4.10 NOISE

Potential noise sources associated with the Project include construction equipment and activities, as well as operational noise associated with pressure limiting regulators, valves, and pressure relief gas discharges. These operational facilities would be located at the proposed metering and pressure limiting/regulating stations. The pipeline itself, as well as most valves, would be underground, and would not create audible noise at nearby receptors.

4.10.1 Environmental Setting

Fundamentals of Environmental Sound and Noise

Sound can be described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the intensity of the pressure vibrations that make up a sound. The pitch of the sound is correlated to the frequency of the sound's pressure vibration. Because humans are not equally sensitive to a given sound level at all frequencies, a special scale has been devised that specifically relates noise to human sensitivity. The A-weighted decibel scale (dBA) does this by placing more importance on frequencies that are more noticeable to the human ear.

Noise is typically defined as unwanted sound. Typically, noise in any environment consists of a base of steady "background" noise made up of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from traffic on a major highway.

Several rating scales have been developed to analyze the adverse effect of noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the volume of the noise, as well as the time of day when the noise occurs. The scales that are applicable to this analysis are as follows:

- The equivalent energy noise level (L_{eq}) is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale

does not vary, regardless of whether the noise occurs during the day or the night;

- The Day-Night Average Level (L_{dn}) is a 24-hour average L_{eq} with a 10 dBA "weighting" added to noise between the hours of 10 p.m. to 7 a.m. to account for noise sensitivity in the nighttime;

- The maximum instantaneous noise level experienced during a given period of time is L_{max}; and

- Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels occurring between 7 a.m. and 10 p.m. and 10 decibels to sound levels between 10 p.m. and 7 a.m.

Noise caused by natural sources and human activities is usually well represented by median noise levels during the day, night, or over a 24-hour period. Environmental noise levels are generally considered low when the L_{eq} is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of settings with low daytime background noise levels are isolated, natural settings that can provide noise levels as low as 20 dBA and quiet, suburban, residential streets that can provide noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise settings in urban residential or semi-commercial areas are typically 55 to 60 dBA and in commercial locations are typically 60 dBA. For a continuous or steady source that emits the same noise level over a 24-hour period, the L_{dn} will be 6.4 dB greater than the L_{eq} (i.e., 50 dBA L_{eq} is equivalent to 56 dBA L_{dn}).

Noise levels from a particular source decline as distance from a receptor increases. Other factors, such as the weather and reflecting or shielding, also help intensify or reduce noise levels at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by approximately 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures; generally,

a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Fundamentals of Groundborne Vibration

Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The ground motion caused by vibration is measured in the United States as vibration decibels (VdB).

The background vibration velocity level in residential and educational areas is usually around 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for most people.

Most perceptible indoor vibration is caused by sources within buildings, such as the operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities can generate groundborne vibrations that can pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants.

Construction vibrations can be transient, random, or continuous. Transient construction vibrations occur from blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment.

Existing Conditions

The Project runs west to east, primarily across agricultural fields or along sparsely populated county roadways in Yolo, Sacramento, Sutter, and Placer counties.

Scattered rural residential uses exist along the roadways in the vicinity of the Project alignment. Most of the land uses along the proposed pipeline route are agricultural or rural residential, and the nearest roadways are lightly traveled west of SR-99. Ambient noise levels along most of the route are therefore expected to range from the quietest levels measured at County Road (CR) 17 to the levels observed at the Sacramento Metro Air Park (see discussion below under Noise Measurements). Ambient noise levels along the proposed route adjacent to Baseline Road are expected to be in the range of the levels measured near the intersection of Baseline Road and Fiddyment Road.

Yolo County

About ten homes are located within about 100 feet of the pipeline route along Yolo CR-17 between Interstate (I) 505 and I-5.

In Yolo County within the town of Yolo the closest school is an existing school with elementary through high school grades to the south of the Line 407 alignment. The existing Cache Creek High School is at the intersection of Clay Street and 2nd Street and is approximately 0.77 mile south of the pipeline alignment and 0.8 mile southeast of the proposed Yolo Junction Pressure Limiting Station (YJS) along Line 172A.

Another sensitive receptor, the Yolo Branch Library, is in the town of Yolo at the intersection of Sacramento Street and 2nd Street, and is approximately 0.66 mile south of the Project area and 0.72 mile southwest of the proposed Yolo Junction Pressure Limiting Station. Approximately 17 residences in the Yolo vicinity are located in close proximity (150 feet or less) to the Project area. The nearest residence to the YJS is approximately 2,100 feet to the south-southeast.

There are seven proposed horizontal direction drill (HDD) segments in Yolo County and there are three residences that occur within 1,000 feet of an HDD pad (near I-505, I-5, and State Route [SR] 113). The main line bridle valves and blow-off stacks would be installed at the west end of Line 406 where it meets Lines 400 and 401. The nearest residences to these pipeline appurtenances are approximately 1 mile to the northeast and southeast.

Further west of the town of Yolo, two schools are approximately 0.9 mile south of the Line 407 route. The Laugenour School site is on the west side of SR-113 to the north of Cache Creek. The Laugenour School is historic and no longer used, but now houses the Future Farmers of American (FFA) and Agriculture programs of the

Woodland and Pioneer High Schools (not in the Project area). Other schools in Yolo County are more than 1 mile from the Project area.

Sacramento County

The portion of the pipeline located in Sacramento County is limited to approximately 2.5 miles of the Powerline Road DFM. There are no sensitive receptors in the vicinity of the Project in Sacramento County.

Sutter County

There are scattered residences along the portion of the pipeline that traverses Sutter County. Two residences on Riego Road (just past Powerline Road and at the corner of Pacific Avenue) are within 50 feet of the Project construction ROW.

Placer County

In Placer County, the nearest sensitive receptors are two schools. The Alpha School (historical) is approximately 0.5 mile north of Line 407 along Baseline Road, and the Coyote Ridge Elementary School is approximately 0.4 mile north-northeast of the eastern terminus of Line 407 at the intersection of Baseline Road and Fiddyment Road.

The proposed Baseline Road Pressure Regulating Station (BRS) would be located on Baseline Road between Walerga Road and Fiddyment Road, within the City of Roseville's sphere of influence. This site is currently undeveloped, but is adjacent to existing suburban residential development to the east and south. Future development is planned under the Sierra Vista Specific Plan and the nearby Placer Vineyards Specific Plan.

Noise Measurements

Ambient noise measurements were conducted in three locations along the pipeline route. A continuous 24-hour noise measurement was conducted at 32865 Yolo CR-17. Short-term (15-minute) noise samples were collected at two locations: near the proposed Powerline Road Pressure Regulating Station (PRS) / Metro Air Park, and near the proposed BRS. Figures 4.10-1a, 4.10-1b, and 4.10-1c show the locations of the ambient noise measurement sites.

The continuous noise measurement site at 32865 CR-17 was selected to be representative of the quietest rural residential areas that could be impacted by Project-related noise. This site is in the Dunnigan Hills approximately midway

between I-5 and I-505, and is shielded from freeway traffic noise by topography. The site is adjacent to CR-17, which experiences very little traffic, as the house at 32865 CR-17 is located at the end of the paved road. Ambient noise sources primarily consist of the wind in trees, insect sounds and bird vocalizations, and occasional traffic. Although no aboveground Project-related equipment would be located near this site, construction would occur immediately in front of the house.

The 24-hour noise measurements were performed August 18 and 19, 2008. The results are summarized in Table 4.10-1, and are portrayed graphically in Appendix I. The noise environment at this location may be described as very quiet, especially during daytime hours. The elevated sound levels at night were apparently caused by birds and insects in the adjacent vegetation. Other homes in rural environments could be exposed to ambient noise levels in this range, though increased proximity to major roadways would result in higher background noise levels (represented by the L_{90} values). In general, the noise environment in the vicinity of the rural residences near the proposed pipeline route and aboveground facilities would be considered to be very quiet.

