the City regarding the property northwest of the intersection of Walterscheid and Allison. BME may also reach out to the new property owner.
    - BME will begin discussions with WYDOT Resident Engineer regarding the existing bridges and any programmed improvements near this project.
    - Bids were received recently for the Harmony Valley sewer. BOPU is involved with this project. BME will reach out to BOPU for information and anticipated construction schedule.
    - BME will also reach out to BOPU and SCWSD for investigation of their systems in the project area.
- FHU will prepare a memo summarizing the methods and assumptions that will be used for the analysis of the traffic data.
- GLM has begun work in the SWMM.
- The MPO has been directed to begin holding in-person public meetings with a virtual component. BME will work with the MPO as we develop a public participation plan specific to this project, health orders, etc.
- At this time, BME believes the first public meeting to be held in the first half of June as shown on our schedule. This is dependent on when data is made available to our team.
- We anticipate the first public meeting to be an information sharing event where we will let the public know what we have learned, as well as a chance for the public to tell us what they know and what their concerns are. Our team will consider alternative locations if a public school facility is not available.
- BME noted that although not in the scope of work, our staff will be surveying the corridor. BME will not bill for this work.
- We recognize this project is rather straight forward with a leading alternative. Per the MPO, other desired outcomes include understanding the educational institutions and incorporation of the pedestrian component will be critical. Additionally, the modeling and forecasting filled the TAZs with housing. There is a high potential for residential development, particularly affordable housing, near and adjacent to Walterscheid within the next 10 years. A business park is being developed south of the project off US 85.

House Keeping Items

- Our team will communicate directly with Jillian and Tom. Any communication with Chris from our team will include Jillian and Tom cc'd. Any assumptions or clarifications that the City Traffic Engineer should provide input on will be sent through Chris. The MPO will begin communication and coordination with other departments and agencies.
- Jillian will send an example of a recent invoice for BME to follow. Invoices will be percent complete per task, include sub-consultant breakdowns, include the associated date range for the services completed, and include a summary/progress report. Invoices will be sent to Nancy Olson with Jillian and Tom cc'd.

Next Meeting

- March 31, 2021, virtually. BME will send an invite.

MEETING MINUTES

March 31, 2021
Via Teams®

Participants

- Cheyenne MPO – Jillian Harris, Tom Mason, and Christopher Yaney
- BenchMark Engineers – Scott Larson and Erin Gates
- FHU – Lyle DeVries, Charles Buck, and Faith Kelley
- GLM Design – Gene MacDonald

Discussion

- The MPO has provided traffic data; FHU is working through it. FHU is working on a memo regarding the methods and assumptions.
    - The team was reminded the Connect 2045 plan was adopted in December 2020.
    - FHU requested the shape files or screen shots for TAZs and data and would prefer the shape files.
    - FHU will need the signal timing. Chris will work with the City and WYDOT to obtain this data.
    - The team was reminded of the interactive crash map that can be found online.
    - It seems the roadway grades may be contributing to speeding at certain areas.
    - Peak hour in the PM is between 3-4 and is associated with the schools in the area. COVID may be impacting this peak. Additionally, schools have increased the bus radii to 1.5 miles for elementary and 2 miles for secondary students, so more parents are dropping off and picking up students. These radii are not anticipated to change without a state legislative action. The team will look into shorter timeframes (15-minutes) within the peak hour.
    - Multi-modal information will be incorporated for forecasting.
- The intersection at Fox Farm and Walterscheid is being designed for signals. BME will contact the City (Anissa) to understand the schedule for construction.
- BME is reviewing the existing data and has concerns with the 5-lane collector recommended in Connect 2045.
    - 100-foot ROW is needed for a 5-lane road, the existing ROW appears to be 80-feet throughout the corridor.
    - It was recommended to look into getting 10 feet on both sides. There may be some challenges to obtain this additional ROW this at all locations due to development, utility easements, etc.
    - The recommendations from this plan must be justified by the data and analysis.
- BME has surveyed the roadway and is working on the CAD file. BME will contact Jennifer Corso to obtain GIS data.
- GLM needs the CAD survey to continue with the drainage study. GLM has a plan set for the Allison Road project.
- BME has contacted BOPU regarding the Allison Draw Interceptor (new sanitary sewer) that is a public-private partnership project. Construction is anticipated for this summer. BME will obtain more specific dates and information from BOPU.
- The MPO provide BME with a schematic-level plan for a proposed hotel southeast of the intersection at Fox Farm and Walterscheid. This hotel will access from Fox Farm.

Public Input

- The MPO shared experiences from the Converse meeting held earlier in the month that was presented entirely via Zoom. They haven't received much feedback but learned to make zoom

more useable. Postcard flyers were sent to approximately 200 addresses within 0.25 miles of the corridor.

