Comment Set PG, Attachment A, cont.

This alternative is difficult to evaluate because the Draft EIR presents no data to support the environmental and technical feasibility of locating the alignments and towers where they have been indicated, and no data is presented specifying tower heights, which is essential information for assessing visual effects. The feasibility of this alternative is particularly questionable in light of the National Park Service Watershed Plan and the Scenic and Recreation Easement. The National Park Service has taken the position that the entirely new segments of overhead transmission lines would be in conflict with their easement rights and would require their concurrence. . The Draft EIR analysis of this alternative speculates that "...it is possible that the SFPUC and NPS would determine that this alternative, while creating a new utility corridor in one area, provides a net benefit to the environment." (Draft EIR Vol. 2, Ap.1-53) However, no evidence is submitted that this would be the opinion of the SFPUC and NPS and that they would agree to allow the new corridors in contradiction of the policies of the Watershed Plan and the provisions of the Scenic and Recreation Easement. Previous statements by the Park Service in their CEQA scoping comments indicate the opposition. This conflict remains a Class I impact. PG-285

The Draft EIR provides little detail on the access roads that could be required to build an maintain the new overhead line segments and no identification of the tree clearing and other vegetative removal that would be required to accommodate the entirely new line segments. Both of these aspects of the proposed line segments could have substantial implications for this alternative's visual effects. As discussed in more detail in General Comment 3 below, no visual simulations have been prepared and presented to demonstrate what the visibility and appearance of these new segments would be as viewed from critical viewing areas.

Given the highly speculative nature of this alternative and the lack of specific information on tower height, access roads, and clearing, we did not have the data required to make a definitive assessment of this project's visual effects. However, based on the data available and reasonable assumptions about tower placement and height, road access and vegetative clearance, it appears that the southernmost of the overhead sections – the portion of the line between Jefferson Substation and tower 1/12 – could have significant impacts. This line would represent an entirely new corridor in an area of watershed lands that now has a relatively undisturbed appearance. This new line segment would closely parallel Cañada Road, a highly scenic roadway that receives heavy use by bicyclists and which also serves as the access route to the Filoli estate and gardens. The transmission towers would be highly visible, and their visibility would be emphasized by the clearing of corridors in the existing tree cover that would be required to accommodate the line. The presence of the towers and the required breaks in the vegetative pattern associated this new alignment would be visible in the near foreground of the views from this recreational corridor, and would seriously impair the current visual integrity of this landscape. Impacts on the scenery in this area would be significant and would not be mitigable. The existing view photos on Attachments Visual A-6, Visual A-7, and A-8are views of existing conditions in the corridor along Cañada Road. The conceptual simulation images on these Attachment figures are simulations of these views as they would appear with the overhead line segment that would be required under the Draft EIR's PUA.

This alternative would also entail placement of a large new transmission tower close to I-280 in an area that falls well within the cone of vision of travelers on both northbound I-280 and northbound Cañada Road. The existing view photo on Attachments Visual A-5, is a view of

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Comment Set PG, Attachment A, cont.

existing conditions in the corridor along I-280 and the conceptual simulation on that page is this same view as it would appear with implementation of the Draft EIR's PUA. PG-285

This southern segment of new overhead line would also be highly visible to travelers heading west on Edgewood Road between I-280 and Cañada Road, and would cause a substantial degradation of the existing character and quality of this now highly attractive view.

In the case of this line segment, the incremental change between existing conditions along the new alignment and conditions along this alignment with the project would be much more substantial and create a higher level of visual impact than the incremental changes associated with the proposed project and the Alternative 1B undergrounding option.

3. General Comment 3

3.1 Insufficient Simulations Provided for the PUA and Proposed Visual Reroutes

In describing the visual impacts of the PUA, the Draft EIR does not present any simulations depicting the new towers installed and new corridors created as part of the PUA. Some of these towers would be highly visible from I-280 and Cañada Road and, according to the Draft EIR, create a Class I impact. The single simulation of the PUA presented was taken from a location and viewpoint angle that ensure that the new towers are not visible in the simulation. In addition, the PUA and Proposed Project are subject to numerous reroutes and tower eliminations as mitigation measures; the Draft EIR similarly does not provide any simulations of those reroutes with associated taller towers. Eliminating towers will almost always require increased conductor spans and taller towers to compensate for the loss of towers, yet the resulting increased tower size and associated greater visual impacts of those specific towers are not simulated. The Draft EIR does not provide sufficient rationale as to why the increase in height would not be considered significant for those towers needing an increase in height, when a similar increase in height is frequently termed a Class I impact elsewhere in the analysis. No evidence or simulations are presented to validate the statements made that "any increase in height of the remaining towers would be more than offset by the elimination of towers." These additional visual impacts are similarly not discussed in the Draft EIR's analysis of the visual re-route measures for the Proposed Project. (Visual Resources, Comment 2.) PG-286

The Draft EIR's analysis of recreational impacts of the PUA does not acknowledge that the route will result in new impacts to previously unaffected areas, such as Cañada Road south of the Pulgas Water Temple. Because these impacts are in a new corridor, they should be considered Class I impacts. This conclusion is necessary in order to be consistent with the Draft EIR's treatment of operation-related impacts for the proposed project in Edgewood Park and Preserve, which are found to be Class I. (Recreational Resources, Specific Comment 2.)

On page D.3-161, the Draft EIR clearly finds that the overhead portion of the PUA would introduce "large vertical structures with substantial industrial character into a predominately natural landscape along Cañada Road" resulting in Class I visual impacts that could not be mitigated. Unlike the Proposed Project, however, these impacts are not the result of incrementally increasing the size of already existing towers in an existing utility corridor, but instead consist of installation of new towers in a new, previously undisturbed visual corridor.

Comment Set PG, Attachment A, cont.

The Draft EIR states that "this significant impact would be offset by the removal of the existing 60kV towers from Edgewood Park and Pulgas Ridge Open Space on the east side of I-280, which is a long-term benefit to those parks". The Draft EIR does not provide adequate justification as to why this stated benefit to the parks of improving the existing condition should be made at the expense of an alternative that introduces a Class I visual impact in a previously unoccupied corridor. PG-286

Moreover, four transition stations would be required by the PUA, which would themselves result in Class I significant unmitigable visual impacts. The PUA would also add two new towers on the west side of I-280 near tower 8/50 as part of a new crossing of I-280. These new towers would result in visual impacts that "would be significant and could not be mitigated to less than significant levels (Class I)." The Draft EIR then proceeds to state that this Class I impact to I-280 travelers and users of Crystal Springs Golf Course would be offset by rerouting towers in a different area, from towers 9/63 to 10/68 west of I-280. This would thereby eliminate the significant visual impact that would be experienced by the residential areas along Loma Vista Drive and Skyview Drive on the east side of I-280, and relocate Tower 10/69. Again, the Draft EIR provides no justification as to why this trade-off should take place.

4. Specific Comments

4.1 Introduction

To address the significant and less than significant visual impacts that it identified, the Draft EIR's Visual Resources analysis proposes mitigation in many cases by means of relocating towers and increasing span lengths. In addition, as a part of the Partial Underground Alternative the Draft EIR proposes creating several entirely new segments of overhead line. Review of these proposals and the Draft EIR's evaluations of them makes it clear that they have been developed without the benefit of engineering and environmental analyses to determine whether they are actually feasible, and if feasible, what the final designs would have to entail. In general, some basic transmission line design concepts appear to not have been considered in developing these mitigation measures and alternatives. The following concepts are important, and their implications appear not to have been given adequate consideration: PG-287

- Conductors approximate parabolic shapes. The sag of conductors change relative to the square of the span length (new sag = old sag * (new span / old span)^2. So if a span length doubles, the sag quadruples. This obviously requires much taller structures, especially when the spans in question are long to begin with (i.e. lots of sag to start with).
- When tall structures are adjacent to not so tall structures (poorly graded line), the conductor will move longitudinally as temperature fluctuates, causing insulators to swing longitudinally and loads to be induced on the structures. This is poor engineering practice.
- Longer spans mean that the conductors will swing more widely when blown by the wind (blow out), which requires a wider right of way and thus more vegetative clearing.

Comment Set PG, Attachment A, cont.

- As a tower gets taller, the footprint required to support that tower gets bigger as a function of the slope of the legs. What may be a visual impact from a distance due to tower height/location becomes a bigger visual and environmental impact at the tower location.
- For the proposed project, the allowable span lengths are 700'-1500'. Some mitigation measures are requesting spans greater than 1500 feet. This will require the need to present new tower designs.

In an effort to provide a better basis for considering the visual implications of the proposed mitigation measures and the Partial Underground Alternative, our engineering staff has made preliminary calculations of what the heights of the relocated and new transmission towers proposed by the Draft EIR would have to be. These heights are presented in the comments below, and compared to the transmission tower heights proposed in the project application. In many cases, the increase in height over the tower heights that had been proposed by the project is substantial. In at least two cases under the Draft EIR's proposals, transmission towers over 200 feet high would be required, necessitating consultation with the FAA to determine the need for aircraft safety lights and markings. PG-287

4.2 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-1: Visibility of Construction Activities and Equipment
Mitigation V-1a
Page D.3-21, D.3-23

PG-288

This states that project construction impacts, given their short-term nature, are not significant visual impacts. The Draft EIR nonetheless requires a visual mitigation measure, Measure V-1a, which is infeasible. This measure requires PG&E to visually screen with temporary screening fencing all project construction sites, if visible from residences or roadways. Since the construction sites include the towers themselves, it is clearly not possible to screen the towers themselves from all views from residences or roadways during construction. It is also unreasonable to expect screening at sites of temporary activities such as pull sites. In addition, in sensitive habitat areas, this screening could increase impacts to valuable vegetation resources. Since the impact is not significant, and the mitigation does not appear warranted, no mitigation should be required. Should large, long-term storage yards or similar facilities be located in residential neighborhoods or in highly visible locations within the Watershed lands, these could be screened visually with temporary screening fencing.

4.3. 230kv/60kV Overhead Transmission Line [Proposed Project]

Impacts on Pulgas Ridge Open Space
Jefferson Substation to Ralston Substation
Page D.3-23, last paragraph, line 8

PG-289

"It was also determined that visual impacts on Pulgas Ridge Open Space would be similar to those experienced at Edgewood County Park because of similar landscape characteristics, transmission line structure locations, and viewing perspectives."

Comment Set PG, Attachment A, cont.

This is incorrect; the analysis does not appear to take into account that the towers are screened, in most cases completely, from trails in Pulgas Open Space since they are located over the ridge from public trails within Pulgas Ridge Open Space. Intervening vegetation consists of heavily wooded areas, as opposed to the rolling grasslands that separate the towers from trails at Edgewood County Park. Given the amount of screening provided by vegetation, viewing distances of about one-half mile away and the fact that, when visible from Pulgas Ridge Open Space, the towers generally appear against a landscape backdrop, the Draft EIR overestimates visual impacts on Pulgas Ridge Open Space. PG-289

4.4. 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-3: Key Viewpoint 2 - Interstate 280 Southbound
D.3-29 and Figures D.3-31 and D.3-33

This states that the visual impact of the Proposed Project is a Class I, unmitigable impact, while the Partial Underground Alternative in this location would be a Class III impact, and that the towers would be beyond the primary cone of vision of southbound I-280 travelers. The figures then show a simulation of the two alternatives. However, the viewpoint was selected to show the significance of the impact of the Proposed Project, and underestimates the impact of the Partial Underground Alternative through the selection of the viewpoint. A viewpoint taken from farther to the north would allow clearer views of the towers along Cañada Road. PG-290

4.5 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-4: Key Viewpoint 3 - Interstate 280 Northbound
D.3-37 and Figures D.3-4B D.3-39 and D.4-41

This analysis states that the impact of the Proposed Project is not significant at this location, then states that this impact would be eliminated with implementation of the PUA. Text should clarify that this viewpoint is located north of the PUA I-280 crossing, looking north, and that the PUA crossing of I-280 occurs behind the viewer and the viewer is facing away from the PUA. PG-291

A more appropriate selection of a north-bound I-280 viewpoint for the PUA would be from a point south of the I-280 crossing, so as to capture that impactAttachment Visual A-5 presents a visual simulation of the Partial Underground Alternative as seen from northbound I-280 at Cañada Road. The simulation shows a portion of the overhead crossing of I-280 associated with the PUA. As shown in this simulation, a new tower would appear prominently in the foreground.

4.6 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-5 Key Viewpoint 4 – Cañada Road at Filoli Center
D.3-43 and Figures D.3-5A and D.3-5B

The proposed visual mitigation measure V-5a proposes eliminating structure 2/13 to reduce the visual impact along Cañada Road. PG-292

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Comment Set PG, Attachment A, cont.

To implement to proposed mitigation measure V-5a will require significantly increasing the adjacent tower heights (1/12 and 2/14) to maintain electrical clearances to ground as shown in the following table: PG-292

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
1/12	207	1/12	102	+ 102%
	N/A	2/13	141	- 100%
2/14	175	2/14	74	+ 136%

Taller structures than the proposed alignment are required due to the longer span length imposed by this mitigation measure as well as maintaining required clearances between energized conductors and the top of the hill which is located in the middle of the proposed span. A large impact to implementing this measure is structure 1/12 is changed from a tangent structure to a medium angle structure. A larger structure foot print on the ground must be considered to accommodate the structure's new loading criteria to handle the angle turned in the route of the conductors.

As these figures indicate, to compensate for the tower that is removed, the heights of the adjacent towers will need to be increased by over 100%. This is a considerably greater height increase than the 30% increase that the Draft EIR analysis appears to assume for this location and indicates would be the acceptable upper limit.

An option to mitigation measure V-5a that will maintain the proposed alignment is to add a tangent structure (2/13) located on the top of the hill between 1/12 and 2/14, although locating a new tower at this location likely will not reduce the visual impact in this area. Utilizing a tangent structure located on the top of the hill would result in heights of 131 feet for 1/12, 75 feet for 2/13 (new tangent), and no change to the height of 2/14 (125 feet). This option provides reasonable tower heights and span lengths.

4.7 230kv/60kV Overhead Transmission Line [Proposed Project]

PG-293

Impacts V-8: Key Viewpoint 7 – I-280 southbound at SR 92
Pages D.3-51, 59, and 65 (text), Figure D.3-8c page D.3-69

Impact V-8 concludes that there is a significant impact from the Proposed Project that warrants Mitigation Measure V-8a, a substantial reroute that places the new line immediately adjacent to Cañada Road and a pedestrian trail in 3 locations. Although PG&E agrees with the statement that this will reduce visual impacts on views from I-280 (paragraph 3, line 3), and that it will "significantly reduce the visual prominence of the existing 60kV towers," no simulation is presented of the views from Cañada Road for this reroute to support the conclusion that the reroutes will have less or similar visual impact on Cañada Road compared to the Proposed Project.

Implementation of proposed mitigation measure V-8a will require taller structures and longer spans. To maintain required electrical clearances to ground, structures heights for the proposed mitigation measure V-8a would be as indicated in the following table:

Comment Set PG, Attachment A, cont.

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
3/18	136	3/19	97	+ 40%
3/19	105	2/20	112	- 7%
3/20	150	2/21	107	+ 40%
3/21	130	3/22	119.5	+ 9%
3/21A	145	N/A		
3/22	155	4/23	129	+ 20%
4/23	155	4/24	96.5	+ 60%
4/24	139	4/24A	106.5	+ 30%
4/25	Removed	4/25	104	- 100%
4/26	115	4/26	97	+ 18%

PG-293

Structures that are taller than those on the proposed alignment are needed due to longer span lengths imposed by this mitigation measure as well as the requirement that towers be located off ridge lines. Structures on downhill slopes and in valleys must be taller to keep the energized conductors a safe clearance above the adjacent hills.

The proposed alignment utilizes approximately 700 and 1500 foot span lengths. This mitigation measure would require spans of 1670 feet (3/21A to 3/22) and 1,630 feet (4/24 to 4/26). These span lengths may exceed the capacity of the proposed towers requiring a more robust tower design that because of its greater structural mass, could be more a visual issue than the towers that were proposed as part of the project.

4.8 230kv/60kV Overhead Transmission Line [Proposed Project]

Mitigation Measure V-6a: Paint Towers with Appropriate Colors
Page D.3-51

PG-294

This measure calls for painting towers appropriate colors, including painting structural surfaces different colors depending on the direction they are facing. Towers painted in this fashion would need to be painted after installation, and paint would be likely to flake, potentially requiring (expensive) on-going maintenance. PG&E has contacted painting contractors to determine feasibility. It is unlikely that painting the lattice towers in this manner will produce the desired result. For example, a striped effect could be observed when viewing the tower from an angle to the structural surfaces, which may increase their visual contrast with the surrounding landscape and their overall visibility. Using non-reflective surfaces, as recommended in PEA Mitigation Measure 8.15, would be a more reliable method to get the desired effect. Note that the dark green paint simulated in V-6a is less noticeable when vegetation is green, but would potentially be more noticeable than a non-reflective gray surface during the dry season when the grasses and shrubs in the backdrop have turned yellow and brown.

4.9 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-9: Key viewpoint 8 – Lexington Avenue
D.3-73

PG-295 / PG-296

Comment Set PG, Attachment A, cont.

PG-295/ PG-296

This discussion calls the impact in this area a Class II impact, (paragraph 2, line 3). Paragraph 2 also states that a similar visual impact to that shown for Tower 29 would be experienced by other residential areas backing onto the proposed route, including Hillsborough residences along Laurel Hill Drive, Seneca Lane, Lakeview Drive, Wedgewood Drive, and Burlingame residences along Skyview Drive and Loma Vista Drive. The paragraph also states that the impact analysis presented for this viewpoint is applicable to the above references residential areas. This is somewhat misleading, since the tower selected for the visual analysis represents one of the towers stated in paragraph 3 as one of three that "are currently most visible from Lexington Avenue". It is also the tower that is closest to the residences, and as such actually represents the worst case and not a typical view.

To address these impacts, the Draft EIR proposes Mitigation measure V-9 that would result in increasing tower height to a Class I impact (paragraph 4, last line). This proposed visual mitigation measure would eliminate towers 5/29, 5/31 and 6/33. Implementation of this mitigation measure will require significantly increasing the tower heights to maintain electrical clearances to ground as shown in the following table:

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
5/28	115	5/28	84.5	+ 36%
	N/A	5/29	111	- 100%
5/30	237	5/30	92	+ 157%
	N/A	5/31	105	- 100%
5/32	281	6/32	94.5	+ 197%
	N/A	6/33	136	- 100%

Taller structures than the proposed alignment are required due to the longer span length imposed by this mitigation. The sag of conductors approximates the shape of a parabola, so as the span length increases a given distance, the sag increases as the square of that distance. This mitigation measure doubles the span lengths around structures 5/32 and 5/30, resulting in significant conductor sag, requiring extremely tall structures.

The longer span lengths also increase the distance energized conductors will blow away from the center line of the alignment (conductor blow-out). For the proposed span lengths, conductor blowout would be as much as 100 feet offset from the alignment center line.

The taller structures required to meet this mitigation measure will result in a very poorly graded line (imbalanced structure heights and wire elevations), which will cause the conductors to have a tendency to move longitudinally along the line as temperature fluctuates, causing insulators to swing and add additional stresses on the towers. This is not good engineering practice and should be avoided when possible.

In effect, the substantial increases in height required to implement this mitigation measure appear in fact to be creating an even larger impact. Measure V-9a would appear to be inappropriate in addition to being technically undesirable.

Comment Set PG, Attachment A, cont.

4.10 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-10: Key viewpoint 9 – Crystal Springs Rest Area
Mitigation Measure V-10a
Page D.3-81, Figures D.3-10A, D.3-10B, and D3-10C

PG-297

Mitigation measure V-10a would eliminate tower 7/40 to mitigate the visual impacts near the Crystal Springs Rest Area.

To implement to proposed mitigation measure V-10a will require slightly increasing the tower heights of structures 6/38 and 7/39 and significantly increasing the tower height of structure 7/41 to maintain electrical clearances to ground as shown in the following table:

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
6/38	127	6/38	107	+ 19%
7/39	161	7/39	141	+ 14%
	N/A	7/40	152	-100%
7/41	151	7/41	90	+ 68%

With the removal of structure 7/40, a few changes to structures and their locations must be considered: structure 7/41 is required to be increased from 90 feet to 151 feet tall to compensate with a longer span length of 1605 feet from 7/39 to 7/41. Also, structure 7/39 must be moved ahead 325 feet as well increased in height from 141 feet to 161 feet tall to allow for the line to meet minimum electrical clearance to ground.

The longer span lengths also increase the distance energized conductors will blow away from the center line of the alignment (conductor blow-out). For the proposed span lengths, conductor blowout would be as much as 75 feet offset from the alignment center line. The taller structures required to meet this mitigation measure will result in a very poorly graded line (imbalanced structure heights and wire elevations) which will cause the conductors to want to move longitudinally along the line as temperature fluctuates.

4.11 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-12: Key viewpoint 11 – Black Mountain Road
Mitigation Measure V-12a
Page D.3-95, Figures D.3-12A, D.3-12B, and D3-12C

PG-298

Mitigation measure V-12a proposes to eliminate towers 7/42, 7/45 and 5/47 to mitigate the visual impacts near Black Mountain Road.

To implement the proposed mitigation measure V-12a will require increasing tower heights to maintain electrical clearances to ground as shown in the following table:

Comment Set PG, Attachment A, cont.

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
	N/A	7/42	100	- 100%
7/43	125	7/43	85	+ 47%
7/44	140	7/44	99.5	+ 40%
	N/A	7/45	100	- 100%
8/46	145	7/46	75	+ 93%
	N/A	7/47	110	- 100%
8/48	140	8/48	109	+ 28%

PG-298

If towers are to be located as indicated in Figure D.3-12C, taller towers would be required: structure 7/43 is increased from 110 feet to 125 feet tall; 7/44 is increased from 120 feet to 140 feet tall; 8/46 is increased from 110 feet to 145 feet tall and 8/48 is increased from 130 feet to 140 feet tall. Also, the following towers must be relocated as follows: move 7/43 a distance 210 feet back toward 7/41; move 8/48 a distance 148 feet back toward 8/46 to accommodate for minimum electrical clearance to the ground due to the longer span lengths between structures.

4.12 230kv/60kV Overhead Transmission Line [Proposed Project]

PG-299

Mitigation Measures V-13a, V-14a, 16a, 17a, 19a: various tower eliminations
Pages D.3-143, Figure D.3-12D,

The Draft EIR does not present any simulations that would allow the reader to conclude that tower elimination in exchange for towers up to 30% taller would be an appropriate mitigation measure, nor were engineering analyses conducted to determine the feasibility of these reroute and tower elimination mitigation measures. Figure D.3-18B and D.3-18C show a simulation of a viewpoint with towers removed per the Mitigation Measure V-19a, but does not show any increase in tower height. Since longer spans allow greater sag in the conductors, taller towers will almost always be required to accommodate tower removal. In this respect, the Draft EIR Figure D.3-18C simulation may be misleading in its portrayal of the mitigation measure's effectiveness.

Mitigation Measure V-13a proposes eliminating towers 10/64 and 10/66 to mitigate the visual impacts near Skyline Boulevard. Implementation of this measure will require increasing the tower heights to maintain electrical clearances to ground as shown in the following table:

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
10/63	120	10/63	110	+ 9%
	N/A	10/64	110	-100%
10/65	141	10/65	96	+ 47%
	N/A	10/66	110	-100%
10/67	141	10/67	106	+ 33%

Comment Set PG, Attachment A, cont.