Table 4.10-1: Measured Noise Levels - 32865 County Road 17, August 18 to 19, 2008

Date	Time	Hourly Sound Level, dB			
		L_{eq}	L_{max}	L_{50}	L_{90}
August 18, 2008	1300	44.1	71.8	36.7	30.6
	1400	49.5	72.1	41.3	34.5
	1500	48.7	69.4	41.9	35.6
	1600	43.5	69.0	36.8	33.3
	1700	46.1	64.9	39.6	34.1
	1800	44.0	59.5	39.4	33.0
	1900	43.2	65.3	39.1	32.2
	2000	52.0	67.1	46.7	42.0
	2100	51.9	65.1	50.3	45.5
	2200	57.6	70.9	55.2	49.2
	2200	54.4	70.8	50.6	39.0
	2300	49.2	67.6	47.1	40.5

Date	Time	Hourly Sound Level, dB			
		L_{eq}	L_{max}	L_{50}	L_{90}
August 19, 2008	0000	52.9	57.1	52.6	47.7
	0100	53.8	57.6	53.9	50.1
	0200	54.1	58.5	53.7	51.1
	0300	52.0	57.3	51.4	48.5
	0400	51.5	56.9	51.5	44.7
	0500	41.1	60.4	36.5	34.3
	0600	37.3	48.1	36.4	34.6
	0700	45.1	65.6	39.1	37.1
	0800	44.3	65.1	37.0	33.3
	0900	46.1	73.5	33.4	29.6
	1000	37.2	57.9	27.6	24.3
	1100	44.2	75.8	27.6	23.9
	1200	44.1	71.8	36.7	30.6
Source: Brown-Buntin Associates, Inc. 2008.					

The proposed PRS / Sacramento Metro Air Park site was selected for ambient noise measurements because the aboveground equipment that would be located in that vicinity could produce audible noise, and because there is the potential for development of moderately sensitive light industrial land uses nearby. The area is currently used for agriculture, and the site is located adjacent to Runway 18L/36R at Sacramento International Airport. Two 15-minute noise measurements were performed on August 7, 2008. The data are summarized in Table 4.10-2. This site is currently affected by local noise sources, and is expected to experience increased ambient traffic noise exposure as the Air Park is developed.

Table 4.10-2: Measured Noise Levels - Short-Term Sample Sites, August 7, 2008

Location	Time	15-Minute Sound Level, dB			
		L_{eq}	L_{max}	L50	L90
Powerline Road and Elverta Road	15:16:15	59.5	74.10	50.3	42.7
	21:59:40	49.4	60.9	45.6	39.8

Location	Time	15-Minute Sound Level, dB			
		L_{eq}	L_{max}	L50	L90
Baseline Road and Fiddyment Road	16:05:00	49.5	62.2	46.9	43.9
	22:35:41	59.4	76.4	47.2	43.3
Source: Brown-Buntin Associates, Inc. 2008.					

The Baseline Road measurement site was selected to represent ambient noise levels at the existing homes near Baseline Road and Fiddyment Road. It was not possible to gain access to the proposed BRS site, so a representative location was selected on the south side of Baseline Road, south of the proposed BRS. Background noise levels were caused by traffic on both Baseline Road and Fiddyment Road; the highest noise levels were due to loud individual vehicles on Baseline Road. Two 15-minute noise measurements were performed on August 7, 2008. The data are summarized in Table 4.10-2. This site is currently affected by local traffic noise sources, and is expected to experience increased traffic noise exposure as new residential development occurs in the immediate vicinity.

4.10.2 Regulatory Setting

Federal

There are no specific Federal regulations for noise produced by local land use projects. However, the Federal government applies guidelines for acceptable noise levels at residential projects that qualify for federal funding support (such as U.S. Department of Housing & Urban Development Housing [HUD] financed multi-family development projects) that are generally in the range of 55 dB L_{dn} to 65 dB L_{dn}, based upon the recommendations contained in the U.S. EPA “Levels Document” and upon the 65 dB L_{dn} criterion applied by the U.S. Department of Housing and Urban Development and other federal agencies.

Source: Adapted from Brown-Buntin Associates, Inc. 2008.

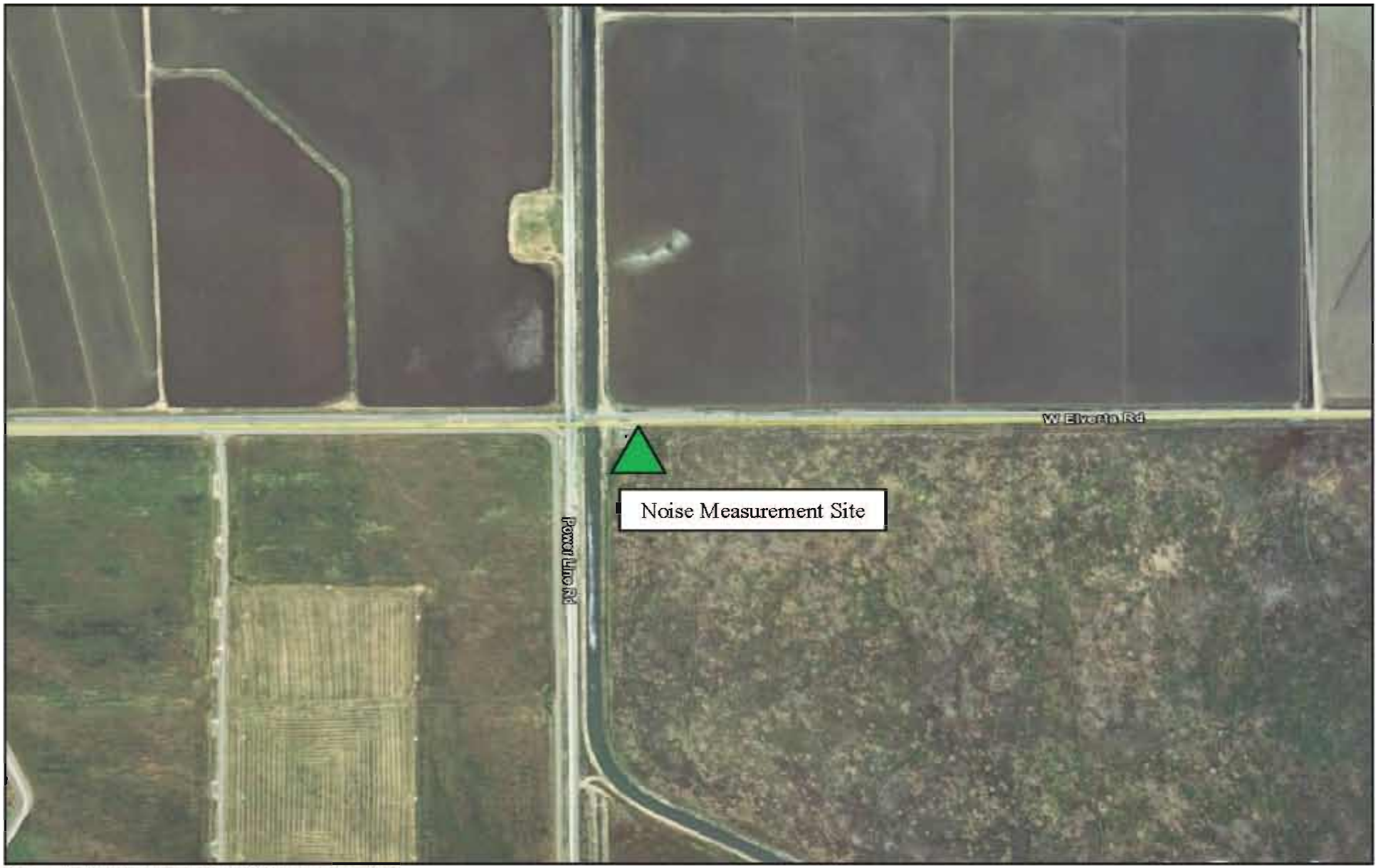
NORTH

NOT TO SCALE

Michael Brandman Associates

23440005 • 09/2008 | 4.10-1A_CR 17.pdf

Figure 4.10-1A
24-Hour Noise Measurement
32865 County Road 17, Yolo County



Source: Adapted from Brown-Buntin Associates, Inc. 2008.

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Michael Brandman Associates

23440005 • 09/2008 | 4.10-1B_Powerline_Elverta.pdf

Figure 4.10-1B
Short-Term Noise Measurement
Powerline Road and Elverta Road, Sacramento County

Source: Adapted from Brown-Buntin Associates, Inc. 2008.

