6.0 COMPARISON OF ALTERNATIVES

We evaluated alternatives to the North Baja Pipeline Project to determine whether these alternatives would be reasonable and environmentally preferable to the proposed action. Section 3.0 describes the range of alternatives considered, as well as alternatives that were considered but eliminated from further analysis. This section describes each alternative that we considered reasonable and practicable and compares it to the corresponding segment of the proposed project. Our analysis is based on information provided by NBP, NBP field surveys, aerial photographs (where available), USGS topographic maps, NWI maps, our field inspections, and agency consultations. We have presented a summary of the advantages and disadvantages of each of the alternatives considered in this section and are seeking additional information and comments on these alternatives for consideration in the final EIS/EIR and proposed plan amendment.

6.1 ROUTE ALTERNATIVES

We identified eight route alternatives in section 3.0 of this draft EIS/EIR and draft plan amendment that warranted additional review. These route alternatives are evaluated below in comparison with the corresponding segment of the proposed route.

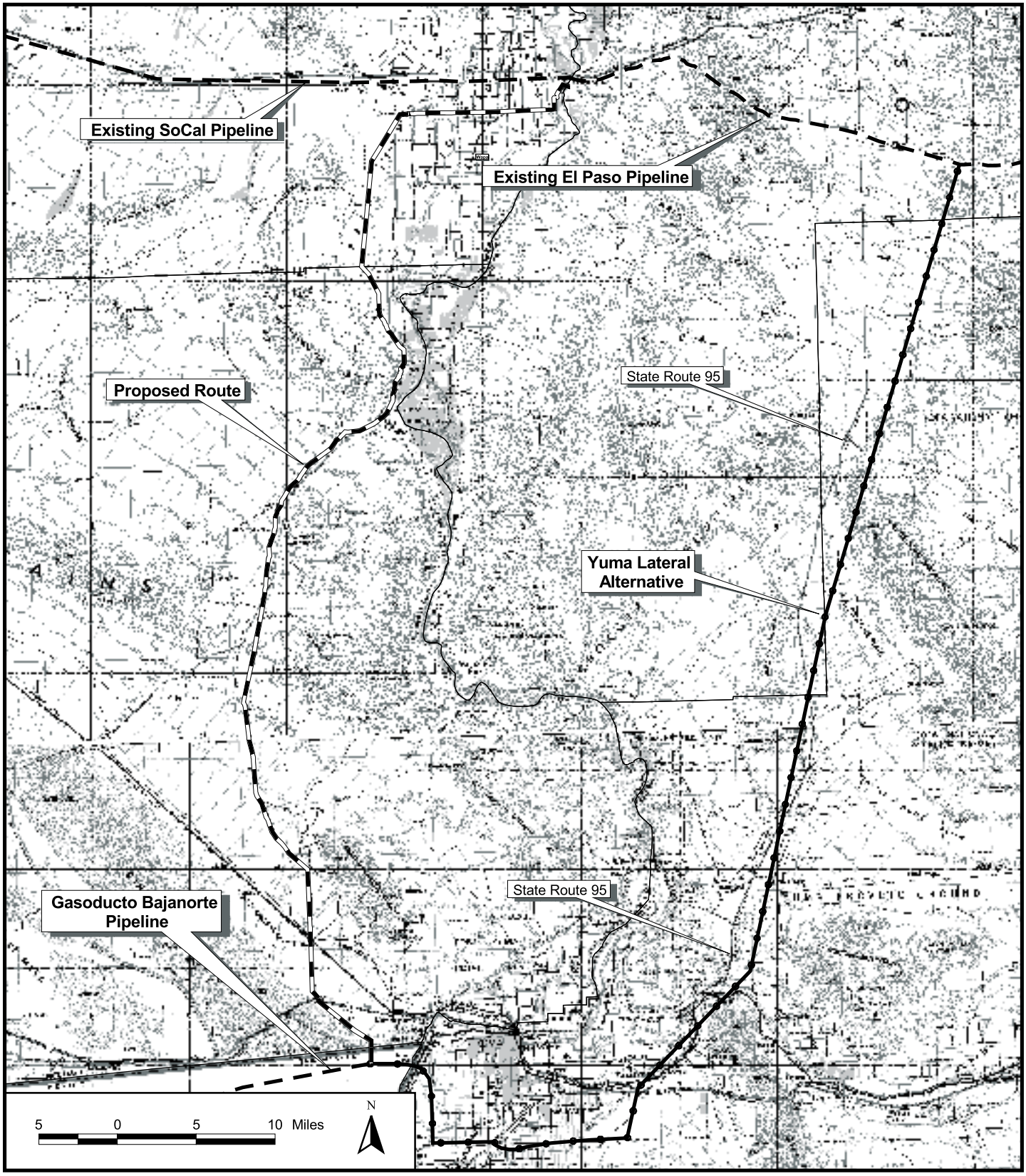
6.1.1 Yuma Lateral Alternative

The Yuma Lateral Alternative was identified by NBP in response to the BLM's request to review the feasibility of an alternative route along El Paso's Yuma Lateral in Arizona.

The Yuma Lateral Alternative would interconnect with El Paso's existing pipeline system near Quartzsite, Arizona approximately 18 miles east of NBP's proposed interconnection point with El Paso in Ehrenberg, Arizona. The Yuma Lateral Alternative would follow El Paso's existing lateral pipeline south along a generally similar alignment as SR 95. The alternative would cross mainly publicly owned desert land to a point on the east side of Yuma, Arizona. There, the alternative would turn and proceed west through the city of Yuma until it ends at the United States/Mexico border (see figure 6.1.1-1). An environmental comparison of the Yuma Lateral Alternative to the proposed route is presented in table 6.1.1-1.

The Yuma Lateral Alternative would be approximately 13.7 miles longer than the proposed route and would follow existing utility corridors/rights-of-way for a smaller percentage of its length (71 percent versus 81 percent). Assuming an 80-foot-wide construction right-of-way, the Yuma Lateral Alternative would disturb 907.6 acres of land during construction or about 150.4 acres more land than the proposed route.

Both the Yuma Lateral Alternative and the proposed route would cross the Colorado River and one other major waterbody: the All American Canal for the proposed route and the Gila River for the Yuma Lateral Alternative. NBP indicates that geological conditions are favorable for directional drilling the Colorado River and the All American Canal. It is not known whether directional drilling would be feasible at the Colorado River and Gila River crossings along the Yuma Lateral. If either river cannot be drilled at the location where it is crossed by the Yuma Lateral Alternative, it would need to be open cut. Open-cut construction would significantly increase the impact on the rivers compared to directional drilling and would likely raise additional concerns related to endangered or threatened species. The proposed route would cross eight jurisdictional wetlands compared to no wetland crossings along the Yuma Lateral. However, four of the eight wetlands crossed by the proposed route would be avoided by the directional drills of the Colorado River and the All American Canal. Three of the remaining four wetland crossings would occur in wetlands dominated by tamarisk (*Tamarix spp.*), which is a noxious weed. The remaining wetland crossing would be in an emergent wetland that would regenerate quickly following construction. Because the wetlands that would be crossed by the proposed route are either emergent or dominated by a monoculture of tamarisk, construction of the proposed route would have only short-term minor impact on wetlands.



LEGEND

Proposed Route

Alternative Route

Figure 6.1.1-1
North Baja Pipeline Project
Yuma Lateral Alternative
MPs 0.0 to 79.8

TABLE 6.1.1-1

Environmental Comparison of the Yuma Lateral Alternative to the Proposed Route MPs 0.0 to 79.8

Environmental Factor	Unit	Yuma Lateral Alternative	Proposed Route
Length	Miles	93.6	79.9
Length within designated corridor or adjacent to existing rights-of-way	Miles	66.8	64.3
Land disturbed during construction	Acres	907.6 a/	757.2
Major waterbody crossings	Number	2	2
Jurisdictional wetlands crossed	Feet	0	1,915 b/
Desert land crossed	Miles	82.9	68.4
Agricultural land crossed c/	Miles	5.3	2.2
Length within roads	Miles	5.0	9.1
Commercial/residential land crossed	Miles	24.7	7.5
Public lands crossed d/	Miles	87.0	57.3

a/ Based on an 80-foot-wide construction right-of-way.

b/ The proposed route would cross 2,250 feet of wetlands; however, 335 feet of these wetlands would be avoided by the directional drill crossings of the Colorado River and the All American Canal.

c/ Crops crossed by the alternative route typically comprise citrus-type crops such as oranges and grapefruits. Crops crossed by the proposed route typically comprise annually cultivated crops such as alfalfa, wheat, and cotton, or irrigated pasture.

d/ Includes Federal, state, and county lands.

The Yuma Lateral Alternative would cross 14.5 miles more desert land and 3.1 miles more agricultural land than the proposed route. The greater lengths of desert and agricultural land crossed by the Yuma Lateral Alternative would increase the impact of the pipeline on these resources. The difference in agricultural land crossed by the two routes is attributable, in part, to the proposed route's greater utilization of public road easements. In general, pipeline construction within road rights-of-way is environmentally preferable because it avoids impacts on soils, vegetation, and in this comparison, agricultural drain and canal crossings regulated by the PVID. The proposed route would be able to cross PVID drains and canals under existing culverts located within 18th Avenue. The PVID believes an alignment within 18th Avenue would be preferable to an alignment within adjacent agricultural land because it would avoid or minimize impacts on drains and canals during construction and subsequent drain and canal maintenance activities (see section 6.1.2). Construction within 18th Avenue would also avoid potential conflicts and safety concerns related to current deep-ripping agricultural practices (PVID, 2001). It is not known if the Yuma Lateral Alternative could offer the same advantage of enabling pipeline construction within road rights-of-way along its most actively cultivated segment near Yuma, Arizona. In this actively cultivated segment near Yuma, the crops typically consist of high value citrus crops such as oranges and grapefruits. The agricultural land crossed by the proposed route is typically used for annually cultivated crops such as alfalfa, wheat, and cotton, or irrigated pasture, and to a lessor extent, melons, lettuce, and broccoli.

The Yuma Lateral Alternative would cross 17.2 miles more commercial/residential land than the proposed route. In addition to the greater length of commercial/residential land crossed, the land crossed by the alternative is more highly developed than that crossed by the proposed route. The commercial/residential land crossed by the alternative is primarily located south of the City of Yuma, which is the third fastest growing city in the United States. In one 4-mile-long stretch south of Yuma, the Yuma Lateral Alternative parallels a highly traveled thoroughfare lined with commercial and residential developments. The remainder of the alternative near Yuma crosses near small amounts of industrial development, a large RV resort, and at least one neighborhood of several hundred residential housing units. In contrast, the proposed route crosses by 23 residences and 2 businesses.

