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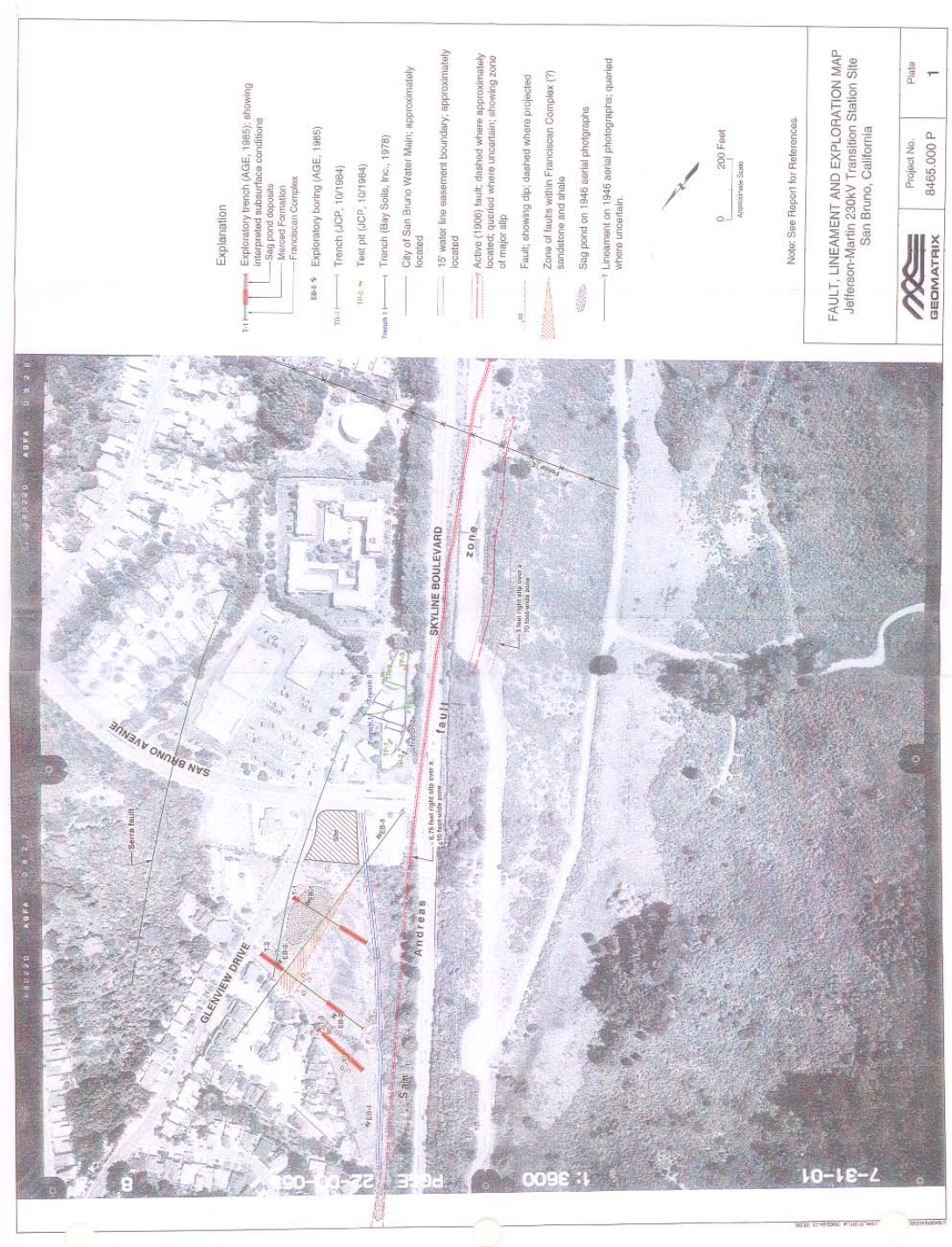

Comment Set PG, Attachment E

ATE OF CALIFORNIA – THE RESOURCES AGENCY
EP[illegible]TMENT OF WATER RESOURCES
16[illegible]H STREET, P.O. BOX 942836
CRAMENTO, CA 94236-0001
6) 653-5791

GRAY DAVIS, *Governor*

AUG 27 2003

Ms. Cheryl Davis, Manager
Water Supply and Treatment Division
Public Utilities Commission
City and County of San Francisco
Post Office Box 730
Millbrae, California 94030

Lower Crystal Springs Dam, No. 10-6
San Mateo County

Dear Ms. Davis:

This is in response to Mr. Lowell Rogers' letter regarding the proposed Jefferson-Martin 230 kV Transmission Project. Mr. Rogers' letter outlined a tentative proposal for Pacific Gas and Electric Company's installation of a 230 kV Transmission line across the crest of Lower Crystal Springs Dam. The proposal was discussed with Mr. Leo Bauer.

We have reviewed Mr. Rogers' letter and find the tentative proposal for a transmission line across the crest of the dam is satisfactory. An alteration application, together with detailed plans and specifications, must be approved by this office prior to the start of any work.

If you have any questions, contact Area Engineer Jon Wright at (916) 227-4627 or Regional Engineer Frederick Sage at (916) 227-4604.

Sincerely,

David A. Gutierrez, Acting Chief
Division of Safety of Dams

cc: Mr. Lowell Rogers, Project Engineer
Black & Veatch Corporation
8950 Cal Center Drive, Suite 238
Sacramento, California 95826

Mr. Robert Masuoka, Principal Planner
Building and Lands Services
Mail Code N10A
Pacific Gas and Electric Company
Post Office Box 770000
San Francisco, California 94177-0001

Comment Set PG, Attachment F

Pacific Gas and Electric Company

Proposed Jefferson-Martin Transmission Line Project

Alternative Underground Section Magnetic Field Evaluation

Trousdale Avenue High Load Condition

Prepared by
Enertech Consultants
300 Orchard City Drive, Suite 132
Campbell, California 95008

September 4, 2003

Comment Set PG, Attachment F, cont.

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Prepared by
Enertech Consultants of Santa Clara, Inc.
Campbell, California

Comment Set PG, Attachment F, cont.

INTRODUCTION

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If the alternative all-underground route is adopted, the transmission line would begin at the Jefferson Substation in Menlo Park. The proposed all-underground line would be routed north along Canada Road until it intersects Skyline Boulevard. At this location, the proposed all-underground line would continue along Skyline Boulevard, crossing from the western side of Highway 280 to the eastern side at Haynes Road. The proposed all-underground line would continue north along Skyline Boulevard near existing residential areas until it reaches Trousdale Avenue. The proposed all-underground line would then be routed east along Trousdale Avenue until it reaches El Camino Real. At this intersection, the alternative all-underground line would continue north along El Camino Real until it joins the underground portion of the originally proposed line route at the intersection of El Camino Real and San Bruno Avenue. The proposed all-underground line would then continue along the proposed underground line route to Martin Substation. Figure 1 presents a diagram of the alternative all-underground transmission line route, along with a portion of the originally proposed underground line route.

MAGNETIC FIELD COMPUTER MODELING ALONG TROUSDALE AVENUE

Computer modeling was performed for the underground line route along Trousdale Avenue. The underground transmission line route along Trousdale Avenue was divided into smaller subsections (panels) to accommodate size limitations of the software, as well as providing a higher level of contour resolution along sections of the proposed line route. Additionally, magnetic field calculations were performed for four different projected loading conditions for the year 2006 :

1. Low : Load is Less 5% of the Year (49% of Peak) = 326 A
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TROUSDALE AVENUE – HIGH LOADING CONDITION ONLY

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1

Comment Set PG, Attachment F, cont.

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Loading and line geometry information was provided by PG&E.

Comment Set PG, Attachment F, cont.

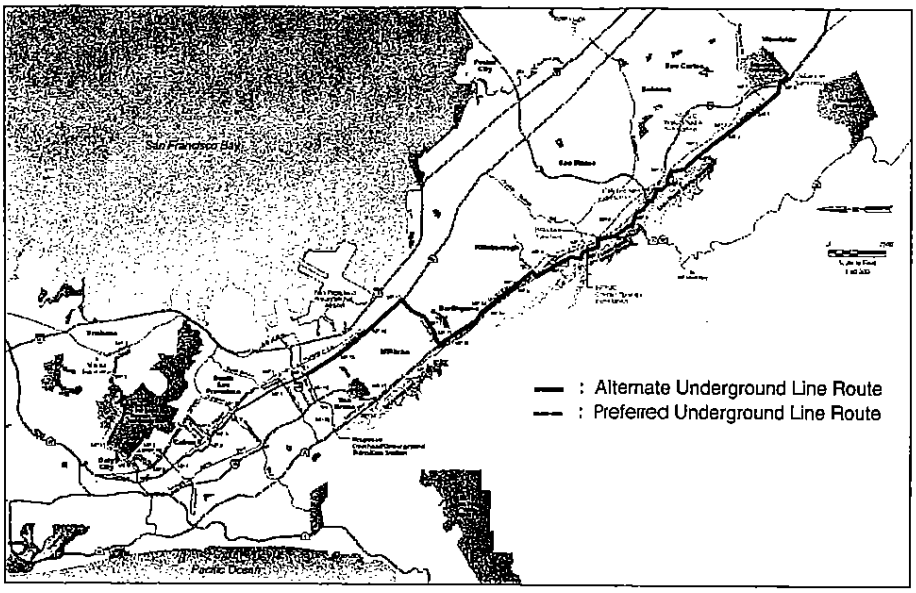


Figure 1. Diagram of Alternative Jefferson-Martin 230 kV
All-Underground Transmission Line Route

3

Comment Set PG, Attachment F, cont.

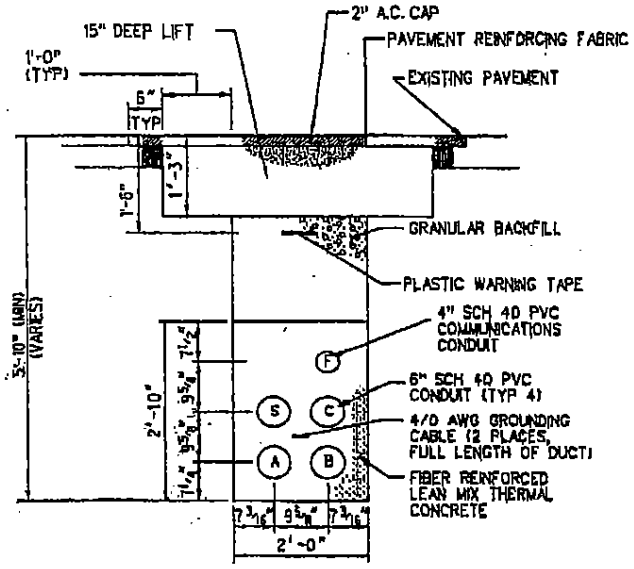


Figure 2. Diagram of Proposed Jefferson-Martin 230 kV Underground Transmission Line Configuration

4

Comment Set PG, Attachment F, cont.

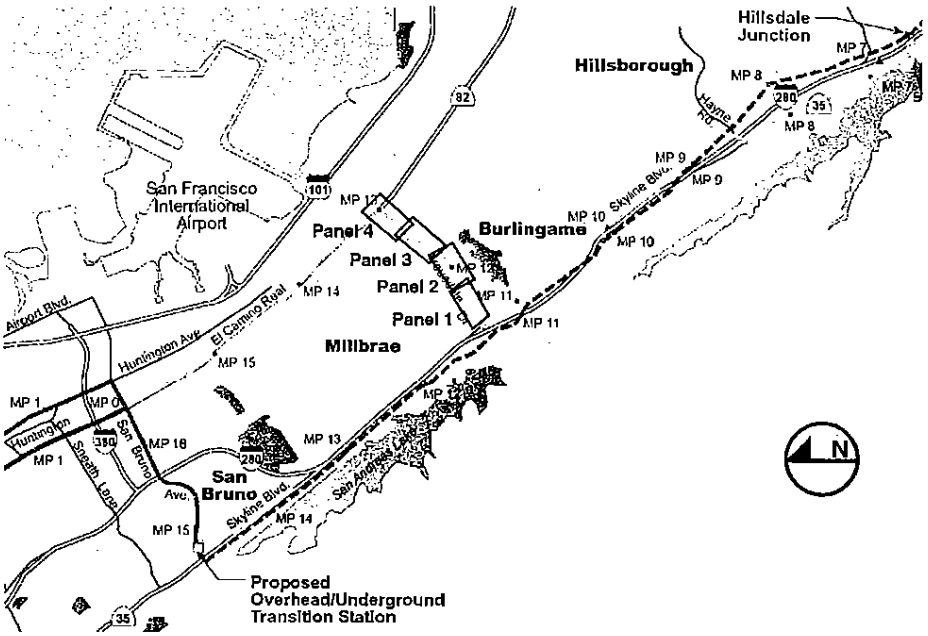


Figure 3. Diagram of Jefferson-Martin 230 kV Underground Transmission Line Route Along the Trousdale Section – Panels 1 Through 4

5

Comment Set PG, Attachment F, cont.

