Hexagon Transportation Consultants, Inc.

Memorandum

Date: September 21, 2016

To: Tiffany Brown, City of Morgan Hill

From: Gary Black

Subject: Transportation, Land Use and Construction Impact Analysis of HSR

WORKSHOP
AGENDA DATE: 09/21/16
SUPPLEMENTAL # 2

Hexagon Transportation Consultants, Inc. has reviewed the proposed three alignment design options for the High Speed Rail (HSR) project through Morgan Hill, California. The three alignment options are described as follows and also shown on Figure 1:

- **Option 1**: The proposed high speed rail tracks would run through the downtown area at-grade. Monterey Road would need to be realigned north of Cochrane Road. Railroad Avenue would need to be realigned between San Pedro Avenue and Maple Avenue. All of the streets that currently cross the Caltrain/UP tracks at-grade would need to be rebuilt as underpasses.
- **Option 2**: The proposed high speed rail tracks would be elevated through the downtown area. Monterey Road and Railroad Avenue would need to be realigned as described in Option 1. All of the streets that currently cross the Caltrain/UP tracks at-grade would remain as is.
- **Option 3**: The proposed high speed rail tracks would by-pass the downtown area and be elevated to run parallel to US 101 on the west side of US 101.
- **Option 4**: The proposed high speed rail tracks would by-pass the downtown area and be elevated to run parallel to US 101 on the east side of US 101.

Hexagon evaluated each design option and identified their land use impacts, transportation impacts, and construction impacts. Option 4 would have the same type of impacts as Option 3 but would be more expensive to build because the HSR tracks would need to cross US101 in two places. Therefore, this paper focuses on Option 3 as the more viable US 101 alignment.

Land Use Impacts

Under each proposed alignment design option, different numbers of properties would need to be acquired for the right-of-way of the high speed rail tracks when it runs at-grade level or for the columns required every 200 feet when the high speed rail track is elevated.

Option 1

With Option 1, the high speed rail tracks are proposed to run through the Morgan Hill downtown area at-grade parallel to, and immediately east of, the existing Union Pacific railroad tracks. A 70-foot right-of-way would need to be acquired adjacent to the existing Union Pacific right-of-way, which would affect most of the properties along the east side of the alignment (see Figures 2a, 2b, and 2c). Currently, Monterey Road runs directly adjacent to the Union Pacific railroad tracks north of Cochrane Road. With the 60 feet right-of-way for the proposed high speed rail tracks, this section of Monterey Road would need to be realigned, and all the properties along the revised alignment

would need to be acquired. Railroad Avenue south of San Pedro Avenue would also need to be realigned, and the properties long the revised alignment would need to be acquired.

Under Option 1, all existing at-grade street crossings of the UP and HSR tracks would be made into underpasses. The following streets in Morgan Hill would be depressed to go under the tracks:

- Main Avenue
- East Dunne Avenue
- San Pedro Avenue
- Tennant Avenue

The following streets that intersect these streets would also need to be partially depressed to maintain their connections or cul-de-saced: Depot Street, Church Street, and possibly McLaughlin Avenue. E. Middle Avenue is planned to be elevated over the tracks. The Butterfield Boulevard overpass would also need to be widened in order to provide enough space for the at-grade HSR tracks.

Either depressing or elevating streets affects the driveway connections of the surrounding properties. As an example, Figure 3 shows an illustration of the proposed underpass at Main Avenue between Monterey Road and Butterfield Boulevard. Figure 4 shows the additional properties and driveways that would be affected by the depressed section along Main Avenue. These affected properties would either be acquired, or their driveways would need to be regraded or removed.

Option 2

Under alignment design Option 2, the high speed rail track is proposed to run through the Morgan Hill downtown area with the same alignment as Option 1 but with the track being elevated. Therefore, all of the cross streets would remain as is. The UP railroad crossings would remain at-grade. The elevated high speed rail track would require one column every 200 feet. Therefore, the same property acquisition as Option 1 would be required for the alignment. Monterey Road would need to be relocated north of Cochrane. No underpasses are required for this option, and the Butterfield Boulevard overcrossing would not need to be widened.

Options 3 and 4

Under alignment Option 3, the high speed rail tracks would bypass the majority of Morgan Hill developed land. The rail tracks would be elevated and would run adjacent to US 101 (see Figures 5a and 5b for Option 3; Figures 6 for Option 4). Under both Options 3 and 4, properties along the alignment would also need to be taken because of the required columns every 200 feet. However, the land is generally less developed.