- BME will work with the MPO to develop a list of stakeholders along to the corridor to meeting with (i.e., LCSD1, Ed Ernst, Head Start, Boys and Girls Club, etc.).

Schedule

- The MPO suggests that the first public meeting be held before school is let out. Currently the last day is scheduled for June 3rd. This may change due to the snow week.

House Keeping Items

- For the next meeting BME and FHU will provide a graphic of pinch points along the corridor.
- The MPO suggested recording meetings but left it as optional for our team.

Next Meeting

- April 28, 2021, 9:00 am, virtually. BME will send an invite.

MEETING MINUTES

April 28, 2021
Via Teams®

Participants

- Cheyenne MPO – Jillian Harris, Tom Mason, and Christopher Yaney
- BenchMark Engineers – Scott Larson and Erin Gates
- FHU – Lyle DeVries, Charles Buck, and Faith Kelley
- GLM Design – Gene MacDonald

Discussion

- Project Task Update
  - Review of Studies is ongoing.
  - Review of Bridges and Structures. We have received plans from WYDOT for the bridges and from the City for the greenway underpass.
  - Review of Utilities. We have requests into both BOPU and SCWSD. BOPU has indicated the sanitary sewer from Harmony Meadows is not crossing within the limits of this project.
  - Traffic Safety Analysis:
    - A context map and accompanying table (included with the agenda) shows speed limits along the corridor, locations where speed data were collected, and speeding within the corridor. There may be an opportunity to raise the speed limit to 35 south of Deming, with a reduced speed ahead warning. A radar feedback sign may be beneficial. Data includes the average speed and the 85th percentile, what would the city prefer us to use? Anissa indicated to Chris she would like to see both.
    - A review of the crash data was presented in the documents attached to the agenda. The team would like to research more of the data for Deming, Allison, and College. (Of note, a subsequent review of data sources identified that some of the crashes initially depicted were later found to not be related to the study intersections. The updated information indicates that Allison Road shows the highest number of crashes of the study intersections.) Fox Farm has the highest rate of crashes. There are some sight distance issues at Allison and insufficient roadway striping along SB Walterscheid approaching College Drive. There are questions on the two pedestrian/bike crashes at Allison. Can more information be provided?
      - A follow up analysis has been performed, indicating that the Pedacycle crash was caused by the bicyclist losing the ability to brake. The bicyclist traveling eastbound on Allison was not able to stop when they saw red pedestrian signal or car in intersection and collided with car traveling southbound on Walterscheid.
      - In the other reported accident, a pedestrian was walking westbound across Walterscheid with green ped signal. Vehicle was turning eastbound left onto northbound Walterscheid. Motorist was unable to see pedestrian due to A-frame of vehicle and did not yield to pedestrian causing collision.
    - It was noted by the MPO that the County is planning on putting the Division Avenue project on the 6th Penny list. Forecasts for Division were included in the modeling.

        - We have reached out the City regarding their plans and schedule for the planned work at that intersection and have not heard back yet.
        - It was noted that traffic volumes were recorded on a Monday, an atypical practice for traffic engineering as Mondays may not accurately represent conditions on the majority of weekdays. The MPO noted that the counts would be utilized as representative.
        - A preliminary daily traffic volume forecast map indicates significant growth in the area by 2045. The forecast numbers are adjusted per standard methodology. The MPO is concerned the growth in the area may be underestimated. It was also noted that a new interchange from I-25 to Division/Wallick was not included in the forecast. Based on the counts, the volumes are reaching the limits for a 5-lane roadway per the UDC.
    - The Stormwater Management Model (SWMM) is set-up and incorporating the Allison Road storm sewer and secondary outfalls. Numerous new developments are planned in or adjacent to the corridor. The model will include evaluating the outfall near the Boys and Girls Club and a new storage facility off Allison Road. Preliminary findings will be available by Mid-May.
    - Work on the 35% design plans will begin following the public meeting and an analysis of alternatives. Typical sections will be under consideration.
        - A pinch points graphic was provided with the agenda documents. This graphic includes the various existing constraints along the corridor. WYDOT has indicated they have plans for bridge deck rehabilitation, but not full reconstruction of the three bridges.
        - Cross sections for Minor Arterials (3-lane and 5-lane) per the UDC were provided along with existing cross sections along the corridor.
- Road Design Discussion
    - Consideration of forecasted counts
    - Consideration of constraints
    - Intersection operations
    - If 3-lane is proposed, right turn lanes will be needed at intersections
    - The MPO directed the team to try for 3-lane Minor Arterial, and where appropriate, add right turn lanes, as it appears we will need to work within the existing 80-foot ROW.
    - However, the MPO will recommend with other property is platted or re-platted that additional ROW is granted.