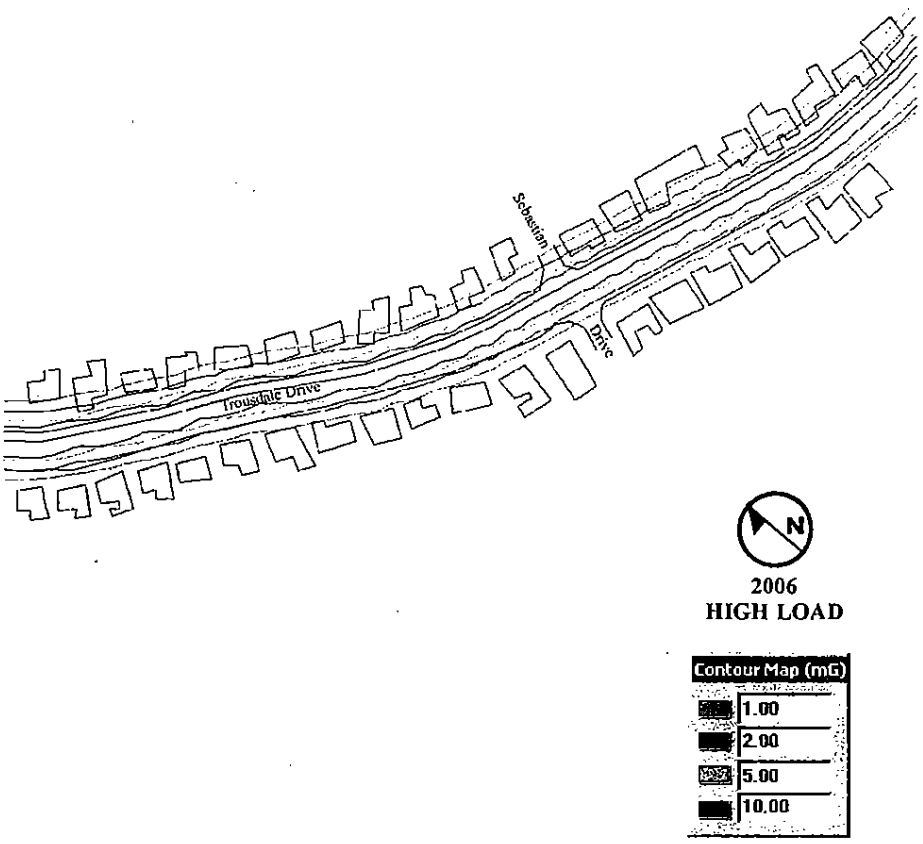
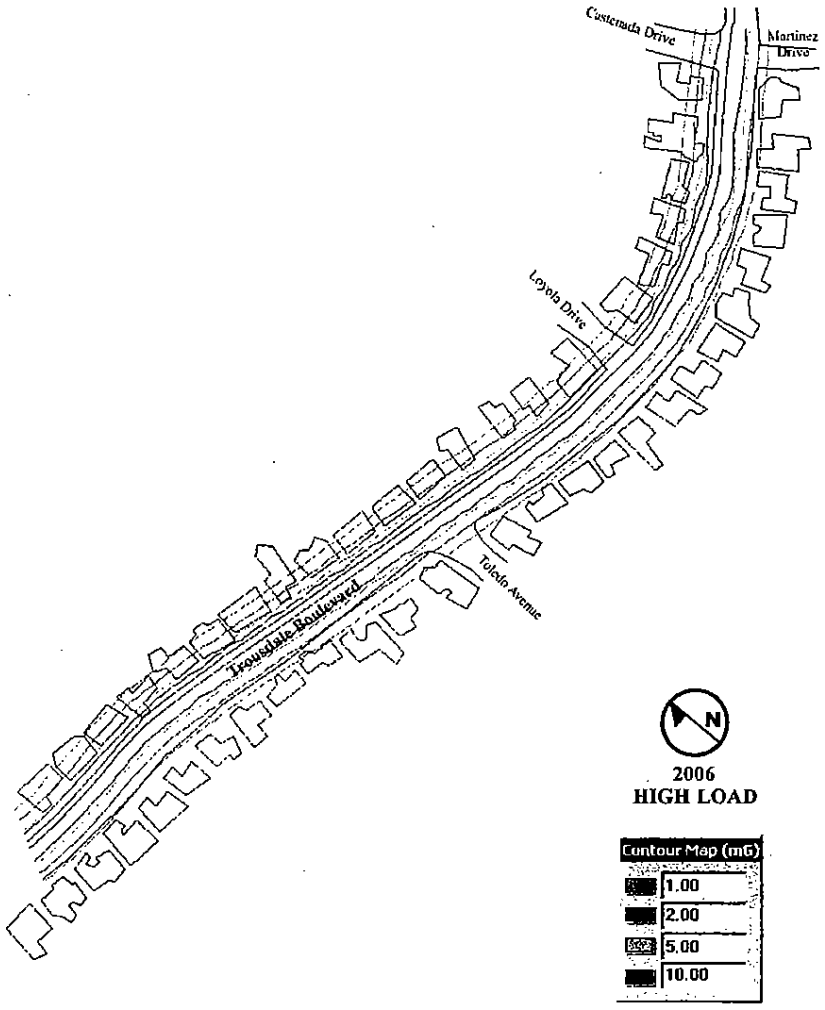


Figure 4. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 1 – High Load
(Load is Less 95% of the Year)

6

Comment Set PG, Attachment F, cont.

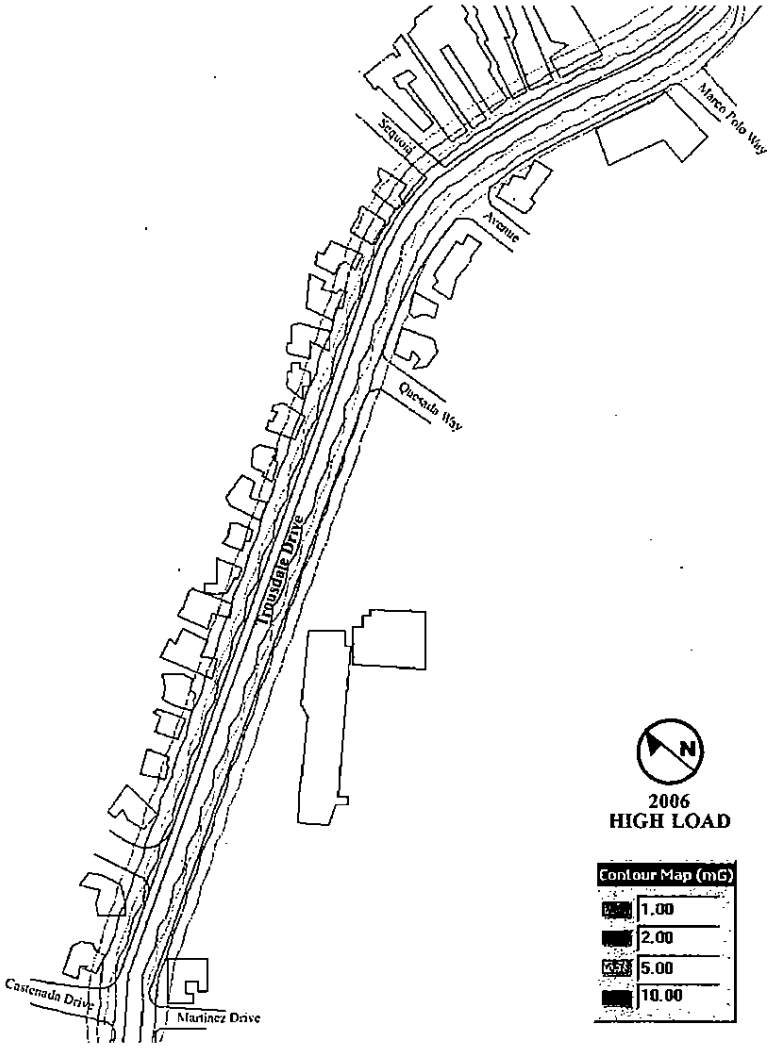


Section : Trousdale - Panel #2

Figure 5. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 2 – High Load
(Load is Less 95% of the Year)

7

Comment Set PG, Attachment F, cont.

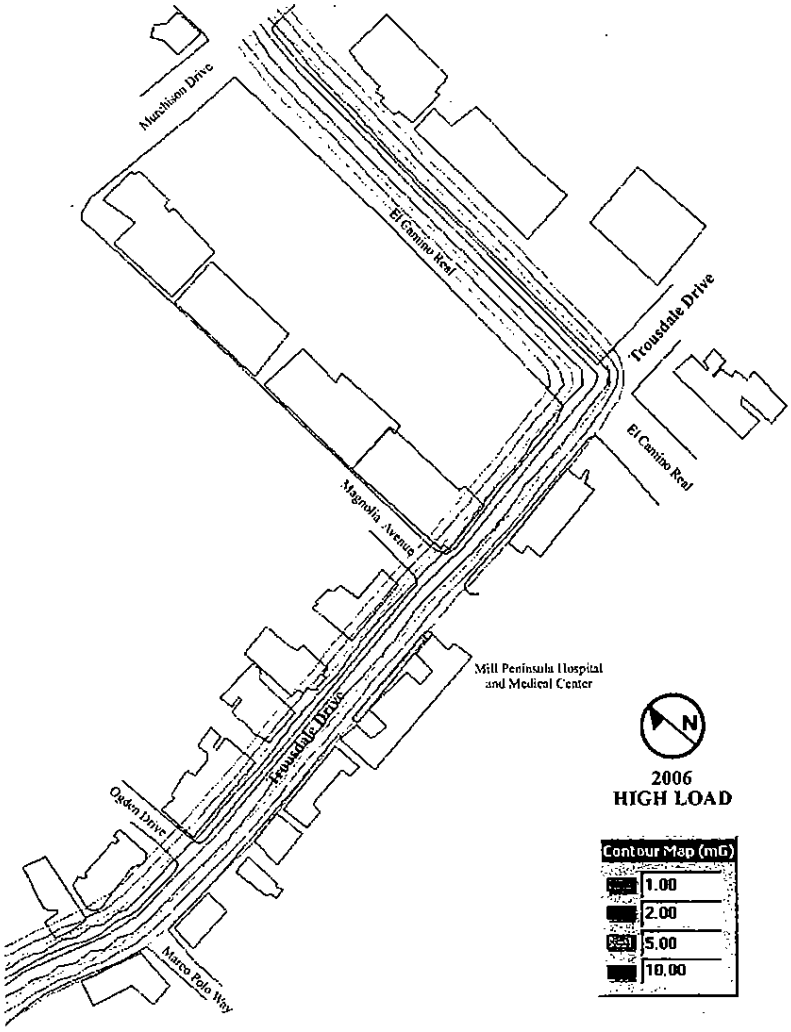


Section : Trousdale - Panel #3

Figure 6. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 3 – High Load
(Load is Less 95% of the Year)

8

Comment Set PG, Attachment F, cont.



Section : Trousdale - Panel #4

Figure 7. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 4 – High Load
(Load is Less 95% of the Year)

9

Comment Set PG, Attachment G

Pacific Gas and Electric Company

Proposed Jefferson-Martin Transmission Line Project

Alternative Underground Section Magnetic Field Evaluation

Trousdale Avenue Low Load Condition

Prepared by
Enertech Consultants
300 Orchard City Drive, Suite 132
Campbell, California 95008

September 4, 2003

Comment Set PG, Attachment G, cont.

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Prepared by
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Campbell, California

Comment Set PG, Attachment G, cont.

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This report includes the calculated magnetic field contour maps along Trousdale Avenue for only one load condition :

TROUSDALE AVENUE – LOW LOADING CONDITION ONLY

Other reports were also prepared for the other loading conditions modeled. Results are presented as magnetic field contour maps with contour levels of 1, 2, 5, and 10 mG.

1

Comment Set PG, Attachment G, cont.

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2

Comment Set PG, Attachment G, cont.