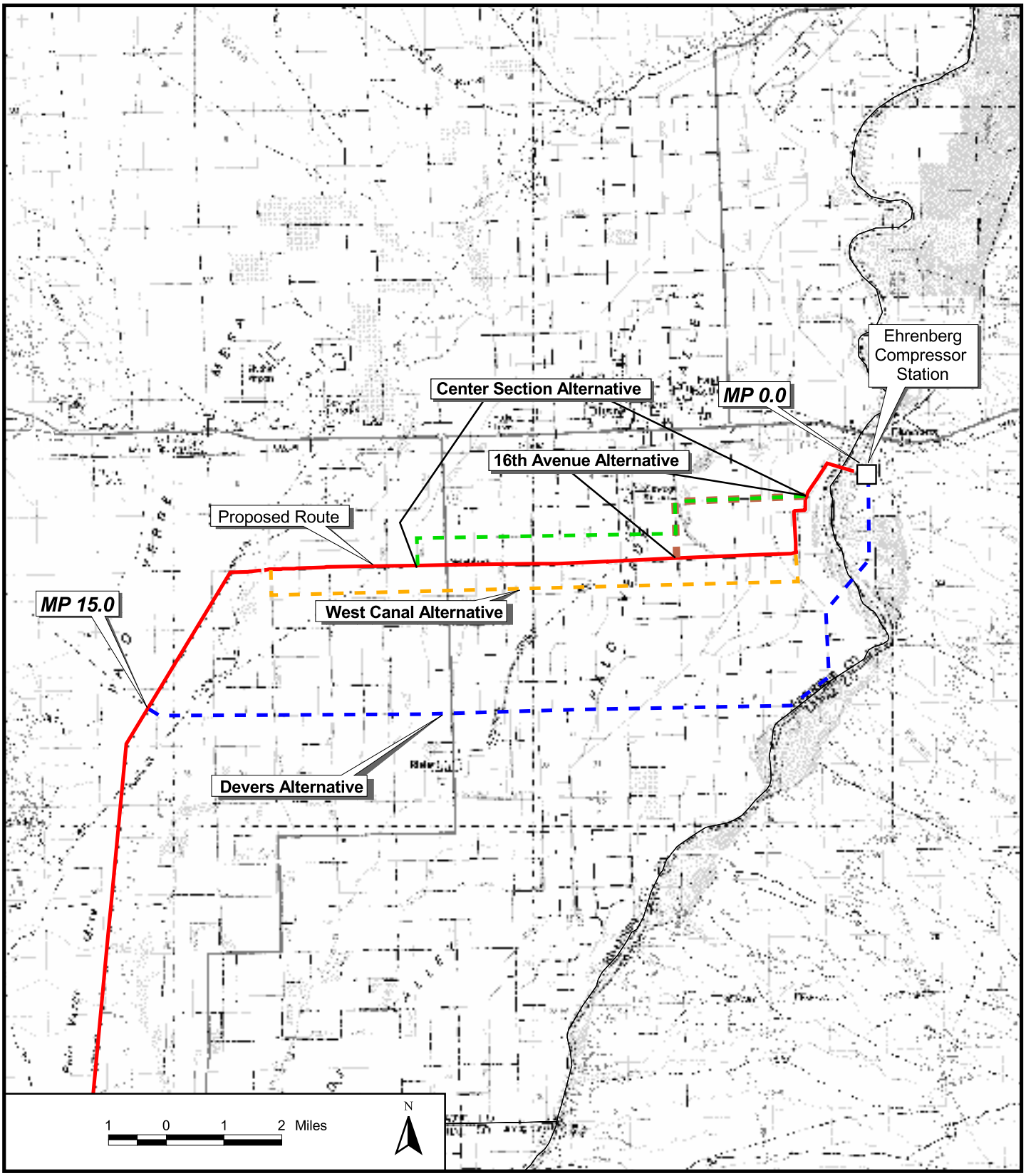
Both the Yuma Lateral Alternative and the proposed route would cross publicly owned lands. The Yuma Lateral Alternative, however, would cross more public lands (87 miles) than the proposed route (57.3 miles). Siting pipelines on public lands may, in certain circumstances, conflict with management activities and goals of the land management agency. While the proposed route would cross public lands managed by the BLM, the route would make use of designated utility corridors for much of its length. It is not known whether the Yuma Lateral Alternative, which crosses BLM-, U.S. Army-, and U.S. Marine Corps-managed lands, would conflict with the existing and/or proposed management goals of these agencies.

In summary, there appears to be no major advantage associated with the Yuma Lateral Alternative. Its primary benefit is that it would avoid wetland crossings. However, as discussed earlier, the impact of the proposed route on these wetlands is anticipated to be minor. Moreover, this small advantage is outweighed by the several disadvantages of the Yuma Lateral Alternative, which include its greater length; greater amount of land disturbance; and its increased impact on desert, agricultural, commercial/residential, and public lands.

Because the Yuma Lateral Alternative follows a similar alignment to SR 95 (see figure 6.1.1-1), we did not conduct a separate analysis of a route alternative along SR 95 as requested during the January 11, 2001 scoping meeting. We believe an alternative following SR 95 would have similar drawbacks as the Yuma Lateral Alternative with no significant advantages over the proposed route.

6.1.2 18TH Avenue Alternatives

We assessed four route alternatives between MPs 0.0 and 15.0 that would avoid construction within or adjacent to 18th Avenue and minimize disturbance to residents along the road. One of these alternatives, the Devers Alternative, follows a completely different route than the proposed route. The other three alternatives, the 16th Avenue Alternative, Center Section Alternative, and West Canal Alternative, follow the same alignment as the proposed route at the beginning and end but deviate from the proposed route for a distance in the middle. The use of a common beginning and ending point for all four alternatives provides meaningful data when comparing the routes. The four route alternatives and the corresponding segment of the proposed route are shown on figure 6.1.2-1. An environmental comparison of the four route alternatives to the corresponding segment of the proposed route is presented in table 6.1.2-1.



LEGEND

- Proposed Route
- Devers Alternative
- 16th Avenue Alternative
- Center Section Alternative
- West Canal Alternative

Figure 6.1.2-1
North Baja Pipeline Project
18th Avenue Alternatives
MPs 0.0 to 15.0

TABLE 6.1.2-1

Environmental Comparison of the 18th Avenue Alternatives to the Proposed Route MPs 0.0 to 15.0

Environmental Factor	Proposed Route	Devers Alternative	16th Avenue Alternative	Center Section Alternative	West Canal Alternative
Length (miles)	15.0	15.8	15.0	15.0	15.9
Length adjacent to existing right-of-way (miles)	13.8	14.1	13.8	11.1	9.9
Streams/canals/drains (number) a/	15	15	15	16	15
Rivers (number)/length of drilled crossing (feet)	1 / 1,900	1 / 3,000	1 / 1,900	1 / 1,900	1 / 1,900
NWI-mapped wetlands crossed (feet)	200	950	400	400	200
NWI-mapped wetlands avoided by drill (feet)	200	500	200	200	200
Land disturbance (acres) b/	144.6	257.3	152.5 c/	203.7	244.0
Agricultural land (miles)	2.2	13.7	2.1	8.1	11.4
Residences within 50 feet of the construction right-of-way (number) d/	6	4	22	6	0

a/ Based on USGS topographic maps.

b/ NBP proposes to use an 80-foot-wide construction right-of-way in agricultural lands along the proposed route. NBP has indicated that a 145-foot-wide construction right-of-way may be needed in agricultural lands along the alternative routes due to sandy soils and high water tables. For comparison purposes, acreage for all routes in this analysis was based on a 145-foot-wide construction right-of-way in agricultural lands, a 60-foot-wide construction right-of-way in roads, and an 80-foot-wide right-of-way elsewhere.

c/ Assumes all of the pipeline could be installed in the road easement using a 60-foot-wide construction right-of-way. NBP indicates that this may not be possible due to the presence of other utilities within the 16th Avenue easement. If not possible, the route would be located north of and immediately adjacent to 16th Avenue. A 145-foot-wide construction right-of-way would be needed in agricultural areas and an 80-foot-wide construction right-of-way would be used in other areas.

d/ Based on information provided by NBP.

The Devers Alternative was identified by landowners during the scoping process to minimize impact on residents along 18th Avenue. The Devers Alternative would begin at the Ehrenberg Compressor Station (MP 0.0) and proceed south for approximately 1.5 miles first along new right-of-way for about 0.8 mile and then adjacent to Oxbow Road for about 0.7 mile. From this point, the alternative would turn southwest and cross the Colorado River and then proceed approximately 1 mile south adjacent to the east side of the D-10-13 Canal. Where the canal nears the Colorado River, the alternative would turn and proceed southwest next to the river for about 0.5 mile to the existing Devers-Palo Verde 500 kV 160- to 200-foot-wide powerline corridor. The alternative would then turn west and proceed adjacent to the south side of the powerline corridor until it rejoins the proposed route at MP 15.0.

The 16th Avenue Alternative would follow the same alignment as the proposed route between MPs 0.0 and 1.2. At MP 1.2, the 16th Avenue Alternative would deviate from the proposed route and proceed west approximately 2.3 miles along 16th Avenue. It is probable that some of the pipeline along 16th Avenue

Alternative would be constructed within the road. However, there are currently several utilities in or adjacent to the roadway. The presence of these utilities would likely require that at least portions of the pipeline be constructed outside of the road easement on private property and agricultural land. After crossing C&D Boulevard, the alternative would turn and proceed south 1 mile adjacent to the boulevard until it rejoins the proposed route at MP 4.4. Between MPs 4.4 and 15.0, the 16th Avenue Alternative follows the same alignment as the proposed route.

The Center Section Alternative would follow the same alignment as the 16th Avenue Alternative for about 4.0 miles. After crossing C&D Boulevard, the Center Section Alternative would turn south adjacent to the boulevard for about 0.5 mile. The route would then proceed west for about 4.5 miles adjacent to existing drains and along new right-of-way until it crosses West Side Drain. There, it would turn and proceed south for 0.5 mile until it rejoins the proposed route at MP 8.9. Between MPs 8.9 and 15.0, the Center Section Alternative would follow the same alignment as the proposed route.

The West Canal Alternative would follow the same alignment as the proposed route between MPs 0.0 and 2.3. It would then deviate from the proposed route and continue south adjacent to the east side of the D-10-13 Canal for about 2,300 feet. There it would turn west, cross the canal, and proceed west across agricultural fields for about 9.1 miles to Rannells Drain. About 4.2 miles of this portion of the alternative would be adjacent to the north side of West Canal. At Rannells Drain, the West Canal Alternative would turn north and proceed for about 2,300 feet until it rejoins the proposed route at MP 11.4. From MPs 11.4 to 15.0, the West Canal Alternative would follow the same alignment as the proposed route.

All of the routes follow existing rights-of-way for a considerable percentage of their total lengths. The collocation of the routes with rights-of-way easements is highest for the proposed route and the 16th Avenue and Devers Alternatives, and somewhat less for the Center Section Alternative. The alternative with the lowest percentage adjacent to existing rights-of-way is the West Canal Alternative.

The Devers Alternative and West Canal Alternative are both longer than the other three alternatives. The greater length of the Devers and West Canal Alternatives would result in more land disturbance during construction than the three shorter routes. This increase in land disturbance by the two longer routes would be exacerbated by the fact that both the Devers Alternative and West Canal Route cross mostly agricultural land. The Center Section Alternative also crosses considerably more agricultural land than either the proposed route or the 16th Avenue Alternative. NBP has determined that it needs at least a 145-foot-wide right-of-way to construct through agricultural lands versus a 60- or 80-foot-wide right-of-way to construct in other areas.

Several factors would contribute to the need for a greater width of right-of-way and an increased level of construction difficulty in agricultural lands. Local farmers routinely plow their fields to depths of 6 feet or more. To avoid interference with current farming practices and protect the pipeline, NBP would need to increase the depth of cover over the pipeline from 3 feet to as much as 9 feet. This would substantially increase both the depth and width of the trench and the amount of spoil excavated from the trench. Both the larger trench and additional spoil would require additional right-of-way.

