



November 6, 2024

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City of Billings Public Works Department
2224 Montana Avenue
Billings, MT 59101

Reference: Tract 1 of Certificate of Survey 3894 Concept Design/Zone Change -
Traffic Analysis Letter
Project No. 82061.154

Dear Dakota:

The purpose of this letter is to provide a traffic generation update for the projected zone change of Tract 1 of Certificate of Survey 3894 in Billings, Montana. The 53.3-acre site was originally zoned as a Suburban Neighborhood (N3) and the proposed change is to a combination of Mixed Residential (NX3 and NX1), First Neighborhood (N1), Mixed-Use (CMU1), and Parks and Open Space (P1). The proposed zoning plan is presented in Figure 1 (attached).

The 2023 City of Billings Long Range Transportation Plan (LRTP) provides existing and proposed roadway functional classifications for roadways throughout Billings. Gleneagles Boulevard, Annandale Road, and High Sierra Boulevard are major roadways surrounding the site. The City of Billings LRTP existing and proposed roadway functional classifications for major roadways surrounding the site are also presented in Figure 1 of the attachments.

Trip Generation

The trip projection analysis utilized Trip Generation, 11th Edition, published by the Institute of Transportation Engineers (ITE), which is the most widely accepted source for determining trip generation projections. Land Use 210 - Single-Family Detached Housing was used to estimate trip generation with the existing N3 zoning. This land use and unit density were determined based on similar, already developed areas in Billings with N3 zoning. Trip generation projections for Tract 1 of Certificate of Survey 3894 with the current N3 zoning are presented in Table 1 on the following page.

Table 1: Trip Generation - Current Zoning

Land Use	Independent Variable		Average Weekday			AM Peak Hour			PM Peak Hour		
	Intensity	Units	total	enter	exit	total	enter	exit	total	enter	exit
Single-Family Detached Housing ¹	190	Dwelling Units	1792	896	896	133	33	100	179	113	66
Full Buildout New External Trips			1792	896	896	133	33	100	179	113	66

(1) Single-Family Detached Housing - Land Use 210* Units = Dwelling Units
 Average Weekday: Average Rate = 9.43 (50% entering/50% exiting)
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.70 (25% entering/75% exiting)
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.94 (63% entering/37% exiting)

*Trip Generation, 11th Edition, Institute of Transportation Engineers, 2021

The new zoning areas for the development are listed as follows: 14.23 acres as NX3, 26.34 acres as NX1, 8.92 acres as N1, 3.08 acres as CMU1, and 0.68 acres as P1. Land Use 220 – Multifamily Housing (Low-Rise), Land Use 215 – Single-Family Attached Housing, Land Use 210 – Single-Family Detached Housing, and Land Use 822 – Strip Retail Plaza (<40k) were used to estimate trip generation for the proposed NX3, NX1, N1 and CMU1 zoning, respectively. These land uses and unit density were determined based on similar, already developed areas in Billings with NX3, NX1, N1, and CMU1 zoning. Trips generated from the proposed P1 zoning would be negligible due the size of the proposed area, therefore, no land use was assigned for that zone. Internal Capture and pass-by trips were calculated where applicable and removed from total gross trips to find the total external trips. Internal capture trips do not have origins or destinations external to a project site, so they do not have an impact on external traffic operations. Pass-by trips are attracted from traffic “passing by” on an adjacent street that offers direct access to the site. Trip generation projections for Tract 1 of Certificate of Survey 3894 with the proposed zoning change are presented in Table 2 on the following page.

The proposed zone change would represent an increase in trip generation of 3,775 average weekday external trips, with an addition of 222 trips during the AM peak hour and 283 trips during the PM peak hour. New external weekday vehicle trips were assigned to adjacent roadways.

Table 2: Trip Generation - Proposed Zoning

Land Use	Independent Variable		Average Weekday			AM Peak Hour			PM Peak Hour		
	Intensity	Units	total	enter	exit	total	enter	exit	total	enter	exit
Multifamily Housing (Low-Rise) ¹	332	Dwelling Units	2238	1119	1119	133	32	101	169	106	63
Internal Capture Trips**			79	47	32	2	1	1	10	7	3
Single-Family Attached Housing ²	300	Dwelling Units	2160	1080	1080	144	36	108	171	101	70
Internal Capture Trips**			77	46	31	2	1	1	10	7	3
Single Family Detached Housing ³	80	Dwelling Units	754	377	377	56	14	42	75	47	28
Internal Capture Trips**			27	16	11	1	0	1	4	3	1
Strip Retail Plaza (<40k) ⁴	20	1000 SF GFA	1089	545	544	47	28	19	132	66	66
Internal Capture Trips**			183	74	109	5	3	2	24	7	17
Pass-By Trips** (Avg. Rate = 34%)			308	160	148	15	9	6	37	20	17
Total Buildout Gross Trips			6241	3121	3120	380	110	270	547	320	227
Total Buildout Internal Capture Trips			366	183	183	10	5	5	48	24	24
Total Pass-By Trips			308	160	148	15	9	6	37	20	17
Total Buildout New External Trips			5567	2778	2789	355	96	259	462	276	186

