5.0 Whittier Project Alternatives Analysis

The California Environmental Quality Act (CEQA), Section 15126.6, requires an Environmental Impact Report (EIR) to describe a reasonable range of alternatives to a Project or to the location of a Project which could feasibly attain its basic objectives and evaluate the comparative merits of the alternatives. This section discusses a range of alternatives to the proposed Project, including alternative sites and a "No Project Alternative." Criteria used to evaluate the range of alternatives and remove certain alternatives from further consideration are addressed. The CEQA Guidelines, Section 15126.6, provide direction for the discussion of alternatives to the proposed Project. This section requires:

- A description of "...a range of reasonable alternatives to the Project, or to the location of a Project, which would feasibly attain most of the basic objectives of the Project but would avoid or substantially lessen any of the significant effects of the Project, and evaluate the comparative merits of the alternatives" (15126.6(a)).

- A setting forth of alternatives that "...shall be limited to ones that would avoid or substantially lessen any of the significant effects of the Project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the Project" (15126.6(f)).

- A discussion of the "No Project" alternative, and "...If the environmentally superior alternative is the "No Project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (15126.6(e)(2)).

- A discussion and analysis of alternative locations "…that would substantially lessen any of the significant effects of the Project need to be considered for inclusion in the EIR" (15126.6(f)(2)(B)).

This document has used an alternative screening analysis to define a reasonable range of alternatives to be evaluated in the EIR. The alternative screening analysis provides a detailed explanation of why some of the alternatives were rejected from further analysis and assures that only the environmentally advantageous alternatives are evaluated and compared in the EIR.

Since detailed analyses of the alternatives and the proposed Project have not been completed at this stage of analysis, this assessment is preliminary, based on the best judgment of the preparers.

This screening methodology also uses the *"rule of reason"* approach to alternatives as discussed in State CEQA Guidelines (Section 15126.6(f)). The rule of reason approach has been defined to require that EIRs address a range of feasible alternatives that have the potential to diminish or avoid adverse environmental impacts. The State CEQA Guidelines state:

> *The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project* (Section 15126.6(f)).

In defining feasibility of alternatives, the State CEQA Guidelines state:

> *Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (Section 15126.6(f)(1)).*

If an alternative was found to be technically infeasible, then it was dropped from further consideration. This was the primary feasibility factor that was used to eliminate an alternative without further screening analysis.

In addition, CEQA states that alternatives should "…*attain most of the basic objectives of the project* ..." (Section 15126.6(a)). If an alternative was found to not obtain the basic objective, then it was also eliminated.

The use of a screening analysis for the alternatives ensures that the full spectrum of environmental concerns is adequately represented, and that a reasonable choice of alternatives is selected for evaluation in the EIR.

Given the CEQA mandates listed above, the remainder of this section covers: (1) a brief description of a range of reasonable alternatives to the proposed Project; (2) a screening analysis that summarizes and compares the significant environmental effects of each alternative; and (3) an environmental analysis of the alternatives that were selected for further consideration in the EIR.

5.1 Description of Alternatives and Screening Analysis

A variety of alternatives for the Project were considered in a screening analysis to determine potential alternatives which might produce fewer significant impacts than the proposed Project. It should be noted that this environmental review and screening analysis benefit from the Applicant modifying the Project to reflect the Environmentally Superior Alternative identified under the previous Public Draft EIR prepared for the development of this Site. The approach taken was to list a wide number of possible alternatives and then screen those to only the alternatives that would satisfy the following:

- The alternative is technically feasible;
- The alternative would lessen the potentially significant impacts of the proposed Project; and
- The alternative would attain most of the basic objectives of the Project.

Alternatives considered included those associated with drilling and processing locations, the use of different access roads, and different pipeline alignments.

Alternatives were divided into five different groups, including:

- No Project Alternative;
- Alternative Drilling and Production Sites;
- Alternative Access Roads; and
- Alternative Pipeline Routes.

Figure 5-1 shows the locations of the various alternative drilling and production sites and alternative access roads. The following sections summarize alternatives within each of these groups.