If towers are to be located as indicated in Figure D.3-12D, taller towers would be required: structure 10/63 is increased from 110 feet to 120 feet tall; 10/65 is increased from 96 feet to 141 feet tall; 10/67 is increased from 106 feet to 141 feet tall. Also, the following towers must be relocated as follows: move 10/65 a distance 211 feet back toward 10/63, and move 10/67 a distance 167 feet back toward 10/65 to accommodate for minimum electrical clearance to the ground due to the longer span lengths between structures. PG-299

Mitigation measure V-14a proposes eliminating towers 9/56, 9/58, and 9/60 to mitigate the visual impacts near the Crystal Springs Golf Course. Implementation of this measure will require increasing the tower heights to maintain electrical clearances to the ground as shown in the following table:

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
9/55	125	9/55	100	+ 25%
	N/A	9/56	110	-100%
9/57	145	9/57	110	+ 32%
	N/A	9/58	110	-100%
9/59	125	9/59	100	+ 25%
	N/A	9/60	90	-100%
9/61	115	9/61	100	+ 15%

If towers are to be located as indicated in Figure D.3-12C, taller towers would be required: structure 9/55 is increased from 100 feet to 120 feet tall; 9/57 is increased from 110 feet to 125 feet tall; 9/59 is increased from 100 feet to 115 feet tall and 9/61 is increased from 107 feet to 117 feet tall.

Eliminating structures 9/56, 9/58, and 9/60 means that these other towers must be relocated as follows: move 9/55 a distance 280 feet ahead toward 9/57; move 9/57 a distance 48 feet ahead toward 9/59, move 9/59 a distance 245 feet back toward 9/57, and move 9/61 a distance 381 feet back toward 9/59, all structure moves are to accommodate for minimum electrical clearance to the ground due to the longer span lengths between structures.

Mitigation measure V-16a proposes relocating tower 11/75 and eliminating tower 12/77 to mitigate the visual impacts near Sawyer Camp Trail at the San Andreas Lake Dam. Implementation of this measure will require increasing the tower heights to maintain electrical clearances to ground as shown in the following table: PG-300

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
11/74	121	11/74	111	+ 9%
11/75	106	11/75	106	+ 0%
	N/A	12/76	106	-100%
12/77	169	12/77	106	+ 59%

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Comment Set PG, Attachment A, cont.

With the removal of structure 12/76, a few changes to structures and their locations must be considered: structure 11/74 is required to be increased from 112 feet to 122 feet tall. Structure 11/75 is being relocated but remains at a height of 107 feet tall. Structure 12/77 must be greatly increased in height; it is increased from 107 feet tall to 169 feet tall to allow for the line to meet minimum electrical clearance to ground. The span length between 11/75 to 12/77 is 1294 feet. PG-300

The longer span length increases the distance energized conductors will blow away from the center line of the alignment (conductor blow-out). For the proposed span length, conductor blowout would be as much as 53 feet offset from the alignment center line. The taller structure required to meet this mitigation measure will result in a very poorly graded line (imbalanced structure heights and wire elevations) which will cause the conductors to want to move longitudinally along the line as temperature fluctuates.

Mitigation measure V-17a proposes relocating 13/84 and V-13b proposes eliminating towers 12/80 and 12/82 to mitigate the visual impacts near the San Andreas Trail. Implementation of measure V-17a will require significantly increasing the tower heights to maintain electrical clearances to ground as shown in the following table: PG-301

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
12/79	155	12/79	105	+ 48%
	N/A	12/80	105	-100%
12/81	160	12/81	95	+ 67%
	N/A	12/82	100	-100%
13/83	95	13/83	106	- 10%
13/84	135	13/84	120	+ 12%
13/85	140	13/85	120	+ 17%

For the first measure (V-17a), relocating structure 13/84 allows the structure to be increased from 120 feet tall to 135 feet tall in its new location. But in doing so, 13/85 is required to be increased from 120 feet tall to 140 feet tall. Also, 13/83 is required to be increased in height by about 12 feet to become a 107 foot tall structure.

For the second measure (V-17b), removing structures 12/80 and 12/82, there is a great impact on the remaining structures. Structure 12/79 is required to be increased from 105 feet tall to 155 feet tall; 12/81 is increased from 95 feet tall to 160 feet tall; and 13/83 is increased to 107 feet tall. Structures 12/79 and 12/81 experience an increase in structure height (over 30%), they are 48% and 67%, respectively. Plus, the required right-of-way is 65 feet on either side of the line to accommodate for conductor blow out between structures 12/79 and 12/81.

Mitigation measure V-19a proposes eliminating towers 13/89, 14/91, 14/92, and 14/94 to mitigate the visual impacts near Skyline Boulevard and the San Andreas Trail. Implementation of this measure will require significantly increasing the tower heights to maintain electrical clearances to ground as shown in the following table: PG-302

Comment Set PG, Attachment A, cont.

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
13/88	140	13/88	130	+ 7%
	N/A	13/89	100	-100%
14/90	150	14/90	100	+ 50%
	N/A	14/91	100	-100%
	N/A	14/92	100	-100%
14/93	145	14/93	90	+ 61%
	N/A	14/94	120	-100%
14/95	146	14/95	120	+ 22%

PG-302

With the removal of structures 13/89, 14/91, 14/92 and 14/94, a few changes to the remaining structures must be considered: structure 13/88 is required to be increased from 130 feet to 140 feet tall; structure 14/90 is required to be increased from 100 feet to150 feet tall; structure 14/93 is increased from 90 feet tall to145 feet tall and is relocated approximately 100 feet back toward 14/90; and structure 14/95 must be increased in height from 120 feet tall to147 feet tall to allow for the line to meet minimum electrical clearance to ground. The span lengths between the remaining structures increase as well. The span lengths are 1014 feet for 13/88 to 13/89; 1083 feet for 13/89 to 14/91; 1264 feet for 14/91 to 14/93 and 1221 feet for 14/93 to 14/95.

The longer span length increases the distance energized conductors will blow away from the center line of the alignment (conductor blow-out). For the proposed span length, conductor blowout would be as much as 49 feet offset from the alignment center line. The taller structure required to meet this mitigation measure will result in a very poorly graded line (imbalanced structure heights and wire elevations) which will cause the conductors to want to move longitudinally along the line as temperature fluctuates.

PG-303

Note: Nothing in the mitigation measure addresses the West of Skyline Transition Station connection to the line route. From Fig. D.3-18d, there is a considerable distance from 14/93 to the Transition Station location. Typically, a structure (or even two structures) is (are) located adjacent to a transition point of a transmission line to accurately tap the line conductors to the above ground equipment, whatever they may be (disconnect switches, underground potheads, rigid bus, etc.). Hence, a structure in the line should be located as close as possible to the transition station site. This point was not looked at in this document since no additional information was included on the transition station in the Draft EIR.

PG-304

4.13 D.3.3.3 230kv/60kV Overhead Transmission Line [Proposed Project]

Mitigation Measure V-15a Figure D.3-14c
Page D.3-120

The proposed reroute could have significant visual impact when viewed from Skyline Boulevard. The proposed reroute does not take into account the significant elevation difference between the current Tower 68 location and the new Tower 69 location, for spanning the freeway.

Comment Set PG, Attachment A, cont.

Mitigation measure V-15a proposes rerouting the proposed alignment to mitigate the visual impacts from northbound I-280. Implementation of this measure will require increasing the tower heights to maintain electrical clearances to ground as shown in the following table: PG-304

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
10/67	120 (see note)	10/67	106	+14%
10/68	140	10/68	131	+ 7%
10/69	125	10/69	146	- 14%
11/70	130	11/70	96	+35%

The change to the alignment of the route allows for shortened spans and slightly increased structure heights. The line crossing I-280 is more perpendicular than the existing alignment and is more advantageous for working with conductor electrical clearance. But, there are heavier angles in the line at structures 10/68, 10/69 and 11/70. These structures need to have large foot prints to accommodate for the conductor dead-end loads applied on the structures.

Note: From the results of measure V-13a, it is noted in that review, structure 10/67 needs to be 141 feet tall. If this mitigation measure was to proceed and V-13a was not, then the height of 10/67 would need to be 120 feet tall. If V-13a were to be implemented regardless of this one being implemented or not, 10/67 would be required to be 141 feet tall for proper electrical clearances to be met along the proposed alignment.

4.14 D.3.3.3 230kv/60kV Overhead Transmission Line [Proposed Project]

Impact V-20; key Viewpoint 18 – Transition Station / San Bruno Avenue PG-305
Page D.3-153

The Draft EIR fails to accurately depict the proposed transition station and overestimates its visual impact. As outlined previously under General Comment 1.4, the Draft EIR Figure D.3-19B incorrectly portrays the location, scale, and appearance of the proposed transition station. As demonstrated by the attached accurate simulations Visual A-2A and A-2B-, the Draft EIR simulation exaggerates the height of the proposed dead-end structure by more than 30%. The Draft EIR also appears to exaggerate the height of the masonry wall while failing to portray PG&E's proposed setbacks and landscaping that would mitigate the potential impacts. The net effect of these inaccuracies is a simulation which overemphasizes the proposed transition station's size and visibility as seen from San Bruno Avenue at Glenview Drive. Using this inaccurate simulation image presented on Figure D.3-19B, Draft EIR page D.3-153 states, "Visual contrast caused by the proposed facility would be moderate to high and the project would appear co-dominant with other landscape features including the Sky Crest Center and background hills. The new facilities would result in a moderate to high degree of view blockage of sky and background land and vegetative forms." The Draft EIR continues, concluding, "the resulting visual impact would be significant (Class I)". This conclusion is questionable for several reasons including the use of an incorrect simulation as a basis and the erroneous characterization of "view blockage" effects (previously detailed under General Comment 1.2).

Comment Set PG, Attachment A, cont.

The Conceptual Landscape Design for the Transition Station, included as Draft EIR Figure B-8 indicates a plant palette with types, sizes and number of trees to be installed as well as suggested species. Although conceptual, PG&E planners and engineers have reviewed the landscape plan for its technical feasibility and have incorporated it into the project. The landscape plan suggests tree species that are recommended by the City of San Bruno. Broad leaf evergreen trees placed about 22 feet apart are shown along a portion of the site's San Bruno Avenue and Glenview Drive frontage to screen views from the south and east. A similar tree planting is proposed on the west side of the masonry wall (except directly underneath the lines), to screen views of the project from Skyline Boulevard. PG-305

Based on the layout plan and elevation presented in Draft EIR Figure B-7a, the transition structures would be situated on the southern portion of the site, more than 150 feet from Skyline Boulevard. Existing vegetation and proposed landscaping would provide screening from Skyline Boulevard, a designated scenic route. The transition station would be setback 25 feet from Glenview Drive and more than 50 feet from San Bruno Avenue. As shown on the attached Visual A-4 aerial and ground-level photographs, existing commercial uses currently situated at the intersection include the Econo Mart gas station and the Sky Crest commercial center. The Sky Crest site includes a large, unscreened surface parking area that is situated along the San Bruno Avenue and Glenview Drive street frontage. As indicated by the simulations presented in the PEA (Figure 8-20) and as attached Visual A-3 , the landscaping proposed as part of the project will screen the proposed transition structure in views from the public roadway. In addition, the proposed project landscaping will help to integrate the transition station site with its overall visual setting including establishing an aesthetic appearance that is compatible with nearby existing commercial uses. The impact of the proposed San Bruno Avenue transition station should be considered Class II (mitigable) impacts, not Class I.

4.15 Alternative 1B

Page D.3-160

As to Alternative 1B, PG&E concurs with the Draft EIR's findings that it "would result in substantially fewer visual impacts compared to the Proposed Project" and if a non-overhead method of crossing Crystal Springs Dam is found "there would not be a significant impact on this alternative." (D.3-160). PG-306

4.16 Partial Underground Alternative

Environmental Impact and Mitigation Measures
Page D.3-161, paragraph 1 PG-307

" The resulting visual impact (Impact V-23) would be significant and it could not be mitigated (Class I). However, this significant impact would be offset by the removal of the existing 60kV towers from Edgewood County Park and Pulgas Ridge Open Space on the east side of I-280, which is a long-term benefit to these park facilities."

The Draft EIR fails to provide any justification as to why a Class I impact should be created in a new corridor along Cañada Road; it merely states that this Class I impact would be offset by removing existing towers from a different location.

Comment Set PG, Attachment A, cont.

It also discusses removal of these towers as a benefit to Pulgas Ridge Open Space, but fails to demonstrate that the towers are visible from existing public trails within that park. As noted in the Comments on Land Use section, the towers themselves are within SFPUC watershed lands in this area. PG-307

4.17 Partial Underground Alternative – Comparison to Proposed Route Segment

PG-308

Page D.3-162.

"Compared to the Proposed Project, the Partial Underground Alternative between Jefferson Substation and Tower 2/12 would be substantially less visually impacting on views from I-280, Edgewood County and Pulgas Ridge Open Space because of the elimination of towers along the east side of I-280."

This statement is misleading; although the PUA may have less impact on views from I-280 southbound and Edgewood County Park, it would have Class I impacts on northbound I-280 with a new crossing, and Class I impacts along Cañada Road. No description is provided of the Class I impacts that the PUA would have within this area, particularly to views from Cañada Road and northbound I-280. In comparing the alternatives, a more accurate statement would be that the PUA will have a Class I impact in this area, as does the Proposed Project. No rationale is presented for why removal of existing towers in an existing utility corridor should be considered to offset the Class I impacts of new towers in a separate, new utility corridor.

A viewpoint of the PUA crossing of I-280, south of Edgewood Road at the Cañada Road underpass is simulated in Attachment Visual A-5 and clearly shows that in this location, the PUA represents a significant, Class I impact of a new tower in a new alignment. Similarly, Attachments Visual A-6, A-7, and A-8 present simulations of views along Cañada Road where this overhead segment of the PUA will be located in the foreground zone of a landscape in which there is no transmission corridor at present, creating a significant impact.

The new alignment proposed by the PUA in this area will require taller structures and longer spans. To maintain required electrical clearances to ground, the structure heights that would be necessary are:

New Tower #	New Height	Exist. Tower #	Existing Height	% Increase
0/2	105	0/2	120	- 12.5%
0/3	135	0/3	115	+ 17%
0/4	145	0/4	135	+ 7%
0/5	135	0/5	125	+ 8%
0/6	185	0/6	135	+ 37%
0/7	230	0/7	140	+ 64%
1/8	120	1/8	110	+ 9%
	N/A	1/9	105	- 100%
	N/A	1/10	110	- 100%
	N/A	1/11	105	- 100%
1/12	120	1/12	120	+ 0%

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Comment Set PG, Attachment A, cont.

Taller structures than the proposed alignment are required due to longer span lengths as well as the requirement that towers be located off ridge lines. Structures on downhill slopes and in valleys must be taller to keep the energized conductors a safe clearance above the adjacent hills. PG-308

The proposed alignment for this mitigation measure requires spans of 1,306 feet (0/5 to 0/6), 2,141 feet (0/6 to 0/7) and 1,571 feet (0/7 to 1/8). These span lengths may exceed the capacity of the tower design that has been proposed, and may require a new design that is more robust and potentially more aesthetically problematic.

4.18 Transition Station Alternatives

Pages D.3-166 to 168 PG-309

As stated above, the simulation for the proposed transition station in the Draft EIR is inaccurate, and PG&E believes that the appropriate landscaping as already proposed would adequately mitigate the visual impact for the substation (Class II). With the Draft EIR not providing any simulations of alternative sites or structure types, it has not been adequately demonstrated that the alternative transition stations proposed would necessarily have less visual impact than the Proposed Project.

Responses to Comment Set PG – PG&E Attachment A: Visual Resources

PG-279 The comment states that the DEIR fails to assess the existing landscape according to the third CEQA criterion which asks whether a "*…substantial degradation of the existing visual character or quality of the site and its surroundings would occur*." The comment also suggests that existing 60 kV transmission line is not properly accounted for. The visual analysis presented in the DEIR relies on the establishment of a number of key viewpoints, which are specifically selected to be representative of a broader range of viewpoints. At each viewpoint, the existing conditions of the landscape and viewing circumstances are described. Visual quality is a specific component of the existing landscape that is included in the description. Within the description of visual quality for each viewpoint, existing built structures (including the 60 kV transmission line) are noted which, combined with other contributing landscape features, contribute to an overall assessment of visual quality. The visual quality description for Key Viewpoint 1 (p. D.3-6) is an example:

"Visual Quality: moderate-to-high. Much of the landscape visible from the trail consists of foreground, open undeveloped rolling grass-covered hills punctuated by stands of eucalyptus and oak woodland, backdropped by middleground to background forested ridges. However, the existing electric transmission line is a prominent feature in foreground views from the park's trails and diminishes the scenic integrity of the park's landscape, reducing what would otherwise be a high level of visual quality."

The comment also states that visual impact is not clearly defined in a way that enables a determination of whether a project will substantially degrade the existing visual character or quality of the site and its surroundings. In fact, the first paragraph of Section D.3.3 Environmental Impacts and Mitigation Measures for the Proposed Project defines an adverse visual impact as occurring when: "*…(1) an action perceptibly changes existing features of the physical environment so that they no longer appear to be characteristic of the subject locality or region; (2) an action introduces new features to the physical environment that are perceptibly uncharacteristic of the region and/or locale; or (3) aesthetic features of the landscape become less visible (e.g., partially or totally blocked from view) or are removed.*" Clearly, along portions of the route, the Proposed Project would introduce taller and more massive structures (new features) that would introduce more prominent industrial character and stronger visual contrast and block from view or obscure background landscape features (land, vegetation, sky).

The comment also states that the combination of Overall Visual Sensitivity with Overall Visual Change leading to a conclusion on impact significance is not explained. In general terms, an assessment of impact significance is always based on a comparison of project-induced change to the pre-project existing conditions. With respect to visual resources, the post-project viewing experience is compared to the pre-project viewing experience. Overall Visual Sensitivity is a logical conclusion as to how sensitive the existing viewing experience is likely to be to the implementation of a specific project. A thorough assessment of Visual Sensitivity must incorporate not only the existing landscape conditions (quality/character), but also public concern or interest in the landscape (viewer concern) and the conditions under which the landscape is observed (viewer exposure). Overall Visual Change is a logical summation of the factors (visual contrast, project dominance, and view blockage) that cause change in the viewing experience. For each view location, the resulting overall visual change is evaluated within the context of the visual sensitivity of the existing landscape and viewing circumstances to arrive at a conclusion on impact significance. Environmental settings with lower visual sensitivity are in essence, more tolerable of adverse visual change while higher sensitivity environmental settings are less tolerable of adverse visual change. Section D.3.3.1 Significance Criteria (p. D.3-21) describes the general correlation of impact significance to combinations of visual change and visual sensitivity: *"…lower visual sensitivity ratings paired with lower visual change ratings will generally correlate well with lower degrees of impact significance when viewed on-site [at the key viewpoint]. Conversely, higher visual sensitivity ratings paired with higher visual change ratings will tend to result in higher degrees of visual impact occurring at the site."*

The comment also states that there is a question as to whether the assumptions built into Table D.3-1 have been validated by empirical research. Table D.3-1 (p. D.3-20) is more a qualitative reflection of common sense than empirical research. There should be little disagreement that low degrees of visual change applied to environmental settings that have low sensitivity to that change will typically result in visual impacts that are not significant. Similarly, it is logical to conclude that high degrees of visual change applied to environmental settings that are highly sensitive to that change will typically result in visual impacts that are significant. Between those obvious extremes is a gradient of change vs. sensitivity. Where the lines are drawn to define this "gray area" of potentially significant impact is a judgment call that relies on the experience of the analyst.

The comment also states that "…according to Table D.3-1, a clear case of significant visual impact requires a rating of at least a 'high' rating of one and a 'moderate to high' rating of the other overall rankings." The comment then points out that, of the 13 significant visual impacts identified in the Draft EIR, none meet these criteria. This is true. But what the comment fails to point out is that Table D.3-1 also identifies six other combinations of visual change and sensitivity that result in "Adverse and Potentially Significant" impacts. As noted in Footnote #3 of the table, these impacts are perceived as negative and may be significant (as determined by the analyst) depending on project and site-specific circumstances. All of the significant visual impacts identified in the Draft EIR fall into this category. It should also be pointed out that of the 21 visual impacts identified for the Proposed Project, 6 are considered significant and 15 are considered less than significant (Table ES-5, pp. ES-60 & 61).

The comment also states that the DEIR fails to make a clear case that the existing landscape is of reasonably high quality and is relatively valued by viewers, and the perceived incompatibility of one or more Proposed Project elements or characteristics tends toward the high extreme, leading to a substantial reduction in visual quality.

Can there be any question that much of the landscape along the State Scenic Route I-280 corridor is of *"reasonably high quality"* (rated moderate, moderate-to-high, or high in terms of visual quality in the Draft EIR)? Similarly, can there be any question that the existing landscapes within the corridor are *"relatively valued by viewers"* (including residents, travelers on roads, and recreationists—rated moderate, moderate-to-high, or high in terms of viewer concern in the Draft EIR)? It is however, reasonable to assume that different people will arrive at different conclusions regarding the compatibility of Project characteristics with the existing landscape. Of the 18 key viewpoints established to evaluate the Proposed Project, it was concluded that one would experience a low degree of project-induced visual change, three would experience low-to-moderate degrees of visual change, seven would experience moderate degrees of visual change, seven would experience moderate-to-high degrees of visual change, and no key viewpoints would experience high degrees of project-induced visual change. For each key viewpoint, the discussion of visual change is broken down into its contributing factors of visual contrast, project dominance, and view blockage and presented in Section D.3.3 Environmental Impacts and Mitigation Measures for the Proposed Project. The results are also summarized in tabular form for easy reference in Appendix VR-1 and in many instances are supported by existing conditions photographs and visual simulations. No additional analysis is deemed necessary to make a "clear case" for the conclusions presented in the Draft EIR.

The comment also states that a clear connection is not made between Table D.3-1 and the above statement. As stated in the introductory paragraph to Table D.3-1 (p. D.3-20):

"Table D.3-1 illustrates the general interrelationship between visual sensitivity and visual change and is used primarily as a consistency check between individual KVP evaluations. Actual parameter determinations (e.g. visual contrast, project dominance, and view blockage) are primarily based on analyst experience and site specific circumstances."

For each viewpoint, the analyst determines the overall visual sensitivity of the existing landscape and viewing circumstance and assesses the degree of visual change that would be caused by the project. A conclusion as to the significance of the resulting visual impact is then reached, taking into account any pertinent project and site-specific circumstances. This is repeated for each key viewpoint. At the quality control step, the results are compared to the D.3-1 Guidance table to insure that the methodology and decision process is consistently applied to each viewpoint. Any deviation from the Guidance table would be further evaluated to verify the analytical conclusions.

PG-280 The comment states that the Draft EIR visual analysis procedures are not well documented and are applied inconsistently. The reader is referred to the response to Comment PG-279 and its various subparts above as most of the points raised in this comment are addressed in that response. In addition, a discussion of the visual analysis approach (which is also summarized in the Draft EIR) is presented below. The table presented in Appendix VR-1 organizes the various components of the existing visual setting and visual change in an easy to follow format that can be referred to while reading this discussion. The process for executing the methodology is straight forward:

1. A preliminary visual assessment is conducted.
2. Visual simulations are then prepared.
3. The visual simulations are then verified in the field.
4. The visual assessment is then verified and revised as necessary with the aid of the visual simulations.
5. The analytical conclusions are cross-checked for consistency using the guidance presented in Table D.3-1

At its core, the visual resources analytical approach utilized for the Jefferson-Martin project is grounded in commonsense understandings of the environment we live in, how the environment is changed by our actions, and how we perceive those changes. These are understandings which are routinely articulated by the public in one form or another in project workshops, public scoping meetings, public hearings, and comment letters, and can be characterized by such intuitive notions as:

- Most people would prefer not to see industrial features introduced into landscapes that are either perceived as scenic or are predominantly natural in character.
- People tend to be very sensitive about views that can be seen from their homes.
- People who recreate in or travel through predominantly natural landscapes tend to appreciate, and are sensitive about, the natural character of their surroundings.
- People will form an opinion about a landscape based on what they can or can't see, how long they can see it, and from what vantage point.
- If a person cannot see an anticipated change or that change has limited visibility, they are likely to be less concerned about the change than if it is prominently visible in landscapes they frequently view.
- Most people would say they know when a particular feature is out of place when they see it (typically resulting from incompatible forms, lines, colors or textures, or excessive structural prominence).
- Most people would agree that industrial structures that extend above the horizon into the sky are more noticeable and less desirable than structures that remain below the horizon.

