Appendix A

Chapters 3 and 4 of the DEIS

DEIS Chapter 3

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

This chapter describes the human, physical, biological, and cultural environment that could be affected by the construction and operation of Southwest Gulf Railroad Company's (SGR) proposed rail line. The term "proposed rail line" refers to SGR's rail line in general, meaning construction and operation of any of the rail route alternatives (proposed route, Alternative 1, Alternative 2, or Alternative 3, as described in Chapter 2). The term "proposed route" refers to SGR's proposed route, as described in Chapter 2.

3.1 Transportation

In the 1880s the Galveston, Harrisburg and San Antonio (GH&SA) Railway and the International and Great Northern (I&GN) Railroad extended their lines west and south through Medina County. The towns of Hondo, La Coste, Dunlay, and New D'Hanis developed along the GH&SA; the towns of Devine and Natalia formed along the I&GN. The demographic makeup of the county experienced significant change from the growth of these newly established railroad towns. These railroads were the primary mode of transportation for agricultural products and livestock and also provided passenger service until the 1940s. After the development of area roadways, shippers began using trucks to transport products to market (Handbook of Texas Online). Currently, Union Pacific Railroad Company (UP) crosses the county from east to west through LaCoste, Hondo, and D'Hanis. The Missouri Pacific Railroad parallels U.S. Highway 81 and Interstate Highway 35 through Natalia and Devine (Dittmar et al., 1977).

A number of roads in the area were constructed or upgraded in the 1920s and 1930s. In 1921 the Old San Antonio Road become graded and then designated as State Highway 2. Later, State Highway 2 became U.S. Highway 81, after being widened and improved, and then served as the main north-south route until 1964, when Interstate 35 was completed. State Highway 3 opened in 1922 and was later designated as U.S. Highway 90. U.S. Highway 90 is currently the main east-west route in the county. (Handbook of Texas Online.) U.S. Highway 90 crosses the county through Castroville, Hondo, and D'Hanis; U.S. Highway 81 and Interstate 35 cross the southern part of the county through Natalia and Devine. State Highway 173 links Hondo to Devine. Medina County also contains numerous farm roads and ranch roads. (Dittmar et al., 1977.)

The closest international airport is the San Antonio International Airport, which is approximately 38 miles east of the proposed project area.

The proposed route would cross a total of seven roadways: County Road 454; County Road 4516; County Road 4512; County Road 365; Farm to Market Road (FM) 2676; and County Road 353 twice. FM 2676 is a paved, state-maintained roadway. The county roads are either unimproved or gravel roads, with the exception of County Road 4516, which is paved.

Alternative 1 would cross a total of eight roadways: County Road 353; FM 2676; County Road 365; County Road 4516; County Road 4517; County Road 454; and County Road 4545 (twice).

Alternative 2 would cross a total of five roadways: County Road 353; FM 2676; County Road 365; County Road 4516; and County Road 454.

Alternative 3 would cross a total of six roads: County Road 353; FM 2676; County Road 365; County Road 4512; County Road 4516; and County Road 454.

The Texas Department of Transportation (TxDOT) submitted comments expressing concern regarding the proposed rail line's crossing of FM 2676. (See Appendix C.) According to TxDOT, Hondo Independent School District has three bus routes and Medina Valley Independent School District has one bus route that travel along FM 2676, and would intersect with the proposed rail line twice daily. In addition, TxDOT stated that there is a large agricultural supply business at the eastern terminus of FM 2676, which provides significant quantities of fertilizer and insecticides to the surrounding area. According to TxDOT, FM 2676 is also abutted by numerous working farms and ranches that utilize these materials on a daily basis. (See Figure 2.1-2 in Chapter 2 for road crossings.)

In addition to road crossings, the proposed route and alternative rail routes would each cross two utility gas pipeline rights-of-way. According to SGR, one of the pipelines is owned by Duke Energy. The second pipeline, which is the one closer to the southern end of the line, is owned by Koch Pipeline and was removed in November 2003. SGR states that it has been in communication with Duke Energy about crossing its pipeline, which is about 3 feet below the surface. According to SGR, Duke Energy has stated that the pipeline is inactive and there are no plans for reactivating it. Duke Energy has agreed to grant an easement to allow the crossing of the pipeline by SGR.

At the Open House (discussed in Chapter 1) local residents indicated that one of the pipelines ruptured in the past and the residents expressed concern regarding the proposed rail line crossing of the pipeline. According to residents, surveyors periodically check for debris along this pipeline right-of-way to protect its integrity.

The proposed project's potential short term and long term effects on both roadway and pipeline crossings and the differences between the various alternatives are discussed in Chapter 4.

3.2 Hazardous Materials Sites and Existing Energy Resources

3.2.1 Hazardous Materials/Waste Sites

The U.S. Environmental Protection Agency (EPA), state agencies, and local emergency planning communities have adopted rules on the identification of hazardous material spill sites located where proposed construction activities and/or railroad operations would occur.

As a general guide, SEA considers a corridor evaluation focusing on the area located within 500 feet on either side of the right-of-way. Typically, construction activities and railroad operations are not likely to disturb hazardous-materials spill sites and hazardous-waste sites located more than 500 feet from the rail line. SEA used United States Geological Survey (USGS) topographic maps, site visits, and aerial photographs as sources of information. SEA did not identify any hazardous materials spill sites within 500 feet of the proposed route or within 500 feet of any of the alternative routes and facilities.

SEA also conducted a search of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database for Medina County, Texas on September 15, 2004.[1] CERCLIS contains data on potentially hazardous waste sites that states, municipalities, private companies, and individuals have reported to EPA. Medina County, Texas contains three sites listed in the CERCLIS database: the Hondo Army Airfield at the Hondo Municipal Airport in Hondo, Texas; the La Costex Refinery in La Coste, Texas; and National Foam Cushion Manufacturing, Inc. in Natalia, Texas. None of these sites are within 500 feet of the proposed route, Alternative 1, Alternative 2, or Alternative 3.

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[1] CERCLIS database, last updated August 20, 2004 (visited September 15, 2004) <cfpub.epa.gov/supercpad/cursites/srchsites.cfm>.

Impacts regarding hazardous materials and the various alternatives are further discussed in Section 4.3.1 of Chapter 4.

3.2.2 Existing Energy Resources

Energy resources located in the existing environment of a project area include gas pipelines, recyclable commodities, and transmission lines. SEA evaluated the presence of each of these resources in the project area. As discussed above, there are two main gas pipeline rights-of-way within the proposed project area that would be crossed by the proposed route and by each of the alternative routes. One of the pipelines is a currently inactive pipeline owned by Duke Energy. The other pipeline, owned by Koch Pipeline, was removed in November 2003.

Rail traffic on the UP rail line that runs east to west on the south end of the proposed project area transports many different products. SEA has not quantified the potential recyclable commodities transported by the UP line. There are no high-tension transmission lines currently within the project area.

Impacts to existing energy resources are further discussed in Chapter 4.

3.3 Water Resources

Water resources in the area of the proposed project include groundwater, surface waters, and wetlands. These are discussed briefly below.

3.3.1 Groundwater

The geology and hydrology of the proposed project area is summarized in Table 3.3-1 below. SEA investigated each aquifer within the proposed project area to assess the relative sensitivity to contamination from the potential hazards that may be associated with the construction and operation of a commercial railroad moving crushed aggregate materials. Sensitivity is defined both in terms of the relative ability of aquifers to transport contaminants to potential receptors (velocity of the groundwater flow) and the relative importance of the aquifer as a usable resource (the current type and amount of use). In addition, aquifer characteristics that facilitate or impede remediation following a spill are addressed, where relevant.

Table 3.3-1 Summary of the Lithologic and Hydrologic Properties of Aquifers in the Proposed Project Area

System	Hydrogeologic Subdivision	Group, formation, or member	Hydrologic function	Thickness	Lithology	Water-bearing properties
Quaternary	Local aquifers	Leona Formation	AQ	25-40	Fine calcareous silt grading down into coarse chert gravel.	Yields small to large quantities of fresh to slightly saline water, locally
Upper Cretaceous	Upper Confining Unit	Escondido Formation	CU	285	Fine-grained sandstone with interbedded shale, clay, and pyroclastic material	Yields small quantities of slightly saline to moderately saline water. Relatively impermeable.
		Anacacho Limestone	CU	240-400	Massive mudstone to packstone, with interbedded bentonitic clay	Yields small quantities of slightly saline to moderately saline water. Relatively impermeable.
		Austin Group	AQ	225-350	Massive, chalky to marly[a], fossiliferous mudstone grading downward into interbedded limestone and shale	Yields small to moderate quantities of fresh to slightly saline water in upper part.
		Eagle Ford Group	CU	30-50	Dark grey to brown, flaggy, sandy shale and argillaceous limestone.	Yields very small to small quantities of slightly to moderately saline water.
		Buda Limestone	AQ	40-50	Buff to light grey, dense mudstone, hard, massive.	Yields small to moderate quantities of fresh to slightly saline water.
		Del Rio Clay	CU	40-50	Blue-green to yellow-brown fossiliferous clay.	Not known to yield water.
Lower Cretaceous	Edwards Aquifer	Devil's River Formation (undivided)	AQ	520-600	Miliolid[b], shell-fragment wackestones and grainstones with abundant rudist and chert compose upper 250 feet. Recrystallized and brecciated mudstones near middle-grade downward into medium-bedded wackestone to grainstone with gray, vuggy spar and chert. Sparry limestone and burrowed mudstones comprise lower 120-180 feet.	Yields moderate to large quantities of fresh water especially in upper part, principal aquifer in area.
		Devil's River Formation (Basal Nodular Unit)	CU	20-70	Fossiliferous grainstone to wackestone, mudstone, and packstone.	Yields small quantities of water.
	Lower Confining Unit	Upper member of the Glenn Rose Formation	CU	350-500	Yellowish tan, thinly bedded limestone and marl.	Yields small quantities of highly mineralized water in northern Medina County. Not known to yield water to wells in central to southern Medina County.

Source: Hydrogeologic subdivisions, groups, formations, members, thickness, lithology, and water bearing properties modified from Clark and Small (1997), Holt (1956), and BEG (1982).

Notes: CU - Confining Unit (a hydrogeologic unit that effectively serves to restrict groundwater movement in the vertical direction)
AQ - Aquifer (a hydrogeologic unit that possesses physical properties that permit to transmit groundwater)

[a] Marl limestone with clay and carbonate

[b] Microfossils

This section is organized as follows:

- Major and local aquifers in the proposed project area are described and their relative sensitivity to contamination is estimated.
- Groundwater use in the proposed project area is described.
- Groundwater spring flow in the proposed project area is described.

Major and Local Aquifers in the Proposed Project Area

The proposed rail line would cross the outcrop (recharge zone) of the Edwards Aquifer, which is designated by the Texas Water Development Board (TWDB) as a major aquifer (Ashworth and Hopkins, 1995) and is the source for the public water supply in the San Antonio area. (See Figure 2.5-1 in Chapter 2.) The proposed rail line would also cross the outcrop of a local aquifer known as the "Leona Gravel aquifer." Potentially sensitive aquifers were identified from TWDB publications and databases. This listing of potentially sensitive aquifers is based on known hydrogeologic factors. These hydrogeologic factors may include:

1. Depth to water (distance from ground elevation to the surface of the water);
2. Aquifer media (the geological formation of the aquifer);
3. Soil development (vertical movement of components);
4. Transmissivity (the ease with which water passes through the geological materials);
5. Whether confined or unconfined (a confined aquifer contains water that would rise above the base of the upper confining unit in a penetrating well. Thus, groundwater is under artesian pressure); and
6. Net recharge (the ability of the aquifer to replenish the groundwater discharged from the aquifer by withdrawal, springflow, or intra-formational flow).

Aquifers are designated as "major" or "minor" by TWDB because they may serve as a primary or secondary potable drinking water source for public supply or domestic use. Local aquifers are all other groundwater sources and are not formally identified by TWDB. A major aquifer is generally defined as supplying large quantities of water in large areas of the state. Local aquifers typically supply moderate to small quantities of water in small areas or relatively small quantities in large areas and are not typically used for public water supply. Major and local aquifers underlie the majority of the study area.

In the section below, reference is made to the U.S. Department of Transportation (DOT) classification of Unusually Sensitive Areas (Savoca, 1999) to describe the aquifers in the proposed project area. In this classification, Class I aquifers are highly vulnerable, Class II are moderately vulnerable, and Class III aquifers are not sensitive. Class U aquifers are undifferentiated and cover approximately six percent of the area of Texas. Within each class, aquifers can fall into the following categories: a (unconsolidated formation); b (soluble or fractured formation); c (semi-consolidated formation); or d (covered formation).

Edwards (Balcones Fault Zone or BFZ) Aquifer. The Edwards BFZ Aquifer covers over 4,000 square miles in parts of eight counties. The aquifer forms a narrow belt extending from an aquifer boundary in Kinney County (near Brackettville) through the San Antonio area northeastward to a groundwater divide (near Onion Creek) in Hays County. The Edwards BFZ Aquifer is classified as a Class Ib aquifer under the DOT classification system described above as a result of well-developed karst topography in the outcrop areas. (Karst topography is described in detail later in this chapter). The outcrop of the Edwards BFZ Aquifer is considered sensitive. The sensitive intervals include the outcrops of the Devil's River Formation that occur within Vulcan Construction Materials, LP's (VCM) proposed quarry site (Rose, 1972).

Leona Gravel Aquifer. This aquifer is classified as a local aquifer as it provides small to moderate supplies of groundwater over wide, non-contiguous areas for uses other than public supply. This aquifer is comprised of the Quaternary-age Leona Formation, an interval of limestone and chert gravels approximately 25-40 feet thick that occurs on the outwash plain down dip of the Balcones Fault Zone Escarpment. The U.S. DOT classification for this aquifer is Class IIa.

Description of Groundwater Use in the Proposed Project Area

This section describes the use and relative dependence upon groundwater supply in the area of the proposed project. There are no known public water supplies withdrawing groundwater from the Edwards BFZ Aquifer or the Leona Gravel Aquifer within 1 mile of the proposed route and alternative routes. Groundwater is used within this area for domestic, or stock purposes, or for irrigation for cultivated agriculture. The Edwards BFZ Aquifer contributes to irrigation in the area. The Leona Gravel Aquifer supplies groundwater for domestic and stock uses.

Groundwater Spring Flow in the Proposed Project Area

The presence of spring flow in the area of the proposed project may indicate that groundwater recharge is occurring nearby or within the local watershed, although it is also possible that the recharge is occurring at a remote location. During a field investigation conducted in March

2003 and a map survey of the project area, SEA did not identify any major or minor groundwater spring sites along or near the proposed route and alternative routes. SEA also studied the proposed project area for the occurrence of cave and karst features. SEA did not identify any known, open, sensitive karst features along or within 1 mile of the proposed route or along the alternative routes.

3.3.2 Surface Waters

The proposed route and the rail alternatives are located entirely within the Nueces River Basin, more particularly within the upper reach of Hondo Creek Basin (a tributary to the Nueces River). This section identifies the streams that would be crossed by the proposed route or alternative routes and describes their pertinent characteristics.

Data Sources

The primary data sources used for this baseline study of surface water resources were: (1) hydrologic and water quality data available from water resource agencies; (2) water rights data maintained and assembled into a spatial database by the Texas Commission on Environmental Quality (TCEQ); (3) available topographic mapping; and (4) regional water studies for various water resources along the proposed route and alternatives.

The result of this research was a spatial (multidimensional) database that includes the following information:

- 1:24,000 scale streamlines (hydrography);
- Geology affecting surface-water transport (Edwards Aquifer Recharge Zone boundary);
- Delineations of watershed areas draining to route crossings;
- Identification of downstream water rights for a variety of uses (primarily municipal, irrigation, mining, and industrial). The source for this information was the TCEQ database assembled for the Nueces River Water Availability Model (WAM);
- Identification of public water supply sources downstream of the stream crossings;
- Identification of long record flow gauges and rain gauges in the project region; and
- Identification of downstream stream segments assessed in Texas Water Quality Inventory.

Surface Water Resources, General

The project area is located within the watershed of Hondo Creek, a tributary of the Frio River, and ultimately the Nueces River and Gulf of Mexico. Figure 3.3-1 shows the region of the project, with locations of relevant USGS and Edwards Aquifer Authority (EAA) stream flow gauges, which measure daily average stream flow. Figure 3.3-2 shows the region of the project, with locations of relevant National Oceanic and Atmospheric Administration (NOAA) rain gauges, which measure daily rainfall totals. The periods of record of these gauges are summarized in Table 3.3-2. Figure 3.3-3 shows the watersheds in the vicinity of the project area. The watershed area intercepted by the proposed and alternative routes for each creek is summarized in Table 3.3-3.

Table 3.3-2. Stream Flow Gauges within Upper Frio River Watershed

Gauge Number	Station Name	Begin Date	End Date	# of Yrs of Record	% of Time Gauge was Operational	Drainage Area (sq mi)
USGS 08200000	Honda Creek near Tarpley, TX	09/1952	current	51	98	95.6
USGS 08200500	Honda County Road near Hondo, TX (DISC)	08/1952	10/1964	14	88	132.0
USGS 08200700	Hondo Creek at King Waterhole near Hondo, TX	01/1961	09/1992	42	100	149.0
USGS 08201500	Seco Creek at Miller Ranch near Utopia, TX	05/1961	current	42	98	45
USGS 08202000	Seco County Road Near Utopia, TX (DISC)	08/1952	09/1961	10	92	53
USGS 08202500	Seco County Road Near D'Hanis, TX (DISC)	08/1952	10/1964	14	88	87
USGS 08202700	Seco Creek at Rowe Ranch near D'Hanis, TX	01/1961	current	42	100	168
USGS 08205500	Frio River Near Derby, TX	08/1915	current	88	99	3429
ME-08-OS EAA	Quihi Creek	1996	1999	4	Unknown	Not estimated
ME-09-0S EAA	Verde Creek	1996	1999	4	Unknown	Not estimated
ME-10-RS EAA	Verde Creek	1996	1999	4	Unknown	Not estimated
ME-11-0S EAA	Verde Creek	1996	1999	4	Unknown	Not estimated
ME-13-0S EAA	Hondo Creek	1996	1999	4	Unknown	Not estimated
ME-14-0S EAA	Seco Creek	1996	1999	4	Unknown	Not estimated
ME-16-0S EAA	Hondo Creek	1996	1999	4	Unknown	Not estimated
ME-18-0S EAA	Seco Creek	1996	1999	4	Unknown	Not estimated
ME-21-0S EAA	Verde Creek	1996	1999	4	Unknown	Not estimated

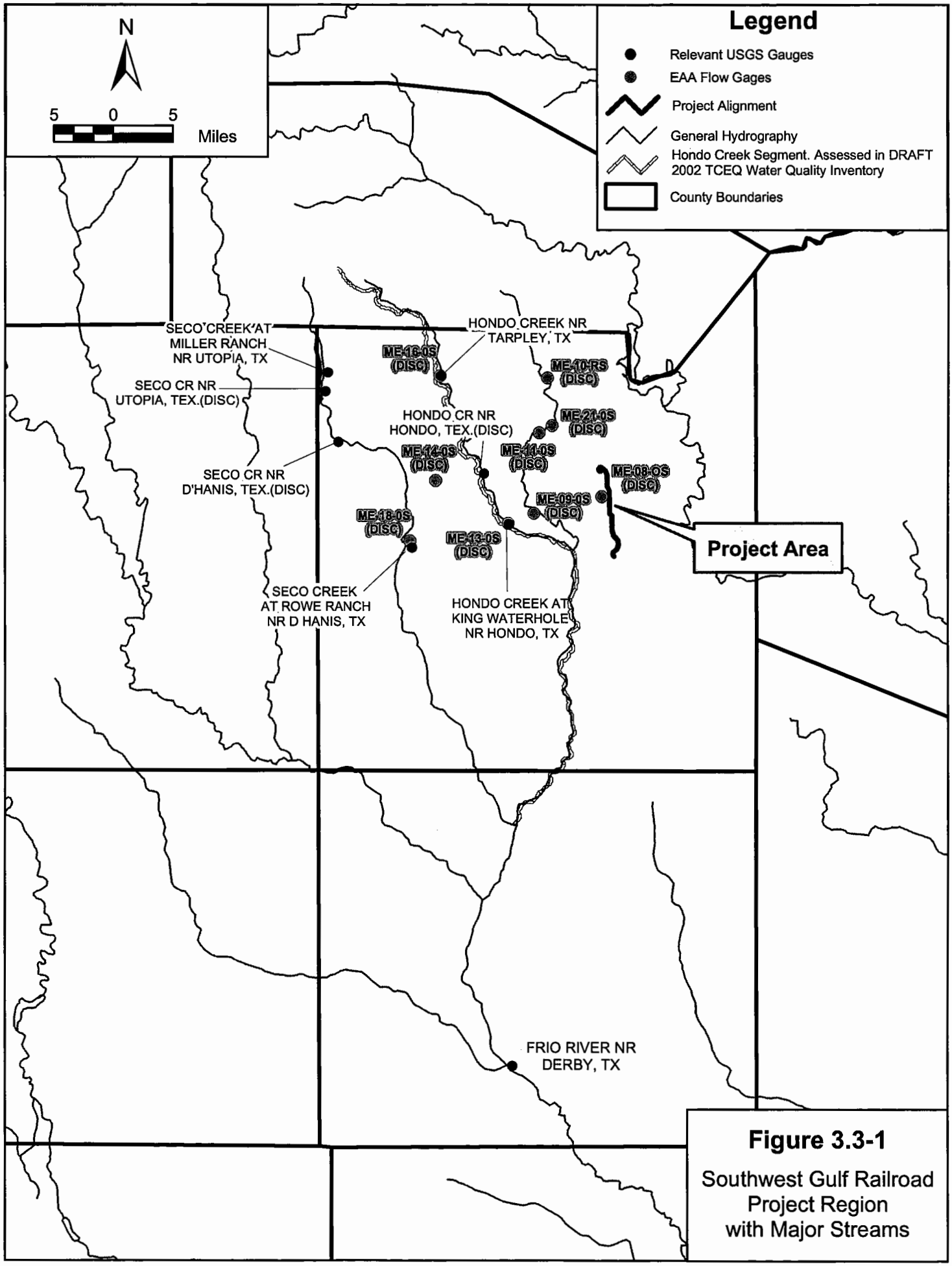

Figure 3.3-1

Southwest Gulf Railroad Project Region with Major Streams

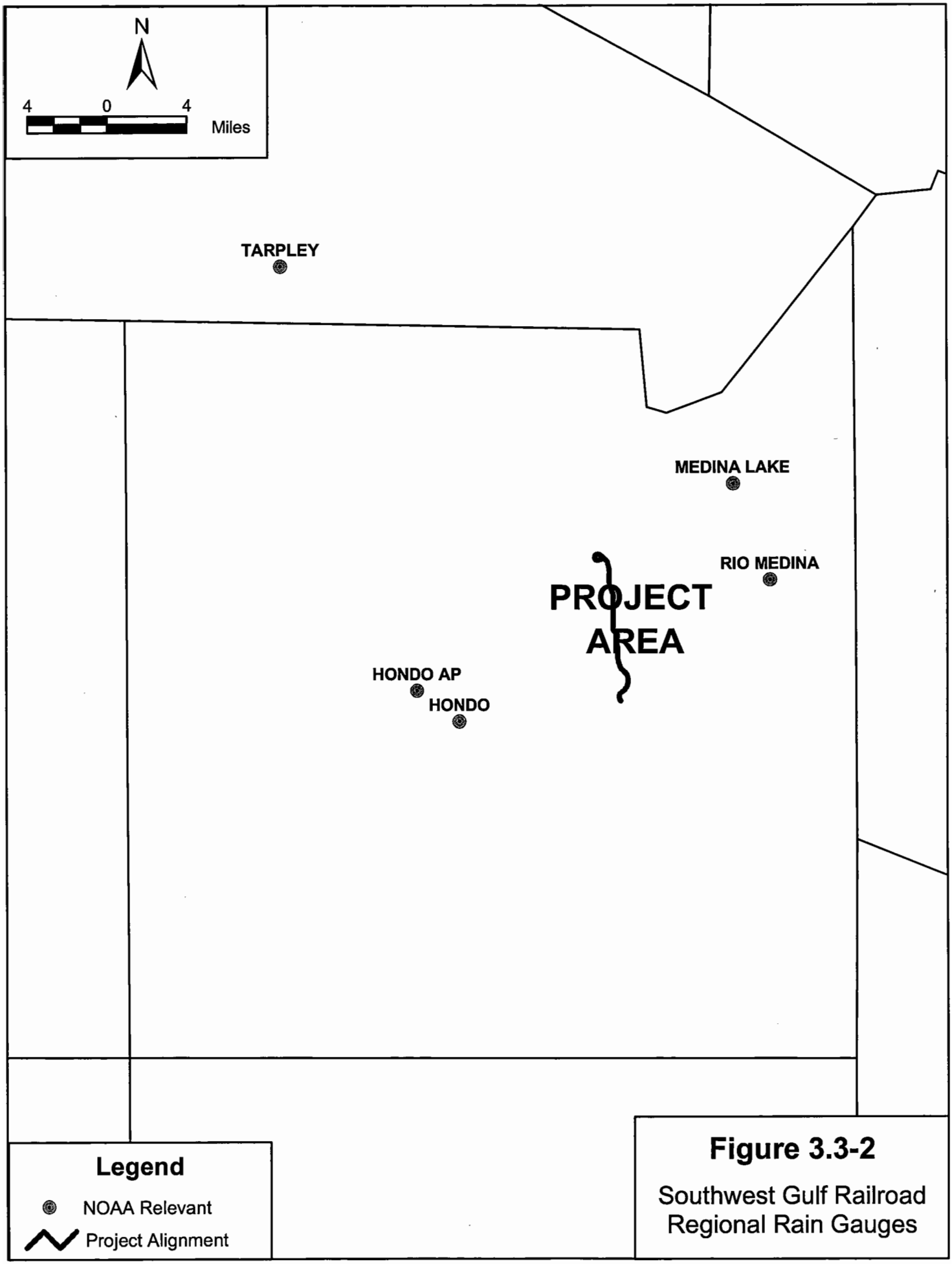

Figure 3.3-2

Southwest Gulf Railroad
Regional Rain Gauges

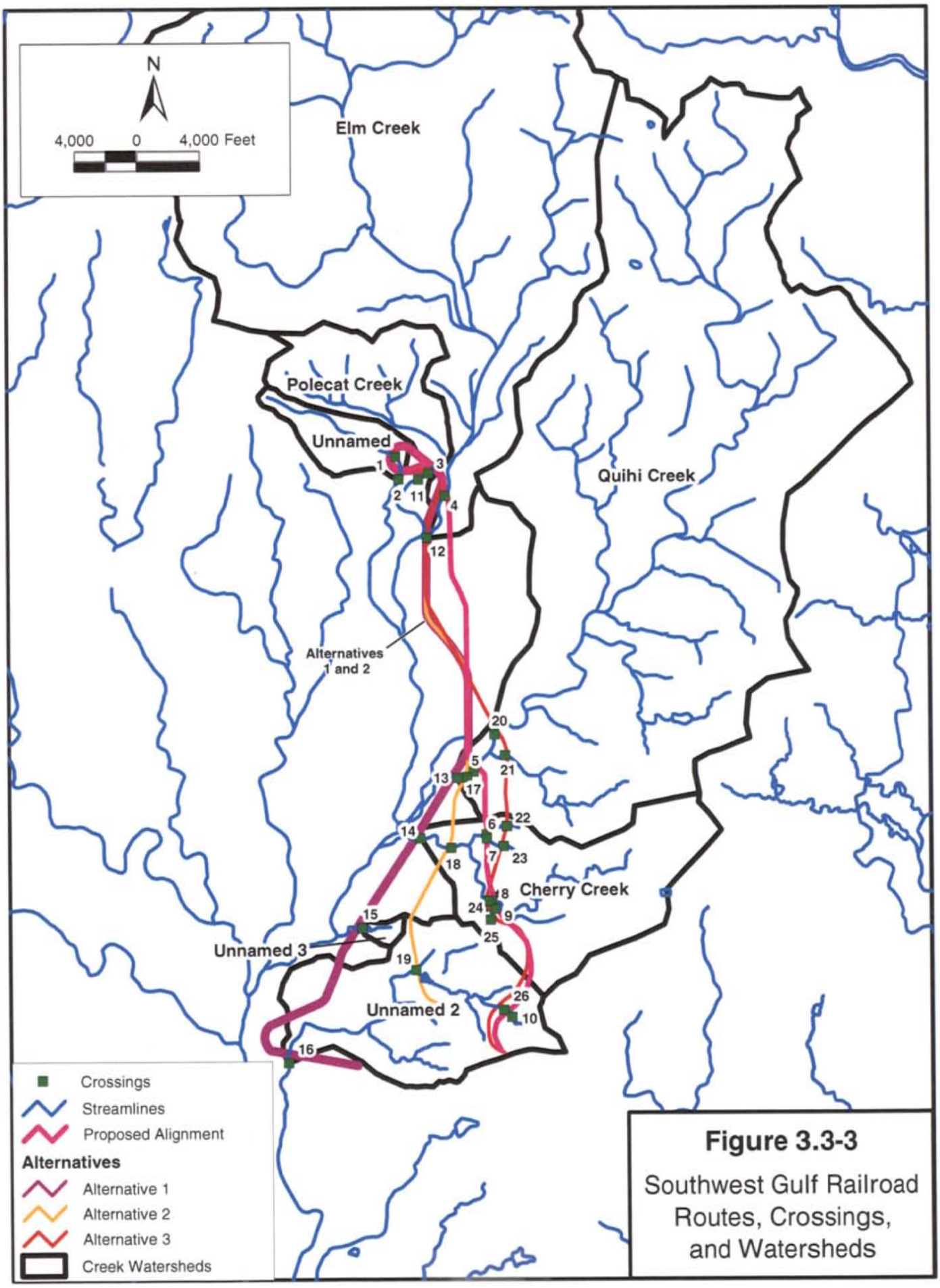

Figure 3.3-3

Southwest Gulf Railroad Routes, Crossings, and Watersheds

Table 3.3-3. Watershed Areas Intercepted by Proposed and Alternative Routes

Watershed	Area Intercepted (sq mi)			
	Proposed Route	Alternative		
		1	2	3
Cherry Creek	3.5	4.8	4.4	3.5
Elm Creek	28.7	29.0	9.0	29.0
Polecat Creek	2.3	2.3	2.3	2.3
Quihi Creek	27.4	27.6	27.5	25.6
Unnamed	0.9	0.9	0.9	0.9

The proposed and alternative routes each would potentially cross between seven and 11 streamlines using USGS 1:24,000 hydrography. (See Table 3.3-4.) The proposed rail line would cross the main channel of Quihi Creek (a tributary to Verde Creek and Hondo Creek). Figure 3.3-4 shows the location of the proposed and alternative routes overlain on surface hydrography. Crossings are individually numbered in this figure and in Table 3.3-4. The stream order associated with each crossing is provided in Table 3.3-4, and it is an indicator of the significance of the crossing. Crossings of stream order 3 and 4 are more significant than crossings of stream order 1 and 2.