NORTH

NOT TO SCALE

Michael Brandman Associates

23440005 • 09/2008 | 4.10-1C_Baseline_Fiddyment.pdf

Figure 4.10-1C
Short-Term Noise Measurement
Baseline Road and Fiddyment Road, Placer County

These criteria are typically applied to noise from transportation noise sources, but may be used to assess the compatibility of other noise sources relative to residential land uses, provided that consideration is given to potential disturbances due to impulsive sound, tonal content (whistles, music, etc.), and the prevalence of nighttime activities.

State

There are no specific State regulations for noise produced by local land use projects. The State Office of Planning and Research (OPR) has prepared guidelines for preparation of the Noise Element of the General Plan for cities and counties in California that are similar in concept to the EPA and HUD recommendations, but it is the responsibility of local governments to adopt Noise Element standards that are suited to their individual situations.

Local

The proposed pipeline Project would pass through or be adjacent to five local governmental jurisdictions: Yolo County, Sutter County, Sacramento County, Placer County, and the City of Roseville.

Yolo County General Plan

There are no quantitative noise standards for new projects in the Yolo County General Plan. The Yolo County General Plan is currently being updated and the draft for public comment was released in September 2008. However, the current (1983) General Plan contains the following general policies directed toward ensuring compatible land uses relative to noise:

Policy N 1: Noise, Basic. Yolo County shall regulate, educate, and cooperate to reduce excessive noise levels within the environment and particularly those noise levels that impinge upon the home environment.

Policy N 2: Noise/Land Use. Yolo County shall regulate the location and operation of land uses to avoid or mitigate harmful or nuisance levels of noise.

Policy N 3: Noise, Prevent and Control. Noise shall be prevented, avoided, and suppressed by controlling noises at the source, providing barriers or buffers, by the implementation of a noise ordinance and by means of wise land use planning and implementation.

Policy N 4: Noise Ordinance. Yolo County shall adopt a comprehensive Noise Ordinance.

Policy N 5: Development Review. Yolo County shall review all new development and redevelopment in terms of the Standards of Noise Avoidance or Control.

Policy N 6: Basic Compatibility. Yolo County will review all new developments, public and private, for noise compatibility with surrounding uses to protect the occupants of nearby lands from undesirable noise levels and shall discourage new residential development in areas subject to legal, long term, excessive noise.

Policy N 7: Development Control/Noise. Yolo County shall review development plans for noise compatibility of the proposed use with the surrounding uses and planned uses, and shall incorporate noise reduction, avoidance, or mitigation techniques as necessary. In addition to other ordinances, standards, or devices, the following may be used to accomplish these policies:

- Provide open space, berms or walls, or landscaped areas between occupied dwellings and noise generators.
- Require specific plans, subdivision maps, or zoning standards to require deep lots in order to locate dwellings farthest from noise generators.
- Require effective sound barriers for new residential developments adjacent to existing freeways and highways.

The Yolo County Code does not have any standards directly related to construction or operational noise.

Sutter County General Plan

According to the Sutter County General Plan, there are very few existing noise conflicts in unincorporated Sutter County and most of these are from mobile sources (e.g., motor vehicles, aircraft, and trains). The general plan establishes land use compatibility guidelines for noise-sensitive uses for operational noises from non-transportation sources (see Table 4.10-3). There are no noise-specific municipal codes for construction noise in Sutter County. Table 4.10-4 provides land-use compatibility guidelines for various land uses for new noise-sensitive developments and provides an indication of acceptable noise levels related to operational noise for different land uses.

Table 4.10-3: On-Site Sound-Level Standards for Sensitive Receptors - Sutter County

Sound-level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly equivalent energy noise level	50	45
Maximum level, decibels	70	65
Source: Sutter County General Plan 1996.		

Table 4.10-4: Land Use Compatibility Noise-Level Guidelines for Development - Sutter County

Land Use Category[1]		Community Noise Exposure L_{dn}/CNEL, dB[2]						
		55	60	65	70	75	80	
Residential, theaters, meeting halls, churches, auditoriums	A							
	CA							
	U							
Transient lodging, motels, hotels	A							
	CA							
	U							
Schools, libraries, hospitals, child care, museums	A							
	CA							
	U							
Playgrounds, neighborhood parks, Amphitheaters	A							
	CA							
	U							
Office buildings, business, commercial, and professional	A							
	CA							
	U							

		Community Noise Exposure L_{dn}/CNEL, dB[2]						
Industrial, utilities, manufacturing, agriculture	A							
	CA							
	U							
Golf courses, riding stables, outdoor spectator sports	A							
	CA							
	U							

Notes:
1 A=Acceptable; CA=Conditionally Acceptable; U=Unacceptable
2 L_{dn}=Day-Night Average Level; CNEL=Community Noise Equivalent Level; dB=Decibel
Source: Sutter County General Plan 1996.

Sacramento County General Plan

Policies NO-1 and NO-2 of the Sacramento County General Plan Noise Element govern the amount of noise a new project can generate, as measured at existing and proposed noise-sensitive land uses. The Noise Element policies of Sacramento County are consistent with the County Noise Control Ordinance (Sacramento County Code, Chapter 6.68). Therefore, satisfaction of the Noise Element policies would also ensure satisfaction of the County Noise Control Ordinance standards.

Policies NO-1 and NO-2 of the County Noise Element are listed below. Policy NO-1 would pertain to any Project-related traffic noise, while Policy NO-2 would apply to on-site activities.

Policy NO-1. Noise created by new transportation noise sources should be mitigated so as not to exceed 60 dB L_{dn}/CNEL at the outdoor activity areas of any affected residential lands or land use situated in the unincorporated areas. When a practical application of the best available noise-reduction technology cannot achieve the 60 dB L_{dn}/CNEL standard, then an exterior noise level of 65 dB L_{dn}/CNEL may be allowed in outdoor activity areas.

For the purposes of the Noise Element, transportation noise sources are defined as traffic on public roadways and railroad line operations. Control of noise from these sources is preempted by Federal and State regulations. Other noise sources are presumed to be subject to local regulations, such as the Sacramento County Noise

Control Ordinance. Areas affected by public use airport noise are subject to the Airport Land Use section and individual Comprehensive Land Use Policy.

The Noise Element further indicates that a community noise environment of up to 70 dB L_{dn} is acceptable for agricultural lands.

Policy NO-2. Noise created by new non-transportation noise sources shall be mitigated so as not to exceed any of the noise level standards of Table 4.10-5, as measured immediately within the property line of any affected residentially designated lands or residential land use situated in the unincorporated areas.

Table 4.10-5: Noise Level Performance Standards for Residential Uses Affected by Non-Transportation - Sacramento County

Statistical Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
L_{50}	50 dBA	45 dBA
L_{max}	70 dBA	65 dBA

Notes:
These standards are for planning purposes only and may vary from the standards of the County Noise Ordinance which are for enforcement purposes.
These standards apply to new or existing residential areas affected by new or existing non-transportation sources.
Source: Sacramento County General Plan 1993.

Placer County General Plan

The Noise Element of the Placer County General Plan includes the following standards (Table 4.10-6) that are applicable to operational noise associated with new projects.

The Placer County Municipal Code (Chapter 9 Public Peace, Safety, and Welfare) includes an article that pertains to noise (Article 9.36). In this article, sensitive noise receptors are defined as “land uses in which there is a reasonable degree of sensitivity to noise. Such uses include single-family and multi-family residential uses, frequently used outbuildings, schools, hospitals, churches, rest homes, cemeteries, public libraries, and other sensitive uses as determined by the enforcement officer.” The sound level standards for operational noise for sensitive receptors are summarized in Table 4.10-7.

Noise from construction activities is considered exempt from Article 9.36 provided the noise occurs between the hours of 6 a.m. and 8 p.m. Monday though Friday and

between the hours of 8 a.m. and 8 p.m. on Saturday and Sunday. For this exemption to be valid, all construction equipment must be fitted with a factory-installed muffling device and maintained in good working order.