5.1.1 No Project Alternative

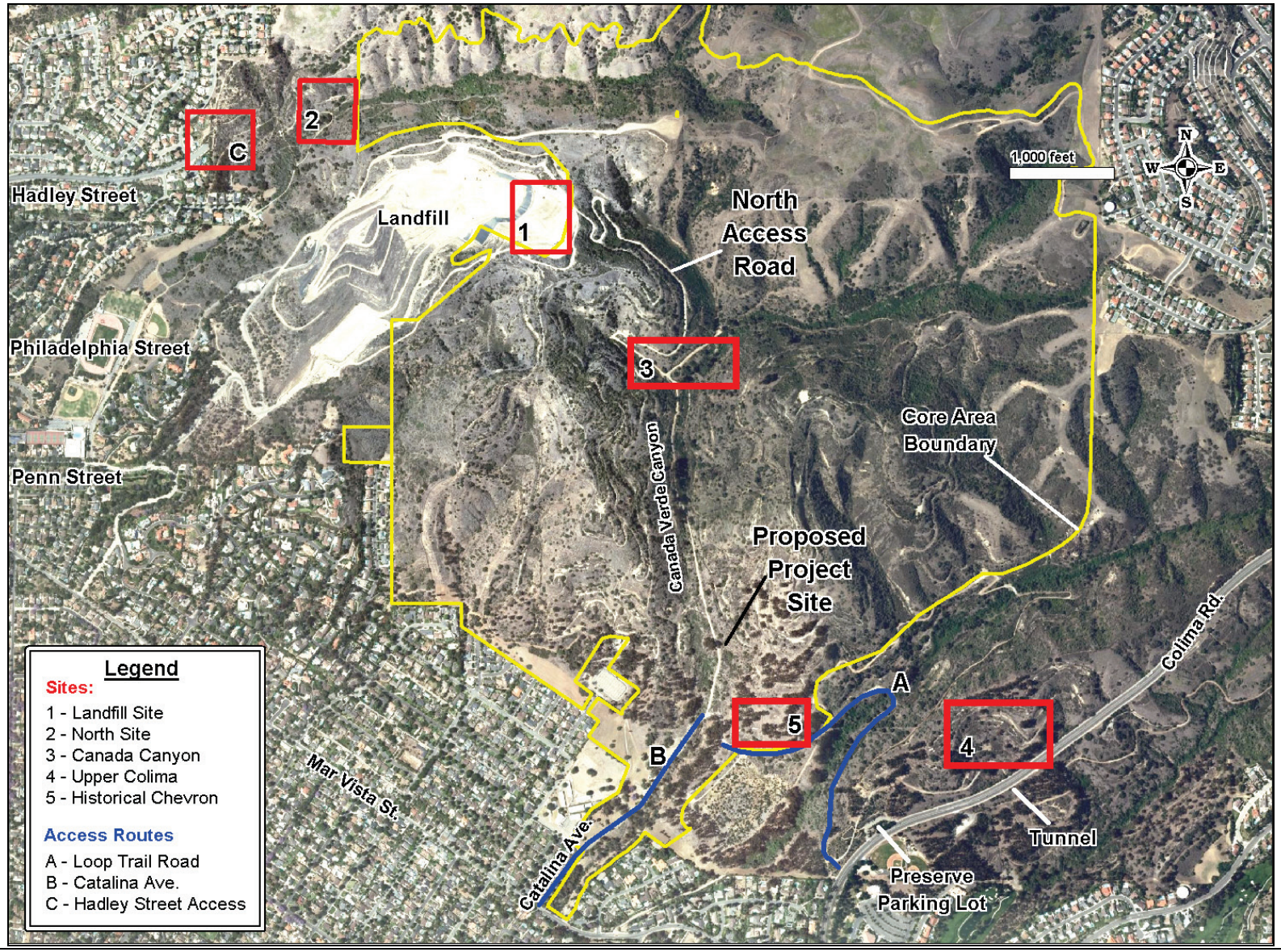
The CEQA requires that the specific alternative of the "No Project" be evaluated along with its impacts as part of the EIR (CEQA Guidelines Section 15126.6(e) (1)). For projects that are other than a land use or regulatory plan, the No Project Alternative is the circumstances under which the Project does not proceed. If disapproval of the Project under consideration would result in predictable actions by others, such as the proposal for another Project, this No Project consequence should be discussed (CEQA Guidelines Section 15126.6(e)(3)(B)). The CEQA Guidelines go on to say that the Lead Agency should analyze the impacts of the No Project Alternative by projecting what would reasonably be expected to occur in the foreseeable future if the proposed Project was not approved (Guidelines Section 15126.6(e)(3)(C)).

The Applicant's proposed Project is construction and operation of drilling and production facilities for exploration and production of oil and gas resources from the Whittier Main Oil Field.

With the No Project Alternative, the field would not be developed and the resources of the field would not be utilized. Under the No Project Alternative, no new activity would occur at the Preserve.

Because CEQA requires the EIR to analyze the No Project Alternative, it has not been addressed in the screening analysis.

Figure 5-1 Location of Alternative Sites and Access Roads



5.1.2 Alternative Drilling and Production Sites

This section discusses the range of alternative sites for the well pad and processing site. This section briefly describes alternative locations that could be used to install drilling and support equipment, which could access the oil reservoir from a location different than the Applicant's proposed Project location. The selection criteria for alternative sites include the following:

- Distance must be within the reach limits of directional drilling technology and enable recovery of a sufficient percentage of the reserves;
- Sufficient distance from populations to minimize public health risks, aesthetics, noise, and vibration impacts; and
- Utilize historically disturbed areas and minimize biological and recreational impacts to areas within the Preserve.

The delineation of the Whittier Main Oil Field reservoir is well established by a long history of wells drilled in the area. In general, the oil resides along an area running diagonally from just north of the Savage Canyon Landfill to just east of the Friendly Hills Country Club golf course and south of the Whittier Fault. The Whittier Fault runs diagonally, approximately through the middle of the Preserve.

The oil and gas are located within at least six to eight different layers, ranging in depth from as shallow as hundreds of feet to potentially 10,000 feet deep. In general, the areas to the north-west have the shallower oil layers.

This delineation of the reservoir determines the allowable location for well pads from where wells could be drilled to access the reservoir. Directional drilling enables extraction of oil and gas from multiple layers with a single well, or from a single layer that runs diagonally or even horizontally, thereby allowing more efficient extraction of oil and gas.

The ability to extract oil and gas from the reservoir by directional drilling is a function of the depth of the oil- and gas-containing layers and the size and ability of the drilling rig. In general, the shallower the layers, the closer the drilling must be to the reservoir. The larger the drilling rig, the farther the drilling can be from the reservoir. The ratio of the horizontal distance to the vertical distance is called the "throw ratio" or horizontal to vertical (H/V) ratio. For the proposed drilling rig, Matrix indicates that a throw ratio of 4.0 could be achieved, with a maximum horizontal distance of 7,000 to 8,000 feet. Projected test well information provided by Matrix indicates that the range of throw ratios of the three test wells would be up to 2.8, targeting pay "targets" (areas with known crude oil) to a maximum depth of 3,800 feet.

Geological modeling conducted for Matrix indicates that the majority of the crude oil with the highest net "pay," or the vertical sum of all of the zones that contain oil, is north and east of the proposed site. These pay thicknesses total 600 to 700 feet in thickness with varying densities of oil and gas.