Public Input

- The first public meeting was originally scheduled for June 9th.
- The first public meeting is scheduled for May 25th. BME will reach out to facilities in the area to identify a location. The meeting should be about 1.5 hours, recommended between 5:30 and 7:00 pm.
- The meeting will be in-person with a virtual component. A formal presentation will be planned and streamed via Facebook by West Edge Collective, the MPO will coordinate directly with West Edge Collective. The remainder of the meeting will be open house format.
    - Meeting materials will be hard copy and digital.
    - The team will meet with the MPO about a week before the meeting to finalize content.
- A stakeholder list was provided, additional stakeholders and contact information will be incorporated.
    - BME will begin to reach out to these entities and invite them to the public meeting.

- The team asked when other stakeholder agencies will be involved with these meetings.

Schedule and Upcoming Meetings

- Pre-Public Meeting: TBD (one week before)
- Public Meeting: May 25, 2021, evening
- Steering Committee and Post-Public Meeting: June 2

MEETING MINUTES

June 22, 2021
Via Teams®

Participants

- Cheyenne MPO – Jillian Harris and Tom Mason
- BenchMark Engineers – Scott Larson and Erin Gates
- FHU – Lyle DeVries, Charles Buck, and Faith Kelley
- GLM Design – Gene MacDonald
- Cheyenne BOPU – Bryce Dorr
- WYDOT – Ryan Shields, Wes Bybee
- Laramie County – Molly Bennett
- City of Cheyenne – Vickie Nemecek, Tom Cobb, and Charles Bloom

Discussion

- Project Task Update
    - Review of Studies: ongoing, as needed.
    - Review of Bridges and Structures: we have received plans from WYDOT for the bridges and from the City for the greenway underpass.
    - Traffic Safety Analysis: design team will need to include the Fox Farm intersection.
    - Traffic Analysis: design team has looked at existing conditions, no-build forecasted conditions, projected volumes, and proposed improvements.
    - Drainage Analysis: continuing. Are designs or as-built plans available for Allison Road, east and west of Walterscheid? WYDOT staff emailed plans for east of Walterscheid.
    - 35% Design Plans: will follow the analysis of alternatives and recommendations.
    - Cost Estimate: to accompany 35% design plans.
    - Public/Stakeholder Involvement: summary of first public meeting to follow.
- Road Design Discussion
    - 3-lane vs. 5-lane. Decision was made during meeting on April 28, 2021 to move forward with 3-lane minor arterial and incorporate turn lanes, as needed, at intersections.
    - City Engineering staff understand the physical constraints along the corridor, including at the I-80 bridges.
    - Future volumes are pushing the upper limits for a 3-lane minor arterial per the UDC. Future volumes are based on anticipated residential development adjacent to the corridor (northwest of Walterscheid and Allison) and near the corridor (south of College).
    - Auxiliary lanes will be key at some intersections.
    - Figures summarizing the traffic analysis will be provided to the City Engineering Department.
    - City Planning and Development Department expressed the need for accommodation for bicyclists and pedestrians.
    - The developers of the anticipated high-density residential subdivision northwest of Walterscheid and Allison have not been in contact with the Planning staff recently.
    - A new hotel is moving forward southwest of the Walterscheid and Fox Farm without specific accommodations for improvements or modifications at the intersection.
- Summary of Public Meeting
    - A presentation was made summarizing the public meeting and comments received from the public.
    - The data provided by the MPO does back-up speeding may be occurring along the corridor.

  - The design team will look into the sight distance under the I-80 bridges.
  - Comments noted that law enforcement is rarely observed along the corridor. Participants on the call were reminded that mapping of the various jurisdictions is not included in the design team's scope of work.

Public Input

- The design team will continue to reach out to stakeholders.

Discussion of Additional Work

- The MPO will send a sample contract modification to BME for the addition of the Fox Farm intersection into this project. The general scope of work will be to look at alternatives (signalization, roundabout, other alternatives) and to complete 35% design plans for the recommended improvements.
- City Engineering will send data, design information, utility mapping, etc. for the Fox Farm intersection.
- The City Engineering Department needs to know if additional rights of way will be required. The proposed hotel at Fox Farm will not be required to plan their site, or delay their site planning, based on this intersection.
- The City Engineering Department does not have a contact for the WAPA lines. The overhead power at Fox Farm is Black Hills.

Additional Discussion

- Laramie County included the Division and Wallick project on the 6th Penny ballot since it was moved down the STIP list. There is no amendment to the STIP yet, may be needed following the outcome of the election (November 2021).
- Add Anissa Gerard and Chris Yaney to meeting invite list.

Schedule and Upcoming Meeting

- Steering Committee Meeting: August 17, 2021, 1:30 PM, anticipated for 1 hour.