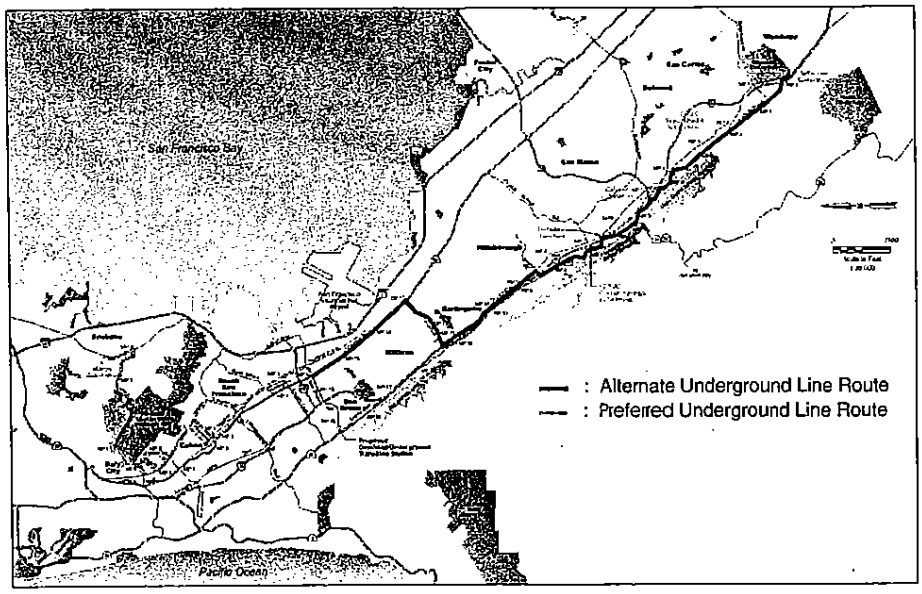


Figure 1. Diagram of Alternative Jefferson-Martin 230 kV
All-Underground Transmission Line Route

3

Comment Set PG, Attachment G, cont.

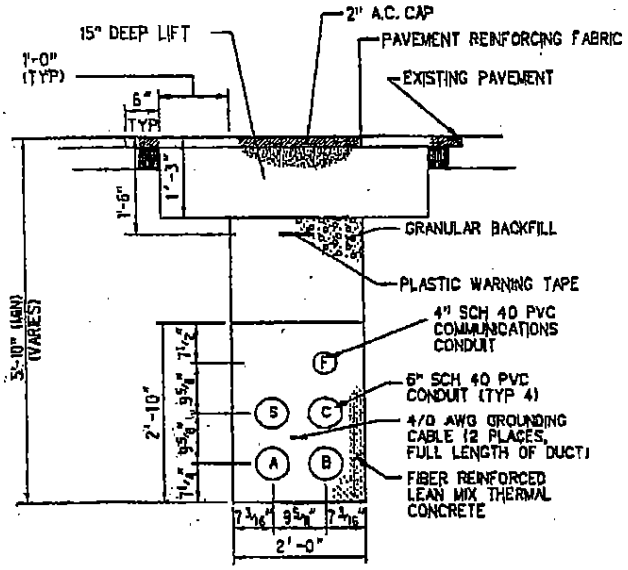


Figure 2. Diagram of Proposed Jefferson-Martin 230 kV Underground Transmission Line Configuration

4

Comment Set PG, Attachment G, cont.

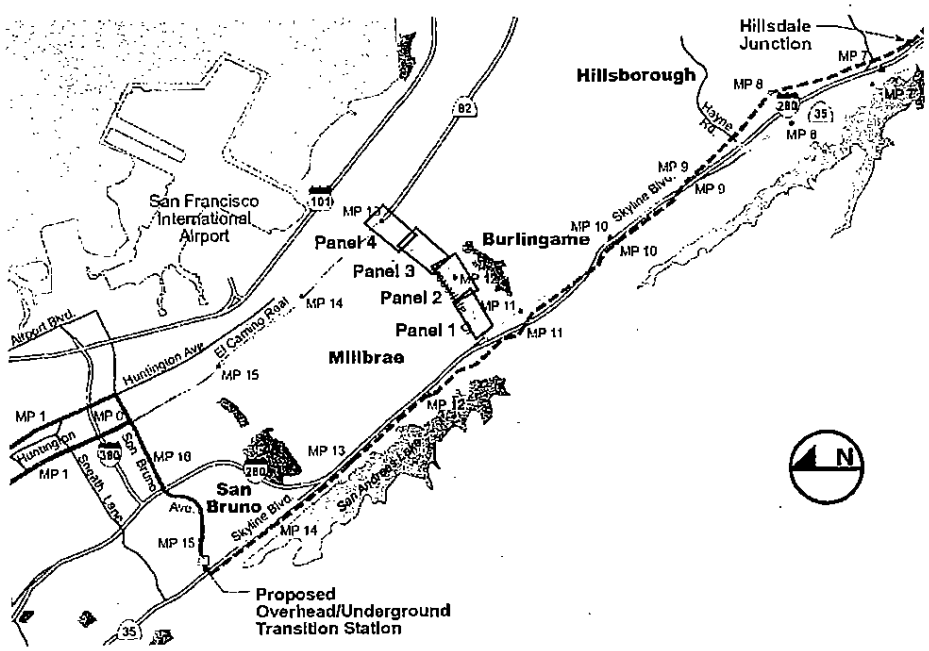
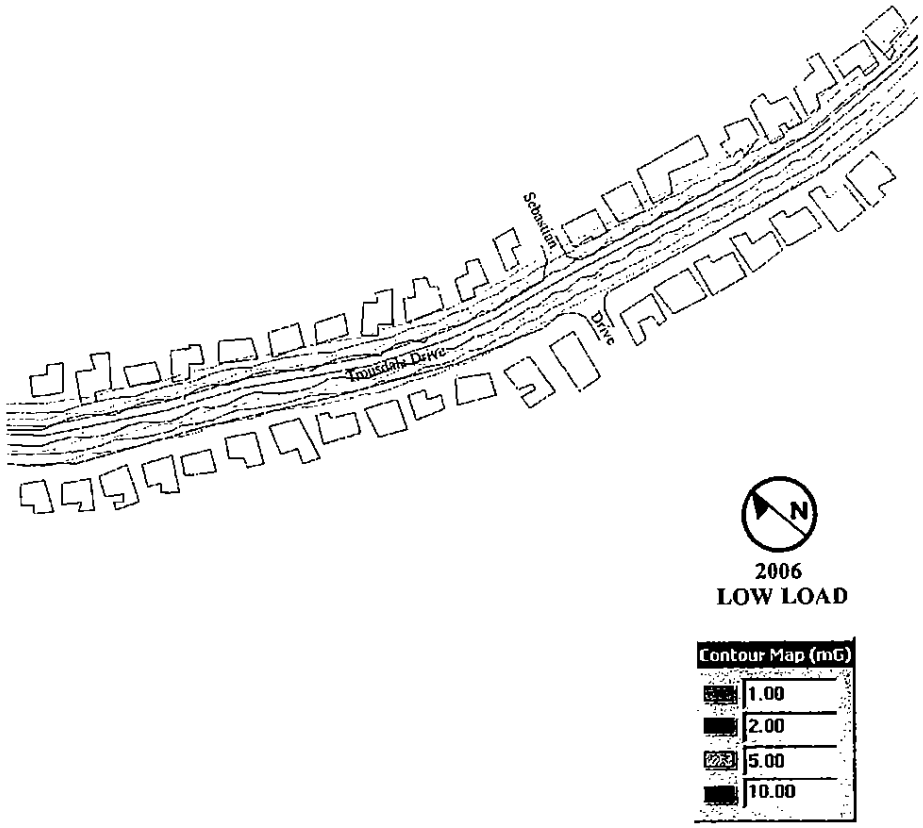


Figure 3. Diagram of Jefferson-Martin 230 kV Underground Transmission Line Route Along the Trousdale Section – Panels 1 Through 4

5

Comment Set PG, Attachment G, cont.

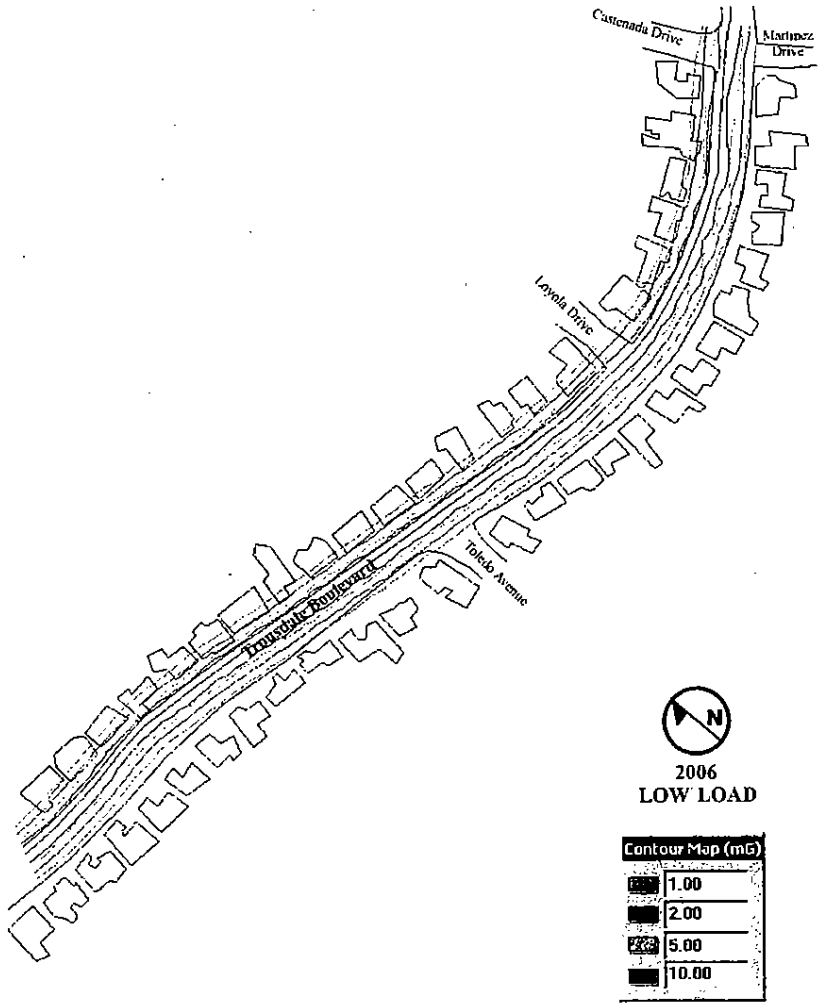


Section : Trousdale - Panel #1

Figure 4. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 1 – Low Load
(Load is Less 5% of the Year)

6

Comment Set PG, Attachment G, cont.



Section : Trousdale - Panel #2

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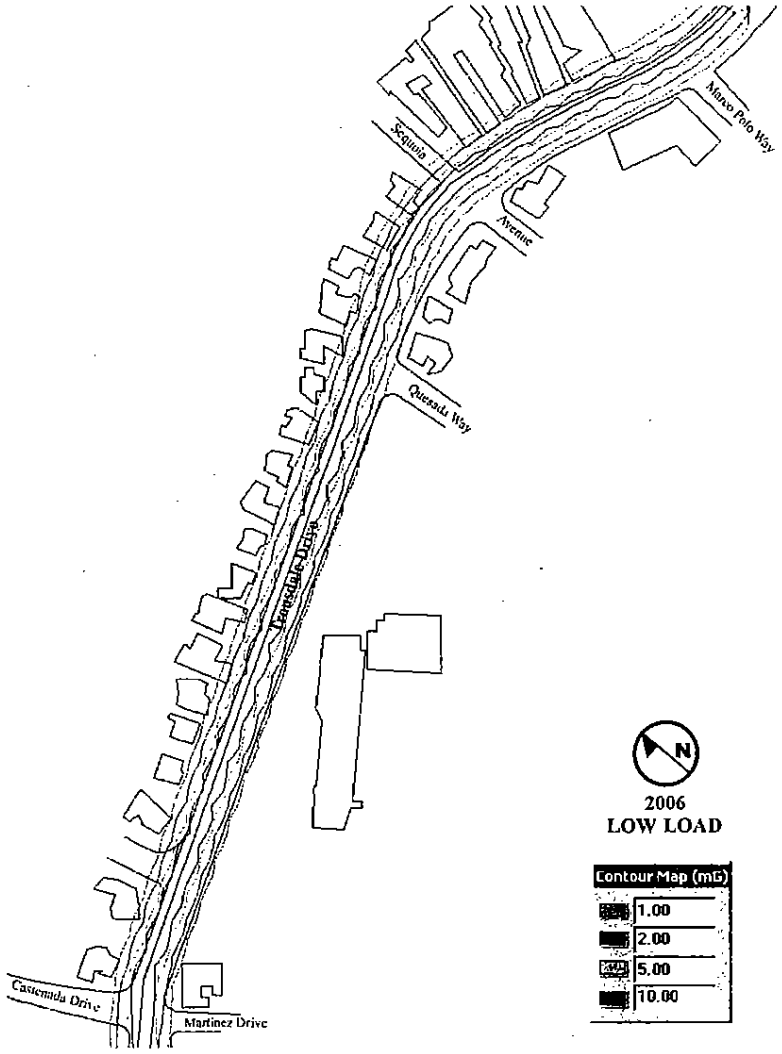
Trousdale Section – Panel 2 – Low Load
(Load is Less 5% of the Year)

7

Comment Set PG, Attachment G, cont.