Transportation Impacts

Option 1

The impacts of each alignment option would be different on the Morgan Hill transportation system with the build-out of the high speed rail project. Under Option 1, the transportation system of Morgan Hill would benefit by the elimination of at-grade railroad crossings in the downtown area. The HSR preliminary design shows Tilton Avenue to be cul-de-saced and the connection to Monterey Road eliminated. This is not in conformance with the Morgan Hill General Plan, which calls for Tilton Avenue to be connected to Burnett Avenue. An overpass or underpass will be needed, as will a connection to the realigned Monterey Road. A The preliminary HSR design shows

the GP planned extension of Madrone Parkway to Hale Avenue with a connection to the realigned Monterey Road.

Option 2

Option 2 would have the same planned extension of Madrone Parkway and would need to also include the planned Tilton Avenue connection to Burnett Avenue. All of the at-grade crossings between the east-west streets and the Union Pacific railroad tracks would remain as is. While Monterey Road and Railroad Avenue would be realigned, their connectivity and function would remain the same. Thus, Option 2 would benefit the Morgan Hill transportation system by adding the new connection between Monterey Road and Hale Avenue at Madrone Parkway.

Options 3 and 4

Options 3 and 4would not result in any changes to the Morgan Hill motor vehicle transportation system. The space under the elevated tracks would provide an opportunity for a multiple-use trail for pedestrians and bicyclists. The City would need to work with the HSR Authority to design the crossings of the possible trail at the interchanges. At-grade crossings would not be safe, so the crossings will need to be under- or over-passes.

Construction Impacts

Construction of the HSR tracks would impact the Morgan Hill transportation system including street closures, lane closures, sidewalk closures, railroad crossing closures, and detours. The main impacts under each design option are described as follows:

Option 1

With Option 1, Monterey Road north of Cochrane Road would need to be realigned, which might result in closure of Monterey Road during construction. Currently, only Monterey Road and US 101 run directly through Morgan Hill. US 101 is already congested during peak times under existing conditions. No widening of US 101 is planned. Table 1 shows the forecasted average daily traffic (ADT) and corresponding roadway level of service (LOS) at several locations along Monterey Road under Year 2035 General Plan conditions. Three out of eight segments along Monterey Road are projected to serve ADT equivalent to unacceptable LOS F.

Table 1
Year 2035 General Plan Conditions Monterey Road Segment Analysis

	Roadway Segment	2035 General Plan Condition	
		ADT [1]	LOS [2]
1	Monterey Road between Kirby Avneue and Tilton Avenue	30,872	**F**
2	Monterey Road between Peebles Avenue and Madrone Parkway	33,269	**F**
3	Monterey Road between Cochrane Road and Old Monterey Road	19,584	D
4	Monterey Road between Wright Avenue and El Toro Street	17,164	C
5	Monterey Road between 3rd Street and 4th Street	13,503	C
6	Monterey Road between San Pedro Avenue and Cosmo Ln	26,140	D
7	Monterey Road between Vineyard Boulevard and Watsonville Rd	26,985	D
8	Monterey Road between Starswept Ln and East Middle Avenue	29,446	**F**

Note:
Source: Morgan Hill 2035 General Plan Update.
1. ADT = Average two-way daily traffic.
2. LOS = Level of service based on daily volume planning thresholds. Peak hour traffic operations may be worse than shown for daily conditions.

The 2035 General Plan includes improvements to enhance north-south connectivity and relieve some of the pressure off of Monterey Road. The following improvements should be provided if Monterey Road is to be partially or completely closed during certain periods of construction.

- Extension of Hale Avenue/Santa Teresa Boulevard as a 2-lane arterial between Main Avenue and Spring Avenue.
- Extension of Murphy Avenue/Mission View Drive as a 2-lane multi-modal arterial between Half Road and Dianna Avenue.
- Realignment of DeWitt Avenue as a 2-lane arterial with Sunnyside Avenue
- Extension of Hill Road/Peet Road as a 2-lane collector between Half Road and Main Avenue.

Before any partial or complete closure of Monterey Road during construction, a detour plan should be prepared and submitted to the City for approval. The detour plan should show the proposed times of closure, the proposed detour routes, and the capacity of the detour routes to accommodate increased traffic during the times of closure.