MEETING MINUTES

January 4, 2022
Via Teams®

Participants

- Cheyenne MPO – Tom Mason and Christopher Yaney
- BenchMark Engineers – Erin Gates and Scott Larson
- FHU – Lyle DeVries, Charles Buck, and Faith Kelley
- WYDOT – Ryan Shields
- City of Cheyenne – Wes Bay and Charles Bloom
- Cheyenne BOPU – Bryce Dorr
- Not in attendance:
    - Gene MacDonald (GLM), provided update to BME for this meeting
    - Molly Bennett (Laramie County PW)
    - Tom Cobb (City Engineer's Office)
    - Vickie Nemecek (City PW Office)
    - South Cheyenne Water and Sewer District

Discussion

- Changes to Steering Committee
    - Tom Mason will be MPO's project manager; Jillian is no longer at the MPO.
    - Ryan Shields will be WYDOT's primary connection; Wes Bybee has moved to another WYDOT group.
    - Wes Bay will be added to the contact list.
- Schedule update
    - Work completed prior to December 2021 is not shown. This schedule also lists anticipated steering committee meetings.
- Refresher of completed work
    - The ultimate future vision of the roadway is 5-lane, however right-of-way is needed. 35% designs will be completed for 3-lane. Traffic data has been collected and provided. Traffic forecasts have been analyzed. Traffic operations and safety analysis has been completed. Structures have been reviewed. Drainage study is nearly complete; we do not need any land from WY Fresh (200 Walterscheid) for detention. One public meeting was held. Initial discussions of alternatives were started. The project now includes the intersection at Fox Farm Road.
- Road and Intersection Design Discussions
    - Moving forward with 3-lane design, per the UDC, with a 10-foot greenway path on one side.
    - A reduction of complete roadway will be needed at bridges due to structures. 2-lanes and protect pedestrians. The slope paving under the bridge may need to be modified.
    - The greenway should be located on the east side between Fox Farm and College, and the west side from Fox Farm to Deming. No sidewalk will be needed along the east side between Fox Farm and Deming.
    - A question was raised regarding a potential land-use restriction due to the old landfill near between Deming/1st and I-80.
    - The greenway crossing Deming/1st may need to shift east rather than be at the intersection.
    - The city has designs for the greenway on the west side from 3rd to 4th.

  - Accesses to residences will include looking beyond the ROW to see if accesses can be consolidated. Additionally, BME requests Laramie County's insight on this.
  - Fox Farm intersection has been studied previously. The all-way stop is not as effective as other methods. FHU has modeled to 2045. The intersection needs more lanes or widening. A full two-lane roundabout all the way around is not warranted. A roundabout with improvements has been analyzed. FHU will verify driver tolerance for delays. Underground utilities have caused problems with other designs. The design team will look into shifting the roundabout to the north and west. The designs will consider the 5-lane future roadway. Proper access to the fire station (northwest of the intersection) is essential. FHU will look into the number of vehicles the intersection can process as signalized or as a roundabout. Intersection analysis have been completed.
  - Forecast information including Harmony Valley and south of Orchard Valley will be provided by the MPO to BOPU.
- Stakeholder coordination
  - Design team will reach out to various stakeholders. Overhead power in the area is Black Hills Energy. The gas line is Holly Frontier. The city will look for a contact for Western Area Power Administration (WAPA) and the fiber optic line.
- Requested information
  - BME requests input regarding the format, sections, etc. to the written portion of the plan from the MPO.

Schedule and Upcoming Meeting

- Steering Committee Meeting: March 16, 2022, 10:30 AM, anticipated for 1.5 hours.
- Second Public Meeting: Tuesday, March 22, 2022, try for Rossman Elementary.

MEETING MINUTES

March 16, 2022
Via Teams®

Participants

- Cheyenne MPO – Tom Mason and Christopher Yaney
- BenchMark Engineers – Erin Gates
- FHU – Charles Buck and Faith Kelley
- GLM – Gene MacDonald
- WYDOT – Taylor McCort
- City of Cheyenne – Tom Cobb, Wes Bay, Charles Bloom, and Mark Christensen
- Laramie County Public Works – Molly Bennett
- City Fire Department – Byron Matthews
- Not in attendance:
    - Cheyenne BOPU – Bryce Dorr
    - City of Cheyenne – Vickie Nemecek
    - South Cheyenne Water and Sewer District