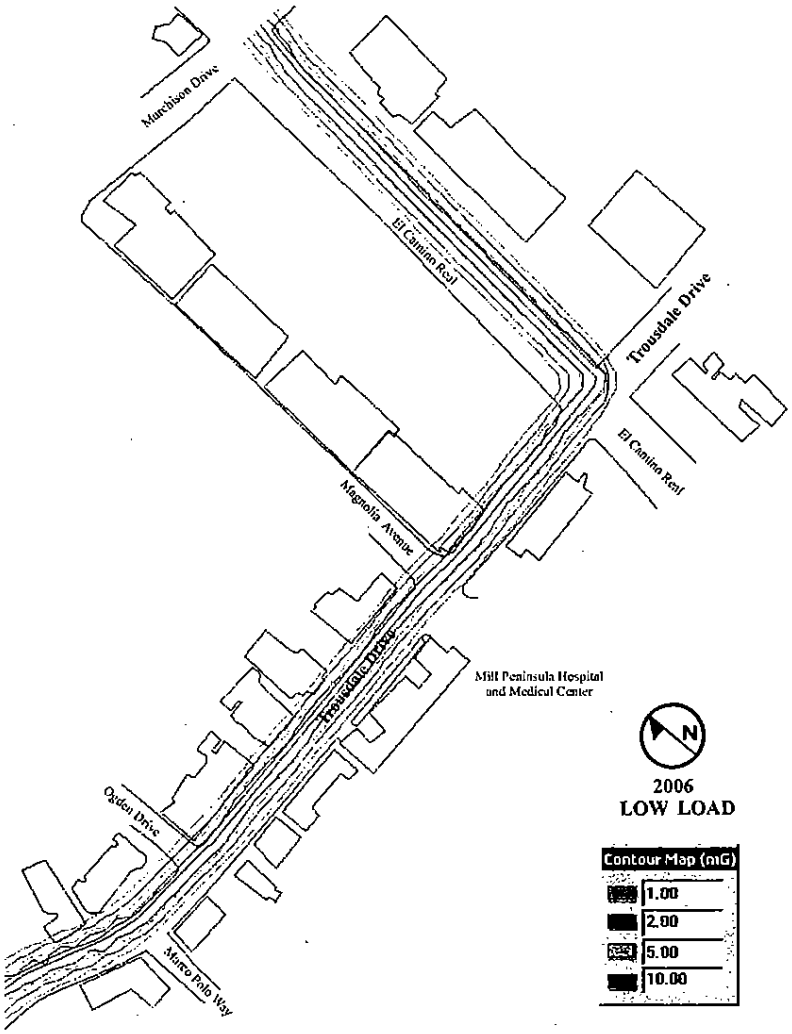


Section : Trousdale - Panel #3

Figure 6. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 3 – Low Load
(Load is Less 5% of the Year)

8

Comment Set PG, Attachment G, cont.



Section : Trousdale - Panel #4

Figure 7. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 4 – Low Load
(Load is Less 5% of the Year)

9

Comment Set PG, Attachment H

Pacific Gas and Electric Company

Proposed Jefferson-Martin Transmission Line Project

Alternative Underground Section Magnetic Field Evaluation

Trousdale Avenue Medium Load Condition

Prepared by
Enertech Consultants
300 Orchard City Drive, Suite 132
Campbell, California 95008

September 4, 2003

Comment Set PG, Attachment H, cont.

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Comment Set PG, Attachment H, cont.

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1

Comment Set PG, Attachment H, cont.

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2

Comment Set PG, Attachment H, cont.

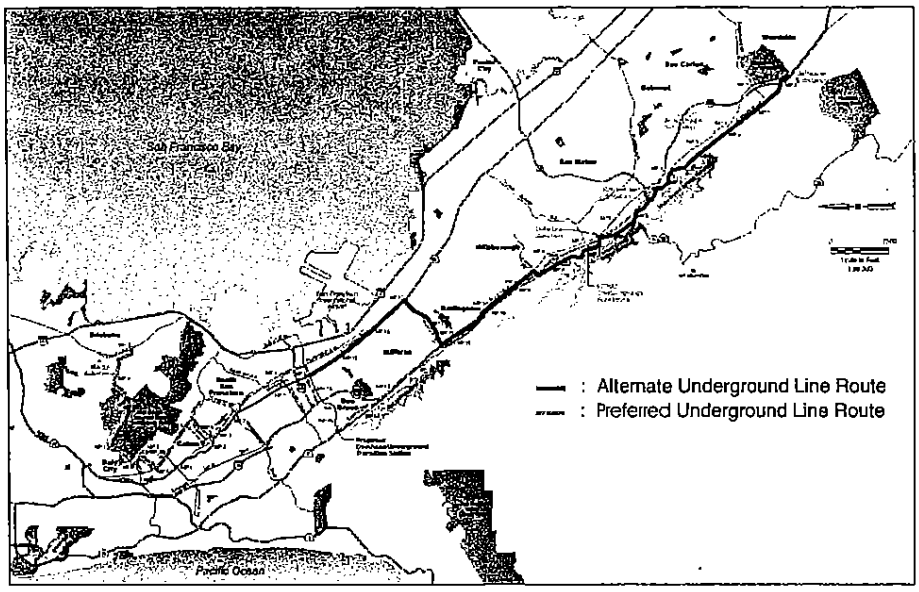


Figure 1. Diagram of Alternative Jefferson-Martin 230 kV
All-Underground Transmission Line Route

3

Comment Set PG, Attachment H, cont.

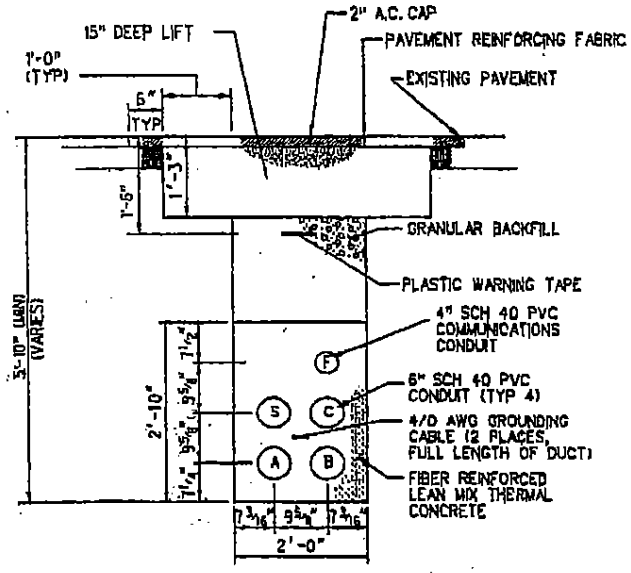
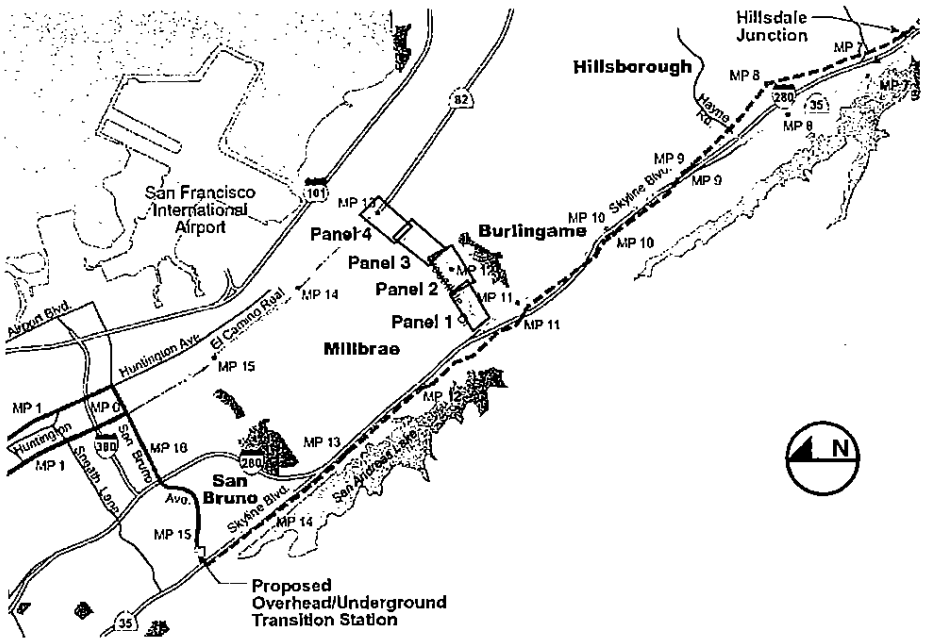


Figure 2. Diagram of Proposed Jefferson-Martin 230 kV Underground Transmission Line Configuration

Comment Set PG, Attachment H, cont.



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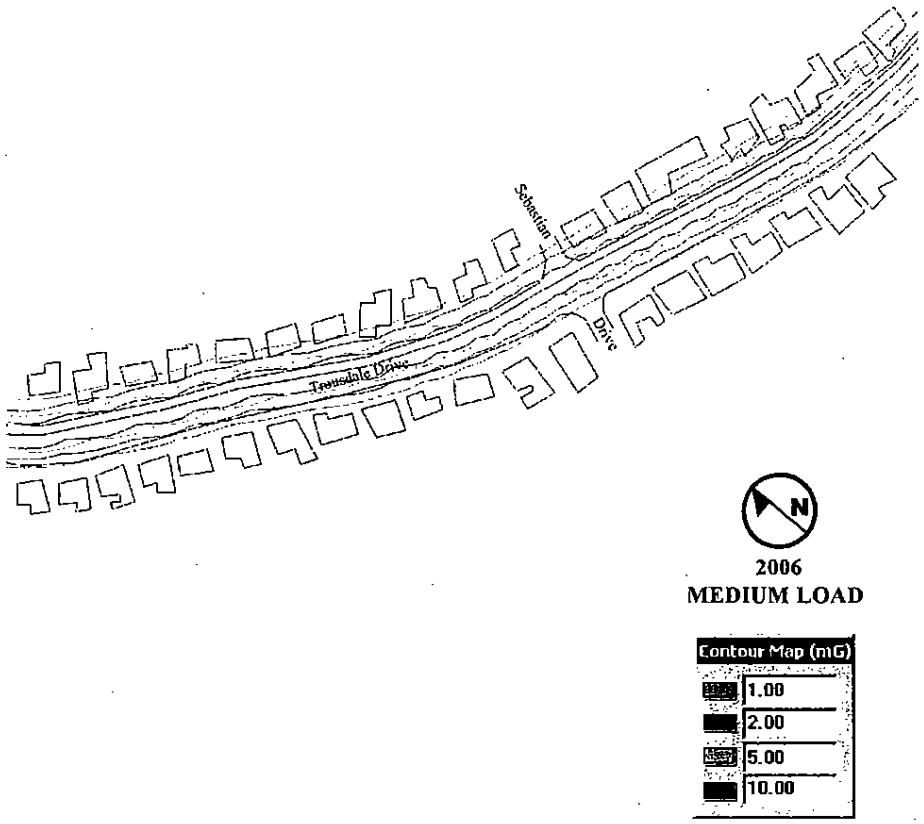
5

Comment Set PG, Attachment H, cont.

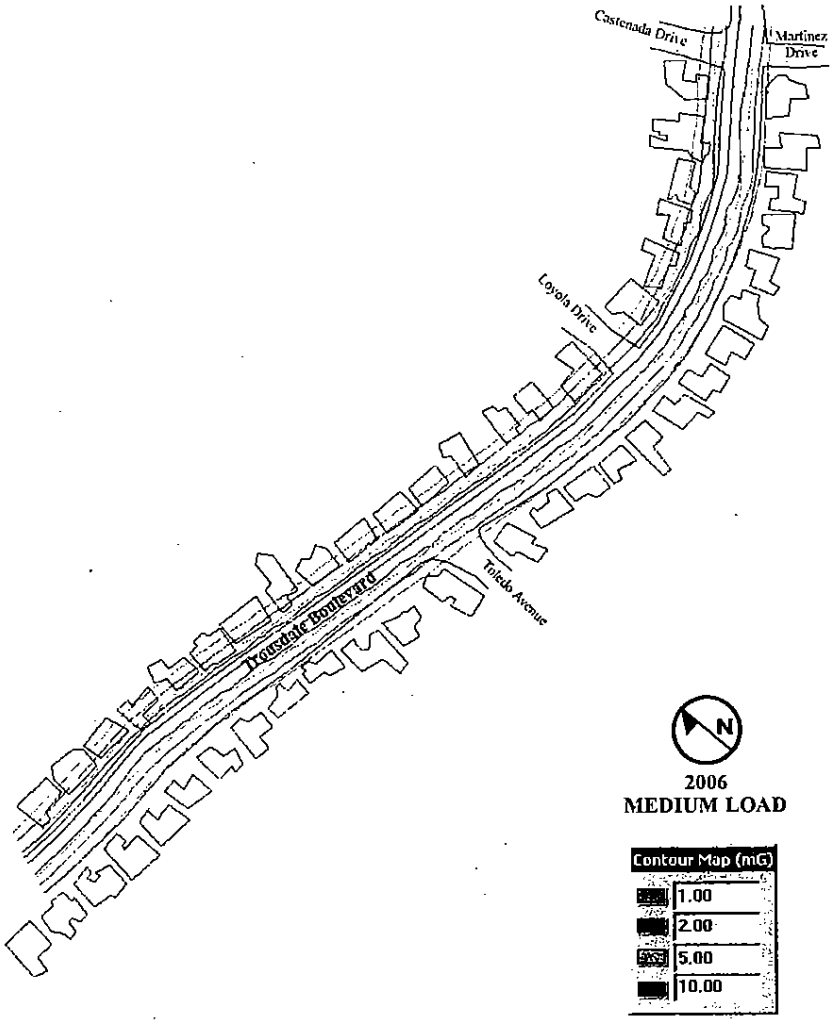


Section : Trousdale - Panel #1

Figure 4. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 1 – Medium Load
(Load is Less 50% of the Year)

6

Comment Set PG, Attachment H, cont.