Table 4.10-6: Allowable L_{dn} Noise Levels within Specified Zone District[1] - Placer County

Zone District of Receptor	Property Line of Receiving Use	Interior Spaces[2]
Residential Adjacent to Industrial[3]	60	45
Other Residential[4]	50	45
Office/Professional	70	45
Transient Lodging	65	45
Neighborhood Commercial	70	45
General Commercial	70	45
Heavy Commercial	75	45
Limited Industrial	75	45
Highway Service	75	45
Shopping Center	70	45
Industrial	—	45
Industrial Park	75	45
Industrial Reserve	—	—
Airport	—	45
Unclassified	—	—
Farm	(see footnote 5)	—
Agricultural Exclusive	(see footnote 5)	—
Forestry	—	—
Timberland Reserve	—	—
Recreation and Forestry	70	—
Open Space	—	—
Mineral Reserve	—	—

Notes:
1. Overriding policy on interpretation of allowable noise levels: Industries operating upon industrial zoned properties must be afforded reasonable opportunity to exercise the rights/privileges conferred upon them by their zoning. Whenever the allowable noise levels herein fall subject to interpretation relative to industrial activities, the benefit of a doubt shall be afforded to the industrial use.

Zone District of Receptor	Property Line of Receiving Use	Interior Spaces[2]
2. Interior spaces are defined as any locations where some degree of noise-sensitivity exists. Examples include all habitable rooms of residences, and areas where communication and speech intelligibility are essential, such as classrooms and offices. 3. In recognition of the fact that noise mitigation from industrial operations may be difficult or costly, the exterior noise standards for residential zone districts immediately adjacent to industry-related zone districts have been increased by 10 decibels as compared to residential districts adjacent to other land uses. 4. Where a residential zone district is located within an -SP combining district, the exterior noise-level standards are applied at the outer boundary of the -SP district. If an existing industrial operation within an -0SP district is expanded or modified, the noise-levels standards at the outer boundary of the -SP district may be increased. 5. Normally, agricultural uses are noise insensitive and will be treated this way. However, conflicts with agricultural noise emissions can occur where single-family residences exist within agricultural zone districts. Therefore, where effects of agricultural noise upon residences located in these agricultural zones are a concern, a Day-Night Average Level of 70 A-weighted decibels will be considered acceptable outdoor exposure at a residence. Source: Buntin Associates June 2002, Placer County General Plan 1994.		

Table 4.10-7: On-Site Sound Level Standards for Sensitive Receptors - Placer County

Sound-Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Equivalent Energy Noise Level	55	45
Maximum Level, decibels	70	65
Source: Placer County General Plan 1994.		

The Placer County Municipal Code prohibits any person at any location from creating sound, or allowing the creation of any sound, on property owned, leased, occupied, or otherwise controlled by such person that:

- Causes the exterior sound level when measured on the property line of any affected sensitive receptor to exceed the ambient sound level by 5 dBA; or
- Exceeds the sound-level standards as set forth in Table 4.10-7, whichever is greater.

Placer County allows exceptions for the provisions of this article and the notice of that request for exception must be given to all the properties that would be affected by the exception. Factors considered for construction-related exceptions include but are not limited to the following:

- Conformance with the intent of Article 9.36;
- Uses of the property and existence of sensitive receptors within the area affected by sound;
- Factors related to initiating and completing all remedial work;
- The time of the day or night the exception will occur;
- The duration of the exception; and
- The general public interest, welfare, and safety.

City of Roseville General Plan

The Noise Element of the City of Roseville General Plan establishes an exterior noise level standard of 60 dB L_{dn} (or CNEL) at the outdoor activity areas of new residential uses affected by transportation noise sources. An exterior noise level of up to 65 dB L_{dn} is considered to be Conditionally Acceptable, and may be allowed only after a detailed acoustical analysis is performed and needed noise abatement features are included in the design. The outdoor activity areas for residential developments are considered to be the back yard patios or decks of single-family dwellings. For multi-family residential units, the outdoor activity area is the common area where people generally congregate. The Noise Element also establishes an interior noise level standard of 45 dB L_{dn} for residential uses. Table 4.10-8 below from the City of Roseville Noise Element contains performance standards for non-transportation noise sources.

Table 4.10-8: Performance Standards for Non-transportation Noise Sources or Projects Affected by Non-Transportation Noise Sources - City of Roseville

Noise-Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65

Notes:
Performance standards are measured at the property line of noise-sensitive uses.
Each of the noise levels specified above should be lowered by five dB for simple tone noises, noises generally consisting primarily of speech or music, or for recurring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints.
These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwelling).
No standards have been included for interior noise levels. Standard construction practices should, with exterior noise levels identified, result in acceptable interior noise levels.
Source: City of Roseville General Plan 2004.

Chapter 9.24 of the Roseville Municipal Code is the City's noise ordinance. Section 9.24.030 of the Code provides an exemption from the City Noise Ordinance for: "G. Private construction (e.g., construction, alteration or repair activities) between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, and between the hours of 8:00 a.m. and 8:00 p.m. Saturday and Sunday; provided, however, that all construction equipment shall be fitted with factory installed muffling devices and that all construction equipment shall be maintained in good working order."

Vibration Level Criteria

The vibration assessment methodology and criteria used for this Project were derived in part from Federal Transit Administration (FTA) recommendations. The FTA criteria for ground-borne vibration are expressed in terms of the "vibration velocity level," in VdB, with a reference velocity of 10-6 in/sec.

The threshold of vibration perception is taken by the FTA to be 65 VdB, and the threshold of potential architectural damage to fragile structures is about 100 VdB. For residential uses, vibration levels less than 72 VdB are considered acceptable for exposures to more than 70 vibration events per day, and vibration levels less than 80 VdB are considered acceptable for exposures to fewer than 30 vibration events per day.

The State of California Department of Transportation (Caltrans) has prepared guidelines for acceptable vibration limits in terms of the induced peak particle velocity (PPV). Tables 4.10-9 and 4.10-10 show the guidelines from the Caltrans Transportation- and Construction-induced Vibration Guidance Manual:

Table 4.10-9: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	-.12	0.08
Fragile Buildings	0.20	0.10
Historic and Some Old Buildings	0.50	0.25
Older Residential Structures	0.50	0.30
New Residential Structures	1.00	0.50
Modern Industrial/Commercial Building	2.00	0.50

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Source: Jones & Stokes, 2004. Transportation and Construction-Induced Vibration Guidance Manual. June. (J&S 02-039.) Sacramento, CA. Prepared for California Department of Transportation, Noise, Vibration, and Hazardous Waste Management Office, Sacramento, CA.		

Table 4.10-10: Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.90	0.10
Severe	2.00	0.40
Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Source: Jones & Stokes. 2004. Transportation and Construction-Induced Vibration Guidance Manual. June. (J&S 02-039.) Sacramento, CA. Prepared for California Department of Transportation, Noise, Vibration, and Hazardous Waste Management Office, Sacramento, CA.		

Measures of Changes in Ambient Noise Levels

For non-transportation noise sources affecting noise sensitive land uses, many jurisdictions consider an increase in ambient noise levels of 5 dB to be potentially significant. This amount of change in environmental noise levels is generally considered to be the minimum required to be clearly noticeable by most people. This measure may be applied to median or energy-average ambient noise levels, whichever is a better measure of potential annoyance in the noise environment.

Some additional guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON findings are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by

the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON findings is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn} or CNEL. The changes in noise exposure that are shown in Table 4.10-11 are expected to result in equal changes in annoyance at sensitive land uses.

Table 4.10-11: Potentially Significant Increases in Cumulative Noise Exposure for Transportation Noise Sources

Ambient Noise Level Without Project (L_{dn} or CNEL)	Maximum PPV (in/sec)
	Change in Ambient Noise Level Due to Project
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more
Source: Federal Interagency Committee on Noise (FICON 1992), as applied by Brown-Buntin Associates Inc.	

4.10.3 Significance Criteria

A noise impact is considered significant and would require mitigation if:

1. Noise levels from Project construction exceed criteria defined in a construction noise ordinance or general plan of the local jurisdiction in which the activity occurs;

2. Noise levels from Project operations exceed criteria defined in a noise ordinance or general plan of the local jurisdiction in which the activity occurs;

3. Noise levels from Project operations result in a substantial permanent increase in noise levels;

4. Groundborne vibrations or groundborne noise from Project activities would have substantial direct or indirect effects on persons or structures; or

5. For a Project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport,

expose people residing or working in the Project area to excessive noise levels. For a Project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

4.10.4 Applicant Proposed Measures

Applicant Proposed Measures (APMs) have been identified by PG&E in its Environmental Analysis prepared for the CSLC. APMs that are relevant to this Section are presented below. This impact analysis assumes that all APMs would be implemented as defined below. Additional mitigation measures are recommended in this Section if it is determined that APMs do not fully mitigate the impacts for which they are presented.