Building underpasses on the east-west street crossings of the HSR tracks would also result in street closures. Table 2 shows the forecasted average daily traffic (ADT) and corresponding roadway level of service (LOS) on these east-west streets under Year 2035 General Plan conditions. Based on the forecasted average daily traffic on these streets under Year 2035 General Plan conditions, all of the streets would operate at LOS C or D. Therefore, it would not be possible to close more than one east-west street at a time.

Table 2
Year 2035 General Plan Conditions East-West Street Segment Analysis

	Roadway Segment	2035 General Plan Condition	
		ADT [1]	LOS [2]
1	Cochrane Road between Adams Ct and Woodview Avenue	27,597	D
2	West Main Street between Hale Avenue and Del Monte Street	6,693	C
3	East Dunne Avenue between Depot Street and Butterfield Boulevard	19,838	D
4	Tennant Avenue between Vineyard Boulevard and Railroad Avenue	17,164	C

Note:
Source: Morgan Hill 2035 General Plan Update.
1. ADT = Average two-way daily traffic.
2. LOS = Level of service based on daily volume planning thresholds. Peak hour traffic operations may be worse than shown for daily conditions.

Option 2

The construction of Option 2 would create the same issues with potential closure of Monterey Road and the need to provide alternative routes. Since the tracks would be elevated over the east-west cross-streets, it is not known whether the cross-streets would need to be closed for construction. If they would need to be closed, only one cross-street should be closed at a time.

Options 3 and 4

Under alignment Options 3 and 4, the high speed rail tracks would bypass the downtown area so there would not be any construction impacts to Monterey Road or the east-west cross-streets. However, there could be construction impacts to the three US101 freeway interchanges. Along US 101, the interchanges with Tennant Avenue, Dunne Avenue, and Cochrane Road provide access to most of the City of Morgan Hill. The level of service results under Year 2035 General Plan conditions show that the intersections at these three interchanges would operate at LOS D or better conditions (see Table 3). However, because of the importance of the interchanges for access to adjacent properties and the overall City of Morgan Hill, all three interchanges should be kept open during construction.

Table 3
Year 2035 General Plan Conditions Intersection Level of Services at US 101 Interchanges

	Roadway Segment	Peak Hour	2035 General Plan Condition	
			Delay (sec/veh)	LOS
1	US 101 SB Ramps and Dunne Avenue	AM	21.0	C
		PM	18.2	B
2	US 101 NB Ramps and Dunne Avenue	AM	12.9	B
		PM	14.7	B
3	US 101 SB Ramps and Tennant Avenue	AM	32.3	C
		PM	50.3	D
4	US 101 NB Ramps and Tennant Avenue	AM	12.9	B
		PM	11.3	B
5	US 101 SB Ramps and Cochrane Road	AM	14.4	B
		PM	21.1	C
6	US 101 NB Ramps and Cochrane Road	AM	13.6	B
		PM	13.1	B

Source: Morgan Hill 2035 General Plan Update.

Conclusions

As discussed above, with the build-out or during the construction process of the HSR tracks, each of the three proposed alignment options would have different impacts on the Morgan Hill transportation system and on the surrounding properties. Table 4 summaries these impacts of each option.

Table 4
Impacts Summary of the Proposed HSR Alignment Options

Alignment Options	Land Use Impacts	Transporation Impacts	Construction Impacts
Option 1 (Downtown at-grade)	- - - -	+ +	- - -
Option 2 (Downtown elevated)	- - -	+	- -
Options 3 (West of US 101 alignment)	- -	o	-
Options 4 (East of US 101 alignment)	-	o	-

Notes:
" - " represents negative impacts
" + " represents benefits
" o " represents no impacts