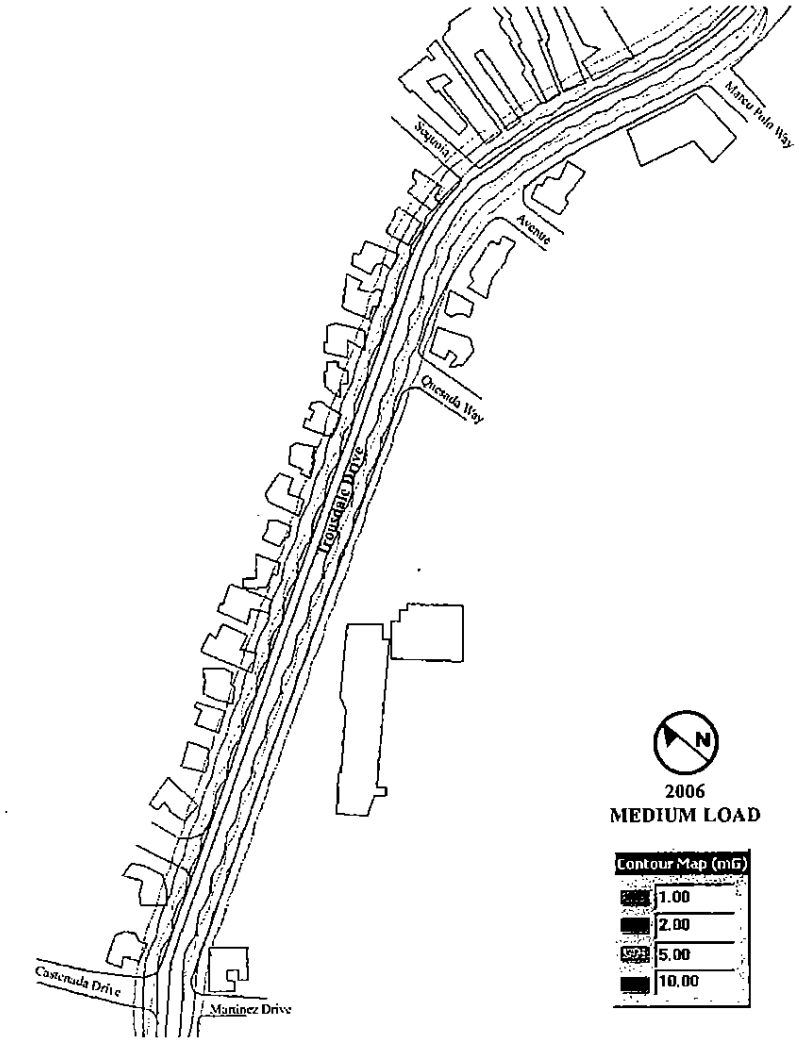


Section : Trousdale - Panel #2

Figure 5. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 2 – Medium Load
(Load is Less 50% of the Year)

7

Comment Set PG, Attachment H, cont.

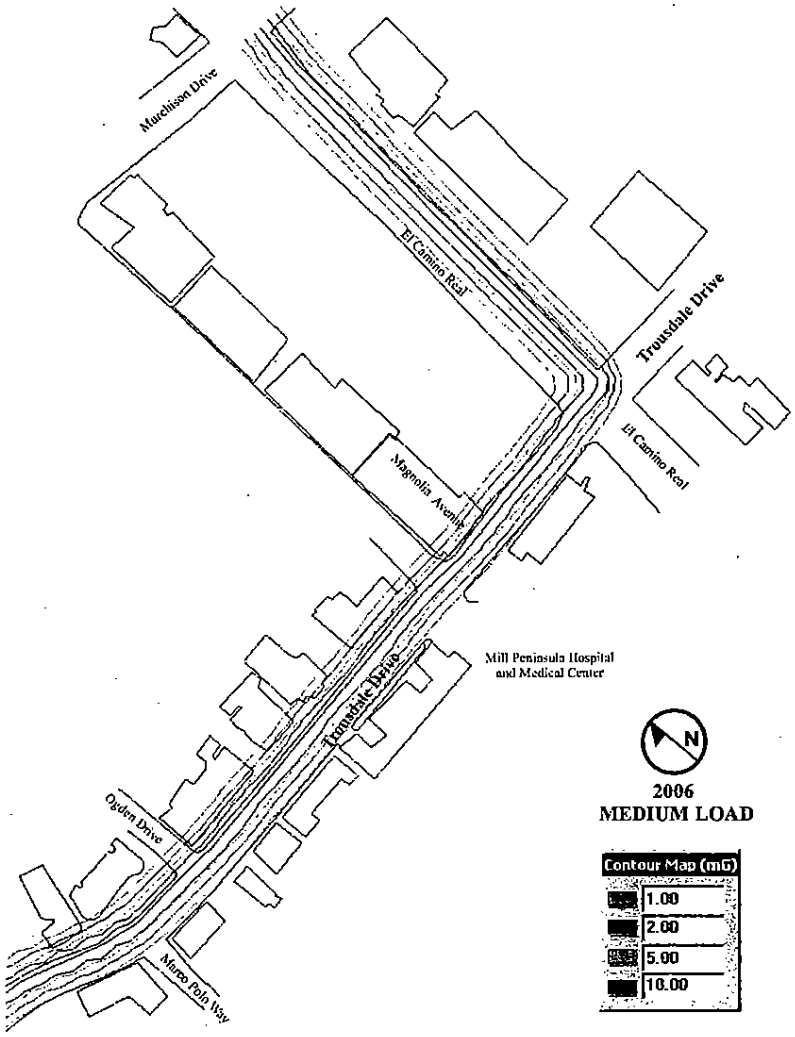


Section : Trousdale - Panel #3

Figure 6. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 3 – Medium Load
(Load is Less 50% of the Year)

8

Comment Set PG, Attachment H, cont.



Section : Trousdale - Panel #4

Figure 7. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 4 – Medium Load
(Load is Less 50% of the Year)

9

Comment Set PG, Attachment I

Pacific Gas and Electric Company

Proposed Jefferson-Martin Transmission Line Project

Alternative Underground Section Magnetic Field Evaluation

Trousdale Avenue Normal Peak Load Condition

Prepared by
Enertech Consultants
300 Orchard City Drive, Suite 132
Campbell, California 95008

September 4, 2003

Comment Set PG, Attachment I, cont.

NOTICE

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Prepared by
Enertech Consultants of Santa Clara, Inc.
Campbell, California

Comment Set PG, Attachment I, cont.

INTRODUCTION

Pacific Gas and Electric (PG&E) has proposed to construct a new 230 kV transmission line, entitled the "Jefferson – Martin" 230kV transmission line project. This new transmission line would supply power from the Jefferson Substation near Menlo Park to the Martin Substation in South San Francisco. As an alternative route to the proposed overhead/underground line, an entirely underground route has been considered. This report presents the power-frequency magnetic field computer modeling results for a portion of the alternative all-underground route of the proposed Jefferson – Martin 230 kV transmission line.

If the alternative all-underground route is adopted, the transmission line would begin at the Jefferson Substation in Menlo Park. The proposed all-underground line would be routed north along Canada Road until it intersects Skyline Boulevard. At this location, the proposed all-underground line would continue along Skyline Boulevard, crossing from the western side of Highway 280 to the eastern side at Haynes Road. The proposed all-underground line would continue north along Skyline Boulevard near existing residential areas until it reaches Trousdale Avenue. The proposed all-underground line would then be routed east along Trousdale Avenue until it reaches El Camino Real. At this intersection, the alternative all-underground line would continue north along El Camino Real until it joins the underground portion of the originally proposed line route at the intersection of El Camino Real and San Bruno Avenue. The proposed all-underground line would then continue along the proposed underground line route to Martin Substation. Figure 1 presents a diagram of the alternative all-underground transmission line route, along with a portion of the originally proposed underground line route.

MAGNETIC FIELD COMPUTER MODELING ALONG TROUSDALE AVENUE

Computer modeling was performed for the underground line route along Trousdale Avenue. The underground transmission line route along Trousdale Avenue was divided into smaller subsections (panels) to accommodate size limitations of the software, as well as providing a higher level of contour resolution along sections of the proposed line route. Additionally, magnetic field calculations were performed for four different projected loading conditions for the year 2006 :

1. Low : Load is Less 5% of the Year (49% of Peak) = 326 A
2. Medium : Load is Less 50% of the Year (69% of Peak) = 459 A
3. High : Load is Less 95% of the Year (90% of Peak) = 599 A
4. Peak : Highest Expected Loading of the Year (Normal Summer Peak) = 665 A

This report includes the calculated magnetic field contour maps along Trousdale Avenue for only one load condition :

TROUSDALE AVENUE – NORMAL PEAK LOADING CONDITION ONLY

Other reports were also prepared for the other loading conditions modeled. Results are presented as magnetic field contour maps with contour levels of 1, 2, 5, and 10 mG.

I

Comment Set PG, Attachment I, cont.

COMPUTER MODELING SOFTWARE

Power-frequency magnetic field calculations for the proposed Jefferson-Martin 230 kV transmission line were performed using the computer software program entitled "The EMF Modeler". The EMF Modeler is a software program which was developed by EPRI and designed to calculate the magnetic fields from complex arrays of transmission lines, distribution lines, substation buswork, substation equipment, passive wire loops, or user-defined current-carrying line segments. This magnetic field modeling program contains several unique features, including three-dimensional modeling capabilities, multiple calculation grids and profiles, calculations accounting for uneven terrain, and multiple loading conditions. The magnetic field calculation results for the EMF Modeler software were used to generate the magnetic field contour maps included within this report.

MODELING ASSUMPTIONS

Computer modeling of the proposed transmission line required several assumptions concerning line and building locations, as well as line configuration. The basic computer model for each panel was created based upon aerial photographs of the area. Distances to buildings and other structures were scaled from the aerial photos. In some circumstances, the building roofline (as shown in the aerial photos) may extend beyond the actual edge of the building, thereby locating the building closer to the proposed line route than the occupied building space.

The configuration of the underground 230 kV transmission line as modeled is provided in Figure 2. The configuration of the transmission line was assumed to be fixed and did not change configuration or depth below ground level along the entire line route. Locations for manholes and other facilities are unknown and were therefore not modeled. For each of the four loading conditions, the proposed 230 kV line was assumed to have a balanced load (with no unbalance or net currents). Only the proposed transmission line was modeled – no other existing electrical facilities were included within the computer models. Changes in loading and the presence of other existing electrical facilities can significantly influence the calculated magnetic field levels as presented within this report. Magnetic field calculations were performed at 1-meter (3.28-feet) above ground level.

In most cases, the terrain was assumed to be flat. At those locations where the effects of terrain and elevation changes influenced the magnetic field calculation results at building locations, the elevations of the buildings with respect to the line location and elevation were included within the computer model.

Loading and line geometry information was provided by PG&E.