According to information provided by Matrix, the three test wells would be drilled to approximately 1,500; 3,600; and 5,000 feet deep, encountering oil-containing zones, or "targets," between 1,000 and 3,800 feet deep. At depths greater than 4,000 feet, historical data is apparently sparse.

Since the oil is spread out between several different geological layers, it is difficult to determine the amount of crude oil unavailable from a specific drilling location farther away from the proposed Project drilling area. Although Matrix indicates that they could achieve a range of up to 8,000 feet horizontal distance, the distance would be less in shallower areas. For example, zones 1,000 feet deep could be reached from only as far away as 4,000 feet (using the 4.0 throw ratio). These estimates are commensurate with other drilling projects, such as Paredon in Carpinteria and Baldwin Hills.

In general, alternative sites would necessarily be within 0.5 miles of the proposed site to drill and extract the majority of the resources from both the north and the south ends of the delineated reservoir while not exceeding a horizontal to vertical ratio (throw ratio) of 4.0 or a distance of 8,000 feet to both ends of the reservoir. Any alternative site must also not be north of the Whittier Fault, which would prevent effective drilling into the reservoir and would prevent achieving Project objectives. Offsite locations were considered and the Savage Canyon Landfill Site is fully evaluated as an alternative; however, no other sites outside of the Preserve were identified that could accomplish the objectives of the Project due to unsuitability (e.g., sufficient distance from populations and reduced impacts compared to the proposed Project) and drilling distances.

The area has a long history of well drilling with many graded well pads producing on historically disturbed areas. Historical aerials of the Project Site and site visits determined suitable alternative locations.

The remainder of this section discusses possible locations for the facilities, including:

1. The Savage Canyon Landfill Site;
2. A site on an existing parcel north of the Landfill (the North Site);
3. An Upper Canada Canyon Consolidated Site;
4. An Upper Colima Road Consolidated Site;
5. The Historical Chevron Processing Facility Site; and
6. Other offsite locations.

The numbers of these sites correspond to the numbers in Figure 5-1. The sites were screened based on which impacts were likely to increase or decrease as a result of the alternative. Alternatives that were not perceived to have any benefit over the proposed Project were discarded from further consideration. Tables 5-1 and 5-2 include a detailed analysis of all alternative issue areas compared with the proposed Project.

5.1.2.1 Savage Canyon Landfill Site (1)

Under this alternative, oil drilling and processing would be located within the existing Savage Canyon Landfill, which is owned by the City of Whittier. Drilling from the Savage Canyon Landfill would be able to reach into some of the reservoirs included in the minerals rights owned by the City. All processing equipment would be installed at the Landfill and drilling would take place at the Landfill immediately adjacent to the processing area. Facility locations within the Landfill would be limited, primarily due to the location of existing, buried waste and topography. Pads under the oil and gas facilities could not be located over previously buried waste, and the

pads would preferably be in areas that would not protrude substantially into areas designated for future waste to minimize the effect on the Landfill life. Most of these areas are steep canyons, such as those south and east of the Landfill. Existing waste could be relocated from areas favorable to an oil and gas plant in a process known as "clean closure." In either case, locating the facilities at the Landfill would encroach on areas intended for future waste burial and would therefore decrease the planned life of the Landfill.

The facilities within the Landfill would also need to be far enough from existing residences to minimize any impacts due to hazards, noise, air quality, and aesthetics. The facilities should be at least 700 to 1,000 feet from residences. Many areas along the edges of the Landfill that are free from existing buried waste are also located on ridge tops, where a 125-foot tall drilling rig would be highly visible, or are close to residences, particularly along the south edge of the Landfill.

Considering these limitations, facilities would have to be on the far north-eastern end of the Landfill (see Figure 5-3). This area is designated for future waste during the proposed Phase C expansion of the Landfill, but Project facilities could be place above the area, which would place the facilities out of the areas planned for waste in the next 10 to 20 years. The area could be graded into a series of pads to contain the drilling and processing equipment. Drilling would occur on the lowest pad to reduce visual impacts. Processing equipment would be installed on a graded area located above the Landfill area, some of which may protrude into the Preserve parcels. The distance to the closest residences would be 2,600 feet. The area would encompass 4.5 to 5 acres. Cut and fill requirements would be similar to the proposed Project.

A pipeline system running along existing Preserve roadways would connect the Landfill Site to the Colima Road oil and gas pipelines. Oil and gas would be transported by truck during the Drilling and Testing Phase and by pipeline during the Operations and Maintenance Phase, utilizing either the proposed pipeline route or one of the alternative pipeline routes. Pipelines within the Preserve would be buried underground beneath existing Preserve roadways. Project traffic would utilize Penn Street and roads within the Landfill for access to the Landfill Site.

Under this alternative, since the well location would be moved from the proposed Project location, production levels would decrease because some of the zones would not be accessible (such as zones near and east of Colima Road). The farthest relocation would be wells from the east end of the reservoir, near and east of Colima Road. This location would limit the depth of crude zones in the far eastern edge of the field to greater than 2,500 feet if drilled from the Landfill site, with a throw ratio of 4.0. This would also limit the depth of accessible crude zones near the proposed Project Site to more than 1,000 feet. Given the number of zones and the varying depths, it is difficult to determine the exact reduction in the production levels with this alternative. However, based on the depth of target-producing zones projected for the test well cross sections made available by Matrix, drilling from Savage Canyon Landfill could likely produce 52 to 59 percent (with throw ratios of 2.8 to 4.0 respectively) of the proposed Project levels.