The visual resources methodology merely provides a framework around which to organize these understandings in a methodical way. Specifically, a project is typically evaluated by establishing key viewpoints that are representative of (a) the various viewing populations, (b) the types of landscapes viewed, and (c) the impacts experienced. At each viewpoint, the existing visual setting and anticipated change are thoroughly described by the logical components that comprise the viewing experience. These components (visual quality, viewer concern, viewer exposure, overall visual sensitivity, visual contrast, project dominance, view blockage, and overall visual change) are defined on pages D.3-1 and 2 of the Draft EIR.

When a landscape is viewed an impression is formed as to the quality or character of that landscape based on the features observed in the landscape and the intactness of those features. The visual resources methodology looks at the various landscape attributes (e.g. variety, vividness, coherence, uniqueness, harmony, and pattern) that, while most people don't consciously think of the landscape in those terms, are the building blocks of the impressions we form. The visual quality for each viewpoint is then recorded in the field.

Each member of the viewing public brings to their observations of the landscape their personal expectations for the landscape and any invested feelings as to whether or not the landscape should be improved, preserved as is, or allowed to be changed. This "viewer concern" is often reflected in public policy documents that identify landscapes of special concern or roadways with special scenic status. While it is impractical for most projects to conduct viewer concern surveys, it is reasonable to make some generalizations regarding viewer concern based on intuitive notions that (a) most residents tend to have relatively high concern regarding the views they have from their homes and yards, (b) most recreationists on trails and at recreation facilities in predominantly natural settings (parks, campgrounds, golf courses) also tend to have relatively high concern regarding the views they experience during those activities, and (c) travelers on scenic roads accustomed to viewing relatively high quality landscapes tend to have relatively high concern for the landscapes they perceive. The predicted viewer concern is the second factor contributing to a landscape's overall visual sensitivity.

Viewer exposure is the third contributing factor to a landscape's overall visual sensitivity. Put simply, because visual impact is predicated on human exposure, if a landscape change cannot be seen by people, then a visual impact does not occur. Therefore, landscapes that have very low viewer exposure (based on landscape visibility, the distance between the landscape and the viewer, the number of viewers that view the landscape, and the duration in time that the landscape can be viewed) will tend to be less sensitive to overall visual change (in the context of human experience of visual impacts). Landscapes with higher viewer exposure will tend to be more sensitive to overall visual changes. This is particularly true for landscapes lacking specific public policy protections. The backcountry landscapes of national parks, wilderness areas, and state parks (to name a few examples) would have high visual sensitivity regardless of the viewer exposure because of the special status protections afforded those unique areas in the governing statutes.

Once the overall viewer exposure is recorded for a viewpoint, it is given equal consideration along with the landscape's visual quality and viewer concern. The analyst then makes a professional judgment as to the viewpoint's overall visual sensitivity to the particular anticipated change.

Once the existing visual setting has been described by all its contributing factors, project-induced visual change is assessed according to the key factors that characterize the change. The form, line, color, and texture of the anticipated change (larger transmission structures in this case) are compared to the characteristic and predominant forms, lines, colors, and textures inherent in the existing landscape to determine the degree to which the proposed change would visually contrast with the existing landscape. In some circumstances, if a new structure is substantially larger than the structure it is replacing (as in the present case) the structural characteristics (form, line, color, and texture) can become substantially more noticeable than the characteristics of the original structure, causing increased visual contrast with other landscape features.

Project dominance is the second aspect that is noted with respect to visual change. This factor is a measure of a particular feature's (transmission structure in this case) apparent size relative to other visible landscape features and the total field of view from the viewpoint. A particular feature's dominance is affected by its relative location in the field of view and its distance to the viewer. Features that are closer to the viewer are more prominent than features that are more distant from the viewer.

View blockage is the third and final factor contributing to visual change and describes the extent to which any previously visible landscape features are blocked from view as a result of a project component's scale (size) and/or position. The blockage (complete or partial) or otherwise impairment of higher quality landscape features (such as landforms, water bodies, vegetations, and open sky) by lower quality project features (complex forms with industrial character) is considered an adverse visual change. Also, it should be noted that anytime a structure is visible above the horizon line (blocking sky), it becomes more noticeable and its structural prominence increases. Once the anticipated view blockage is recorded for a viewpoint, it is given equal consideration along with the anticipated visual contrast and project dominance. The analyst then makes a professional judgment as to the overall visual change that would be experienced at that particular viewpoint. This concludes the preliminary visual assessment.

With completion of the preliminary visual assessment, visual simulations are then prepared. Concern has been expressed in the Applicant's comments regarding the type of camera and lens that was used and the procedures employed to verify the accuracy of the simulation images. An underlying premise in the preparation of the Jefferson-Martin simulations for the Draft EIR is that they convey a "reasonable representation" of the view that would be experienced from a given viewpoint. To this end, the type of camera and lens used to photograph the landscape are essentially irrelevant. What is important is that the image presented on the printed page replicates life-size scale when held at a standard reading/viewing distance. The standard reading/viewing distance for the Jefferson-Martin Draft EIR images is approximately 18 inches. The appropriate page size for this type of simulation is considered to be 11 inches x 17 inches. As a result, when the simulation is held at approximately 18 inches from the eye, the image features will appear approximately the same size as they would appear if the viewer was standing at the viewpoint in the field. This is the best approach to convey a realistic viewing experience to a reader that may not be able to view the landscape in the field.

It was also determined that the most realistic simulations would be achieved by placing images of existing towers that are the same as those proposed for the project into the existing landscape images. This was a relatively straight forward process because the existing 60 kV towers provided accurate scale and location markers to guide scaling and placement of the introduced structures.

Elsewhere in the Applicant's comments, questions have been raised as to why the PEA simulations were replaced in favor of new simulations. The PEA simulations were very useful in gaining a conceptual understanding of the Proposed Project. However, the presentation format of the simulations and existing conditions photos, two per 8 1/2"x11" page, results in images that are at a scale substantially smaller than life-size and show a very restricted field of view. As stated above, the most effective way to communicate a realistic viewing experience is to present simulation and existing conditions imagery at a life-size scale when viewed at a reasonable reading/viewing distance. Images smaller than life-size scale do not convey the sense of magnitude that is readily apparent when standing at a given viewpoint. For those reasons, the simulations were not considered appropriate for use in the Draft EIR.

Another question raised in the Applicant's comment is: *"Does the Draft EIR presume that a specific degree of size increase represents a threshold for acceptable visual change?* " The short answer is no. Each tower is evaluated on a case by case basis in the context of the existing landscape characteristics and viewing circumstances. Three key variables that are particularly important in determining the importance of a specific tower's size include: (a) structure visibility (Is the increase in tower size readily apparent or is it obscured to the extent that the significance of the size increase is reduced?), (b) proximity to the viewer (Is the structure close enough to the viewer such that the apparent size increase results in a substantial increase in visual contrast or structural prominence?), and (c) structure skylining (Does the increase in size result in new structure skylining where none existed before and to what extent?).

The comment further questions the rationale for allowing an additional 30% increase in height under certain mitigation measures that recommend tower elimination when the increase in height proposed for some structures is less than 30% to begin with. First of all, it is important to remember that 30% is considered the upper limit. As the Applicant's own calculations show elsewhere in these comments, some of the increases in structure height necessary to accommodate tower eliminations are substantially less than 30%. However, the 30% limit is somewhat arbitrary which is best explained with the following example. Let us assume that we have three towers of equal height, of which the middle one is to be eliminated. If the two retained towers increase in size by 50% in order to eliminate the middle tower, the end result is zero net reduction in structural mass between the three towers. If the allowable structure size increases are limited to 40%, the end result is a 20% reduction in structural mass between the three towers. The 20% reduction was not considered a sufficient offset for the increased tower heights and potential visibility. However, a 30% allowable increase in size limit for the two retained towers produces a 40% reduction in structural mass between the three towers. As a matter of professional judgment, the complete elimination of one tower location with an accompanying 40% net reduction in structural mass was considered a beneficial trade-off against the increased structure size and potential for increased visibility. To the extent that structure sizes increase by amounts less than 30% in the tower elimination scenarios recommended, the reductions in net structural mass become even more dramatic.

PG-281 The comment states that the methods and techniques employed to produce the Draft EIR visual simulations are not documented. Please see Response to PG-280.

PG-282 The comment states that the Draft EIR visual simulations are inaccurate and misleading and points out a shift in image color between Figures D.3-3A, D.3-3B, and D.3-3C. With regards to the apparent variation in landscape color, the background landscape images are identical. The variation in color is merely an artifact of the commercial print production process when color management is not adequately maintained. However, in this case, the variation in the color tint of the final print images has no bearing on the analysis or conclusions. It is for this reason that a set of color-controlled originals are provided to the Lead Agency Project Manager, the EIR Project Manager, and the commercial print shop. It may be worth noting that a somewhat similar lack of color control is apparent in the Applicant's Attachments R and S to these comments (unless of course Cañada Road actually has been painted pink and mauve since the Draft EIR was prepared!).

The comment also states that the location and scale of the San Bruno Avenue Transition Station shown in Figure D.3-19B are shown incorrectly and that the net effect of these inaccuracies is a simulation that overemphasizes the proposed transition station's size and its visibility. The comment has correctly identified an error in the scaling of the electric facilities resulting from the composition of images of differing resolutions. The simulation has been revised and is presented as Visual Resources Figure D.3-19B(REV). Also, story poles were erected on site to better tie in the corners of the masonry wall and placement of the electric facilities on site. This has resulted in an adjustment to the placement of the wall. Much of what is shown of the electric facilities in the simulation are taken from an actual photograph of a 230 kV transition station recently constructed for PG&E's Tri-Valley Project. PG&E identified the Tri-Valley transition station as an example of what was to be constructed for the Jefferson-Martin Project with the exception that the Tri-Valley transition station was a double-circuit 230 kV facility and Jefferson-Martin would be a single-circuit 230 kV facility. Therefore, the station was altered to more closely resemble a single-circuit facility. The approach of inserting images of existing facilities into the San Bruno Avenue landscape was selected in order to more effectively capture the realism of the structural complexity and detail that creates the industrial character of the facility.

What is clear from the revised simulation is that the transition station would introduce a moderate-to-high degree of visual change into the existing landscape with the resulting visual impact being significant and unmitigable. This finding is consistent with the conclusions presented in the DEIR and no additional changes to the text have been made. The Applicant's simulations presented as Attachments L and M to this comment also effectively illustrate the prominence of the station's industrial character and the magnitude of the visual impact that would be caused though the station infrastructure has been simplified and the image has been presented at a scale that is approximately 40 percent smaller than life-size. What this under-scaling means is that the features in the printed simulation (both existing and simulated) appear substantially smaller than they would appear if the viewer were to stand at the actual viewpoint. In this circumstance, landscape features appear noticeably more prominent "in the field" than they appear on the printed page.

The Applicant's Attachment M to this comment provides a simulation of the proposed landscaping for the transition station. The landscaping is shown at maturity, which is expected to take up to 10 years to reach. What is apparent in the simulation is that, while the landscaping will screen the majority of the lower electrical components, it will not be effective in screening the upper portion of the H-frame transition structure. Furthermore, given that the landscaping would take up to 10 years to reach maturity (the PEA [p. 8-105] states that it would take 8 to 10 years), the lower electrical components would still cause a long-term visual impact before they would be effectively screened.

The simulation of the transition station presented in the DEIR only shows gravel around the perimeter of the facility and does not show the proposed landscaping – (a) in order to clearly illustrate the magnitude of the visual impact that would be readily apparent at the end of construction, and for a substantial time thereafter, and (b) because the landscaping plan would not be effective as shown, is only conceptual, and would be augmented in some fashion (to be determined at a later time) by Applicant Proposed Measure 8-13.

PG-283 The comment states that the Draft EIR fails to analyze the project with the incorporation of visual mitigation measures that are proposed as part of the project including: (a) the selective plantings of vegetation along trails in Edgewood County Park and Watershed lands and in residential areas, (b) landscaping along Skyline Boulevard, (c) landscaping around the San Bruno Avenue transition station, and the use of non-reflective, non-glare finish on poles in Segment 1.

As stated in Section D.3.3.2 Applicant Proposed Measures of the Draft EIR (p. D.3-21, the implementation of all of the Applicant's proposed measures were assumed in the visual analysis. With the exception of the San Bruno Transition Station as discussed in the previous response, the visual simulations do not show implementation of the selective plantings and landscaping because no planting or landscaping plans have been provided. Indeed, the Applicant's own simulations do not show implementation of these measures. Further, some of the measures were not considered sufficiently effective in mitigating the resulting visual impacts. For example in Edgewood County Park, it is difficult to imagine the wall of vegetation that would be necessary to effectively screen the project from the south loop of the Serpentine Trail, particularly for those portions of the trail that actually pass parallel and beneath the transmission line. With the exception of the transition station as discussed and the in the previous response, no substantive information has been provided regarding the applicant's proposed measures. Vague descriptions of good intentions are not adequate substitutes for realistic proposals with detailed specifications and clear articulation of mitigation objectives and effectiveness criteria, backed up with adequate specification and documentation.

PG-284 The comment implies that contrary to CEQA, the Draft EIR visual analysis imposes visual mitigation measures for effects that it finds to be "less than significant" including Mitigation Measures V-6a (tower painting), V-8a (tower reroute), V-10a (tower elimination), and V-19a (tower elimination). While CEQA does not require mitigation for impacts that are less than significant, it is up to each lead agency to decide whether or not to adopt mitigation that would further reduce impacts that are less than significant. In other recent PG&E projects (Tri-Valley and Northeast San Jose), the CPUC has adopted mitigation for "Class III" impacts (those that are less than significant). As a further point of clarification Mitigation Measure V-6a is proposed for a less than significant visual impact. However, Mitigation Measures V-8a, V-10a, and V-19a are proposed for significant visual impacts.

With regard to the feasibility of the recommended reroutes and tower eliminations, the reroutes were evaluated prior to publication of the Draft EIR based on site visits and informal alternative segment screening for potential impacts and for any factors that might indicate that they would <u>not</u> be feasible. The primary concern in siting was avoidance of sensitive biological resources; the description of these survey results has been expanded in the Final EIR (e.g., Section D.4.4.2).

PG-285 The comment states that it is difficult to evaluate the Partial Underground Alternative because, among other things, no data is presented on the tower heights for the various reroutes. In general, the tower heights were assumed to be comparable to those of the Proposed Project. With regard to potential conflict with the watershed Scenic and Recreation Easements, see Responses to Comment Set N (National Park Service).

The comment also states that the vegetation clearing and access roads that would be required for the reroutes could have substantial implications for this alternative's visual effects. The Draft EIR (pp. D.3-160-163) indicates that a portion of the reroute along Cañada Road (three towers) would result in significant Class I visual impacts. However the first five towers of the reroute would be located adjacent to Cañada Road and would result in minimal access road visual impacts. There would be the removal of some eucalyptus trees as the route passes through a stand west of I-280. This vegetation removal has been considered in the determination of the Class I significant visual impact. No additional detail or simulations would change the conclusion that a portion of this reroute (Towers 1/3, 1/4, and 1/5) would result in significant visual impacts that could not be avoided. The Applicant's simulations provided as Attachments P, Q, R, and S to this comment are reasonable conceptualizations of the reroute along Cañada Road except that the 1/3, 1/4, and 1/5 towers adjacent to Cañada Road would be tubular structures and would be located closer to Cañada Road (see Mitigation Measure B-1m). A new simulation has been provided to illustrate this portion of the Partial Underground Alternative; see Figure D.3-20c and D.3-20d.

Towers 1/1 and 1/2 of this route segment would not result in significant visual impacts. The Applicant's simulation of Tower 1/2 (Applicant's Attachment P to this comment) illustrates how the tower would be substantially backdropped by vegetation. Painting the tower with a neutral green color would reduce the structure's color contrast with the background vegetation. What is not apparent from the simulation is that the view of the tower from northbound I-280 is very brief as motorists at high speed round the curve at this location. In addition this brief structural view would be significantly more than offset by the removal of all seven towers stretching across Edgewood County Park and the ridgeline immediately east of I-280 and the elimination of the long duration views of the structures from I-280 as illustrated in Draft EIR Figure D.3-3C.

PG-286 The comment states that "The single simulation of the PUA presented [Visual Resources Figure D.3-3C] was taken from a location and viewpoint angle that ensure that the new towers are not visible in the simulation." Actually, the viewpoint was selected to illustrate the changed visual condition viewed from southbound I-280. It is true however, that the Segment 1 reroute would have very limited visibility from I-280, which was precisely the point of the reroute. While three new towers of the reroute along Segment 1 would result in a significant visual impact, this impact would be apparent to a substantially smaller viewing population (along Cañada Road and Edgewood Road) than the large viewing population along I-280. The Draft EIR presents the reasonable conclusion that the elimination of the significant visual impacts on I-280, Edgewood County Park, and the Pulgas Ridge Open Space due to the removal of the seven proposed (and existing) tower locations on the east side of I-280, more than offsets the significant visual impact of three towers on a substantially smaller viewing population.

The comment also challenges the appropriateness of making the trade-offs in impacts that would be achieved with the four transition stations (structures are proposed), new crossing of I-280 at Tower 8/50, and reroute from Towers 9/63 to 10/68. The benefit and appropriateness of these trade-offs is quite clear. The four new transition structures would eliminate 23 towers along residential areas, a number of which cause significant visual impacts to I-280, local roads, and the Junipero Serra Overlook at the Crystal Springs Rest Area as well. The Draft EIR does identify the proposed I-280 crossing at Tower 8/50 as a Class I visual impact on I-280 and the golf course. It should be noted however, that the mitigation proposed for the Proposed Project would also be included for this alternative, thus the tower eliminations proposed within the northern portion of the golf course (Visual Resources Mitigation Measure V-14A) would partially offset the impact of the new crossing on the southern portion of the golf course. The proposed reroute between Towers 9/63 and 10/68 would eliminate five towers from views from residential areas along Loma Vista Drive and Skyview Drive as well as I-280. The new towers would be placed west of I-280 in an area with no public access. In conclusion, the rational for the impact trade-offs is to achieve a significant net reduction in visual impacts on a broad spectrum of viewers.

PG-287 The comment questions whether the proposed tower eliminations and reroutes were subjected to engineering and environmental analysis to determine feasibility. Environmental analysis for the biological impacts of these reroutes was completed in order to ensure that towers were not recommended for areas in sensitive habitats. No detailed engineering was completed, but no factors were identified that indicated feasibility problems. See below and in subsequent responses regarding increased tower heights that would result from tower eliminations.

The comment also refers to tower height calculations that the Applicant has prepared to compare the new and relocated transmission towers with those proposed in the project application. The Applicant's calculations indicate that the proposed tower eliminations presented in the Draft EIR would require changes in heights of the retained structures ranging from –14% to +197%. However, in 17 of 51 tower calculations, the Applicant has inappropriately used the heights of the existing 60 kV towers as the baseline for comparison and not the towers proposed in the project application. When the correct tower heights are incorporated into the calculations, the required changes in height would range from –21% to +124%. The Applicant's calculations demonstrate the following:

Applicant Calculated Increases In Tower Height

% Increase in Height	Number of Towers	% of Towers
≤ 0	8	16%
1-10	11	21%
11-20	12	23%
21-30	3	6%
31-40	5	10%
41-50	4	8%
51-60	1	2%
61-70	4	8%
71-80	1	2%
91-100	1	2%
121-130	1	2%

The above analysis clearly illustrates that without any additional adjustments in the locations of either proposed or necessitated tower relocations, approximately two-thirds of the towers affected by the proposed mitigation would meet the 30% limitation imposed by the mitigation measures. The mitigation measures requiring tower elimination have been modified (see Section D.3) to reduce tower height and to require consultation with a visual resources specialist during final tower design and location. As a result, fine-tuning of the tower locations would occur and as a result, it is anticipated that even more of the towers would meet the 30% height increase limitation. Note that several mitigation measures have been modified as explained in Responses to Comments PG-292 to PG-304 below.

PG-288 The comment questions the applicability of Mitigation Measure V-1a (requiring the screening of construction sites) to the individual towers. The measure was intended to apply only to substations, transition stations, and staging and material and equipment storage areas. The mitigation measure has been revised to make clear this intent.

PG-289 The comment states that the Draft EIR discussion of visual impacts on Pulgas Ridge Open Space is incorrect because most of the trails are situated in the eastern portion of the Preserve. While it is acknowledged that the majority of the Pulgas Ridge Open Space trails are located in the eastern portion of the Preserve with limited or no visual access to the Proposed Project (just as there are trails in the eastern portion of Edgewood County Park with no views of the project), the Draft EIR discussion of visual impacts on Pulgas Ridge Open Space refers to the western portion of the Preserve with views of the transmission line. Specifically, the analysis would apply to the Hassler Trail which has unobstructed, panoramic views of the Proposed Project and surrounding landscape. Towers 1/7 and 1/8 are particularly prominent in views from the Hassler Trail. Furthermore, the proposed increased heights for 1/7 and 1/8 (22% and 17% respectively) would result in new skylining from some portions of the trail and increased skylining along other portions of the trail. Therefore, the Draft EIR discussion is correct with respect to its discussion of visual impacts on the Preserve.

PG-290 The comment states that [Key Viewpoint 2] on southbound I-280 was selected to show the significance of the impact of the Proposed Project, and underestimates the impact of the Partial Underground Alternative. The comment further states that a viewpoint taken from farther to the north would allow clearer views of the towers along Cañada Road. The comment is partially correct but misses the point of this location. The viewpoint was selected because it effectively captures both the impact of the Proposed Project and the benefits of the Partial Underground Alternative on the landscapes to the east of I-280, which is the point of the discussion. A viewpoint further north on I-280 could capture more of the Partial Underground Alternative, specifically one or two towers along Cañada Road but the structures would be only briefly at the edge of the primary cone of vision of travelers on I-280 and generally beyond the primary cone of vision. Therefore, the visual impact on I-280 would still be as characterized in the Draft EIR.

PG-291 The comment is concerned with the location of Key Viewpoint 3 in that it doesn't show the crossing of the Partial Underground Alternative, which occurs behind the view presented in Visual Resources Figures D.3-4A and 4B. Again, the comment misses the point that KVP 3 was selected to evaluate the Proposed Project and not the Partial Underground Alternative. Therefore, the viewpoint location is appropriate. Furthermore, as the Applicant's simulation shows in Attachment P to this comment, Tower 1/2 would be substantially backdropped by vegetation which would reduce its structural prominence. Painting the tower with a neutral green color would further reduce the structure's color contrast with the background vegetation. Also, what is not apparent from the simulation is that the view of the tower from northbound I-280 is very brief as motorists at high speed round the curve at this location.

PG-292 The comment addresses the proposed elimination of Tower 2/13 in Mitigation Measure V-5a and states that Towers 1/12 and 2/14 would need to be 207 feet tall and 175 feet tall respectively in order to achieve removal of Tower 2/13. The table provided in this comment incorrectly calculates percent increase in tower heights for 1/12 and 2/14 as 102% and 136% respectively. The error in the calculation stems from the use of the existing 60 kV towers as the existing height instead of the heights proposed in the Application. The correct percentage increases would be 72% and 44% for 1/12 and 2/14. However, the comment is correct in that these percentage increases exceed the limitation of 30% recommended in the Draft EIR.