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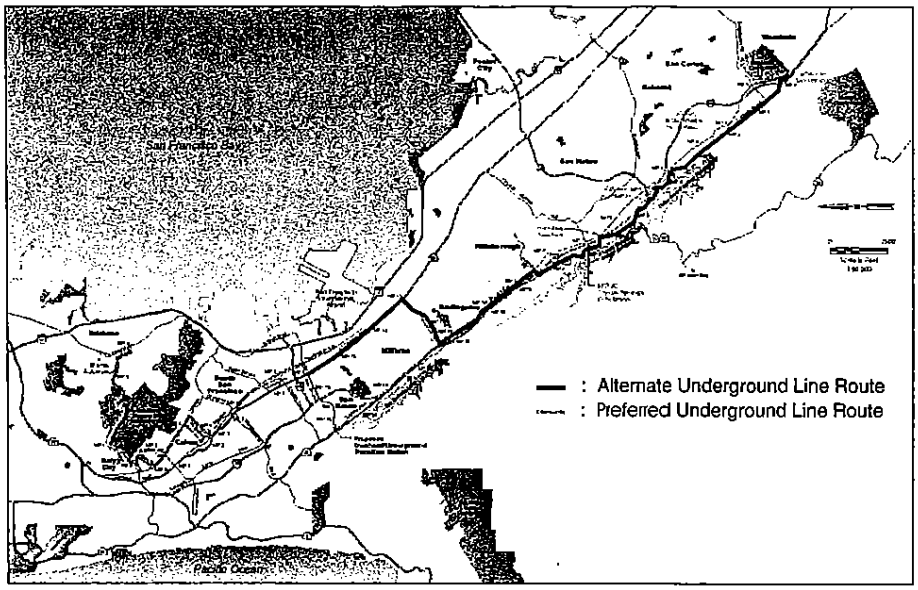

Figure 1. Diagram of Alternative Jefferson-Martin 230 kV
All-Underground Transmission Line Route

3

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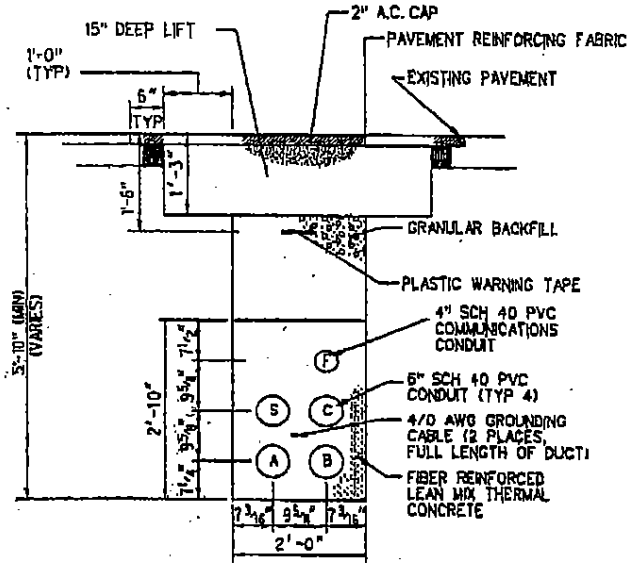

Figure 2. Diagram of Proposed Jefferson-Martin 230 kV Underground Transmission Line Configuration

4

Comment Set PG, Attachment I, cont.

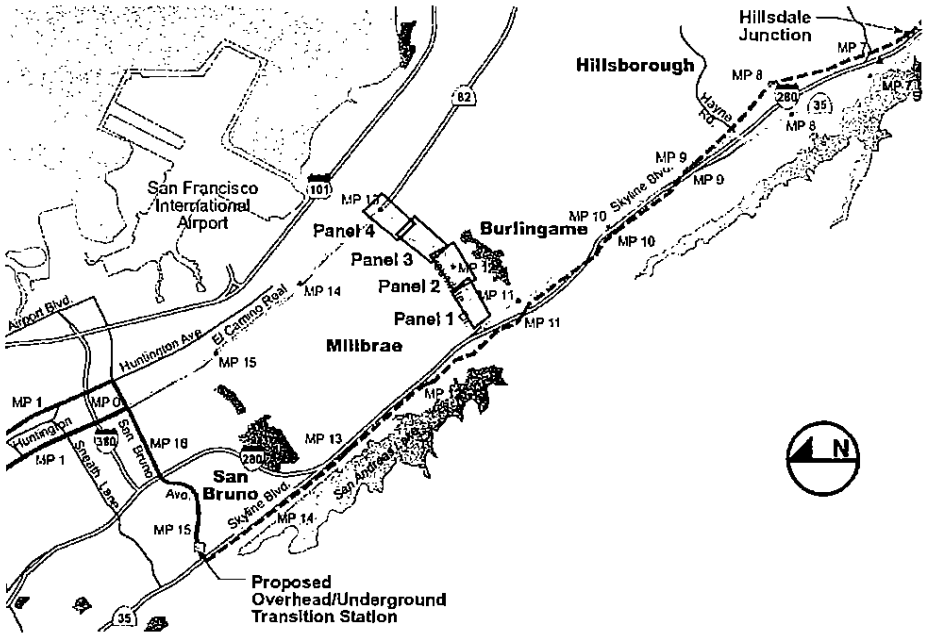

Figure 3. Diagram of Jefferson-Martin 230 kV Underground Transmission Line Route Along the Trousdale Section – Panels 1 Through 4

5

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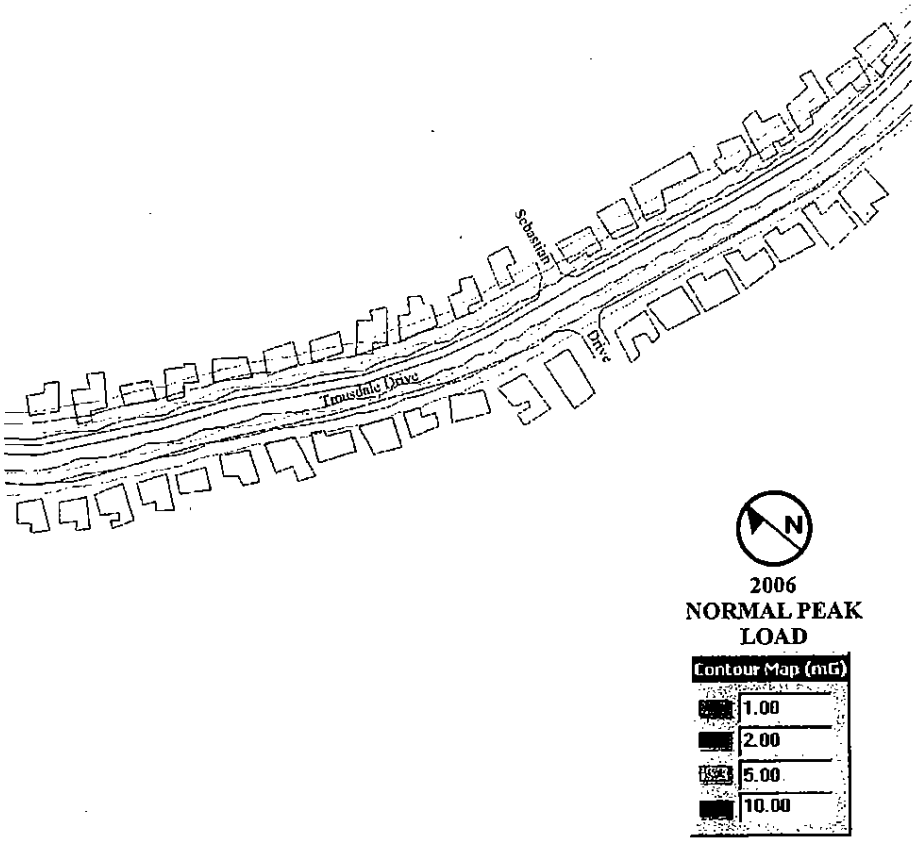

Section : Trousdale - Panel #1

Figure 4. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 1 – Normal Peak Load
(Highest Expected Loading of the Year)

6

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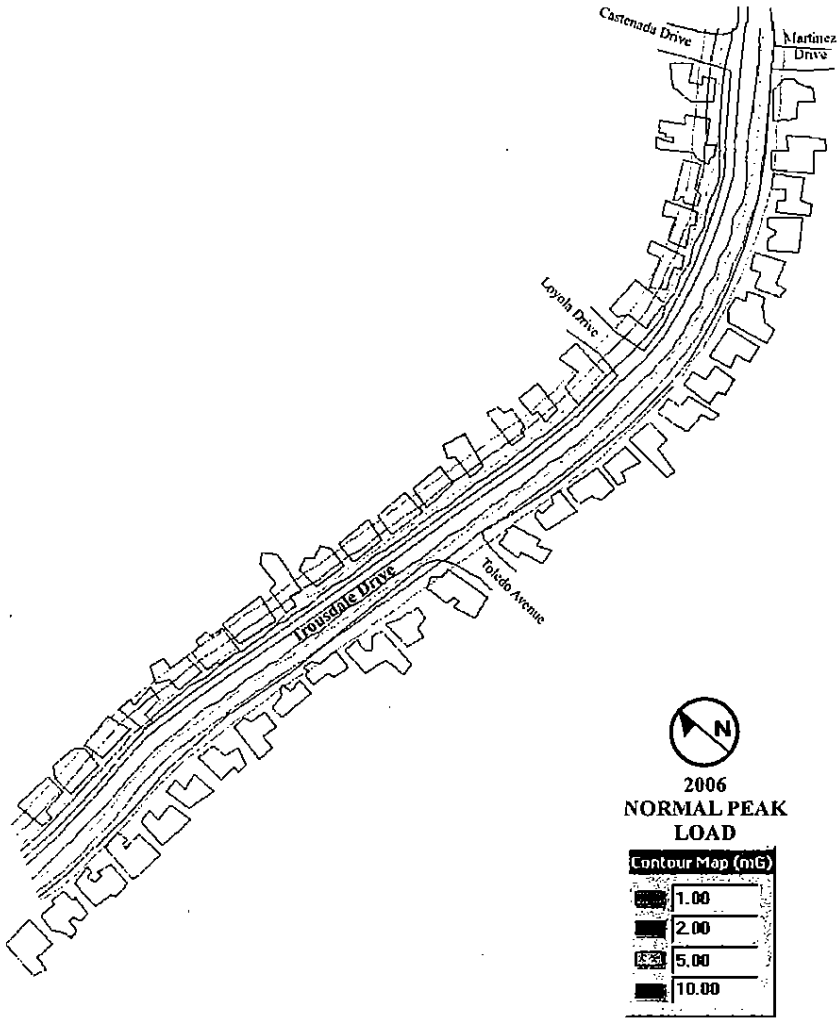
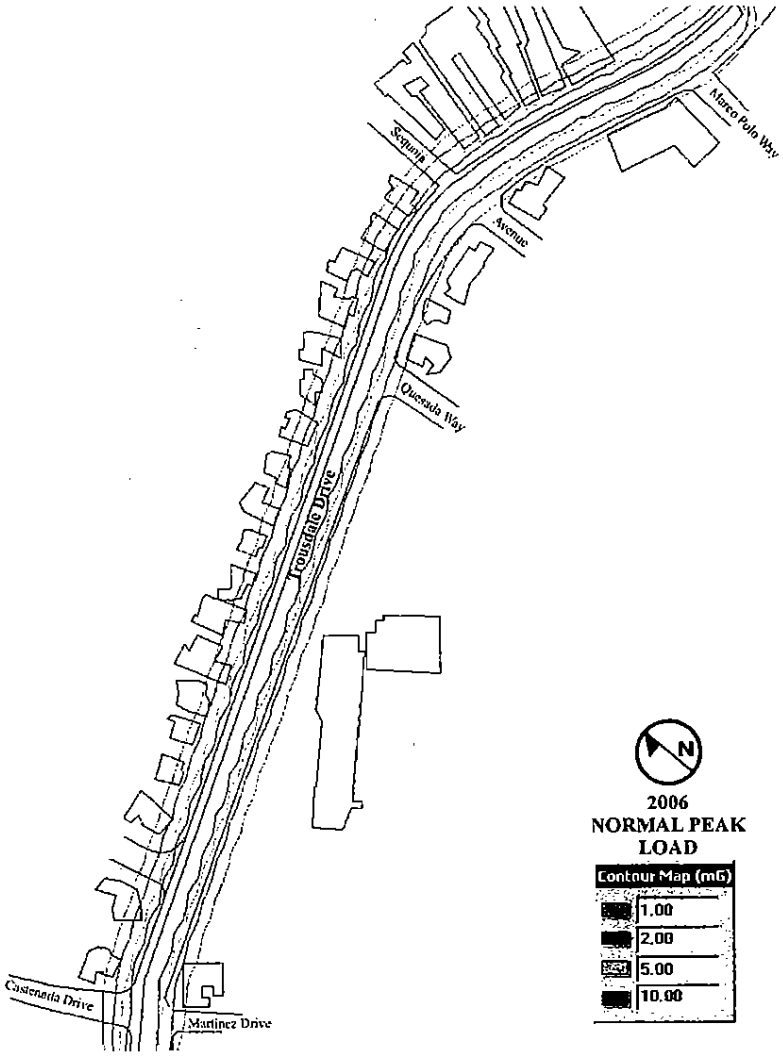


Section : Trousdale - Panel #2

Figure 5. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 2 – Normal Peak Load
(Highest Expected Loading of the Year)

7

Comment Set PG, Attachment I, cont.