Figure 5-3 Savage Canyon Landfill Site

Impacts that are Less than the Proposed Project

This alternative would reduce biology and recreation impacts since no facilities would be located within the Preserve. Since facilities would be farther from residences than the proposed Project Site, risk of upset and noise impacts would be reduced compared to the proposed Project. There would be some reduction in impacts for aesthetic resources since the facilities would be located at the Landfill, which is already industrialized. Air quality impacts related to odor would be less since the facilities would be farther from residences. Fire protection and cultural impacts would also be less since the facilities would be in an area that is already disturbed and cleared of brush.

Transportation impacts could be less since vehicles would exclusively enter and exit through the Landfill and utilize the less congested areas along Penn Street as opposed to Mar Vista Street.

Impacts that are More than the Proposed Project

However, this alternative would require significant time-consuming amendments to existing state Landfill permits, which would create land use impacts. It is unknown whether drilling within the Landfill would be approvable within the constraints of Landfill operations and state and federal regulations. Installation of oil and gas facilities at the Landfill would also reduce the planned life of the Landfill. Although the area is already industrialized, the drilling rig and tanks would be visible from some areas of the City since they would be located along or near ridge tops. However, the rig and tanks would be a substantial distance from residences, thereby minimizing their visual impact. Finally, drilling from within the Landfill would most likely only be able to access a reduced quantity of the oil reservoir.

Even with the impediments associated with land use; reduced recovery of oil and gas, and a decrease in the Landfill life, this alternative has the substantial environmental benefit of preventing any development within the Preserve while still recovering some of the oil and gas. It has therefore been retained for further consideration.

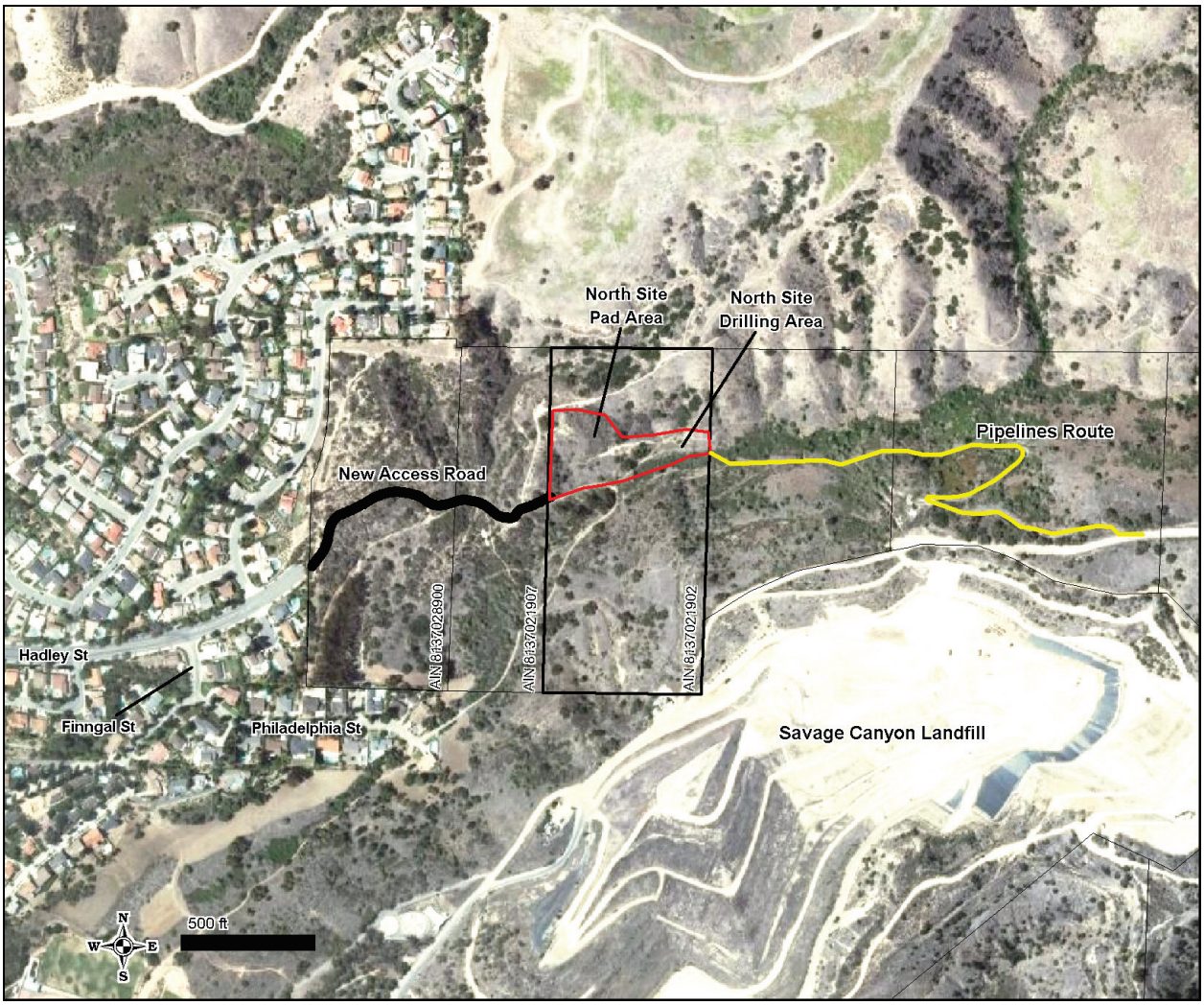
5.1.2.2 North Site (2)

Under this alternative, production would occur from an area north of the Landfill on a parcel (APN 8137021902) owned by the City of Whittier in Worsham Canyon and accessed from Hadley Street. There are existing dirt roadways into the parcel and the area was used historically for drilling wells. DOGGR indicates that ChevronTexaco drilled eight wells here and the City of Whittier drilled one well into the Home Newlin Lease. Development on this 18-acre parcel would require grading and cut and fill to increase the size of the current pad areas, develop roadway access directly from Hadley Street, and install pipelines and utilities.