APM NOI-1. PG&E will limit construction activities to daytime hours whenever possible and will apply noise control best management practices to minimize adverse noise impacts to nearby residences or other sensitive receptor land uses. These provisions would be applicable to construction activities in the vicinity of residences, as no other noise-sensitive uses have been identified along the proposed pipeline route.

APM NOI-2. PG&E will coordinate drilling activities where residents may live within 1,000 feet of the HDD temporary-use areas if construction is scheduled to occur between 8 p.m. and 6 a.m.

4.10.5 Impact Analysis and Mitigation

Impact Discussion

Permanent Noise Level Increase

The Project would install approximately 40 miles of underground 30-inch-diameter natural gas transmission pipeline in Yolo, Sutter, Sacramento, and Placer counties.

Movement of the natural gas through the pipeline would not create any noticeable groundborne vibration or noise. Consequently, no groundborne vibration or groundborne noise from Project operation would affect nearby sensitive receptors.

However, permanent noise from the Project would result from the construction of six aboveground facilities described below:

- The Capay Metering Station (CMS) would be constructed at the connection of Lines 400 and 401 and Line 406, and would consist of just under 1 acre and have sides measuring approximately 134 feet, 142 feet, 209 feet, and 285 feet in length. The CMS would be no greater than 10 feet in height. Access would be provided from an existing dirt road that connects with CR-85 to the east. The Capay Station, depicted on Figure 2-3, would be fitted with an aboveground spool and blind flange to accept a portable pig launcher.

- The Yolo Junction Pressure Limiting Station (YJS) would be constructed at the connection of Line 406 and Line 172A near I-5, and would cover an area of approximately 100 feet by 127 feet (12,700 square feet or 0.29 acres). The YJS would be no greater than 5 feet in height. As shown on Figure 2-3, access would be provided by an unnamed farm road from CR-97 on the west;

- The Powerline Road Main Line Valve (PRV) would be constructed at the connection of Line 407 and the 10-inch DFM and would be installed within a yard measuring approximately 100 feet by 100 feet (10,000 square feet or 0.23 acres) at the intersection of Riego Road and Powerline Road. The PRV would also house the Riego Road Regulating Station (RRS), which would regulate gas pressure from Line 407 into the DFM, and would be no greater than 10 feet in height. The facility would include a main line valve, blowdown facilities, pressure regulating equipment, pressure transmitters, gas flow meter, SCACD/telecom equipments, and cathodic protection equipment. As shown in Figures 2-4, 2-5, and 2-6, access would be provided from an existing dirt road that connects with Riego Road to the south;

- The Powerline Road Pressure Regulating Station (PRS) would be constructed at the southern terminus of the DFM at the southeastern corner of Powerline Road and West Elverta Road. The PRS would regulate gas from the DFM into the local 60-psig distribution system. It would be constructed in an area measuring approximately 40 feet by 102 feet (4,080 square feet or 0.09 acres), would be no greater than 10 feet in height, and would include pressure regulating equipment, gas filtration equipment, and SCADA/telecom equipment. As shown in Figure 2-6, access would be provided directly from West Elverta Road;

- The Baseline/Brewer Road Main Line Valve Station (MLV) would be constructed approximately 250 feet west of Brewer Road along baseline Road. The main line valve is a manually-operated 24 inch ball valve with a high head extension. The MLV would require a permanent easement are of approximately 50 feet by

50 feet (2,500 square feet or 0.06 acres). The MLV would be fenced and include two 10 inch blow-off valves located on each side of the MLV; and

- The Baseline Road Pressure Regulating Station (BRS) would be constructed at the connection of Line 407 and Line 123 on the north side of Baseline Road near Walerga Road/Fiddyment Road. The BRS structure would be no greater than 10 feet in height and would require a permanent easement area of approximately 84 feet by 145 feet (12,180 square feet or 0.28 acres). It would regulate gas from Line 407 into Line 123 and would include a main line valve, blowdown facilities, pressure regulating equipment, pressure transmitters, gas flow meter, SCACD/telecom equipments, and cathodic protection equipment. The BRS would be fitted with an aboveground spool and blind flange to accept a portable pig receiver. Access would be provided directly from Baseline Road (Figure 2-5).

There are no existing sensitive receptors located close to the proposed CMS, PRV or PRS. It does not appear that any noise sensitive development would occur in the vicinity of the proposed CMS, which is surrounded by agricultural land uses. In the vicinity of the proposed PRV and PRS facilities, it is expected that future development would introduce industrial land uses, which would generate noise due to industrial activities and traffic.

There is an existing residence within 1,000 feet of the proposed YJS. Single family homes are adjacent to the proposed MLV site, and it is likely that the lands immediately adjacent to that site will ultimately be developed with residential uses.

The MLV would be located relatively close to existing residences on South Brewer Road north of Baseline Road. Field investigations revealed that the nearest residence, about 160 feet from Baseline Road in the northeast quadrant of the intersection, is burned out and abandoned. Another residence is located about 500 feet north of Baseline Road.

The BRS would be located about 750 feet from existing residences at the northeast, southeast and southwest quadrants of the intersection of Baseline and Fiddyment/Walerga Roads. Residents in the northeast quadrant of the intersection are located within Roseville's city limits. Residents in the southeast and southwest quadrants are located in Placer County.

Aboveground facilities are designed to have the control valves and piping buried underground. To characterize the noise levels associated with the proposed stations, noise measurements and visual observations were performed on the morning of July 14, 2008, at a similar facility in San Joaquin County, the PG&E Bixler Road PLS. At that location, several valve assemblies and low-pressure gas discharge openings were present aboveground. A control building was also located on the site, and it was equipped with an air conditioning unit.

During the observation period of about one hour, the only audible noise source was the air conditioning unit on the control building, which produced 60 dBA at a distance of 10 feet. The air conditioning unit operated intermittently as a function of the interior air temperature. There was no noticeable noise associated with the aboveground valves. It was reported by PG&E staff that the valves operate quickly and intermittently to route gas to different pipelines, and that their operation is very quiet. The gas discharge openings did not appear to be significant noise sources.

Noise levels from these stations would not result in a substantial permanent increase in noise levels. Based upon the observations at the existing Bixler Road Pressure Limiting Station, it was concluded that the only potentially significant noise source was the air conditioning unit associated with the control building. This noise source would produce a sound level of 45 dBA at a distance of about 56 feet. Both the MLV and the BRS would be located at distances significantly greater than 56 feet from the nearest residences, so the predicted noise levels would not be expected to exceed the 45 dBA Leq noise standards for Placer County or the adjacent City of Roseville.

Based upon the observed ambient noise levels in the vicinity of the proposed Baseline PLS, noise produced by the other facilities is not expected to exceed ambient noise levels at existing noise sensitive receptors.

Noise levels from Project operations would not exceed any criteria defined in a noise ordinance or general plan of the local jurisdictions in which the activities would occur, and noise levels from Project operations would not result in a substantial permanent increase in noise levels. Impacts would be less than significant (Class III).

Airport or Private Airstrip Noise

The Project is within 2 miles of a public airport or public use airport, but is not located within an airport land use plan and would not expose people residing or working in the Project area to excessive noise levels. The only public airport or

airstrips in the vicinity of the Project are the Sacramento International Airport and Freedom Field. The Sacramento International Airport is the major transportation airport in the Sacramento metropolitan area that has numerous aircraft landings and takeoffs each day. The southern terminus of the 10-inch-diameter north-south pipeline spur along Powerline Road is approximately 1.49 miles from the nearest terminal buildings, so passengers and airport staff would not be affected by noise during construction activities. Project-related construction workers could be exposed to aircraft noise levels similar to those shown by Figure 4.8-5 when working near the pipeline spur and the Powerline Road Main Line Valve (PRV), with maximum noise levels approaching 75 dBA. This exposure would not be expected to be excessive and would occur only temporarily. Consequently, this would be a less than significant impact. By comparison, Freedom Field, located in the northeast quadrant of Locust Road and Baseline Road, is a private facility that only accommodates sportplanes and ultralights. The Project does not create alternate land uses that would modify the long-term noise conditions for people who live or work in the vicinity of the airport or airstrip and are regularly exposed to airplane noise. Construction workers would conceivably be exposed to noise from airplanes for short periods of time during construction when construction occurs close to the airport runway approaches (especially near the Sacramento International Airport along the western end of Riego Road and along Powerline Road). This exposure would not be expected to be excessive and would occur only temporarily. Consequently, this would be a less than significant impact (Class III).