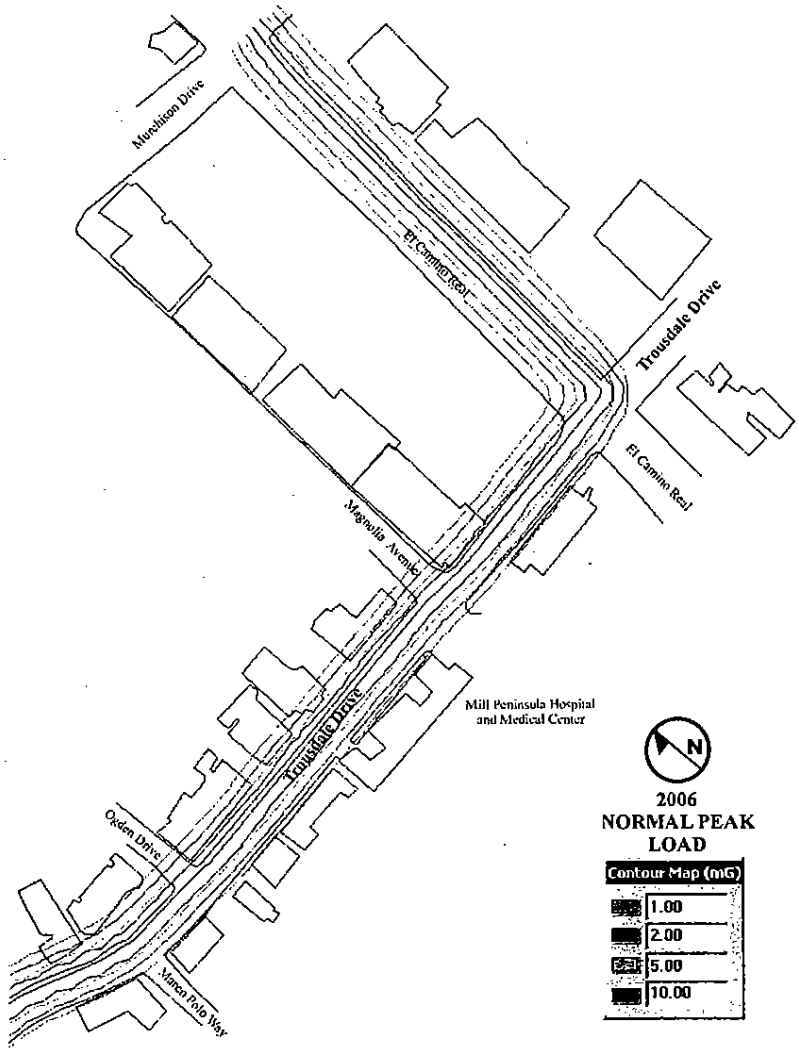


Section : Trousdale - Panel #3

Figure 6. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 3 – Normal Peak Load
(Highest Expected Loading of the Year)

8

Comment Set PG, Attachment I, cont.



Section : Trousdale - Panel #4

Figure 7. Magnetic Field Contour Map of Jefferson-Martin 230 kV UG T-Line Route
Trousdale Section – Panel 4 – Normal Peak Load
(Highest Expected Loading of the Year)

9

Comment Set PG, Attachment J

Pacific Gas and Electric Company

Proposed Jefferson-Martin Transmission Line Project

Alternative Underground Section Magnetic Field Evaluation

Trousdale Avenue School Section

Prepared by
Enertech Consultants
300 Orchard City Drive, Suite 132
Campbell, California 95008

September 4, 2003

Comment Set PG, Attachment J, cont.

NOTICE

This report was prepared by the organization(s) named below as an account of work sponsored by Pacific Gas & Electric Company (PG&E). Neither PG&E, Enertech Consultants, nor any person acting on their behalf: (a) makes any warranty, express or implied, with respect to the use of any information, apparatus, method, or process disclosed in this report or that such use may not infringe privately owned rights; or (b) assumes any liabilities with respect to the use of or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

Prepared by
Enertech Consultants of Santa Clara, Inc.
Campbell, California

Comment Set PG, Attachment J, cont.

INTRODUCTION

Pacific Gas and Electric (PG&E) has proposed to construct a new 230 kV transmission line, entitled the "Jefferson – Martin" 230kV transmission line project. This new transmission line would supply power from the Jefferson Substation near Menlo Park to the Martin Substation in South San Francisco. As an alternative route to the proposed overhead/underground line, an entirely underground route has been considered. This report presents the power-frequency magnetic field computer modeling results for a portion of the alternative all-underground route of the proposed Jefferson – Martin 230 kV transmission line.

If the alternative all-underground route is adopted, the transmission line would begin at the Jefferson Substation in Menlo Park. The proposed all-underground line would be routed north along Canada Road until it intersects Skyline Boulevard. At this location, the proposed all-underground line would continue along Skyline Boulevard, crossing from the western side of Highway 280 to the eastern side at Haynes Road. The proposed all-underground line would continue north along Skyline Boulevard near existing residential areas until it reaches Trousdale Avenue. The proposed all-underground line would then be routed east along Trousdale Avenue until it reaches El Camino Real. At this intersection, the proposed all-underground line would continue north along El Camino Real until it joins the original proposed underground line route at the intersection of El Camino Real and San Bruno Avenue. The proposed underground line would then continue along the original proposed underground line route to Martin Substation Figure 1 presents a diagram of the proposed alternative all-underground transmission line route, along with a portion of the proposed underground line route.

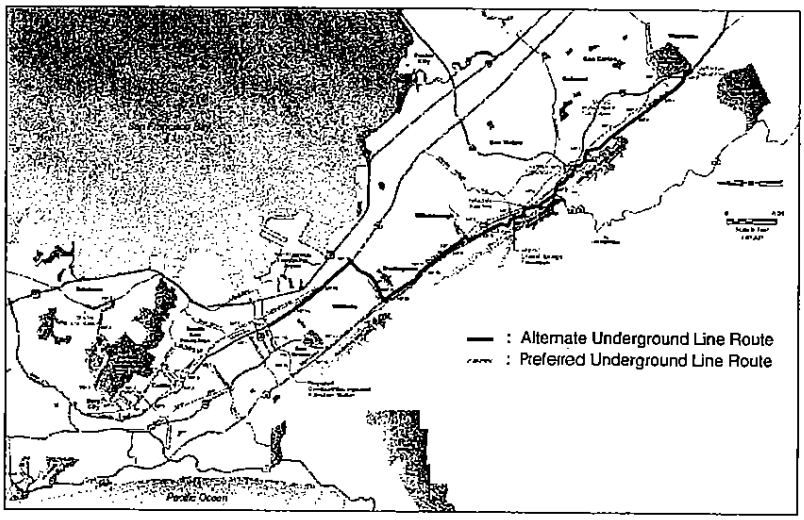


Figure 1. Diagram of Proposed Jefferson-Martin 230 kV Underground Transmission Line Route

1

Comment Set PG, Attachment J, cont.

DESCRIPTION OF MAGNETIC FIELD COMPUTER MODELING

Power-frequency magnetic field calculations for the proposed Jefferson-Martin 230 kV transmission line were performed using the computer software program entitled "The EMF Modeler". The EMF Modeler is a software program which was developed by EPRI and designed to calculate the magnetic fields from complex arrays of transmission lines, distribution lines, substation buswork, substation equipment, passive wire loops, or user-defined current-carrying line segments. This magnetic field modeling program contains several unique features, including three-dimensional modeling capabilities, multiple calculation grids and profiles, calculations accounting for uneven terrain, and multiple loading conditions. The magnetic field calculation results for the EMF Modeler software were used to generate the magnetic field contour maps included within this report.

The proposed alternative all-underground transmission line section passing in front of the school on Trousdale Avenue was modeled. In addition, magnetic field calculations were performed for four different projected loading conditions for the year 2006 :

1. Low : Load is Less 5% of the Year (49% of Peak) = 326 A
2. Medium : Load is Less 50% of the Year (69% of Peak) = 459 A
3. High : Load is Less 95% of the Year (90% of Peak) = 599 A
4. Peak : Highest Expected Loading of the Year (Normal Summer Peak) = 665 A

Loading and line geometry information was provided by PG&E.

DESCRIPTION OF TROUSDALE AVENUE SCHOOL SITE

A portion of the alternate Jefferson – Martin 230kV transmission line all-underground route is proposed to be routed along Trousdale Avenue near a public school. Figure 2 presents an aerial photo of Trousdale Avenue from Skyline Boulevard towards El Camino Real, where the alternative all-underground line route is proposed to be located. Figure 3 presents a more detailed aerial photo of the section of Trousdale Avenue with the school site. The proposed all-underground line was located near the center of Trousdale Avenue in the computer model (approximately 16-feet from the sidewalk opposite the school site). This report presents the graphical results of the power-frequency magnetic field computer modeling for a portion of the alternative underground line route along Trousdale Avenue near the school.

2

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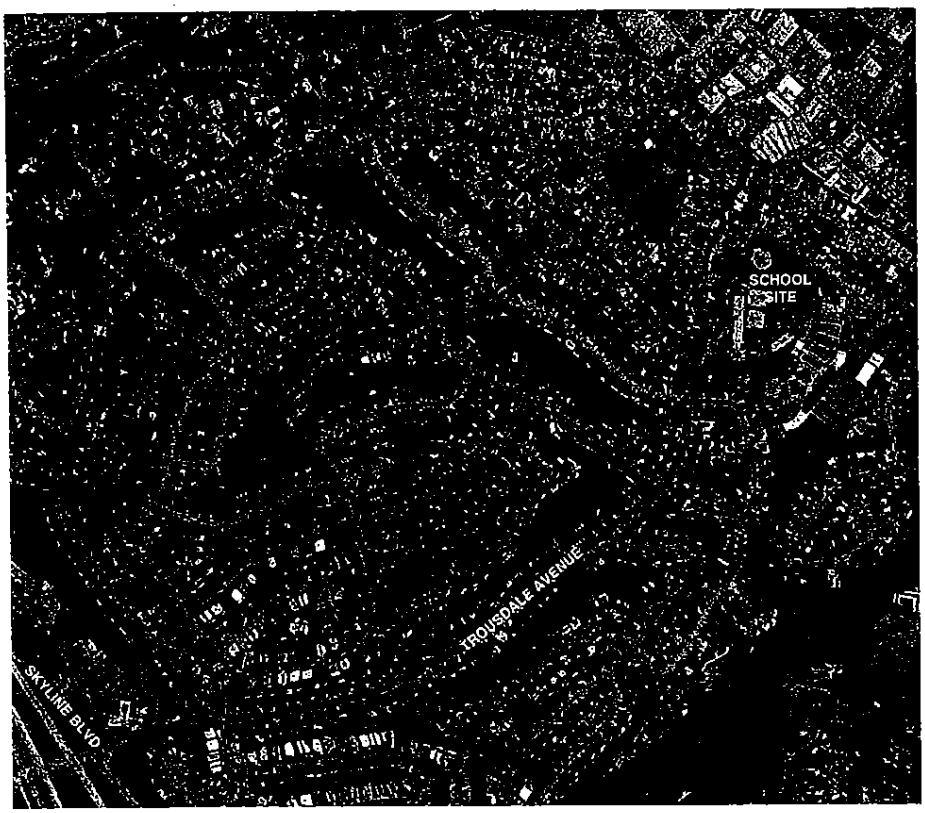

Figure 2. Aerial Photo of Trousdale Avenue (From Skyline Blvd. Towards El Camino Real)

3

Comment Set PG, Attachment J, cont.

Figure 3. Aerial Photo of Trousdale Avenue (School Site)

4

Comment Set PG, Attachment J, cont.

MODELING ASSUMPTIONS

Computer modeling of the proposed transmission line required several assumptions concerning line and building locations, as well as line configuration. The basic computer model for this area was created based upon aerial photographs. Distances to buildings and other structures were scaled from the aerial photos. In some circumstances, the building roofline (as shown in the aerial photos) may extend beyond the actual edge of the building, thereby locating the building closer to the proposed line route than the occupied building space.

The configuration of the underground 230 kV transmission line as modeled is provided in Figure 4. The configuration of the transmission line was assumed to be fixed and did not change configuration or depth below ground level along the entire line route. Locations for manholes and other facilities are unknown and were therefore not modeled. For each of the four loading conditions, the proposed 230 kV line was assumed to have a balanced load (with no unbalance or net currents). Only the proposed transmission line was modeled – no other existing electrical facilities were included within the computer models. Changes in loading and the presence of other existing electrical facilities can significantly influence the calculated magnetic field levels as presented within this report. Magnetic field calculations were performed at 1-meter (3.28-feet) above ground level. The proposed all-underground line was assumed to be located near the center of Trousdale Avenue in the computer model (approximately 16-feet from the sidewalk opposite the school site). Loading and line geometry information was provided by PG&E.

In most cases, the terrain was assumed to be flat. At those locations where the effects of terrain and elevation changes influenced the magnetic field calculation results at building locations, the elevations of the buildings with respect to the line location and elevation were included within the computer model.