Two other factors that would greatly increase the width of right-of-way and the difficulty of construction in agricultural fields are the generally high water table and sandy soils. In addition to the project area's proximity to the Colorado River, these fields are irrigated with channels and canals that significantly raise the water table. Removing this water from the trench would require an elaborate dewatering operation including the use of well points and large pumps along the length of the trench. Achieving the necessary trench depth would also be more difficult because of the loose non-cohesive sandy subsoils, which would

collapse and cave-in during excavation. If the trench were to widen beyond what is anticipated, topsoil on the working side of the right-of-way could be lost into the trench. To prevent this from happening, NBP could strip topsoil from the full width of the right-of-way, but this would increase the potential for water to collect on the right-of-way and require an even wider right-of-way to store the additional topsoil. In order to maintain worker safety and stabilize the trench walls, NBP may also need to install sheet piling. This trenching method would slow the rate of construction significantly and unreasonably increase construction costs. For all of these reasons, the impact on agricultural land would be much greater for the Devers, Center Section, and West Canal Alternatives than the proposed route or 16th Avenue Alternative.

The proposed route and all of the alternatives would cross the Colorado River and generally the same number of mapped irrigation canals and drains. The Devers Alternative, however, would cross the Colorado River at a different location than the other routes. The Devers Alternative river crossing would be about 1,100 feet longer than river crossings by the other routes. Because NBP has not conducted geotechnical work at this alternative crossing location, the feasibility of drilling the river at the Devers Alternative location is unknown. However, even assuming that subsurface conditions are similar to the proposed crossing, the greater length of the Devers Alternative drill would increase the duration of the crossing and the risks of drill problems and failure. If the drill fails, the river crossing would need to be open-cut, which would affect habitat for special status species (see sections 5.3.2.2 and 5.7).

The Devers, Center Section, and West Canal Alternatives would have a greater impact on mapped irrigation canals and drains than either the proposed route or 16th Avenue Alternative. Whereas many of the canal and ditch crossings associated with the proposed route and the 16th Avenue Alternative would be at road culverts, and thus could easily be bored by NBP, the canal and drain crossings in the agricultural fields would be far from roads and either open cut, bored, drilled, or aerially spanned. The PVID, which manages the major irrigation canals and drains in the Palo Verde Valley, has expressed concerns about all of these possible crossing methods when the crossing would not be associated with a road culvert. The PVID is concerned that crossings outside of the roadway easement could affect the integrity or flow of irrigation canals and drains during construction and may limit future drain operation and maintenance activities. The PVID specifically asked us to give strong consideration to placing the pipeline in a dedicated public road right-of-way. The FWS has also indicated a preference for the pipeline to be installed across drains in a roadway easement because the drains contain habitat for the federally listed endangered Yuma clapper rail and the state-listed threatened black rail. The FWS is concerned that construction across drains outside of a roadway would result in both more direct (*e.g.*, additional open-cut drain crossings) and indirect (*e.g.*, additional noise and activity) disturbances to areas potentially occupied by these sensitive species.

The Devers, 16th Avenue, and Center Section Alternatives would cross slightly more NWI-mapped wetlands than either the proposed route or the West Canal Alternative. All of the mapped wetlands crossed by the proposed route and the West Canal Alternative and about half of the wetlands crossed by the other alternatives are adjacent to the Colorado River and would be avoided by the directional drill crossing of the river. About 450 feet of scrub-shrub wetland, mostly east of the river, would be disturbed by the Devers Alternative and about 200 feet of scrub-shrub wetland associated with Goodman Slough would be disturbed by the 16th Avenue (if the pipeline would not be in the roadway) and Center Section Alternatives. Overall, the differences in wetland impact between the routes would be relatively minor, and would be mitigated by NBP's CM&R Plan.

The 16th Avenue Alternative would have more residential impact than the other routes. Based on information provided by NBP, there are 22 residences within 50 feet of proposed work areas for the 16th Avenue Alternative. The number of residences that would be within 50 feet of work areas of the other routes is, by contrast, six residences/businesses for the proposed route, six residences for the Center Section

Alternative (five of which would be within the construction right-of-way), four residences for the Devers Alternative, and no residences for the West Canal Alternative. During construction, residents living near construction activities would experience increased noise, dust, traffic, and other inconveniences. Because of the greater number of people living near construction areas along 16th Avenue, a larger number people would be exposed to these impacts along that route than along the other routes. As discussed in sections 5.8.2.2 and 5.8.2.3, these effects would be temporary, however, and would be mitigated by NBP's plan to coordinate construction activities with local officials and residents, its adherence to site-specific residential construction plans, its commitment to maintain access to residential homes, and its offer to temporarily relocate residents to a hotel or other lodging during construction near their homes.

During the public scoping period, concerns were raised about the safety of operating a pipeline along 18th Avenue. At the January 11, 2001 scoping meeting, however, the Emergency Services Coordinator for the city of Blythe, California stated that he would prefer an alignment along 18th Avenue to safeguard against inadvertent contact with agricultural equipment. Presumably similar concerns would be expressed about operating a pipeline along 16th Avenue. These concerns might also be voiced for the other alternatives. Pipeline safety is regulated by the DOT. NBP would construct the pipeline to meet and, in some cases, exceed DOT's safety requirements. These requirements include more stringent safety measures in populated areas. Specifically, NBP has indicated that in the case of 18th Avenue it proposes to exceed the DOT's requirements by installing a thicker-walled pipe than required by the DOT. NBP also proposes to install a MLV along 18th Avenue at a closer interval to the other MLVs than required by the DOT. For additional information about pipeline safety, see section 5.12.

In spite of being close to a number of residences, the collocation of the proposed route within an existing road easement may reduce the number of landowner easements required. According to NBP, the Devers and Center Section Alternatives would require more easements from landowners than the proposed route. A similar increase in landowner easements also seems probable for the West Canal Alternative due to its lower utilization of existing rights-of-way. The number of landowner easements required for the 16th Avenue Alternative depends on how much of the pipeline could be constructed within the road. As discussed above, at least portions of the 16th Avenue Alternative are likely to be outside the road easement due to the presence of existing utilities currently in or adjacent to 16thAvenue.

Based on the factors discussed above, we believe that none of the four 18th Avenue alternatives is environmentally preferable to the proposed route. The 16th Avenue Alternative offers no advantages and would have a greater impact on residents. Additionally, the 16th Avenue Alternative would affect one more wetland than the proposed route and would potentially affect more landowners and agricultural property if, as NBP speculates, portions of the route would need to be constructed outside of the road easement to avoid existing utilities. The Center Section and West Canal Alternatives would have similar or fewer residences near the construction right-of-way as the proposed route, but both routes would increase land disturbance and have significantly greater agricultural impacts than the proposed route. The Center Section and West Canal Alternatives would also increase drain and canal impacts by crossing these features outside of roadway easements where the drains and canals are not contained within culverts. Both alternatives would also require easements from more landowners, and bisect more properties than the proposed route. The relative impact of the Devers Alternative would be even greater. Not only would the Devers Alternative be longer than the other routes, but it would cross and disturb more agricultural land. The Devers Alternative would also have the greatest impact on wetlands and the most difficult crossing of the Colorado River.

6.1.3 Designated Utility Corridor Alternatives

The proposed North Baja pipeline route is within the CDCA from MPs 3.4 to 22.3 and MPs 33.8 to 79.8. As previously discussed, the BLM administers a comprehensive land use management plan for the CDCA (CDCA Plan) that designates 16 utility planning corridors and 8 contingent corridors. These corridors were developed to minimize the number of separate rights-of-way, encourage joint use of corridors, provide alternative corridors to be considered during processing of applications, and avoid sensitive resources wherever possible (BLM, 1980). Deviations from a designated utility corridor within the CDCA on BLM land would require an amendment to the CDCA Plan. The North Baja pipeline route is outside the designated utility corridors within the CDCA on BLM land in five locations for a total length of 19.8 miles. These locations are between MPs 34.1 to 35.0, MPs 53.6 to 65.0, MPs 68.0 to 70.5, MPs 71.8 to 74.3, and MPs 77.3 to 79.8 (see figure 6.1.3-1).

As also shown on figure 6.1.3-1, the proposed route would cross the Milpitas Wash SMA between MPs 29.2 and 33.8. Approximately 3.3 miles of this crossing would be on BLM land. As previously discussed, the portion of the route on BLM land within the Milpitas Wash SMA would require an amendment to the Yuma District Plan.

We evaluated alternative routes that would comply with the CDCA Plan and the Yuma District Plan. These routes would be adjacent to the existing WAPA electric transmission line and would remain within a designated utility corridor within the CDCA on BLM land for all but 2.5 miles near the southern terminus of the project. None of the alternatives would cross the Milpitas Wash SMA. The alternatives correspond to three segments of the proposed route that deviate from the designated utility corridor.

The Palo Verde Mountains Alternative is an alternative to the corresponding segment of the proposed route between MPs 22.3 to 39.0. The Powerline North Alternative is an alternative to the corresponding segment of the proposed route between MPs 51.8 to 66.8. The Powerline South Alternative is an alternative to the corresponding segment of the proposed route between MPs 66.8 to 79.8. Figure 6.1.3-1 shows the proposed and alternative routes in relation to the CDCA boundary, the Milpitas Wash SMA, BLM land, and designated utility corridor boundaries.

Palo Verde Mountains Alternative (MPs 22.3 to 39.0)

The Palo Verde Mountains Alternative would deviate from the proposed route at MP 22.3 and proceed south adjacent to an existing WAPA electric transmission line through the Palo Verde Mountains for approximately 13.5 miles before rejoining the proposed route at MP 39.0 (see figure 6.1.3-2). The majority of the Palo Verde Mountains Alternative would be within the CDCA and all of the alternative would be within designated Utility Corridor J. None of the alternative would cross the Milpitas Wash SMA. An environmental comparison of the Palo Verde Mountains Alternative to the corresponding segment of the proposed route is presented in table 6.1.3-1.

The Palo Verde Mountains Alternative would be 3.2 miles shorter than the corresponding segment of the proposed route and would follow existing rights-of-way for its entire length compared to only 3.3 miles of the proposed route being adjacent to existing rights-of-way. As shown on figure 6.1.3-2, the majority of the proposed pipeline route in this segment is outside of the CDCA. Where the proposed pipeline route is within the CDCA, approximately 0.9 mile is on BLM land outside of a designated utility corridor and would require a CDCA Plan amendment. Outside the CDCA, BLM land crossed by this segment of the proposed route is under the jurisdiction of the Yuma Field Office. Approximately 3.3 miles of the proposed pipeline route in this location crosses BLM land within the Milpitas Wash SMA and would require an amendment to the Yuma District Plan (see figure 6.1.3-2).