Impact NOI-1: Project Construction

Noise levels from Project construction would exceed criteria defined in a construction noise ordinance or general plan of the local jurisdiction in which the activity occurs (Potentially Significant, Class II).

The Project would install approximately 40 miles of underground 30-inch-diameter natural gas transmission pipeline in Yolo, Sutter, Sacramento, and Placer counties.

Noise would be generated during the construction of the Project. At any given location, construction noise would be generated over a relatively short period, and would not create a permanent addition to background noise levels. Sensitive noise receptors in the vicinity of the Project alignment may be affected by temporary construction noise.

Maximum noise levels from construction equipment such as that which would be used during various phases of pipeline construction are shown in Table 4.10-12. According to Table 4.10-12, instantaneous (L_{max}) noise levels from construction equipment could reach 96 dB at 50 feet. Besides the equipment listed in Table 4.10-12, other more specialized equipment (such as the HDD rig) would also be used. Typical operational noise levels for this specialized equipment are not available, though it is anticipated that the primary noise source would be the diesel engine. Therefore, it is not likely that any of this equipment would generate maximum noise levels in excess of the equipment listed in Table 4.10-12.

The closest receptors to construction activity are sparsely distributed residences along the rural county roadways in Yolo, Sutter, and Placer counties, and in the City of Roseville. Some of these residences would be within 50 feet of the construction right-of-way (ROW). There would be no residences along the DFM within Sacramento County. The construction noise would represent a noticeable temporary increase in ambient noise levels at the nearest residences in Yolo, Sutter, and Placer counties, and in the City of Roseville. Increases in ambient noise due to construction would be much less at the nearest schools or other sensitive receptors, but could still be noticeable.

In Yolo County, additional sensitive receptors are found in the town of Yolo and include the Woodland Community School and the Yolo Branch Library (approximately 4,000 feet and 3,500 feet south to Line 407, respectively). In Placer County, the nearest sensitive receptors are two schools. The Alpha School (historical) is approximately 0.5 mile north of Line 407 along Baseline Road, and the Coyote Ridge Elementary School is approximately 0.4 mile north-northeast of the eastern terminus of Line 407 at the intersection of Baseline Road and Fiddyment Road.

Maximum construction noise levels could reach up to 86 dBA at the nearest residential receptors to the pipeline (representing a worst-case scenario for receptors in all four counties that are within 50 feet of the construction ROW). In Sutter County there are two residences locate within 50 feet of the construction ROW. In Yolo County, which represents the most sensitive receptors along the pipeline, maximum sound levels from construction noise at the nearest sensitive receptors are expected to be approximately 58 dBA at both the Woodland Community School and the Yolo Branch Library. In Placer County, maximum sound levels from construction noise at the nearest sensitive receptors are expected to be

approximately 61 dBA at the Alpha School and 64 dBA at the Coyote Ridge Elementary School.

Table 4.10-12: Construction Equipment Noise Levels (dBA)

Equipment	Impact Devise	Measures L_{max}[1] (50 feet)	Predicted L_{max} (2,500 feet)
Auger drill rig	No	84	51
Backhoe	No	78	45
Boring jack power unit	No	83	50
Clam shovel (dropping)	Yes	87	54
Compactor (ground)	No	83	50
Compressor (air)	No	78	45
Concrete mixer truck	No	79	46
Concrete pump truck	No	81	48
Concrete saw	No	90	57
Crane	No	81	48
Dozer	No	82	49
Drill rig truck	No	79	46
Drum mixer	No	80	47
Dump truck	No	76	43
Excavator	No	81	48
Flat-bed truck	No	74	41
Front-end loader	No	79	46
Generator	No	81	48
Generator (<25KVA, VMS signs)	No	73	40
Gradall	No	83	50
Grapple (on backhoe)	No	87	54
Horizontal boring hydraulic jack	No	82	49
Jackhammer	Yes	89	56
Man lift	No	75	42
Mounted impact hammer (hoe ram)	Yes	90	57

Equipment	Impact Devise	Measures L_{max} [1] (50 feet)	Predicted L_{max} (2,500 feet)
Pavement scarifier	No	90	57
Paver	No	77	44
Pickup truck	No	75	42
Pneumatic tools	No	85	52
Pumps	No	81	48
Rivet buster/chipping gun	Yes	79	46
Rock drill	No	81	48
Roller	No	80	47
Scraper	No	85	52
Shears (on backhoe)	No	96	63
Slurry plant	No	78	45
Slurry trenching machine	No	80	47
Vacuum excavator (vac-truck)	No	85	52
Vacuum street sweeper	No	82	49
Vibrating hopper	No	87	54
Vibratory concrete mixer	No	80	47
Welder/torch	No	74	41

Notes:
1. L_{max} is the maximum instantaneous noise level experienced during a given period of time.
Source: Federal Transit Administration 2006.

For the work within Placer County, the predicted maximum exterior noise levels (61 to 64 dB exterior at the two nearest schools and 86 at the closest residential receptors) would exceed the land use noise standards for sensitive receptors (L_{eq} of 55 dBA between 7 a.m. and 10 p.m. and 45 dBA between 10 p.m. and 7 a.m.). For work within Sutter County, the predicted maximum exterior noise levels at the closest residential receptors would be 86 dBA. This would exceed the Sutter County land use noise standards for sensitive receptors (L_{eq} of 50 dBA between 7 a.m. and 10 p.m. and 45 dBA between 10 p.m. and 7 a.m). Yolo County does not have any standards directly related to construction or operation noise. These noise standards are intended to apply to permanent noise sources. Construction noise, however, is

short-term and temporary in nature, and equipment is not in continuous operation at these maximum noise levels.

Most municipal regulations allow for exemptions to noise standards for construction provided that work is completed during daytime hours. It is anticipated that pipeline construction would progress along the routes in a manner so that noise impacts at any one residence would be of relatively short duration.

For example, the expected sequence of construction events near a given residence would include preliminary grading, topsoil stripping, digging trenches, welding, installation of the pipe, and backfill of the trenches. These activities would occur over a period of about one month, though the use of heavy equipment would probably occur over a period of only a few days. Trenching, for example, would proceed at a rate of about 1,500 to 3,000 feet per day, so the trenching equipment would only be in close proximity to a given residence for 1 to 2 days. Similarly, grading, stripping, and backfill would each occur over a 1 to 2 day period.

An HDD construction process would be employed where necessary to install the pipeline under canals, vernal pools, and major roadways. An HDD rig consists of a diesel engine that powers a drill rig and mud pumps. It is typically operated on a continuous basis after setup until the bore is completed. For this Project, HDD use would occur no closer than about 400 feet to the nearest residence (in the vicinity of Garden Highway and Riego Road), and otherwise would be 800 feet or more from the nearest rural residence. At the nearest residence, the noise level produced by an HDD rig would be about 68 dBA. In all other cases, the noise levels at the nearest residences would be no more than about 62 dBA. A setback of about 3,000 feet would be required to reach a noise level of about 50 dBA.

Even though construction activities could occur outside of normal daytime construction hours, this would only happen when the nature of the work would make it necessary to perform construction around the clock. This would be the case with only a small portion of the overall work, such as during directional drilling and hydrostatic testing. Because Project construction noise would be noticeable at various receptors during construction, PG&E would be expected to mitigate construction noise where possible and to coordinate with residents and local authorities to minimize the adverse impacts associated with construction noise. Mitigation would cover the most conservative regulations along the pipeline.

Construction of the Project would generate high levels of noise that could substantially increase ambient noise levels on a temporary basis in the vicinity of the pipeline route. In Placer County and Sacramento County, construction noise during daylight working hours is exempt from noise standards. Given that construction noise at any given location would be short-term and temporary in nature, impacts are not expected to be significant.

There are no existing noise sensitive receptors adjacent to the Project in Sacramento County.

Noise levels from Project construction would exceed criteria defined in a construction noise ordinance or general plan of the local jurisdiction in which the activity occurs.

Mitigation Measures for Impact NOI-1: Project Construction

MM NOI-1a. **Limited Construction Hours.** Construction activities shall be limited to daytime hours (7 a.m. to 7 p.m.) when they occur within 1,000 feet of residences, except for the operation of horizontal directional drilling equipment.