Discussion

- Changes to Steering Committee
    - Taylor McCort will be WYDOT's primary connection.
    - Byron Matthews will be added to the contact list.
- Project Update
    - The preliminary draft of the plan was submitted to the MPO on February 2, 2022.
        - Review of the proposed cross sections and how they vary from the UDC standard.
        - Review of intersection improvements. The left turns at College should be offset.
        - The county intends to move forward with the Division Wallick project within the next few years. $3,045,399.52 was approved on the 6th Penny ballot in 2021.
        - The plan will recommend if any properties redevelop the accesses should be moved off Walterscheid.
        - The property owner northwest of Allison and Walterscheid is planning to move forward with development, beginning at the western portion and moving eastward. A pre-application meeting has not been held with the city.
        - City staff can assist with plat research for plats not available via the Cheyenne and Laramie County Cooperative GIS mapping system.
        - Designs may need to attach the sidewalk and greenway at certain locations to avoid conflicts with existing features (WAPA tower leg, underpass headwalls).
        - Information regarding WAPA easements has been provided.
        - Design team will look more in the geometry of the roundabout at Fox Farm to see if the footprint can be reduced. City Fire has concerns with ingress and egress to Fire Station 2, as well as the functionality of the roundabout. If the intersection is signalized, emergency services can control the signal to clear the intersection. The design team will review the level of service without the auxiliary lanes. The width of the lanes at the roundabout was asked. Additional design criteria is needed to complete the RODEL analysis. The diameter of the roundabout is 90' to the inner back of curb, and 140' to the outside back of curb.
        - The plan recommends street lighting. City Engineering will provide a contact for BHE.

        - Clarification on the forecasted traffic volumes was requested. The MPO provided constrained and unconstrained data. The MPO will discuss this with WYDOT offline.
    - The draft of the Transportation Operations report was provided. This report summarizes the data and provides text to support the recommendations and graphics provided previously.
    - The draft of the plan included a preliminary drainage report. Stormwater can be kept within the right of way with surface features and piping. Adequate capacity is available in the Allison Channel. Improvements are needed near Harmony Meadows; this will include a larger pipe and an easement to pipe the flows to the channel. Discussions will be held with owners at 200 Walterscheid.
- Stakeholder coordination
    - The second of two public meetings will be held March 22, 2022 at Rossman Elementary School from 5:30 PM to 7:00 PM.
        - The meeting will include a powerpoint and display boards. Items will be provided to the MPO for review prior to the meeting.
        - All members of the Steering Committee and encouraged to attend.
    - The design team will continue to reach out to stakeholders.
    - The city will provide contact information for any fiber optic lines in the project limits.
    - The project was presented to the MPO Technical Committee on February 16, 2022
    - The project was scheduled to be presented to the MPO Citizens' Advisory Committee on February 17, 2022. This did not happen due to a lack of a quorum.
    - The project is scheduled to be presented to the MPO Policy Committee on March 23, 2022

Draft Plan Review

- Review comments on the draft plan, including the transportation operations report, are to be completed and provided to Erin Gates (ering@benchmarkengineers.com) with Tom Mason cc'd (tmason@cheyennecity.org) by end of day on March 31, 2022.

Schedule and Upcoming Meeting

- The design team will need at least one month after the issuance of the review comments to reach concurrence and finalize the plan.
- Second Public Meeting: Tuesday, March 22, 2022, try for Rossman Elementary.
- Steering Committee Meeting: April 14, 2022, 8:30 AM, anticipated for 1.5 hours.

MEETING MINUTES

April 14, 2022
Via Teams®

Participants

- Cheyenne MPO – Tom Mason and Christopher Yaney
- BenchMark Engineers – Erin Gates
- FHU – Lyle Devries, Charles Buck, and Faith Kelley
- WYDOT – Taylor McCort
- City of Cheyenne – Tom Cobb, Wes Bay, Charles Bloom, and Mark Christensen
- Laramie County Public Works – Molly Bennett
- Cheyenne Fire and Rescue – Byron Mathews
- Not in attendance:
    - GLM Design
    - Cheyenne BOPU
    - City of Cheyenne Public Works
    - South Cheyenne Water and Sewer District

Discussion

- Changes to Steering Committee
    - No changes.
- Project Update
    - The preliminary draft of the plan was submitted to the MPO on February 2, 2022, comments have been received from the MPO and City Public Works.
- Items to be resolved
    - Discussion of traffic forecasting
        - Feedback was received from the public, specifically the westbound left turn movement on Allison Rd. A public meeting attendee had expressed concern that the westbound left turn at this intersection experiences significant volume increases during school peak hours and it is difficult to complete the turn. A review of the traffic counts did not indicate a significant peak hour issue with this left turn. However, the traffic counts do indicate a significant increase in eastbound through traffic during the 2:45 pm – 3 pm 15 minute time period. It is likely that the westbound permissive left turn movement experiences more delay during this time. Adding a protected left turn arrow to assist with this movement should be considered, creating a protected/permitted condition that could be activated during only school peak hours.
        - The design team has further considerations of traffic volume forecasts of the various models and has requested additional information regarding the models.
        - The design team is refining the operational analysis of the roundabout at Fox Farm.
        - The city engineering department will have one of their consultants review the Transportation Operations Report.
        - The design team discussed the forecasting update:
            - The RTP travel demand model used as the basis for traffic volume forecasts to date included a 5-lane section for Walterscheid. This scenario does not reflect the current identified option for Walterscheid – a 3-lane option. It is the hypothesis of the design team that the 5-lane condition along Walterscheid in the model causes more traffic to be drawn tot eh