- (1) Multifamily Housing (Low-Rise) - Land Use 220*
 Units = Dwelling Units
 Average Weekday: Average Rate = 6.74 (50% entering/50% exiting)
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.40 (24% entering/76% exiting)
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.51 (63% entering/37% exiting)
- (2) Single-Family Attached Housing - Land Use 215*
 Units = Dwelling Units
 Average Weekday: Average Rate = 7.20 (50% entering/50% exiting)
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.48 (25% entering/75% exiting)
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.57 (59% entering/41% exiting)
- (3) Single-Family Detached Housing - Land Use 210*
 Units = Dwelling Units
 Average Weekday: Average Rate = 9.43 (50% entering/50% exiting)
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.70 (25% entering/75% exiting)
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.94 (63% entering/37% exiting)
- (4) Strip Retail Plaza (<40k) - Land Use 822*
 Units = 1000 SF GFA
 Average Weekday: Average Rate = 54.45 (50% entering/50% exiting)
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 2.36 (60% entering/40% exiting)
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 6.59 (50% entering/50% exiting)

*Trip Generation, 11th Edition, Institute of Transportation Engineers, 2021

**Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, 2017

ADT Comparison

Sanbell collected ADT data on September 10-12, 2024, to analyze the impact on roadways and intersections due to the proposed zoning change. The data was collected on Gleneagles Boulevard and High Sierra Boulevard using Houston Radar Stats Analyzer.

The ADTs counted by the radar data collection devices for High Sierra Boulevard and Gleneagles Boulevard were 1,330 and 3,953 vehicles, respectively, as shown in the attached Figure 2. MDT's traffic count stations on High Sierra Boulevard and Gleneagles Boulevard just north of Wicks Lane collected 2023 annual average daily traffic (AADT) volumes of 2,170 vehicles on High Sierra Boulevard and 4,240 vehicles on Gleneagles Boulevard. The location of the High Sierra Boulevard radar device for

this study was placed north of Skyview High School so that school traffic was not captured, which explains the decrease in volumes in comparison to the MDT volumes.

Average weekday trip generation values were added to existing ADTs collected for this study to determine future volume projections on High Sierra Boulevard and Gleneagles Boulevard. The resulting Existing + Site volumes are 3,218 vehicles on High Sierra Boulevard and 5,840 vehicles on Gleneagles Boulevard. These values are also shown in Figure 2 (attached). The City of Billings LRTP projects a 2045 AADT of less than 3,000 vehicles on High Sierra Boulevard. The addition of the new zoning trips does make High Sierra Boulevard exceed the future volume expectation, but it is still well below the 12,000 vehicles theoretical capacity for a two-lane road. With the proposed development adjacent to High Sierra Boulevard, its future volumes will inevitably increase beyond the LRTP projection. Gleneagles Boulevard is projected to experience a 2045 AADT in the 3,001 to 10,000 vehicles range. With the addition of the new zoning trips, Gleneagles Boulevard is still within the future projected volume range and below the theoretical capacity of two-lane roads.

Speed Data

Speed data was also collected on September 10-12, 2024, using Houston Radar Stats Analyzer. Data was collected on High Sierra Boulevard between Siesta Avenue and El Rancho Drive and on Gleneagles Boulevard between Wicks Lane and Pebble Beach Road.

The posted speed limit on Gleneagles Boulevard is 35 mph, and High Sierra Boulevard is 25 mph. The speeds at which 50 percent and 85 percent of traffic are observed to travel at or below during free-flow conditions (50th percentile and 85th percentile speeds) were collected in addition to the 10-mph pace of the traffic stream. These values are illustrated in Table 3 below. The 50th and 85th percentile speeds are often used to help establish appropriate speed limits.

Table 3: Speed Data

Location	50th Percentile Speed	85th Percentile Speed	Pace of Traffic Stream
35-mph Speed Zone - NB & SB			
Gleneagles Boulevard	31-mph SB	35-mph SB	(26-mph - 36-mph)
280-ft N of Siesta Avenue	30-mph SB	34-mph SB	(25-mph - 35-mph)
25-mph Speed Zone - NB & SB			
High Sierra Boulevard	28-mph NB	33-mph NB	(24-mph - 34-mph)
800-ft N of Wicks Lane	30-mph SB	34-mph SB	(25-mph - 35-mph)

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The 50th and 85th percentile speeds collected on Gleneagles Boulevard did not exceed the posted speed limit of 35 mph, and the average pace was 25-35 mph. This data suggests the posted speed limit is adequate for Gleneagles Boulevard.