Figure 5-4 shows the location of the North Site and a possible configuration of the pad area. The pad area would be approximately 500 feet from the closest residence and the drilling area would be farther east into the canyon, almost 1,000 feet from the closest residence.

The pad area would be restricted by the terrain, which is steep on the south side of the parcel towards the Landfill and on the north side of the parcel. Total pad area would only be 2.5 acres, which is less than the proposed Project, but it would be more than double the existing Sycamore Canyon site. Cut and fill would be similar to the proposed Project, including roadway construction.

Figure 5-4 North Site Alternative



A pipeline system running north into the Landfill to the east and along existing Preserve roadways would connect the North Site to the Colima Road oil and gas pipelines. Oil and gas would be transported by truck during the Drilling and Testing Phase and by pipeline during the Operations and Maintenance Phase, utilizing either the proposed pipeline route or one of the alternative pipeline routes. Pipelines within the Preserve would be buried beneath existing Preserve roadways.

Project traffic would utilize Hadley Street. A new roadway would be constructed from the end of Hadley Street to connect to the new pad areas. The existing roadway that enters the Preserve at the end of Philadelphia Street, and accesses Hadley Street along Finngal Place and Philadelphia Street, would be utilized for the test drilling phase. Construction and operations would utilize the new roadway.

Impacts that are Less than the Proposed Project

This alternative would reduce biology impacts since no facilities would be located within the core portions of the Preserve. Transportation impacts could be less since vehicles would enter and exit through Hadley Street, which is a larger roadway with no direct residential access along the far eastern stretch of Hadley Street. Traffic would avoid Penn Street, which currently has periods of high activity and residences accessed directly from Penn Street, although even the proposed Project would not produce significant impacts along Penn Street.

Impacts that are More than the Proposed Project

This alternative would increase impacts to aesthetic resources since the facilities would be in a canyon area more directly visible from residences than the proposed Project canyon. Since the facilities would be closer to residences, impacts related to noise, risk, and odor would be greater, but would most likely still be less than significant. Fire protection and cultural impacts would be similar to the proposed Project. Since the area in the canyon is restricted, the size of the facility would necessarily be smaller than the proposed Project. In addition, the site would be within 300 feet of the Worsham Canyon trail, which is an established recreational resource in the area accessed from Turnbull Canyon Road. Finally, as with the Landfill Alternative, the distance from the reservoirs could likely reduce crude production levels by more than 50 percent under the North Site Alternative.

The increased aesthetic impacts and the closer proximity to residences and recreational areas are considered to be greater than the advantages to biology. The facilities would still be located within the Preserve and some recreational activities take place in this area. Therefore, this alternative has been excluded from further consideration.

5.1.2.3 Upper Canada Canyon Consolidated Site (3)

Under this alternative, production would occur from an area within the Preserve at the top of Canada Canyon and farther northwest of the proposed Project Site. Both processing and drilling would be installed at this site. Development would be similar to the proposed Project.

A pipeline system running along existing Preserve roadways would connect the Upper Canada Canyon Site to the pipeline routes along Colima Road (see Figure 5-1). Oil and gas would be transported by truck during the Drilling and Testing Phase and by pipeline during the Operations and Maintenance Phase, utilizing either the proposed pipeline route or one of the alternative pipeline routes. Pipelines would be installed within the Preserve to connect the site to the pipeline route along Colima Road. Pipelines within the Preserve would be buried beneath existing Preserve roadways.

During the Drilling and Test Phase, the Design and Construction Phase, and the Operations and Maintenance Phase, facility traffic could use Catalina Avenue or the proposed North Access Road, as in the proposed Project.

Impacts that are Less than the Proposed Project

This alternative could eliminate or reduce impacts related to facility construction and operation on the surrounding residences since the facilities would be tucked away deeper within the

Preserve. This alternative would decrease impacts associated with risk of upset, odor impacts associated with air quality, aesthetics, and noise. These impacts would be reduced because of the more remote location of the facilities and the correspondingly greater distance between residences and the drilling and processing operations.

Impacts that are More than the Proposed Project

Additional biological and land use compatibility impacts could occur as a result of uses inconsistent with the Preserve's Resource Management Plan and the designated Core Habitat. In addition, significant geological impacts could occur due to proximity to the Whittier Fault and steep terrain along the canyon walls that may require considerable engineering retrofits and grading, which would likely encroach farther onto biological resources. This area has substantially steeper slopes and canyon walls than the area around the proposed Project, which could create stability issues.

Fire protection impacts would also be more severe than under the proposed Project since the site location is deeper in the Preserve, with greater wildfire and access issues. Further, the total space available in this area is approximately 3.5 acres, which would be less than the proposed Project area but may not be sufficient to meet the objectives of the Project.

This alternative is eliminated from further consideration because stability and geological issues may prevent use of potential pad areas, and the alternative would encroach farther into the core habitat of the Preserve, a potential increase in biological impacts.

5.1.2.4 Consolidated Upper Colima Road Site (4)

Under this alternative, production would occur from a series of previously disturbed oil and gas production pads north of the Preserve parking lot adjacent to Colima Road. This alternative would encompass four different preexisting pads covering approximately 5 acres (see Figure 5-1). This alternative site could be reached from the existing access along the Arroyo Pescadero and Arroyo San Miguel Trail. Cut and fill amounts would be similar to the proposed Project. Disturbed areas would also be similar to the proposed Project, although the oil and gas processing site may be distinct to use of the existing, separate pads.

The Upper Colima Site would be approximately 1,000 feet from residences, approximately 500 feet from the Murphy Ranch baseball fields, and approximately 1,600 feet from residences along Lodosa Drive east of Colima Road along the ridge.