roadway in the long term projection. Re-running the model with a 3-lane section may help provide more accurate forecasts and confirm/refute this hypothesis. The group indicated that such a re-run would not require alterations to the Connect 2045 document.
- There are future traffic operations issues at Fox Farm noted with the more aggressive growth 5-lane model scenario.
- Looking deeper at other scenarios, the E+C scenario kept Walterscheid as a 2-lane roadway and showed more north/south traffic along South Greeley Highway that Walterscheid, further supporting the need to adjust the re-run of the model with a 3-lane Walterscheid.
- 3-lane vs 5-lane modeling outcomes will have implications at intersections.

        - The design team is looking at an alternatives/sensitivity scenario to provide a recommendation based on 3-lane Walterscheid. Tendency is to not alter the more aggressive growth-based analyses, but test options with a lower growth scenario as a sensitivity analysis.
        - At Fox Farm intersection the design team is reviewing the roundabout. Considering the operations of a single-lane roundabout and when it would begin to fail operationally. It could last until 2035 or 2040 with aggressive growth. With less growth it could potentially operate acceptably until 2045.
        - Tom Cobb noted that input from the Fire Chief is needed, and they are more comfortable with pre-emptive signals.
        - Byron Matthews noted that until they want to see a layout and have a discussion. He also noted that curves need to be negotiated.
        - A preliminary layout was shown with the access to the fire station on the west side of the building. This access is on the city's property.
        - A meeting will be set-up with the MPO, Fire and Rescue, City Engineering, and the design team.
    - Intersection improvement recommendations
        - Intend to increase capacity at intersections.
    - Reminded the group regarding the notations on the plans about the right-of-way
    - Recommending street lighting
        - Wes Bay will provide contact information for BHE.
- Stakeholder coordination
    - The second public meeting was held March 22, 2022, at Rossman Elementary School from 5:30 PM to 7:00 PM.
        - The meeting included a presentation with slides, a question and answer session, and display boards.
        - A summary of the presentation, discussion, and comments was presented.
    - The design team will continue to reach out to stakeholders.
    - The project will be presented to the MPO Technical Committee and MPO Citizens' Advisory Committee on May 25, 2022.
    - The project was also presented to the MPO Policy Committee on March 23, 2022

Action Items

- MPO will conduct an additional model run to evaluate "RTP" and "RTP with development" with Walterscheid modeled as a 3-lane roadway

- MPO will provide information on the road classification used for Walterscheid for each model run.

Schedule and Upcoming Meeting

- Coordination meeting with MPO, Fire and Rescue, City Engineering, TBD.
- Steering Committee Meeting: May 17, 2022, 8:30 AM, anticipated for 1.5 hours.

MEETING MINUTES

May 26, 2022
Via Teams®

Participants

- Cheyenne MPO – Tom Mason, Christopher Yaney, and Ginni Stevens
- BenchMark Engineers – Erin Gates
- FHU – Lyle Devries and Faith Kelley
- GLM Design – Gene MacDonald
- WYDOT – Taylor McCort
- City of Cheyenne – Tom Cobb, Charles Bloom, and Vicki Nemecek
- Laramie County Public Works – Molly Bennett
- Cheyenne Fire and Rescue – Byron Mathews
- Not in attendance:
  - Cheyenne BOPU
  - South Cheyenne Water and Sewer District