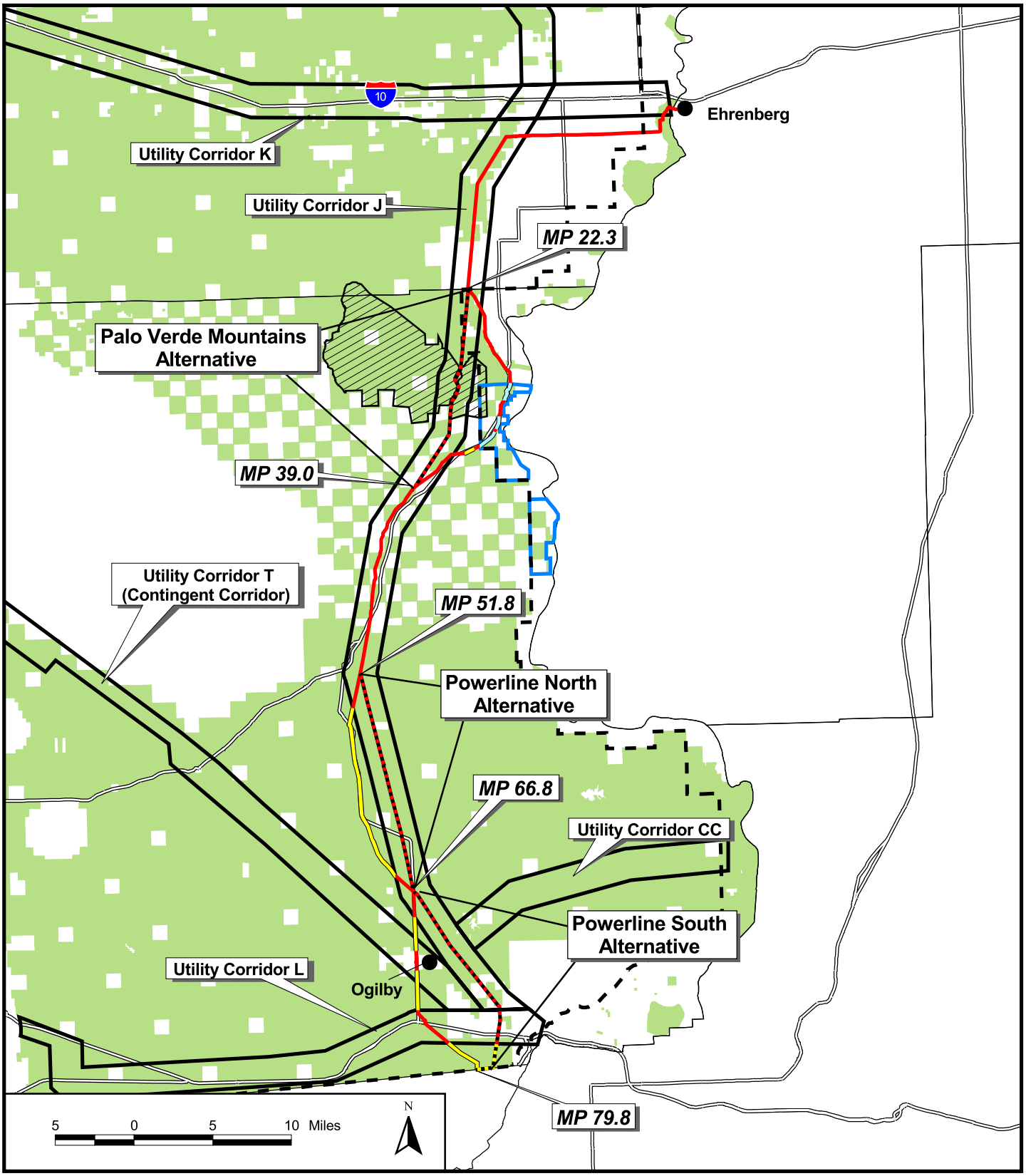
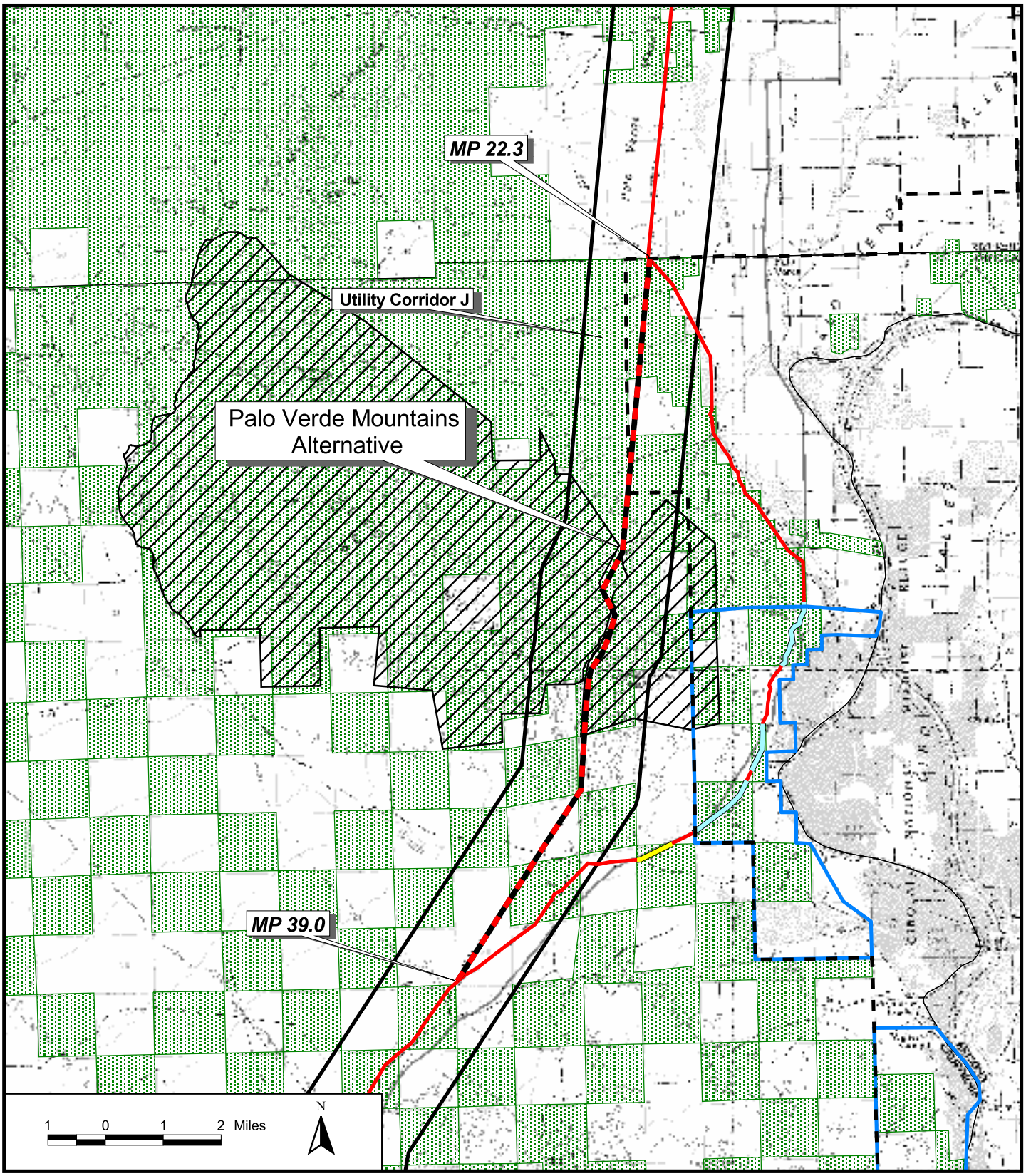


Figure 6.1.3-1
North Baja Pipeline Project
Designated Utility Corridor Alternatives
MPs 22.3 to 79.8



LEGEND

- -Proposed Route
- -Alternative Route
- -Proposed Route Requiring a CDCA Plan Amendment
- -Proposed Route Requiring a Yuma District Plan Amendment
- CDCA Boundary
- Milpitas Wash SMA
- BLM Land
- Utility Corridor
- Wilderness Area

Figure 6.1.3-2
North Baja Pipeline Project
Palo Verde Mountains Alternative
MPs 22.3 to 39.0

TABLE 6.1.3-1

Environmental Comparison of the Palo Verde Mountains Alternative to the Proposed Route MPs 22.3 to 39.0

Environmental Factor	Unit	Palo Verde Mountains Alternative	Proposed Route
Length	Miles	13.5	16.7
Length adjacent to existing rights-of-way	Miles	13.5	3.3
Length adjacent to designated wilderness areas	Miles	3.5	0
Length requiring a CDCA Plan amendment a/	Miles	0	0.9
Length requiring a Yuma District Plan amendment b/	Miles	0	3.3
Cultural resources within 1,300 feet c/	Number	84	44
Cultural resources potentially eligible for listing on the NRHP c/	Number	36	40
Habitat for Nelson's bighorn sheep	Miles	13.5	0

a/ Length of route segment on BLM land within the CDCA but outside of a designated utility corridor.

b/ Length of route segment on BLM land within the Milpitas Wash SMA.

c/ Totals for the alternative are based on a records search. Totals for the proposed route are based on a records search and cultural resources survey results.

NBP was aware of the advantages of the Palo Verde Mountains Alternative when it first identified the pipeline route. In fact, because of these advantages, the alternative was NBP's preferred route during the initial planning stages of the project. However, after field reconnaissance, NBP determined that the resources, terrain, and workspace constraints associated with the Palo Verde Mountains Alternative were unfavorable and ill-suited for installation of a pipeline.

This alternative would pass between two designated parts of the Palo Verde Mountains Wilderness Area adjacent to the existing transmission line. As stated in section 4.8.5, the 1964 Wilderness Act stipulates that there shall be no commercial enterprise, no permanent road (except as necessary to meet minimum requirements for the administration of the area), no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area. Unlike the rest of Utility Corridor J, which is 2 miles wide, the corridor in this area is limited to the 100-foot-wide transmission line easement. The guy wires from the transmission line extend to the edge of the easement. The transmission line is paralleled by a wash that weaves back and forth from the east to the west side of the corridor. The terrain in this area is also rugged and steep with narrow canyons and side slopes. Unlike the transmission line that can span difficult terrain and thereby minimize ground disturbance, construction of the pipeline would require extensive grading, blasting, and recontouring in this area to create a level working surface for the operation of equipment. These activities would likely increase the width of the right-of-way needed to build the pipeline, increase land disturbance, and scar the landscape. The increase in the construction right-of-way would encroach into the wilderness area in some locations. Although NBP would attempt to recontour disturbed areas, reestablishment of the

preconstruction contours in some of the steepest areas may not be possible. This could permanently alter the landscape and diminish the value of the adjacent wilderness areas. Additionally, because of the narrow width of Utility Corridor J in the Palo Verde Mountains Wilderness Area, it is unlikely that the corridor could accommodate other utilities if the pipeline were to be built in this location. The combination of the existing powerline and the terrain modifications that may result from construction of the pipeline could also increase unauthorized use of the area by OHVs.