MM NOI-1b. **Best Management Practices.** When construction activities occur within 1,000 feet of residences, the following best management practices shall be implemented:

1. All construction equipment shall be fitted with factory installed mufflers and enclosures.

2. All construction equipment shall be maintained in good working order.

3. Horizontal directional drilling equipment shall be shielded from view of the nearest residences with temporary barriers (such as plywood or straw bales) that block line of sight from engines and pumps to the windows of those residences.

4. PG&E shall provide a noise complaint hot line, staffed on a 24-hour basis, to allow nearby residents to submit complaints about construction-related noise. The hot line number shall be clearly posted at the construction site.

5. PG&E shall respond to noise complaints in a timely manner, so that residents may obtain any necessary relief before the construction is completed.

MM NOI-1c. **Noise Reduction Plan.** To minimize nighttime construction noise impacts, a noise reduction plan shall be developed by a qualified acoustical professional and submitted to the California State Lands Commission for review and approval. The Noise Reduction Plan shall include a set of site-specific noise attenuation measures that apply state of the art noise reduction technology to ensure that nighttime noise levels from Project sources within do not exceed the applicable county's nighttime exterior noise threshold at nearby residences.

The attenuation measures shall include, but not be limited to, the control strategies and methods for implementation, as feasible, that are listed below and shall be implemented prior to commencement of any horizontal direction drilling (HDD) construction or hydrostatic testing activities. If any of the following strategies are determined by PG&E to not be feasible, an explanation as to why the specific strategy is not feasible shall be included in the Noise Reduction Plan:

- Plan horizontal direction drill activities to minimize the amount of nighttime construction.
- Offer temporary relocation of residents within 300 feet of nighttime construction areas.
- Install temporary noise barriers, such as shields and blankets, immediately adjacent to all nighttime stationary noise sources (e.g., drilling rigs, generators, pumps, etc.).
- Install a temporary noise wall that blocks the line of sight between all nighttime HDD activities and the closest residences. The noise wall shall achieve an attenuation of at least 10 dBA.
- Fit all engines associated with nighttime HDD activities with critical silencer muffler designs that achieve attenuation of at least 15 dBA compared to standard muffler designs.

Rationale for Mitigation

People are typically most annoyed by noise due to activities beyond their control during nighttime hours, when most people sleep. This disproportionate response is recognized by commonly-accepted noise standards in Noise Elements and Noise Ordinances, which typically apply a 10-decibel penalty to noise occurring during nighttime hours. The proposed mitigation measures account for the increased sensitivity of people to noise at night.

By requiring that the equipment be maintained in good working order with all original silencing devices intact, the proposed mitigation measures recognize that modern construction equipment is effectively silenced to provide the maximum practical noise reduction.

The proposed shielding for the HDD equipment recognizes that such equipment must be operated on a continuous basis, and provides a practical reduction of noise by requiring an effective noise barrier between the HDD equipment and the nearest residences.

Finally, the proposed mitigation measures provide a method for residents to contact PG&E in the event of a noise complaint, and they require PG&E to resolve the complaints in a fair and practical manner.

Implementation of an approved Noise Reduction Plan that would limit nighttime noise levels at nearby residences and limit nighttime noise levels to the most extent feasible would reduce nighttime construction noise impacts.

By implementation of MM NOI-1a, MM NOI-1b, and MM NOI-1c, noise impacts would be reduced to less than significant.

Impact NOI-2: Groundborne Vibration or Noise

Groundborne vibrations or groundborne noise from Project activities would have substantial direct or indirect effects on persons or structures (Potentially Significant, Class II).

Heavy-duty construction equipment could be used during the construction phase of the Project. Typical levels of groundborne vibration produced by various pieces of construction equipment that could be used during Project construction are shown in Table 4.10-9. While some specialized pieces of equipment other than those listed in

Table 4.10-9 may be used during construction, it is unlikely that maximum vibration levels associated with this equipment would be greater than the listed equipment.

According to the site maps, some residential receptors would be within 50 feet of the pipeline alignment. Consequently, construction could contribute noticeable levels of groundborne vibration at any of these receptors. However, these would be short-term exposures that would occur primarily in the daytime.

Based upon Table 4.10-13, vibration due to the operation of equipment such as heavy trucks and bulldozers associated with the Project could be perceptible, and could result in annoyance for residents in homes located within about 60 feet of the construction site. Structural damage due to construction-related vibration is unlikely beyond 25 feet of the construction site.

The majority of construction activity is expected to occur at distances greater than 60 feet from sensitive structures. Where construction activity involving heavy equipment occurs within 60 feet of residences (such as may occur along the pipeline route), the people in those homes may be annoyed, but no structural damage would be expected, provided that vibration-causing equipment is at least 25 feet from sensitive structures. The use of heavy equipment that would produce the highest vibration levels would be limited to daytime hours. Groundborne vibration or groundborne noise from Project construction activities would have substantial direct or indirect effects on persons or structures.

Table 4.10-13: Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 feet (inches/seconds)	Approximate Vibration Level (VdB) at 25 feet
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58
Source: U.S. Department of Transportation, Transit Noise and Vibration Impact Assessment, Federal Transit Administration May 2006.		

Mitigation Measures for Impact NOI-2: Groundborne Vibration or Noise

MM NOI-2a. **Distance from Residences.** Avoid operating heavy equipment closer than 25 feet from any residences.

MM NOI-2b. **Heavy-loaded Trucks.** Route heavily-loaded trucks away from residential streets where possible. Select streets with the fewest homes if no alternatives are available.

MM NOI-2c. **Earth Moving Equipment/Distance from Vibration-Sensitive Sites.** Operate earth-moving equipment as far away from vibration-sensitive sites as possible, and no closer than 25 feet. Phase demolition, earth-moving and ground-impacting operations so as not to occur in the same time period.

MM NOI-2d. **Nighttime Construction.** Avoid conducting nighttime construction activities immediately adjacent to residences during non-HDD activities.

Rationale for Mitigation

The proposed mitigation measures would serve to move potentially significant sources of vibration as far from sensitive receptors as possible. The total vibration level produced may be significantly reduced when each vibration source operates separately. People are more aware of vibration in their homes during the nighttime hours.

4.10.6 Impacts of Alternatives

A No Project Alternative as well as twelve options have been proposed for the alignment in order to minimize or eliminate environmental impacts of the proposed Project and to respond to comments from nearby landowners. The twelve options, labeled A through L, have been analyzed in comparison to the portion of the proposed route that has been avoided as a result of the option. Descriptions of the options can be found in Section 3.0, Alternatives and Cumulative Projects, and are depicted in Figure 3-2A through Figure 3-2K.

No Project Alternative

Without the Project, there would be no temporary construction activities and consequent noise and vibration, and no potential for long-term noise production by aboveground facilities. Thus, there would be no noise and vibration impacts.

Option A

Option A would shift approximately 14 miles of pipeline from the more densely populated area around Line 406 to the sparsely populated area to the north. Under Option A, the alternative Capay Metering Station (CMS) would be moved approximately 1.5 miles north of where it would be placed under the proposed Project. This option would increase the overall pipeline length by approximately 2,200 feet. Similar to the proposed Project, there are no existing sensitive receptors located close to the CMS. It does not appear that any noise sensitive development will occur in the vicinity of the CMS, which is surrounded by agricultural land uses.

The closest receptor to construction activity in Option A is a farmhouse north of Road 16 at Road 86. There are no other sensitive receptors in the vicinity of Option A, nor are there any public airports or airstrips. Option A crosses five fewer private residential parcels than Line 406. One residence would be located within 200 feet of the pipeline construction under Option A, whereas eight residences would be located within 200 feet of construction under the proposed Project. Under Option A, the nearest residence to an HDD crossing would be located approximately 490 feet away from the HDD construction pit. The residence nearest the proposed Project's HDD crossing would be located approximately 100 feet from the HDD construction pit. As a result, there would be fewer potential construction-related noise or vibration impacts along this segment of the pipeline.

Option B

Option B would shift approximately 6.5 miles of pipeline from the more densely populated area around Line 406 to the sparsely populated area to the north. Under Option B. the alternative CMS would be moved approximately 1.5 miles north of where it would be placed under the proposed Project. Similar to the proposed Project, there are no existing sensitive receptors located close to the alternative CMS. It does not appear that any noise sensitive development will occur in the vicinity of the alternative CMS, which is surrounded by agricultural land uses.