The Drilling and Testing Phase would utilize the most southwestern portion of the Upper Colima Site, which would be cleared and drilling equipment would be established. Oil and gas would be transported by truck during the Drilling and Testing Phase. Trucks would access the site by the Preserve Road entrance off of Colima Road immediately south of the current Preserve parking area which then becomes the Arroyo Pescadero and Arroyo San Miguel Trails.

During the Design and Construction Phase and the Operations and Maintenance Phase, a new access road to the site would be constructed from Colima Road north of the Preserve parking area, which would include turning lanes to and from the southbound side of Colima Road.

Oil and gas would be transported by truck during the Drilling and Testing Phase and by pipeline during the Operations and Maintenance Phase, utilizing either the proposed pipeline route or one of the alternative pipeline routes.

Impacts that are Less than the Proposed Project

This alternative would move development completely out of the Preserve's designated core habitat and into the less sensitive preservation area, thereby reducing impacts to biological resources within the core habitat. Recreation impacts in the core habitat area would also be minimized since all development would occur outside of the recreational areas along the Loop Trail. Traffic impacts would be reduced because Catalina Avenue would not be used for access during any phase.

Impacts that are More than the Proposed Project

However, this alternative could increase biological impacts to the wildlife corridor that utilizes the Arroyo San Miguel Trail tunnel, and it could increase recreational impacts on users of the Arroyo San Miguel Trail (on the east side of Colima Road) and other trails that use the initial portion of the Arroyo Pescadero and Arroyo San Miguel Trails for access. Increased aesthetic impacts would occur since this alternative site would be visible from residences on the ridge along Lodosa Drive and Aurora Crest Drive on the east side of Colima Road above the golf course. In addition, production facilities located so far to the east of the field may limit the ability to drill into the west end of the reservoir. Geological impacts may increase since the area could have large areas of poorly compacted soil and steep slopes could lead to stability issues. Therefore, this alternative has been eliminated from further consideration.

5.1.2.5 Historical Chevron Processing Facility Site (5)

This site is immediately east of the proposed Project Processing Site and would occupy an area previously used by Chevron for their processing facilities. This site could replace the proposed site for production and processing. Access to the site and transportation of oil and gas would be the same as with the proposed Project or alternative access roads.

Impacts that are Less than the Proposed Project

This alternative may cause less impacts to cultural resources compared to the proposed Project since this location was originally the site of Chevron processing facilities.

Impacts that are More than the Proposed Project

This alternative would generate additional recreation and visual impacts compared to the proposed Project due to its location immediately adjacent to public trails and its visibility from the hiking trails and viewpoint areas. This alternative site would also be more visible from residences to the south. In addition, this alternative does not offer any added environmental benefit over the proposed Project. This alternative is therefore eliminated from further consideration.

5.1.2.6 Other Offsite Locations

Utilization of other sites outside of the Preserve to produce the oil and gas proposed under this Project, such as the Sycamore Canyon site, the Honolulu Terrace site, or the La Habra Heights area, would produce less crude oil than the proposed Project due to the increased distance from recoverable reserves. In addition, the Sycamore Canyon and La Habra Heights sites are not within the jurisdiction of the lead agency (the City of Whittier) and therefore could not be permitted as part of this Project.

Matrix currently owns the Sycamore Canyon site and operates several wells at the developed site, which is approximately 3.5 miles northwest of the proposed Project Site. Drilling from Sycamore Canyon would limit production to only zones deeper than approximately 5,000 feet, which would most likely reduce recoverable reserves by more than 90 percent.

Matrix also currently owns the Honolulu Terrace site and operates several wells at the developed site, which is approximately 2.5 miles northwest of the proposed Project Site. Drilling from Honolulu Terrace would limit production to only zones deeper than approximately 3,500 feet, which would most likely reduce recoverable reserves by more than 80 percent.

Matrix is currently exploring the possibility of drilling from a site within the City of La Habra Heights, located on Le Flore Drive (see Section 3.0, Cumulative Projects). This site is approximately 1.6 miles southeast of the proposed Project Site. Drilling from the La Habra Heights site could potentially be able to access to the eastern portion of the reservoirs. Due to the distance, drilling from this site would limit production to only zones deeper than approximately 2,000 feet, which would most likely reduce recoverable reserves to 24 to 32 percent (with a throw ratio of 2.8 to 4.0 respectively) of the proposed Project levels.

Due to the substantially reduced production levels from any of these sites, and the location of Sycamore Canyon and La Habra Heights outside of the jurisdiction of the lead agency, these sites have been eliminated from further consideration.

5.1.3 Alternative Access Roads

Existing roads within the Preserve would provide access to the oil field under the proposed Project. For that reason, this alternative evaluation considered alternative access roads. The following access roads are alternatives to the access road included under the proposed Project:

A. Loop Trail Road;

B. Exclusive Catalina Avenue Access; and

C. Access through Hadley Street.

The lettering of these road alternatives corresponds to the letters in Figure 5-1.

5.1.3.1 Loop Trail Road (A)

Under this alternative, access to the proposed Project site would be provided along the Loop Trail Road that is accessed through a gate along Colima Road located immediately south of the Preserve parking area along Colima Road. The Loop Trail Road is currently only used by

recreational hikers and Preserve rangers to access the Loop Trail and Arroyo Pescadero area within the Preserve. Most of the Loop Trail Road is currently used as a recreational trail, called the Deer Loop Trail, which is accessed from the Preserve parking lot along Colima Road. The proposed Project proposes to install the sales gas pipeline and crude oil pipeline underneath this roadway in order to access pipelines that could take the products to market along Colima Road.