In comparing the routes, the proposed route and Alternative 3, by being located to the high east side of the project area, would cross more lower order streamlines (1 and 2) while Alternatives 1 and 2 would cross more higher order streamlines (3 and 4).

Description of Significant Stream Crossings

A brief description of the main stream order crossings follows.

Quihi Creek. The proposed rail line would cross Quihi Creek in Medina County, approximately 3.5 miles north of Dunlay. Quihi Creek is an intermittent stream that is dry most of the time except during periods of intense rainfall. There are several landowner-constructed impoundments along the reach that temporarily hold water. Quihi Creek has a relatively narrow and shallow channel (about 20 feet across and 3 feet deep) to the first stream terrace.[2] Most of the reach is developed with non-native grasses like coastal bermuda. The water is slow-moving over a bottom substrate partially composed of gravel and silt.

[2] A flat overflow area immediately outside the main channel.

Table 3.3-4. Summary of Stream Crossings per USGS 1:24,000 Scale Mapping

Crossing Number	Route(s) Associated with Crossing	Watershed	Stream Order	Note	Proposed Route	Alternative 1	Alternative 2	Alternative 3
1	Loop (all)	Unnamed	1		x	x	x	x
2	Loop (all)	Unnamed	1		x	x	x	x
3	Proposed	Polecat Creek	3	main stem	x			
4	Proposed	Elm Creek	4	main stem	x			
5	Proposed	Quihi Creek	4	main stem	x			
6	Proposed	Cherry Creek	1		x			
7	Proposed	Cherry Creek	1		x			
8	Proposed	Cherry Creek	2		x			
9	Proposed	Cherry Creek	1		x			
10	Proposed	Unnamed 2	1		x			
11	Alternative 1, 2, 3	Polecat Creek	3	main stem		x	x	x
12	Alternative 1, 2, 3	Elm Creek	4	main stem		x	x	x
13	Alternative 1	Quihi Creek	4	main stem		x		
14	Alternative 1	Cherry Creek	3	main stem		x		
15	Alternative 1	Unnamed 3	1			x		
16	Alternative 1	Unnamed 2	3	main stem		x		
17	Alternative 2	Quihi Creek	4	main stem			x	
18	Alternative 2	Cherry Creek	3	main stem			x	
19	Alternative 2	Unnamed 2	1				x	
20	Alternative 3	Quihi Creek	4	main stem				x
21	Alternative 3	Quihi Creek	2					x
22	Alternative 3	Cherry Creek	1					x
23	Alternative 3	Cherry Creek	1					x
24	Alternative 3	Cherry Creek	2					x
25	Alternative 3	Cherry Creek	1					x
26	Alternative 3	Unnamed 2	1					x
		Total Number of Crossings			**10**	**8**	**7**	**11**
		Total Number of Main Stem Crossings			**3**	**5**	**4**	**3**

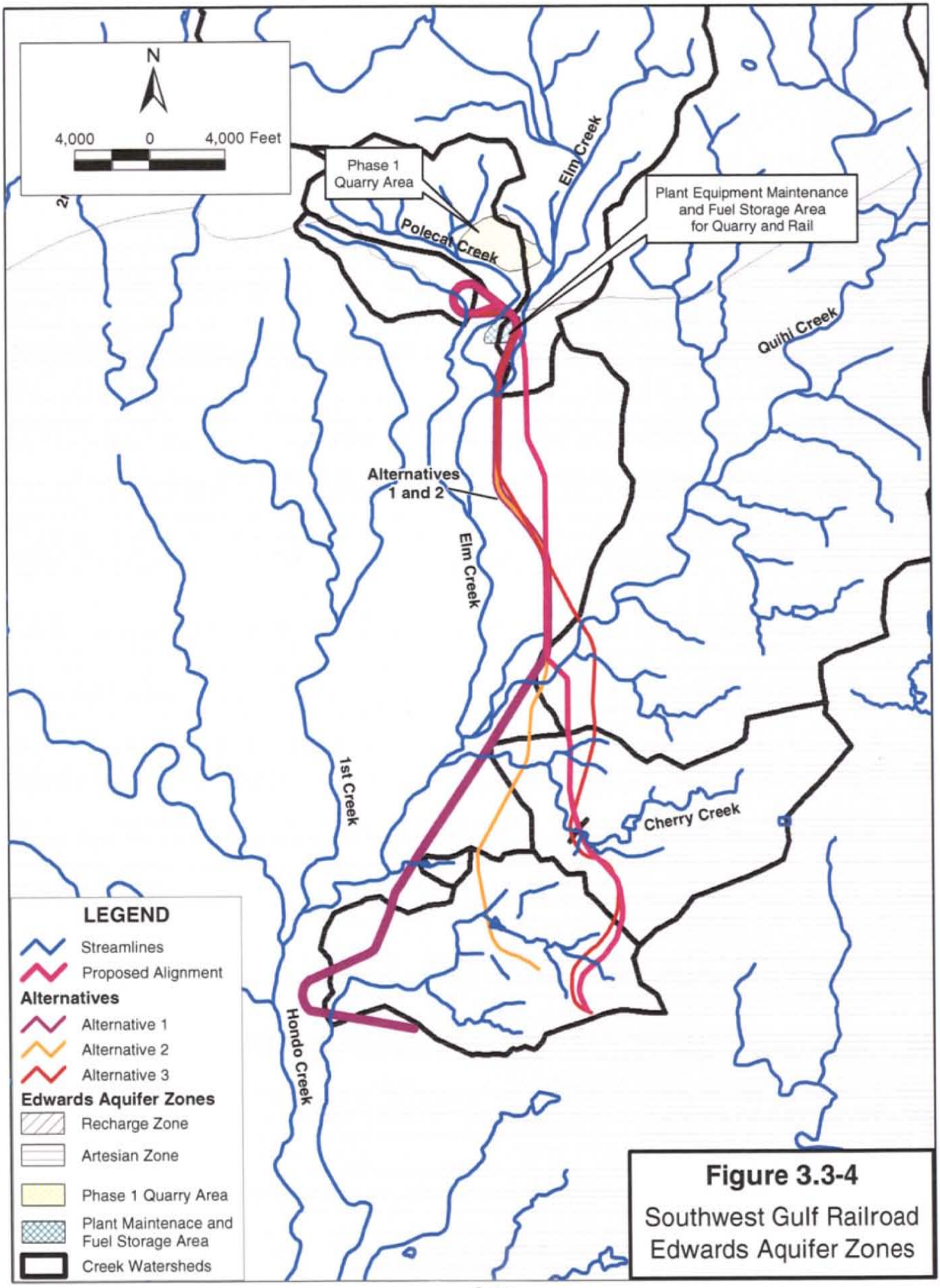

Figure 3.3-4

Southwest Gulf Railroad
Edwards Aquifer Zones

Elm Creek. The proposed rail line would cross Elm Creek in Medina County, approximately six miles north of Dunlay. Elm Creek is an intermittent stream that is dry most of the time except during periods of intense rainfall. At the location where the proposed route or alternative routes would cross Elm Creek, particularly intense rainfall (>3"/hour) would be required to cause flow in the creek because the stream channel immediately upstream of the reach crosses the Edwards Aquifer Recharge Zone (EARZ). The EARZ is a particularly receptive substrate with high infiltration rates. The banks are gently sloped and cross rangeland or cultivated agricultural lands.

Polecat Creek. Polecat Creek is located in the area of the proposed quarry and the proposed route and alternative routes crossings would be right before the circular loading loop or series of parallel tracks. Although there are more elevated uplands adjacent to the creek, channel configuration is similar to the other creeks that would be crossed by the proposed rail line. Woodlands adjacent to the channel are more dense, however, and the substrate within the channel has a higher percentage of rock. Otherwise, the flow regime is likely similar to Cherry Creek, as the drainage areas are similar.

Cherry Creek. The proposed route and alternative routes would cross a small tributary of Cherry Creek and then the main channel of Cherry Creek near County Road 4516 (labeled as FM 2676 on the USGS maps). The small tributary contains only small surface water flows following larger rain events. The main channel near County Road 4516 is similar in configuration to Quihi Creek, although the channel is smaller and several small, on-channel impoundments are located within several hundred feet above and below the crossing point of the proposed route. Loose to consolidated clays with gravel make up the composition of the channel bottom. As stated in Table 3.3-4 and shown in Figure 3.3-3, the Cherry Creek crossing of Alternative 1 and Alternative 2 would be of higher order, although the proposed route and Alternative 3 would cross this creek more times.

There are three unnamed creeks that would be crossed by the proposed or alternative routes, labeled "Unnamed", "Unnamed 2", and "Unnamed 3" in Figure 3.3-3. The two larger of these three are described below.

Unnamed Tributary of Elm Creek (Unnamed). This small drainage feature is located on the uplands within the proposed quarry area and loading/unloading loop and might be affected

by construction of the loading loop or straight track. The drainage lecture is a small ravine with a rock and clay bottom that only has surface flows after rainfall events.

Unnamed Tributary of Hondo Creek (Unnamed 2). This is a very small creek with a limited defined channel at the point of the proposed route and Alternative 3 crossings, about three-fourths of a mile north of where the routes would connect with the UP rail line. Alternative 2 would cross this creek west of the proposed route where the creek displays similar characteristics. Flows may occur during and immediately after heavy rainfall events and the creek is little more than a dry wash. The crossing of Alternative 1 would be of higher order than that of the other alternatives.

Streamflow Regime at Creek Crossings

In the karst terrain of the Edwards Aquifer, there are complex regional interactions between surface and groundwater. In this area, surface water can enter local karst features, pass rapidly through subterranean solution zones, and re-emerge in surface springs miles downstream. However, no streamflow sites have been identified within the area of the proposed project.

The northern end of the proposed rail line would be partially located within the EARZ. Four of the watersheds intercepted by the proposed and alternative routes are partially within the EARZ. (See Figure 3.3-4 and Table 3.3-5.) The crossings associated with Polecat Creek, and the Unnamed Creek occur upstream of the downstream boundary of the EARZ. The respective lengths of channel over the EARZ, downstream of the crossings, are approximately 2,200 feet and 2,500 feet for the Polecat Creek and Unnamed Creek crossings, respectively.

The most representative flow gauges available for streams across the EARZ in this region are those that straddle the EARZ on Hondo Creek and Seco Creek. **(See Figure 3.3-1.)** In the most recent study by the Texas Board of Water Engineers, completed in 1958, roughly half the 59 cubic feet per second (cfs) inflow from Hondo Creek into the upstream end of the EARZ was transmitted into the Edwards Group limestones across the EARZ. In the same study, relatively low losses into the Edwards Group limestone were noted along Seco Creek. In other words, a significant portion of surface water flow entered the Edwards Aquifer.

Table 3.3-5 Summary of Portion of Watersheds Within Edwards Aquifer Recharge Zone

Name	Edwards Zone	Acres	Sq Mi
Cherry Creek	Artesian[1]	3,069	4.8
Elm Creek	Artesian	228	0.4
	Recharge[2]	18,357	28.7
Polecat Creek	Artesian	51	0.1
	Recharge	1402	2.2
Quihi Creek	Artesian	10,984	17.2
	Recharge	6,687	10.4
Unnamed Creek	Artesian	391	0.6
	Recharge	200	0.3

[1] The artesian zone is a complex network of interconnecting spaces located between two less permeable layers that confine the water and pressurize the system.
[2] The recharge zone also known as the Balcones Fault Zone provides the path for water to reach the artesian zone.

This condition would not have significantly changed in the 45 years since the study was conducted. In an area where significant stream losses have been measured over a reach of exposed karst limestone, the losses are likely due to solution cavities naturally eroded within the limestone providing a relatively unimpeded path from surface water into groundwater. Losses through karst limestone are higher than for a typical sand and gravel bed stream, because flow through sand and gravel is much slower. The solution cavities essentially act as open pipes from the ground surface to the subsurface groundwater. The losses over karst would significantly change only: 1) if there were a significant change in inflow flow regime (i.e. change in typical seasonal flows); 2) if there were significant changes in the size of solution cavities transmitting the flow; or (3) if those cavities were blocked by sediment. There does not appear to have been a significant change in land use within these watersheds within the past 45 years. Thus, there would likely not have been a significant change over this period in storm runoff, upstream recharge feeding baseflow, or sediment loading. Also, the geologic processes that form and expand solution cavities in karst are typically slow. Therefore the stream losses over the EARZ are not expected to have materially changed in the past 45 years.

Additionally, SEA noted that a significant cave (Woodward Cave near Utopia, Texas) in the EARZ limestone exists within the Seco Creek floodplain that transmits large flows into the limestone during floods.

Water Quality Downstream of Creek Crossings

The Draft 2002 Texas Water Quality Inventory includes an assessment of Hondo Creek (Segment 2114) for 78 miles, from the intersection with State Road 470 in Bandera County to the intersection with the Frio River. (See Figure 3.3-1.) The proposed and alternative routes all are located upstream of the lower half of this assessed segment. The quality of water within the lower 53 miles of the 78 mile assessed segment was listed as fully capable of supporting general use and public water supply. No concerns were noted for narrative criteria or secondary concerns. The relevant lower portion of the segment was not assessed for aquatic life use, contact recreation, nutrient enrichment concerns, or algal growth. The upper portion of the segment (upstream of the junction with Quihi Creek) received a more detailed assessment and was found fully supporting of general use, public water supply use, aquatic life use, and contact recreation use. This upper segment was also assessed for nutrient enrichment, algal growth, narrative criteria and secondary concerns; no concerns were identified in any of these categories. Neither portion of the segment was assessed for fish consumption, sediment contaminants, or fish tissue contaminants.

Identification of Downstream Water Users

The locations of the nearest downstream water rights, as derived from the TCEQ Nueces River WAM database, are shown in Figure 3.3-5. Table 3.3-6 summarizes the basic characteristics of these rights. These rights are for irrigation purposes, and owned by individuals. Figure 3.3-6 shows the locations of the rights (derived from the same source) much further downstream, to include large municipal use rights owned by the City of Corpus Christi, and smaller rights owned by the City of Three Rivers. Table 3.3-7 summarizes the basic characteristics of these downstream municipal use water rights.

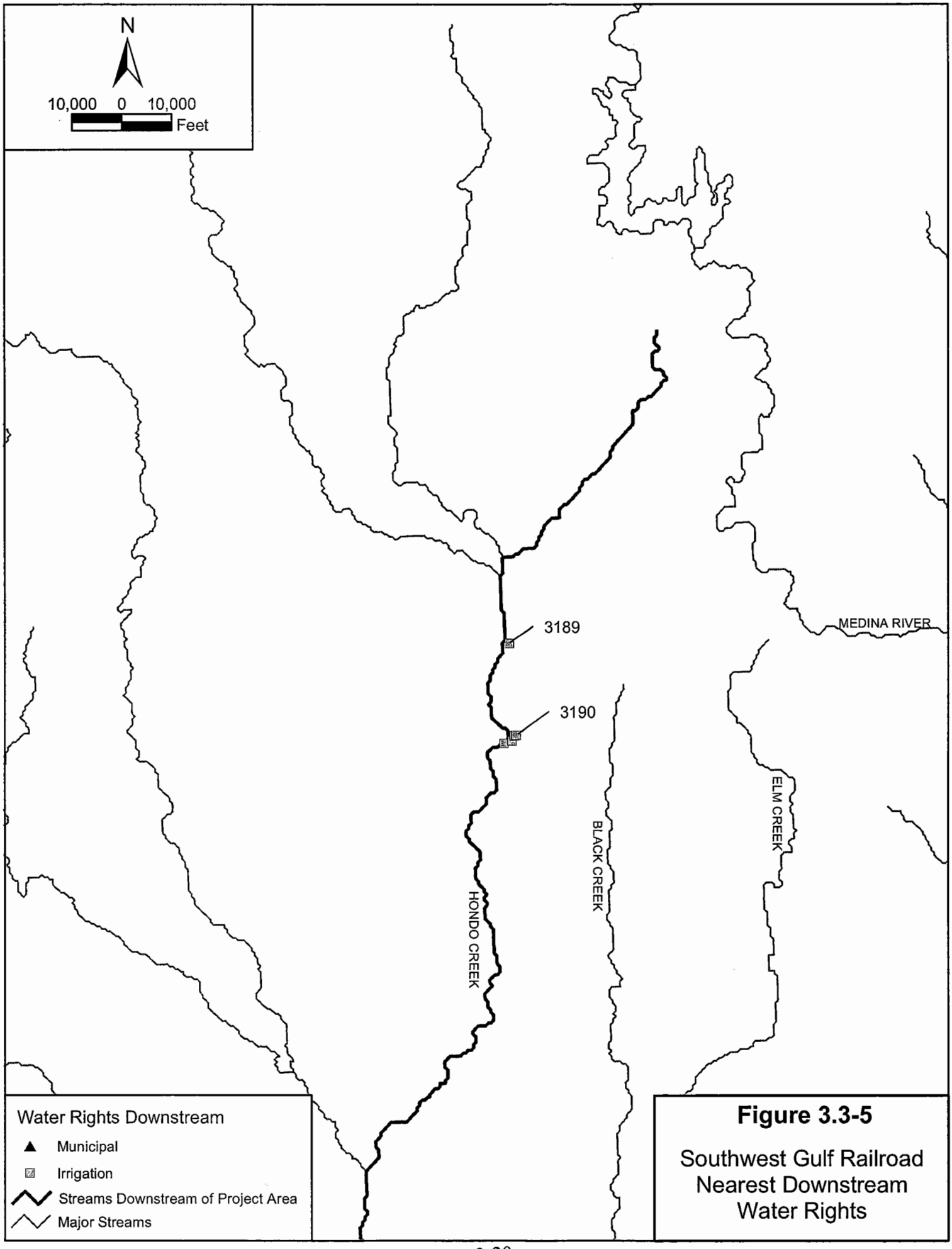

Figure 3.3-5

Southwest Gulf Railroad
Nearest Downstream
Water Rights

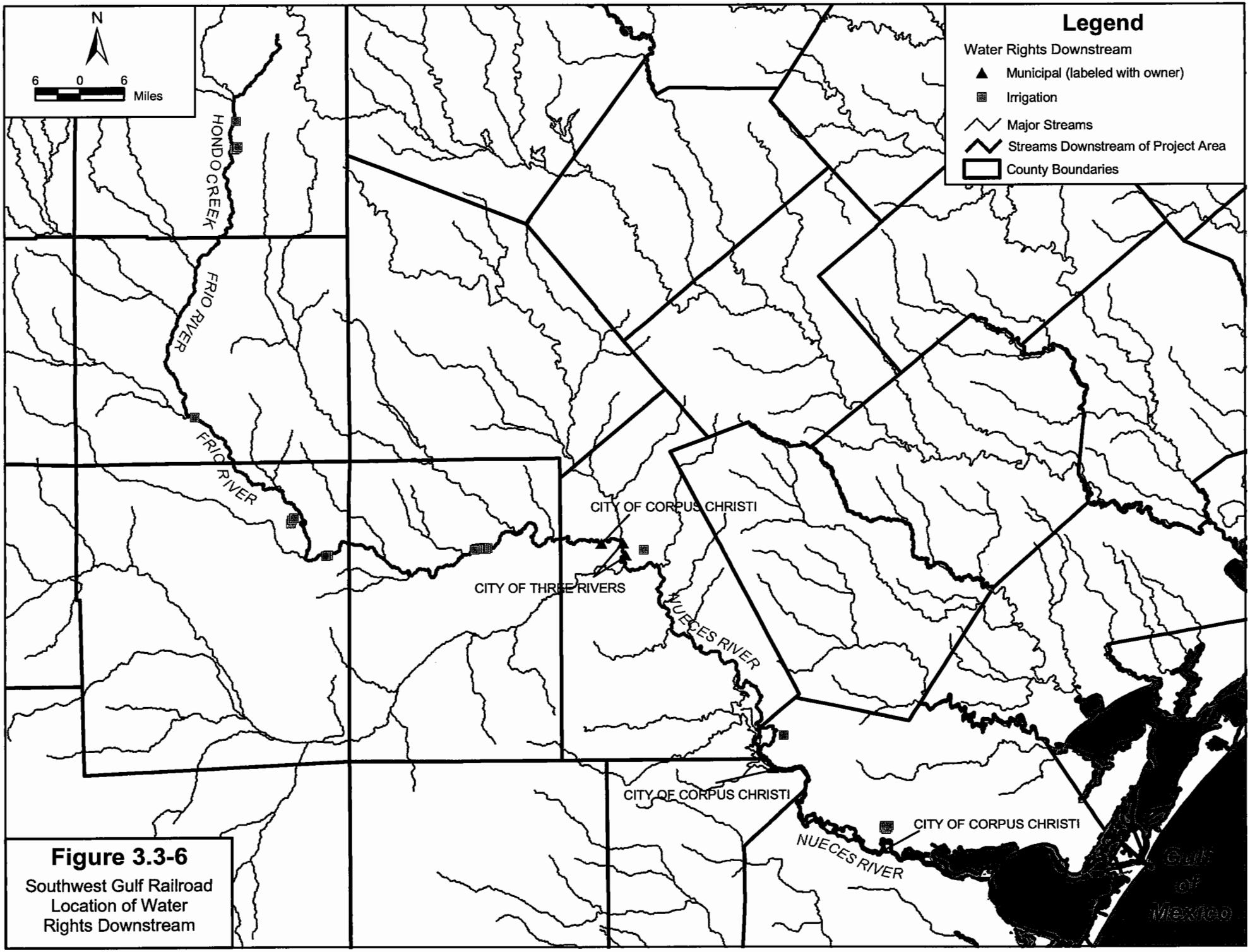

Figure 3.3-6
Southwest Gulf Railroad
Location of Water
Rights Downstream

Table 3.3-6. Summary of Water Rights in Vicinity of Project

Water Right	Owner	Use	Amount (Ac-ft/year)	Water Rights ID from WAM	Type	Source of Right
4506	Individual	Irrigation	40	12104506001	Diversion point	Hondo Creek
3190	Individual	Irrigation	80	62103190001	Diversion point	Hondo Creek
				62103190002	Diversion point	Hondo Creek
				62103190003	Diversion point	Hondo Creek
				62103190401	Off-channel reservoir	Hondo Creek
3189	Individual	Irrigation	40	62103189001	Diversion point	Hondo Creek

Table 3.3-7. Summary of Downstream Municipal Use Water Rights

Water Right	Owner	Use	Amount (Ac-ft/ year)	Type	Stream
2464	City of Corpus Christi	Municipal/Domestic	150000	Diversion point	Nueces River
	City of Corpus Christi	Municipal/Domestic	150000	Diversion point	Nueces River
3214	City of Corpus Christi	Municipal/Domestic	Unknown	Diversion point	Frio River
3215	City of Three Rivers	Municipal/Domestic	700	Diversion point	Frio River
	City of Three Rivers	Municipal/Domestic	700	Diversion point	Frio River

3.3.3 Wetlands

Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin et al., 1979). Wetlands vary widely because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance.

For regulatory purposes under the Federal Clean Water Act (CWA), the term wetlands means "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (40 CFR Part 230.3(t).)

On May 1, 2003, SEA conducted a site visit of the proposed route area and identified aquatic and wetland resources consisting of stream channels, temporary pools formed along stream channels, and man-made excavated and diked areas that impound water. The National Wetlands

Inventory (NWI) lists numerous small features of this type adjacent to the proposed route and alternatives. The NWI lists only Elm Creek and portions of Cherry Creek and Quihi Creek as forming Riparian Wetlands.[3] The remaining creeks and drainages are considered to have insufficient flows to form wetlands. However, all drainages are listed as having small pools along the channel of the creek that form Palustrine Wetlands.[4] Also, numerous, small, man-made impounded areas spread throughout the project area are listed as various types of wetland resources. The number of these that would form wetlands as defined under provisions of the CWA is, however, limited to those closely associated with the larger streams. This is in part due to the lack of occurrence of hydric soils.[5]

There is little natural opportunity for significant wetland resources to form in Medina County. The area is normally subtropical and xeric (i.e., very dry). The one soil type considered a hydric soil by the Natural Resource Conservation Service that is within Medina County is not located within the proposed project area. Therefore, wetland resources in the proposed project area are restricted to the channels of the larger creeks and to moist soil areas immediately adjacent to these stream channels. The possibility of adjacent moist soil areas supporting wetlands is, however, enhanced by the frequent impounding of stream channels for agricultural purposes.

Activities that affect resources of this type may be regulated under the CWA and the U.S. Army Corps of Engineers (Corps) regulatory program under Section 404 of the CWA. Linear projects like the proposed rail line commonly cross creeks and other types of surface water.

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[3]Riparian Wetlands are the most biologically productive ecosystems in nature. This habitat is essential to a vast diversity of species including birds, fish, reptiles, invertebrates and mammals.

[4]Wetlands within this category include inland marshes and swamps as well as bogs, fens, tundra, and floodplains. Palustrine systems include any inland wetland that lacks flowing water and contains very low concentrations of ocean derived salts.

[5]A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions (no oxygen) in the upper part.

Activities that affect a stream with sufficient duration of water flows to create an ordinary high water mark[6] are regulated as well as are wetlands adjacent to such streams. Wetlands that are "isolated" from and therefore not associated with a stream are not regulated. There are several proposed stream crossings identified for the proposed route and alternatives that could be subject to regulation under the Corps permit program. These are small intermittent streams with narrow channels, as described above. SGR has stated that it would build trellis bridges for the proposed crossings of Polecat, Elm, and Quihi Creek. Figure 3.3-7 shows the 100 year floodplain regions for the project area. Chapter 4 discusses the proposed stream crossings in more detail.

3.4 Biological Resources

Biological resources along the proposed rail line consist of a diverse assortment of wooded areas, brushlands, open pasture and agricultural croplands. Prior land development for agriculture, farmstead, and rural residences has produced a mosaic of these various vegetation types. Wildlife resources most notable in the area are associated with the pronounced edges between different types of vegetation.

SEA completed field assessments of the proposed route between February and May, 2003, which included pedestrian surveys of undeveloped lands and unimproved agricultural lands. The assessment of biological resources along the alternative routes was completed by partial observation by automobile and by a more detailed review of these routes on aerial photography (Texas Digital Ortho Quadrangle False Color Infrared dated 1995), published soil maps, National Wetland Inventory Maps, and USGS 7.5 minute topographic maps. SEA observed that resources occurring along the proposed route and alternative routes were similar in vegetative cover and habitat characteristic.

3.4.1 Flora

The project area is almost entirely located along the northern border of the South Texas Brushlands vegetation region. Natural vegetation consists largely of brushlands interspersed with small areas of prairie. Agricultural uses of this area, based on the age of structures in the area,

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[6] "The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." 33 CFR 328.3(e).