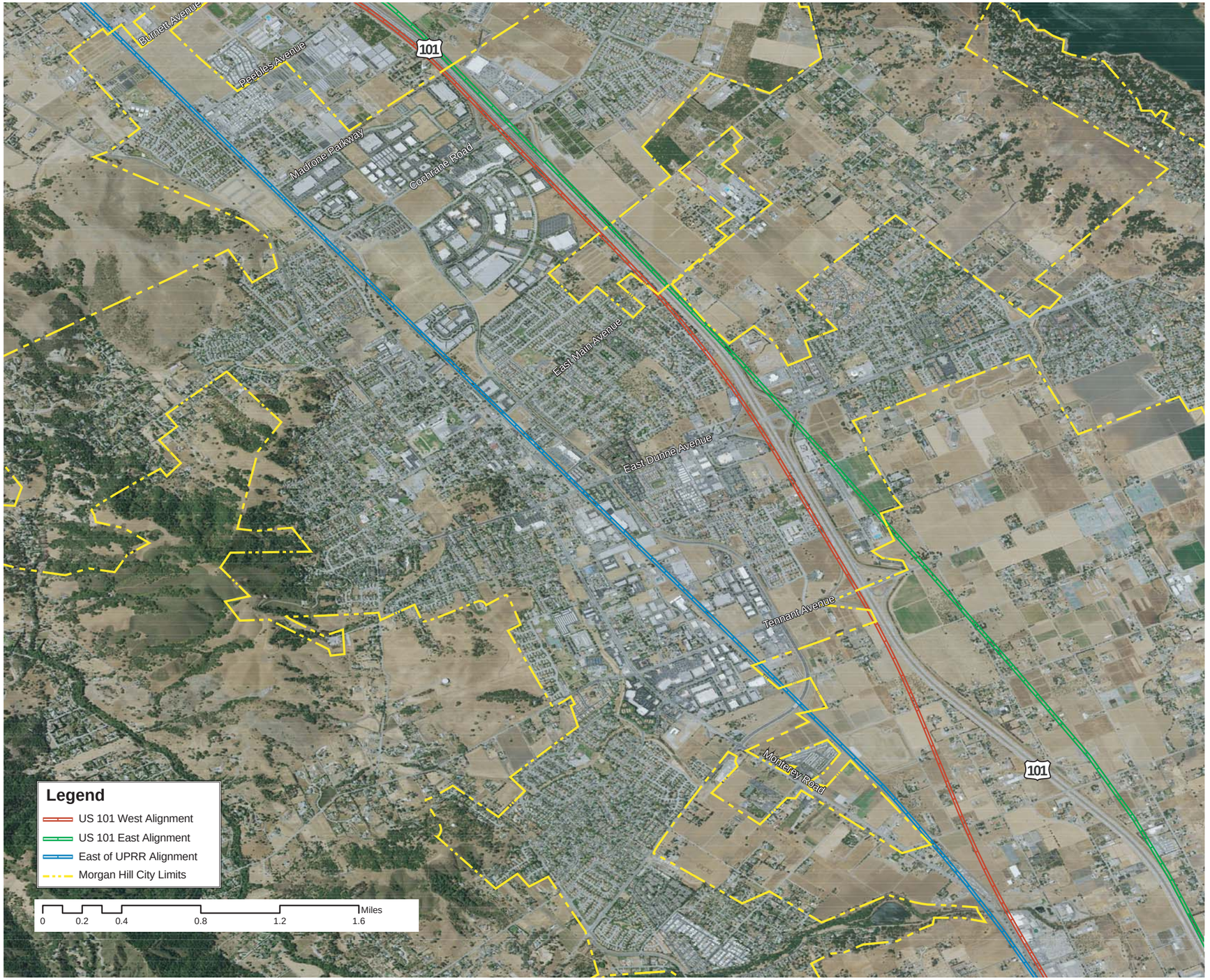

Figure 1
Alignment Options for the Proposed High Speed Rail Track

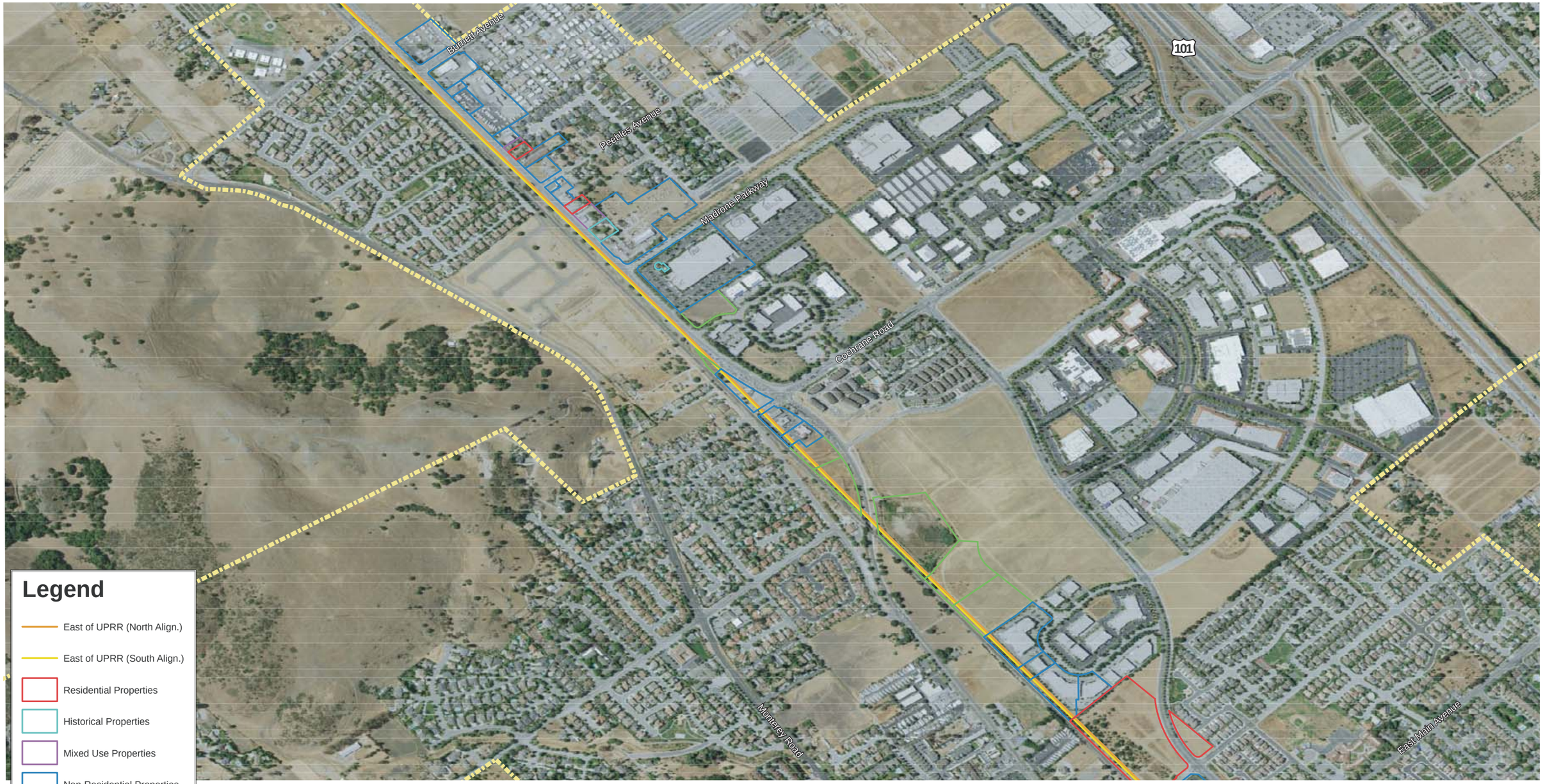

Figure 2a