The Loop Trail Road access route takes a somewhat circuitous route from Colima Road to the proposed Project site, with the entrance gate located off of Colima and immediately adjacent to residences located along Lodosa Drive (See Figure 2-6). The Loop Trail Road then turns north and continues up Arroyo Pescadero Canyon before heading west and crossing the creek. It then heads in a southwesterly direction before passing through a chain-gate and entering the area of the Preserve that is off-limits to recreational users. It then arrives at the proposed Project site.

The road is currently partially paved and dirt and is somewhat overgrown. It would need to be widened and improved to provide Project access. The entry and exit onto and off of Colima Road would need to be re-aligned to intersect with the new traffic signal that was installed in connection with the Whittier Area Community Church. This re-alignment would allow for a smoother and controlled flow of project traffic onto and off of Colima Road.

Under this alternative, the Loop Trail Road would be used for the construction and operational phases of the project. Catalina Ave. would continue to be used for the Drilling and Testing phase.

Impacts that are Less than the Proposed Project

Biological impacts would be reduced with this alternative, since Project traffic would not use the North Access Road that travels through the core area of the Preserve. The use of an access route that allows for direct access to an arterial roadway and does not pass through residential streets, such as along Catalina or Mar Vista or along Penn Street with the North Access Road, would reduce impacts to residential areas associated with increased traffic, noise and air quality.

Impacts that are More than the Proposed Project

Increased project traffic along Arroyo Pescadero area could impact wildlife corridor movements through the Colima tunnel. This alternative access road would also interfere with existing recreational users since a part of the road is a hiking trail used by Preserve visitors. This access road would also generate some biological impacts since roadway use would interfere with some biological corridor issues. This alternative would also reduce separation between the Project traffic and the residences along the south side of the Preserve, since Project traffic would travel closer to residences along Lodosa Drive when entering and exiting the Preserve from Colima Road.

This alternative provides benefits by reducing traffic through residential neighborhoods, but increases the impacts to recreational areas. It has been retained for further consideration.

5.1.3.2 Catalina Avenue Access (B)

Under this alternative, Catalina Avenue would be used exclusively by the project. It would provide all access during the Drilling and Testing Phase, as is proposed under the proposed Project, and all access during the Design and Construction Phase and the Operations and

Maintenance Phase of the Project. Catalina Avenue is accessed by Mar Vista Street, which is a two -lane road with a 3-ton weight limit and is highly impacted by traffic during peak hours.

Impacts that are Less than the Proposed Project

This alternative would have fewer impacts associated with biology since traffic would not pass through the core area of the Preserve and negatively impact wildlife corridor resources. In addition, facility traffic would be routed away from Penn Street and William Penn Park.

Impacts that are More than the Proposed Project

However, Mar Vista Street and the intersection of Catalina Avenue and Mar Vista Street are currently heavily impacted by traffic, during both peak hours and the daily average, and use of this route would substantially impact traffic and circulation, particularly during the Design and Construction Phase, when traffic would be heaviest. Impacts associated with traffic could be mitigated during the Drilling and Testing Phase and the Operations and Maintenance Phase. However, during the Design and Construction Phase, higher levels of traffic would create significant and unavoidable impacts to traffic.

Expanding Catalina Avenue through the ravine next to Catalina Avenue was considered as a sub-alternative to the access via Catalina Avenue. The intent would be to capitalize on existing vegetation as noise and aesthetic buffers between the residences alongside Catalina Avenue and Project traffic. However, this would require vegetation removal and grading in environmentally sensitive habitat close to the creek. In addition, this expansion of Catalina Avenue would place the road closer to the neighbors on the other side of the creek area, which would simply transfer the impacts from one set of residences to the other without any meaningful difference in impact from the proposed Project or the Catalina Avenue Alternative.

As a result, both the Catalina Avenue alternative and this sub-alternative could create new traffic impacts along Mar Vista Street and the intersection of Catalina Avenue and Mar Vista Street. The sub-alternative would increase biological resource impacts compared to the Project. Therefore, both are eliminated from further consideration for use by the Project during all phases of the Project and for all of the traffic. However, the proposed Project includes limited use of Catalina Avenue and Mar Vista Street, including all Drilling and Testing Phase traffic and some traffic during the Design and Construction Phase and the Operations and Maintenance Phase.

5.1.3.3 Hadley Street Extension Access (C)

Under this alternative, access would be established from the end of Hadley Street (near the North Site Alternative site) and a roadway would be constructed from the end of Hadley Street to the Landfill and then connect with the North Access Road. This alternative route would have the advantage of directing traffic onto a roadway (Hadley Street) that is wider than Penn Street with less direct residential access. However, the extension of Hadley Street would require negotiating a steep slope and ravine area in order to provide access to the Landfill for access to the North Access Road. This may require construction of a large bridge and substantial grading and road construction to allow access to the Landfill. This presents significant engineering concerns that make the Hadley Street extension to access the Landfill infeasible.

5.1.4 Alternative Pipeline Alignments

Products would be transported via pipeline from the Project Site during the Operations and Maintenance Phase. The following subsections discuss two potential pipeline alternatives. Figure 5-5 shows the alternative pipeline alignments.

5.1.4.1 Lambert Railroad Right-of-Way Alignment

Matrix would construct the crude oil pipeline connection down Colima Road to Lambert Road and then onto the railroad right-of-way along Lambert Road to a tie-in to the Crimson California Pipeline System at the intersection of Lambert Road and Leffingwell Road. This alternative alignment would have advantages over the proposed Project since it would avoid impacts related to construction within a roadway (La Mirada Boulevard). However, this alignment is approximately 0.35 miles longer than the alignment in the proposed Project and may present some leasing and permitting difficulties with the right-of-way along the railroad. This alternative has been retained for further analysis.