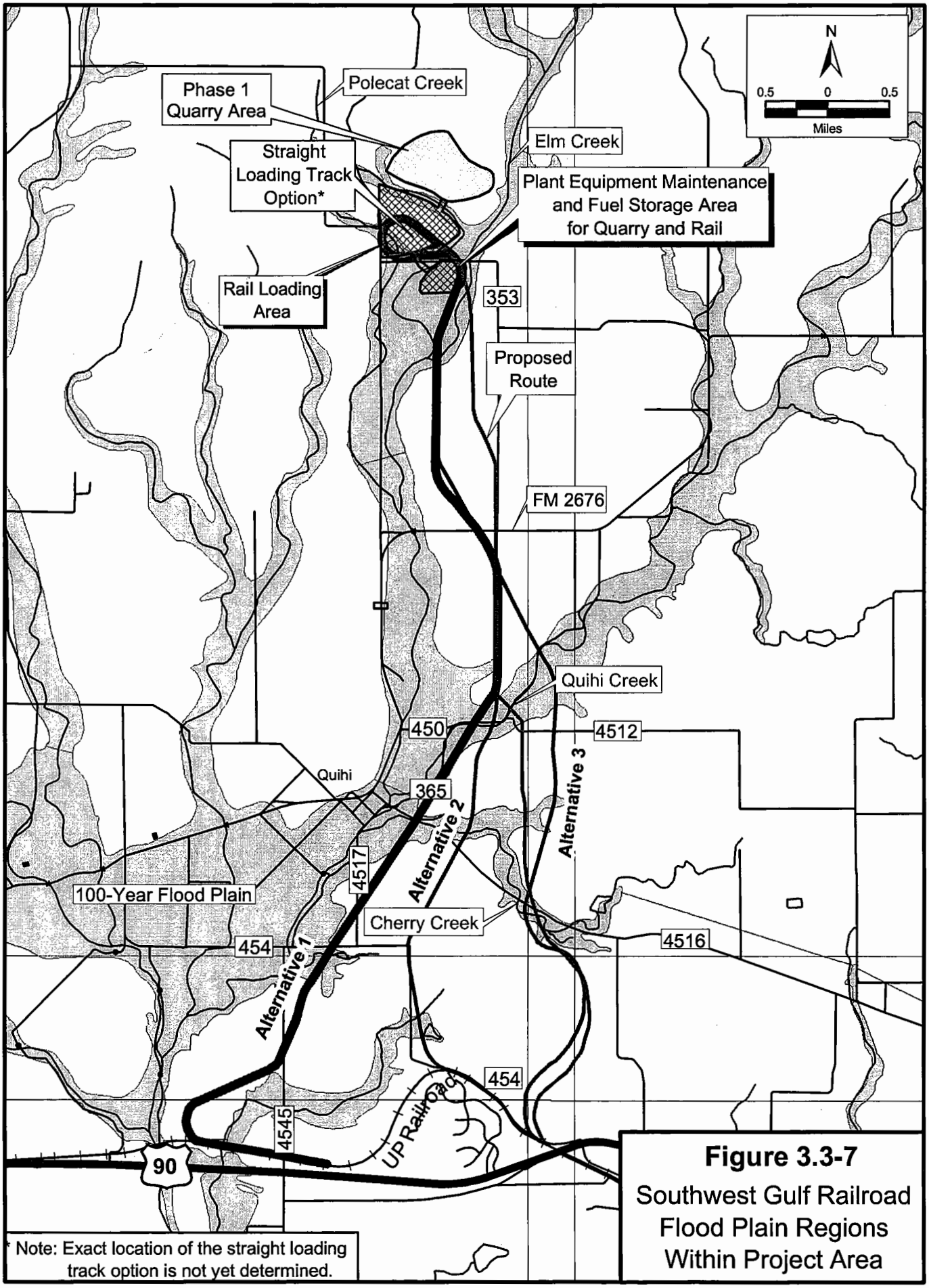

Figure 3.3-7
Southwest Gulf Railroad
Flood Plain Regions
Within Project Area

likely began over 150 years ago. At that time, areas of native brush were cleared and used for a period of time for crops or grazing. Some of the areas were then abandoned and allowed to return to brushlands. The better crop producing soils likely have remained clear of brush and native vegetation since that time. The area now consists of a diverse mosaic of croplands, managed pasturelands, and brushlands of various stages of redevelopment. Some of the more densely wooded areas are associated with soils that are poorly adapted to agricultural use. These areas may remain in relatively original conditions, but are uncommon and appear to consist of small areas maintained as wood lots.

SEA did not identify any sensitive plant communities located within or near the proposed route or alternative routes of the rail line. This could be attributable to the extensive clearing and land use practices in the area.

3.4.2 Fauna

Animal populations in the project area consist largely of species tolerant of agricultural and land clearing activities. Songbirds such as Mockingbirds are very common due to their use of the edges between different plant communities. Other bird species such as Brown-headed cowbirds, White-wing dove, and Starlings, are attracted to agricultural activities and are abundant in the area as well. SEA did not identify any sensitive wildlife resources located within or near the proposed route or alternative routes of the rail line.

3.4.3 Endangered or Threatened Species

SEA obtained a review of species potentially occurring in Medina County currently listed as protected under the Federal Endangered Species Act, as well as state listed species, from the Wildlife Diversity Program of the Texas Parks and Wildlife Department. These are summarized in Table 3.4-1. The U.S. Fish and Wildlife Service (FWS) submitted a letter, dated April 22, 2003, indicating that the two Federally-listed songbirds, the Black-capped Vireo and the Golden-cheeked Warbler, had a possibility of occurrence in the project area. **(See Appendix C.)** Field surveys conducted by SEA indicate that neither the Black-capped Vireo nor the Golden-cheeked Warbler are present in the area of the proposed route and alternatives, likely due to lack of suitable habitat. The proposed loading loop or straight track would be located within the quarry area; this area is in a dispersed woodland composed largely of juniper and oaks that could provide suitable habitat for the Golden-cheeked Warbler.

Table 3.4-1. Federal and State Listed Threatened, Endangered and Protected Species in Medina County Including Additional Species of Concern Listed by Texas Parks and Wildlife Department

	Federal Status	State Status
* * * AMPHIBIANS * * *		
Edwards Plateau Spring Salamandes (*Eurycea* sp. 7) - endemic; troglobitic; springs, seeps, cave streams, and creek headwaters; often hides under rocks and leaves in water; Edwards Plateau, from near Austin to Val Verde County		
Valdina Farms Sinkhole Salamander (*Eurycea troglodytes*) - isolated, intermittent pools of a subterranean stream; sinkhole located in Medina County		
* * * ARACHNIDS * * *		
Braken Bat Cave Meshweaver (Veni's Cave Spider) (Cicurina venii) – small, eyeless, or essentially eyeless spider; karst features in western Bexar County and eastern Medina County	LE	
Government Canyon Bat Cave Meshweaver (Vesper Cave Spider) (Cicurina vespera) - small, eyeless, or essentially eyeless spider; karst features in northwestern Bexar County and northeastern Medina County	LE	
Government Canyon Bat Cave Spider (Government Canyon Cave Spider) (Neoleptoneta microps) - small, eyeless, or essentially eyeless spider; karst features in northwestern Bexar County and northeastern Medina County	LE	
Madla Cave Meshweaver (Madla's Cave Spider) (Cicurina madla) - small, eyeless, or essentially eyeless spider; karst features in northern Bexar County and northeastern Medina County	LE	
* * * BIRDS * * *		
American Peregrine Falcon (*Falco peregrinus anatum*) - potential migrant; nests in west Texas	DL	E
Arctic Peregrine Falcon (*Falco peregrinus tundrius*) - potential migrant	DL	T
Black-capped Vireo (Vireo atricapillus) – oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous & broad-leaved shrubs & trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, & required structure; nests mid April-late summer	LE	E
Golden-cheeked Warbler (Dendroica chrysoparia) - juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees & shrubs nests late March-early summer	LE	E
Henslow's Sparrow (*Ammodramus henslowii*) - wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking; likely to occur, but few records within this county		
Zone-tailed Hawk (*Buteo albonotatus*) - arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T

Table 3.4-1. (Continued)

	Federal Status	State Status
*** INSECTS ***		
A Ground Beetle (*Rhadine exilis*) - small, essentially eyeless ground beetle; karst features in northern Bexar County and northeastern Medina County	LE	
A Ground Beetle (*Rhadine infernalis*) - small, essentially eyeless ground beetle; karst features in northern and western Bexar County and northeastern Medina County.	LE	
Helotes Mold Beetle (*Batrisodes venyivi*) - small, eyeless mold beetle; karst features in northwestern Bexar County and northeastern Medina County	LE	
Maculated Manfreda Skipper (*Stallingsia maculosus*) - most skippers are small and stout-bodied; name derives from fast, erratic flight; at rest most skippers hold front and hind wings at different angles; skipper larvae usually feed inside a leaf shelter and pupate in a cocoon made of leaves fastened together with silk		
*** MAMMALS ***		
Frio Pocket Gopher (*Geomys texensis bakeri*) - associated with nearly level Atco soil, which is well-drained and consists of sandy surface layers with loam extending to as deep as two meters		
*** REPTILES ***		
Indigo Snake (*Drymarchon corais*) - Texas south of the Guadalupe River and Balcones Escarpment; thornbush-chaparral woodlands and south Texas, in particular dense riparian corridors; can do well in suburban and irrigated croplands if not molested or indirectly poisoned; requires moist microhabitats, such as rodent burrows, for shelter		T
Keeled Earless Lizard (*Holbrookia propinqua*) - coastal dunes, barrier islands, and other sandy areas; eats insects and likely other small invertegrates; eggs laid underground March-September (most May-August)		
Spot-tailed Earless Lizard (*Holbrookia lacerata*) - central & southern Texas and Adjacent Mexico; oak-juniper woodlands & mesquite-prickly pear associations; eggs laid underground; eats small invertebrates		
Texas Garter Snake (*Thamnophis sirtalis annectens*) - wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas Horned Lizard (*Phrynosoma cornutum*) - open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows or hides under rock when inactive; breeds March-September		T
Texas Tortoise (*Goherus berlandieri*) - open brush with a grass understory is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush of bush or cactus, sometimes in underground burrows or under objects; longevity greater than 50 years; active March-November; breeds April-November		T

Table 3.4-1. (Continued)

	Federal Status	State Status
*** VASCULAR PLANTS ***		
Bracted twistflower (*Streptanthus bracteatus*) - endemic; shallow clay soils over limestone, mostly on rocky slopes, in openings in juniper-oak woodlands; flowering April-May		
Sandhill woolywhite (*Hymenopappus carrizoanus*) - endemic; open areas in deep sands derived fro Carrizo and similar Eocene formations, including disturbed areas; flowering late spring-fall		
Texas mock-orange (*Philadelphus texensis*) - endemic; limestone cliffs and boulders in mesic stream bottoms and canyons, usually in shade of mostly deciduous sloped forest; flowering April-May		

Source: Texas Parks & Wildlife Department Annotated County Lists of Rare Species for Medina County Last Revision: 10 Mar 2003

Status Key:

LE,LT - Federally Listed Endangered/Threatened
PE,PT - Federally Proposed Endangered/Threatened
E/SA, T/SA - Federally Endangered/Threatened by Similarity of Appearance
C1 - Federal Candidate, Category 1; information supports proposing to list as endangered/threatened
DL,PDL - Federally Delisted/Proposed for Delisting
NL - Not Federally Listed
E,T - State Endangered/Threatened
"blank" - Rare, but with no regulatory listing status

Vulcan Construction Materials, L.P. (VCM) initiated broad-scale field surveys of Phase I of the proposed quarry in July 2000. Phase I of the quarry development would include an approximate 400-600-acre area that would include the processing and crushing plant, the loading loop/straight track area, the fuel and maintenance facility (located to the south of the quarry), the first phase of mining activities (about 10-15 years worth of reserves), and associated habitat buffers and corridors. These surveys were conducted during the spring breeding season in 2001, 2002, and 2003. VCM is planning additional surveys for the remaining quarry areas. The focus of all of these surveys is to identify potential threatened and endangered species in the quarry area.

Copies of the biological assessments conducted by VCM are presented as **Appendix F**. VCM identified mature Ashe juniper and hardwoods areas on the quarry site that could provide suitable habitat for the Golden-cheeked Warbler. Those areas with the highest potential to support Golden-cheeked Warbler habitat are to be set aside as buffer zones and undisturbed wildlife preserve areas surrounding the quarry operations. (See Appendix G, February 18, 2004 letter from SGR attaching letter from FWS to VCM.)

The remaining Federally-listed species are associated only with karst features (caves, sinkholes, etc.). A small portion of the proposed rail line would occur on geologic outcrops of karst forming limestone. This area is within the site of the proposed quarry and SEA did not locate observable karst features during field surveys. Additional detailed surveys conducted by VCM also did not locate karst features within the loading and/or fuel maintenance areas.

There are no Federally-listed endangered or threatened plants known to occur in Medina County.

3.5 Climate and Air Quality

Medina County has a subtropical and subhumid climate, with hot and dry summers. Annual rainfall averages 28.43 inches and the average relative humidity ranges from 81 percent at 6 a.m. to 49 percent at 6 p.m. The average low temperature is 42°F in the winter and the average high temperature is 96°F in the summer, with an annual growing season of 263 days (Handbook of Texas Online.) The heaviest amount of rainfall occurs from April through June and from September through October. In an average year, evaporation exceeds precipitation by 36 inches; mean annual free water (lake) evaporation is 62 inches. The prevailing wind circulation during the warm season is reversed during the cool season. Northerly winds predominate from November through February because of the influence of polar continental air masses, but southeasterly winds are persistent from April through September, because tropical maritime air masses from the Gulf of Mexico control the weather. (Carr, 1967 and Dittmar et al., 1977.)

Medina County is in attainment of all National Ambient Air Quality Standards established under the Federal Clean Air Act (CAA) and administered by the EPA. However, neighboring Bexar county is considered an affected county that may become a non-attainment area in the near future.

3.6 Physical Setting (Physiography)

Medina County, located in south central Texas, has an area of about 1,357 square miles, or 868,480 acres. The major streams located in the county include the following: the Medina River (San Antonio River major basin); Chacon Creek; Hondo Creek; San Francisco Perez Creek; San Geronimo Creek; Seco Creek; and Verde Creek. The Frio River flows for a short distance in the southwestern part of the county. Squirrel Creek, Seco Creek, Hondo Creek, Verde Creek, and Quihi Creek are the principal streams that drain the northern and western part

of the county (Nueces River major basin). These streams are intermittent across and somewhat downstream of the Edwards Aquifer Recharge Zone (EARZ) and flow south into the Frio and Nueces Rivers outside the county. The streams all flow in a south to southeast direction. Medina Lake, on the Medina River in the extreme northeastern part of the county, provides water for irrigation and recreation. (Dittmar et al., 1977; Carr, 1967.)

Medina Lake, which is approximately 18 miles in length when full with a 110-mile shoreline, covers 5,575 acres at spillway level (i.e., the level at which the water begins to overflow from the lake). The center of the lake marks the boundary between Medina County to the south and Bandera County to the north. (Dittmar et al., 1977.) The northern and eastern parts of the county are drained by the Medina River, which is the only perennial stream in the county and which empties into the San Antonio River. Hondo Creek also has a perennial flow for about eight to ten miles in the southern part of the county. Most of the southeastern part of the county is drained by Black Creek, San Francisco Perez Creek, and Chacon Creek, which flow into the Frio and Nueces River outside the county.

Relief (change in elevation) in Medina County ranges from nearly level to steep. The northern part of the county is rough or hilly and locally is called "hill country." Large areas in the central part of the county and scattered areas throughout the country are nearly level. Elevation ranges from 560 feet in the southeastern corner of the county to 2,030 feet in the northwestern corner.

Most of the irrigation water in Medina County comes from deep wells drilled into the Edwards Group Limestones that comprise the Edwards Aquifer. In the southern part of the county some relatively shallow wells obtain water from the Carrizo Sand and the Indio Rock Formations. In the southeastern corner of the county, about 18,000 acres of land receive irrigation water by canal from Medina Lake. The communities of Hondo, D'Hanis, Castroville, and LaCoste depend on water mainly from the Edwards Aquifer. In the central to southern part of the county, some irrigation and domestic/stock wells are drilled in the shallow Leona Formation. In the northern part, ponds, springs, and shallow wells drilled mainly into the Glen Rose Formation and Cow Creek Limestone supply groundwater. Most of these groundwater aquifers, (with the exception of the Leona Formation) occur in confined conditions. Some wells drilled in the Edwards Aquifer in the extreme southern portion of Medina County are flowing

artesian wells.[7] Elevations at the site of the proposed project are between 800 and 900 feet above mean sea level.

3.6.1 Soils

Native soils in the southern portion of the proposed rail line belong to the Olmos-Yologo-Hindes soil association (Dittmar et al., 1977). These soils range from very shallow to moderately deep, and are gently sloping to sloping and undulating. The soils are also gravelly and loamy, as well as noncalcareous to calcareous soils.[8] Most of this association is used for range and wildlife habitat. In general, this association is not suitable for cultivation. Most of the relief changes occur in the southernmost portions of the proposed route and alternative rail routes.

The native soils in the central part of the proposed rail line belong to the Knippa-Mercedes-Castroville association, with deep, nearly level to gently sloping, loamy and clayey, calcareous soils. These soils can be used for cultivation and wildlife habitat.

The northern portion of the proposed rail line consists of native soils that belong to the Speck-Pratley-Mereta association. These soils are moderately deep and shallow, nearly level to gently sloping and undulating, loamy and clayey, noncalcareous to calcareous soils. These soils are well suited for range and wildlife habitat. Most of these soils are not suited for cultivation.

SEA contacted the U.S. Department of Agricultural Natural Resources Conservation Service (NRCS) to obtain a listing of prime farmland soils in Medina County. SEA then studied soil maps of the project area to determine whether the proposed or alternative routes would cross soils that have been designated as prime farmland soils. According to NRCS National Soil Survey Handbook, title 430-VI, prime farmland is: "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses."

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[7] A flowing artesian well has water that comes up to the surface because of internal pressure in the underground.

[8] Calcareous soils are soils in which a high amount of calcium carbonate is present. These soils are formed by the weathering of calcareous rocks and fossil shell beds.

Below is a description of the different soil series that would be crossed by each of the potential rail alignments, obtained by using the following references: NRCS Electronic Field Office Technical Guide; and "Soil Survey of Medina County, Texas" (Dittmar et al., 1977).

Soil Series on Proposed Route

The following soil series would be crossed by the proposed route (in order of first occurrence, south to north):

Olmos, undulating (OND) – found on low knolls or long, narrow ridges, this series has medium surface runoff and presents severe erosion hazard. High lime content makes these soils poor for forage and unsuitable for cultivation.

Monteola gravelly clay (MoC) – found mainly on uplands with smooth or undulating relief, surface runoff is medium, with slight erosion hazard. Pebbles on the surface help reduce evaporation and erosion. This series is mainly used for range, with some areas cultivated; cultivated fields have specific management needs, including terraces and countour tillage to help control erosion, and well-designed irrigation systems on irrigated lands. In the area that would be crossed by the proposed route, MoC soils are currently occupied by scrub brush vegetation. The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) has listed Monteola gravelly clay as a prime farmland soil in Medina County.

Monteola clay (MnC) – found on slope breaks of erosional uplands, surface runoff is medium, with medium erosion hazard. This series is used for range and crops; cultivated fields have specific management needs, including terraces and countour tillage to help control erosion, and well-designed irrigation systems on irrigated lands. In the area that would be crossed by the proposed route, MoC soils near the south end of the corridor are currently occupied by a mix of scrub brush and open range vegetation, while at the north end are open range. NRCS has listed Monteola clay as a prime farmland soil in Medina County.

Rehm complex (RmD) – consisting of undulating gravelly clay loams on uplands, with medium surface runoff and high erosion hazard. These soils are not suitable for cultivation because of the slope, content of gravel, and susceptibility to erosion, and almost all areas are used for range and wildlife habitat. RmD soils are found along the southern portion of the proposed route, and are currently covered by scrub brush vegetation.

Victoria clay, 0-1 percent slopes (VcA) – nearly level soil found on outwash plains and stream terraces, this series has very slow runoff and slight erosion hazard. This soil is mainly used for crops and is suited to irrigation. South of Quihi Creek the VcA soils that would be crossed by the proposed route are covered by scrub brush vegetation, but north of Quihi Creek VcA soils are cultivated. NRCS has listed Victoria clay as a prime farmland soil in Medina County when irrigated.

Knippa clay, 0-1 percent slopes (KnA) – nearly level soil on broad, smooth outwash planes and old stream terraces, this series has very slow runoff and slight erosion hazard. This soil is mainly used for crops and is suited to irrigation. KnA soils crossed by the proposed route are cultivated. NRCS has listed Knippa clay as a prime farmland soil in Medina County.

Knippa clay, 1-3 percent slopes (KnB) – gently sloping soil with medium surface runoff and moderate erosion potential. This soil is mainly used for crops, with additional management requirements because of the sloping, including terraces and contour tillage as suggested improvements. KnB soils that would be crossed by the proposed route are cultivated. NRCS has listed Knippa clay as a prime farmland soil in Medina County.

Hanis sandy clay loam, 1-3 percent slopes (HaB) – gently sloping soil found on uplands, mainly between more level soils, and on breaks along narrow drainageways and shallow valleys, this series has medium surface runoff and moderate erosion hazard. This soil is mainly used for crops, and is cultivated in the area that would be crossed by the proposed route. NRCS has listed Hanis sandy clay loam as a prime farmland soil in Medina County.

Other soils – narrow bands of soils not considered as prime farmland would be crossed by the proposed rail line, including: Quihi Series (QuC), a gravelly clay found on uplands not suitable for cultivation; Divot clay loam (Dp), frequently flooded, a soil found along Quihi and Elm creeks that is used mainly for range and wildlife habitat; Olmos complex (OmD), 1 to 8 percent slopes, a sloping gravelly clay used mostly for range; and Quihi and Devine soils (QvD), 1 to 8 percent slopes, consisting of sloping, gravelly upland soils, almost entirely used for range.

Soil Series on Alternatives 1, 2, and 3

In addition to the soil series crossed by the proposed route, the following prime farmland soil series would be crossed by the alternative alignments:

Castroville clay loam 0-1 percent slopes (CsA) – nearly level soil found on broad outwash plains or stream terraces, this series has slow surface runoff and slight erosion hazard. This soil is mainly used for crops, and is well suited for irrigation. NRCS has listed Castroville clay loam as a prime farmland soil in Medina County.

Castroville clay loam 1-3 percent slopes (CsB) – gently sloping soil found on stream terraces, this series has medium surface runoff and moderate erosion hazard. This soil is mainly used for crops, and is well suited for irrigation. NRCS has listed Castroville clay loam as a prime farmland soil in Medina County.

Divot clay loam, occasionally flooded (Do) – found on floodplains and alluvial fans of streams, this series has slow surface runoff and slight erosion hazard, and is flooded for brief periods about once in 5 to 20 years. This soil is mainly used for crops, and is well suited for irrigation. NRCS has listed occasionally flooded Divot clay loam as a prime farmland soil in Medina County.

Mercedes clay 0-1 percent slopes (McA) – nearly level soil found over broad areas, this series has slow surface runoff and slight erosion hazard. This soil is mainly used for crops, and is well suited for irrigation. NRCS has listed Mercedes clay as a prime farmland soil in Medina County when irrigated.

Mercedes clay 1-3 percent slopes (McB) – gently sloping soil, this series has medium surface runoff and moderate erosion hazard. This soil is used for crops, and is well suited for irrigation – however, the area where the alternative alignments would cross this series is dedicated to pasture. NRCS has listed Mercedes clay as a prime farmland soil in Medina County when irrigated.

Chapter 4, Section 4.10, lists the acreage of NRCS prime farmland soils crossed by the proposed alignment and alternatives. As noted above, some of these designations may not be applicable here based on use, as a few of the soil types crossed (CsB, McB, MnC, MoC) are not currently cultivated in the areas that would be impacted by the proposed or alternative alignments.

In general, there are highly or severely erosive soils in the vicinity of the loading loop or straight track, and in the vicinity of the southern four miles of the proposed route (Dittmar,

1977). Alternative 1 and Alternative 2 appear to largely avoid the highly and severely erosive soils within the south end of the project area.

No-Action Alternative

Under the no-action alternative, an approximately 100-acre truck-to-rail remote loading facility would be situated in the southern portion of the project area, near to the UP rail line. Soil series at the site include Rehm Complex (RmD), Olmos Undulating (OMD), Monteola Clay (MnC), and Monteola Gravelly Clay (MoC), all of which are described above. Monteola Clay and Monteola Gravelly Clay are NRCS designated prime farmland soils.

3.6.2 Geologic Hazards

The geologic hazards (geohazards) discussed in this section are limited to landslide/mass movement hazards.

Landslide/Mass Movement Hazards

Mass movements of earth materials, more commonly known as landslides, are defined as the moderately rapid to rapid (on the order of one foot per year or greater) downslope transport of earth by means of gravitational body stresses. These landslides can result from a variety of causes, such as earthquakes, excess groundwater saturation, and volcanism. Whenever the topographic land forms become too unstable to maintain their form against the force of gravity, a mass movement or landslide is the result. Landslides can be catastrophically rapid or a slow creep that takes years to show appreciable movement.

Landslide data for the Texas region were derived from USGS and The Bureau of Economic Geology (BEG) (**Garner, et. al., 1976**). The landslide hazard data used is organized based on two descriptors: susceptibility and incidence.

Susceptibility is defined as the probability that land forms will respond (by landsliding) to natural or artificial cutting, loading of slopes, or to high precipitation rates. Susceptibility is classified as high, medium, or low and is determined based upon geologic materials, land forms, and degree of slope.

Incidence is categorized as low, moderate, or high. The three incidence categories are organized based on percentage of the defined area actually involved in landslide processes.

Incidence Categories

Area involved in the landsliding process	Incidence
15 percent	High
1.5-15 percent	Medium
<1.5 percent	Low

Based on a map reconnaissance, SEA determined that the landslide hazard along the proposed project area is described as low incidence with susceptibility ranging from low to high. According to the maps, the highest susceptibility areas occur in or near the areas in the southern portion of the proposed project area where the railroad would cross the Escondido Formation outcrop.[9] Portions of this outcrop have overlying outcrops of the Tertiary-age Uvalde Gravels on the hilltops. Local experience has shown that slope failure can occur when excavations are made at and within a few feet of the contact between the two formations. The natural slope at the formation contact should be preserved whenever possible because these areas are not stable and prone to slope failure when excavations are made into the slope near the contact between these two formations. Slope failure tends to occur at the formation contact during periods of higher than average rainfall.

As a result of this preliminary evaluation, SEA conducted an on-site visit to verify actual field conditions in March of 2003. This field assessment indicated that the proposed and alternative rail line routes were much lower on the slope of the hills than the area of concern shown on the maps. The southern portion of the routes would be completely upon the Escondido Formation. As a result, SEA determined that landslide hazards in this area would be negligible along the proposed and alternative routes.

3.6.3 Karst Features

Karst is a term used to identify the unique morphological and hydrological characteristics associated with carbonate bedrock terrains. Carbonate rocks, most commonly limestone or dolomite, are susceptible to chemical dissolution resulting in the development of solutional voids within the rock. This process results in the karst terrain land forms that include caves, sinkholes, blind valleys, sinking streams, springs, and other related features. Soluble rocks that have undergone karstification typically have high secondary porosity, allowing for rapid and large

[9] An outcrop is a portion of the geological formation exposed to the surface.

volumes of groundwater movement through them and making them important potential drinking water sources.

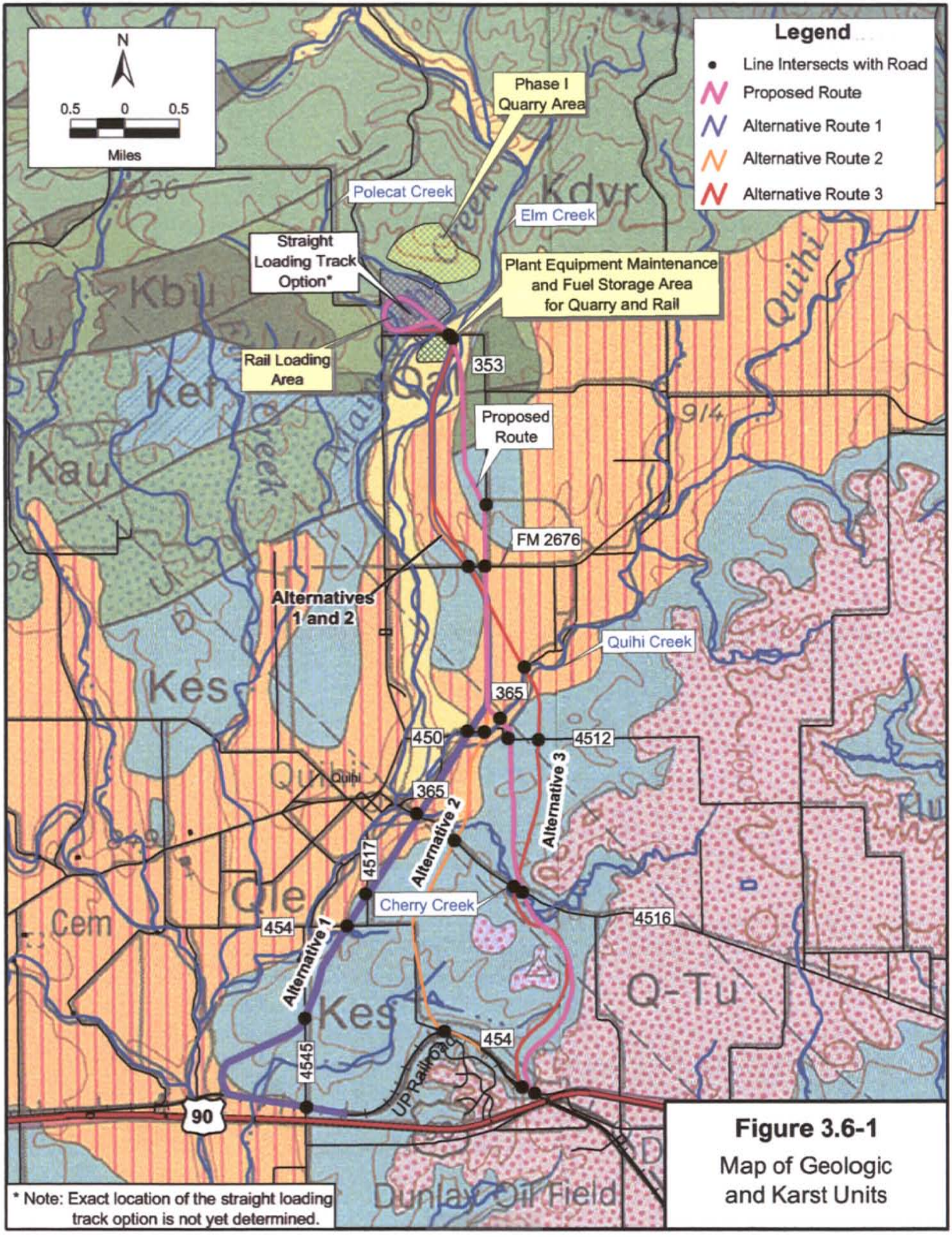
In order for karst land forms to develop, there must be carbonate or other soluble bedrock located at or near the ground surface. **Figure 3.6-1** presents the distribution of the lithologic units that are exposed at ground surface within the proposed rail line area (Bureau of Economic Geology, 1983). A review of the map indicates that there are four primary geologic units that are intersected by the proposed and alternative rail line routes. These formations include, from youngest to oldest, quaternary alluvium, the Leona Formation, the Escondido Formation, and the Devil's River Formation. Of these formations, only the Devil's River Formation is susceptible to karst development. **Figure 3.6-2** presents the Karst and pseudokarst regions of Texas, including the Balcones Fault Zone in Medina County. Table 3.3-1 in Section 3.3 provides a summary of the geologic units in the study area and their spatial relationships.