All 50th and 85th percentile speeds collected on High Sierra Boulevard exceeded the posted speed limit of 25 mph, and the average pace was 25-35 mph. This data suggests that increased enforcement of the 25-mph speed limit may be necessary on High Sierra Boulevard. Traffic calming measures such as curb bulb outs at intersections, raised intersections or crosswalks, speed humps, and/or narrower lanes could also be implemented to reduce speeds on High Sierra Boulevard.

Conclusion

The projected zone change of Tract 1 of Certificate of Survey 3894 from N3 to NX3, NX1, N1, CMU1, and P1 is expected to result in a large increase in traffic demand but is not anticipated to exceed roadway capacities. Projected volumes from the 2023 LRTP are projected to be exceeded on High Sierra Boulevard but remain within the anticipated range on Gleneagles Boulevard.

Please feel free to contact me at 406-922-4306 or jstaszczuk@sanbell.com if you have any questions or would like to discuss this further.

Sincerely,



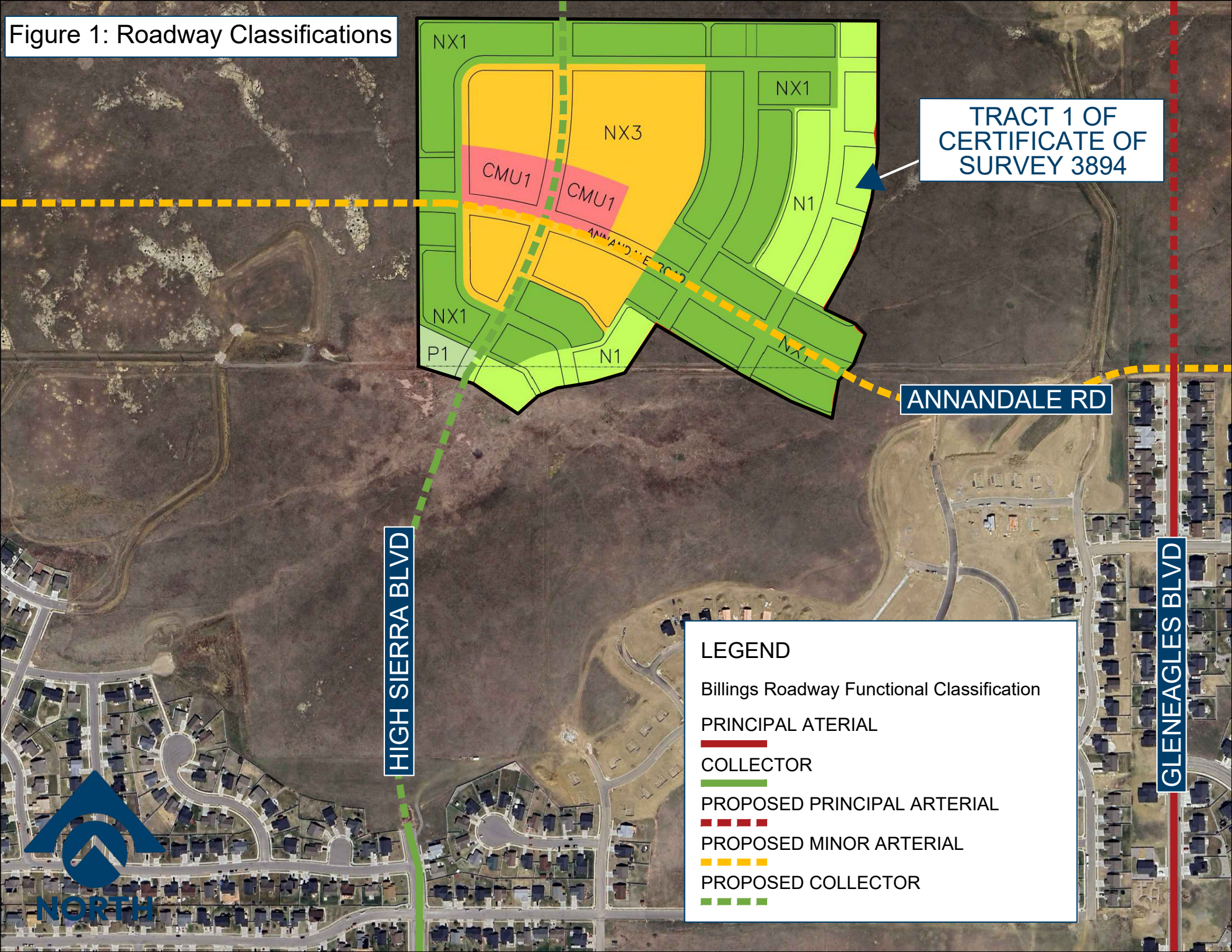
Joey Staszczuk, PE, PTOE, RSP1
Senior Engineer | Community Transportation Studio Manager