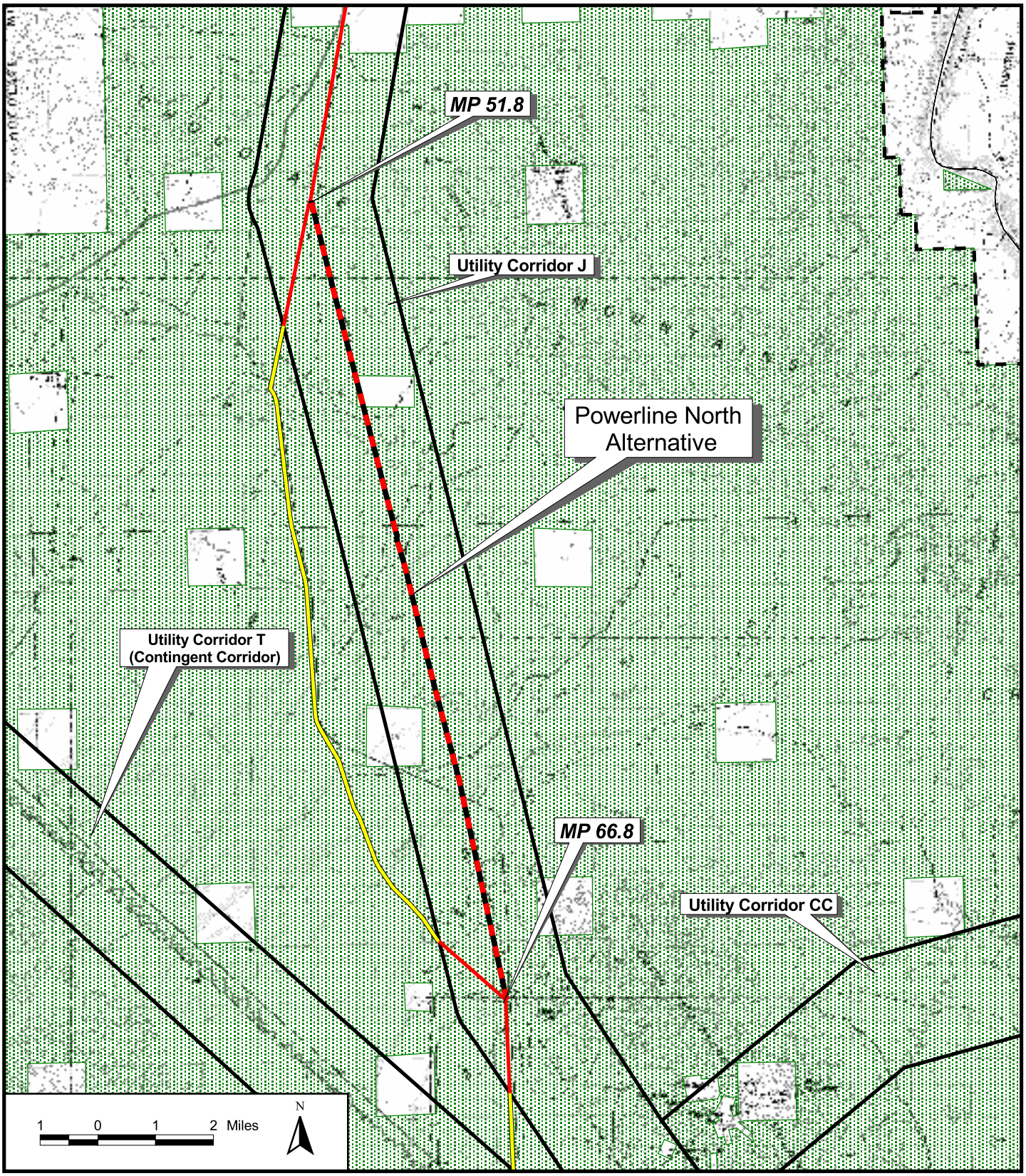
Because the alternative route through the Palo Verde Mountains is physically impassable for pipeline construction without violating the Palo Verde Wilderness boundaries, NBP did not complete detailed cultural resources and biological field surveys for this segment. However, according to a records search of previous survey data, construction along the Palo Verde Mountains Alternative has the potential to affect more cultural resources than the proposed route. Based on an approximately 1,300-foot-wide corridor centered on the existing transmission line, 84 cultural resources are located in the area of the alternative route, 36 of which are potentially eligible for listing on the NRHP. A records search was also conducted for the proposed route prior to survey that identified 11 sites within 1,300 feet of the route and 10 cultural resources potentially eligible for listing on the NRHP. After survey was conducted along the proposed route, the number of cultural resources increased to 44 as indicated in table 6.1.3-1; however, the alternative would still potentially affect almost twice as many known cultural resources. It is likely additional cultural resources would be identified along the alternative if surveys were conducted.

The alternative would also cross Nelson's bighorn sheep habitat in the Palo Verde Mountains that the proposed route would avoid by constructing through the foothills of the mountains (BLM and CDFG, 2001). Nelson's bighorn sheep is a BLM sensitive species found in rocky, steep areas with available water and herbaceous forage.

In summary, the advantages of the Palo Verde Mountains Alternative compared to the corresponding segment of the proposed route are its shorter length, greater collocation with existing rights-of-way, and location within a designated utility corridor, which would eliminate the need to amend the CDCA Plan. The primary disadvantages of the Palo Verde Mountains Alternative are its proximity to more cultural resources, potential effect on Nelson's bighorn sheep, and construction constraints caused by its rugged and steep terrain that would result in encroachment into the Palo Verde Mountains Wilderness Area boundaries. The 1964 Wilderness Act prohibits commercial enterprises, roads, use of motor vehicles, and structures or installation within any wilderness area. Although the proposed route does not encroach into or cross the Palo Verde Mountains Wilderness Area, it does cross the Milpitas Wash SMA and thus would require a Yuma District Plan amendment. It is not possible to identify an alternative route in this location that would avoid the wilderness area without crossing the Milpitas Wash SMA because the Milpitas Wash SMA overlaps the eastern boundary of the wilderness area (see figure 6.1.3-2). In section 6.2.1, we evaluate route variations that would reduce the length of the crossing of the Milpitas Wash SMA.

Powerline North Alternative (MPs 51.8 to 66.8)

The Powerline North Alternative would deviate from the proposed route at MP 51.8 and proceed southeast adjacent to the existing WAPA electric transmission line before rejoining the proposed route at MP 66.8 (see figure 6.1.3-3). All of the Powerline North Alternative would be within the CDCA and within designated Utility Corridor J. Table 6.1.3-2 provides an environmental comparison of this alternative to the corresponding segment of the proposed route between MPs 51.8 to 66.8.



LEGEND

- -Proposed Route
- -Alternative Route
- -Proposed Route Requiring a CDCA Plan Amendment
- BLM Land
- Utility Corridor
- CDCA Boundary

Figure 6.1.3-3
North Baja Pipeline Project
Powerline North Alternative
MPs 51.8 to 66.8

TABLE 6.1.3-2

Environmental Comparison of the Powerline North Alternative to the Proposed Route MPs 51.8 to 66.8

Environmental Factor	Unit	Powerline North Alternative	Proposed Route
Length	Miles	14.2	15.0
Length adjacent to existing rights-of-way	Miles	14.2	9.3
Length requiring a CDCA Plan amendment a/	Miles	0	11.42
Cultural resources within the 220-foot-wide survey corridor	Number	34	20
Cultural resources potentially eligible for listing on the NRHP	Number	29	17
Wash crossings > 6 feet wide	Number	38	15
Length of FWS-designated critical desert tortoise habitat	Miles	7.8	7.8
Length of BLM Category II desert tortoise habitat	Miles	5.4	5.4
Desert tortoise and desert tortoise sign	Number		
Scat/tracks		6	10
Burrow/pallet		28 (36 percent active)	28 (39 percent active)
Carcass/remains b/		3	8
Tortoise		7	14

a/ Length of route segment on BLM land within the CDCA but outside of a designated utility corridor. Includes a 0.02-mile-long access road at MP 60.2 that NBP indicates would be permanent.

b/ Includes carcass, bones, scutes, and shell fragments.

The Powerline North Alternative would be approximately 0.8 mile shorter than the corresponding segment of the proposed route and would follow existing rights-of-way for its entire length compared to only 9.3 miles or 62 percent of the proposed route being adjacent to existing rights-of-way. As discussed above, the Powerline North Alternative would be located entirely within a designated utility corridor. In contrast, the proposed route includes 11.42 miles outside of a designated utility corridor on BLM land within the CDCA that would require a CDCA Plan amendment.

NBP completed cultural resources and biological surveys along the Powerline North Alternative. These surveys identified 14 more cultural resources along the alternative route than the proposed route. NBP's cultural resources consultant recommended that 29 of the cultural resources associated with the alternative are potentially eligible for listing on the NRHP versus 17 cultural resources along the proposed route (Kirkish, 2001).

The Powerline North Alternative would increase impact on desert wash habitat since the powerline route is located within a desert wash complex for much of its length. As discussed in sections 4.5.1 and 4.6.1, the desert wash vegetation type is less common in the project area and provides habitat for a greater number of species than Sonoran creosote bush scrub. The alternative would also cross more ephemeral washes greater than 6 feet wide.

The Powerline North Alternative and the proposed route both cross similar amounts of FWS-designated critical habitat and BLM Category II habitat for the desert tortoise. During March and April 2001,

NBP conducted a desert tortoise survey of the proposed route and the Powerline North Alternative. As shown in table 6.1.3-2, more desert tortoise and desert tortoise sign were observed along the corresponding segment of the proposed route than along the Powerline North Alternative. It is unknown whether the different topography along the routes may have influenced the ability to identify desert tortoise and desert tortoise sign and/or whether additional surveys would show the same results or trends given the relatively small number of observations.

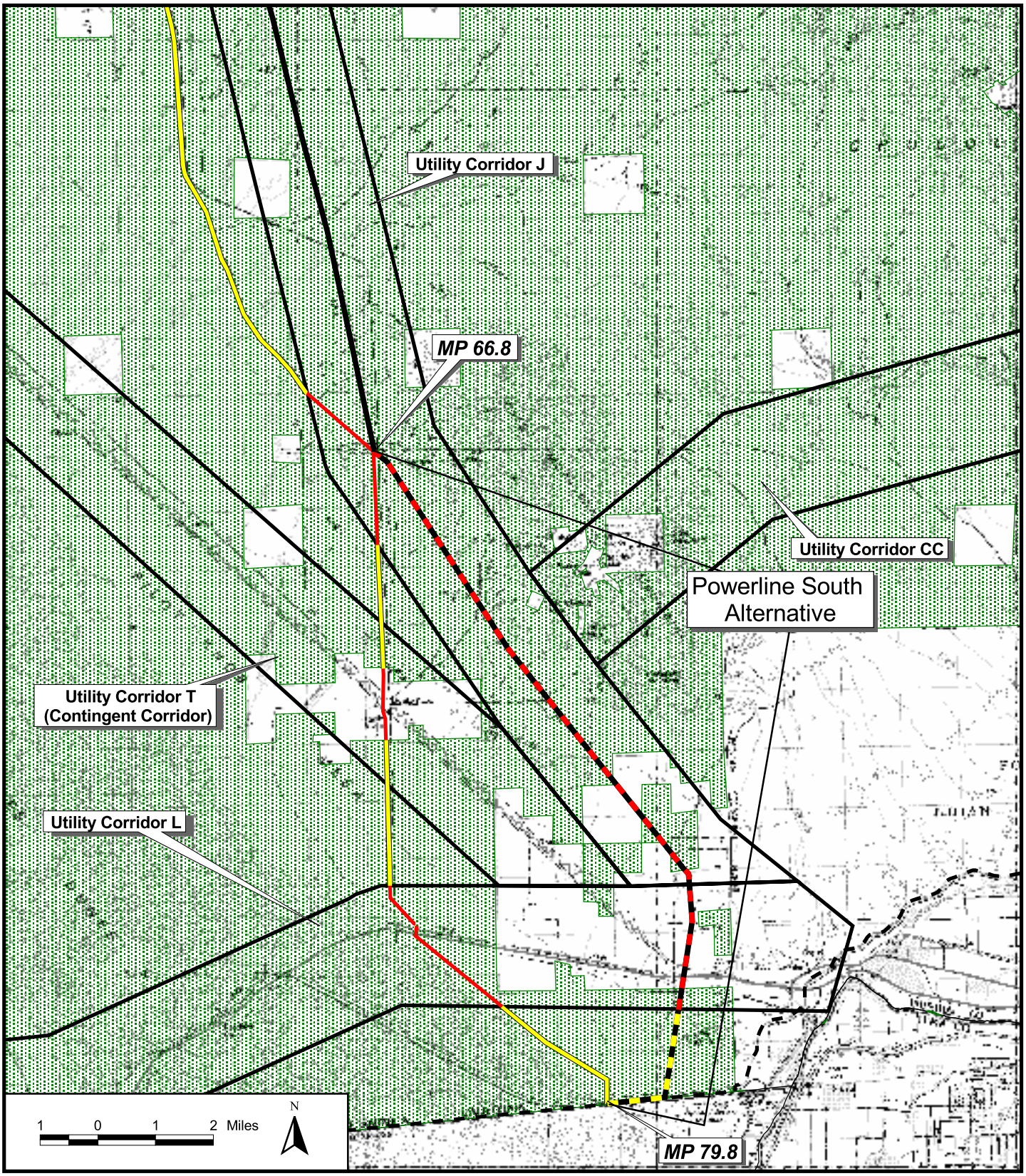
Access to both routes could be accomplished using a series of existing roads in the area. According to NBP, six access roads would be used along the proposed route in this area to access the construction right-of-way from Ogilby Road. Of these six roads, three are existing roads needing no improvement (Type 1), one is an existing road needing some improvement (Type 2), and two are new roads (Type 3) (see table C-2 in appendix C). Existing roads are also available to access the alternative route from Ogilby Road. These roads would be used to access another existing road that runs adjacent to the powerline for the entire length of the alternative route.