Quaternary Alluvium

The quaternary alluvium deposits occur along the northern portion of the proposed route and alternative rail routes for approximately 3,000 to 4,000 feet. These deposits consist of floodplain and stream deposits associated with the Elm Creek drainage and likely occur in thicknesses of less than 50 feet. The deposits are dominantly composed of sand and gravel layers with lesser amounts of silts and clays. In the area of the proposed rail line the alluvium is likely overlying either the Devil's River Formation or the Escondido Formation.

Leona Formation

This formation consists of quaternary aged sedimentary deposits ranging from fine calcareous silt to cherty gravel and typically ranges in thickness from 25 to 40 feet. As discussed in **Section 3.3.1**, this formation is classified as a Class IIa local aquifer that can provide small to moderate supplies of groundwater. A significant length of the central portion of the proposed route and alternative rail routes crosses over this formation. The Leona Formation in the study area is likely underlain by the Escondido Formation



* Note: Exact location of the straight loading track option is not yet determined.

Figure 3.6-1
Map of Geologic and Karst Units

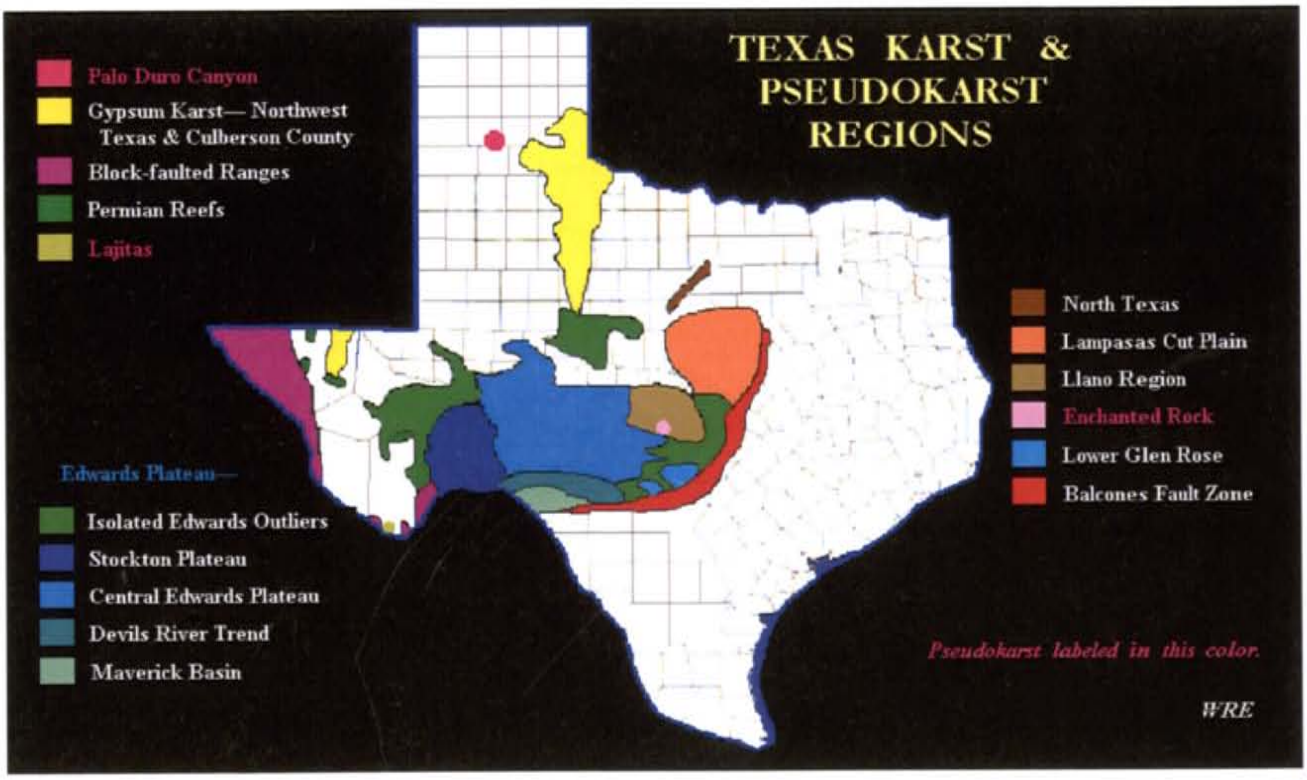


Figure 3.6-2. Texas Speleological Survey Map by William R. Elliott of the Karst and Pseudokarst Regions of Texas Including the Balcones Fault Zone in Medina County

Escondido Formation

The Escondido Formation is composed of a mixture of interlayered sandstone, siltstone, and shale and can occur in thicknesses of up to 285 feet in the study area. This formation has low porosity and permeability and is considered a regional confining unit to groundwater flow. The proposed rail line would cross a small area of the Escondido Formation in the central portion of the line and the entire southern half of the proposed rail line would be underlain by this rock unit.

Devil's River Formation

The Devil's River Formation (undivided) is the equivalent of the Edwards Formation (undivided) prevalent to the east of the study area. Regionally, the Devil's River Formation is composed of limestone and dolomite with lesser amounts of mudstone, fossiliferous zones, and zones of abundant chert. This Formation can be up to 600 feet thick and outcrops at the ground surface in the northern portion of the study area where faulting along the BFZ has exposed the formation on the upthrown side. The Devil's River Formation is highly karstified with abundant

dissolutional features resulting in a high secondary porosity and is the host rock for the Edwards Aquifer as discussed in **Section** 3.3.1. This Formation represents the material that would be removed by VCM's proposed quarry operations. The northern extent of the proposed route and alternative rail routes within the vicinity of the quarry operations would be constructed on this unit. The potential for karst development in the study area is limited to this rock unit.

3.7 Land Use

As shown in **Figure** 2.1-1, the proposed rail line would be located in south central Texas in Medina County near the community of Dunlay. Medina County's economy is based primarily on the following industries:

a) Livestock raising (cattle, sheep, and hogs);
b) Agricultural production of crops such as peanuts, pecans, sorghum, corn, grasses, wheat, carrots, watermelons, and hay;
c) Milk and egg production;
d) Mineral extraction (oil, gas, clay, coal, sand, and gravel); and
e) Other industries stemming from the area's natural resources.

Medina County contains an array of natural resources. There are four major oil and gas fields in the county: the Taylor-Ina field; the Adams field; the Bear Creek field; and the Chacon Lake field. The D'Hanis area of western Medina County contains high quality clays for the production of bricks and tile and the readily available good quality limestone in the county contributes to the construction of buildings and hand-carved tombstones. The county contains plentiful resources of crushed limestone, flintstone, igneous pebbles, caliche, and clay, which go into the development of road materials. In addition, mined from the caves in the limestone hills north of Hondo, bat guano is sold as high quality fertilizer. (Handbook of Texas Online.)

The Medina River crosses the northeastern portion of the county, and the county is divided from east to west by the Balcones Escarpment, which separates the Edwards Plateau and Hill Country to the north from the Rio Grande Plains to the south. Approximately 45 percent of the total area is prime farmland, and 55 percent is forest and grazing land. (Handbook of Texas Online.)

The proposed project area begins at the proposed quarry location and extends south approximately seven miles to the Del Rio Subdivision of the UP rail line near Dunlay. The general location of the proposed quarry is shown in Figure 2.1-1. The proposed rail route and

alternative rail routes are shown in Figure 2.1-2. Appendix H present an aerial photograph of the site and Appendix A presents ground level pictures of the proposed route. Most of the proposed rail line would be on property owned by SGR. However, some of the right-of-way of the proposed route or alternative rail routes would be on land owned by private owners. According to SGR, the proposed route would cross 10 individual properties that are not owned by SGR or its affiliates; Alternative 1 would cross about 20 individual properties; Alternative 2 would cross about 18 individual properties; and Alternative 3 would cross about 16 individual properties. (See aerial photograph in Appendix H.) Nearby land uses (USGS, 2001) include:

- Cropland and pasture.
- Deciduous forest.
- Evergreen forest.
- Herbaceous rangeland.
- Mixed rangeland.
- Mixed urban or built-up land.
- Nonforested wetlands.
- Reservoirs.
- Residential.
- Shrub and brush rangeland.
- Strip mines, quarries, and gravel pits.
- Transitional areas.

The lower reaches of Lake Medina are located to the north and east of the project site, approximately seven miles from the proposed rail line at the nearest location. The land within the proposed route and the alternative routes north of Schmidt Hill drains to Elm Creek, Cherry Creek, and subsequently Quihi Creek. The land within the proposed route and alternative routes south of Schmidt Hill drains into an unnamed tributary of Quihi Creek. Quihi Creek subsequently drains into Verde Creek and the Hondo Creek mainstream. The topography of the proposed project area is gently sloping, with a maximum grade of approximately 30 feet.

3.8 Noise

This section describes the existing noise environment in the proposed project area. The following discussion describes the receptors that may be affected by noise, the results of a site reconnaissance, and the sound level measurements in the project area.

The proposed route and the alternative routes would be located in an area that is primarily rural and is composed of relatively flat farmland and pastureland. The area is sparsely populated. The primary noise sources in the area consist of agricultural machinery, vehicular traffic, and insects. Insects significantly contribute to the ambient noise environment during the nighttime hours. Average daily traffic (ADT) volumes range from 40 and 200 vehicles on County Road 353 and County Road 4516, respectively (Medina County Commissioner 2003) to 610 and 1,950 vehicles on FM 2676 and FM 471, respectively (TxDOT, 2002).

SEA recorded a series of sound level measurements on August 6 and 7, 2003 at the closest residences to quantify the existing noise environment in the area of the proposed project. The residences were chosen based on proximity to the proposed route and potential rail alternatives, as well as for ease of access during all measurement periods. Some residences were not chosen because of issues, such as the presence of dogs, gates, or not being able to obtain permission from the resident. SEA believes the measurement locations selected are representative of the residences in the area. Data were gathered using one Larson Davis Model 820 ANSI (American National Standards Institute) Type 1 Integrating Sound Level Meter and three Larson Davis Model 720 ANSI Type 2 Integrating Sound Level Meters. The meters were calibrated before and after each measurement period. The meters were mounted on a tripod five feet above the ground to simulate the average height of the human ear. Each measurement location was monitored for one hour during the daytime and nighttime periods. The weighted average sound level for a 24-hour day (Ldn) was then calculated for each site using the hourly mean weighted sound level (Leq) values.[10] The following details the measurement locations. The results of the measurements and simultaneous traffic counts are summarized in Table 3.8-1 and correspond to the measurement locations depicted in Figure 3.8-1.

[10] Basis for these calculations can be found in Section 4.12.2 Fundamentals of Acoustics.

Table 3.8-1. Sound Level Measurements (dBA)

Measurement Identification	Location	Time	Sound Level Measurements						Traffic Counts*		
			L_e	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Autos	Medium Trucks	Heavy Trucks
ML1	187 County Road **351**	12:00 pm - 1:00 pm	41.8	33.5	58.9	42.9	36.6	34.9	0	0	0
		1:30 am - 2:30 am	48.9	47.1	53.9	50.1	48.4	48.0	0	0	0
ML2	1253 County Road 353	1:10 pm - 2:10 pm	50.4	42.6	62.5	52.7	49.1	46.4	1	0	0
		12:25 am - 1:25 am	51.1	49.8	53.7	52.1	50.5	50.1	1	0	0
ML3	993 County Road 354	2:15 pm - 3:15 pm	44.0	35.7	66.3	45.1	40.1	37.4	3	0	0
		11:20 pm - 12:20 am	49.0	46.2	55.2	50.8	48.3	47.2	1	0	0
ML4	5465 FM 2676	3:20 pm - 4:20 pm	41.0	33.7	59.9	42.8	36.4	34.9	14	0	0
		10:15 pm - 11:15 pm	50.2	48.0	53.6	50.8	50.0	48.9	6	0	0
ML5	Unknown Address on County Road 365 N29.24.360, W99.00.417	11:45 am - 12:45 pm	47.9	40.7	61.5	49.9	45.2	43.2	3	0	0
		11:40 pm - 12:40 am	53.2	51.9	54.40	53.9	52.9	52.5	0	0	0
ML6	190 County Road 4512	9:30 am - 10:30 am	42.2	37.1	53.5	44.4	39.7	37.1	0	0	0
		10.30 pm - 11:30 pm	50.2	48.1	53.1	513.7	50.0	49.6	0	0	0
ML7	388 County Road 356	2:35 - 3:35 pm	43.9	39.6	59.0	44.6	40.7	40.2	NA		
		1:20 - 2:20 am	52.9	51.0	60.0	53.1	52.7	51.6	NA		
ML8	4010 County Road 4516	12:10 - 1:10 pm	52.4	42.8	73.6	50.9	46.7	44.8	4	0	0
		1:20 - 2:20 am	53.1	51.4	57.8	53.8	53.1	52.2	0	0	0
ML9	944 County Road 4643	1:15 - 2:15 pm	53.1	42.5	48.8	52.1	46.7	44.6	10	0	0
		12:15 - 1:15 am	56.2	54.7	61.0	56.7	56.2	55.8	0	0	0
ML10	2560 County Road 454	2:20 - 3:20 pm	56.7	36.5	72.6	59.7	52.4	44.7	0	0	0
		11:10 pm - 12:10 am	55.6	48.9	73.0	57.7	53.3	50.4	0	0	0
ML11	1048 County Road 4511	10:00 - 11:00 am	45.2	36.7	61.5	48.1	43.2	40.2	0	0	0
		10:15 - 11:15 pm	58.1	48.2	72.8	58.7	50.2	49.3	0	0	0
ML12	299 County Road 4545	3:30 - 4:30 pm	49.3	37.4	72.7	52.7	41.6	36.9	1	0	0
		10:00 - 11:00 pm	60.1	48.0	87.5	56.7	51.2	49.4	1	0	0

Table 3.8-1. (Continued)

Measurement Identification	Location	Time	Sound Level Measurements						Traffic Counts*		
			L_e	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Autos	Medium Trucks	Heavy Trucks
ML13	915 County Road 454	12:10 - 1:10 pm	48.9	37.1	73.6	48.1	43.0	39.4	0	1	0
		11:10 pm - 12:10 am	53.5	52.2	63.1	53.9	53.4	52.8	0	0	0
ML14	5201 FM 2676	1:30 - 2:30 pm	61.5	36.6	81.3	59.6	40.6	37.6	17	1	0
		12:15 - 1:15 am	52.8	45.5	75.8	47.1	46.7	46.3	2	0	0

Measurements taken on August 6 and 7, 2003.
*Traffic counts of address roadway.

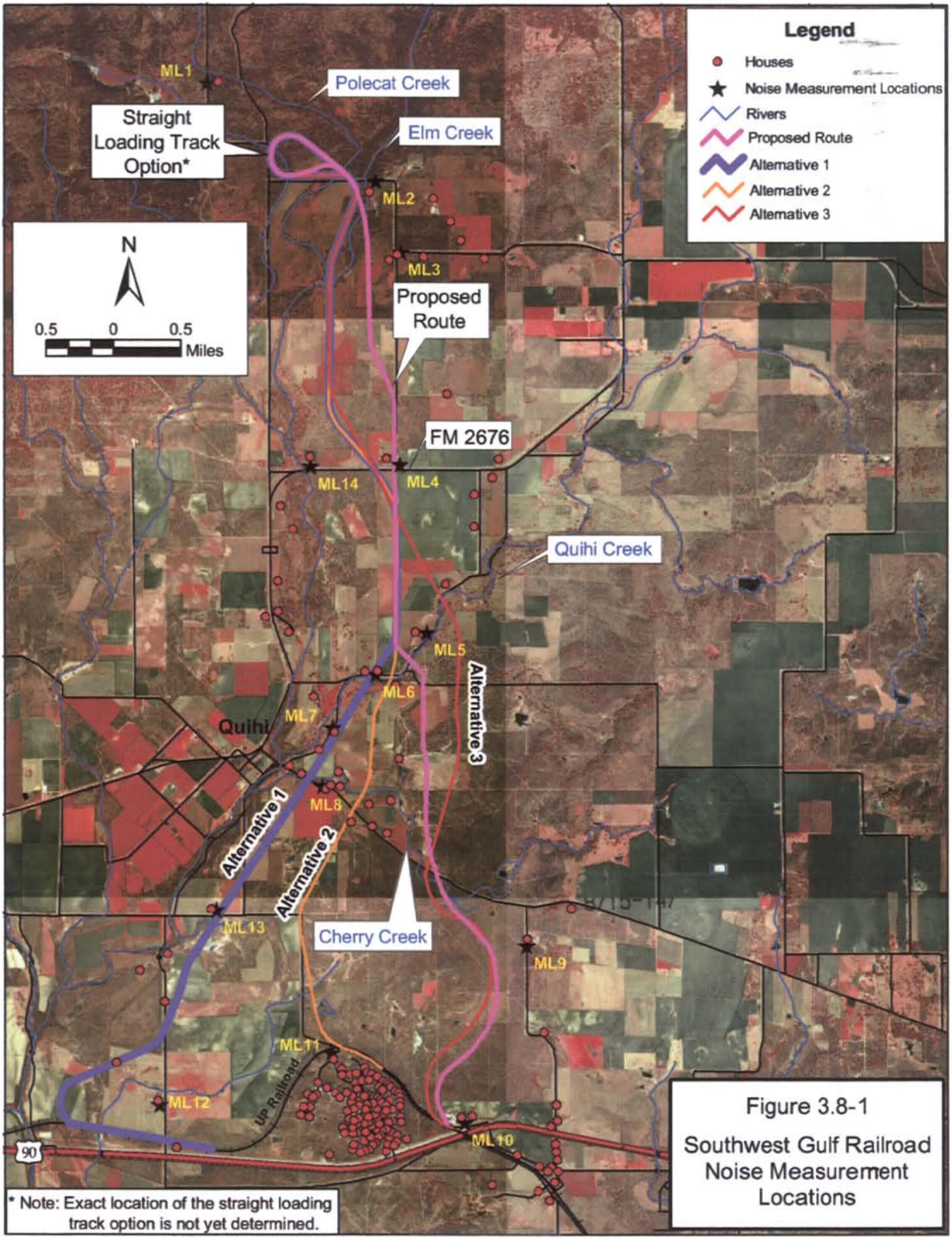


Figure 3.8-1

Southwest Gulf Railroad Noise Measurement Locations

ML1. Measurements were taken at 187 County Road 351 (single-family residence) on August 6, 2003 between the hours of 12:00 p.m. and 1:00 p.m. (daytime) and 1:30 a.m. and 2:30 a.m. (nighttime). Daytime noise sources consisted of birds, and insects. Nighttime noise sources consisted of frogs and insects. The daytime Leq was 41.3 dBA, the nighttime Leq was 48.9 dBA, and the calculated Ldn was 55 dBA.

ML2. Measurements were taken at 1253 County Road 353 (single-family residence) on August 6 and 7, 2003 between the hours of 1:10 p.m. and 2:10 p.m. (daytime) and 12:25 a.m. and 1:20 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on County Road 354 (1 car), birds, and insects. Nighttime noise sources consisted of vehicular traffic on County Road 354 (1 car) frogs and insects. The daytime Leq was 50.4 dBA, the nighttime Leq was 51.1 dBA, and the calculated Ldn was 57 dBA.

ML3. Measurements were taken at 993 County Road 354 (single-family residence) on August 6 and 7, 2003 between the hours of 2:15 p.m. and 3:15 p.m. (daytime) and 11:20 a.m. and 12:20 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on County Road 353 (3 cars), birds, and insects. Nighttime noise sources consisted of vehicular traffic on County Road 353 (1 car) frogs and insects. The daytime Leq was 50.4 dBA, the nighttime Leq was 51.1 dBA, and the calculated Ldn was 55 dBA.

ML4. Measurements were taken in the open field across from 993 County Road 354 (single-family residence) (approximately 150 feet from County Road 353 and 200 feet from FM 2676)) on August 6, 2003 between the hours of 3:20 p.m. and 4:20 p.m. (daytime) and 10:15 p.m. and 11:15 p.m. (nighttime). Daytime noise sources consisted of vehicular traffic on FM 2676 (14 cars), birds, and insects. Nighttime noise sources consisted of vehicular traffic on FM 2676 (6 cars) and insects. The daytime Leq was 41.0 dBA, the nighttime Leq was 50.2 dBA, and the calculated Ldn was 56 dBA.

ML5. Measurements were taken at the fence line of a single-family residence on County Road 365 (Lat N 29.24.483, Long W 99.00.623) on August 7, 2003 between the hours of 11:45 a.m. and 12:45 p.m. (daytime) and 11:20 p.m. and 12:40 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on County Road 365 (3 cars), birds, and insects. Nighttime noise sources consisted of insects. The daytime Leq was 47.9 dBA, the nighttime Leq was 53.2 dBA, and the calculated Ldn was 59 dBA.

ML6. Measurements were taken near the gate at 190 County Road 4512 (single-family residence) on August 7, 2003 between the hours of 9:30 a.m. and 10:30 a.m. (daytime) and 10:30 p.m. and 11:30 p.m. (nighttime). Daytime noise sources consisted of birds, and insects. Nighttime noise sources consisted of insects. The daytime Leq was 42.2 dBA, the nighttime Leq was 50.2 dBA, and the calculated Ldn was 56 dBA.

ML7. Measurements were taken at 388 County Road 356 (single-family residence) on August 7, 2003 between the hours of 2:35 and 3:35 p.m. (daytime) and 1:20 and 2:20 a.m. (nighttime). Daytime noise sources consisted of aircraft overflights, birds, and insects. Nighttime noise sources consisted of frogs and insects. The daytime Leq was 43.9 dBA, the nighttime Leq was 52.9 dBA, and the calculated Ldn was 59 dBA.

ML8. Measurements were taken at 4010 County Road 4516 (single-family residence) on August 6 and 7, 2003 between the hours of 12:10 and 1:10 p.m. (daytime) and 1:20 and 2:20 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on County Road 4516, aircraft overflights, birds, and insects. Nighttime noise sources consisted of vehicular traffic on County Road 4516, dogs barking, distant train whistles, and frogs and insects. The daytime Leq was 52.4 dBA, the nighttime Leq was 53.1 dBA, and the calculated Ldn was 59 dBA.

ML9. Measurements were taken at 944 County Road 4643 (single-family residence) on August 6 and 7, 2003 between the hours of 1:15 and 2:15 p.m. (daytime) and 12:15 and 2:15 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on County Road 4643 (10 cars), dogs barking, people talking at the residence, birds, and insects. Nighttime noise sources consisted of distant vehicular traffic on U.S. Highway 90, dogs barking, distant train whistles, and frogs and insects. The daytime Leq was 53.1 dBA, the nighttime Leq was 56.2 dBA, and the calculated Ldn was 62 dBA.

ML10. Measurements were taken at 2460 County Road 454 (single-family residence) on August 6, 2003 between the hours of 2:20 and 3:20 p.m. (daytime) and 11:10 p.m. and 12:10 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on U.S. Highway 90, birds, and insects. Nighttime noise sources consisted of vehicular traffic on U.S. Highway 90, dogs barking, and insects. The daytime Leq was 56.7 dBA, the nighttime Leq was 55.6 dBA, and the calculated Ldn was 62 dBA.

ML11. Measurements were taken at the rear yard fence line of 1048 County Road 4511 (single-family residence in the Creekwood trailer park) on August 6 and 7, 2003 between the

hours of 10:00 and 11:00 a.m. (daytime) and 10:15 and 11:11 p.m. (nighttime). Daytime noise sources consisted of distant vehicular traffic on U.S. Highway 90, one train pass-by (no whistle), sounds from unidentified machinery towards the east, people talking, dogs barking, aircraft overflights, birds, and insects. Nighttime noise sources consisted of distant vehicular traffic on U.S. Highway 90, dogs barking, and insects. The daytime Leq was 45.2 dBA, the nighttime Leq was 58.1 dBA, and the calculated Ldn was 64 dBA.

ML12. Measurements were taken at 299 County Road 4545 (single-family residence) on August 6, 2003 between the hours of 3:30 and 4:30 p.m. (daytime) and 10:00 and 11:00 p.m. (nighttime). Daytime noise sources consisted of vehicular traffic on U.S. Highway 90 and County Road 4545 (one car), one train pass-by (with whistle), dogs barking, and insects. Nighttime noise sources consisted of vehicular traffic on U.S. Highway 90 and County Road 4545 (one car), dogs barking, and insects. The daytime Leq was 49.3 dBA, the nighttime Leq was 60.1 dBA, and the calculated Ldn was 66 dBA.

ML13. Measurements were taken at 915 County Road 454 (single-family mobile home) on August 7, 2003 between the hours of 12:10 and 1:10 p.m. (daytime) and 11:10 p.m. and 12:10 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on County Road 454 (one truck), aircraft overflights, birds, and insects. Nighttime noise sources consisted of dogs barking, frogs, and insects. The daytime Leq was 48.9 dBA, the nighttime Leq was 53.5 dBA, and the calculated Ldn was 59 dBA.

ML14. Measurements were taken at 5201 FM 2676 (single-family residence) on August 7, 2003 between the hours of 1:30 and 2:30 p.m. (daytime) and 12:15 and 1:15 a.m. (nighttime). Daytime noise sources consisted of vehicular traffic on FM 2676 (17 cars, 1 medium truck), birds, and insects. Nighttime noise sources consisted of vehicular traffic on FM 2676 (2 cars), frogs, and insects. The daytime Leq was 61.5 dBA, the nighttime Leq was 52.8 dBA, and the calculated Ldn was 62 dBA.

Section 4.12 in Chapter 4 discusses the noise impacts from the proposed rail construction and operation and the differences between the various alterative. Alternative 1 would have greater noise impacts than the other potential rail routes.

3.9 Vibration

Currently, there are no sources of vibration in the area of the proposed project.

3.10 Recreation and Visual Resources

Traditionally, hunting and fishing have been major recreational activities throughout Medina County. Medina Lake, a reservoir completed in 1913 in the northeastern part of the county for irrigation purposes, contains large numbers of black bass, white bass, catfish, northern pike, Florida bass, and hybrid striped bass. Man-made surface reservoirs have also been constructed along and near the channels of Chacon, Parkers, Squirrel, Live Oak, and Elm Creeks. (Handbook of Texas Online.) These reservoirs and their tributaries provide opportunities for recreational activities in the vicinity of the proposed project. Typically these ponds are small (less than one acre and up to two acres) and are committed for use in stock-watering. Several ponds appear to have been recently created for recreational purposes along Quihi and Elm Creeks north and east of the community of Quihi. These ponds are about one mile away from the proposed project area.

Private land owners in the county lease their land for hunting activities. The types of game that are hunted include white-tailed deer, wild turkey, and javelina (wild swine), as well as sika deer, axis deer, and mouflon sheep. (Handbook of Texas Online.)

The proposed rail line would cross no parks or recreational water facilities.

In a rural setting visual aesthetics are dominated by naturally appearing landforms and vegetation. In general, the proposed rail line would traverse undeveloped shrub and wooded areas. The primary water-related visual resources in the area are the intermittent streams that would be crossed by the proposed rail line along either the proposed or alternative routes. The proposed rail line would traverse the Quihi, Texas area, which is within a potential rural historic landscape, as discussed in more detail in Section 3.11.

3.11 Cultural Resources

This section summarizes the known cultural resources or historic properties[11] located within the project area and also provides an assessment of the potential for unknown historic properties, including previously unidentified historic and prehistoric archaeological sites

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[11] An historic property is defined as "any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria" [36 CFR Part 800.16(l)(1)].

(Figure 3.11-1). This discussion focuses primarily on historic properties included within the area of potential effect(s) (APE)[12] for Alternatives 1, 2, 3 and the proposed route (the APE consists of each proposed rail alignment plus a buffer zone of 1000 feet on each side of the alignment). Presented first is a summary of relevant laws and regulatory requirements. This is followed by a discussion and chronology of the Section 106 process[13] for this project, and an overview of historic properties potentially affected by the proposed rail line construction and operation.

3.11.1 Summary of Laws and Regulatory Requirements

As discussed earlier, the National Environmental Policy Act (NEPA) and the regulations of the President's Council on Environmental Quality (CEQ) implementing NEPA (see 40 CFR 1500-1508) require Federal agencies to assess the direct and indirect impacts of a major Federal action on the affected human environment. This includes considering potential impacts to historic and cultural resources that may be on or eligible for listing in the National Register of Historic Places (National Register).[14] In addition, Section 106 of the National Historic Preservation Act (NHPA) of 1966 as amended, 16 U.S.C. 470f, requires Federal agencies to determine the potential impact of their actions or undertakings on National Register listed or eligible historic properties. The implementing regulations of both NEPA and NHPA encourage agencies to combine their consideration of historic properties in order to save time and avoid duplication of effort. SEA has done so here.[15]

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[12] Area of potential effect is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" [36 CFR Part 800.16(d)].

[13] The Section 106 process refers to those steps taken in order to comply with 36 CFR Part 800, the implementing regulations of the National Historic Preservation Act of 1966 as amended, 16 U.S.C. 470f.