The comment also suggests relocating Tower 2/13 upslope between 1/12 and 2/14 rather than eliminating the tower. In doing so, the Applicant has calculated that this approach would result in tower heights of 131 feet for 1/12 (a 9% increase), 75 feet for 2/13 (a 53% reduction), and 125 feet for 2/14 (approximately the same). This approach would be acceptable in that it would eliminate the Class II significant visual impact caused by the currently proposed Tower 2/13 by substantially reducing its height and moving it out of the primary cone of vision of travelers on Cañada Road. Mitigation Measure V-5a has been revised to accommodate this option.

PG-293 The comment states that taller structures would be required to accommodate the reroute recommended in Mitigation Measure V-8a (exceeding the 30% height increase limitation in three cases). It also states that there is no visual simulation to support the Draft EIR conclusion that visual impacts on northbound Cañada Road would be less than with the Proposed Project and visual impacts on southbound Cañada Road would be similar or less than with the Proposed Project. The table provided in this comment incorrectly calculates percent increase in tower heights for Towers 3/18 through 4/26. The calculation error stems from the use of the existing 60 kV towers as the existing height instead of the heights proposed in the Application. Instead of height increases ranging from -7% to 60%, the correct percentage changes would range from -21% to +20%, well within the recommended 30% height increase limitation. Although there is no simulation illustrating the impacts on Cañada Road, the route map presented as Visual Resources Figure D.3-8C effectively depicts the reroute's benefits to Cañada Road. As shown in the figure, compared to the centrally positioned and highly exposed proposed Tower 3/22 (see Visual Resources Figure D.3-7B), Towers 3/21 and 3/22 would either appear backdropped or screened by trees depending the direction of travel on Cañada Road. New Tower 4/23 would be partially screened by vegetation compared to the highly exposed proposed Tower 4/23, and new Tower 4/24 would be substantially less visible to southbound travelers on Cañada Road compared to the highly visible and prominent proposed Tower 4/24 location.

PG-294 The comment states that the painting of tower surfaces different colors as recommended in Mitigation Measure V-6a would have to be done after installation and would likely flake. If it is independently confirmed that painting structures multiple colors is not feasible, then the structures should be painted an appropriate non-reflective color to blend the structure with the background as viewed from the most sensitive viewpoint for that tower position.

The comment also states that the dark green paint simulated in Measure V-6a would be potentially more noticeable when background grasses and shrubs have turned yellow and brown. It should be noted that the structures visible from Key Viewpoint 5 at the southbound I-280 Vista Point are predominantly backdropped by trees and shrubbery that are of varying shades of green throughout most of the year. In those cases where the background vegetation is predominantly characterized by shades of green during most of the year, the towers should be painted a neutral, non-reflective green to better blend the structure with the background.

PG-295 The comment states that the Draft EIR's claim that the analysis of the visual impact at Key Viewpoint 8 is applicable to other residential areas (p. D.3-73) is somewhat misleading, since the tower selected for the visual analysis represents one of the more visible towers from Lexington Avenue. As always, the task of the EIR is to evaluate reasonable worst-case scenarios. Tower 29 is one of the towers that represent the reasonable worst-case visual impacts along Lexington Avenue. As such, its accompanying visual analysis can be applied to other residential areas as representational of the reasonable worst-case impact analysis for similar viewing experiences in those areas. There are many areas with similar views of other towers behind residential areas along the existing ROW.

The comment also states that "extremely tall" structures would be required to accommodate the tower eliminations recommended in Mitigation Measure V-9a (exceeding the 30% height increase limitation in all three cases) and appears to be inappropriate in addition to being technically undesirable. The table provided in this comment incorrectly calculates percent increase in tower heights for Towers 5/28, 5/30, and 5/32. The calculation error stems from the use of the existing 60 kV towers as the existing height instead of the heights proposed in the Application. Instead of height increases ranging from 36% to 197%, the correct percentage increases would 9% for Tower 5/28, 95% for Tower 5/30, and 124% for Tower 32. According to the Applicant's calculations, two of the tower heights would substantially exceed the recommended 30% height increase limitation. Therefore, Mitigation Measure V-9a has been revised to include the following: If the tower eliminations cannot be accomplished as described above without exceeding the 30% height increase threshold, then Tower 5/29 shall be eliminated, Towers 5/31 and 5/33 shall be retained, and the visibility of Towers 5/30 and 5/31 shall be reduced, all to be accomplished by taking the following steps: (a) Move Tower 5/28 northward (still staying adjacent to the trees) but no further than the revised location shown in Visual Resources Figure D.3-9c (Rev); (b) Increase the height of Tower 5/28 as necessary but not exceeding the 30% height increase threshold; (c) Move Tower 5/31 slightly south as shown in Visual Resources Figure D.3-9c (Rev) to increase structural screening by the adjacent trees; and (d) Increase the height of Tower 5/31 the minimum extent necessary to facilitate the span to Tower 5/32 without exceeding the 30% height increase limitation. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-296 Please refer to Response to Comment PG-295.

PG-297 The comment states that in order to eliminate Tower 7/40 as recommended in Mitigation Measure V-10a, the height of Tower 6/38 would need to be increased by 19% (20 feet), Tower 7/39 would need to be increased 14%, and Tower 7/41 would need to be increased 68%. While the increase in height of Tower 7/39 is acceptable, the height increase for Tower 6/38 may not be because of its unique location. Presently, the top of Tower 6/38 is just at the grade of I-280 as the freeway spans San Mateo Creek. Increasing Tower 6/38 by 20 feet may be sufficient to raise the structure into a prominent viewing position for travelers on I-280. For this reason, the raising of Tower 6/38 is not recommended. Also, Tower 7/41 would exceed the 30% limitation for height increases. Therefore, Mitigation Measure V-10a has been revised to incorporate the following steps to enable the elimination of Tower 7/40: (a) Move Tower 7/39 slightly north as shown in Visual Resources Figure D.3-10c (Rev); (b) Increase the height of Tower 7/39 the minimum amount necessary and not exceeding an additional 30%; (c) Move Tower 7/41 slightly to the south as shown in

Visual Resources Figure D.3-10c (Rev); (d) If necessary to further reduce the height of Tower 7/41, increase the height of Tower 7/43 (Tower 7/42 will also be eliminated); and (e) If necessary to further reduce the height of Tower 7/41, shift Tower 7/43 slightly to the south to reduce the span distance between Towers 7/43 and 7/41. Also, if necessary to facilitate the relocation of Tower 7/39 slightly to the north, the height of Tower 6/38 can be increased a maximum of 10%. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-298 The comment states that in order to eliminate Towers 7/42, 7/45, and 8/47 as recommended in Mitigation Measure V-12a, the heights of Tower 7/43 would need to be increased by 47%, Tower 7/44 would need to be increased 40%, Tower 7/46 would need to be increased by 32%, and Tower 8/48 would need to be increased by 28%. However, the increased height percentages are incorrectly calculated because the 60 kV transmission tower heights are used as the existing height instead of the heights proposed in the Application. The correct height increases are as follows: Tower 7/43 would increase by 14%, Tower 7/44 would increase by 20%, Tower 7/46 would increase by 32%, and Tower 8/48 would increase by 8%. Three of the towers would meet the 30% height increase limitation and Tower 7/46 is close to meeting the threshold. In order to remain below the 30% height increase limitation, Mitigation Measure V-12a has been revised to include the following steps: (a) Increase the height of Tower 7/43 slightly to offset the tower's shift in location to the south as described in Mitigation Measure V-10a; (b) Increase the height of Tower 7/44 slightly to enable the reduction in height of Tower 7/46 (and to further facilitate the slight relocation of Tower 7/43 to the south as described in Mitigation Measure V-10a); and (c) If necessary, Increase the height of Tower 8/48 slightly to further reduce the height of tower 7/46. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-299 The comment states that the Draft EIR does not present any simulations that would allow the reader to conclude that tower elimination in exchange for towers up to 30% taller would be an appropriate mitigation measure and that the simulation presented in Figure D.3-18C does not show increased tower height. See Response to Comment PG-280 regarding the rationale behind the selection of 30% as a maximum height threshold. Figure D.3-18C does not show increased tower heights because the necessity for increased structure heights had not been determined at that time. However, the 30% height increase limitation was tested on Key Viewpoint 17 (Towers 14/90 and 14/93) and was determined to be acceptable and still effective in reducing the visual impact of shorter yet more numerous structures under the Proposed Project.

The comment also states that in order to eliminate Towers 10/64 and 10/66 as recommended in Mitigation Measure V-13a, the heights of Tower 10/63 would need to be increased by 9%, Tower 10/65 would need to be increased 47%, and Tower 10/67 would need to be increased by 33%. According to the Applicant's calculations, Tower 10/63 would meet the 30% height increase limitation and Tower 10/67 is very close to meeting the threshold. However, Tower 10/65 would substantially exceed the threshold. In order to remain below the 30% height increase limitation, Mitigation Measure V-13a has been revised to include the following steps: (a) Increase the height of Tower 10/63 (not to exceed the 30% threshold) to enable a reduction in the height of Tower 10/65; (b) If necessary, shift the location of Tower 10/67 slightly to the south as shown on Figure D.3-12d (Rev) in order to reduce the height of Tower 10/65; and (c) If necessary, a 35% increase in height of Tower 10/67 (5% over the 30% height increase limitation) would be acceptable to meet the objectives of this measure. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

The comment also states that in order to eliminate Towers 9/56, 9/58, and 9/60 as recommended in Mitigation Measure V-14a, the heights of Tower 9/55 would need to be increased by 25%, Tower 9/57 would need to be increased 32%, Tower 9/59 would need to be increased by 25%, and Tower 9/61 would need to be increased by 15%. According to the Applicant's calculations, three of the four towers would meet the 30% height increase limitation and Tower 9/57 would need to be reduced by only two feet to meet the threshold. In order to remain below the 30% height increase limitation, Mitigation Measure V-14a has been revised to include the following steps: (a) Increase the height of Tower 9/59 slightly to enable a reduction in the height of Tower 9/57, and (b) If necessary, increase the height of Tower 9/55 slightly to enable the reduction in height of Tower 9/57. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-300 The comment states that the proposed relocation of Tower 11/75 and the elimination of Tower 12/76 as recommended in Mitigation Measure V-16a, would require that the height of Tower 11/74 be increased by 9% and the height of Tower 12/77 be increased by 59%. According to the Applicant's calculations, while two of the affected towers 11/74 and 11/75 would be well within the 30% limit for height increases, Tower 12/77 would substantially exceed the limit. In order to remain below the 30% height increase limitation, Mitigation Measure V-16a has been revised to include the following steps: (a) Tower 11/74 is to be moved to the east side of the current 60 kV Tower location rather than the west side as currently proposed (the purpose of this move is to reposition the tower to a slightly less prominent position when viewed from the San Andreas Lake Dam); (b) Tower 11/75 is to be relocated to a position south of the presently proposed location shown in Visual Resources Figure D.3-15C (the purposed of this move is to shorten the span distance between Towers 11/74 and 11/75 in order to enable a reduction in height of Tower 11/74); (c) Retain Tower 11/76 rather than eliminate it in order to eliminate the height increase for Table 12/77. With these adjustments, the prominence of the Proposed Project would be substantially reduced when viewed from the Sawyer Trail in the vicinity of the San Andreas Lake Dam. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-301 The comment states that the relocation of Tower 13/84 [recommended in Mitigation Measure V-17a] would require "significantly increasing" the heights of the adjacent towers to maintain electrical clearance to ground. However, the Applicant's calculations do not substantiate that claim. The Applicant's calculations show that Tower 13/83 would decrease in height by 10%, Tower 13/84 would increase in height by 12%, and Tower 13/85 would increase in height by 17%. The two tower height increases would be well below the 30% limitation recommended in the Draft EIR and the result would be the elimination of a very significant visual impact.

The comment also states that the removal of Towers 12/80 and 12/82 would result in substantial increases in the heights of Towers 12/79 (a 48% increase) and 12/81 (a 67% increase). In order to remain below the 30% height increase limitation, Mitigation Measure V-17b has been revised to include the following steps: (a) Retain Tower 12/80, thereby eliminating the need to increase the height of Tower 12/79 and reducing the height increase of Tower 12/81; and (b) If necessary, increase the height of Tower 13/83 to facilitate the reduction in heights of both Towers 12/81 and 13/84. PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-302 The comment states that the removal of Towers 13/89, 14/91, 14/92, and 14/94 [as recommenced in Mitigation Measure 19a] would result in substantial increase in Towers 13/88 (a 7% increase), 14/90 (a 50% increase), 14/93 (a 61% increase), and 14/95 (a 22% increase). In order to remain below the 30% height increase limitation, Mitigation Measure V-19a has been revised to include the following steps: (a) Retain Tower 14/92, thereby substantially reducing the necessary height increases of Towers 14/90 and 14/93; and (b) Re-position Tower 14/92 to even the span distances between Towers 14/90 and 14/93 and to reduce the necessary height increases of Towers 14/90 and 14/93. PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-303 The comment states that Mitigation Measure V-19a did not address the potential need to add one or two structures to enable connection to the alternative West of Skyline Transition Station. Mitigation Measure V-19a only addresses the Proposed Project, which includes the proposed San Bruno Avenue Transition Station. It is understood that if the West of Skyline Transition Station were to be selected, an additional structure or two would be needed to facilitate the connection to the transition station. This visual impact of the new structure (or two) would be offset by the elimination of the towers in Mitigation Measure V-19a (if accomplished) and the elimination of Tower 14/95.

PG-304 The comment states that the relocation of the I-280 crossing between Towers 10/68 and 10/69 would result in the following changes in structure heights: Tower 10/67 would increase by 14%, Tower 10/68 would increase by 7%, Tower 10/69 would be reduced by 14%, and Tower 11/70 would increase by 35%. According to the Applicant's calculations, three of the four remaining towers would be below the 30% height increase limitation recommended in the Draft EIR and Tower 11/70 only slightly exceeds it by 5%. In order to remain below the 30% height increase limitation, Mitigation Measure V-15a has been revised to include the following steps: (a) Relocate Tower 10/68 slightly to the north as shown in Visual Resources Figure D.3-14c (Rev) to avoid spanning private property; (b) Increase the height of Tower 10/69 slightly if necessary to reduce the height of Tower 11/70; and (c) If necessary adjust the location of Tower 11/71 slightly to the southeast to reduce the span between Towers 11/70 and 11/71 and the height of Tower 11/70. During the preparation of final construction plans, PG&E shall consult with the visual specialist to insure that the objectives of this measure are achieved.

PG-305 The comment states that the Draft EIR fails to accurately depict the proposed transition station and overestimates its visual impact. Please see Response to Comment PG-282.

PG-306 The comment concurs with the Draft EIR's finding that Alternative 1B would result in fewer visual impacts than the Proposed Project. However, as a point of clarification, the comment incorrectly refers to "…a non-overhead method of crossing Crystal Springs Dam" in the referenced text under *Comparison to Proposed Route Segment* on page D.3-160. The passage refers to an "…underwater cable around the dam." However, a significant visual impact would be avoided by either an underwater cable, a cable attached to the dam, or the option described in Comment PG-7 above.

PG-307 The comment states that the Draft EIR fails to provide any justification as to why a Class I impact should be created in a new corridor along Cañada Road and fails to demonstrate that the towers are visible from existing public trails within the Pulgas Ridge Open Space. Please see Responses to Comments PG-283, PG-285, PG-286, PG-289, and PG-293.

PG-308 The comment states that the DEIR's contention that the following statement is misleading: "Compared to the Proposed Project, the Partial Underground Alternative between Jefferson Substation and Tower 2/12 would be substantially less visually impacting on views from I-280, Edgewood County Park and Pulgas Ridge Open Space because of the elimination of towers along the east side of I-280." The comment also states that "No rationale is presented for why removal of existing towers in an existing utility corridor should be considered to offset the Class I impacts of new towers in a separate, new utility corridor. Please see Responses to Comments PG-283, PG-285, PG-286, PG-289, and PG-293.

PG-309 The comment states that the simulation of the proposed San Bruno Transition Station is inaccurate and that it has not been adequately demonstrated that the alternative transition stations proposed would necessarily have less visual impact than the Proposed Project. Please see Response to Comment PG-282.

Comment Set PG, Attachment A, cont.

Noise and Vibration

1. General Comments—Proposed Project and All Alternatives

1.1 Addition of Two APM Requirements not Proposed by PG&E in the PEA

PG-310

Impact N-1: Construction Activities Would Temporarily Increase Local Noise Levels Page D.11-11, Paragraph 3.

On Page D.11-11, third paragraph, the DEIR states that PG&E has committed to implementing one Applicant Proposed Measure (APM 15.1) to reduce the impact of construction noise on sensitive receptors. The DEIR includes the conditions of APM 15.1 in Table D.11-7 on Page D.11-11; however, the DEIR adds two new conditions as APMs that were not proposed by PG&E in the PEA. In light of this error, PG&E requests a review of DEIR-reported APMs to ensure that what is presented in the DEIR as an APM reflects what PG&E committed to in the PEA. The requirements that PG&E "Install sound barriers for pile driving activity" and "Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible..." were incorrectly added as APMs.

PG&E does not believe sound barriers are effective for pile drivers to be used for this project. Also, because of the height of the noise source, noise screens near the sensitive receptors may not be possible or practicable. The second additional measure "Limit pickup trucks and other small equipment to an idling time of five minutes..." has been addressed, and idling equipment mitigation measures already committed to in APM 14.1 (page D.10-6) will limit vehicle idling. It should be noted that repeated starting and stopping of vehicles and equipment can cause more noise disturbance, and could adversely affect air quality, depending on frequency.

1.2 Inconsistency in the Characterization of the Operational Impacts at Martin Substation

PG-311

Impact N-5: Noise from Operation of the Martin Substation with Modifications

There appears to be an inconsistency in the characterization of the operational impacts from the modifications of the Martin substation. DEIR, Page D.11-17, paragraph 3, states that "New transformers at the substation would increase the existing noise levels and could violate local noise ordinances." Noise levels as measured by PG&E determined that the average noise level at the fence line closest to the nearest sensitive receptor on Geneva Avenue was Leq 72 dBA with a calculated Ldn of 78 dBA. These high values were attributed predominately to the high background traffic noise on Bayshore Blvd. A computer modeling effort indicates that the installation of the new transformers at the Martin Substation would increase the substation contributed noise to the environment by 1 dBA (from 59 to 60 dBA-Ldn) and with a 5 db penalty for pure tones noise residences would be exposed to approximately 65 dBA-Ldn.

SAC/172750/431616_1.DOC 1

Comment Set PG, Attachment A, cont.

The inconsistency lies on page D.11-18, first paragraph which correctly states: "...Martin Substation would not noticeable increase the ambient noise levels over those existing without the project. Because the noise levels would not increase substantially, the impact would be less than significant (Class III)." The language on page D.11-17 paragraph 3 indicates that a significant impact is possible. PG-311

Responses to Comment Set PG – PG&E Attachment A: Noise and Vibration

PG-310 The Applicant Proposed Measure (APM 15.1) shown in Table D.11-5 and Table D.11-7 of the Draft EIR includes all of the measures proposed by PG&E in the PEA and the Response of PG&E to CPUC Data Request No. 1, February 18, 2003. Although it is not clear from the discussion of pile driving noise in the PEA (p. 15-10) whether the project would include any sound barriers, PG&E committed to using noise shields for pile driving, when practicable, in the Response to Data Request 15.1. In that response, PG&E also committed to manage equipment idling using a common sense approach. The CPUC believes that these measures would be feasible and that they would help to avoid unnecessary construction noise, and that the measures should, therefore, continue to be included as part of the project (Draft EIR, Table D.11-7).

To more accurately portray PG&E's proposal in the Response to Data Request 15.1, this Final EIR includes the following revision to Tables D.11-5 and D.11-7:

- Install sound barriers for pile driving activity, where practicable (e.g., use an acoustic curtain or blanket around the point of impact).

Under Table D.11-5, the following reference source is added in the Final EIR:

PG&E Response to Data Request 15.1, 2003.

PG-311 The statement in the Draft EIR (p. D.11-17) that notes that the new transformers could violate local noise ordinances is an introductory statement illustrating that careful analysis of the significance of Impact N-5 is necessary. The full analysis considers the elevated background noise conditions and concludes by ultimately characterizing the impact as less than significant (Class III). The conclusion of the impact discussion is not inconsistent with the introductory statement because the conclusion depends on the unique site-specific background conditions. No revisions are necessary.

Comment Set PG, Attachment A, cont.

Socioeconomics

1. General Comments

1.1 Economic Impacts (Impacts to Businesses on El Camino Real)

Example: DEIR page D.13-16, paragraph 6

PG-312

The DEIR fails to discuss impacts of the project alternatives on businesses/loss of business during construction, particularly for routes in highly commercial areas like El Camino where it may not be possible to ensure alternate parking within 1,000 feet of construction. Additionally, increased traffic may discourage shoppers from traveling to the area.

2. Specific Comments

2.1 Route Option 4B: Environmental Impacts and Mitigation Measures

Page D.13-15, Section D.13.5.4, paragraph 3

PG-313

"As PG&E's Route Option 4B would be slightly shorter than the Proposed Project route, impacts would be similar, but slightly less. The difference of 0.2 miles in construction distance would likely be a negligible difference in the amount of construction labor necessary for the project."

The analysis states that because Route Option 4B would be shorter, it would have less impact. This statement is not correct. There would only be less impact if fewer personnel would be needed to construct this route option.

Proposed revisions: Delete impact statement.

SAC/172750/431618_1.DOC 1

Responses to Comment Set PG – PG&E Attachment A: Socioeconomics

PG-312 El Camino Real, as a major traffic thoroughfare as well as a major utility corridor, is frequently the subject of maintenance and repair work. With the high volume of traffic that utilizes El Camino Real and the transportation management plan required for the project in Mitigation Measure T-1a, it is not anticipated that project construction would discourage shoppers from traveling to the area. Under existing traffic conditions, shoppers traveling to businesses along El Camino Real are accustomed to traffic congestion. Additionally, the majority of parking for El Camino Real businesses is either off the street or set back from El Camino Real separated from the street by a curb or barrier. Little street parking is available on El Camino Real so construction activities would have little affect on deterring shoppers due to displaced parking. As such, a fuller analysis of the economic impacts on El Camino Real is not warranted.

PG-313 Text in Section D.13.5.4 (PG&E's Route Option 4B – East Market Street) of the DEIR has been revised to state that because Route Option 4B would be shorter by 0.2 miles than the Proposed Project, "impacts would be similar, but could be slightly less of a socioeconomic impact." This change from "but slightly less" to "but could be slightly less" indicates a level of probability in the assumption, as pointed out by the commenter, that a shorter distance would require less labor. There is no guarantee that this is necessarily the case, particularly for a distance of only 0.2 miles. However, the discussion in the DEIR does continue by stating that the difference in the amount of construction labor for the Route Option 4B would likely be negligible compared to the Proposed Project. A negligible difference between the two denotes that there would likely be no significant difference between the Proposed Project and the alternative. The socioeconomic analysis of Route Option 4B concludes by stating, "Differences in the socioeconomic impacts of PG&E's Route Option 4B – East Market Street alternative would be minimal compared with any impacts resulting from construction or operation of the Proposed Project underground route segment." No other changes to this discussion are necessary.