Affected Properties by Option 1 (2) - East of UPRR Alignment

Figure 2b
Affected Properties by Option 1 (2) - East of UPRR Alignment

NORTH
Not to Scale

Figure 2c
Affected Properties by Option 1 (2) - East of UPRR Alignment

NORTH
Not to Scale

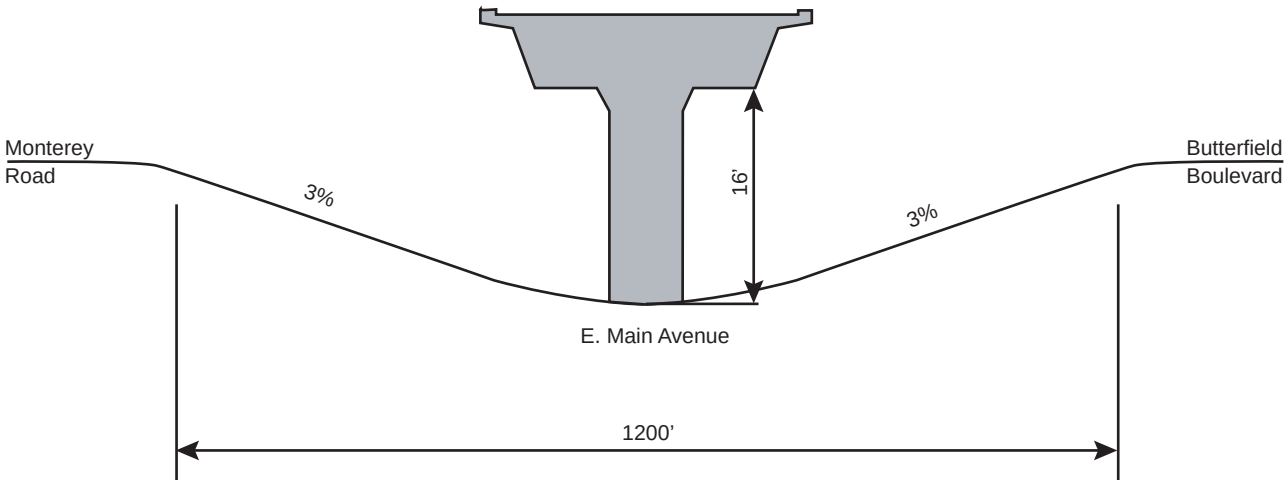

Figure 3
Proposed Underpass at Main Avenue

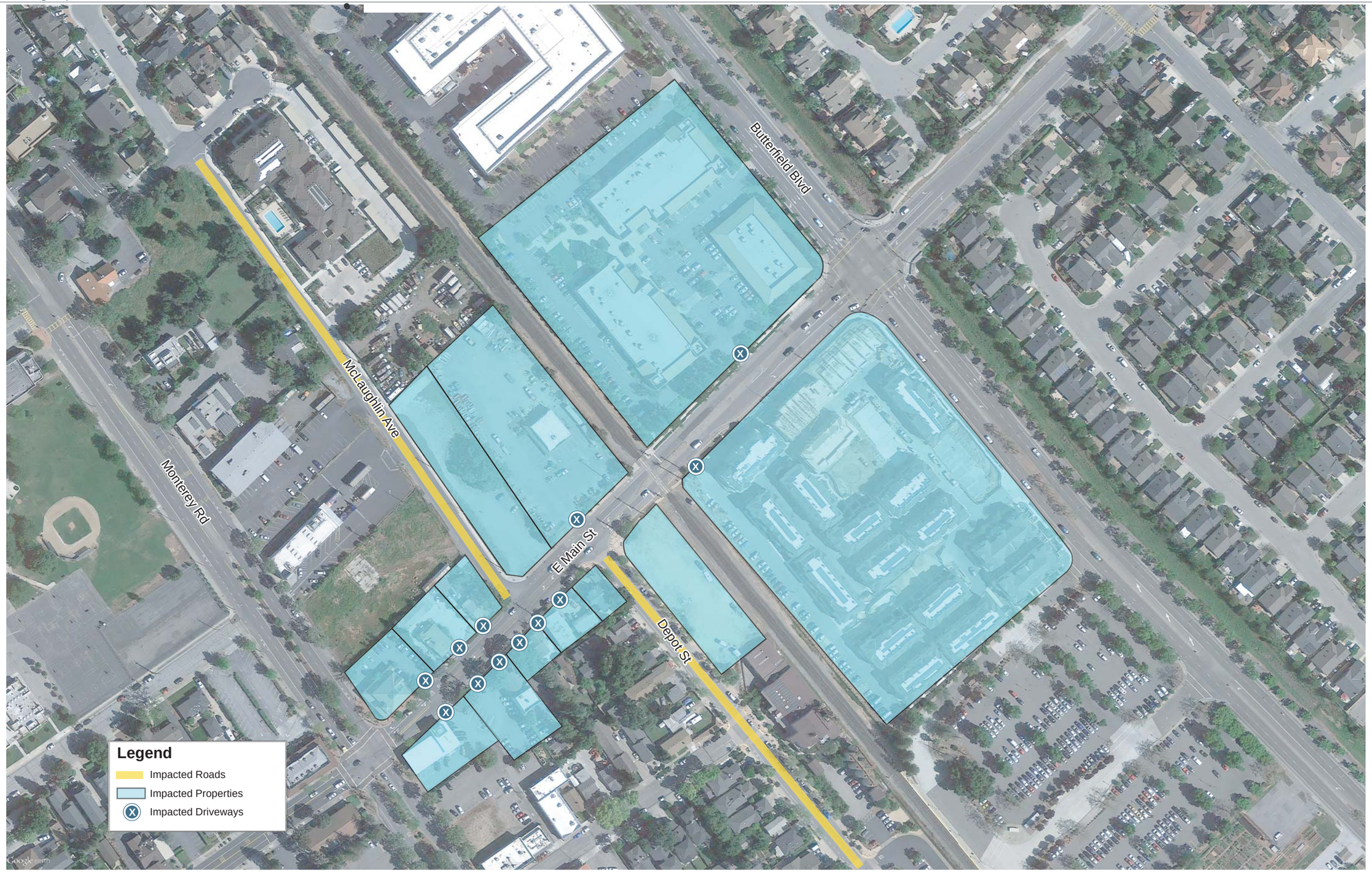

Figure 4