[14] The National Register of Historic Places has established a set of criteria for evaluating historic properties and determining their eligibility (see 36 CFR Part 63 and National Register publication: Listing A Property, What is the Process? at http://www.cr.nps.gov/nr/listing.htm).

[15] See 40 CFR Part 1502.25 and 36 CFR Part 800.8.

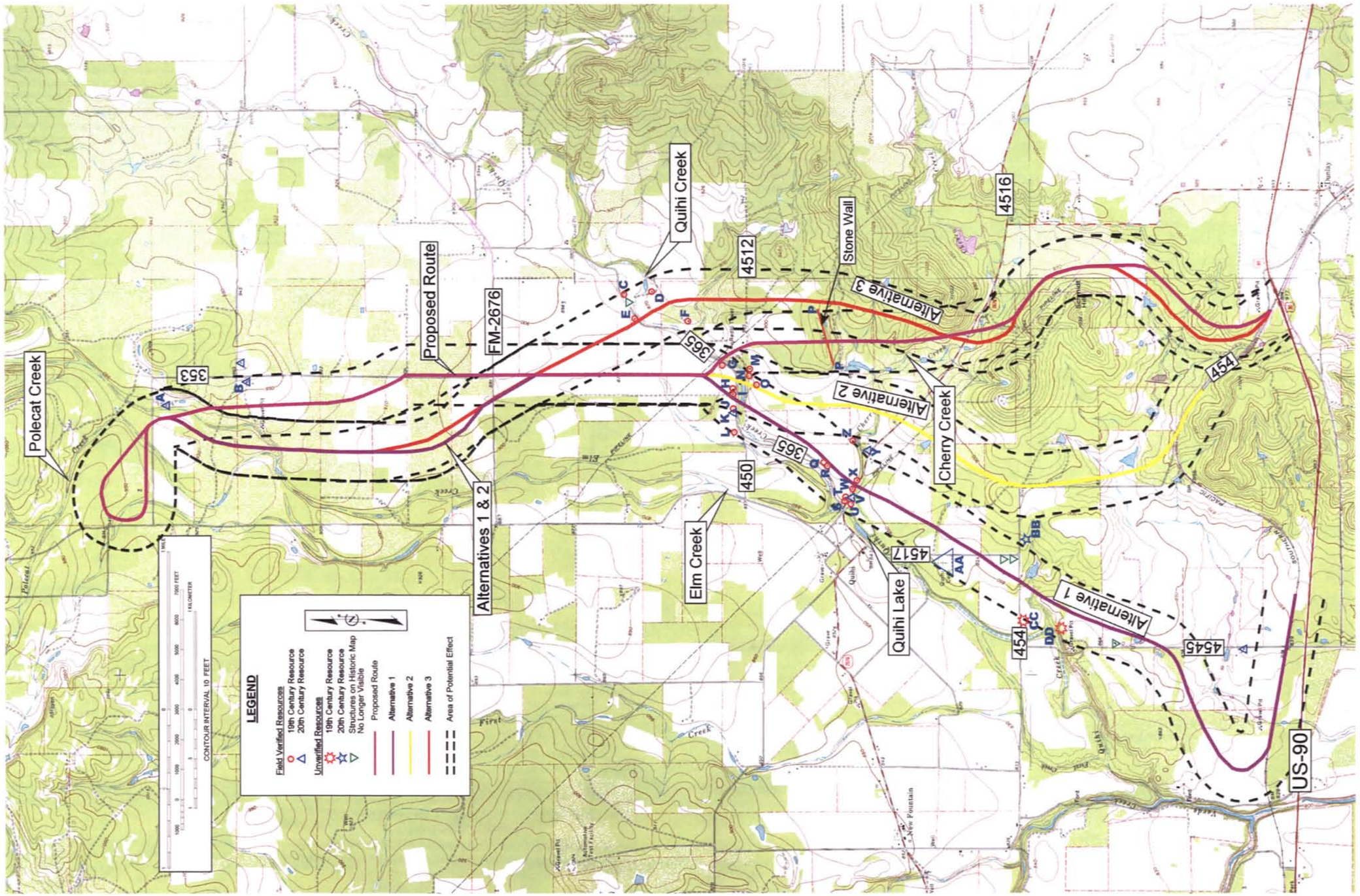

Figure 3.11-1. Location of Known and Potential Historic Period Resources Within 1000 feet of the Project Corridors

The Section 106 process requires Federal agencies to follow specific procedural steps to identify, evaluate, and resolve potential adverse effects [16] on National Register listed or eligible historic properties within the designated APE(s). In the proceeding under consideration here, SEA has conducted the Section 106 process in consultation with the State Historic Preservation Officer (SHPO), the applicant (Southwest Gulf Railroad Company [SGR] in this case), representatives of local governments, and any Federally recognized tribe(s) that may attach traditional religious or cultural importance [17] to properties located within the APE(s). Consistent with the Section 106 process, SEA may add other consulting or interested parties at a later stage of the process, as appropriate. SEA has also solicited and considered the views of the public and will continue to do so until the completion of the Section 106 process.

3.11.2 Discussion and Chronology of the Section 106 Process for This Proceeding

On March 31, 2003 SEA requested input from the Texas Historical Commission (SHPO) regarding the SGR's proposed rail line construction project pursuant to 36 CFR 800.3 (c).[18] The SHPO's response included recommendations for consulting parties to be brought into the process, including Federally-recognized tribes. Other parties requested their inclusion independently. SEA has also granted consulting party status to the Medina County Environmental Action Association; the Medina County Historical Commission; the Quihi and New Fountain Historical Society; the Schweers Historical Foundation; Mr. Archie Gerdes (a local landowner); and the Honorable Henry Bonilla of the U.S. House of Representatives (see Appendix I-1.1).

SEA has identified and contacted Federally-recognized tribes pursuant to 36 CFR 800.3(f)(2) in order to invite them to participate as consulting parties and to seek their input regarding potential impacts to historic properties within the project area. SEA has made these contacts through a combination of letters and phone calls. Thus far, SEA has contacted 16 Federally-recognized tribes both within and outside the state of Texas (see Appendix I-1.2 for a

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[16] An effect is as an "alteration of the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register 36 CFR Part 800.16(I) ."

[17] Properties of traditional religious and cultural importance as defined in 36 CFR 800 are generally evaluated for significance per the guidelines stipulated in National Register Bulletin 38 on Traditional Cultural Properties (see National Register Bulletin 38 at http://www.cr.nps.gov/nr/publications/bulletins/nrb38/). However, this does not supercede tribal input in determining National Register significance.

[18] Consulting party status was automatically granted to the SHPO and SGR per 36 CFR 800.2(c)).

complete list of tribes contacted). Of those contacted, the Comanche Nation of Oklahoma, the Wichita and Affiliated Tribes of Oklahoma, the Kiowa Tribe of Oklahoma and the Mescalero Apache Tribe have all requested and been granted consulting party status. In addition, the Poarch Band of Creek Indians of Alabama has requested that they be sent information about the project as it proceeds through the environmental review process. In February 2004, the Tap Pilam-Coahuiltecan Nation of Texas contacted SEA independently regarding their interest in the project. Although this tribe does not have Federal or state recognition, the tribe does have ancestral connections to the project area and has been included as an additional consulting party pursuant to 36 CFR 800.2 (c)(5) (the tribe is currently seeking both state and Federal recognition).[19]

Beginning in February 2003, SEA conducted background and archival research in order to determine the locations of any known historic properties, including standing structures and buildings, and archaeological sites located within the APE(s) under study and in order to determine potential impacts to historic properties within each alternative. (Specific impacts are set forth in Chapter 4.) SEA accessed site records on file with the Texas Historical Commission on February 28, 2003 through the Texas Historic Sites Atlas (accessible on-line at http://atlas.thc.state.tx.us/). In March 2003, SEA examined applicable historic maps for information concerning potential historic archaeological site locations and in order to assist in making a preliminary assessment regarding the National Register eligibility of any standing structures or buildings located within the APE(s). Finally, SEA also researched census records and other historical data to provide a contextual basis for the project area.

On March 27, 2003 and again on April 2, 2003, SEA conducted site visits to the project area consisting of windshield surveys[20] in order to make a preliminary assessment concerning the project area's historic properties. The results of the above activities were presented in SEA's *Preliminary Cultural Resources Assessment* prepared in October 2003. (See Appendix I-2.2). SEA submitted the report to the SHPO, Federally-recognized tribes, and other consulting parties identified at that time. The document was also made available to the public on the Board's website at http://www.stb.dot.gov.

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[19] Only Federally-recognized tribes can receive consulting party status as tribes [see 36 CFR 800.16(m)].

[20] Windshield surveys allow for the general identification of an area's resources. Such surveys are not intensive and do not result in the complete identification of historic properties within a project area.

On June 12, 2003 SEA held an Open House in Hondo, Texas, to provide the public with information about the environmental review process for the project and to solicit comments (copies of the written comments received are available on the Board's website). Additional comments from consulting parties and members of the public were received following the release of SEA's *Preliminary Cultural Resources Assessment* in October 2003. Some of the comments on the preliminary report expressed concern about omissions and errors contained in the report. Appendix I-1.3 contains these comments in full. A table summarizing the comments and SEA's responses is located in Appendix I-2.1.

In March 2004, SEA, the SHPO, and SGR drafted a Programmatic Agreement (PA), pursuant to 36 CFR Part 800.14(b). The purpose of the PA was to define the process by which 1) historic properties would be identified and evaluated; 2) the agency would determine whether the proposal would have an adverse effect on these properties, and 3) the agency would develop potential mitigation measures to be implemented prior to construction of the approved alternative. The PA was designed to address concerns expressed by the SHPO, consulting parties and members of the public concerning the potential adverse effects of the undertaking to significant historic properties, and to mitigate against such impacts within the APE(s) of the approved corridor. In early 2004, the Advisory Council on Historic Preservation (ACHP) contacted SEA by phone to state that it approved of a programmatic approach for the resolution of adverse effects per 36 CFR Part 800.14(b) and to express its intent to participate in consultation on the PA. The draft version of the PA is presented in Appendix I-3. SEA is specifically requesting public review and comment on the PA, which may be modified pursuant to the consultation provisions outlined at 36 CFR 800.6.

SEA conducted additional research and field work within the project area between June 7 until June 11, 2004. These were initiated, in part, to respond to comments received on the *Preliminary Cultural Resource Assessment.* The follow-up work included additional background and archival research and field inspections within portions of each of the alternatives.[21] During the field work, SEA field checked known historic properties, and assessed the archaeological potential of the entire project area.[22]

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[21] See Appendix I-4, Figure 1 for areas where field inspections were completed.

[22] SEA developed a predictive model to determine the potential for unknown historic and prehistoric sites to compliment field inspections of the project area. This strategy was employed instead of a complete intensive survey due to the complexity of the project area, multiple alternatives under consideration, high cost of conducting intensive surveys of the entire project area, limited access to all properties in the project area, and the potential for newly identified

The results of the additional cultural resources investigations are summarized in a Technical Memorandum completed by SEA in August 2004 (Appendix I-4).

Taken as a whole, the cultural resource studies accomplished the following objectives:

- Identify known historic properties,
- Determine their significance,
- Make an assessment regarding the locations of unknown historic properties, and
- Provide sufficient information to compare impacts to cultural resources within each of the alternatives.

The results of these efforts are summarized below.

3.11.3 Prehistoric Sites

This section summarizes the prehistoric archaeology of the project area, which is centered around the Quihi, Texas. Although little research has been done in the Quihi area itself, what archaeological investigations have been conducted in the region surrounding Quihi indicate a significant potential for previously unidentified National Register archaeological sites to be located within the project area, including those identified thus far.

This discussion begins with a general overview of what is known of the prehistory of the region, followed by a review of known and potential prehistoric archaeological sites in the immediate project area. The known archaeological sites will also be assessed for their significance as defined by the National Register.[23]

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archeological sites in the project area to be damaged by looting.

[23] See Appendixes I-2 and I-4 for details about the methodology used in determining the prehistoric potential of the project area.

Prehistoric Context

Evidence related to prehistoric quarrying, stone tool manufacturing (lithic technology[24]), hunting, and habitation (short and long term) has been reported in the Quihi Creek watershed (Hester, 2000; Hester, 2003; Keller, 1973). Continuous occupation of the area from the late part of the Ice Age to historic periods is indicated by site types ranging from the Paleo-Indian (11,500-6000 B.C.) and Archaic periods (6000 B.C. to 800 A.D) to Late Prehistoric period sites of the Toyah culture (1200 A.D. to historic contact).

Paleo-Indian sites are identified by distinctive tool types such as the Folsum, Clovis and Plainview points (Hester, 1986). These sites are associated with mobile hunters who followed large herds of mammals, such as mammoth and bison. Paleo-Indian sites within the Balcones Escarpment area are sparse and generally consist of lithic material, though some large mammal kill sites have also been discovered (Hester, 1986). Paleo-Indian habitation of the area is substantiated by finds recovered from Site 41UV2 located approximately 30 miles west of the project area. The site contains both Clovis (11,500 year ago) and Folsom period (10,800 years) occupations (Hester, 2003; Hester, 2000).

The Archaic period is generally divided into the Early Archaic (6000 - 3000 B.C.), the Middle Archaic (3000 - 1000 B.C.) and the Late to Terminal Archaic (1000 B.C. - A.D. 800), but the exact chronological boundaries between these subperiods are the subject of ongoing discussion and analysis by archaeologists working in the region (e.g., Hester, 2000; Johnson, 1995). The Early Archaic is typified by small, mobile hunting bands. Most of the Early Archaic sites near the project area are located at the edges of the Balcones Escarpment, possibly as those areas once provided greater access to water (Hester, 1986). Early Archaic site types tend to be small in nature and consist largely of lithics such as the Bell, Gower, Early Corner-Notched dart points and Guadalupe and Clear Fork tools (Hester, 1986). This period also witnessed the introduction of ground stone tools and ornaments that followed a change in climate more similar to today (Hester and Turner, nd).

With the advent of the Middle Archaic, Native American groups developed more localized hunting and gathering activities centered around seasonal camps. Populations also increased and developed subsistence strategies that relied on hunting local game, such as deer and the collection of other food stuffs such as acorns (Hester, 1986). Middle Archaic site types

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[24] The term lithic generally means a stone tool or refuse from stone tool production.

in the area are typified by "burned rock midden"[25] that appear as piles of fire-cracked rock (Bement 1994). These sites mark the locations where various cooking and processing activities occurred, often over a long period of time (Bement, 1994; Hester, 2000). Much of this subsistence strategy continued through the Late or Terminal Archaic, although during this period trade networks appear to have greatly expanded (Hester, 1986). The addition of large scale cemeteries during the Middle Archaic and Late Archaic may also indicate more emphasis on territoriality (Hester and Turner, nd). It was during the Late Archaic that ceramics were introduced into the area, marking the onset of more settled life. Distinctive point styles from this period include the Ensor, Darl, Frio, and Fairland (Hester and Turner, nd). A burial cave site (41ME30) dated to the Late Archaic is located approximately 20 miles west of the project area. The site is situated in a natural sinkhole formation, as is common practice for burials in this part of Texas. Sinkholes with the potential to contain burials may exist just north of the project area (Hester, 2003).

The Late Prehistoric period is marked by the introduction of the bow and arrow, bison hunting, and the greater use of rockshelter sites for habitation (Hester, 1986). Archaic through Late Prehistoric habitation of the area is indicated by finds discovered at Scorpian Cave (41ME8), located approximately 8-10 miles east of the project area along the banks of the Medina River (Hester, 2003; Ochoa, nd; Hester, 2000). This site was continuously inhabited by either Coahuiltecan or Tonkawa Indians for thousands of years beginning in the Middle Archaic to possibly around 1600 A.D. (Ochoa, 1996). Artifacts collected from the site include bone tools, lithic tools, and painted pebbles (Hester, 2000). An additional site from the Toyah Phase (41ME34) is located approximately 12 miles to the west/southwest of the project area (Hester, 2003). According to Hester (2003), sites such as these, found adjacent to small creeks, could be expected in the project area (the site includes nearby stratified[26] deposits as old as 5500 years ago). Later historic period incursions of the Lipan Apache and Comanche may also have left traces, although very little physical evidence of their occupation in Medina County has been found (Hester, 2003).

In all, Medina County contains at least 131 recorded archeological sites (Godwin et al., 2003). More previously unidentified sites are likely in the region, as little work has been

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[25] The term midden refers to the remains creating during food consumption or cooking activities. The midden can include burnt rock and wood, fish bone, animal bone, and other remains.

[26] A stratified deposit is one which is layered and, therefore, has the potential to provide information from the site from different time-frames (the top being the more modern and the bottom being the oldest, given lack of disturbance).

conducted in Medina County overall (Hester and Turner, nd). Quihi Creek, Cherry Creek, Elm Creek, Polecat Creek, and their tributaries, exhibit shallow to deep alluvial soils[27] that have the potential to contain previously unidentified archeological deposits associated with Native American populations, including habitation, or activity areas. While the above-named water sources are intermittent in nature, water was likely available year round from other sources such as the "Four-Mile Waterhole" (Medina County Environmental Action Association, Inc., 2003). Year-round supplies of water in the area indicate the potential for long term habitation as well as shorter-term camps.

Extensive deposits of Uvalde gravels, a raw material known to be frequently exploited by prehistoric tool makers, are not present in the study area, but are found 5 miles north and 10 miles south near La Coste, Texas (SEA, 2003). In addition to annual supplies of water, these procurement areas indicate a significant potential for activity sites associated with tool production and use within the project area.

Known Prehistoric Period Archaeological Sites

The Texas Historic Sites Atlas[28] documents three prehistoric archaeological sites in the vicinity of the project area (41ME5, 41ME132, and 41ME133).[29] Of the three, only 41ME133 is situated within the APE(s) for the project. Site 41ME5 is located on the west side of Elm Creek about 3,200 feet west of where combined Alternatives 1, 2, and 3 cross FM 2676. This site was identified during a survey conducted for improvements to FM 2676, based on information provided on the site form (Keller, 1973). A surface survey in a plowed field identified the site as a sparse scatter of debris from the manufacture of stone tools of unknown age and cultural affiliation. It appears that this site was destroyed by construction associated with FM 2676 (when the nearby right-angle intersection was replaced with a curve).

Site 41ME132 (the Buddy Mangold Site) is a large site located on the edge of an upland plateau approximately 1.3 miles east of Alternative 3 (Texas Historical Commission, 2003a).

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[27] Alluvial deposits pertain to those deposited by flowing water.

[28] The Texas Historic Sites Atlas is accessible on-line at http://atlas.thc.state.tx.us/ and is maintained by the Texas Historical Commission. However, access to site forms that show the location of archaeological sites is restricted.

[29] The distribution of the archaeological site maps and files is being restricted pursuant to Section 304 of the National Historic Preservation Act. These documents are on file with SEA and will be made available on a case-by-case basis.

The site includes many diagnostic artifacts[30] including cores and points. The site form was recorded by Dr. Thomas Hester in July of 2003, but the site was found earlier and investigated by the late Buddy Mangold on the property of his brother Russell. An avocational archaeologist, Mr. Mangold recovered evidence of intensive and long term deposits from almost every time period from Paleo-Indian to the Contact Period in deposits ranging as deep as five feet below the surface. Although documentation of his excavations is not available, he left his collection to his friends and neighbors, Glenn and Cynthia Lindsey. Glenn Lindsey observed some of Mr. Mangold's excavations in progress and the Lindseys have allowed Dr. Hester to analyze the collections.

Site 41ME133 (the Gap Site) is located approximately 100 feet east of Alternative 3. This site was also found by Buddy Mangold and entered into the state inventory by Thomas Hester (Texas Historical Commission, 2003b). Mr. Mangold apparently dug a number of test pits and recovered eight Frio projectile points (these points are associated with the later portion of the Archaic Period). Mr. Mangold did not conduct more intensive excavations here because he was concerned that the location was too visible and that looters would discover the site (Lindsey, personal communication 2004). In late July of 2004, Dr. Hester directed a group from the Southern Texas Archaeological Association in a program of survey and test excavations at 41ME133 and on the adjacent Lindsey property. Additional artifacts were recovered (MacCormack, 2004), but results of this recent research are not yet available.

In addition to the investigations described above, archaeological surveys were conducted in the mid 1980s for upgrades to US 90, just south of where the proposed project meets the existing Union Pacific rail line. These surveys of 9.4 miles of US 90 by the state highway department did not identify any archaeological sites in the vicinity of the proposed project (SDHPT 1985, 1986).

National Register Eligibility Determinations of Prehistoric Sites

Until recently, neither Site 41ME132 nor Site 41ME133 had been the subject of professional level analysis, study, or verification. Both sites were brought to the attention of SEA on November 6, 2003 by Dr. Thomas Hester, who recorded both on July 18, 2003. As noted above, previous work conducted at the sites had been completed by Mr. Buddy Mangold, a local avocational archaeologist whose methodology and archaeological skills are not known and

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[30] Diagnostic artifacts are those that are distinctive of a specific time frame and cultural tradition and can be used to date a site and determine its cultural affiliation.

who may or may not have kept site records. As a result, the morphology, significance, or integrity[31] of the sites has not been assessed, and determinations of eligibility for the National Register cannot be definitely determined at this time.[32] Nevertheless, it is likely that both properties are eligible based on the information available at this time.

Although local collecting activities have impacted the integrity of both sites, they are potentially eligible under Criterion D of the National Register.[33] If the sites are considered to be important to any Federally-recognized tribe with an interest in the area, they could also be potentially eligible under other criteria. According to the site form for 41ME132, the site is important because of long occupancy of the site and the lack of similar sites in this part of the SE Edwards Plateau Ecotone (Texas Historical Commission, 2003a). Site 41ME133 has also yielded a number of diagnostic artifacts from the late Archaic Period. The site is estimated to be largely intact. As previously noted, Site 41ME5 was destroyed and thus, is not eligible for the National Register.

Table 3.11-1. National Register Eligibility of Prehistoric Sites Within or Near Project APE(s)

Site Number	Site Location	National Register Eligibility
41ME132	One mile east of Alternative 3	Potentially eligible
41ME133	Approximately 100 feet east of Alternative 3	Potentially eligible
41ME5	Destroyed	Not eligible

[31] The integrity of a site bears on its significance and is considered within its location, design, setting, materials, workmanship, feeling, and association in mind. See the National Register publication Evaluating the Significance of Archaeological Properties at http://www.cr.nps.gov/nr/publications/bulletins/arch/pt4.htm .

[32] Additional studies including determinations of eligibility will be completed for historic properties located within the *approved* corridor as stipulated in the draft programmatic agreement (PA) pursuant to 36 CFR 800.14(b). A copy of the draft PA can be found in Appendix I-3.

[33] The National Register of Historic Places at 36 CFR Part 63 has established a set of criteria for evaluating historic properties and determining their eligibility (see Listing A Property, What is the Process? at http://www.cr.nps.gov/nr/listing.htm). Under Criterion D, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and have yielded or may be likely to yield, *information* important in prehistory or history.

Prehistoric Site Sensitivity

Based on SEA's field inspections, analysis of the area's soils and land forms, and the location of known sites in the region, it is likely that there are additional archaeological sites obscured by soil and vegetation that have not yet been identified within the APE(s). Even though only one site (Site 41ME133) has been recorded in close proximity to any of the project alignments or the proposed route, there is evidence to show that other sites are likely to be contained within the APE(s). The area contains ample waterways upon which Native American Indian sites were generally located. Although Quihi Creek is not a large waterway with a deep flow, the bed of the creek appears to contain springs and seeps that have attracted and maintained abundant vegetation and wild game resources for thousands of years. Local inhabitants report that it rarely runs completely dry, even though it sometimes shrinks to isolated pools. The same factors that attracted the European settlers to Quihi in the 1840s would likely have attracted Native American Indians as well.

Higher spots on the alluvial soils along the floodplain and adjacent stream terraces are likely to contain buried prehistoric sites. In addition, level landforms adjacent to the base of the valley side slopes may have colluvial soil deposits[34] where archaeological sites have been buried by slope wash. Additional high-probability areas for prehistoric sites would include upland areas located near springs and karst features. Local residents have reported that there are at least two sinkholes in the vicinity of the proposed quarry, and multiple "mound" features have also been reported in this area on the Wurzbach property. Neither the sinkholes nor the mounds have been field-confirmed by an archaeologist (sinkholes were often used as human burial features by Native American Indians). Dr. Thomas Hester has suggested that perhaps the "mound" features could be burned rock middens (Hester, personal communication, 2004).

Combining SEA's field inspections, review of topographic maps, and a soils predictive model created for this project,[35] a qualitative assessment of the relative prehistoric site sensitivity can be made for each of the rail routes (Table 3.11-2). In sum, Alternative 1 should be considered the most sensitive because it traverses the most terrain near Quihi Creek and its tributaries. Stream terraces of well-drained soils along these creeks are most likely to contain substantial, well-preserved prehistoric sites. Alternative 2 is the next most sensitive. It is also relatively close to the creek, but not quite as near as Alternative 1. Alternative 3 and the proposed route are less sensitive because the south ends of these corridors traverse a large section

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[34] Colluvial deposits are those that are located downslope and are created by the force of gravity.

[35] SEA's Technical Memorandum in Appendix I-4 provides details regarding this sensitivity model and how it was derived.

of sloping side hill terrain that is less likely to contain prehistoric sites. Alternative 3 is the only corridor that passes near a known site – 41ME133 – but as a whole, it intersects less sensitive terrain.

Table 3.11-2. Relative Prehistoric Sensitivity of Project APE(s)

Alternative	Known Prehistoric Sites	Relative Prehistoric Archaeological Sensitivity Rating (1=highest, 4=lowest)
Alternative 1	None	1
Alternative 2	None	2
Alternative 3	Site 41ME133; 100 feet to east	4
Proposed route	Non4	

3.11.4 Historic Period Resources

This section summarizes the historic period resources located in the project area and makes a preliminary assessment concerning their eligibility for the National Register. Presented first is a summary of the Quihi area history or context and is followed by a synopsis of the project area's buildings, ruins, districts, and known and potential historic archaeological sites. More detailed information concerning individual historic period resources, including photographs and maps is presented in SEA's technical reports included in Appendixes I-2.2 and I-4.[36]

Historic Context

SEA's *Preliminary Cultural Resources Assessment* includes a more detailed historic context for the project area as noted above (Appendix I-2.2). A brief summary of that context is presented here to facilitate review of the known historic resources.

Although Spanish explorers and traders are known to have passed through the general region in the seventeenth century, and San Antonio de Bexar was established in 1719, the Quihi area does not appear to have had a permanent European settlement during the Spanish and Mexican period. Texas gained its independence from Mexico in 1836, and the new republic focused on attracting new settlers to what was then the western frontier (Ochoa, 1996).
In 1842, a Frenchman named Henri Castro arranged to settle a colony of European immigrants west of San Antonio along the Medina River (Bishop, 1996). In 1844, a contingent dominated

[36] The maps included in the Technical Memorandum in Appendix I-4 provide the most updated information concerning historic resources within the project area . See also Figure 3.11-1.

by Alsatians settled Castroville. Later that year, the town that was to be Quihi was surveyed west of Castroville in anticipation of future settlement. Back in Europe, Castro's agents also recruited to the north of Alsace, and they succeeded in convincing some families from Ostfriesland to join the colony and settle in Quihi in the late 1840s (Adams, 2003).

The town of Quihi was founded by several families, including the Brucks, Heyen, Muennink, Pichot, Schweers, Schuele, and Saathoff families, and continued to grow with the addition of new Germanic immigrants (SEA, 2003). The first settlements focused around Quihi Lake, and as the community expanded, additional houses were built to the northeast and southwest of the lake along Quihi Creek, which provided a reliable water source in the days before well drilling technology was available to tap the deep aquifers. The settlers built distinctive homes of local limestone with features reminiscent of building traditions they had known previously in Europe (Echols, 2000). Throughout this report, these stone structures are referred to as "Germanic-Alsatian" houses to reflect their unique hybrid vernacular architectural style originating from the Alsace and Ostfriesland regions of northern Europe. Most of the surviving examples near the project area are believed to have built between the 1850s and the 1880s (SEA, 2003; THC, 2004).

Known Historic Period Resources

Historic period resources are those material remains created after Euro-American contact and include buildings, structures, objects, ruins,[37] roads, and archaeological sites (to name a few). Although historians often consider the National Register eligibility as they pertain to individual resources, entire regions, towns, or landscapes can also be eligible for the National Register.[38] The National Register eligibility or significance of either a building, structure, site, object, or district is considered within a local, regional and/or national context.[39] In general, historic period sites must be at least 50 years old in order to be considered eligible for the National Register unless the resource is of exceptional significance either locally, regionally, or nationally.

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[37] In this document, historic ruins refer to those buildings or structures that are still standing to some degree, but are no longer habitable. A historic site in contrast is one whose surface manifestations are less visible.

[38] This is true for prehistoric and historic period resources.

[39] See an explanation of these terms and the meaning of "significance" as it pertains to the National Register criteria. See the National Register publication: How to Apply the National Register Criteria for Evaluation at http://www.cr.nps.gov/nr/publications/bulletins/nrb15/nrb15_8.htm .

This section includes a summary of known historic period resources located generally within the project area's APE(s).[40] Research to date has identified 30 historic period individual resources, and one potential historic district within or near the project area (see Figure 3.11-1). This total includes 18 Germanic-Alsatian stone buildings (11 still standing with roofs, and 7 partially collapsed ruins). Most of these stone buildings were used as homes, but several also appear to have served other functions, for example, as a store, courthouse, and barn. The total also includes two late nineteenth century Victorian frame houses, four early twentieth century vernacular frame houses,[41] one early twentieth century masonry barn, one stone wall, and four cemeteries (two family cemeteries, one community cemetery, and one reported early twentieth century Native American Indian cemetery).