Comment Set PG, Attachment B

TECHNICAL MEMORANDUM **CH2MHILL**

CRLF Issues at Crystal Springs Dam

PG&E Jefferson-Martin 230 kV Transmission Project

PREPARED FOR:	Louis Leonard/ Latham & Watkins
PREPARED BY:	Lynne Hosley/CH2M HILL
COPIES:	Wesley Skow/Latham & Watkins Scott Oppelt/CH2M HILL Lowell Rogers/Black & Veatch Bob Masuoka/PG&E Sheila Byrne/PG&E
DATE:	August 21, 2003

On Page Ap.1-34, the DEIR Alternatives Screening Report states that placement of the duct bank within a cut trench on top of Crystal Springs Dam is a technically feasible option, described as Option 1. The DEIR states on Page Ap.1-42, sixth paragraph, that "*there are endangered species concerns at the dam (i.e., California red-legged frog) that could affect permitting of Options 1 and 5.*" For this reason, this option of crossing the dam is not retained as a viable component of Route Option 1B for full analysis in the DEIR. Based on the assessment and procedures outlined by Dr. Sam McGinnis, the 230 kV line could be placed on top of the dam such that potential impacts to California red-legged frog (CRLF) would be mitigated to less than significant levels (Class II impact).

Studies conducted by Dr. McGinnis have established that the shallow concrete pond at the south end of the top of Crystal Springs Dam is a viable CRLF breeding and larval rearing habitat. The annual CRLF reproductive cycle within this pond begins in February and early March with the movement of several adult female and at least one male CRLF to the pond from foraging areas in the adjacent San Mateo Creek canyon.

After spawning, the adults leave the pond, presumably because there is little foraging opportunity on the concrete apron which surrounds it. They leave behind egg clusters attached to the aquatic vegetation in the southeast segment of the pond. The eggs hatch by early April and the larva feed and grow until mid-August when they begin to undergo metamorphosis. The newly transformed juvenile frogs (metamorphs) remain in the pond until early fall rains saturate the understory of the plant community on the adjacent canyon wall. Here they presumably forage and may return to the pond two or more years later as breeding adults. Of special note for this proposed project is the fact that the pond now remains void of all CRLF life forms until breeding adults again return in February or March of the next year.

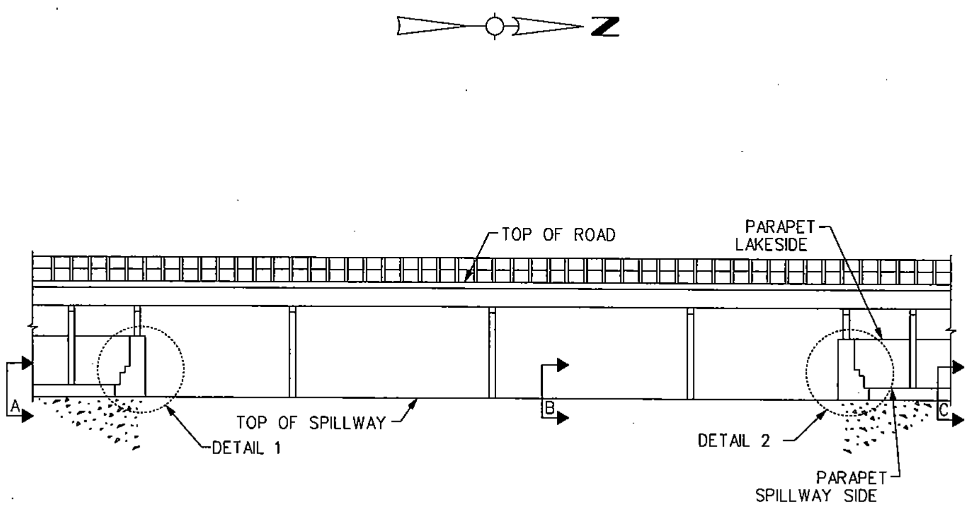
Dr. McGinnis suggests the following procedure be followed to minimize impacts to CRLF during installation of the duct bank:

Comment Set PG, Attachment B, cont.

- The construction period for the top of the dam will be limited to between November 15 and January 15.
- Before initiating any work on top of the dam, a permitted biologist will carefully search the pond water and substrate to verify that year no CRLF are present.
- A pathway into the pond area will be established which will not disturb the plant community on the canyon wall immediately adjacent to the south end of the pond.
- A solid four-foot high plywood exclusion fence with the bottom buried six inches below grade will be attached to the outside of the chain link fence at the south end of the pond. This will prevent any CRLFs which may be wandering through the adjacent hillside early in the rain season from entering the pond.
- A permitted biological monitor will check the work site daily to see that all protective procedures are being followed and answer any questions concerning same that may arise. Specialized environmental training will be given to those personnel working on top of the dam.
- A sand bag wall will be constructed along the edge of the work space in order to contain mud and remaining water from seeping into the cable installation site. The workspace area will then be dewatered and all aquatic plants and substrate material removed from the work space and stored for future use.
- The installation of the concrete cable box will be done in such a way that the top of the box is flush with the concrete bottom of the rest of the pond. This will insure that no loss of CRLF critical habitat occurs.
- Upon completion of all work, soil will be replaced, the work area will be filled with finely screened lake water, the sand bag barrier between the pond and the work area will be removed, , and all plants replanted in a pattern as directed by the principal biological monitor. The plywood barriers will then be removed
- The pond will be monitored weekly for the appearance of adult frogs and eventually egg clusters. These two events will represent the success criteria for the work through this area.

From the information currently available, this alternative is not expected to conflict with the future bridge removal and construction. Additional coordination with SFPUC will be necessary to obtain information regarding future spillway modifications. Since the CRLF is a federally-listed species, consultation with the Fish and Wildlife Service will likely be required under Section 7 of the Endangered Species Act, and appropriate measures such as those listed above will be adopted to mitigate the potential impact on the frog to less than significant levels (Class II impact).

Comment Set PG, Attachment B, cont.



DOWNSTREAM ELEVATION VIEW
NOT TO SCALE

DAM/SPILLWAY CROSSING
WITH DUCT BANK

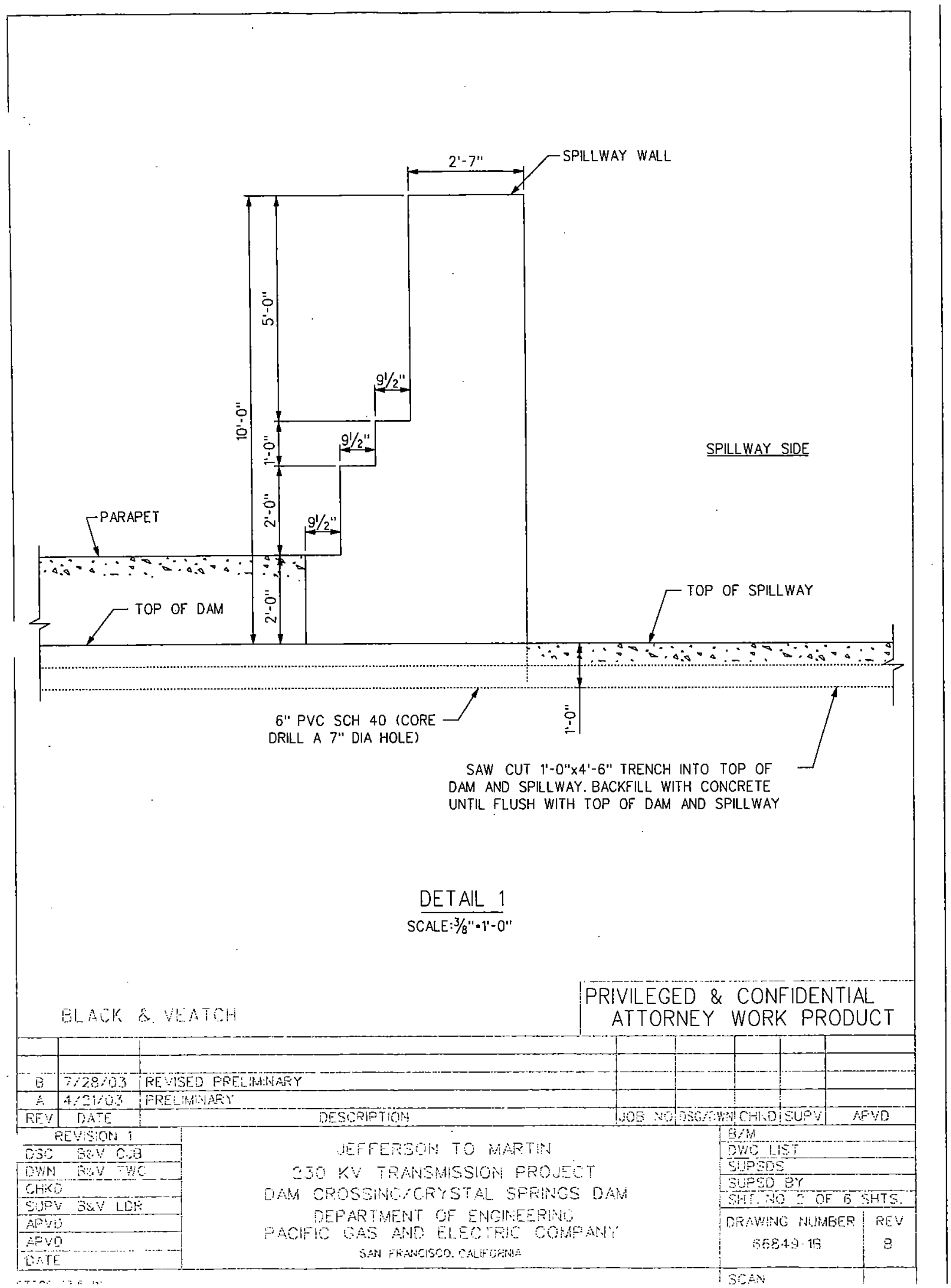
BLACK & VEATCH

PRIVILEGED & CONFIDENTIAL
ATTORNEY WORK PRODUCT

REV	DATE	DESCRIPTION	JOB NO	DSG/DWN	CHKD	SUPV	APVD
B	7/28/03	REVISED PRELIMINARY					
A	4/21/03	PRELIMINARY					

REVISION 1		
DSG B&V CJB	JEFFERSON TO MARTIN	B/M
DWN B&V TWC	230 KV TRANSMISSION PROJECT	DWG LIST
CHKD	DAM CROSSING/CRYSTAL SPRINGS DAM	SUPSDS
SUPV B&V LDR		SUPSD BY
APVD	PACIFIC GAS AND ELECTRIC COMPANY	SHT. NO 1 OF 6 SHTS.
APVD	SAN FRANCISCO, CALIFORNIA	DRAWING NUMBER 66849-1A — REV B
DATE		

Comment Set PG, Attachment B, cont.



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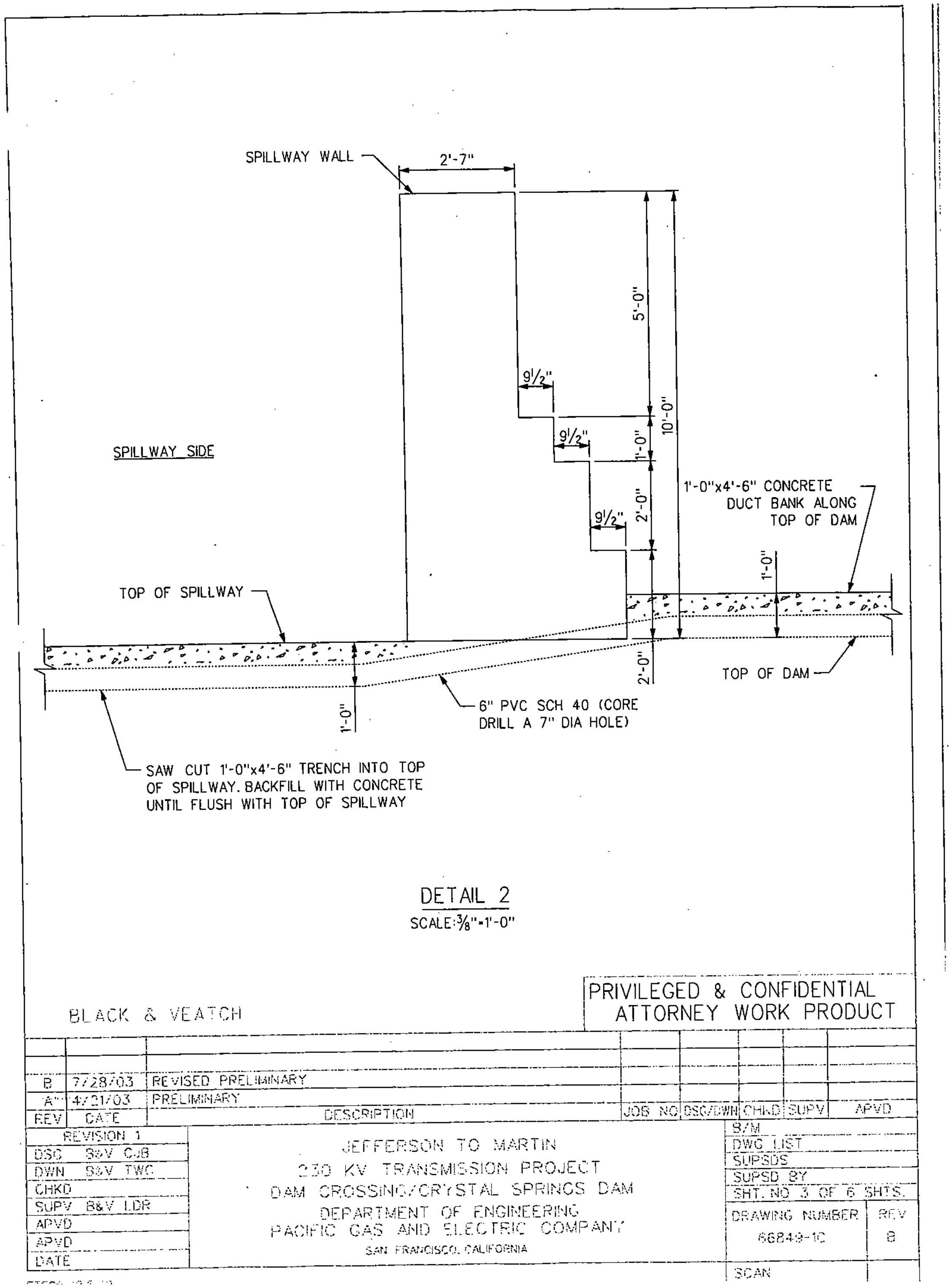

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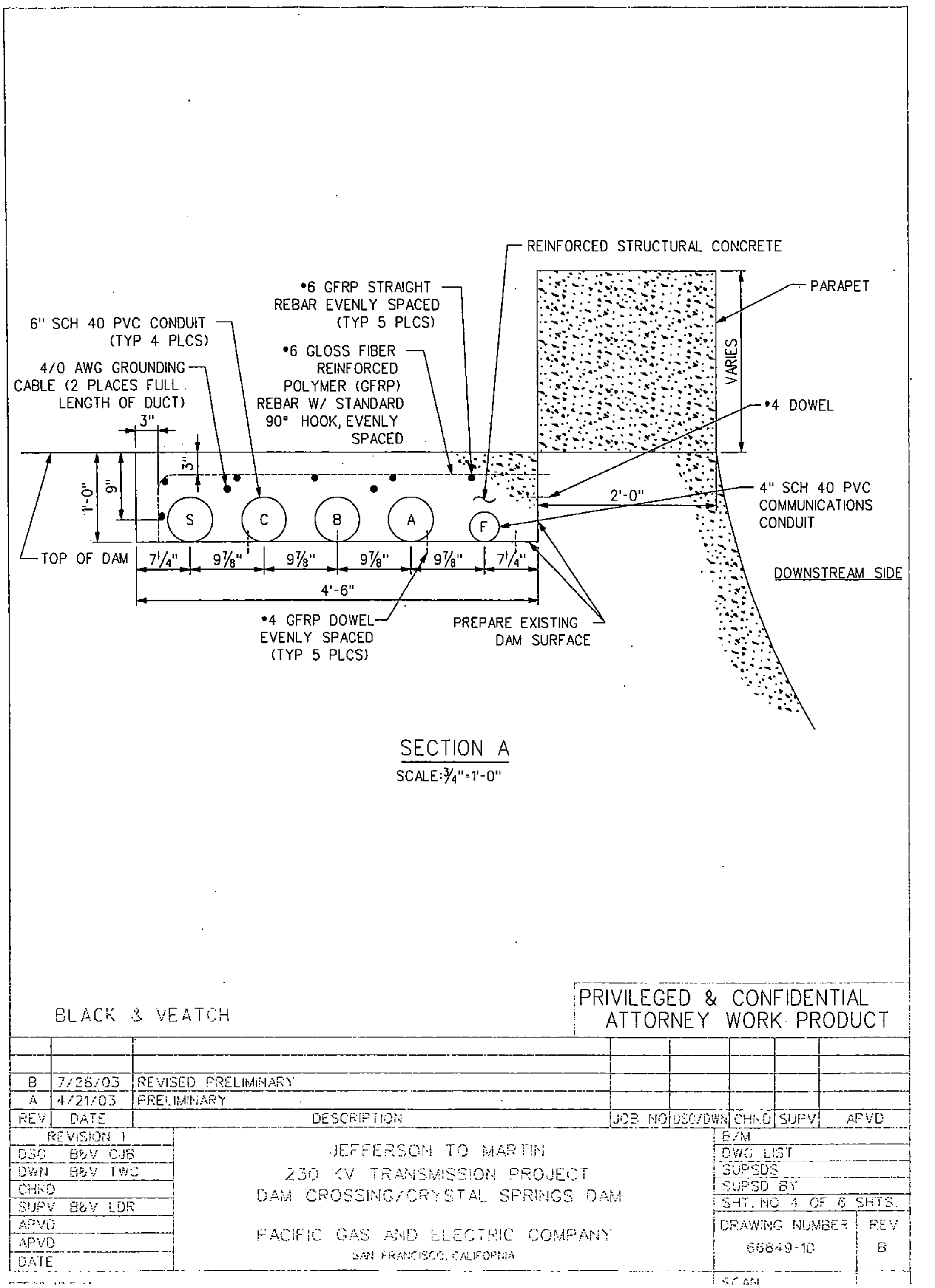

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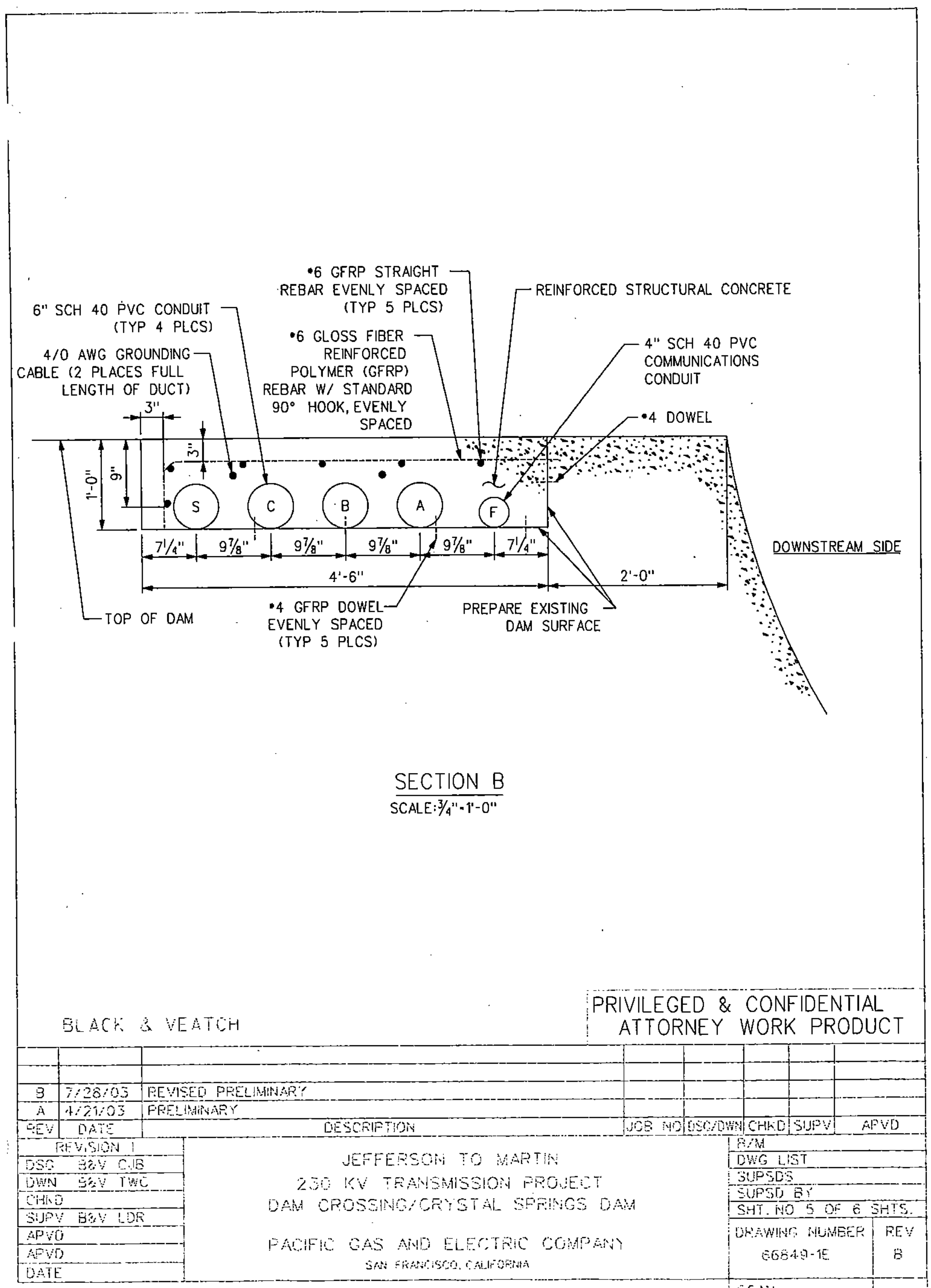

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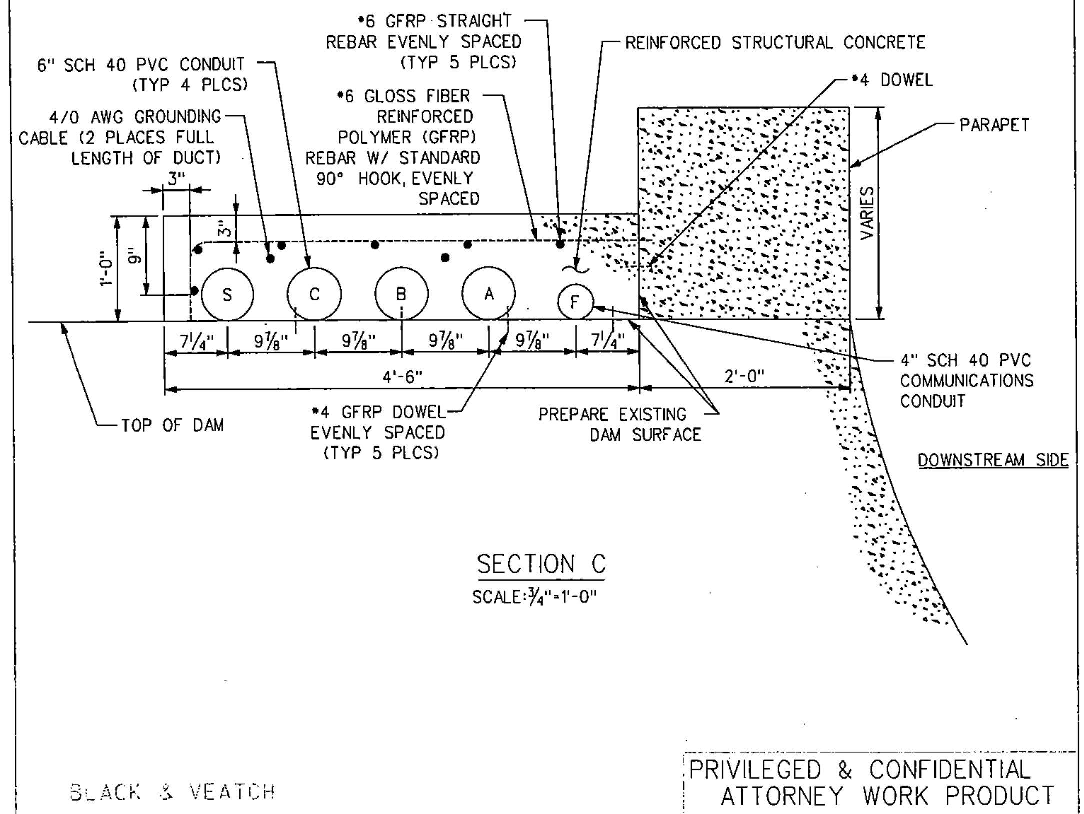


REV	DATE	DESCRIPTION	JOB NO	DSG/DWN	CHKD	SUPV	APVD
B	7/28/03	REVISED PRELIMINARY					
A	4/21/03	PRELIMINARY					

REVISION 1	JEFFERSON TO MARTIN 230 KV TRANSMISSION PROJECT DAM CROSSING/CRYSTAL SPRINGS DAM PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA	B/M
DSG B&V CJB		DWG LIST
DWN B&V TWC		SUPSDS
CHKD		SUPSD BY
SUPV B&V LDR		SHT. NO 6 OF 6 SHTS.
APVD		DRAWING NUMBER 66849-1F REV B
APVD		
DATE		SCAN

Comment Set PG, Attachment B, cont.