5.1.4.2 La Habra Heights Pipeline Alignment

Under this alternative, Matrix would construct both a gas and an oil pipeline under Colima Road and within existing dirt roads to eventually access existing pipelines that are part of an ongoing oil production facility in the La Habra Heights area. This alternative could avoid potential traffic impacts along Colima Road and La Mirada Boulevard and using previously disturbed dirt roads could make this alternative pipeline alignment desirable. The distance of this pipeline route would be approximately 2 miles from the Colima Road proposed Project tie-in. However, the status of pipelines in the La Habra Heights area is uncertain at this time and the feasibility of utilizing these pipelines is unknown. Therefore, this alternative has been eliminated from further consideration.

5.1.4.3 Western Pipeline Alignments

Under this alternative, Matrix would construct both a gas and an oil pipeline that exits the area to the north and transverses the City of Whittier to connect to the Crimson California Pipeline System near the intersection of Whittier Avenue and Norwalk Avenue and the gas system along Lambert Avenue near Santa Fe Springs Road. This alternative would be more relevant for the alternative sites, such as the Savage Canyon Landfill Site Alternative or the North Site Alternative, since the pipeline route would not pass through the Preserve to get to Colima Road. The distance to the Crimson California Pipeline System tie-in would be approximately 4 miles from the Landfill Site. The distance to the gas pipeline tie-in would be approximately 3.0 miles south from the Landfill Site.

However, since the oil and gas connection locations would not coincide for most of the route, and the routes would more complicated and would pass through the center of Whittier, this alternative would create greater disturbances and impacts. It has therefore been eliminated from further consideration.

Section 6.0, Comparison of Proposed Project and Alternatives, provides a full comparison of alternatives determined to be carried forward for full environmental review and includes the discussion of the Environmentally Superior Alternative.

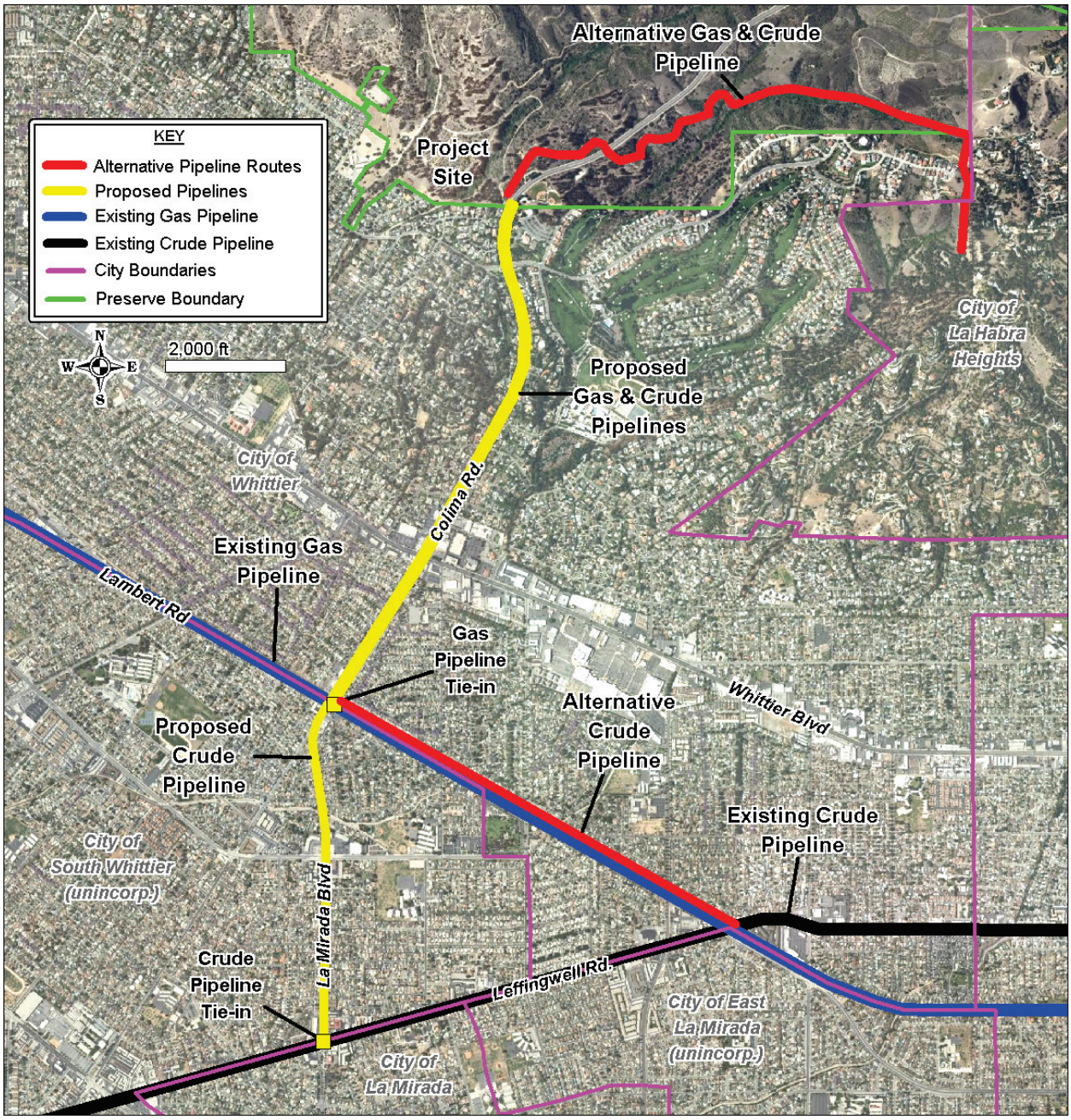



Figure 5-5 Alternative Pipeline Alignments