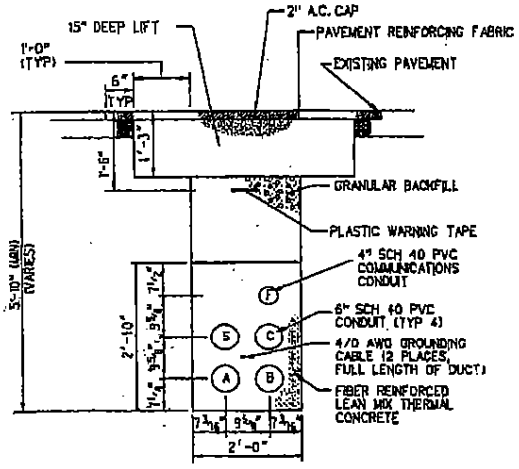

Figure 4. Diagram of Proposed 230 kV Underground Transmission Line Configuration

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MAGNETIC FIELD COMPUTER MODELING RESULTS AT SCHOOL SITE

This report presents the graphical results of the power-frequency magnetic field computer modeling for a portion of the alternative all-underground line route along Trousdale Avenue near the school. Figures 5 through 8 present the calculated magnetic field results as contour maps for four different loading conditions (Light, Medium, Heavy, and Normal Peak). Contour levels are shown for calculated magnetic field levels of 0.5, 1, 2, 3, 4, 5 and 10 mG. Only the two school buildings closest to the line were included in the computer model.

As shown in Figures 5 through 8, the calculated magnetic field at the edge of the closest school buildings is about 0.5 mG or less, even under Peak loadings conditions. Calculated magnetic field levels along the sidewalk area in front of the school range from about 1 mG to 4 mG, depending upon the loading condition.

6

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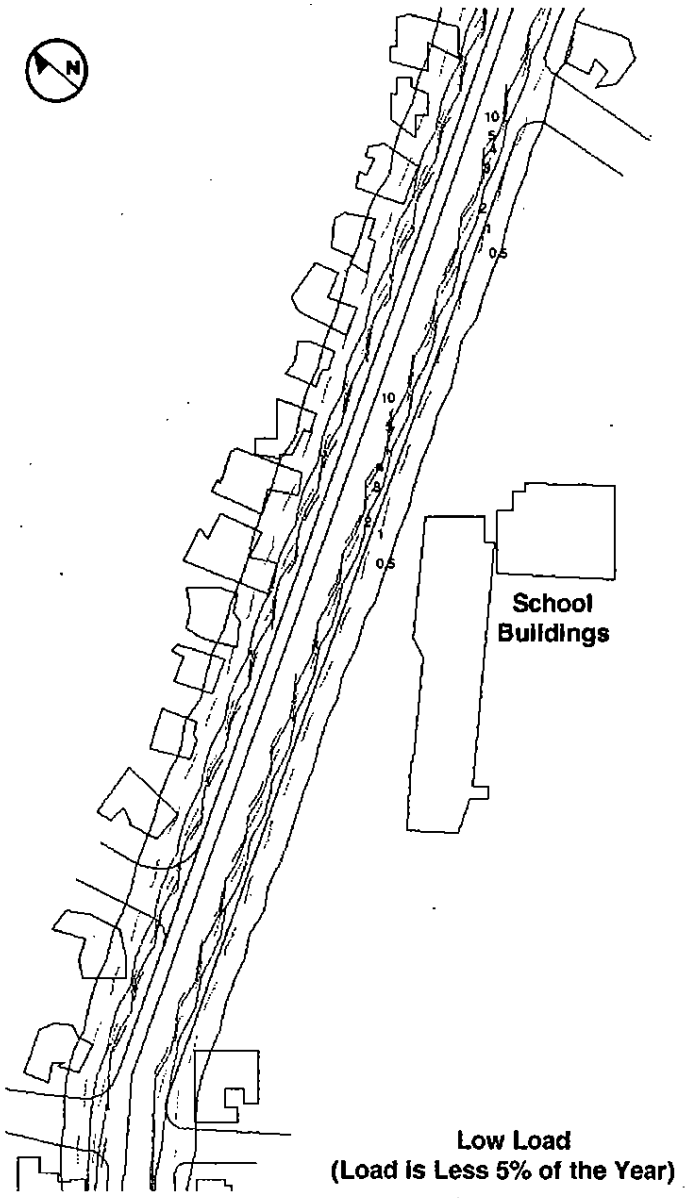

Figure 5. Calculated Magnetic Field Contour Map of Proposed Underground Line Along Trousdale Avenue Near School (Low Load)

7

Comment Set PG, Attachment J, cont.

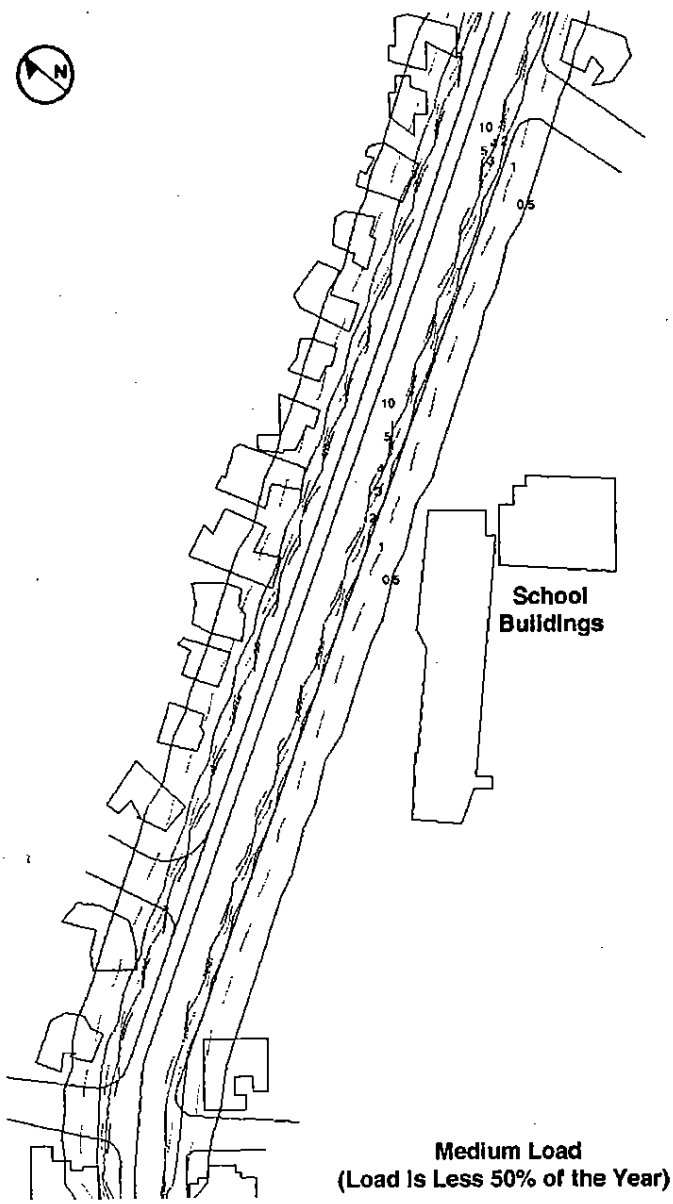

Figure 6. Calculated Magnetic Field Contour Map of Proposed Underground Line Along Trousdale Avenue Near School (Medium Load)

8

Comment Set PG, Attachment J, cont.

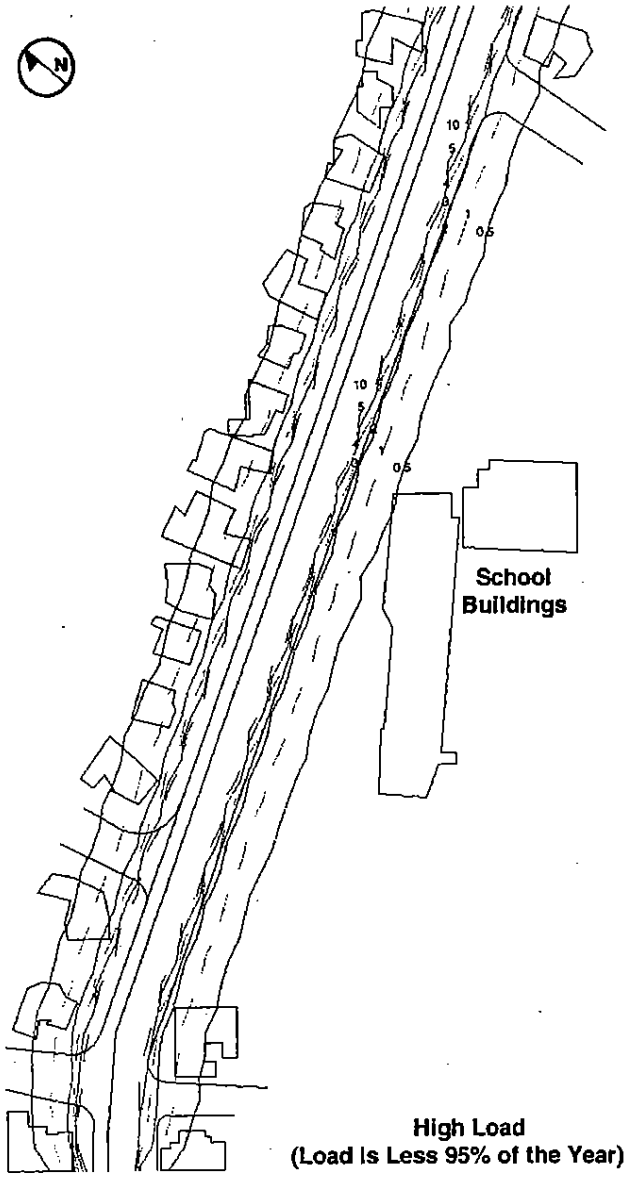

Figure 7. Calculated Magnetic Field Contour Map of Proposed Underground Line Along Trousdale Avenue Near School (High Load)

9

Comment Set PG, Attachment J, cont.

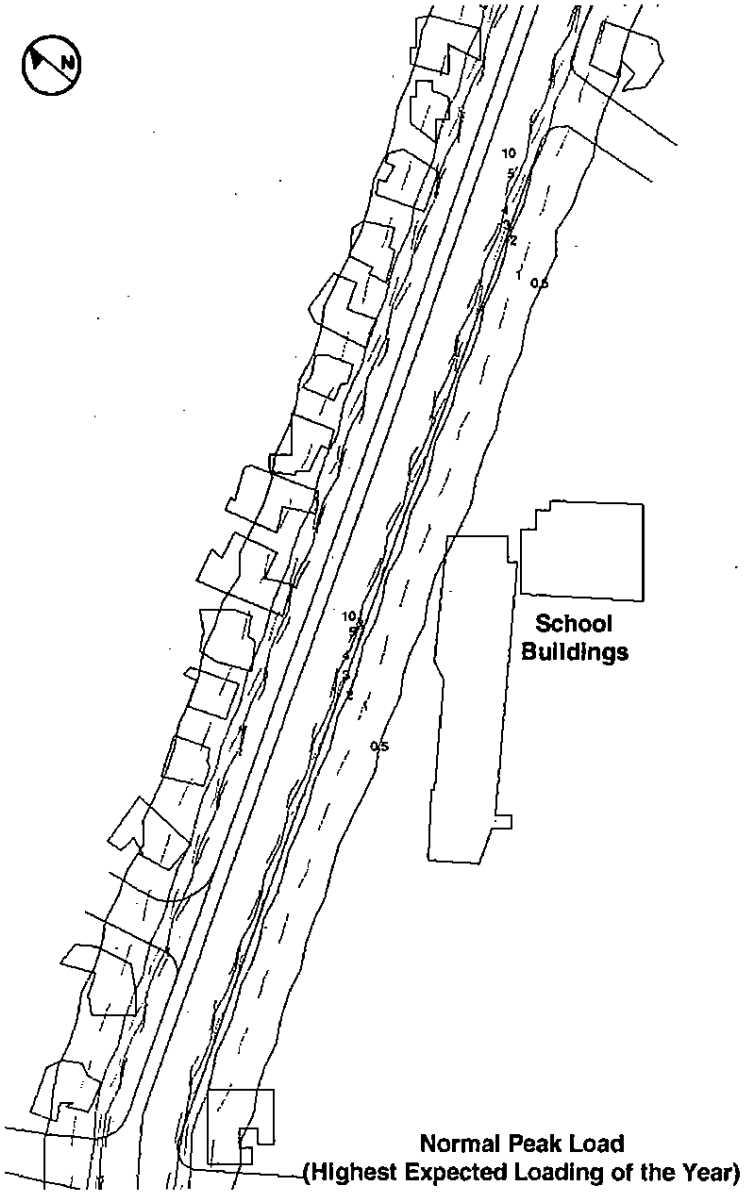

Figure 8. Calculated Magnetic Field Contour Map of Proposed Underground Line Along Trousdale Avenue Near School (Normal Peak Load)

10