Dr. Samuel M. McGinnis
Biological Consultant
9699 Melton Road Manteca, California 95337
(209) 599-2726

August 12, 2003

TO: Dr. Sheila Byrne
Senior Biologist, PG&E
San Ramon, CA
FAX: (925) 866-5915

SUBJECT: Suggested procedure for the Dam Attachment Option 1B for the underground cable crossing of Crystal Springs Dam

Biological Background

My on-going study for the past 6.5 years at this site has shown that the shallow concrete pond at the south end of the top of Crystal Springs Dam is a viable California Red-legged Frog (CRF) breeding and larval rearing habitat. The annual CRF reproductive cycle here begins in February and early March with the movement of several adult female CRFs and at least one male CRF to the pond from foraging areas in the adjacent San Mateo Creek canyon. After spawning the adults leave the pond, presumably because there is little foraging opportunity on the concrete apron which surrounds it. They leave behind egg clusters attached to the aquatic vegetation in the southeast segment of the pond.

The eggs hatch by early April and the larva feed and grow until mid-August when they begin to undergo metamorphosis. The newly transformed juvenile frogs (metamorphs) remain in the pond until early fall rains saturate the understory of the plant community on the adjacent canyon wall. Here they presumably forage and may return to the pond two or more years later as breeding adults. Of special note for this proposed project is the fact that the pond now remains void of all CRF life forms until breeding adults again return in February or March of the next year.

Suggested procedure for the placement of a concrete box containing the transmission line cables along the dam-face edge of the CRF concrete breeding pond.

1. The construction period for this project must fall between November 15 and January 15 of the following year.

2. Before any works begins, a permitted biologist should carefully search the pond water and substrate to verify that year no "stragglers" remain.

3. A pathway into the pond area should be established which will in no way disturb the plant community on the canyon wall immediately adjacent to the south end of the pond, since this is the only CRF entrance and exit route.

4. A solid four foot high plywood exclusion fence with the bottom buried six inches below grade should be attached to the outside of the chain link fence at the south end of the pond. This will prevent any CRFs which may be wandering through the adjacent hillside early in the rain season from entering the pond.

Comment Set PG, Attachment B, cont.

5. Before work begins, the entire crew for this project should attend a short, on-site information meeting conducted by one of the project biologists. He or she will review procedures to be followed if a CRF is encountered in or near the work space.

6. A permitted biological monitor should be on call (cell phone) during the entire project in case a CRF is encountered in the work space. A monitor should also check the work site daily to see that all protective procedures are being followed and answer any questions concerning same that may arise.

7. The pond should now be de-watered and all aquatic plants and substrate material removed from the work space and stored in tubs. A sand bag wall should be constructed along the edge of the work space in order to keep mud and remaining water from seeping into the cable installation site.

8. The installation of the concrete cable box should be done in such a way that the top of the box is flush with the concrete bottom of the rest of the pond. This will insure that no loss of CRF critical habitat occurs.

9. Upon completion of all work, the sand bag barrier between the pond proper and the work space should be removed, all substrate replaced, and all plants re-planted in a pattern as directed by the principal biological monitor. The pond should then be re-supplied with finely screened lake water and the plywood barriers should now be removed.

10. The pond will be monitored weekly for the appearance of adult frogs and eventually egg clusters. These two events will represent the success criteria for this project.

A Cautionary Note: Although the foregoing procedure is biologically sound and should in no way effect the function of the "Top of Dam Pond" as a breeding and larval rearing habitat for the CRF, there is unfortunately one problem which may very likely negate the use of this option within the proposed time frame of the transmission cable project. I refer to the fact that for the past six years the Department of Public Works, San Mateo County, has been attempting to get a workable biological opinion from USFWS, Sacramento, for the protection of CRF eggs and larva in the Top of Dam Pond during the replacement of the Crystal Springs Dam Bridge.

Instead, the USFWS issued a completely unworkable biological opinion which requires a new mitigation pond for both the CRF and the San Francisco Garter Snake (which is not at this site) to be constructed nearby on San Francisco Water Department land. The water department has absolutely forbid this, the USFWS to date refuses to change their biological opinion, and the bridge continues to deteriorate. Approval of the preceding plan for the in-pond cable installation would most likely necessitate the concurrent approval of a similar egg cluster/larval protection plan which I wrote for the public works project, and unless USFWS, Sacramento, is legally challanged on these matters, I'm afraid this stalemate may go on for at least another six years.

2

Comment Set PG, Attachment C

TECHNICAL MEMORANDUM — CH2MHILL

"Face of the Dam" Crossing of Crystal Springs Dam

PG&E Jefferson-Martin 230 kV Transmission Project

PREPARED FOR: Louis Leonard/ Latham & Watkins

PREPARED BY: Lynne Hosley/CH2M HILL

COPIES: Wesley Skow/Latham & Watkins
Scott Oppelt/CH2M HILL
Lowell Rogers/Black & Veatch
Bob Masuoka/PG&E
Sheila Byrne/PG&E

DATE: August 21, 2003

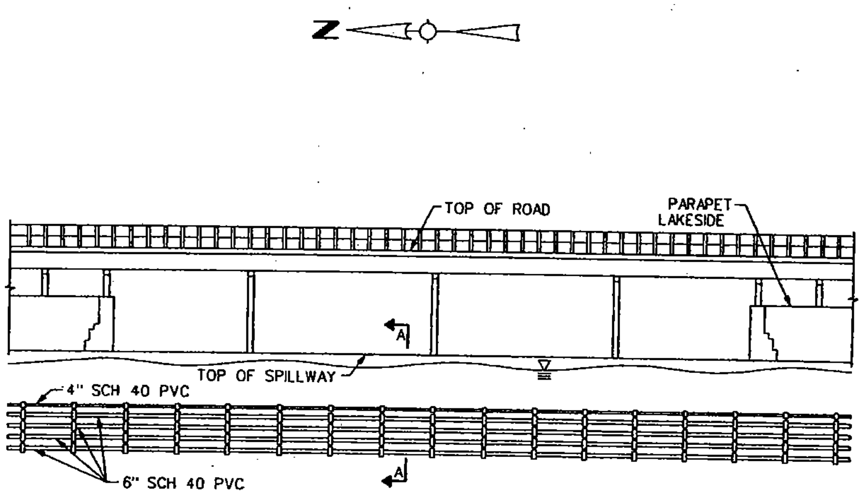
This alternative method to cross San Mateo Creek would place the duct bank on the lake side (upstream side) of the dam, below the water line (see attached plans). This alternative would use the two access roads at each end of the dam to access the dam face. From these roads, the duct bank would traverse along the dam, then connect to the PVC conduits that would be attached to the face of the dam. The conduits will be located below the minimum seasonal water level, in order to keep the system out of sight and minimize the potential for debris impact during spilling. The final design would ensure protection of the cable from floating debris and/or boat impact.

This alternative is unlikely to impact the red-legged frog, especially if the peak movement periods of the frog are avoided. No visual impact would occur once construction is completed, since the line would be out-of-sight under the water.

From the information currently available, this alternative is not expected to conflict with the future bridge removal and construction. Additional coordination with SFPUC will be necessary to obtain information regarding future spillway modifications. Since the CRLF is a federally-listed species, consultation with the Fish and Wildlife Service will likely be required under Section 7 of the Endangered Species Act, and appropriate measures such as those listed above will be adopted to mitigate the potential impact on the frog to less than significant levels (Class II impact).

sfo/lgl - JM Face of Dam Memo(431709_1_SF)1.DOC 1

Comment Set PG, Attachment C, cont.



LAKE SIDE ELEVATION VIEW
NOT TO SCALE

UNDERWATER CROSSING/ATTATCHED TO DAM

BLACK & VEATCH

PRIVILEGED & CONFIDENTIAL
ATTORNEY WORK PRODUCT

REV	DATE	DESCRIPTION	JOB NO	DSG/DWN	CHKD	SUPV	APVD
A	4/21/03	PRELIMINARY					

REVISION 1
DSG B&V CJB
DWN B&V TWC
CHKD
SUPV B&V LDR
APVD
APVD
DATE

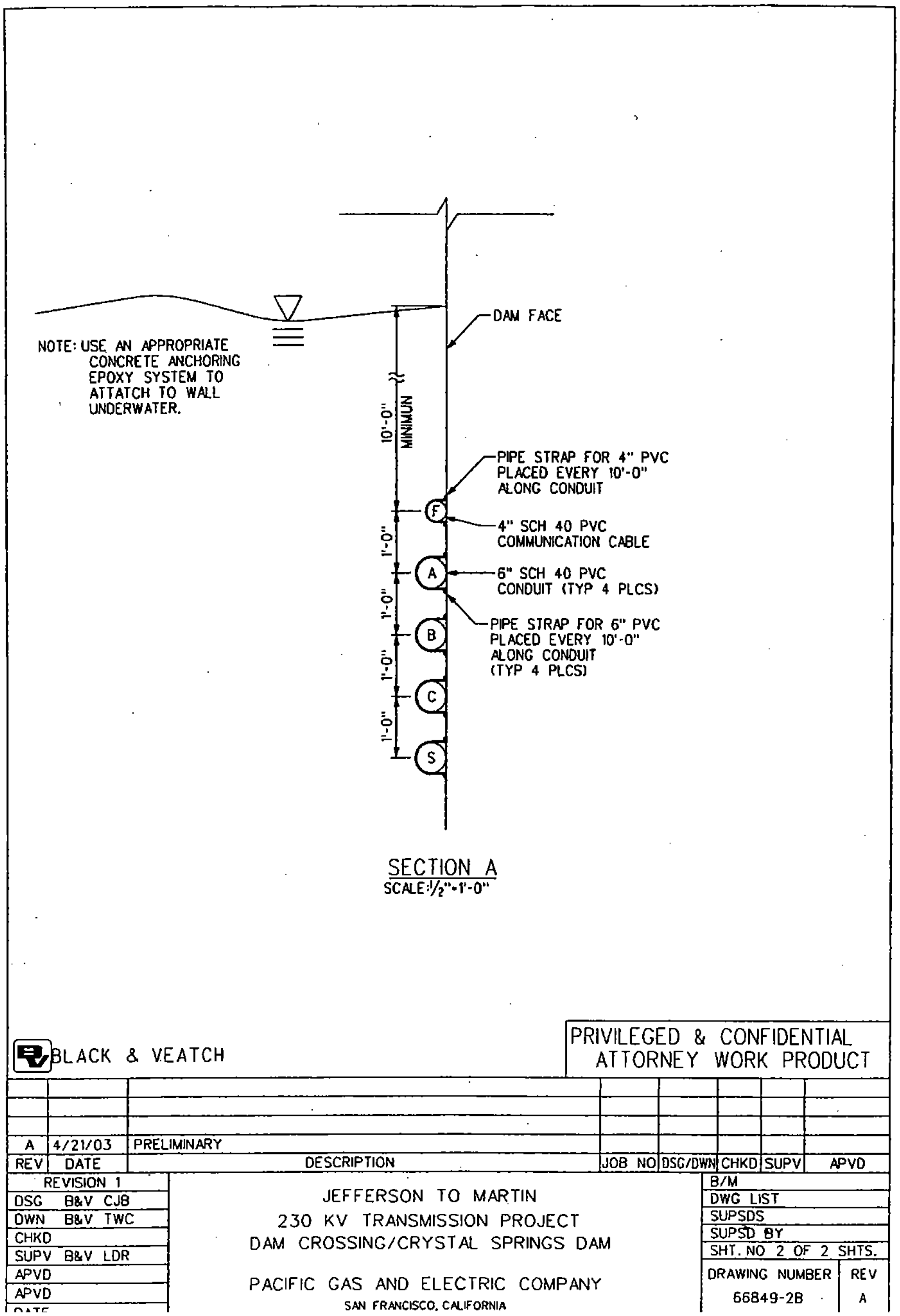
JEFFERSON TO MARTIN
230 KV TRANSMISSION PROJECT
DAM CROSSING/CRYSTAL SPRINGS DAM

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

B/M
DWG LIST
SUPSDS
SUPSD BY
SHT. NO 1 OF 2 SHTS.
DRAWING NUMBER 66849-2A
REV A
SCAN

ETECO (8.5x11)

Comment Set PG, Attachment C, cont.



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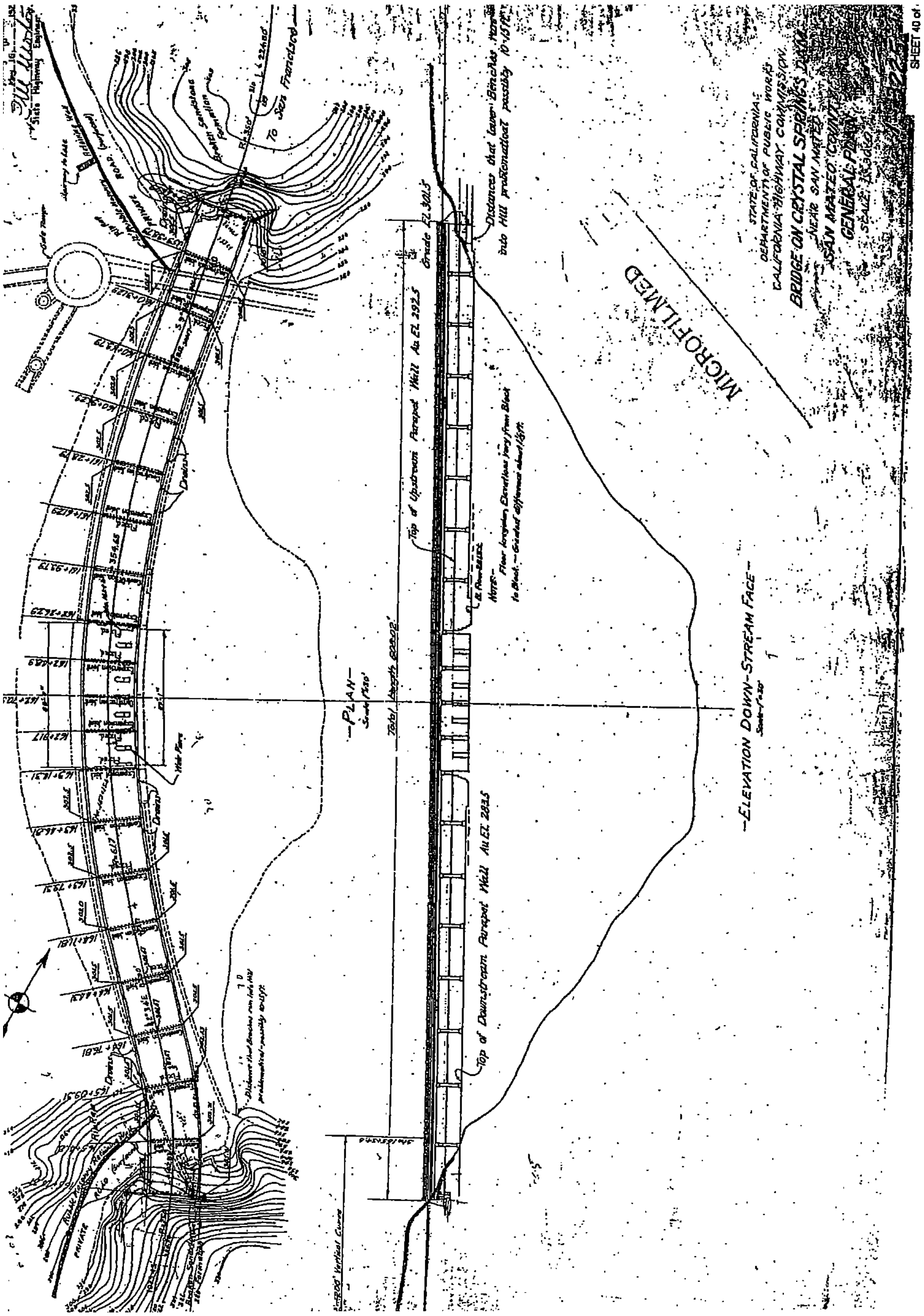

Comment Set PG, Attachment C, cont.

2101 Webster Street
12th Floor
Oakland, CA 94612
(510) 663-4100 • FAX (510) 663-4141

GEOMATRIX

August 25, 2003
Project No. 8465.000.P

Attorney David T. Kraska
Law Department
Pacific Gas and Electric Company
P.O. Box 770000 – Mail Code B30A
San Francisco, California 94177

Subject: Assessment of Fault Rupture Hazards
Jefferson-Martin 230 kV Transition Station Site
San Bruno, San Mateo County, California

Gentlemen:

Geomatrix Consultants (Geomatrix) is pleased to present the results of our assessment of fault rupture hazards at the proposed Pacific Gas and Electric Company (PG&E), Jefferson-Martin 230kV Transition Station Site (site). The site is located at the northwest corner of the intersection of San Bruno Avenue and Glenview Drive, east of Skyline Boulevard, in San Bruno, San Mateo County, California (Plate 1). The site is a relatively level graded pad and is currently undeveloped. The site was formerly a gas station that was present in 1982, abandoned by mid-1985 and subsequently removed. We understand that the proposed project consists of a facility to transition from the proposed Jefferson-Martin 230 kV overhead transmission line along Skyline Boulevard to the proposed 230 kV underground transmission line along San Bruno Avenue. We understand that the facility will consist of a dead-end structure for the incoming 230 kV overhead circuit, support structures for the cable terminations and surge arresters, an underground vault, an out-going cable trench, and a small control building, all surrounded by a concrete masonry wall.

EXECUTIVE SUMMARY

- No active or potentially active faults cross the proposed site and thus the potential fault rupture hazard is considered to be very low. The active San Andreas fault zone is located southwest of the proposed site.

- The proposed site is bounded on the west by a probable Reidel shear and on the east by a probable secondary fault. Both of these secondary faults are considered to be potentially active. The estimated maximum oblique net slip across either of these faults is ≤ 1 foot. The eastern fault crosses the proposed alignment of the 230 kV underground transmission line.

Geomatrix Consultants, Inc.
Engineers, Geologists, and Environmental Scientists

Comment Set PG, Attachment C, cont.

August 25, 2003
David T. Kraska
Pacific Gas and Electric Co.
Page 2

GEOMATRIX

- Ground deformation associated with slip on the secondary faults that bound the proposed site could consist of warping, tilting, and/or settlement. Maximum estimated displacement across the proposed site is ≤ 1 foot.

- A bedrock contact located 450 feet east of the proposed site crosses the proposed alignment of the San Bruno 230 kV underground transmission line. There is a potential for sympathetic movement on this contact resulting from triggered slip on the Serra fault during an earthquake on the San Andreas fault zone. The estimated maximum net sympathetic slip on this fault is ≤ 1 foot.

- The potential fault hazards at the proposed site and along the proposed San Bruno 230 kV underground transmission alignment near the proposed site can be mitigated by engineering design alternatives.

SCOPE OF WORK

Our scope of work generally followed the scope of work for Tasks 1-3 outlined in our proposal to you dated October 25, 2002, and authorized by your Contract Work Authorization dated November 11, 2002 (Job Order No. 7045265). Our scope of work included the following tasks:

- Reconnaissances (2) of the site and adjacent areas;
- Search, acquisition, and critical review of previous unpublished reports covering the site and adjacent areas;
- Review of published reports and maps covering the site and adjacent areas;
- Review of historic photographs of the 1906 fault ground rupture in the area;
- Review of stereo paired, black and white aerial photographs dated 7/29/1946 and 9/29/1972 covering the site and adjacent areas;
- Analyses of data and formulation of findings and conclusions; and
- Preparation of this report.

Our scope of work did not include any assessment of the potential for hazardous materials on the site, nor did it include any assessment of geotechnical conditions on the site. In addition, we did not develop site design parameters for seismic ground shaking.

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LOCATION OF 1906 FAULT GROUND RUPTURE AND ASSOCIATED DEFORMATION FROM HISTORIC DATA

Fault ground rupture and associated ground deformation resulting from the 1906 earthquake on the San Andreas fault zone was intensively studied immediately after the earthquake and documented in the Lawson (1908) report. This report contains several photographs of fault ground rupture and associated deformation in the area of the site, including fence "C" (Lawson, 1908, Figure 30), which was distorted by faulting. This fence was surveyed after the 1906 earthquake by a Civil Engineer, R.B. Symington (Lawson, 1908, Figure 31), so there is an excellent record of its deformation. Fence "C" was accurately located and Figure 31 very carefully analyzed by Dr. Hall for PG&E (1991). Fence "C" is located about 1400 feet southeast of the site as shown on Plate 1. Dr. Hall (PG&E, 1991) concluded that at fence "C", the majority of right slip in 1906 occurred on two traces at the locations shown on Plate 1. The main, northeast trace experienced right slip of between 6 and 7 feet across a zone about 10 feet wide. This is consistent with numerous trenching investigations that show that the active zone of faulting on the main 1906 trace on the San Francisco Peninsula segment of the San Andreas fault zone is characteristically about 10 feet wide (Hall and others, 2001). A secondary trace located about 130 feet to the southwest, experienced about 3 feet of right slip across a zone estimated to be about 70 feet wide. The main active trace in the area has a strike of about N33W as measured by Symington (Lawson, 1908). No mention of other active fault traces in this area is found in Lawson (1908). The secondary trace appears to gradually merge with the main trace near the intersection of Skyline Boulevard and San Bruno Avenue, although the exact location is unclear. Neither trace has clear geomorphic expression in this area. The locations of the 1906 traces shown on Plate 1 are similar to the locations shown by the California Geological Survey (CGS, 1982), although they are somewhat further to the southwest. CGS (1982) also shows two northerly trending faults splaying off the main trace in the vicinity of the site.

Dr. Carol C. Prentice of the U.S. Geological Survey (USGS), and Drs. Hall and Wright recently completed a draft strip map of the San Francisco Peninsula segment of the San Andreas fault zone. This map is based on an integrated synthesis of historical observations of the 1906 faulting (e.g., Lawson, 1908), photo interpretation of stereo pairs of pre-development aerial photographs, and subsurface fault investigations performed by various consultants for development purposes. As part of their work, they reconfirmed the location of the 1906 traces in the area of the site as shown on Plate 1.