Affected Properties and their Driveways by the Proposed Underpass

NORTH
Not to Scale

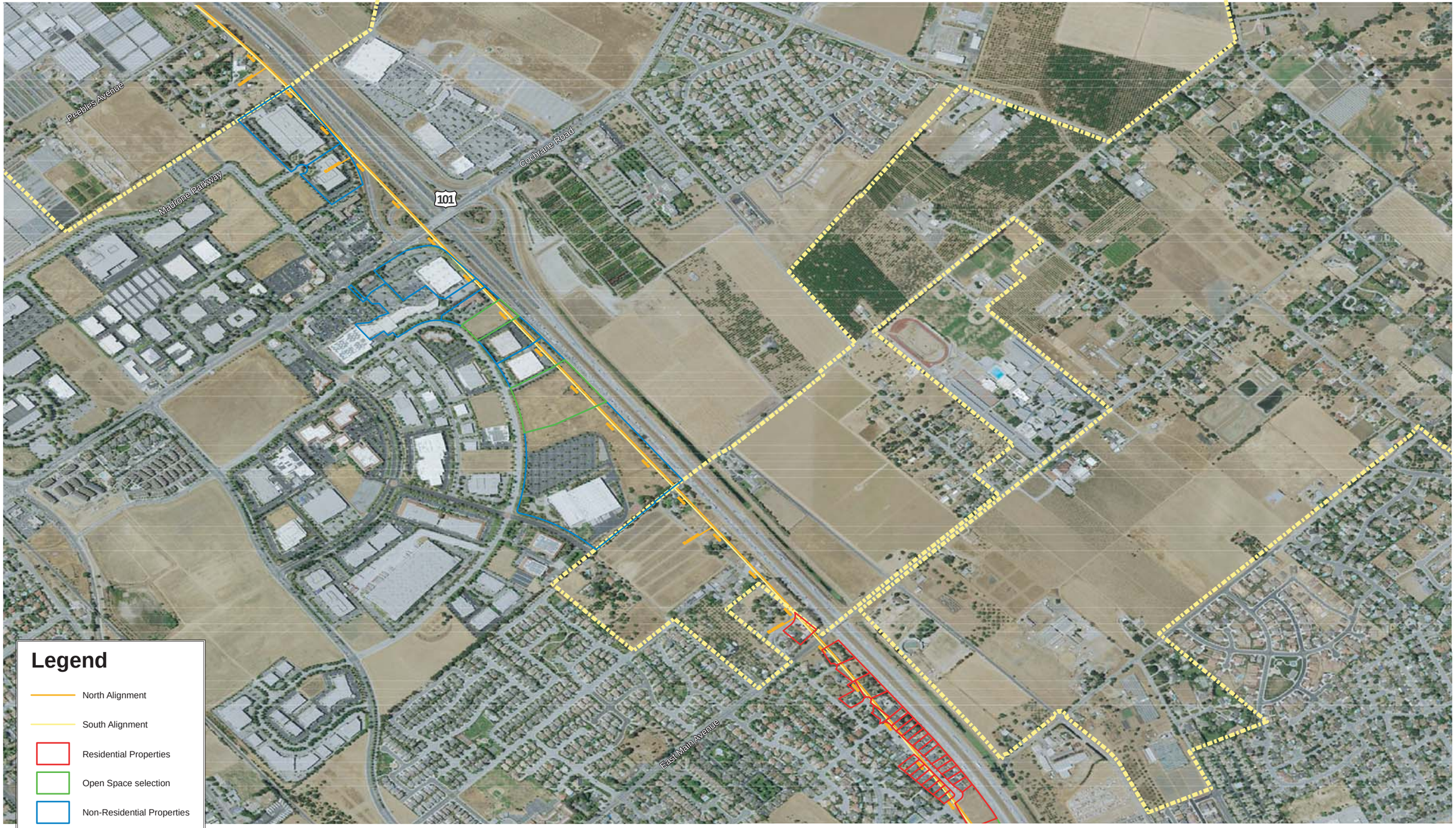

Figure 5a
Affected Properties by Option 3 - West of US 101 Alignment

Figure 5b