In summary, the advantages of the Powerline North Alternative compared to the corresponding segment of the proposed route are its location within a designated utility corridor and its potential to affect fewer desert tortoise. The primary disadvantages of the Powerline North Alternative compared to the proposed route would be its increased effect on desert wash habitat, its proximity to a greater number of cultural resources, including resources recommended as potentially eligible for listing on the NRHP, and its increased number of crossings of large ephemeral washes.

Powerline South Alternative (MPs 66.8 to 79.8)

The Powerline South Alternative would deviate from the proposed route at MP 66.8 and proceed southeast adjacent to the existing WAPA electric transmission line within designated Utility Corridor J to the intersection with an east-west running electric powerline located north of I-8 within designated Utility Corridor L. The alternative would then continue south to the United States/Mexico border (see figure 6.1.3-4). At the border, the route would turn west and parallel the All American Canal for about 1 mile to connect with the Gasoducto Bajanorte Project. All of the Powerline South Alternative would be within the CDCA and all but 2.5 miles of the alternative would be within a designated utility corridor. Table 6.1.3-3 provides an environmental comparison of the Powerline South Alternative to the corresponding segment of the proposed route between MPs 66.8 to 79.8.

The Powerline South Alternative would follow existing rights-of-way for a greater percentage of its length (78 percent) than the proposed route (60 percent). Although the Powerline South Alternative would be located mostly within a designated utility corridor, an amendment to the CDCA Plan would be needed for the 2.5 miles of the alternative that are outside a designated utility corridor on BLM land within the CDCA. The proposed route includes 7.5 miles that would require a CDCA Plan amendment, of which 1.5 miles would be in a contingent corridor (see section 4.8.4.1).



LEGEND

- -Proposed Route
- -Alternative Route
- -Proposed Route Requiring a CDCA Plan Amendment
- -Alternative Route Requiring a CDCA Plan Amendment
- BLM Land
- Utility Corridor
- CDCA Boundary

Figure 6.1.3-4
North Baja Pipeline Project
Powerline South Alternative
MPs 66.8 to 79.8

TABLE 6.1.3-3

Environmental Comparison of the Powerline South Alternative to the Proposed Route MPs 66.8 to 79.8

Environmental Factor	Unit	Powerline South Alternative	Proposed Route
Length	Miles	14.0	13.0
Length adjacent to existing rights-of-way	Miles	10.9	7.8
Length requiring a CDCA Plan amendment a/	Miles	2.5	7.5 b/
Cultural resources within the 220-foot-wide survey corridor	Number	33	19
Cultural resources potentially eligible for listing on the NRHP	Number	28	14
Wash crossings > 6 feet wide	Number	24	16

a/ Length of route segment on BLM land within the CDCA but outside of a designated utility corridor.

b/ Includes the 1.5-mile-long portion of the proposed route on BLM land within Contingent Utility Corridor T (see section 4.8.4.1).

Another advantage of the Powerline South Alternative is that it would be further from the Imperial Sand Dunes, which provide a large area of OHV use. In a meeting on March 12, 2001, the FWS expressed concern about the close proximity of the proposed pipeline route to the Imperial Sand Dunes and the increased accessibility the right-of-way could provide into this sensitive area.

The primary disadvantage of the Powerline South Alternative is its proximity to Pilot Knob. Pilot Knob is considered a culturally sensitive area by Native Americans. The Quechan Tribe expressed concerns about routes that would be closer to Pilot Knob than the proposed route and indicated that the southern portion of the Powerline South Alternative, which skirts the base of Pilot Knob, would be of greater concern to the tribe than routes to the west such as the proposed route. The Quechan Tribe specifically asked that the proposed route be sited as far from Pilot Knob as possible.

Because the Quechan Tribe indicated that following the Powerline South Alternative where it approaches Pilot Knob would present cultural conflicts, NBP did not conduct detailed biological surveys of the alternative. However, compared to the proposed route, the alternative would be longer and consequently increase land disturbance. Although the types of habitats crossed by both routes are similar, the greater length of the alternative would increase impact on desert vegetation. Additionally, the Powerline South Alternative would cross eight more large ephemeral washes (washes greater than 6 feet wide) than the proposed route.

This alternative may also have a greater impact on cultural resources. NBP completed cultural resources surveys along the Powerline South Alternative that identified 14 more cultural resources along the alternative route than the proposed route (Kirkish, 2001). NBP's cultural resources consultant recommended that 28 of the cultural resources associated with the alternative are potentially eligible for listing on the NRHP versus 14 resources along the corresponding segment of the proposed route.

In summary, although the Powerline South Alternative has several advantages, its major advantage is its location within a designated utility corridor for all but 2.5 miles of the route. However, the BLM would still need to amend the CDCA Plan for the alternative. The alternative would also be further from the Imperial Sand Dunes. The disadvantages of the Powerline South Alternative include its proximity to Pilot

Knob, the crossing of more desert habitat and large washes, and proximity to a greater number of cultural resources, including 28 cultural resources potentially eligible for listing on the NRHP. To further address concerns about the potential for the proposed route to increase access into the Imperial Sand Dunes, we evaluated two variations to the proposed route that would move the route further from the dunes (see section 6.2.2).

6.2 ROUTE VARIATIONS

We identified five route variations in section 3.0 of this draft EIS/EIR and draft plan amendment that warranted additional review. These route variations are evaluated below in comparison with the corresponding segment of the proposed route.

6.2.1 Refuge Variations

We assessed three route variations between MPs 28.6 and 31.9 that would avoid construction in the foothills of the Palo Verde Mountains and reduce the crossing of the Milpitas Wash SMA on BLM land. Two of the variations, the Cibola and Saddle Variations, follow a completely different route than the proposed route. The other variation, the Connector Variation, follows the same alignment as the proposed route between MPs 28.6 and 30.1 but then deviates and follows a different route from the proposed route for the rest of its length. The use of a common beginning and ending point for all three variations provides meaningful data when comparing the route. These route variations are based on NBP's June 11, 2001 filing, which moved the variations closer to SR 78 than variations under earlier consideration.

All three of these variations would cross the Cibola NWR, which would require a compatibility determination from the FWS. The proposed route does not cross the Cibola NWR. All three of these variations and the proposed route would cross the Milpitas Wash SMA. As previously discussed, installation of a new utility on BLM land within the Milpitas Wash SMA would require an amendment to the Yuma District Plan.

Figure 6.2.1-1 shows the proposed route and the three route variations in relation to the Cibola NWR, the Milpitas Wash SMA, BLM land, and SR 78. An environmental comparison of the three route variations to the corresponding segment of the proposed route is presented in table 6.2.1-1.

The Cibola Variation would begin at MP 28.6 and proceed southeast and then southwest mostly adjacent to or on gravel roads for about 1.3 miles. From this point, the variation would traverse the western boundary of the Cibola NWR crossing into the refuge at five separate locations over the next 2.5 miles until it rejoins the proposed route at MP 31.9. This variation would be adjacent to existing gravel roads or transmission line right-of-way for approximately 2.4 miles. The total length of the Cibola Variation within the Cibola NWR would be about 1.4 miles, of which about 1.2 miles would be adjacent to an existing transmission line right-of-way. About 0.5 mile of the Cibola Variation would require a Yuma District Plan amendment.

The Saddle Variation would follow the same alignment as the Cibola Variation for about 0.8 mile. It would then turn and proceed south for about 0.4 mile to a point just north of the Cibola NWR boundary. At this location, the Saddle Variation would follow the same alignment as the Cibola Variation until MP 31.9, where it would rejoin the proposed route. This variation would be adjacent to existing gravel roads or transmission line right-of-way for approximately 2.3 miles. The total length of the Saddle Variation within the Cibola NWR would be about 1.4 miles, of which about 1.2 miles would be adjacent to an existing transmission line right-of-way. About 0.5 mile of the Saddle Variation would require a Yuma District Plan amendment.