Based on this previous work, we have a high level of confidence in the locations of the main 1906 traces in the area, and are reasonably certain that they do not traverse the site, but lie more than 100 feet to the west. Because the four previous site investigations (see Appendix B) that we critically reviewed for this study were not located or reviewed for the strip map project, we were interested in any evidence that the main 1906 traces might be located further to the northeast. However, we were more interested in evidence presented in these reports for more northerly trending subsidiary traces, which as indicated by the following quote from Lawson (1908, p. 93), were common features of the 1906 faulting.

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"*Associated with the fault fractures* (i.e., the 1906 fault traces) *are many cracks, extending away from the fault in a northward, or north slightly eastward, direction; that is at an oblique angle to the northeast side. These cracks were especially abundant along the northeast side of the northern half of Crystal Springs Lake, and between there and San Andreas Lake. In places they run off every foot or few feet for a distance of 100 yards or more, and again they do not form for some distance. They vary in size from minute crevices in the earth to fractures a foot or more in width.*"

ASSESSMENT OF POTENTIAL FAULT RUPTURE HAZARDS BASED ON PRE-DEVELOPMENT GEOMORPHOLOGY

Locating the traces of the San Andreas fault active in 1906 and other traces of probable Holocene age is especially challenging in the Daly City – San Bruno area because widespread urban development has largely erased the surface evidence for faulting. Extensive grading has significantly modified the area northeast of Skyline Boulevard, including the site, and destroyed or covered evidence for the probable location of faults. However, the site's pre-development surface is available for assessment of geomorphic features indicative of active faulting on pre-development aerial photographs and topographic maps. For the strip map project we plotted the location of fault traces in the area, both historically documented and inferred, on a pre-development orthophotograph of the northern Montara Mountain 7.5-minute quadrangle provided by the USGS. Our photo interpretation was based on USGS black and white aerial photographs GS-CP, 3-3 and 3-4, scale ~ 1:24,000, flown 7/29/1946. Fault traces and key geomorphic features such as sag ponds were transferred by observation using the 1946 aerial photographs to the photo base map provided by Pacific Gas and Electric Company (PG&E 22-00-055, 8, scale 1:3600, flown 7/31/01; see Plate 1).

The site lies on a gentle north-facing slope on the east side of a broad, elongate northwest-trending ridge within the San Andreas fault zone that separates headwaters drainages of San Mateo Creek and San Andreas Lake on the west from the upper reaches of San Bruno Creek on the east. The main 1906 trace crosses to the east of the crest of this ridge about 800 feet southwest of the site. To the northwest, the ridge loses definition and is replaced by more typical "rift zone" topography with linear drainages, scarps, troughs and numerous sag ponds.

The main 1906 trace, while obscure near the site, is well constrained both south-southeast and northwest of the site. About 1400 feet to the south, the trace is well located where it deformed fence "C" as discussed above (see Plate 1). About 1200 feet northwest of the site, the main 1906 trace becomes clearly expressed across a narrow zone of faulting characterized by linear drainages, well defined scarps, and small sags. From there, 1906 faulting can be traced continuously to the shoreline on the north side of Mussel Rock in Daly City on pre-development maps and photographs. As shown on Plate 1, the main 1906 fault trace crosses the intersection of Skyline Boulevard and San Bruno Avenue about 190 feet southwest of the southwest boundary of the site and then essentially parallels Skyline Boulevard to the northwest. This location is based on connecting the well-constrained locations of the active trace both northwest and southeast of the site and by following the base of a subtle northeast-

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facing scarp east of Skyline Boulevard. We estimate the main 1906 fault trace northwest of San Bruno Avenue is located within ± 25 feet.

The 1946 aerial photographs reveal the presence of a well-defined sag pond north of the site on the northeast side of the main 1906 trace as shown on Plate 1. We interpret this sag to be the result of local crustal extension controlled by faulting. We also judge faults that bound sag ponds in northern California to be of Holocene age and thus must be considered tectonically active and capable of surface rupture. We base this judgment on two considerations. First, sag ponds are sediment traps that soon, in geological terms, will be filled and erased from the landscape. Second, during his field evaluations of the San Andreas fault zone in Marin County after the 1906 earthquake, G.K. Gilbert (as reported in Lawson, 1908) observed that the closure of all the sags along the epicentral reach of the San Andreas fault zone had increased as a result of the historic faulting.

We interpret that the nearly linear west margin of the sag is controlled by an active (Holocene) fault. On the 1946 aerial photographs this lineament is marked by a linear drainage and a knob to the north and by more subtle changes in slope to the south. This lineament has an approximate strike of N-S, an orientation consistent with a Reidel shear branching from the main trace of a right-lateral fault. As mentioned above, such subsidiary fault features were widely observed on the northeast side of the San Andreas fault zone after the 1906 earthquake (e.g., Lawson, 1908, p. 93). As discussed below and in Appendix B, and shown on Plate 1, this lineament is coincident with the east margin of a zone of bedrock (Franciscan Complex) faulting encountered in Trenches 1 and 2 excavated north of the site (Associated Geotechnical Engineers [AGE], 1985). We estimate that this lineament is located within ± 10 feet. Unfortunately, the age of last faulting cannot be determined from the logs because the surficial deposits have been removed by grading.

On the 1946 aerial photographs the sag pond is also bounded on its east side by a lineament whose trend appears to be subparallel to the main 1906 trace (Plate 1). We interpret that the nearly linear east margin of the sag is also controlled by an active (Holocene) fault. Before grading in the area, a prominent west-facing scarp that formed the east margin of the sag clearly marked this eastern bounding inferred fault. To the southeast, this inferred fault becomes less prominent, its location indicated only by a subtle scarp and a vegetation lineation. We estimate that this lineament/inferred fault is located within ± 25 feet. No evidence of faulting associated with this inferred fault was encountered in trenches excavated north of the site (AGE, 1985).

Neither the Reidel shear bounding the sag on its west side nor the inferred fault bounding the sag on its northeast side cross the site (Plate 1). The Reidel shear projects southwest and passes about 10 feet beyond the west corner of the site, and the inferred fault bounding the sag on the east projects southeast and passes about 10-20 feet beyond the northeast boundary of the site. Therefore, these features are unlikely to pose a ground rupture hazard to the proposed project.

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We did not observe evidence on the 1946 aerial photographs for the lineaments and sag pond postulated by Earth Systems Consultants (ESC, 4/1985) on the property south of San Bruno Avenue, or the lineament postulated by AGE (1985) north of the site (see Appendix B).

ASSESSMENT OF POTENTIAL FAULT RUPTURE HAZARDS BASED ON REVIEW OF PREVIOUS STUDIES

Copies of four previous site specific fault investigation reports were acquired and critically reviewed as part of this study. Our reviews are presented in Appendix B. Three reports (Bay Soils, Inc. [BSI], 1978; JCP, 10/984; ESC, 4/1985) were prepared for development of the property south of San Bruno Avenue and northeast of Skyline Boulevard currently occupied by a storage facility. The locations of trenches and test pits excavated as part of these investigations are plotted on Plate 1. These reports were obtained from the CGS Alquist-Priolo files (AP 1806). They were not encountered and reviewed during the USGS-NEHRP Strip Map Project. Based on our reviews, the data presented in these reports is not useful for evaluating faulting on the storage facility property. In our judgment, the trenches likely exposed Franciscan Complex throughout, except perhaps at the southwest end of Trench 1 where sheared serpentinite in a talc-chlorite matrix may be related to nearby faulting. In our judgment, there is no credible data in these reports that suggests that 1906 or Holocene faulting crosses the property, or that lineaments or geomorphic features consistent with Holocene faulting cross the property.

One report (AEG, 1985) was prepared for the property that includes the proposed site. The locations of trenches and borings excavated/drilled as part of this investigation are plotted on Plate 1. This report was provided to us by CalTrans through PG&E. The report was not encountered or reviewed during the USGS-NEHRP Strip Map Project. Based on our review, the data presented in this report indicates that Colma Formation and possibly dune sand, and folded and locally faulted Merced Formation and Franciscan Complex underlie the property (see Appendix B). The most significant tectonic feature with respect to the site is an approximately north-south trending zone of faulting within Franciscan Complex bedrock that narrows to the south and projects west of the site. The east side of this zone is coincident with a lineament observed on 1946 and some later aerial photographs along the western margin of a sag pond. There is no convincing evidence for the easternmost "secondary fault trace" and the "primary fault trace" as shown on Figure 2 of the report.

FAULT HAZARDS EAST OF THE PROPOSED SITE

A contact between Franciscan Complex bedrock on the southwest and marine sedimentary deposits of the Merced Formation on the northeast crosses San Bruno Avenue about 450 feet east of the proposed site (Plate 1). This contact is sub-parallel to the San Andreas fault zone and is seen as a moderate lineament on the 1946 aerial photographs. This contact crosses the alignment of the proposed 230 kV underground transmission line with an angle of intersection of about 65 degrees. This contact has been mapped by Pampeyan (1981) as primarily depositional, with local shearing. PG&E (1992, page 23) considered that shearing at the contact could be the result of flexural slip during uplift and folding of the ground east of the

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San Andreas fault zone, or could be the result of gravity driven creep. PG&E estimated that in a worst-case scenario, the contact is a subsidiary fault that could experience a maximum of 3 feet of right slip, with an up-on-the-west dip-slip component of up to three inches.

In our judgment, this contact, even if sheared, should not be considered to be a subsidiary fault with potential displacements as high as previously estimated. There is no evidence of displacement on this contact in 1906 (Lawson, 1908). The contact is located within the hanging wall of the Serra fault, a northwest-striking reverse fault. The Serra fault is similar to a series of northwest-striking reverse faults that bound the southwestern margin of the Santa Clara Valley known as the Foothills thrust belt. The proximal association of these thrust faults with the San Andreas fault zone indicates that they may not be independent seismic sources, but may accommodate triggered slip during large earthquakes on the nearby San Andreas fault zone (Fenton and Hitchcock, 2001). The 1989 Loma Prieta earthquake produced triggered slip or secondary faulting up to a few centimeters on several of the reverse faults in the Foothill thrust belt (Burgmann and others, 1997). Similar triggered slip on the Serra fault during an earthquake on the San Andreas fault zone would result in tension in the hanging wall. In our judgment, in a worst-case scenario there is a potential for sympathetic movement on the contact resulting from triggered slip on the Serra fault during an earthquake on the San Andreas fault zone. The potential movement on the contact should be less than the movement on the Serra fault. In our judgment, a conservative estimated maximum net slip on this contact is ≤ 1 foot.

SUMMARY OF FINDINGS AND CONCLUSIONS

Plate 1 shows our interpretation of faults and related tectonic features in the area of the proposed project site. No fault or lineaments cross the site. The main active (1906) trace of the Peninsula segment of the San Andreas fault zone traverses the area with a strike of N33W and is located between 160 and 190 feet southwest of the southwest boundary of the site. A secondary trace is located parallel to and about 130 feet to the southwest. The majority of right slip in the area in 1906 occurred on these two traces. Hall and others (2001) have convincingly demonstrated that the 1906 fault zone on the San Francisco Peninsula has been the location of fault ground ruptures throughout the Holocene, so it is highly likely that ground rupture in the area from future earthquakes on the San Andreas fault zone will be on these traces.

Pre-development, 1946 aerial photographs reveal the presence of a well-defined sag pond north of the site on the northeast side of the main 1906 trace. We interpret this sag to be the result of local crustal extension controlled by faulting. Although partially removed by grading, remnants of this sag were exposed in the east end of Trench T-1 excavated in the area by AGE (1985). The western margin of the sag pond is an approximately N-S lineament that is coincident with the east margin of a zone of bedrock (Franciscan Complex) faulting encountered in Trenches 1 and 2 excavated in the area by AGE (1985). This lineament/fault zone has an orientation consistent with a Reidel shear branching from the main trace of a right-lateral fault zone. The age of last faulting cannot be determined from the logs because the surficial deposits have been removed by grading. However, faults that bound sag ponds

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along the San Andreas fault zone in northern California are considered to be of Holocene age and thus tectonically active and capable of surface rupture (potentially active).

Pre-development, 1946 aerial photographs indicate that the sag pond is also bounded on its east side by a lineament whose trend appears to be subparallel to the main 1906 trace. Although no evidence of faulting associated with this inferred fault was encountered in trenches excavated north of the site (AGE, 1985), we interpret that the nearly linear east margin of the sag is also controlled by an active (Holocene) fault.

Neither the Reidel shear bounding the sag on its west side or the inferred fault bounding the sag on its east margin cross the site, and thus they are unlikely to pose a ground rupture hazard to the proposed transition station site. Future slip on these faults due to a large earthquake on the San Andreas fault zone will be oblique in nature, a combination of dextral slip and down on the side towards the sag. It is our judgment that net slip across either of these subsidiary faults will not exceed 1 foot. Potential damage from this type and magnitude of slip to the proposed 230 kV underground transmission line along San Bruno Avenue where it crosses the inferred fault east of the site can be mitigated by engineering design alternatives.

A locally sheared contact between Franciscan Complex on the southwest and Merced Formation on the northeast is present sub-parallel to the San Andreas fault zone and about 450 feet east of the proposed site. This contact crosses the proposed alignment of the 230kV underground transmission line with an angle of intersection of about 65 degrees. In our judgment, there is a potential for sympathetic movement on this contact resulting from triggered slip on the Serra fault during an earthquake on the San Andreas fault zone. The estimated maximum net slip on this contact is ≤1 foot.

With respect to the proposed site itself, the most significant seismic design considerations are seismic ground shaking and ground deformation associated with secondary slip on the potentially active faults bounding the sag pond and site. It is our judgment that potential secondary ground deformation on the site could consist of warping, tilting, and/or settlement with a maximum displacement across the site of ≤ 1 foot. Potential damage from these types and magnitude of ground deformation to the proposed Jefferson-Martin 230 kV transition station facilities can be mitigated by engineering design alternatives.

Because of the previous site grading and use of the site as a gas station, potentially adverse foundation conditions may be present and should be considered in design and construction.

BASIS FOR FINDINGS AND CONCLUSIONS

In the performance of our professional services, Geomatrix, its employees, and its agents comply with the standards of care and skill ordinarily exercised by members of our profession practicing in the same or similar locations. This report does not provide all the subsurface information that may be needed to design the project or by a contractor to construct the project. No warranty, either express or implied, is made or intended in connection with the work performed by us, or by the proposal for consulting or other services, or by the furnishing

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of oral or written reports or findings. We are responsible for the findings and conclusions contained in this report, which are based on data related only to the specific project and locations discussed herein. In the event that findings and conclusions based on these data are made by others, such findings and conclusions are not our responsibility unless we have been given an opportunity to review and concur with such findings and conclusions in writing.

ADDITIONAL STUDIES

In our judgment, additional subsurface investigations (trenching) to evaluate the fault hazards at the proposed site are not warranted. Considering the past use of the proposed site as a gas station, and both the pre-development site grading and grading involved to abandon and remove the gas station, it is almost certain that the natural surface and near surface materials and relationships necessary to evaluate the presence and age of activity of any faulting and related ground deformation have been removed/destroyed.

Opportunities for additional subsurface investigations (trenching) north of the proposed site near the eastern end of previous trench T-1 (Plate 1) are marginal. Although there is some discrepancy in the trench logs with respect to the origin of the sandy materials in the upper part of the trenches, the area near the eastern end of Trench T-1 has been graded, which likely removed the natural surface and near surface materials, including the upper portion of the sag pond deposits in this area. Although additional trenching and detailed logging in this area would likely result in more detail on the features in the bedrock and confirm their location, and provide an opportunity to observe and log any possibly fault related features in the sag pond deposits, past grading has removed/destroyed the natural surface and near surface materials and relationships necessary to evaluate the presence and age of activity of any faulting and related ground deformation.

We enjoyed working on this interesting project. If you have any questions or require additional information, please call the undersigned.

Sincerely,

GEOMATRIX CONSULTANTS

Robert H. Wright, Ph.D., CEG 962
Senior Engineering Geologist

REGISTERED GEOLOGIST
ROBERT H. WRIGHT
No. 962
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

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APPENDIX A

REFERENCES

(listed chronologically – references reviewed in Appendix B in **bold**)

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Pacific Gas and Electric Company, June 1991, Seismic Hazards Evaluation, Gas Mains 101, 109, and 132: prepared for Gas Transmission and Distribution by Geosciences Department, 122 pages and Appendices A and B.

Pacific Gas and Electric Company, November 1, 1992, Geologic Hazard Evaluations, Gas Transmission Lines 109 and 132 in San Bruno: prepared by Geosciences Department, 38 pages.

Hall, N.T., R.H. Wright, and C.S. Prentice, 2001, Studies Along the Peninsula Segment of the San Andreas Fault, San Mateo and Santa Clara Counties: California Geological Survey Bulletin 210 and Association of Engineering Geologists Special Publication 12, pages 193-209.

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APPENDIX B

REVIEW OF PREVIOUS STUDIES

(listed chronologically – see Plate 1 for location of studies)

STORAGE BUILDING COMPLEX PROPERTY SOUTH OF SAN BRUNO AVENUE

Bay Soils, Inc., 1978

Bay Soils, Inc. (BSI) conducted a soil investigation for development of the property southeast of San Bruno Avenue and northeast of Skyline Boulevard (see Plate 1) in 1978. A copy of this report is in the California Geological Survey Alquist-Priolo files (AP 1806), but was not encountered during the USGS-NEHRP Strip Map Project research. The report (page 2) describes the property as previously graded (cut and fill) to level the property, particularly in the southern portion. No site geologic map or cross section is included in the report.

Three parallel and partially overlapping trenches up to about 12 feet deep were excavated in the central portion of the property (Figure 2), all oriented N70E approximately perpendicular to the general N33W trend of the San Andreas fault zone in the area. The lengths of the trenches are not given in the text, but the horizontal scale of the trench logs indicate that Trench 1 was 130 feet long (Figure 4), Trench 2 was 60 feet long (Figure 3), and Trench 3 was 55 feet long (Figure 3). In compiling the trench locations on Plate 1, it became apparent that the scale of the Site Plan (Figure 2) is incorrect and about 75% of the true scale and that the lengths of the trenches plotted on the Site Plan are also incorrect. Based on a comparison of the lengths of Trenches 2 and 3 on Figures 2 and 3, and the elevations of the ground surface of the trenches depicted on the logs (Figure 3), it also appears that Trench 2 and 3 are mislabeled on the Site Plan (Figure 2) with the numbers reversed.

The locations of the trenches on Plate 1 are plotted assuming a proper scale for Figure 2. The northeast ends of Trenches 1 and 3 are fixed close to the property line and the southwest end of Trench 2 is fixed close to the edge of the mapped fill in this area shown on Figure 4 of JCP (1984). The lengths of the trenches shown on Plate 1 are the lengths of the trenches as shown on the logs (Figures 3 and 4).

The report references Brabb and Pampeyan (1972) as indicating that regional geologic mapping in the area suggests that the San Andreas fault zone juxtaposes Franciscan Complex on the southwest against Merced Formation on the northeast. However, the report (trench logs) identify the bedrock encountered in the trenches as Franciscan Formation (Complex) and Monterey Formation.

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The log of Trench 1 (Figure 4) shows a relatively uniform layer of probable fill about 1 foot thick increasing to about two feet thick in the northeast end, overlying bedrock on a relatively sharp, level graded (cut) contact. The log shows a near vertical contact at Station 0+48 feet (from the northeast end of the trench) between breccia, consisting of angular serpentinite (greenstone?) fragments in a clay matrix interpreted to be Franciscan Formation (Complex), on the southwest, and fragmented argillite interpreted to be Monterey Formation, on the northeast. The northeast about 12 feet of the trench is logged as fragmented silty clay and is separated from the fragmented argillite by a near vertical contact. The southwest about four feet of the trench is logged as sheared clayey siltstone separated from breccia to the northeast by a near vertical contact. The southwest end of the trench is logged as northeast-dipping, sheared serpentinite in a talc-chlorite matrix. The log also shows a zone of breccia, consisting of angular lithic fragments in a clay matrix labeled as possible fill, about 8 feet wide between Stations 0+20 and 0+30. The zone has near vertical walls and a rounded base and does not extend to the bottom of the trench, a geometry that is consistent with a backfilled trench.

The logs of Trenches 2 and 3 (Figure 3) show a relatively uniform layer of probable fill about one foot thick, overlying breccia consisting of lithic fragments in a clay matrix that are unlabeled but similar to the Franciscan Complex logged in Trench 1, on a relatively sharp, level graded (cut). A talc-calcite seam is located at about Station 0+21 (from the northeast end of the trench) in Trench 2, and a pocket of serpentinite in silty clay is logged between Stations 0+34 and 0+40 (from the northeast end) of the trench) in Trench 3. This pocket of serpentinite in silty clay has a similar shape to the possible backfilled trench in Trench 1, and may also be a backfilled trench.

The trench logs are schematic and small scale, and the descriptions of the units minimal. The materials identified on the log of Trench 1 (Figure 4) as Monterey Formation are almost certainly not Monterey Formation; Monterey Formation has not been mapped in this area. The materials are probably not Merced Formation, which is mapped in the area, but generally consists of sandstone, siltstone and claystone, with lenses of conglomerate and ash. In our judgment, the materials exposed throughout the trenches are most likely Franciscan Complex, which would be consistent with the findings of JCP (1984).

No faults or fault zones are identified on Figures 3 and 4, although contacts between different lithologic units within the Franciscan Complex are generally considered by geologists familiar with subduction complexes to be faulted. However, Figure 2 shows a N48W dashed line passing through Trench 1 with a 20-foot setback line on the northeast, which the text (page 7) identifies as a fault zone. Given the scale and location problems previously discussed, it is difficult to correlate this line with a specific contact on the log of Trench 1 (Figure 4), although the near vertical contact between Monterey Formation and Franciscan Complex at about Station 0+48 may be the origin of this fault zone. No description of this contact is provided on the trench log, and the logged contact is not characteristic of the active San Andreas fault zone where well documented elsewhere on the Peninsula. The origin of the N48W trend of this fault zone is unknown; no strikes and dips or cross trench orientations are provided on the logs (Figures 3 and 4). This orientation may simply be a projection from the contact at Station 0+48 in Trench 1 (Figure 4), southeast to just off the northeast end of

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Trench 3. The orientation of the fault zone is significantly (16 degrees) more northwest that the general N32W trend of the San Andreas fault zone in the area, and is inconsistent with the northeast orientation of Riedel shears commonly associated with the San Andreas fault zone. The northeast-dipping sheared serpentinite in a talc-chlorite matrix logged in the southwest end of Trench 1 (Figure 4), is the most likely fault-related feature in the trenches. This feature is also near the northeastern-most active (1906) fault trace shown on Plate 1. However, the feature is not present in the southwest end of the adjacent Trench 1.

In our judgment the data presented in the report is not useful for evaluating hazards associated with active faulting on the property. The trenches likely exposed Franciscan Complex throughout, except perhaps at the southwest end of Trench 1 where sheared serpentinite in a talc-chlorite matrix may be related to nearby activity on the San Andreas fault.

JCP, October 1984

JCP conducted a geologic and soil and foundation investigation for a proposed storage building complex on the property southeast of San Bruno Avenue and northeast of Skyline Boulevard (see Plate 1) in 1984. A copy of this report is in the California Geological Survey Alquist-Priolo files (AP 1806), but was not encountered during the USGS-NEHRP Strip Map Project research. The report (page 5) describes the property as relatively level and indicates that fill is present in the southern portion, along the northeast (including the northeast approximately one-third of Trench 1), and along the southwest (adjacent to Skyline Boulevard) margins of the property (Figure 4). The Site Plan and Geologic Map (Figure 4) maps the entire property, except for fill, as being underlain by Franciscan Complex bedrock. The Geologic Cross Section of the property (Figure 5) shows a thin (less than about 3 feet thick) layer of fill across the flat portion of the property overlying Franciscan Complex bedrock on a level graded (cut) contact.