National Register Eligibility Determinations of Historic Period Resources

Table 3.11-3 summarizes the National Register eligibility of the historic resources in the project area. Of the 30 historic resources shown, only one is currently listed on the National Register of Historic Places (the Schuele-Saathoff House). It is likely that many the other historic properties could be individually eligible for the National Register, especially the 19th century German-Alsatian buildings associated with the early history of Quihi.[42] Although many of these are in poor condition – they are essentially ruins – it is possible that they could be considered eligible under Criterion D of the National Register (for the information they contain).

The four cemeteries included in this inventory may not be individually eligible for the National Register because cemeteries are normally excluded unless they include a grave of a historic figure of great importance.[43]

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[40] See Appendices I-2 and I-4 for details about each structure, including photographs, and for background research and field inspections conducted to identify historic resources in the project area.

[41] Vernacular architecture is that which is not subject to any particular architectural style. Also known as folk architecture, buildings constructed in this style were functional in nature and built by people without specific architectural training.

[42] See Appendices I-2, and I-4 regarding preliminary National Register eligibility determinations for these properties.

[43] See eligibility criteria for listing of cemeteries in the National Register publication, Listing A Property, What is the Process? at http://www.cr.nps.gov/nr/listing.htm.

In addition to National Register eligibility of the 29 resources not formally evaluated, each could also be eligible as part of a district nomination as the entire project area is likely part of a rural historic landscape.[44] The Germanic-Alsatian-style native stone homes and ruins and Victorian-style wooden frame homes shown in Table 3.11-3 do not exist in isolation but are associated with the 19th and 20th century communities of Quihi and Upper Quihi. These homes and ruins are the remnants of a unique and relatively unchanged rural area that has retained much of its integrity since the early part of the 19th century.

The layout of Quihi was done in a pattern reminiscent of villages from the Alsace and Ostfriesland regions of northern Europe. The settlements were laid out in town lots surrounded by outlying twenty-and forty-acre farming plots. Settlers lived in the protective environment of their towns and farmed nearby fields. The immigrants brought with them their unique culture and a distinctive architecture. Buildings were being made of rough-cut native limestone, sandstone, or some combination of stone and timber; lime plaster was used to coat the exterior walls and adobe the interior walls. Houses were designed with a characteristic rectangular shape, short in the front and long at the rear roof line, common to the rural structures of their homelands. Most homes and buildings had fireplaces built with internal angular flue systems.

Settlers in Quihi continued to speak German and established ethnic social organizations such as the Quihi Gun Club. The road network today appears to be much the same as it was in the 19th century and early 20th century. A number of the roads are unpaved and most of the creek crossings utilize fords instead of bridges. The property parcels still maintain many of the sizes and shapes of the original grants and are delineated by fence lines and roads that have been in the same location for over a century. The vegetation patterns of pasture, cropland, and woodland maintain substantial continuity with historic patterns. Much of the above is due to the properties remaining in the hands of descendent families of the original owners.

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[44] See eligibility criteria for listing a rural historic landscape in the National Register publication, Guidelines for Evaluating and Documenting Rural Historic Landscapes at http://www.cr.nps.gov/nr/publications/bulletins/nrb30/nrb30_3.htm

Table 3.11-3. Historic Resources within Project Area

Property Name/Type	Date	Location Relative to Alternatives	Within APE?	National Register Eligibility	Map Desig.[45]
Saathoff 20th century frame house	pre-1936	At northern edge of project area, east of all alternatives, west of CR 353	Yes	Potentially Eligible	A
Dittmar 20th century frame House	pre-1936	At northern edge of project area, east of the proposed route, west of CR 353	Yes	Potentially Eligible	B
Saathoff German-Alsatian House	19th century	East of Alternative 3, east side of CR 365	Yes	Potentially Eligible	C
Saathoff Victorian House	1890s	East of Alternative 3, south of CR 365	Yes	Potentially Eligible	D
Oeffinger German -Alsatian House	1870s to 1880s	Just east of Alternative 3, west side of CR 365	Yes	Potentially Eligible	E
German-Alsatian Ruins	19th century	West of Alternative 3, east side of CR 365	Yes	Potentially Eligible	F
Henry Schweers German-Alsatian House	1858	Just west of proposed route, west side of CR 365	Yes	Potentially Eligible	G
Schweers/Balzen Family Cemetery	1879-1913	Between Alternatives 1 and 2, west side CR 365	Yes	Unknown*	H
William Schweers German-Alsatian House	1874	Just east of Alternative 1, west side CR 365	Yes	Potentially Eligible	I
Heyo/Schweers German-Alsatian Ruins	19th century	West of Alternative 1, west side of CR 365	Yes	Potentially Eligible	J
M. Walden Vernacular Frame House	20th century	West of Alternative 1, west of CR 365	Yes	Potentially Eligible	K
Ben-Ivey German-Alsatian House	19th century	West side of Alternative 1, west side of CR 365	Yes	Potentially Eligible	L
Schuele-Saathoff German-Alsatian House	1870	Between Alternative 2 and the Proposed route, south side CR 4512	Yes	Potentially Eligible	M
Pichot German-Alsatian House	19th century	Just east of Alternative 2, south side of CR 4512	Yes	Potentially Eligible	N
German-Alsatian Ruins	19th century	Adjacent to east side of Alternative 2, south of CR 4512	Yes	Potentially Eligible	O
Historic Stone Wall	Estimated pre-1870s	Intersected by Proposed route, south of CR 4512	Yes	Potentially Eligible	P
German-Alsatian Barn (Q) and House ®)	19th century	Just west of Alternative 1, east of CR 365	Yes	Potentially Eligible	Q and R
German-Alsatian Ruins	19th century	West of Alternative 1, at intersection of CR 365 and CR 4516	Yes	Potentially Eligible	S
Victorian Frame House	1880s to 1890s	West of Alternative 1, at intersection of CR 365 and CR 4516	Yes	Potentially Eligible	T

[45]See 3.11-1 for a map of the project area showing location of historic properties using these designations.

Table 3.11-3. (continued)

Property Name/Type	Date	Location Relative to Alternatives	Within APE?	National Register Eligibility	Map Design.
German-Alsatian Ruins	19th century	West of Alternative 1, at the intersection of CR 365 and CR 4516	Yes	Potentially Eligible	U
Frame House	20th century	West of Alternative 1 at the intersection of CR 365 and CR 4516	Yes	Potentially Eligible	V
German-Alsatian Ruins	19th century	Just west of Alternative 1, north side of CR 4516	Yes	Potentially Eligible	W
German-Alsatian House	19th century	Just west of Alternative 1, north side of CR 4516	Yes	Potentially Eligible	X
Barn	20th century	Between Alternatives 1 and 2, north side of CR 4516	No	Potentially Eligible	Y
German-Alsatian House	19th century	Between Alternatives 1 and 2, north side of CR 4516	Yes	Potentially Eligible	Z
Quihi Cemetery	1870s to present	West of Alternative 1, west side of CR 4517	Yes	Unknown*	AA
Early Native American Cemetery on Schorobiny Tract	Early 20th century	East of Alternative 1, south side of CR 454	No	Unknown*	BB
Schorobiny German -Alsatian Ruins	ca. 1850	West of Alternative 1, south of CR 454	Yes	Potentially Eligible	CC
Schorobiny Family Cemetery	Post 1850s	West of Alternative 1, just south of CR 454	Yes	Unknown*	DD

* Cemeteries are generally not eligible for the National Register.

Historic Archaeological Site Sensitivity

No historic period archaeological sites have been recorded for the project area (although a number of the Germanic-Alsatian house ruins appear to be in the process of becoming archaeological sites) and none were identified during the field inspections of the project area.[46] However, houses and farmsteads are likely to contain a variety of associated features and structures such as barns, privies, trash middens, etc. Consequently, historic archaeological deposits may be associated with structures identified within the project area (see Appendix I-4).

In addition to the above, it is possible that there are historic archaeological sites obscured by soil and vegetation that have not yet been identified. Although the specific locations of such sites are not known, the general areas in which they are likely to be located can be inferred from available information (i.e as a result of field inspections conducted by SEA, and through an analysis of historic maps[47] and the historic settlement pattern in Quihi). In general, the majority of historic period archaeological sites are likely to be located reasonably close to the historic road

[46] See Appendix I-4, Figure 1 for a map showing where field inspections were completed.
[47] See Appendix I-4, Figures 29 and 30, for historic maps of the project area.

network. The historic settlement in this area also was concentrated around Quihi Lake and along Quihi Creek for best access to reliable water. An analysis of all these factors including consideration of the length of the alignments suggests that Alternative 1 is the most sensitive alignment for potential historic archaeological sites, followed by Alternative 2, the proposed route and Alternative 3 (see Table 3.11-4; see Appendix I-4).

Table 3.11-4. Relative Historic Archaeological Sensitivity of Project APE(s)

Alternative	Potential Historic Sites Identified on Historic Maps	Relative Historic Archaeological Sensitivity Rating (1=highest, 4=lowest)
Alternative 1	3	1
Alternative 2	None	2
Alternative 3	None	4
Proposed Route	1	3

3.12 Socioeconomic Setting

This section gives an overview of the social and economic setting of Medina County.

3.12.1 Population

The project area is located in Medina County, Texas, approximately 30 miles west of San Antonio. The 1990 and 2000 populations for the state, county, and nearby towns are presented in Table 3.12-1.

Table 3.12-1. Current Population and Growth Rates

Place	1990 Population[1]	2000 Population[2]	Average Annual Rate of Population Change (%)
Castroville	2,159	2,664	2.3
Devine	3,982	4,140	0.4
Hondo	6,018	7,897	3.1
Lytle	2,225	2,383	0.7
Natalia	1,216	1,663	3.7
Medina County	27,312	39,304	4.4
Texas	16,986,510	20,851,820	2.3

[1] 1990 Census of Population and Housing, STF1 http://factfinder.census.gov/
[2] 2000 Census of Population and Housing, STF3 http://factfinder.census.gov/

The population of Medina County was 39,304 in 2000. Hondo, the county seat, is the largest town in Medina County, with a 2000 population of 7,897. Between 1990 and 2000

Medina County experienced an average annual population growth rate of 4.4 percent, compared to the state average annual growth rate of 2.3 percent.

Castroville (within 7 miles) and Hondo (within 8 miles) are the towns closest to the proposed project. There is a housing subdivision with a population of nearly 500 to the northwest of the community of Dunlay, near where the proposed rail line would connect with the UP rail [48]

Table 3.12-2 presents 2000 minority population characteristics for Medina County, Texas, and towns near the proposed project. Approximately 49 percent of Medina County's 2000 line. The community near Quihi, with a population of just over 50 people, is located within 1.5 miles of the proposed project. A rough estimate, based on 2000 census data, is that approximately 500 persons reside within 1 mile of the proposed route and alternative routes. population was minority, and 5 of the 36 census blocks within 1 mile of the proposed project area have a greater than 47.6 percent minority population (the Texas state average). The block group that would be affected by the proposed project has a 22.7 percent minority population.

Table 3.12-2. Minority Population Characteristics

Place	Total Population[1]	Minority Population[1]	Percent Minority
Castroville	2,664	1,014	38.1
Devine	4,140	2,271	54.9
Hondo	7,897	5,443	68.9
Lytle	2,383	1,516	63.6
Natalia	1,663	1,354	81.4
Medina County	39,304	19,385	49.3
Texas	20,851,820	9,918,507	47.6

[1] 2000 Census of Population and Housing, http://factfinder.census.gov/. Minority populationn includes all Non-Whites and White Hispanics.

Table 3.12-3 presents statistics for population living below poverty level for Medina County, Texas, and towns near the proposed project. Just over 15 percent of Medina County's 2000 population lived below poverty level, which is the same as the average for the State of Texas. As can be seen in Table 3.12-3, the major towns (except for Castroville) have a higher

[48] SEA received several comments stating that additional subdivisions (Medina Oak and Rocky Creek) are located near the north end of the proposed rail line. SEA has determined that these subdivisions are about five miles from the north end of the rail line, and thus, too far away to include on a detailed map of the proposed project area.

percentage of residents living below the poverty level than the county-wide average. In the proposed project area, the rural census block group data indicates that seven percent of the population lives below the poverty level.

3.12.2 Employment and Income

Medina County has a rural economy. The retail trade and service centers primarily serve local populations. The 2002 unemployment rate for Medina County was 4.8 percent, compared to unemployment rates of 6.1 percent in Texas (Texas Health and Human Services Commission, 2002) and 5.8 percent nationwide (Bureau of Labor Statistics, 2002). Figure 3.12-1 shows employment by major economic sectors in Medina County for the year 2000 (Bureau of Economic Analysis, 2000). The Agriculture, Services, and Government sectors were the largest employers in the county, each comprising about 20 percent of total employment. The median household income in Medina County was $36,063 in 2000 compared to a median household income of $39,927 for the State of Texas (U.S. Census Bureau, 2000).

Table 3.12-3. Population Living Below Poverty Level

Place	Total Population[1]	Persons Living Below Poverty Level	Percent Living Below Poverty Level[1]
Castroville	2,664	242	9.1
Devine	4,140	811	19.6
Hondo	7,897	1,785	22.6
Lytle	2,383	396	16.6
Natalia	1,663	555	33.4
Medina County	39,304	6,065	15.4
Texas	20,851,820	3,204,360	15.4

[1]2000 Census of Population and Housing, http://factfinder.census.gov/. Total number of persons living below poverty level was computed from percentages reported by the Census Bureau.

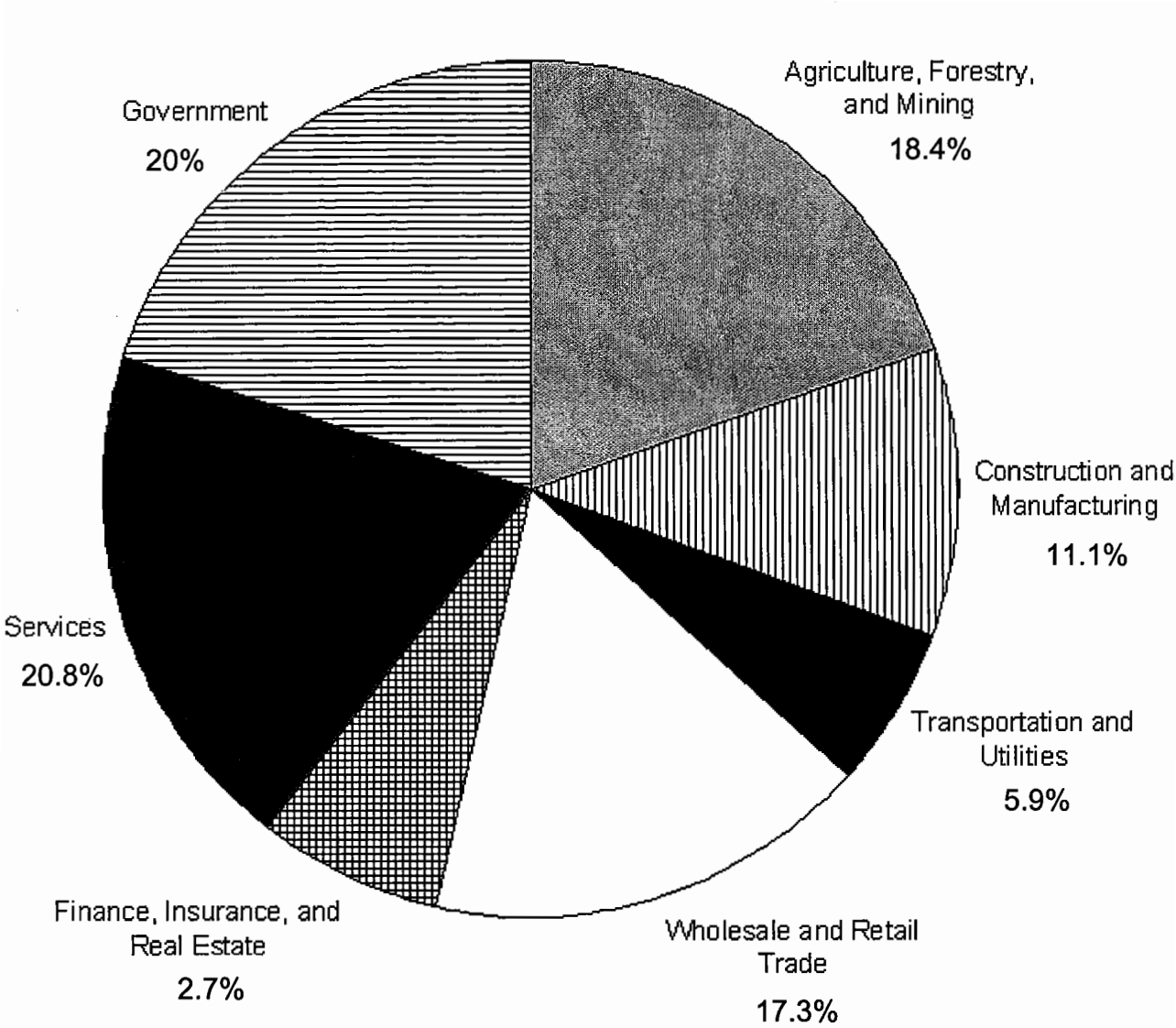

Figure 3.12-1. Employment by Major Economic Sectors In Medina County

DEIS Chapter 4

4.0 ENVIRONMENTAL IMPACTS OF CONSTRUCTION AND OPERATION OF THE PROPOSED RAIL LINE AND PRELIMINARY CONCLUSIONS

This chapter sets forth the Section of Environmental Analysis' (SEA) assessment of the environmental impacts of constructing and operating Southwest Gulf Railroad Company's (SGR) proposed new rail line.

Overview

As set forth in Chapter 3, the proposed project area is in a rural region of Medina County, Texas, approximately 30 miles west of San Antonio, Texas. Currently, a majority of the proposed project area is evergreen forest, cropland and pasture, or shrub and brush rangeland. There are several county roads and one state farm to market road in the area that would be crossed by the proposed rail line (proposed route, Alternative 1, Alternative 2, or Alternative 3). The average daily traffic (ADT) on the county roads ranges from 40 to 200 vehicles, while the ADT on Farm to Market road (FM) 2676 is 610 vehicles. Six creeks would be crossed at various points by each of the potential rail routes.

The proposed rail line along any of the potential routes would primarily traverse the Quihi, Texas area. This area is within a potential rural historic landscape, which is one of the categories of properties that can qualify for listing in the National Register of Historic Places (National Register) as a historic district. The proposed route would be located within one mile of 166 homes; Alternative 1 would be located within one mile of 56 homes; Alternative 2 would be located within one mile of 145 homes; and Alternative 3 would be located within one mile of 153 homes.

The proposed rail line would extend approximately seven miles from a loading track at a proposed Vulcan Construction Materials, LP (VCM) quarry to the Del Rio subdivision of the Union Pacific Railroad Company (UP), near Dunlay, Texas. SGR would use the new rail line to transport limestone from the proposed quarry to the UP rail line.[1] Operations over the rail line

[1] SGR states that it may enter into an agreement with an existing rail carrier, such as UP, to operate the line for SGR, should the Board issue final approval of SGR's petition. Any such carrier would need to seek separate Board authority to operate over the line. SEA's environmental review of SGR's petition has examined both the proposed rail construction and proposed rail operations, taking into consideration that SGR may not be the actual operator of the proposed rail line.

would be two round trips or four total train trips per day (two empty trains moving from the UP rail line to the quarry and two loaded trains moving from the quarry to the UP rail line).

SEA has received comments from local residents who are concerned that SGR's proposed rail line construction and operation in combination with VCM's proposed quarry would significantly and adversely affect their current quality of life, significantly and adversely impact the human and natural environment, and transform their community into an industrial area. SEA generally prepares Environmental Assessments (EA)[2] for rail construction proposals that are relatively short in length and that are unlikely to result in potentially significant environmental impacts, either as analyzed or with the addition of environmental mitigation, and had initially determined that preparation of an EA would be appropriate in this case (see Appendix G). However, based on the nature and extent of the comments received, SEA determined that the effects of the proposed project on the quality of the human environment are likely to be highly controversial, and that thus, pursuant to 40 CFR 1508.27(4), preparation of a full Environmental Impact Statement (EIS) would be appropriate. Although the low level of proposed train traffic generally makes an in-depth analysis in certain resources areas (such as air quality and noise) unnecessary, in order to address the concerns raised by local residents, SEA has quantified potential air quality impacts and potential noise impacts.

Terminology

Proposed action means the construction and operation of SGR's proposed rail line plus a loading track on the proposed quarry site (either a two-mile loading loop or a series of parallel tracks one mile in length).

Proposed rail line means SGR's proposed rail line under any of the potential rail routes (proposed route, Alternative 1, Alternative 2, or Alternative 3).

Proposed route means SGR's proposed route, approximately seven miles in length.

Alternative 1 means the rail route that would connect with the UP line approximately three miles west of the proposed route. This route is approximately two miles longer than the proposed route.

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[2] An EA is a concise public document that provides "sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact." 40 CFR 1508.9; 49 CFR 1005.4(d).

Alternative 2 means the rail route would connect with the UP rail line approximately 0.3 miles northwest of the proposed route's connection with the UP rail line, and is approximately the same length as the proposed route. This route would swing farther west than SGR's proposed route.

Alternative 3 means the rail route that would connect with the UP rail line in the same location as SGR's proposed route. This route would swing father east and then cut back to the west diagonally across several properties. This route would be nearly 2,500 feet longer than the proposed route.

No-action alternative means that the proposed rail line construction and operation would not take place and that the limestone would be transported by truck from the quarry to the UP rail line.

Summary of Analysis

The Council on Environmental Quality's (CEQ) guidelines for implementing the National Environmental Policy Act (NEPA) require agencies to assess three types of impacts: (1) direct; (2) indirect; and (3) cumulative (40 CFR 1508.25(c)). Direct and indirect impacts are both caused by the action. Direct impacts occur at the same time and place, while indirect impacts are later in time or farther removed in distance, but are still reasonably foreseeable.[3] A cumulative impact is the "incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."[4] This means that the agency's cumulative impacts analysis must take into consideration actions that are not caused by the proposed action but that are close enough geographically and temporally to potentially affect the same resources as the proposed action.[5]

SEA conducted an in-depth analysis of direct impacts, comparing the four rail route alternatives and the no-action alternative, for the following resource areas: transportation and traffic safety; public health and safety; hazardous materials/waste sites and existing energy

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[3] 40 CFR 1508.8.

[4] 40 CFR 1508.7.

[5] See Considering Cumulative Effects under the National Environmental Policy Act (CEQ, 1997).

resources; worker health and safety; water resources; biological resources; air quality; geology and soils (including karst features); land use; environmental justice; noise; vibration; recreation and visual resources; cultural resources; and socioeconomics.

For the cumulative impacts analysis, SEA consulted with local, state, and Federal agencies, as well as with SGR, and conducted public outreach and scoping activities to identify other past, present, and reasonably foreseeable future actions in the proposed project area, as described in Chapter 1. SEA also contacted the Medina County Floodplain Administrator by telephone in August 2004 to determine whether any new proposals for projects in the area had been made. SEA determined that VCM's proposed quarry was the only project that overlaps with the proposed action in terms of geographic area and time frame. Because the quarry and the rail line are related to the extent that the rail line would serve the quarry and because development and operation of the quarry has the potential to impact some of the same resources as the rail line at about the same time as the rail line construction and operation, SEA determined that analysis of the quarry is an appropriate part of the cumulative impacts analysis. Thus, SEA's cumulative impacts analysis assessed the combined effects of the rail line and the quarry on the environment in the following resource areas: transportation and traffic safety; water resources; biological resources; air quality; karst features; land use; environmental justice; noise; vibration; cultural resources; and socioeconomics.

SEA identified no indirect impacts from SGR's proposed rail line construction and operation. As stated above, indirect impacts are reasonably foreseeable impacts caused by the proposed action that are either later in time or farther removed in distance. As discussed in Chapter 1, if the proposed rail line were not built, according to SGR, VCM would use trucks to transport the limestone aggregate from the quarry for the approximately seven miles to the UP rail line. Therefore, any impacts that are related to the proposed action and are farther removed in distance from the proposed project area would occur regardless of the proposed action and thus, would not be caused by the proposed action. The Texas Historical Commission (THC) submitted a letter stating that because SGR would hold itself out as a common carrier to other shippers that may locate to the area in the future, an increase in area development should be assessed as an indirect impact of the proposed action. (See Appendix C.) However, as discussed above, aside from the proposed quarry (assessed as part of the cumulative impacts analysis), SEA identified no proposals for other projects in the area. Thus, it is not clear at this point whether there would be an increase in area development (other than that caused by the quarry itself) as a

result of this project. Nor is there any way to predict and properly assess what type of further future area development there could potentially be.

Summary of Impacts and Recommendations for Mitigation to Reduce Identified Adverse Impacts

A. Transportation and Traffic Safety:

(1) *At-Grade Road Crossings*. The proposed route would cross a total of seven area roadways at-grade, while Alternative 1 would cross eight roadways, Alternative 2 would cross five roadways, and Alternative 3 would cross six roadways. These at-grade road crossings could cause some traffic delays during operation of the proposed rail line. However, due to the low level of train traffic from proposed operations and the low level of vehicular traffic on the roadways that would be crossed, these traffic delays would not be significant. Construction of the at-grade road crossings would also involve traffic delays and some road closings or detours. But these impacts would be temporary (the proposed construction would take place over 12 months) and would not be significant, due to the low level of vehicular traffic on the area roadways and the availability of alternate routes.

Mitigation. To address the concerns raised by area residents and state and local agencies regarding the proposed at-grade road crossings, SEA recommends that the Board impose several conditions requiring SGR to coordinate with the appropriate authorities, install appropriate grade crossing warning devices, and develop appropriate emergency response and maintenance plans.

(2) *Risk of Accidents*. SEA used national statistics to calculate the risk of accidents from operations over the proposed route and the alternative rail routes and determined that there would be a minimal risk of accidents from the proposed rail operations. While the risk of accidents from truck operations under the no-action alternative would be greater than the risk of accidents from proposed rail operations, this risk also would not be significant.

Mitigation. None recommended at this time.

(3) *Utility Crossings*. All of the rail route alternatives would cross two utility gas pipeline rights-of-way. One of the pipelines has been removed and the other is currently inactive. SEA has identified no significant impacts associated with the rail-pipeline crossing.

Mitigation. To avoid any adverse safety impacts from the proposed rail line construction and operation, SEA recommends that the Board impose a condition requiring SGR to consult with the pipeline owner prior to beginning construction in order to make appropriate modifications to the design of the rail line to maintain pipeline integrity.

(4) *No-Action Alternative.* Because of the traffic impact and the impacts to road maintenance, the no-action alternative would represent a significant change to the current road system. Thus, SEA preliminarily concludes that the no-action alternative would have significant, adverse impacts on the transportation infrastructure and traffic safety of the area.

B. Public Health and Safety: SEA has determined that there would be no significant impacts to public health and safety from construction and operation of the proposed rail line, due to the short duration of construction activities and low risk of accidents from proposed operations. SEA has also determined that the risks to public health and safety from the no-action alternative would not be significant.

Mitigation. In order to reduce any adverse impacts to public health and safety, SEA recommends that the Board impose conditions requiring SGR to use dust suppression controls during construction activities and to prohibit public access to the construction site.

C. Hazardous Materials/Waste Sites and Existing Energy Resources: SEA did not identify any known hazardous waste sites that could be affected by the proposed project, and thus, has determined that there is no risk of disturbing known hazardous materials or hazardous waste sites. In addition, based on the lack of proximal industrial activities, the historical land use, and observation of aerial photography and site surveys, SEA believes that the potential for disturbing undocumented sites during construction of the proposed rail line is extremely low. The existing energy resources in the project area are the two utility gas pipeline rights-of-way, which would not be significantly impacted by the proposed rail line construction or operation or by the no-action alternative, as discussed above.

Mitigation. None recommended at this time.

D. Worker Health and Safety: SEA has determined that impacts to worker (i.e., workers who construct the rail line and operate the trains) health and safety from the proposed construction and operation would not be significant. Construction and operation activities associated with the no-action alternative would likely cause greater impacts to worker health and safety, because the construction activities would likely require more workers, and injuries to workers during trucking operations are statistically greater. However, these impacts also would not be significant.

Mitigation. In order to reduce adverse impacts to worker health and safety, SEA recommends that the Board impose conditions requiring SGR to use dust suppression controls during construction activities and to comply with the reasonable requirements of the Occupational Safety and Health Administration.

E. Water Resources:

(1) *Groundwater.* Construction and normal operations over the proposed rail line (any rail alternative) would result in little or no impacts to groundwater resources, including aquifers. Temporary silting due to construction and maintenance activities for the proposed rail line could cause minor impacts to groundwater, but the trucking operations that would occur under the no-action alternative would have a more pronounced adverse effect on groundwater resources in the area. In the highly unlikely event of a release of diesel fuel caused by a derailment on the proposed line, SEA proposes mitigation to reduce the impacts to groundwater so that they would not be significant.

Mitigation. SEA recommends that the Board impose several conditions including requiring SGR to develop appropriate water pollution prevention plans and utilize Best Management Practices during construction and maintenance activities.

(2) *Surface Water.* SEA determined that the construction of the proposed rail line (all routes) could have an adverse impact on flooding and on the stability of, and sediment loading in, streams crossed by the rail line. SEA has determined that compliance with proposed conditions designed to reduce the potential for flooding, stream instability, and erosion would make any potential adverse impacts less than significant. While rail operations could cause degradation of surface waters due to spills of diesel oil, mitigation would reduce these impacts to below the level of significance. The no-action alternative would have a greater impact on surface water due to the substantial increase in heavy truck traffic on the roadways in the project area, which would generate non-point source pollutants and dust that would be carried by stormwater runoff to nearby creeks.