Affected Properties by Option 3 - West of US 101 Alignment

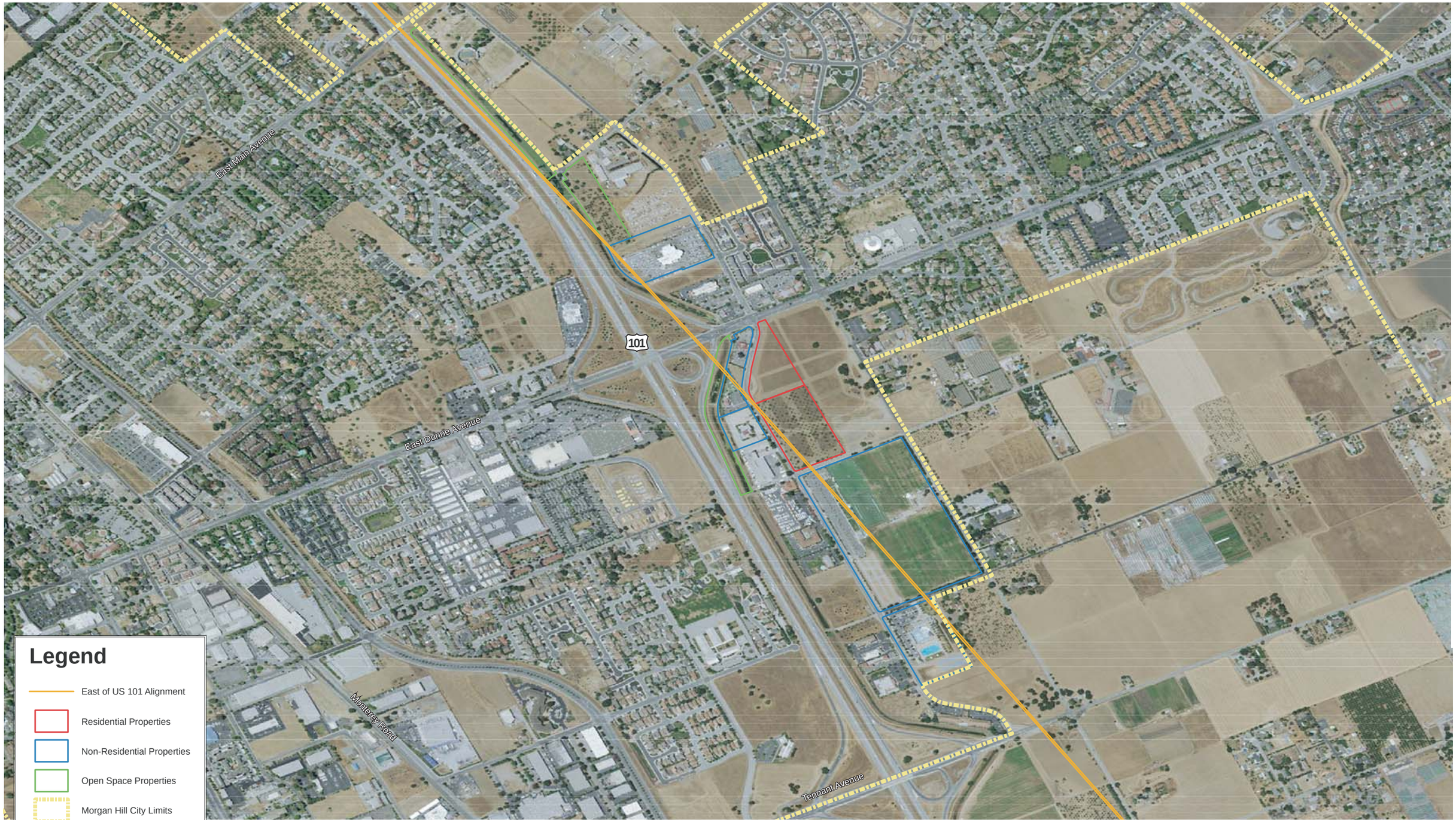

Figure 6
Affected Properties by Option 4 - East of US 101 Alignment

NORTH
Not to Scale