Discussion

- Changes to Steering Committee:
  - Ginni Stevens is new Senior Transportation Planner with the MPO
- Project Update
  - Design team has reviewed the comments from the preliminary submittal. There are a few to review, clarify, or address:
    - ADA ramps will be properly aligned.
    - Additional rights-of-way will be noted.
    - Modeling is being completed for fire trucks if the intersection at Fox Farm is a roundabout.
    - Drainage concerns between College and Sta 18+00. This project will improve drainage.
    - Considerations of elevation differences. Separate greenway/sidewalk can help with grade differences. This project will not produce preliminary grading plans.
    - Verified LCSD1's limits for providing transportation.
    - Verified the year of expenditure for the project identified in the Connect 2045 Master Transportation Plan.
    - Verified the status of the Division/Wallick project in the 2022WYDOT STIP. Is there an update or status report for the Division/Wallick project?
    - Verify who provides snow removal. Plan will note the city provides snow and ice control, and not snow removal.
    - Plan will note how the road was dedicated in public right-of-way.
    - Has the city's surveyor looked into the easement documents for the WAPA lines?
  - Work in progress
    - Traffic forecasting
      - Prior modeling was for Walterscheid as a 5-lane road, recommendation is for 3-lane. Modeling has been updated for 3-lane since the model assigns traffic based on number of lanes. Results show forecasted volumes are lower. Design team will use the RTP plus development scenario and will adjust the forecast volumes.
      - Team will also look at intersections with the revised volumes, particularly if a signal is warranted at Jefferson and if right turn lanes are warranted.
      - City Engineering will provide the traffic study for the proposed McDonalds at South Greeley Highway and Jefferson to the design team.

        - A change order may be warranted for the additional analysis. The design team will look into this. This work may be a sensitivity analysis.
    - Fox Farm intersection
        - Design team looked at all-way stop, signalized, and roundabout.
        - This is a multi-criteria decision: level of services, utilities, rights-of-way, construction costs, maintenance costs, proximity to fire station, etc. The design team will develop a matrix to assist in the recommendation for the intersection.
        - City Engineering concerns include emergency services, pre-emption, navigation of the intersection, and utilities.
        - City Fire and Rescue is leaning toward signalization based on experience.
        - There are concerns with local drivers not understanding how to navigate roundabouts when emergency vehicles are present. There is a possibility of including instruction signage. There are concerns with additional wear and tear on vehicles due to the curb apron. It appears the minimum curb height for the apron is 1" with significant pavement color differences. A third tier further inside the circle could also be constructed that is higher.
        - Consider a new approach into the fire station on the west side of the property.
    - Finalizing drainage report and recommendations
        - Design team is finalizing pipe sizing and inlet locations. The improvements will reduce the peak flows with the proposed system.
        - Not directly related to this project: property at 200 Walterscheid has an erosion problem due to material from the ditch. The existing fence is buried about half its height. Curb and gutter and landscaping could help this. There is no need for stormwater detention for this project on this private property.
- Additional items for discussion
    - Should a sidewalk be included on the east side between Deming and Fox Farm. There are significant elevation differences between the back of curb and existing grade. The recommendation for no pedestrian facilities in this specific area will be carried forward.
    - WYDOT has a project for College Drive from I-25 to Campstool. The design team will reach investigate this further.
- Stakeholder coordination
    - The project was be presented to the MPO Technical Committee and MPO Citizens' Advisory Committee on May 25, 2022.

Action Items

- A small group meeting (design team, MPO, City Engineering, and City Fire) will be held June 10, 2022, to discuss the Fox Farm intersection. Primary items for consideration will be operations and navigation.
- Design team will look at budget and check need for contract amendment for additional analysis.

Schedule and Upcoming Meeting

- Coordination meeting with MPO, Fire and Rescue, City Engineering, TBD.
- Steering Committee Meeting: June 30, 2022, 3:30 PM, anticipated for 1.5 hours.

MEETING MINUTES

June 30, 2022
Via Teams®

Participants

- Cheyenne MPO – Tom Mason, Christopher Yaney, and Ginni Stevens
- BenchMark Engineers – Erin Gates
- FHU – Lyle Devries
- WYDOT – Taylor McCort
- City of Cheyenne – Tom Cobb
- Cheyenne BOPU – Bryce Dorr
- Cheyenne Fire and Rescue – Byron Mathews
- Not in attendance:
  - GLM Design
  - City Planning and Public Works
  - Laramie County Public Works
  - South Cheyenne Water and Sewer District

Discussion

- Project Update
  - Items to be addressed in the plan
    - Ownership and maintenance of storm sewer improvements to be resolved later.
    - WAPA easements, the city is still looking into. If not verified during this project, will be noted to be included with the recommended boundary survey.
    - Intersection at Deming needs additional auxiliary lanes. Previously, it was recommended to have signalization or become a roundabout. Signalization needs westbound left and right, northbound right, and southbound left lanes. Roundabout closes W. 4th Street: residential and business would only have access from Thomes via 5th, also limits access to 409 W. 4th from 4th Street only and closes the partial alley south of 409 W. 4th. A suggestion was made that 4th Street and the alley be closed if the intersection is signalized. A question was asked regarding changes to the distribution of trucks with the modifications at 5th. The roundabout option helps the intersection with better operation for westbound left and operational movements. A signal is the least favorable option for operations. Current turn lanes are adequate, the northbound could be lengthened. A question was asked regarding a year or volume when a roundabout could be recommended. Such a recommendation may be based on the westbound left turn que and delay and could be a later phase of the improvements to the corridor. Crashes are not a significant issue. Speeding is more of an issue and roundabouts can help with speeding. It was recommended the intersection remain as is and for the city to re-analyze after the 5th bridge is completed. The design team will continue to gather feedback from the MPO on this intersection.
    - A decision matrix has been developed for the intersection at Fox Farm. A WB-60 vehicle can navigate the roundabout, however future design phases should refine the splitter islands, lane widths, etc. The curb height should be reduced along the inner circle, the slope of the apron will be appropriate for accommodate large vehicles. A small group discussed this intersection a few weeks ago and the two options. The design team was instructed to keep progressing on the decision matrix and the costs. Maintenance costs that were shown were from the WRD feasibility analysis. These will be updated and for 25-year life. It was noted the roundabout should operate better than the signal during