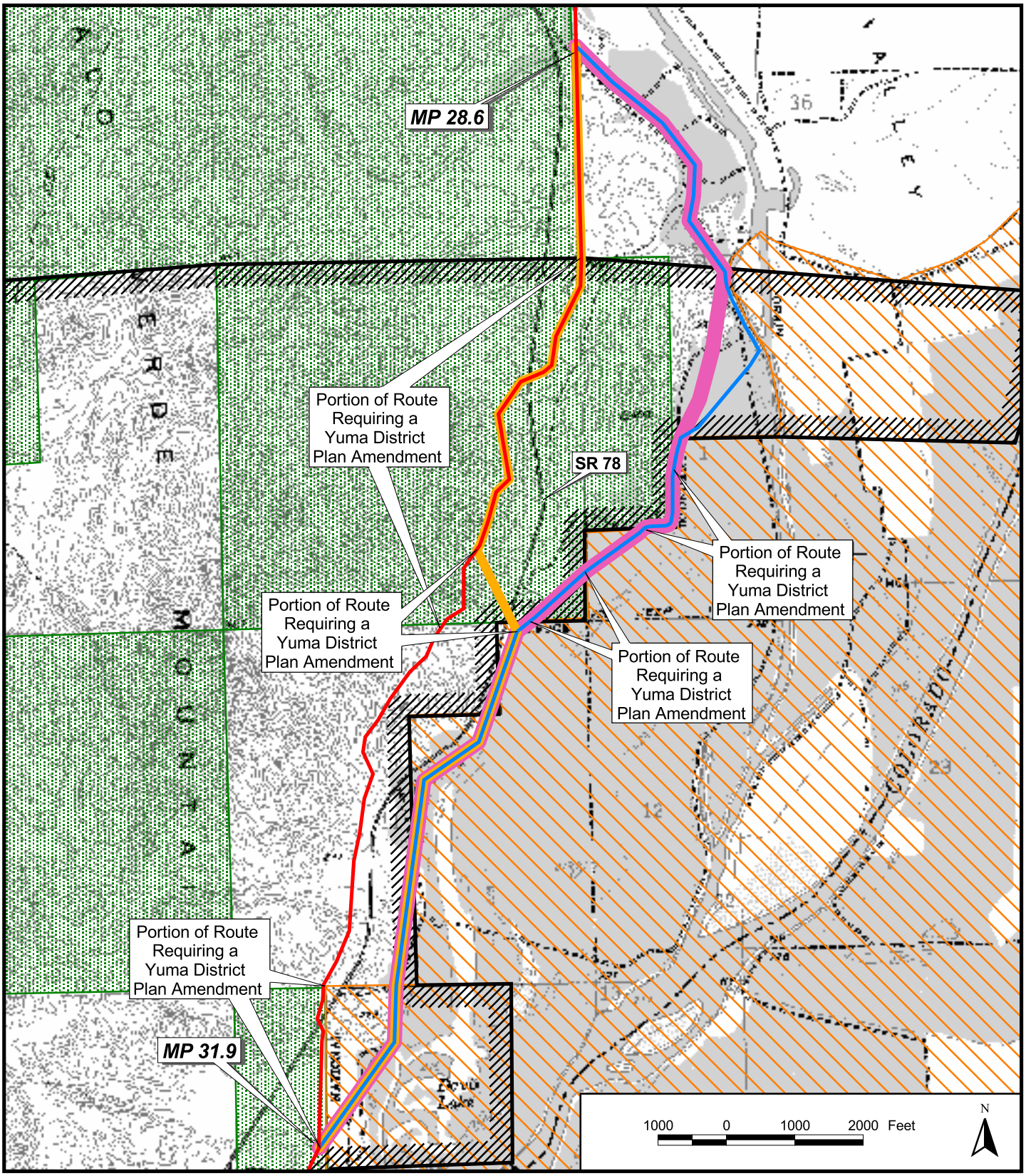


Figure 6.2.1-1
North Baja Pipeline Project
Refuge Variations

TABLE 6.2.1-1

Environmental Comparison of the Refuge Variations to the Proposed Route
MPs 28.6 to 31.9

Environmental Factor	Proposed Route	Cibola Variation	Saddle Variation	Connector Variation
Length (miles)	3.3	3.8	3.7	3.5
Length adjacent to existing roads or transmission line (miles)	0.0	2.4	2.3	1.2
Length within Cibola NWR (miles)	0.0	1.4	1.4	1.2
Length adjacent to existing roads or transmission line within Cibola NWR (miles)	0.0	1.2	1.2	1.2
Length requiring a Yuma District Plan amendment a/	1.5	0.5	0.5	1.2
Land disturbance (acres) c/	32.0	36.8	35.9	33.9
Construction/restoration difficulty b/	Moderate/Difficult	Low	Low/Moderate	Low/Moderate
Rivers/streams/canals/drains (number) d/	0	0	0	0
Dry desert washes > 4 feet wide (number) b/	6	17	17	11
NWI-mapped wetlands (feet)	0	8,100	6,950	3,175
Creosote bush scrub habitat crossed (acres) b/	31.0	15.5	14.6	27.5
Desert wash woodland habitat crossed (acres) b/	1.0	2.0	2.0	0.0
Sodic seasonal wetland/tamarisk scrub habitat crossed (acres) b/	0.0	19.3	19.3	6.4
Desert tortoise habitat disturbed (acres) b/	32.0	15.5	14.6	25.5
Desert tortoise and desert tortoise sign (number)				
Scat	1	0	0 e/	0 f/
Abandoned burrow	1	0	0 e/	0 f/
Southwestern willow flycatcher potential habitat disturbed (acres) b/	0.0	19.3	19.3	6.4
Cultural resources that are in APE/difficult to avoid (number) b/	12/10	10/8	11/8	10/8
Cultural resources likely to be eligible for listing on the NRHP (number) b/	11	6	7	8

a/ Length of route segment on BLM land within the Milpitas Wash SMA.

b/ Based on information provided by NBP.

c/ Based on an 80-foot-wide construction right-of-way.

d/ Based on USGS topographic maps.

e/ The portion 0.4-mile-long portion that deviates from the Cibola Variation was not surveyed.

f/ The portion 0.3-mile-long portion that deviates from the Cibola Variation was not surveyed.

The Connector Variation would follow the same alignment as the proposed route between MPs 28.6 and 30.1. At MP 30.1, the Connector Variation would deviate from the proposed route and proceed southeast for about 0.3 mile and cross SR 78. A short distance southeast of the SR 78 crossing, the Connector Variation would join and follow the same alignment as the Cibola Variation until MP 31.9, where it would rejoin the proposed route. The total length of the Connector Variation within the Cibola NWR would be about 1.2 miles, all of which would be adjacent to an existing transmission line right-of-way. About 1.2 miles of the Connector Variation would require a Yuma District Plan amendment.

All of the variations are longer and would disturb between 1.9 to 4.8 acres more land than the proposed route. The Cibola Variation would result in the greatest amount of land disturbance (36.8 acres) followed by the Saddle Variation (35.9 acres), and the Connector Variation (33.9 acres). The three variations would cross between 1.2 and 1.4 miles of the Cibola NWR, which is administered by the FWS. The proposed route avoids the wildlife refuge in its entirety.

All three variations would cross less BLM land within the Milpitas Wash SMA than the corresponding segment of the proposed route. The Cibola and Saddle Variations would cross 0.5 mile, the Connector Variation would cross 1.2 miles, and the corresponding segment of the proposed route would cross 1.5 miles within the Milpitas Wash SMA that would require a Yuma District Plan amendment.

The variations would follow existing roads or the transmission line right-of-way for a greater percentage of their total lengths than the proposed route. The proposed route does not follow any existing rights-of-way. The collocation of the variations with existing rights-of-way is highest for the Cibola Variation and somewhat less for the Saddle and Connector Variations. A portion of these variations follow the west side of a powerline through the wildlife refuge to be closer to, and in part on, the SR 78 right-of-way. In this location, the Caltrans right-of-way is 400 feet wide. The variations would longitudinally encroach into the Caltrans right-of-way at two separate locations for a total distance of about 1,322 feet. Review of the Caltrans Encroachment Permit Manual appears to prohibit longitudinal encroachments of certain types of facilities. NBP met with Caltrans on May 22, 2001 to discuss potential use of the Caltrans right-of-way in this location and submitted a follow-up request on May 30, 2001 for conceptual review and approval of the encroachment.

The proposed route, and to a lesser extent the Connector Variation, would cross much more rugged terrain and would be more difficult to construct and restore than the Cibola or Saddle Variations. The difficulties of constructing a pipeline and restoring a right-of-way through rugged terrain are discussed in detail for the Palo Verde Mountains Alternative in section 6.1.2. Although we determined in section 6.1.2 that the proposed route through the foothills of the mountains was preferable to a route though the heart of the mountains, it would still require the resolution of some difficult construction conditions including steep and side sloping terrain. Blasting and aerial crossings over some of the steeper canyons would be required to install the pipeline along the proposed route and the Connector Variation. The Cibola and Saddle Variations would largely eliminate these and other construction difficulties by locating the pipeline through the flatter and more gently sloping terrain within the Cibola NWR.

None of the routes cross any perennial rivers or streams. The variations would cross between 11 and 17 dry washes greater than 4 feet wide, whereas the proposed route would cross 6 dry washes greater than 4 feet wide. Additionally, the variations, particularly the Cibola and Saddle Variations, would cross several NWI-mapped wetlands. Compared to the proposed route, which does not cross any NWI-mapped wetlands, the Cibola, Saddle, and Connector Variations would cross about 8,100 feet, 6,950 feet, and 3,175 feet of NWI-mapped wetlands, respectively.

There are other differences between the routes with respect to the types of vegetation that would be crossed. Based on a habitat assessment by NBP, the proposed route would cross primarily creosote bush scrub habitat. The variations would cross considerably less creosote bush scrub habitat and more sodic seasonal wetland habitat. This wetland habitat is dominated by tamarisk, which is classified as a noxious weed. The Cibola and Saddle Variations would cross more desert wash woodland habitat than either the proposed route or Connector Variation. The federally threatened desert tortoise prefers creosote bush scrub and desert wash woodland habitats and is known to occur in the vicinity of the proposed route. Surveys of the proposed route identified signs of desert tortoise (*i.e.*, scat and an abandoned burrow) along the proposed route between MPs 28.6 and 31.9. Although not all portions of the Saddle or Connector Variations were surveyed, no live tortoise or tortoise sign was observed during a survey of the Cibola Variation.

The areas of sodic seasonal wetland/tamarisk along the Refuge Variations could provide marginal habitat for the southwestern willow flycatcher. As discussed in section 4.5.2, tamarisk is an invasive, non-native plant that aggressively outcompetes native vegetation in areas that have saline or nutrient-poor soil. For wildlife, tamarisk has little value and is usually considered detrimental to native animals. The leaves, twigs, and seeds are extremely low in nutrients, and, as a result, very few insects or wildlife will use them. Although not preferred nesting habitat, tamarisk monocultures can sometimes be used by southwestern willow flycatchers for nesting. To assess whether southwestern willow flycatchers occupy these areas, NBP's biologists will follow current survey protocols (National Park Service, 1997; FWS, 2000a) and visit these areas on five separate occasions during the summer of 2001. Although the results of these surveys are not yet available, the manager of the Cibola NWR considers the habitat very poor and believes that construction through the area could serve to improve habitat conditions by removal of the tamarisk in combination with NBP's proposed measures for post-construction weed control (Hawkes, 2001).

NBP conducted cultural resources surveys of the variations. Although the survey reports are not yet available, based on the results of the surveys NBP indicates that the variations would reduce both the number of cultural resources near the pipeline that may be eligible for listing on the NRHP and the number of cultural resources that would be difficult to avoid during construction in comparison with the corresponding segment of the proposed route. Of the three variations, the Saddle Variation would have the greatest impact on cultural resources, particularly since it crosses one large potentially NRHP eligible site that NBP believes is unavoidable. The Cibola Variation would have the least impact on cultural resources and would avoid a significant petroglyph site along the proposed route that is eligible for the NRHP. During a field visit on April 21, 2001, a representative of the Quechan Tribe commented that the Tribe would prefer the project be constructed in the disturbed road bed adjacent to SR 78, rather than along the proposed route in the undisturbed Palo Verde foothills. If a route adjacent to SR 78 is not possible, the Quechan prefer the Cibola Variation, provided measures are taken to protect certain cultural resources. As stated above, a portion of the Cibola Variation has been moved closer to SR 78 than earlier routes under consideration and NBP is consulting with Caltrans regarding encroachment into its right-of-way.

NBP states that it believes the Cibola Variation is the most environmentally preferable route and submitted a request for a compatibility determination for the Cibola Variation to the Manager of the Cibola NWR on June 6, 2001. Based on our review of the information currently available, we believe all of the Refuge Variations, and particularly the Cibola Variation, have the potential to minimize impacts on biological and cultural resources. Additionally, the Cibola and the Saddle Variations would reduce the amount of BLM land crossed within the Milpitas Wash SMA that would require an amendment to the Yuma District Plan. However, the cultural resources and southwestern willow flycatcher survey reports for the variations have not yet been filed, it is unknown whether Caltrans would allow the required encroachment into its right-of-way, and the outcome of the FWS' compatibility determination is unknown.