Option B crosses approximately two more private residential parcels than Line 406. However, there are no residences within 200 feet of the I-505 HDD crossing under Option B or the proposed Project. There are no residences located within 200 feet of the pipeline construction under Option B or proposed Project. There are no other sensitive receptors in the vicinity of Option B, nor are there any public airports or airstrips. As a result, there would be no change in potential construction-related noise or vibration impacts along this segment of the pipeline.

Option C

There are no residences located within 200 feet of the pipeline construction under Option C or the proposed Project. There are no other sensitive receptors in the vicinity of Option C, nor are there any public airports or airstrips. As a result, there would be no change in potential construction-related noise or vibration impacts.

Option D

Under Option D, five residences would be located within 200 feet of the pipeline construction, whereas no residences would be located within 200 feet of construction for the proposed Project. There are no other sensitive receptors in the vicinity of Option D, nor are there any public airports or airstrips. There would be an increase in potential construction-related noise or vibration impacts associated with this option.

Option E

This alternative would relocate pipeline construction along CR-19 west of I-505. Option E crosses approximately 3 more private residential parcels than Line 406. Under Option E, three residences would be located within 200 feet of the pipeline construction, whereas no residences would be located within 200 feet of construction for the proposed Project. There are no other sensitive receptors in the vicinity of Option E, nor are there any public airports or airstrips. There would be an increase in potential construction-related noise or vibration impacts associated with this option.

Option F

Under Option F, no residences would be located within 200 feet of the pipeline construction, whereas one residence would be located within 200 feet of construction for the proposed Project. There are no other sensitive receptors in the vicinity of Option F, nor are there any public airports or airstrips. There would be similar potential construction-related noise or vibration impacts associated with this option.

Option G

There are three residences located within 200 feet of Option G and the proposed Project. Under Option G, however, the nearest residence would be located approximately 10 feet closer to construction activities than under the proposed

Project. This would result in a less than significant change in construction noise levels. There are no public airports or airstrips in the vicinity of Option G. There would be no change in potential construction-related noise or vibration impacts associated with this option.

Option H

Option H crosses approximately three fewer private residential parcels than Line 406. Under Option H, only one residence would be located within 200 feet of the pipeline construction, whereas five residences would be located within 200 feet of construction for the proposed Project. Under Option H, the nearest residence to an HDD crossing would be located more than 2,000 feet away from the HDD construction pit. The residence nearest the proposed Project's HDD crossing would be located approximately 360 feet from the HDD construction pit. There are no other sensitive receptors in the vicinity of Option H.

The pipeline would pass within about 1.4 miles of the terminal buildings at Sacramento International Airport, and within about 0.5 miles of the runway ends. Project-related construction workers would be exposed to noise from aircraft arrivals and/or departures. Aircraft sound levels could exceed 65 dBA for about 30 seconds per noise event, with maximum noise levels in the range of 85-90 dBA. The noise due to aircraft overflights would not require hearing protection measures beyond those already required for the exposure to noise produced by heavy equipment, but the aircraft noise events would add slightly to the total employee noise exposure. With this option, there would be fewer potential construction-related noise or vibration impacts for sensitive receivers, but there would be slight increases in noise exposure for project construction workers.

Option I

Under Option I, four residences would be located within 200 feet of the pipeline construction, whereas eight residences would be located within 200 feet of construction for the proposed Project. There are no other sensitive receptors in the vicinity of Option I, nor are there any public airports or airstrips. Freedom Field (a private airstrip) is located within about 0.5 miles of Option I, but the main pipeline along Baseline Road passes closer to this facility than does Option I. The project does not create alternate land uses that would modify the long-term noise conditions for people who live or work in the vicinity of the airport or airstrip and are regularly exposed to airplane noise. Project-related construction workers would conceivably be exposed to noise from airplanes for short periods of time during construction

when construction occurs close to the airport runway ends. This exposure would not be expected to be excessive and would occur only temporarily. There would be fewer potential construction-related noise or vibration impacts associated with this option.

Option J

Under Option J, six residences would be located within 200 feet of the pipeline construction, whereas eight residences would be located within 200 feet of construction for the proposed Project. There are no other sensitive receptors in the vicinity of Option I, nor are there any public airports or airstrips. Freedom Field (a private airstrip) is located within about 0.5 miles of Option J, but the main pipeline along Baseline Road passes closer to this facility than does Option J. The project does not create alternate land uses that would modify the long-term noise conditions for people who live or work in the vicinity of the airport or airstrip and are regularly exposed to airplane noise. Project-related construction workers would conceivably be exposed to noise from airplanes for short periods of time during construction when construction occurs close to the airport runway ends. This exposure would not be expected to be excessive and would occur only temporarily. There would be fewer potential construction-related noise or vibration impacts associated with this option.

Option K

This alternative would relocate pipeline construction approximately 150 feet north of Baseline Road in an uninhabited area. There are no residences within 200 feet of Option K or the proposed Project. There are no other sensitive receptors in the vicinity of Option K, nor are there any public airports or airstrips. As a result, there would be no change in potential construction-related noise or vibration impacts.

Option L

Under Option L, a portion of the proposed Project adjacent to Baseline Road would be constructed utilizing HDD instead of trenching. Option L would not change the location of the route, but would change the construction method from trenching to HDD. However, there are no residences located near Option L. There are no other sensitive receptors in the vicinity of Option L, nor are there any public airports or airstrips. As a result, there would be no change in potential construction-related noise or vibration impacts.

Table 4.10-14: Comparison of Alternatives for Noise

Alternative	Comparison with Proposed Project
No Project	No Impacts
Option A	Fewer Impacts
Option B	Similar Impacts
Option C	Similar Impacts
Option D	Greater Impacts
Option E	Greater Impacts
Option F	Similar Impacts
Option G	Similar Impacts
Option H	Fewer Impacts
Option I	Fewer Impacts
Option J	Fewer Impacts
Option K	Similar Impacts
Option L	Similar Impacts
Source: Michael Brandman Associates 2009.	

4.10.7 Cumulative Projects Impact Analysis

The proposed Project, in addition to other projects in the area, may contribute to cumulative noise impacts. Cumulative noise impacts associated with the Project could occur if the noise levels due to aboveground facilities were to add significantly to ambient noise levels.

Cumulative noise impacts associated with the Project could occur if the noise levels due to aboveground facilities were to add significantly to ambient noise levels. The areas in which such impacts could potentially occur are those of the residential neighborhoods near the Baseline/Brewer Road Main Line Valve (MLV) and the Baseline Road Pressure Regulating Station (BRS). However, in those areas, vehicular traffic is the dominant noise source, and existing traffic noise levels would greatly exceed the mitigated project noise level due to aboveground facilities. As a result, there would be no cumulative noise impact due to the Project.

4.10.8 Summary of Impacts and Mitigation Measures

Noise levels from Project operations would not exceed any criteria defined in a noise ordinance or general plan of the local jurisdiction in which the activity occurs, and noise levels from Project operations would not result in a substantial permanent increase in noise levels. No mitigation measures would be required for these less than significant impacts (Class III). Noise levels from Project construction would exceed criteria defined in a construction noise ordinance or general plan of the local jurisdiction in which the activity occurs, resulting in a Class II impact. This impact would be mitigated to a less than significant level after applying MM NOI-1a through NOI-1c and APM NOI-1. Groundborne vibrations or groundborne noise from Project construction activities would have substantial direct or indirect effects on persons or structures, resulting in a Class II impact. This impact would be mitigated to a less than significant level after applying MM NOI-2a through NOI-2d.

Table 4.10-15: Summary of Noise Impacts and Mitigation Measures

Impact	Mitigation Measure
NOI-1. Project construction.	**NOI-1a.** Limited construction hours. **NOI-1b.** Best management practices. **NOI-1c.** Noise reduction plan.
NOI-2. Groundborne vibration or noise.	**NOI-2a.** Distance from residences. **NOI-2b.** Heavy loaded trucks. **NOI-2c.** Earth-moving equipment/distance from vibration-sensitive sites. **NOI-2d.** Nighttime construction.
Source: Michael Brandman Associates 2009.	