off-peak hours. The MPO requested the design team's recommendation. All the data will be included in the plan.

- Work in progress
  - Traffic forecasting is being finalized and is anticipated to include recommendations for right turn lanes at most intersections. The traffic operations report is being finalized with the revised modeling. The 5-lane modeling data will be included in the appendix of the report.
  - The drainage modeling, report, and recommendations are being finalized and incorporated into the design plans. The proposed improvements will connect to existing infrastructure as much as reasonably possible.

- Additional items for discussion
  - The amendment for additional work will be at the Finance Committee on July 5th and finalized on July 11th.

Schedule and Upcoming Meeting

- Steering Committee Meeting: August 30, 2022, 10:00 AM.

MEETING MINUTES

August 17, 2022
Via Teams®

Participants

- Cheyenne MPO – Tom Mason, Christopher Yaney, and Ginni Stevens
- BenchMark Engineers – Erin Gates
- FHU – Lyle Devries, Faith Kelly
- WYDOT – Taylor McCort
- City Public Works – Vicki Nemecek
- City of Cheyenne – Tom Cobb
- Cheyenne BOPU – Bryce Dorr
- Cheyenne Fire and Rescue – Byron Mathews
- Not in attendance:
  - GLM Design
  - City of Cheyenne Planning
  - Laramie County Public Works
  - South Cheyenne Water and Sewer District

Discussion

- Project Update
  - Items to be addressed in the plan
    - Deming – Walterscheid intersection. FHU noted the existing turn lanes are short and the intersection currently operates at an acceptable level of service during peak conditions. The 2045 forecast anticipates traffic volumes to be approximately double with a LOS of F during peak times. The que will increase to nearly 400' and 2-3 minute wait for westbound traffic. Forecasted peak hour volumes are just short of the criteria to warrant a signal. There are no defined warrants for roundabouts, as that is a multi-criteria decision. Roundabouts can also provide traffic calming. A roundabout will be recommended for future installation in the plan. This could be 2030 to 2035. However, the modeling should be updated and monitored following the completion of the signal and bridge at 5th to verify if any traffic is diverted from this intersection. With a roundabout, 4th Street will dead end; a cul-de-sac was recommended, and nearby accesses will be affected by this closure/dead end.
    - Fox Farm – Walterscheid intersection. A smaller group discussed the intersection options and worked toward an idea of signalized preemption on the north, east, and south approaches. BME and City Engineering have reached out to Black Hills Energy for additional information regarding utilities in the intersection without response. BME looked to the MUTCD regarding traffic control signals and hybrid beacons for emergency vehicle access. The design team found a few examples of fire stations around near roundabouts. City Fire and Rescue understands the challenge of 3-way preemption. An example in Lakewood, Colorado is a reasonable approximation, however a question regarding the response type from this station was asked. City Engineering feels specific questions and solutions to preemption can be answered and resolved during the design of the intersection. It was determined the best solution for the intersection is a roundabout. The design team presented an update to the decision matrix for this intersection. The cost estimate extends from the intersection to locations where the typical cross section would be in place. Right-of-way impacts on the southeast quadrant are noted in the decision matrix and may impact the hotel's parking. The design team has

not contacted property owners at the intersection where additional rights-of-way are needed. With either intersection, the east approach into the fire station will be closed, a new approach to the west will be constructed, a hammerhead will be installed in the east parking.
    - BOPU has no additional items for inclusion.
  - Work to finalize
    - The design team will finalize the traffic operations report, drainage report, plans, cost estimate, etc.

Schedule and Upcoming Meeting

- Design team anticipates submitting final plan for MPO review by September 14th to meet the schedules for the Technical Committee, Citizens' Advisory Committee, and Policy Committee. The MPO anticipates this will be at the 2nd City Planning Commission Meeting in October and will go to the County Planning Commission as well.
- The Steering Committee may not meet again but can track the progress through the various committees and meetings.

Appendix I

Resolutions

BME

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