Two trenches and three test pits were excavated on the property (Figure A-1). Trench TR-1 was located across the center of the property and oriented N40-50E, approximately perpendicular to the general N33W trend of the San Andreas fault zone in the area. Trench TR-1 was about 135 feet long (scales to just over 115 feet long on Figure A-1) and about 6 feet deep. The log of Trench TR-1 (Figure A-1) shows a relatively uniform layer of fill and topsoil about 2 feet thick throughout the length of the trench, overlying Franciscan Complex on a relatively level graded (cut) contact. The log breaks out four bedrock units: greenstone and associated volcanic rocks, sand (probably weathered sandstone), Franciscan Complex (probably mélange), and claystone (weathered Franciscan Complex). The log suggests that the bedrock is fractured, and that the orientations of possible unit contacts are highly variable. The log shows a 3.5-4 foot wide, N43W, 65N oriented and a 0.5 foot wide, N45W, 70N oriented fault trace in the northeast portion of the trench (Figure A-1). The fault traces are described (page 8) as zones of "disruption exhibiting characteristics such as mitrixies (sic) of altered clay and serpentinite, caliche, slickensides, fault gouge and evidence that the topsoils were affected by the faulting." Slickensides (no orientation given) are noted along the south margin of the wider of these zones. The log shows that the wider, southwest fault trace

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juxtaposes greenstone and associated volcanic rocks on the southwest against sand on the northeast. The narrower, northeast fault trace juxtaposes sand on the southwest against greenstone and associated volcanic rocks on the northeast.

Trench TR-2 was located in the center of the property southeast of Trench TR-1 and oriented N70E, approximately perpendicular to the general N33W trend of the San Andreas fault zone in the area. Trench TR-2 was about 75 feet long (scales to just over 60 feet long on Figure A-1) and about 6 feet deep. The log of Trench TR-2 (Figure A-2) shows a relatively uniform layer of fill and topsoil about 2.5 feet thick throughout the length of the trench, overlying Franciscan Complex on a relatively level graded (cut) contact. A wedge of subsoil is mapped between the fill and bedrock in the northeast end of the trench. The log breaks out two bedrock units: greenstone and associated volcanic rocks, and Franciscan Complex (probably mélange?). The log suggests that the bedrock is fractured, and that the orientations of possible unit contacts are highly variable. No faulting is shown on the log.

No logs of the three test pits is presented in the report, but descriptions of the pits (Table A-2) indicate that all three test pits encountered between 0-3 feet of fill and topsoil overlying Franciscan Complex bedrock to the bottom of the pits at between 4-5 feet.

The trench logs are schematic and small scale. The trenches were also relative shallow. The descriptions of the fault traces in Trench 1 are not characteristic of the active (1906) San Andreas fault zone where it has been well documented elsewhere on the Peninsula, but the descriptions are consistent with the faulted contacts between units within the Franciscan Complex, and particularly within the mélange. The orientation of the fault traces is significantly (11-13 degrees) more northwest that the general N32W trend of the San Andreas fault zone in the area, and is inconsistent with the northeast orientation of Riedel shears commonly associated with the San Andreas fault zone. Northwest projections of these fault traces do not cross the proposed transition station site.

The trench logs (Figures A-1 and A-2) and cross section (Figure 5) suggest that the property was graded (cut and fill) prior to 1984. Therefore, the fill overlying bedrock shown on the logs and cross section is more likely correct than the text (pages 5 and 8), which indicates that topsoil was more widespread. In our judgment, except for perhaps the wedge of subsoil mapped between the fill and bedrock in the northeast end of Trench TR-2, the top of the bedrock is almost certainly a cut contact with the natural soils removed. Given evidence from historic photographs that the ground in the area was natural (not graded) in 1906, it is highly unlikely that the fault traces shown on the log of Trench TR-1 extended up into the overlying, post-1906 fill, as logged.

There is essentially no correlation between the materials and contacts/faults logged in the trenches excavated by BSI (1978) and those logged by JCP (1984). This is particularly true in comparing the logs of Trench 1 and Trench TR-1 from these reports, respectively. Although these trenches are sub-parallel and close together, and should have exposed similar materials and structures, the logs are dissimilar. The 3.5-4 foot wide, N43W, 65N oriented fault trace logged between about Stations 1+01 and 1+05 in Trench TR-1 (JCP, 1984, Figure A-1) does

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project northwest to the contact in Trench 1 (BSI, 1978, Figure 4) at approximately Station 0+48. However, the width, character, and dip of the two features, and the materials juxtaposed, are different. The northwest projection of this postulated contact/fault trace does not cross the proposed transition station site.

In our judgment the data presented in the report is not useful for evaluating hazards associated with active faulting on the property. The trenches likely exposed Franciscan Complex throughout.

Earth Systems Consultants, April 1985

Earth Systems Consultants (ESC) conducted a geologic and seismic hazards evaluation for a proposed storage facility on the property southeast of San Bruno Avenue and northeast of Skyline Boulevard (see Plate 1) in 1985. A copy of this report is in the California Geological Survey Alquist-Priolo files (AP 1806) but was not encountered during the USGS-NEHRP Strip Map Project research. The evaluation was based on review of the previous investigations of the property done by BSI (1978) and JCP (October 1984), aerial photograph interpretation, logging of road cuts, and site reconnaissance, but no additional subsurface investigations were done. No site geologic map or cross section is included in the report. The report recognized the generalized nâture of the trench logs, and the discrepancies between the trench logs and Site Plan in the JCP (1984) report with respect to the lengths of the trenches and locations of the fault traces, but did not recognize the similar discrepancies in the BSI (1978) report. The discrepancies inherent in the BSI (1978) and JCP (October 1984) reports appear to have been transferred to the Site Plan (Figure 2) of the ESC report.

The report (page 14) states that comparison of 1955 and 1982 aerial photographs indicates that the property was undeveloped and did not change appreciably during that interval. The quality of the print of the 1955 photograph (Figure 4a) is poor, but the property appears to be relatively unvegetated and traversed by several dirt roads; Skyline Boulevard is present. The quality of the print of the 1982 photograph (Figure 4b) is also poor, but the property appears to have been further modified; San Bruno Avenue and Glenview Drive are present, and the adjacent gas station property is developed.

The report (page 14) indicates that two lineaments were seen on 1955 and 1982 aerial photographs crossing the site (Figures 4a and 4b) and intersecting in a possible sag. The lineaments are shown on the Site Plan (Figure 2) as faults "from aerial photograph interpretation and evidence cited in the literature", and are labeled "surface rupture in 1906 earthquake", but this sag is not shown on Figure 2, or on Figures 4a and 4b. Additional sags are reported (page 13) visible north of the site on the 1955 photographs and one located north of San Bruno Avenue is shown on Figures 4a and 4b. Both the presence of these lineaments and characterizing them as faults appears to be in conflict with the statement (page 14) that the entire surface of the property has been altered by grading, probable several times since the construction of Skyline Boulevard which took place before 1955. Furthermore, the locations of the lineaments where they cross the trenches shown on the Site Plan (Figure 2) or on Plate

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1 do not correspond with features (contacts/fault traces) mapped in the trenches, and the lineaments, if present, do not have a tectonic origin and cannot be the "surface rupture in the 1906 earthquake." These lineaments and the sag at their intersection are not observed on the 7/29/1946 aerial photographs. However, the sag shown of Figures 4a and 4b north of San Bruno Avenue is similar to the one we observed on the 7/29/1946 aerial photographs shown on Plate 1.

The report also references an addendum to the October 1984 JCP report, not the November 1984 addendum, that apparently shows an additional "main" fault trace along the southwest margin of the property based on published data. This trace is shown on the Site Plan (Figure 2) as the "trace from JCP map." The published data may be the California Geological Survey (1982) that shows an active trace along the southwest margin of the property. We did not locate and review this addendum to the October 1984 JCP report.

Although no additional subsurface exploration was done by ESC, the report (page 14) indicates that "a detailed log was made of the road cut along the east side of Skyline Boulevard, adjacent to the site." The location of the logged road cut is not shown on the Site Plan (Figure 2), the 1955 Air Photo showing Fault Traces (Figure 4a,) or the 1982 Air Photo showing Fault Traces (Figure 4b). However, the road cut referred to is probably the road cut along the southwest side of Skyline Boulevard. The northeast margin of Skyline Boulevard adjacent to the property is likely fill, consistent with the site description and Site Plan in the JCP report (1984; Figure 4). The ESC report (page 14) states that the road cut exposes weathered greenstone and serpentinite bedrock of the Franciscan Complex, and that two fault traces in the northern half of the logged cut offset the contact between the bedrock and overlying soils (Figure 5). Figure 5 shows the generalized logs of two road cuts. Two faults are shown near the northwest end of the log of Cut Slope 1 at about Stations 0+28 and 0+35. The orientation of these faults is N25W, 65W and N26W, 90, respectively. A several foot wide mylonite zone on the southwest side of the N26W trending fault could be gouge. The report (page 14) states that "this fault lies along a aerial photograph lineament that passes through the site" (Figures 4a and 4b) and the mapped 1906 break shown by the California Geological Survey (1982). As noted above, we did not observe these lineaments on the 7/29/46 aerial photographs. This fault, however, could be the main 1906 trace where it crosses the road cut along the southwest side of Skyline Boulevard as shown on Plate 1, near the spring shown on ESC Figure 4a.

In our judgment, little credence can be given to this report given that it is for the most part based on data from previous reports that were not of themselves useful for evaluating fault ground rupture on the property. The logs of the road cuts are of little use since the location of the logs is not presented, but the main 1906 trace may have been encountered.

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UNDEVELOPED PROPERTY NORTHWEST OF SAN BRUNO AVENUE

Associated Geotechnical Engineers, Inc., 1985

Associated Geotechnical Engineers, Inc. (AGEI) conducted a geologic feasibility study and preliminary foundation investigation for the proposed Crestmoor Highlands No. 2 Development of the property northwest of San Bruno Avenue and northeast of Skyline Boulevard (see Plate 1) in 1985. The southeast corner of this property includes the site (see Plate 1). A copy of this report is apparently not in the California Geological Survey Alquist-Priolo files and was not encountered during the USGS-NEHRP Strip Map Project research. CalTrans through PG&E provided a copy of this report to us. The investigation included ground magnetometer and surface seismic refraction surveying, aerial photograph interpretation, the excavation of 3 backhoe trenches, and the drilling of 5 borings. The report describes the property as previously graded and nearly level, with cut slopes along the eastern side of the property adjacent to Glenview Drive and near San Bruno Avenue. Figure 2 indicates the property in 1985 consisted of three relatively level benches stepped down to the north and separated by cut (?) and fill slopes, with a cut slope along the eastern margin of the property along Glenview Drive and a northwest-flowing drainage swale along the southwest side of the property, which is similar to existing conditions. The northeast half of highest bench in southwest portion of the property, bound by Skyline Boulevard, San Bruno Avenue, and Glenview Drive, was an abandoned gas station that has since been removed and is the project site. Figure 2 shows a City of San Bruno water main within a 15 foot-wide easement traversing the property from southwest to northeast. Stereo paired, black and white aerial photographs dated 9/29/1972 (San Andreas Lake 2-10 and 2-11, scale 1:6000) that we reviewed for this study show that the area now developed along Estates Drive shown on Figure 2 was also a relatively level cut (?) and fill bench in 1972.

Stereo-paired, black and white aerial photographs dated 1943, 1956, 1966, and 1982 were reviewed as part of the study. The report indicates that two lineaments trending N22W and N13W, respectively, were observed in the 1943 and 1966 photographs (but not the 1956 photographs?). The report indicates that these lineaments essentially coincided with fault traces encountered in the exploratory trenches and labeled "principal fault trace" and "secondary fault trace" on Figure 2. As discussed below, there is evidence for bedrock faulting in Trenches T-1 and T-2, although not essentially coincident with the location of the "secondary fault trace" shown on Figure 2, but only a single fault trace (not a 10-foot wide zone shown on Figure 2) in Trench T-3 is coincident with the westernmost lineament labeled "principal fault trace" on Figure 2. No faulting is present in the western end of Trench T-2 where the "principal fault trace" crosses the trench, and the trace is mapped west of the west end of Trench T-1 and does not cross the trench. Therefore, there is no evidence for faulting in the trenches coincident with the "principal fault trace" as shown on Figure 2.

Figure 2 also shows a lineament trending N6E that the report indicates was observed on the 1943 and "to some extent" on the 1956 and 1966 photographs, and a sag pond observed in the 1943 photographs but not present in the 1956 photographs, along the eastern side of the property along the base of a ridge where Glenview Drive is located. This suggests that the

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property was graded after 1943 but before 1956. This lineament is labeled "secondary fault trace" on Figure 2, and is mapped just east of the east end of Trench T-2 and through Trench T-3 where unfaulted sag pond deposits were encountered. Therefore, there is no evidence in the trenches for the origin of this lineament. The orientations of the lineaments are inconsistent with the general N33W trend of the San Andreas fault zone in the area, but are not inconsistent with the typical orientations of Riedel shears and faulted-bounded sags associated with the fault zone.

Three trenches were excavated on the property (Figure 2). Trench T-1 was located across the center of the property and oriented N86E, at a high angle to the general N33W trend of the San Andreas fault zone in the area. Trench T-1 (from log) was about 265 feet long (scales to just over 275 feet long on Figure 2) and up to about 11 feet deep. The log of Trench T-1 (Figure 4) shows sandy clay with gravel in the eastern end of the trench between about Stations 0+00 and 0+20. Although no units encountered in the trenches are identified on the logs or in the text, the materials in the east end of Trench T-1 are consistent with the Merced Formation. From about Stations 0+75 to 1+77 the log shows jointed and locally sheared sandstone and shale consistent with the Franciscan Complex. The materials between about Stations 0+20 and 0+75 are unfaulted colluvium/sag pond deposits to the bottom of the trench, and appear to lap onto what we interpret to be Merced Formation and Franciscan Complex materials. The sag pond deposits are roughly coincident with the sag pond observed on the 1943 (and some later) aerial photographs. From about Station 0+75 to 1+77 the log shows jointed and locally sheared sandstone and shale consistent with the Franciscan Complex. A zone of narrow widely spaced, steeply east and west-dipping seams of clay gouge labeled fault traces is shown between about Station 1+20 and 1+29 and possibly 1+35. No strikes and dips or cross trench orientations are provided on the log. All the seams are within the bedrock and terminate at the base of the overlying sand labeled fill, except one seam at Station 1+29 that may terminate a thin sandy clay interpreted to be native (soil?). The scale and detail of the logging makes it impossible to determine what the field relations were at this location. This zone of seams roughly coincides with the "secondary fault trace" on Figure 2 but plots about 10 feet further to the east than shown. Shallowly (about 10 degrees) west dipping, interbedded silty clay with sand and gravel consistent with the Merced Formation (some units labeled native on the log) is shown from about Station 1+77 to the west end of the trench at Station 2+65. Except for a very thin layer of probably unfaulted, sandy clay labeled native (soil?) overlying bedrock between Stations about 1+29 and 1+66, the bedrock throughout the trench shown to be is overlain by silty sand labeled fill. The fill thickens in the western portion of the trench west of about Station 1+80. No more detailed description of the fill is provided on the log or in the text. There is no evidence that the material contained deleterious materials or other characteristics consistent with fill, and the irregular (up to 1± foot of relief) lower contact of the material in the western portion of the trench, suggests that this material may be Colma Formation or possibly dune sand.

Trench T-2 was located across the northern portion of the property and oriented about E-W, at a high angle to the general N33W trend of the San Andreas fault zone in the area. Trench T-2 (from log) was about 394 feet long (scales to 404 feet on Figure T-2) and up to 13 feet deep. The log of Trench T-2 (Figures 4 and 5) shows horizontal (?), interbedded silty clay with

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gravel (the lower unit with organics labeled native) in the eastern end of the trench between about Stations 0+00 and 0+88. Although no units encountered in the trenches are identified on the logs or in the text, the materials in the east end of Trench T-2 are consistent with the Merced Formation. From about Stations 0+88 to 2+64, the log shows jointed and locally sheared sandstone and shale consistent with the Franciscan Complex. A zone of narrow, widely spaced, near vertical to steeply east dipping seams of clay gouge labeled fault traces is shown between about Stations 0+93 and 1+34. No strikes and dips or cross trench orientations are provided on the log. All the seams are within the bedrock and terminate at the top of the trench, which appears to be in cut. This zone of seams is similar to the zone logged in Trench T-1 between about Stations 1+20 to 1+29. This zone of seams does not coincide with the "secondary fault trace" on Figure 2 where it crosses Trench T-2, but plots further to the east (see Plate 1). A single 42-degree west dipping 2-3 inch thick seam of clay gouge labeled fault trace is shown at Station 1+59. This fault juxtaposes shale against sandstone with possible relative up on the east sense of movement. A similar feature/relationship is not shown on projection on the log of Trench T-1. Silty clay with sand and gravel consistent with the Merced Formation (labeled native on the log) is shown between about Stations 2+64 and 3+24. Jointed and locally sheared shale consistent with the Franciscan Complex is shown between about Station 3+24 and 3+59. Between about Stations 0+00 to 0+63 the bedrock materials are overlain by a thin layer of native silty clay (soil?), overlain by silty sand labeled as fill. The fill and native materials appear to be interlensed between about Station 0+64 and 0+64, which is inconsistent with the silty sand being fill. Between about Station 0+87 and 1+47 the bedrock extends to the top of the trench, which appears to be in cut. A thin layer of unfaulted, native clayey sand (soil?) is logged between about Stations 1+47 and 2+39. West of about Station 2+44 to the west end of the trench the bedrock is overlain by unfaulted, native silty clay (soil?), overlain by silty sand labeled fill. Both the possible soil and fill thicken toward the west end of the trench. No more detailed description of the fill is provided on the log or in the text. There is no evidence that the material contained deleterious materials or other characteristics consistent with fill, and the local interlensed relationship with possible soil (?) suggests that this material may be Colma Formation or possibly dune sand.

Trench T-3 was located across the northwest portion of the property and oriented about N83W, at a high angle to the general N33W trend of the San Andreas fault zone in the area. Trench T-3 (from log) was about 190 feet long (scales to 195 feet on Figure 2) and up to 12 feet deep. The log of Trench T-3 (Figure 5) shows silty clay from the east end of the trench to about Station 0+7. Although no units encountered in the trenches are identified on the logs or in the text, these materials are consistent with the Merced Formation. This material is shown to be in near vertical, west dipping contact with sandstone and shale consistent with Franciscan Complex that extends to Station 0+17. Although shown as a depositional contact, this contact may be faulted. Shallowly (about 15 to 22 degrees) west dipping, interbedded silty clay with sand and gravel to clayey sand with gravel consistent with the Merced Formation (all labeled native on the log) is shown from about Station 0+17 to the west end of the trench at Station 1+95, although east of about Station 1+50 the materials may be horizontal. A single 83-degree east dipping fault trace is shown in the bottom of the trench at Station 1+41. This fault appears to juxtapose silty clay overlying shale on a depositional

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contact against silty clay with possible relative up on the east sense of movement. However, the relationships could also be irregularities in the original, pre-Merced Formation, Franciscan Complex ground surface modified by subsequent folding. The overlying black silty clay with organic matter and roots could be an old root ball. The scale and detail of the logging makes it impossible to determine what the field relations were at this location. This fault trace is coincident with the western side of the 15-foot-wide "primary fault trace" shown on Figure 2 crossing this trench. No strikes and dips or cross trench orientations are provided on the log, but no similar feature/relationship is shown on southeast projection on the log of Trench T-1. This feature, if it has any lateral extent, must pass off the west end of Trench T-2, and not as shown on Figure 2 through Trench T-2. Between about Stations 0+87 to the west end of the trench, a thin layer of unfaulted, native silty clay to clayey silt (soil?) overlays the bedrock materials. Throughout the length of the trench, both the bedrock materials and soil (?) are overlain on a relatively sharp planar, unfaulted contact by a 2-3 foot thick layer of silty sand with gravel labeled as fill. No more detailed description of the fill is provided on the log or in the text. There is no evidence that the material contained deleterious materials or other characteristics consistent with fill, and this material may be Colma Formation. It is too coarse to be dune sand.

Boring EB-1 was drilled in the area of the sag pond deposits near the east end of Trench T-1 (see Plate 1). The boring encountered about 2.5 feet of silty sand with gravel that we interpret to be Colma Formation (labeled fill on log), underlain by materials consistent with sag pond deposits to the bottom of the boring at 30 feet. Groundwater was at 12 feet below the ground surface at the time of drilling. Boring EB-2 was drilled between Trenches T-2 and T-3 (see Plate 1), and encountered about 4.5 feet of silty sand with gravel that we interpret to be Colma Formation (labeled fill on the log), underlain by materials consistent with the Merced Formation to a depth of about 23 feet, underlain by materials consistent with the Franciscan Complex to the bottom of the boring at 29.5 feet. No groundwater was encountered at the time of drilling. Boring EB-3 was drilled near the east end of Trench T-2 (see Plate 1) and encountered about 3 feet of silty clay with gravel that we interpret to be Colma Formation (labeled fill on log), underlain by materials consistent with the Merced Formation to a depth of about 17 feet, underlain by materials consistent with the Franciscan Complex to the bottom of the boring at 30 feet. No groundwater was encountered at the time of drilling. Boring EB-4 was drilled in the northwest portion of the property (see Plate 1) and encountered silty sand with gravel that we interpret to be Colma Formation (labeled fill on log), underlain by materials consistent with the Merced Formation to a depth of 28 feet (not 18 feet as stated in the text (page 8), underlain by materials consistent with the Franciscan Complex to the bottom of the boring at 30 feet. No groundwater was encountered at the time of drilling. Boring EB-5 was drilled in the southwest corner of the property adjacent to the site (see Plate 1). The boring encountered about 6 feet of silty to gravelly sand that we interpret to be Colma Formation (labeled fill on log), underlain by materials consistent with Merced Formation to about 18 feet, underlain by materials consistent with Franciscan Complex to the bottom of the boring at 30 feet. The text (page 8) indicates that no groundwater was encountered at the time of drilling, but the log shows groundwater was encountered at 27 feet. We note that there is a discrepancy between the description of the fill on the boring logs and the description on the trench logs. Except for Trench T-3, the materials described on the boring logs are

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significantly coarser that those described on the trench logs. The coarser material, if correctly described, is unlikely to be dune sand.

We did not review the magnetometer and seismic refraction survey data. In general, and for an urban property as modified as this property, we do not believe that shallow geophysical survey techniques are as reliable in locating near surface faults as historic data and trenching. The text (page 6) indicates that the results of the surveys generally supported the presence of the "principal fault trace" and "secondary fault trace" in the shallow subsurface. However, the text indicates that the "principal fault trace" was not encountered in any of the four magnetometer survey lines.

In our judgement, the data presented in this report is somewhat better than the data presented in the previous reviewed reports. However, it is difficult to evaluate the report because the trench logs are of small scale and are generalized, lack detailed descriptions of the materials encountered, lack strikes and dips or cross trench orientations, and show conflicting and sometimes unreasonable geologic relationships. In addition, there are discrepancies between the data shown on the trench logs, the data discussed in the text, and the data shown on Figure 2. Our interpretation of the data in the report is presented on Plate 1. In our judgment, Colma Formation and possibly dune sand, and folded and locally faulted Merced Formation and Franciscan Complex underlie the property. The most significant feature with respect to the site is an approximately north-south trending zone of faulting within Franciscan Complex bedrock that narrows to the south and projects west of the site. This zone is coincident with a lineament observed on 1946 and some later aerial photographs along the western margin of a sag pond. We find no convincing evidence for the easternmost "secondary fault trace" and the "primary fault trace" as shown on Figure 2 of the report.

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