KRK/ars/roft/jhs

Enc:
Roadway Classification Figure
Traffic Volumes Figure

P:82061.154_High_Sierra_II_Zone_Change_and_Concept_11.6.2024

Figure 1: Roadway Classifications



TRACT 1 OF
CERTIFICATE OF
SURVEY 3894

ANNANDALE RD

HIGH SIERRA BLVD

GLENEAGLES BLVD

LEGEND

Billings Roadway Functional Classification

PRINCIPAL ATERIAL

COLLECTOR

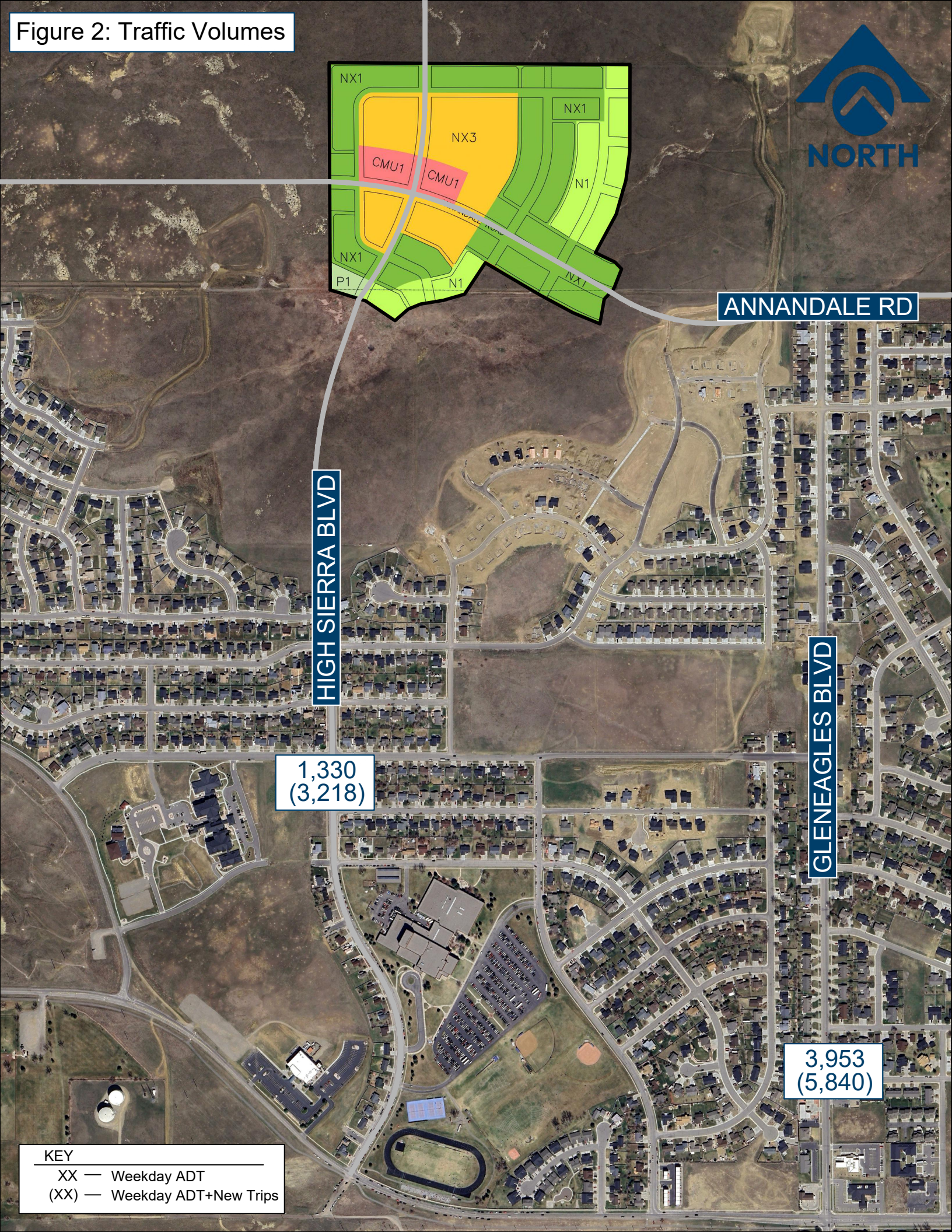
PROPOSED PRINCIPAL ARTERIAL

PROPOSED MINOR ARTERIAL

PROPOSED COLLECTOR



Figure 2: Traffic Volumes



ANNANDALE RD

HIGH SIERRA BLVD

GLENEAGLES BLVD

1,330
(3,218)

3,953
(5,840)

KEY

XX	Weekday ADT
(XX)	Weekday ADT+New Trips