Mitigation. SEA recommends that the Board impose several conditions including requiring SGR to utilize Best Management Practices during construction, operation, and maintenance activities, comply with the guidelines of appropriate agencies, such as the Medina County Floodplain Administrator and the U.S. Army Corps of Engineers, and conduct appropriate hydrological modeling.

(3) *Wetlands*. SEA determined that the only potentially significant impacts to wetlands and other aquatic resources from the proposed rail line would be in areas associated with the crossings of several of the larger creeks. This impact, however, could be avoided by designing spans to avoid the placement of permanent fill material or structures within the ordinary high water mark (OHWM) of the stream channels. Approval from the U.S. Army Corps of Engineers also would be required under Section 404 of the Clean Water Act, if a crossing would result in creating permanent features within the OHWM of a stream. Other minor impacts to wetlands could be avoided or minimized by the implementation of appropriate mitigation measures.

Mitigation. SEA recommends that the Board impose several conditions including hydrological studies and engineering of spans across streams and creeks to minimize impacts on flooding and following the guidance of the Texas Parks and Wildlife Department to minimize erosion during construction.

F. Biological Resources: The construction and operation of the proposed route would have some effects on biological resources, for example, the clearing of vegetation on the small amount of land to be covered by rail bed. However, SEA determined that the proposed route and alternatives would have no significant impact on biological resources either during construction or during operation of the proposed rail line.

Mitigation. SEA recommends that the Board impose several conditions to reduce any adverse impacts to biological resources, including replacing mature trees, reseeding appropriate areas of the right-of-way with native grasses, and developing measures to avoid impacts to migratory birds in the area.

G. Air Quality: SEA evaluated the potential effects of the construction and operation of the proposed rail line on air quality, as well as the potential effects on air quality from the no-action alternative (transport by trucks). This analysis revealed that there would be no significant effects on air pollution as a result of constructing or operating the proposed route or the alternative rail routes, but that significant emissions would result from operation of the no-action alternative.

Mitigation. In order to reduce the effects on air quality from the construction of the proposed rail line, SEA recommends that the Board impose conditions requiring SGR to comply with applicable Clean Air Act requirements for burning debris during construction and to take appropriate measures to control fugitive dust during construction.

H. Geological Hazards: Landslide/mass movement hazards are the most likely geological hazards in the area of the proposed project. SEA concluded that

landslide hazards in this area would be negligible along the proposed and alternative rail routes.

Mitigation. None recommended at this time.

I. **Karst Feature Formation and Hazard Potential:** The majority of the proposed rail line under any of the potential alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) does not have the potential to be impacted by development of karst features. However, the area near the loading loop (or alternative parallel lines of loading track) is susceptible to karst-feature development at a higher elevation than the 950 feet contour along Polecat Creek and Elm Creek. Additionally, a portion of the area extending approximately 1,500 feet to the south of the loading loop (mapped in Figure 3.6-1 as Quaternary Alluvium to the north of the fault zone) has the potential to develop karst features. SEA believes that implementation of its recommended mitigation would reduce impacts from potential karst feature development to less than significant.

Mitigation. SEA recommends that the Board impose conditions including requiring SGR to identify potential risk areas for sinkhole development in the areas described above prior to construction and to provide engineering alternatives to protect those areas from future sinkhole development, as well as consult with a karst features specialist if a significant karst feature is identified during construction.

J. **Land Use:** Acquisition and use of right-of-way for the proposed rail line under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would have some adverse effects on land use that could not be fully mitigated, as would the trucking and remote rail loading operations under the no-action alternative. The no-action alternative would have greater effects on land use than the proposed action. Alternative 1 would have greater effects on land use than the other potential rail alignments, followed by Alternative 3, Alternative 2 and then the proposed route.

Mitigation. In order to reduce adverse impacts to land use from construction and operation of the proposed rail line, SEA recommends that the Board impose conditions requiring SGR to ensure landowners access to any properties severed by the rail line and to comply with its voluntary mitigation to maintain native grass and shrubs inside the proposed rail line right-of-way to allow the proposed rail line to blend with the natural surroundings.

K. **Environmental Justice:** SEA identified no environmental justice communities of concern in the proposed project area. Thus, the proposed rail line construction and operation does not have the potential to cause disproportionately high and adverse human health or environmental effects on environmental justice communities of concern (i.e. low-income or minority populations).

Mitigation. None recommended.

L. **Noise:** Noise impacts from construction of the proposed rail line under any of the potential alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) are not expected to be significant. Nevertheless, in order to minimize any adverse impacts area residents could experience from potential rail construction activities, SEA recommends that the Board impose appropriate noise mitigation. Operations over the proposed route, Alternative 2 or Alternative 3 would not trigger the thresholds for analysis in the Board's environmental rules; operations over Alternative 1 would trigger the thresholds at two measurement locations, and that is one of the reasons SEA is not recommending Alternative 1.

Horn noise would adversely affect residences close to the at-grade road crossings. However, due to the low level of projected train traffic (four trains per day), the sound levels generated by the horn at the proposed grade crossings along the proposed route, Alternative 1, Alternative 2, or Alternative 3 would not appreciably affect the overall Day-Night Average Noise Level (Ldn). Moreover, the blowing of the horns would be of short duration and the horns would likely only be sounded during daytime hours. Thus, SEA preliminarily concludes that the impacts from horn noise from the proposed train operations would not be significant.

Construction activities associated with the no-action alternative would also not result in significant noise impacts. The truck operations under the no-action alternative would increase noise levels by more than 5 A-weighted sound level decibels (dBA) at one measurement location.

Mitigation. SEA recommends that the Board impose mitigation requiring SGR to consult with local residents regarding SGR's project-related construction schedule, including the hours during which construction takes place, to minimize, to the extent practicable, construction-related noise disturbances in residential areas. SEA is also recommending that the railroad be required to minimize noise by using continuously welded rail.

M. **Vibration:** SEA preliminarily concludes that construction and operation of the rail line under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would not cause significant vibration impacts to sensitive structures.[6] Although pile driving activities associated with the proposed rail line construction could cause adverse vibration effects to sensitive structures, these impacts would be minimized by the implementation of appropriate mitigation measures. Operation of the rail line could cause adverse vibration effects to

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[6] The term "sensitive structures" encompasses cultural resources, pipelines, ancillary equipment, and private wells.

sensitive structures located in close proximity to the rail line; these impacts could also be reduced by the implementation of SEA's proposed mitigation measures. Under the no-action alternative, construction activities and truck operations would not cause significant vibration impacts to sensitive structures.

Mitigation. SEA recommends that the Board impose conditions requiring SGR to monitor pile driving activities and to make appropriate modifications to the design of its rail line prior to construction to protect sensitive structures from vibration impacts.

N. **Recreational and Visual Resources:** SEA identified no significant impacts to recreational and visual resources from construction and operation of the proposed rail line. There are no public recreational sites within the project area. There are numerous stock-watering ponds in the area that may provide private recreational opportunities. But SEA did not identify any pond that would be adversely impacted by the proposed route or by any of the alternative rail routes. Although a new rail line through a rural area would have some adverse visual impacts, these impacts would be reduced by SGR's proposed voluntary mitigation measures.

Mitigation. To ensure that the stock-watering ponds in the area would not be affected by the proposed rail line, SEA recommends that the Board impose a condition requiring SGR, prior to construction, to identify the location of the ponds and attempt to avoid them or minimize intrusion into them. SEA also recommends that the Board impose a condition requiring SGR to comply with its voluntary mitigation to maintain native grass and shrubs inside the proposed rail line right-of-way to allow the proposed line to blend with the natural surroundings.

O. **Cultural Resources:** SEA has determined that SGR's proposed project would have adverse effects to cultural resources within the areas of potential effect for all of the potential rail alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3). However, the extensive proposed mitigation measures in the Programmatic Agreement would appropriately address adverse effects to cultural resources.

Mitigation. SGR shall be required to comply with the terms of the Programmatic Agreement, developed pursuant to the provisions of the National Historic Preservation Act, to address potential adverse effects to cultural resources.

P. **Socioeconomics:** SEA preliminarily concludes that there would be no significant socioeconomic impacts as a result of the proposed action or the no-action alternative.

Mitigation. None recommended at this time.

Q. **Cumulative Impacts:** SEA preliminarily concludes that, with the exception of land use, the proposed construction of approximately seven miles of new rail line and the operation of four trains per day (two round trips from the quarry to the UP rail line) would not create any cumulative impacts in the project area.

R. **Indirect Impacts:** SEA identified no indirect impacts that would be caused by SGR's proposed rail line construction and operation.

S. **Environmentally Preferable Alternative(s):** SEA preliminarily concludes that the proposed route, Alternative 2 and Alternative 3 would be environmentally preferable to Alternative 1 and the no-action alternative.

Truck transportation of the limestone under the no-action alternative would have a greater risk of accidents than any of the rail route alternatives and would have greater potential impacts to groundwater and surface water. Truck transportation would also cause more adverse air quality impacts and would increase noise levels by more than 5 dBA at one measurement location. The construction of the remote truck-to-rail loading facility that would be necessary under the no-action alternative would displace more biological habitat than would construction of any of the rail route alternatives. Visual impacts from the construction of this facility and from the operation of trucks would also be greater than if the proposed rail line were constructed and operated. Thus, SEA preliminarily concludes that the no-action alternative is less environmentally preferable than construction and operation of the proposed rail line under any of the route alternatives.

Of the four rail route alternatives, Alternative 1 would cause the greatest environmental impacts. Alternative 1 is about two miles longer than the other rail routes. Thus, even with mitigation, Alternative 1 has the potential to cause proportionally greater environmental impacts in the areas of transportation and traffic safety, biological resources, air quality, and land use. Alternative 1 would also have the highest number of at-grade roadway crossings (eight) of any of the rail route alternatives, would trigger the Board's noise thresholds at two measurement locations, and would be located near more known above-ground historic resources and cross more archeologically sensitive terrain than the other rail alternatives. Thus, SEA preliminarily concludes that Alternative 1 is less environmentally preferable than the proposed route, Alternative 2 or Alternative 3.

Although the proposed route, Alternative 2 and Alternative 3 would each be the most environmentally preferable in one or more resource categories, construction and operation of these three alternative rail routes would have similar or identical potential environmental impacts

in most resource categories. Thus, SEA preliminarily concludes that none of these rail routes can be designated as clearly environmentally preferable to the others at this point.

The primary environmental distinctions between these potential routes is as follows: the proposed route would be slightly shorter than Alternative 3 and would cross less floodplain area; the proposed route would also cross the fewest private properties; Alternative 2 would have the smallest number of at-grade roadway crossings (five) of any of the rail route alternatives and thus could have slightly less transportation and traffic safety impacts than the other potential routes; and Alternative 3 appears to have slightly fewer potential impacts to cultural resources than the other routes. SEA concludes that, based on the information available to date, these distinctions are not sufficient to designate one potential route as the most environmentally preferable. SEA specifically requests comments on this issue from all interested parties and the public.

The Board's Jurisdiction

Under 49 U.S.C. § 10501(b), the Board's jurisdiction over the construction and operation of rail lines, including rail-related facilities, is exclusive. On the basis of this exclusive jurisdiction, the Board and courts have consistently found that the application of state and local law (and even Federal law), including the application of statutes and ordinances, in such as to impair the construction or operation of a rail line, or impair the ability of a railroad company to acquire the property needed to construct a Board-approved rail line, is preempted by Federal law.

The Board has limited authority to impose conditions to mitigate potential environmental impacts. As a government agency, the Board can only impose conditions that are consistent with its statutory authority. Accordingly, any conditions the Board imposes must relate directly to the transaction before it, must be reasonable, and must be supported by the record before the Board. The Board's practice consistently has been to mitigate only those impacts that result directly from the proposed action. The Board typically does not require mitigation for pre-existing environmental conditions.

Organization of This Chapter

This chapter is organized into twenty-one separate sections. Sections 4.1 through 4.16 discuss the direct impacts that could be caused by the proposed rail line construction and operation, separated into specific resource categories; Section 4.17 describes SEA's cumulative impacts analysis for the proposed action; Section 4.18 discusses SEA's preliminary conclusions regarding indirect impacts; Section 4.19 lists the unavoidable adverse impacts of the proposed

rail line construction and operation; Section 4.20 addresses the effects on the short-term uses and long-term productivity of the environment as a result of the proposed action; and Section 4.21 discusses the irreversible and irretrievable commitment of resources that would be needed to construct and operate this proposed line. SEA emphasizes that the conclusions and recommended environmental mitigation measures in this Draft EIS are preliminary and invites public and agency comments on all aspects of this Draft EIS.

4.1 Transportation and Traffic Safety

In this section, SEA will:

a. Describe the potential impacts of the proposed action on the existing transportation network in the project area, including vehicular delays at grade crossings and grade-crossing safety.

b. Describe the potential for train derailments or accidents from proposed rail operations.

c. Describe potential pipeline safety issues at rail/pipeline crossings, as appropriate.

d. Describe the impacts on transportation and traffic safety from the truck traffic under the no-action alternative.

e. Propose mitigative measures to reduce or eliminate potential project impacts to transportation and traffic safety, as appropriate.

4.1.1 At-Grade Road Crossings

The proposed route would cross a total of seven roadways: County Road 454; County Road 4516; County Road 4512; County Road 365; FM 2676; and County Road 353 twice. FM 2676 is a paved, state-maintained roadway. The county roads are either unimproved or gravel roads, with the exception of County Road 4516, which is paved.

Alternative 1 would cross a total of eight roadways: County Road 353; FM 2676; County Road 365; County Road 4516; County Road 4517; County Road 454; and County Road 4545 (twice).

Alternative 2 would cross a total of five roadways: County Road 353; FM 2676; County Road 365; County Road 4516; and County Road 454.

Alternative 3 would cross a total of six roads: County Road 353; FM 2676; County Road 365; County Road 4512; County Road 4516; and County Road 454.

Vehicular Delays

SEA generally does not quantify traffic delays at crossings where the average daily traffic (ADT) is less than 5,000 vehicles. In this case the crossings at issue all have relatively few drivers who would experience the potential effects of train operations, and the associated vehicle delays would be minimal. All of the roadways that would be crossed by the proposed rail line would have an ADT substantially less than 5,000 vehicles. The ADT on the county roads ranges from 40 to 200 vehicles (Medina County Commissioner 2003), while the ADT on Farm to Market road (FM) 2676 is 610 vehicles (TxDOT, 2002).

Nevertheless, because area residents raised concerns regarding potential vehicle delays at grade crossings, SEA approximated the potential delays the proposed rail operations could cause. There would be a maximum of four trains per day on this line (two empty and two full) for the reasonably foreseeable future. A typical train would consist of 100 cars and one or more locomotives. Each car would range from 50 to 58 feet in length, including variable numbers of engines. Thus, the average train length would range from 5,200 to 5,800 feet. SGR has stated that the average train operating speed would be 25 miles per hour, although track geometry would allow a 40-mile per hour maximum speed. Given the length of the train and the average speed, each 100-car/2 locomotive train at 25 mph would block an intersection for approximately 2.6 minutes. Assuming no cars would cross the track once the train is within 1000 feet of the intersection, or until the train is 1000 feet past the intersection, the total time delay would be in the range of 3.6 minutes. Based on the assumption that train speed would vary slightly at times and private vehicles would respond differently at the grade crossings, on average, each train would block an intersection at a grade crossing for approximately four minutes, causing some traffic delays.

Due to the relatively low level of proposed train traffic (four trains per day – two round trips from the quarry to the UP rail line) and the relatively low level of vehicular traffic, SEA preliminarily concludes that the traffic delays at the at-grade crossings of area roadways would not be significant.

Grade Crossing Safety

Several commenters, including the Texas Department of Transportation (TxDOT), expressed concern about the impact of the proposed project on the safety of the traveling public at an at-grade crossing of Farm to Market road (FM) 2676. This state-maintained road has an ADT of only 610 vehicles per day (District Highway Map, 2000). However, as mentioned in

Chapter 3, Hondo Independent School District has three bus routes and Medina Valley Independent School District has one bus route that travel along FM 2676 and would cross the rail line along the proposed route or any of the alternative routes twice daily. TxDOT also states that FM 2676 is used by numerous working farms and ranches on a daily basis. (See Appendix C.)

SGR has stated that it has initiated consultations with TxDOT to develop appropriate ways to address potential grade crossing concerns. As a result of these consultations, TxDOT indicated that upon determination and identification of the exact FM 2676 rail-crossing location, TxDOT would conduct a safety assessment of the proposed crossing to determine the safety improvements that would be required to address the needs of the traveling public. SGR would then be required to implement safety improvements for the FM 2676 crossing in accordance with TxDOT's policy and procedures. This would require an agreement between TxDOT and SGR that would need to be approved by the Texas Transportation Commission (TTC). The TTC approval would include the type of safety treatment required by TxDOT at this highway-rail intersection. In accordance with the Texas Transportation Code, funding for initial and future rail crossing safety improvement would be borne by the rail company. (See Appendix C.)

Due to the relatively low level of proposed train traffic (four trains per day – two round trips from the quarry to the UP rail line), the relatively short length of the proposed rail line (the proposed route would be seven miles in length, Alternative 1 would be nine miles in length, Alternative 2 would be about seven miles in length, and Alternative 3 would be 7.5 miles in length), the relatively low level of vehicular traffic, and the relatively slow speed of proposed train operations (25 miles per hour), SEA does not believe that an at-grade crossing of FM 2676 or the county roads would pose a significant safety risk. (See Section 4.1.2 for SEA's analysis of risk of accidents). However, in order to address the concerns raised by members of the public and TxDOT, SEA recommends that the following mitigation measures be imposed on any decision approving the proposed action:

T. Southwest Gulf Railroad Company shall consult with the Texas Department of Transportation (TxDOT) prior to beginning rail line construction regarding the rail line crossing of FM 2676 and shall adhere to TxDOT's reasonable recommendations regarding the design of this crossing.

U. In consultation with and based on the recommendations of the Texas Department of Transportation and Medina County, Southwest Gulf Railroad Company shall install and maintain appropriate grade-crossing warning devices at all at-grade crossings.

V. Southwest Gulf Railroad Company shall develop a plan with the Texas Department of Transportation and Medina County that specifies the responsibility of each party concerning the maintenance and repair of the grade-crossing warning devices and the grade crossings along the new rail line prior to construction.

W. Southwest Gulf Railroad Company shall consult with local school officials in Medina County prior to construction to take school bus schedules into consideration in its plans and to minimize rail operations when school buses are on area roadways.

Temporary road closings or traffic delays would occur during construction, while track is installed and adjustments or tie-ins are made along the road crossings. Due to the low level of vehicular traffic on the roadway and because these impacts would be temporary, SEA does not believe that these impacts would be significant.

A lower probability risk with potentially greater impact could occur during proposed operations if a train malfunctioned and blocked a grade crossing for an extended period of time. Any such break-down would create a need for a minor detour of traffic, but no homes or businesses would be completely isolated due to such an event. There are several other state and county roads in the area that could be used as alternative routes under these circumstances. Thus, these impacts would not be significant.

Although impacts to transportation and traffic safety from construction of these road crossings or train malfunctions at these crossings would not be significant, these impacts could be reduced by implementation of the following mitigation measures, which SEA recommends that the Board impose:

- Southwest Gulf Railroad Company shall consult with the Texas Department of Transportation and Medina County regarding how to minimize vehicular traffic delay during rail line construction across roadways, and adhere to their reasonable requirements.
- Southwest Gulf Railroad Company (SGR) shall develop internal emergency response plans for use during rail line construction and operation to ensure that appropriate agencies and individuals are notified in case of an emergency. SGR shall provide the emergency response plan to appropriate state and local entities prior to any rail construction activities.
- Southwest Gulf Railroad Company (SGR) shall take into account maintenance of emergency response capabilities and school bus schedules in planning and executing

the necessary road work for construction and maintenance activities on the rail line. SGR shall station equipment so as to minimize the need for any total road closures and to allow the disturbed areas to be quickly restored for passage by emergency vehicles.

- Southwest Gulf Railroad Company shall be responsible for the cost of all permits, detours, coordination with local officials and agencies, and public notifications related to temporary lane restrictions or road closures necessitated by rail construction activities.

4.1.2 Risk of Accidents

Although the risks of accidents from proposed train operations would be unlikely, due to the limited amount of proposed rail operations (four trains per day – two round trips from the quarry to the UP rail line), the relatively short length of the proposed rail line (the proposed route would be seven miles in length, Alternative 1 would be nine miles in length, Alternative 2 would be about seven miles in length, and Alternative 3 would be 7.5 miles in length), the relatively low level of vehicular traffic, and the relatively slow speed of proposed train operations (25 miles per hour), SEA calculated the potential for the risk of accidents to human health and safety from proposed rail operations over the proposed route, Alternative 1, Alternative 2 and Alternative 3. SEA also calculated the risk of accidents at grade crossings. Based on the analysis (set forth below), SEA preliminarily concludes that the risk of accidents to human health and safety and the risk of accidents at grade crossings from SGR's proposed rail operations would not be significant along the proposed route or any of the three alternative rail routes.

The risk of derailments would be reduced because of the newness of the track. Also, like any similar railroad, SGR would be required to conduct track safety inspections and follow maintenance procedures according to the Federal Railroad Administration (FRA) standards set forth at 49 CFR Part 213. The inspection program should detect any potential problems with the physical condition of the rail line at an early stage.

Under the no-action alternative, the proposed rail line would not be built and the trips from the quarry to the UP rail line would be performed by heavy trucks. As set forth below, the risk of accidents under this alternative would be somewhat higher than would result from the various rail alternatives. However, SEA does not believe that this risk would be significant.

Methodology for Calculating Risk of Accidents

SEA used the data provided in the document *Longitudinal Review of State-Level Accident Statistics for Carriers of Interstate Freight* (Saricks and Kvitek, 1994) to calculate the risk of

accidents to human health and safety from operations over the proposed rail line. The study derived data from an analysis of state-level accident rates by mode of transportation performed by the Department of Energy's (DOE) Environmental Mitigation program. According to the study, based on national average accident statistics and considering all injuries and fatalities associated with regular trains,[7] the risks of accidents to human health and safety were 4.26×10^{-8} injuries per railcar-km and 2.27×10^{-8} fatalities per railcar-km.

Dedicated trains,[8] which would be used to transport the stone at issue in this rail construction project, spend much less time in rail yards than do regular trains, since dedicated trains do not undergo classification. Therefore, the risk of injuries and fatalities during railyard operations are not as relevant for dedicated trains as they are for regular trains. If the large percentage of casualties that occur in rail yards is excluded from the national averages, the injury rate would decrease by a factor of almost 7 and the fatalities would decrease by a factor of about 36 (Saricks and Kvitek, 1994).

The U.S. Department of Transportation (DOT) has compiled data on accidents at grade crossings (U.S. DOT 2000). DOT studies show that between 1991 and 1996, there was about a 1 in 32 chance of an accident at a given grade crossing per year, a 1 in 92 chance of an accident-related injury per year, and a 1 in 320 chance of an accident-related fatality per year.

Calculations for the Proposed Route: The total distance covered by the trains transporting stone between the quarry and the Union Pacific Railroad Company rail line under SGR's proposed route would be approximately 7 miles, or 11.3 kilometers (km). Each train would be approximately 100 cars long, and there would be a total of two round trips a day, for a total of 4,500 railcar-km/day.

Using the methodology set forth above for regular trains, the risk to human health and safety due the operation of the proposed route on an annual basis would be:

$(4.26 \times 10^{-8}$ injuries/railcar-km) × (4,500 railcar-km/d) × (250 days/year) = 0.048 injuries, and
$(2.27 \times 10^{-8}$ injuries/railcar-km) × (4,500 railcar-km/d) × (250 days/year) = 0.026 fatalities

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[7] "Regular" trains are those which may share use, either between passenger/freight or between various types of freight (Saricks and Kvitek, 1994).

[8] "Dedicated" trains are those used for a single freight type (Saricks and Kvitek, 1994).

But the actual risk here would be even lower, due to the use of dedicated trains.

The proposed route would have seven at-grade crossings. Using the DOT statistics set forth above for grade crossings, the accident risk at these grade crossings would be 0.22 accidents per year, resulting in 0.076 injuries and 0.022 fatalities.

Calculations for Alternative 1: The total distance covered by Alternative 1 would be approximately 9 miles, or 14.5 kilometers (km). Each train would be approximately 100 cars long, and there would be a total of two round trips a day, for a total of 5,760 railcar-km/day.

Using the methodology set forth above for regular trains, the risk to human health and safety due to the operation of Alternative 1 on an annual basis would be:

$(4.26 \times 10^{-8}$ injuries/railcar-km) × (5,760 railcar-km/d) × (250 days/year) = 0.061 injuries, and
$(2.27 \times 10^{-8}$ fatalities/railcar-km) × (5,760 railcar-km/d) × (250 days/year) = 0.033 fatalities

But the actual risk here would be even lower, due to the use of dedicated trains, but slightly higher than the risk of accidents for operations over the proposed route.

Alternative 1 would have eight at-grade rail crossings. Applying DOT statistics for grade crossings, the accident risk at these grade crossings would be 0.25 accidents per year, resulting in 0.087 injuries and 0.025 fatalities.

Calculations for Alternative 2: The total distance covered by Alternative 2 would be approximately the same as the proposed route. Thus, the risk to human health and safety due to accident risks due to the operation of Alternative 2 on an annual basis would be essentially the same as for the proposed route.

Alternative 2 would have five at-grade rail crossings. Applying DOT statistics for grade crossings, the accident risk at these grade crossings would be 0.16 accidents per year, resulting in 0.054 injuries and 0.016 fatalities.

Calculations for Alternative 3: The total distance covered by Alternative 3 would be approximately 7.5 miles, or 12 kilometers (km). Each train would be approximately 100 cars long, and there would be a total of two round trips a day, for a total of 4,800 railcar-km/day.

Using the methodology set forth above, the risk to human health and safety due to accident risks due to the operation of Alternative 3 on an annual basis would be:

$(4.26 \times 10^{-8}$ injuries/railcar-km) × (4,800 railcar-km/d) × (250 days/year) = 0.051 injuries, and
$(2.27 \times 10^{-8}$ fatalities/railcar-km) × (4,800 railcar-km/d) × (250 days/year) = 0.027 fatalities

As was the case for the other routes, the actual risk would be even lower, due to the use of dedicated trains, and almost the same as the risk of accidents for operations over the proposed route.

Alternative 3 would have six at-grade crossings. Applying DOT statistics for grade crossings, the accident risk at these grade crossings would be 0.19 accidents per year, resulting in 0.065 injuries and 0.018 fatalities.

Calculations for the No-Action Alternative: Under the no-action alternative, the proposed rail line would not be built and the trips from the quarry to the UP rail line would be performed by heavy trucks. This would require approximately 850 round trips or 1,700 one-way trips each day, at 9 miles per trip, for a total of 15,300 truck-miles per day or 3 million truck miles/year. According to the DOT National Highway Traffic Safety Administration, in recent years approximately 0.69 injuries/million truck-miles and 0.025 fatalities/million truck-miles have resulted from accidents involving heavy trucks annually (U.S. DOT, 2000). Thus, the risk of to human health and safety from the operation of the no-action alternative on an annual basis would be:

(0.69 injuries/million truck-miles) × (15,300 truck-miles) × (250 days/year) = 2.6 injuries, and
(0.025 fatalities/million truck-miles) × (15,300 truck-miles) × (250 days/year) = 0.096 fatalities.

This represents a higher risk for injuries and fatalities than would result from the various rail alternatives.

While train/vehicle accidents result in a higher probability of fatality per incident than truck/vehicle accidents, the probability of a fatality from the use of trucks would be on the same order of magnitude as the probability caused from the implementation of the proposed rail service. However, because train/vehicle accidents are much less likely to occur than truck/vehicle

accidents, the probability of injuries would be 40 times higher under the no-action alternative than in any of the rail alternatives.

4.1.3 Utility Crossings

The proposed route and the three alternative rail routes each would cross two utility gas pipeline rights-of-way. According to SGR, Duke Energy owns one of the pipelines, and it is buried about 3 feet below the surface. SGR states that the other pipeline, owned by Koch Pipeline, was removed in November 2003.

SEA has identified no potentially significant impacts from the pipeline/rail crossing that would result from construction and operation of the proposed route and each of the other build alternatives. To date, Duke Energy has raised no safety concerns related to the crossing. SGR states that it has consulted with Duke Energy, which has indicated that its pipeline is inactive and that it has no plans to reactivate it. According to SGR, Duke Energy has agreed to grant SGR an easement for the pipeline crossing. Although Duke Energy has not raised any safety concerns related to this crossing, SGR intends to consult further with Duke Energy prior to any rail construction.

In preparing this Draft EIS, SEA consulted with the Texas Office of Pipeline Safety (OPS), which orally indicated that pipeline owners are responsible for ensuring the safety of pipeline/rail crossings. Thus, according to OPS, SGR should work with the owners of the pipeline easements to make appropriate modifications to the design of the rail line, in order to maintain pipeline integrity, if this proposed rail line is approved and built (OPS, oral communication, **December, 2003**). OPS indicated that vibration from trains would cause no harm to buried pipelines and that casing them could potentially cause corrosion problems, so that it would be preferable to leave them alone.

In order to ensure that adequate safety precautions regarding the pipeline/rail crossing are taken during construction and operation of the proposed rail line, SEA recommends that the Board impose the following condition:

- Southwest Gulf Railroad Company shall consult with Duke Energy prior to beginning rail line construction and shall make appropriate modifications to the design of the rail line necessary to ensure that the rail line will not affect the integrity of the Duke Energy pipeline.