6.2.2 Railroad and I-8 Variations

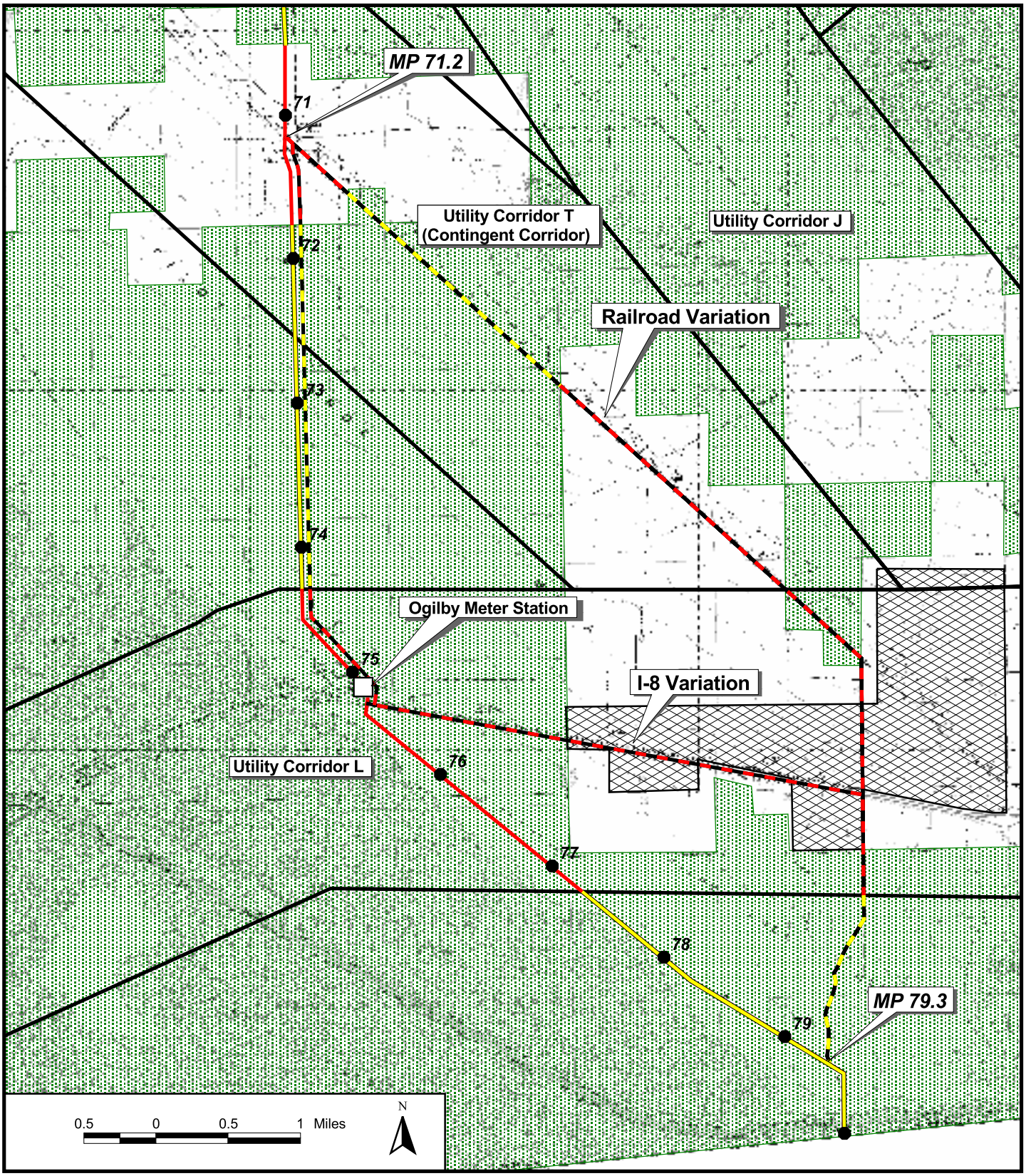
We identified the Railroad and I-8 Variations on the south end of the pipeline route between MPs 71.2 and 79.3 to maximize use of designated and contingent utility corridors and existing rights-of-way. Other issues identified in this area include concerns by the FWS regarding the proximity of the proposed route to the Imperial Sand Dunes and the resulting potential increase in OHV access caused by the pipeline right-of-way, and the preference of the Quechan Tribe to site the proposed pipeline as far from Pilot Knob as possible. The Railroad and I-8 Variations are shown on figure 6.2.2-1 and discussed below.

The Railroad Variation would deviate from the proposed route at MP 71.2 and proceed southeast for 5.3 miles along the south side of the Southern Pacific Railroad within Utility Corridors T and L. From this point, the route would turn and proceed south where it would cross I-8 and exit Utility Corridor L. South of I-8, the variation would proceed adjacent to an existing unimproved road before rejoining the proposed route at MP 79.3.

The I-8 Variation would follow the same alignment as the proposed route from MPs 71.2 to 75.2. There, it would turn east and follow the south side of I-8 within Utility Corridor L for 3.4 miles. The I-8 Variation would then turn south and follow the same unimproved road as the Railroad Variation to MP 79.3 where it would rejoin the proposed route. A portion of both variations and the proposed route would require a CDCA Plan amendment. An environmental comparison of the Railroad and I-8 Variations to the corresponding segment of the proposed route is presented in table 6.2.2-1.

An advantage of both variations is their greater use of designated and contingent utility corridors and existing rights-of-way when compared to the proposed route. Both variations would also reduce the length of route requiring a CDCA Plan amendment. The I-8 Variation increases the amount of pipeline within designated utility corridors and adjacent to existing rights-of-way, but it also increases the length of the pipeline by 1.3 miles. The greater length of the I-8 Variation increases the amount of land disturbance associated with the pipeline. Assuming all of the routes could be constructed using an 80-foot-wide right-of-way, the I-8 Variation would disturb 12.7 acres more land than the other routes.

All three routes would cross Sonoran creosote bush scrub habitat and desert wash woodland habitat. The Sonoran creosote bush scrub habitat is common throughout the project area and is characterized by shrubs that are generally less than 10 feet tall and widely spaced. The desert wash woodland habitat is characterized by open to dense scrub woodlands less than 60 feet tall occurring in sandy or gravelly washes. The washes typically have braided channels that can be substantially rearranged with every surface flow event. In general, the desert wash woodland habitat provides structural diversity, cover, and forage for more wildlife species than the Sonoran creosote bush scrub habitat. NBP completed an analysis of these variations and concluded that the two variations would impact more desert wash woodland habitat than the proposed route.



LEGEND

- -Proposed Route
- -Route Variation
- -Proposed Route Requiring a CDCA Plan Amendment
- -Route Variation Requiring a CDCA Plan Amendment
- BLM Land
- Planned Community

Figure 6.2.2-1
North Baja Pipeline Project
Railroad and I-8 Variations
MPs 71.2 to 79.3

TABLE 6.2.2-1

Environmental Comparison of the Railroad and I-8 Variations to the Proposed Route MPs 71.2 to 79.3

Environmental Factor	Unit	I-8 Variation	Railroad Variation	Proposed Route
Length	Miles	9.4	8.1	8.1
Length adjacent to existing rights-of-way	Miles	8.8	7.3	3.4
Length within designated utility corridors	Miles	4.5	2.3	3.0
Length requiring a CDCA Plan amendment a/	Miles	3.7	3.2	4.5
Land disturbed during construction b/	Acres	91.2	78.5	78.5
Desert wash woodland crossings d/	Number	29	24	14
Crosses approved 2,345-acre planned community	Yes / No	Yes	Yes	No
Distance from Pilot Knob	Feet	4,800	4,800	6,300
Known cultural resources c/	Number	8	3	11
Cultural resources potentially eligible for listing on the NRHP	Number	5	3	8

a/ Length of route segment on BLM land within the CDCA but outside of a designated utility corridor. Includes the portion of the proposed route and each variation within Contingent Utility Corridor T as follows: (0.8 mile for the I-8 Variation, 2.0 miles for the Railroad Variation, and 0.7 mile for the proposed route).

b/ Based on an 80-foot-wide construction right-of-way.

c/ The proposed route has been surveyed in its entirety; the variations have only partial survey coverage.

d/ Based on review of aerial photographs dated 1996.

Our review of the variations supports NBP's conclusion; however, we believe much of this impact appears to be the result of NBP analyzing routes north of the railroad and I-8 for the Railroad and I-8 Variations, respectively. It appears that desert wash woodland habitat impacts can be reduced for both variations by following alignments south of the railroad and I-8. Based on our review, the proposed route would cross approximately 14 desert wash woodlands compared to 29 along the I-8 Variation and 24 along the Railroad Variation. In addition to crossing more desert wash woodland habitat, the variations would cross more dry washes. An extensive dry wash network is located approximately 3.5 miles east of Ogilby Road where the variations turn and proceed south. In this area, both variations would cross dry washes for distances up to 10,000 feet. NBP indicates that construction through this area would require burying the pipeline deeper to protect it from the forces generated during overland flow events. The Railroad Variation, in particular, would require extra depth of cover to protect the pipeline from washout associated with the high velocity flows of the outlet points of the washes that cross under the railroad embankment. Additional depth of cover to protect the pipeline from washout would also be necessary for the Railroad Variation between the railroad and I-8 where the variation would be located in the approximate center of a large dry wash. The additional pipeline depth may require using additional temporary workspace to store excess spoil and stage equipment which, if required, would result in more land disturbance compared to the proposed route.

The variations would impact more landowners and would cross a planned development. Whereas the corresponding segment of the proposed route crosses BLM land, portions of the variations cross private land (see figure 6.2.2-1). Some of this private land is part of a 2,345-acre planned community that would be

located south of the Southern Pacific Railroad and on both sides of I-8. The plans for this community include housing, commercial, and industrial developments and have been approved and adopted by the Imperial County Board of Supervisors.

Of the three potential routes, only the proposed route has been surveyed for cultural resources in its entirety. Survey coverage for the variations include the portions where they overlap the proposed route and along the alignment south of I-8 that was surveyed when NBP reviewed access roads. Eight cultural resources potentially eligible for listing on the NRHP have been identified along the proposed route compared to three and five cultural resources along the surveyed portions of the Railroad and I-8 Variations, respectively. It is not known whether additional cultural resources occur along the segments of the variations where surveys have not been completed.

Both variations place the pipeline closer to Pilot Knob than the proposed route. As stated in section 6.1.2, Pilot Knob is considered a culturally sensitive area by Native Americans and the Quechan Tribe has specifically asked that the proposed route be sited as far from Pilot Knob as possible. In the summer of 2000, NBP met with the representatives of the Quechan Culture Committee to discuss alternative routes. At that meeting, committee members expressed concerns about routes that would be closer to Pilot Knob than the proposed route. According to NBP, the Tribal Council expressed a strong preference for the proposed route and objected to the alternatives because they are too close to Pilot Knob.

An advantage of both variations is that they would be further from the Imperial Sand Dunes than the proposed route. As discussed in section 6.1.3, in a meeting on March 12, 2001, the FWS expressed concern about the proximity of the proposed route to the Imperial Sand Dunes and the potential for the pipeline right-of-way to attract and facilitate OHV access to the dunes. The FWS indicated that a route as far from the Imperial Sand Dunes as possible would be preferable.

In summary, the advantages of the variations are that they would make greater use of designated and contingent utility corridors and existing rights-of-way and would require an amendment to the CDCA Plan for a shorter distance. The variations would also be further from the Imperial Sand Dunes, which could potentially reduce impact on the dunes. The advantages of the proposed route are that it is located further from Pilot Knob, avoids crossing a planned 2,345-acre development, and crosses less desert wash woodland habitat.