No-Action Alternative

There would be no pipeline/rail crossing under this alternative.

4.1.4 No-Action Alternative

Under the no-action alternative, a fleet of about 24 dedicated heavy-trucks of varying capacity would make approximately 850 total round trips (1,700 one-way trips) to transport limestone from the quarry loading loop to a 100-acre truck-to-rail remote loading facility to be located off County Road 4516, just north of Highway 90 and the main UP line. (See Figure 3.4-1 for location of truck-to-rail remote loading facility and truck routes.) At that point, the limestone would be transferred from the trucks to the trains that would carry the limestone over the existing UP line. SGR estimates that each truck would operate 20 hours per day, 250 days per year. These trucks would travel about 2.5 miles on either County Road 351 or County Road 353, to FM 2676. The trucks would then proceed south for about 3.5 miles and then east on County Road 4516 for about 3 miles to the point where the remote truck-to-rail loading facility would be located.

SGR indicated that a possible alternative routing could involve traveling 2.4 miles southbound on County Road 353, 1.5 miles on a new privately-owned road that would be constructed on VCM's property connecting County Road 353 with County Road 365, about 1.25 miles south on County Road 365 to County Road 4512, and then east on County Road 4516 about 1.3 miles to a private road leading to the remote truck-to-rail loading facility. (See Figure 2.4-1 in Chapter 2 for location of truck routes.)

According to SGR, FM 2676 would be capable of sustaining this type of added traffic for at least a short period of time. However, neither County Road 4516 nor County Road 353 are currently designed to handle this increased truck traffic. Both of these roads would require immediate and substantial upgrading for the entire length that those roads would be used for the quarry truck traffic. In several cases, particularly on County Road 353 leading to the quarry and plant area, SGR estimates that the roads would need to be upgraded to handle tractor-trailers carrying aggregate to local customers as well as quarry employee traffic and local residents. SGR states that VCM has already proposed to upgrade County Road 353 to an adequate width, and possibly County Road 4516 as well, to handle the truck traffic to local markets that would take place regardless of whether or not the rail line is built. SGR adds that VCM would continue to work with the Medina County commissioners on the specifications of these upgrades.

The truck trips under the no-action alternative would represent approximately a 300% increase in daily traffic volume for FM 2676, and a greater increase for County Road 351 or 353. None of these roads are designed to sustain this type of load continuously. Because of the traffic impact and the impacts to road maintenance, the no-action alternative would represent a significant change to the current road system. Thus, SEA preliminarily concludes that the no-action alternative would have significant, adverse impacts on the transportation infrastructure and traffic safety of the area.

4.2 Public Health and Safety

In this section SEA will:

a. Describe potential public health impacts from the proposed new rail line construction and operation.

b. Propose mitigative measures to reduce or eliminate potential project impacts to public health, as appropriate.

4.2.1 Summary of Impacts

Construction and operation of the proposed rail line under any of the routes (proposed route, Alternative 1, Alternative 2, or Alternative 3) would not result in significant impacts to public health and safety.

Impacts to public health and safety from construction of the proposed rail line would primarily be from the emission of dust and criteria air pollutants (Total Particulate Matter (TPM), Particulate Matter less or equal to 10 microns (PM_{10}), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Sulphur Oxides (SO_x), Volatile Organic Compounds (VOCs), and Ammonia (NH_4)) that could be generated by heavy equipment during construction activities. The impact to regional air quality from construction would be minimal (see Section 4.7), though there would be some localized impacts. Because the construction activities on any given segment of the rail line would be of short duration, any adverse impact on public health would be temporary. Therefore, these potential impacts would not be significant.

The severity of impacts during construction depends in large part on project size. Therefore, due to the similar lengths of the proposed route, Alternative 2 and Alternative 3, impacts from construction activities would be essentially the same for these rail alignments. Alternative 1 would be two miles longer in length, and thus construction activities would be

slightly longer in duration. Although impacts to public health and safety from rail construction activities would not be significant, in order to reduce any potential adverse impacts to public health and safety from construction of the proposed rail line, SEA recommends that the Board impose the following mitigation:

- During rail line construction, Southwest Gulf Railroad Company shall take appropriate measures to control fugitive dust, including the use of water trucks.
- Southwest Gulf Railroad Company shall take appropriate measures to prohibit public access to the construction site during rail line construction activities.

Under the no-action alternative, construction activities would involve creation of the truck-to-rail remote loading facility and the widening and improvement of roadways, as described in Chapter 2. The potential health impacts from these construction activities would be similar to those identified for the proposed rail line and would also not significantly affect public health and safety. Road construction activities, however, would be longer in duration and would disturb a larger area.

Impacts to public health and safety from proposed rail operations over any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would include risks from at-grade crossings of roadways and risks from rail accidents, as discussed in Section 4.1.

Under the no-action alternative, the major impact to public health and safety would be from the risk of accidents involving the large number of trucks that would be used in place of rail transport. SEA quantitatively assessed these risks, as discussed in Section 4.1.

4.3 Hazardous Materials/Waste Sites and Existing Energy Resource Impacts

4.3.1 Hazardous Materials/Waste Sites

As discussed in Chapter 3, SEA performs a corridor evaluation focusing on the area located within 500 feet on either side of the right-of-way when assessing hazardous waste sites. Typically, construction activities and railroad operations are not likely to disturb hazardous-materials-spill sites and hazardous-waste sites located more than 500 feet from the rail line.

Based on the results of its site visits to the area and reviews of maps and aerial photography, SEA has not identified any existing hazardous-materials-spill sites or hazardous-

waste sites within 500 feet of the proposed route and/or alternative routes that could potentially be affected as a result of the proposed construction activities. SEA also conducted a search of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database for Medina County, Texas on September 15, 2004.[9] CERCLIS contains data on potentially hazardous waste sites that states, municipalities, private companies, and individuals have reported to EPA. Medina County, Texas contains three sites listed in the CERCLIS database: the Hondo Army Airfield at the Hondo Municipal Airport in Hondo, Texas; the La Costex Refinery in La Coste, Texas; and National Foam Cushion Manufacturing, Inc. in Natalia, Texas. None of these sites are within 500 feet of the proposed route, Alternative 1, Alternative 2, or Alternative 3. Therefore, SEA determined that there is no risk of disturbing known hazardous materials or hazardous waste sites. In addition, based on the lack of proximal industrial activities, the historical land use, and review of aerial photography and site surveys, SEA believes that the potential for disturbing undocumented sites during construction of the rail line is extremely low.

SGR's proposed rail operations do not involve the transportation of hazardous materials; the proposed rail line would transport limestone from VCM's quarry to the UP rail line.

4.3.2 Energy Impacts

There are two main gas pipelines within the entire project area that would be crossed by the proposed route or any of the alternative routes. According to SGR, Duke Energy owns one of the pipelines, which is currently inactive. SGR states that the other pipeline, owned by Koch Pipeline, was removed in November 2003. Section 4.1 contains SEA's discussion of potential impacts to the Duke Energy pipeline.

4.4 Worker Health and Safety

In this section SEA will:

a. Describe potential public health impacts from the proposed new rail line construction and operation.

b. Propose mitigative measures to reduce or eliminate potential project impacts to public health, as appropriate.

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[9] CERCLIS database, last updated August 20, 2004 (visited September 15, 2004) <cfpub.epa.gov/supercpad/cursites/srchsites.cfm>.

4.4.1 Summary of Impacts

Construction and operation of the proposed rail line under any of the routes (proposed route, Alternative 1, Alternative 2, or Alternative 3) would not result in significant impacts to worker health and safety.

Impacts to worker health and safety from construction of the proposed rail line would be similar to the public health impacts discussed in Section 4.2, and would primarily be from exposure to criteria air pollutants (Total Particulate Matter (TPM), Particulate Matter less or equal to 10 microns (PM_{10}), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Sulphur Oxides (SO_x), Volatile Organic Compounds (VOCs), and Ammonia (NH_4)) that could be generated by construction activities. However, because the construction activities would be of short duration, any adverse impact on worker health would be temporary. Therefore, these potential impacts would not be significant. Moreover, the proposed construction and operation activities would be subject to the Occupational Safety and Health Administration's (OSHA) regulations that reduce the risk of adverse health impacts to workers (OSHA General Industry Standards at 29 CFR Part 1926 and OSHA Construction Industry Standards at 29 CFR Part 1926).

Other potential health impacts to workers during construction and operation of SGR's proposed rail line would be limited to the normal hazards associated with construction and operation of any rail line. SEA anticipates no unusual situations that would make the proposed construction and operation more hazardous than normal for a major industrial project. According to SGR, the construction of the proposed rail line would require a peak work force of 15-20 workers and would be completed in 12 months. Based on Bureau of Labor Statistics (BLS), Census of Fatal Occupational Injuries, 2002 data, the number of fatalities expected over the construction period is estimated to be only 0.0005 (much less than one). Based on BLS statistics for construction worker nonfatal occupational injuries, the number of nonfatal injuries, involving lost workdays over the 12-month construction period of the proposed rail line is estimated to be 1.5.

The risk of impacts to workers during construction depend to a large extent on project size. Therefore, due to the similar lengths of the proposed route, Alternative 2 and Alternative 3, the potential for impacts from proposed construction activities would be essentially the same for these rail alignments. Alternative 1 would be two miles longer in length, and thus construction activities would be slightly longer in duration. Although impacts to worker health and safety from construction activities would not be significant, in order to reduce any potential adverse impacts to

public health and safety from construction of the proposed rail line, SEA recommends that the Board impose the following mitigation:

- During rail line construction, Southwest Gulf Railroad Company shall take appropriate measures to control fugitive dust, including the use of water trucks.
- Southwest Gulf Railroad Company shall comply with appropriate Occupational Safety and Health Administration standards (OSHA General Industry Standards at 29 CFR Part 1926 and OSHA Construction Industry Standards at 29 CFR Part 1926) during rail line construction and operation activities.

Under the no-action alternative, construction activities would involve construction of the truck-to-rail remote loading facility and the widening and improvement of several roadways, as described in Chapter 2. The potential worker health and safety impacts from these construction activities would be similar to those identified for the proposed rail line. These potential impacts would also be comparable to the normal risks for road construction. Thus, SEA preliminarily concludes that these impacts would not be significant. However, these construction activities would be longer in duration than the construction activities for the proposed rail line, and would disturb a larger area. SEA expects the peak work force required to build these facilities to be larger than those required for the proposed route and alternatives; and thus, the risks for fatalities and non-fatal injuries would be proportionally larger. According to BLS statistics, the number of fatalities for private industry as a whole was 0.006 per 100 employees, whereas for employees in highway and street construction this number was 0.03 per 100 employees.

According to SGR, operation of the proposed rail line over any of the alignments (proposed route, Alternative 1, Alternative 2 or Alternative 3) would involve 24 employees operating trains to move limestone from the quarry to the connection with the UP rail line. Using BLS data, SEA estimates that over a 30-year period the number of fatalities during normal operations (including activities involving transportation and transfer of limestone from the quarry to the rail line, as well as return trips) would be 0.081 (i.e., less than one). Based on BLS data, SEA estimates that approximately 24 nonfatal injuries would occur on the proposed rail line during normal operations over 30 years. Thus, SEA preliminarily concludes that these impacts would not be significant.

The no-action alternative would require approximately 30 truck drivers. Based on BLS statistics for the trucking industry, SEA estimates that over a 30-year period the number of fatalities during normal operations would be 0.22 (less than one) and that approximately 75

nonfatal injuries would occur. Thus, SEA preliminarily concludes that these impacts would not be significant.

4.5 Water Resource Impacts

SEA evaluated the effects of the proposed rail line and no-action alternative on water resources described in Section 3.3, including groundwater (aquifers and springs), floodplains, surface waters (including watersheds, streams, and creeks), and wetlands. SEA examined relevant maps, publications and databases of the Texas Water Development Board (TWDB), and consulted with Federal and local agencies to assess the potential impacts from construction and operation of the proposed rail line and no-action alternative on these resources.

4.5.1 Summary of Impacts to Water Resources

Construction and normal operations over the proposed rail line (any rail alternative) would result in little or no impacts to groundwater resources, including aquifers. Temporary silting due to construction and maintenance activities for the proposed rail line could cause minor impacts to groundwater, but the trucking operations that would occur under the no-action alternative would pose a greater risk of adverse impacts to groundwater resources in the area. In the highly unlikely event of a release of diesel fuel caused by a derailment on the proposed line, SEA proposes mitigation to prevent significant impacts to groundwater.

Construction of the proposed rail line potentially could impact surface waters by increasing erosion and consequent deposition of sediment into area streams, by interfering with surface discharge within small areas, and by degrading surface water quality slightly due to oil spills from construction vehicles. SEA has proposed mitigation measures that would reduce any of these impacts to a less than significant level.

As for wetlands, the access roads needed for vehicles used to construct the proposed rail line could result in some adverse impacts that would be made less than significant with SEA's recommended mitigation. SEA's recommended mitigation would require the railroad to remove the access roads and stabilize the area after completion of construction. Other recommended mitigation includes compliance with the reasonable recommendations of the Texas Parks and Wildlife Department to minimize erosion during construction. To reduce the impact of spans across streams and creeks, SEA's recommended mitigation would require hydrological studies and engineering of spans designed to minimize impacts on flooding. SEA preliminarily concludes that construction and operation of the proposed rail line in compliance with all of the recommended

mitigation conditions would not result in significant adverse effects to wetlands, including flooding, and would have fewer adverse impacts than the no-action alternative.

4.5.2 Groundwater

Construction Impacts to Groundwater

Construction of a rail line involves earth-disturbing activities, such as creation of a roadbed and making cuts and fills to level out the grade of the rails. In this case, disturbance of the earth could create the potential for stormwater runoff containing silt and debris to enter into the streams that recharge the Edwards BFZ and Leona Gravel aquifers. The Edwards BFZ Aquifer is a major aquifer that is the source of drinking water for private wells in the area as well as some municipal water supplies. The portion of the proposed rail line crossing the EARZ (zone that recharges the Edwards BFZ Aquifer) is small, representing only the northernmost one-half mile of the proposed rail line.

Repair and replacement activities that would take place after the proposed rail line begins operating could also involve some minor disturbance of the earth and generate small volumes of runoff containing silt or debris to enter into the groundwater in the two aquifers. Stormwater runoff tends to occur during more intense rainfalls that are in excess of three inches per hour or greater. Rainfall events of this size usually occur during the spring and fall months. The summer and winter months are relatively dry by comparison.

To minimize the impact of silt or debris entering the groundwater to the maximum extent possible, SEA recommends that the Board impose a condition requiring that construction and repair/replacement activities be performed in accordance with a storm water pollution prevention plan (SWPPP) that contains Best Management Practices (BMPs) to use during construction and maintenance activities. These BMPs would entail use of temporary measures such as silt fencing, rock berms, and hay-bale berms.

Construction and maintenance of the proposed rail line (all four routes) would result in an extremely small risk of a significant amount of petroleum products entering the area's aquifers. Any piece of equipment used in construction or repair would contain only a small volume of gasoline (or diesel fuel) and oil, and there is only a small risk of an accident causing a piece of equipment to spill fuel.

Petroleum poses a concern upon reaching the groundwater table in an aquifer because the petroleum spreads out on top of the water surface and travels in the direction of water flow, eventually emerging at springs or other discharge points and causing particular concern for those wells that withdraw from the top of the water column. The impact of such a petroleum spill would be minor when the water is used to irrigate crops or to water stock because petroleum products may be applied to the land surface as a low concentration over a wide surface area and would evaporate rapidly or dissipate through natural attenuation. The impact would be more significant if the water were used for domestic supply (private-use wells) because the benzene, toluene, and other organic compounds in gasoline and diesel fuel are a health risk to humans. As discussed below, SEA recommends requiring implementation of plans to reduce the risk of petroleum spills, to promptly remediate any spills that occur, and to address the needs of well owners should any contamination occur.

Moreover, to reduce the likelihood of an equipment-related fuel spill, SEA has recommended a condition requiring good maintenance and safe operation of rail construction equipment. SEA also recommends a condition requiring construction contractors and repair crews to act immediately to contain and remediate any fuel spill from construction equipment.

The no-action (all-truck) alternative would require improvement to area roads to enable them to support the additional 1,700 trips per day of heavy trucks hauling crushed limestone to the UP line and returning empty. The impacts on groundwater from road reconstruction likely would be similar to those of construction of the proposed rail line: a small risk of a petroleum spill from an accident with the equipment used to reconstruct the roads.

Operational Impacts to Groundwater

Turning to the operational phase of the proposed rail line, there is no potential for contamination of groundwater resources from a spill of crushed limestone, which is the only commodity that would be transported on the proposed rail line for the foreseeable future, because limestone is not hazardous to humans, stock, or agricultural water. Limestone is the principal constituent comprising the aquifers in the area.

There is a small risk of petroleum entering the groundwater during normal fueling and maintenance of locomotives. To reduce that risk, SEA recommends several mitigation conditions. One condition would require that fueling and maintenance of locomotives be conducted in a designated area off of the EARZ. To further reduce the effects of a spill of petroleum during fueling and maintenance activities, SEA also recommends requiring compliance with BMPs for

post-spill containment that would be sufficient to meet the requirements of a Texas Commission on Environmental Quality (TCEQ)-approved Water Pollution Abatement Plan (WPAP) and Spill Prevention, Containment and Countermeasures (SPCC) Plan. Compliance with these requirements would reduce any impacts from the refueling and maintenance of locomotives to a less than significant level.

Although the low level of traffic of the proposed rail line (four trains per day) makes a derailment very unlikely, a derailment could potentially cause a release of fuels (likely diesel) from a locomotive or other service vehicle that operates on the proposed rail line. Such a spill could impact groundwater resources.

In the extremely unlikely event of a petroleum spill due to a derailment, the severity of the impacts on groundwater would vary with the speed of detection and the speed and thoroughness of the cleanup. The impact of such a spill would be more significant as to drinking water resources if the spill occurred along hydrologically sensitive one-half mile in the EARZ. In order to ensure that adequate preventative and responsive mitigation measures would be taken, SEA recommends a condition requiring compliance with a SPCC plan for the rail line, particularly for the portions of the route that would be constructed over the EARZ.

Rapid detection and response to a release of petroleum (or any other contaminant) in the segments of the proposed route overlying the Leona Gravel aquifers would minimize the long-term impacts to the aquifer water quality. Regular surface observation would reveal any releases of petroleum because it would give off volatile odors and would rapidly distress vegetation. For that reason, SEA recommends a condition that would require SGR personnel to promptly report any suspected petroleum contamination along the rail line and a condition requiring SGR promptly to take corrective action to identify the source, and to prevent additional contamination. For example, if a release occurred at a point where the petroleum products spread overland, much of the contamination would be captured by the retention capacity of the soil. Remediation of these soils, particularly prior to rainfall or flooding, which could dissolve soil contaminants, would be an important first step to limit the amount of potential contaminants entering the aquifer. Accordingly, a recommended condition would require SGR to take such soil-remediation steps.

Proposed Route

SEA identified no public water system or public recreational uses of groundwater within one mile of the proposed route. SEA identified irrigation wells and stock tanks within one mile of

the proposed route, using USGS 7.5-minute series topographic maps and the TWDB water well database known as Water Information and Integration Dissemination system. All known irrigation wells within this area are located within the confined (artesian) zone of the Edwards BFZ Aquifer. Thus, these groundwater sites are well protected from surface contamination by the thick upper confining unit (rock) overlying the aquifer. This means that it is unlikely that contaminants released upon the outcrop could migrate to the irrigation wells and stock tanks in the examined area. However, contaminants released along the proposed route may pose a slightly greater risk to the local aquifers that occur within the Leona Gravel formation. SEA preliminarily concludes that construction and operation of the proposed route would have a minimal risk of significant adverse impacts to groundwater resources. Imposition of the recommended mitigation measures would reduce this risk such that any adverse impact would not have a significant effect on the human environment.

Alternative 1

This route, which is approximately two miles longer than the proposed route, would present a relatively equal risk (minimal) to groundwater resources than would the proposed route. The wells and springs within one mile of this route are within the artesian zone of the Edwards BFZ Aquifer. As with the proposed route, contaminants released along this route could pose a slightly greater risk to local aquifers occurring within the Leona Gravel Formation.

Alternative 2

This route, which is approximately the same length as the proposed route, would have the same minimal impacts to groundwater resources as the proposed route, for the same reasons as Alternative 1.

Alternative 3

This route, which is almost 2,500 feet longer than the proposed route, would have the same impacts to groundwater resources as the proposed route, for the same reasons as Alternative 1.

No-Action Alternative

The no-action alternative would have a greater potential for impacts to groundwater resources in the area than the proposed action, due to the increase in truck traffic. The no-action alternative would cause a substantial increase of 1,700 individual truck trips per day on the county and state maintained roadways in the area. On both paved and unpaved roads, these trucks would generate large amounts of dust that would deposit upon and alongside the roadways. This dust could subsequently be carried as suspended sediment by stormwater runoff and be transported to

the area aquifer recharge zones (EARZ and Leona Gravel). Additionally, the high volume of truck traffic would also deposit non-point source pollutants (NPSP), such as oils, greases, and rubber, on the roadways that would be carried as runoff into the local streamflow network. Moreover, the occurrence of motor vehicular accidents (collisions, overturning) per miles traveled is statistically greater than for rail transport. Thus, the likelihood of an incident involving the release of petroleum hydrocarbons (diesel fuel) from a vehicular incident is greater for trucks than for rail transport. Any such incident would likely require local remedial activities to remove contaminated soils and groundwater. The potential negative impacts to groundwater quality would therefore be greater from the no-action alternative than from the proposed rail line (any route).

4.5.3 Surface Water

Construction Impacts to Surface Water

SEA consulted with the U.S. Army Corps of Engineers, the Federal Emergency Management Agency (FEMA), and the Medina County Floodplain Administrator concerning the potential impacts of the proposed rail line on surface water resources. Based on these consultations, SEA determined that the construction of the proposed rail line (all routes) could have an adverse impact on flooding and on the stability of, and sediment loading in, streams crossed by the rail line. However, compliance with conditions designed to reduce the potential for flooding, stream instability, and erosion would make any adverse impacts less than significant.

Construction of the proposed rail line (any route) could have an adverse impact on flooding because it would require the crossing of a number of intermittent streams and could involve the use of fill (added material) at these stream crossings. (The exact number of crossings varies with the route; see Table 3.3-4). The added fill would increase the width of floodplains above stream crossings because it would change the hydraulic conditions at the crossings.

If the Board authorizes a particular rail route, SGR has voluntarily agreed to design the stream crossings in a manner that would not exacerbate pre-existing flooding risks. SGR states that it would study the area's hydrology, build fact-based numerical models, and modify the models to include the stream spans needed for the line to be constructed. SGR would utilize the models to characterize the response of surface water to the spans and compare these changes to the existing conditions. SGR would then utilize an iterative process (running the numerical

model again until no further relevant data is obtained) to investigate and determine the appropriate criteria that would be included in the final design of bridges to minimize any adverse impacts to the watershed, such as increases in base-flood elevations or increased erosion.

Accordingly, SEA recommends that, in any decision granting approval of the proposed line, the Board impose a condition requiring SGR to conduct the hydrological study, create and run the models, and design the bridges with adequate opening sizes, geometries, and bank stabilization-measures to convey floods and base-stream flows hydraulically without impounding water on the upstream side of the structure. As noted above, SEA's recommended mitigation also would require SGR to design a Water Pollution Abatement Plan (WPAP) and a Storm Water Pollution Prevention Plan (SWPPP) to mitigate water quality impacts during (and after) construction of the rail line.

In consultations, FEMA stated that Medina County participates in the National Flood Insurance Program under the direction of the Medina County Floodplain Administrator. (See Appendix C.) SEA also consulted with the Medina County Floodplain Administrator (see Appendix C), who orally indicated that Medina County has established development standards that would require SGR to demonstrate that the proposed construction would not cause more than a 12-inch rise in the current 100-year floodplain elevation. In order to further ensure that SGR's proposed construction would not have a significantly adverse effect on flooding, SEA recommends that the Board impose a condition on any decision granting approval of the proposed project requiring SGR to complete a floodplain study and consult with the Medina County Floodplain Administrator concerning each crossing prior to beginning construction.

SEA also consulted with the U.S. Army Corps of Engineers (the Corps) regarding the proposed rail construction and operation. (See Appendix C.) Under Section 404 of the Clean Water Act (CWA), the Corps regulates the discharge of dredged and fill material into waters of the United States, including wetlands (discussed below). According to Section 10 of the Rivers and Harbors Act of 1899, the Corps also regulates any work in, or affecting, navigable waters of the United States, including tributaries to navigable waters and wetlands. Any such discharge or work requires a permit from the Corps. According to the Corps, there are areas within the proposed project area that appear to be subject to Section 404 regulation, including Polecat Creek, Elm Creek, Quihi Creek, and Cherry Creek, other unnamed tributaries to navigable waters, and adjacent wetlands. Consequently, to assure compliance with those acts, SEA recommends that any approval of rail line construction include a condition requiring SGR to

consult with, and obtain approval from, the Corps as to any stream crossings within the authority of the Corps.

SEA preliminarily concludes that if the recommended conditions discussed above are imposed and implemented, the potential adverse impacts to surface waters from constructing the proposed rail line would not be significant.

Operation

Operation of trains over the proposed rail line would not have an adverse impact on flooding, and any spill of the limestone to be transported on the proposed rail line would not be hazardous to surface waters. Operations could, however, cause degradation of surface waters due to spills of diesel oil. The conditions recommended above to mitigate adverse impacts of a fuel spill on groundwater would also reduce the impacts to surface water so that the impacts would not be significant. Likewise, the proposed condition on the fueling, maintenance, and storage facility if imposed and implemented would minimize impacts to surface water. SEA also proposes conditions requiring SGR to perform all engine and oil cleaning or change outs with environmentally friendly solvents and/or absorbent pads or other containment materials to ensure no contact with the ground and to repair and resurface the tracks via manual resurfacing, assuring that the railroad would not use chemicals that could introduce additional pollutants into surface water.

SGR has voluntarily agreed to control weeds and vegetation along its right-of-way, consistent with rail industry standards and the need to minimize fire hazards. To reduce any adverse impacts to surface waters that may result from this activity, SEA recommends that the Board impose this voluntary mitigation as well as a condition requiring SGR to perform vegetation control manually via typical vegetation cutting methods, so that no toxic materials, such as herbicides, would be used for this purpose.

SEA identified no public recreational uses of surface water resources within one mile of the proposed rail line. The closest public recreational use of surface water is Medina Lake, which is located several miles away and is hydrologically upgradient from the proposed rail line (meaning surface waters in the proposed project area flow away from Medina Lake). Therefore, operation of the rail line is not expected to affect the water quality in Medina Lake.

To protect the recreational opportunities (fishing) in the privately owned stock-watering ponds in the area of the proposed line, SEA recommends that the Board impose a condition requiring that SGR incorporate into the recommended SPCC plan specific measures to address the remote possibility of sediment runoff or fuel spills flowing into these ponds.

Proposed Route

The proposed route would cross less floodplain than the alternative routes, largely because at the north end the alternative routes follow a path parallel to Elm Creek and within the Elm Creek floodplain for over a mile. In contrast, the proposed route would directly cross that floodplain. (See Figure 3.3-7.) With a more direct floodplain crossing, the rise in upstream floodplain is local to the crossing and more easily mitigated by the engineering design of the crossing. The proposed route would intercept the floodplain for a total length of 10,300 feet for all six crossings.

As noted in Section 3.3, the proposed route, by being located on the higher elevation east side of the project area, would cross more streamlines of lower order. Crossings of lower order typically have fewer intermittent flows, and wider, more mature riparian zones, and are easier to traverse without impact.

Alternative 1

Alternative 1 would intercept the floodplain for a total length of 16,300 feet for all six crossings, which is the greatest floodplain-intercept of the four rail alternatives. Alternative 1 would cross fewer streamlines than the proposed route, but more streamlines of higher order (i.e., more main stems), which means it would be more difficult to mitigate an increased potential for flooding by the engineering design of the crossing. This alternative largely avoids the highly and severely erosive soils within the south end of the project area, which means that there would be less construction disturbance of these soils and less potential for sediment loading into area streams than the proposed route and Alternative 3.

Alternative 2

Alternative 2 would intercept the floodplain for a total length of 12,650 feet for all four crossings, which is a greater intercept than the proposed route and a smaller intercept than Alternative 1. Alternative 2 crosses fewer streamlines than the proposed route, but more streamlines of higher order (i.e., more main stems), which means it would be more difficult to mitigate an increased potential for flooding by the engineering design of the crossing.

Alternative 3

Alternative 3 would intercept the floodplain for a total length of 14,050 feet for all six crossings. This is a greater intercept than the proposed route and Alternative 2, but a smaller intercept than Alternative 1. Alternative 3, which is located on the higher elevation east side of the project area, would cross more streamlines of lower order, which would make it easier to design stream crossings to mitigate an increased potential for flooding.

No-Action Alternative

The no-action alternative would have a greater impact on surface water due to the substantial increase in heavy truck traffic on the roadways in the project area. These trucks would generate large amounts of dust that would deposit upon and alongside the roadways. This dust would subsequently be carried as suspended sediment by stormwater runoff to nearby creeks. Additionally, the high volume of truck traffic would also deposit non-point source pollutants such as oils and grease, and rubber, which would be carried as runoff into the local streamflow network. Potential mitigation could involve creating stormwater drainages. The area roadways also would likely require frequent maintenance to keep up with the damage caused by large volumes of truck traffic. Roadway construction would also have an impact upon water resources, particularly by increasing sediment contaminated stormwater runoff. Furthermore, as discussed above, the likelihood of fuel spills from accidents related to this increased truck traffic would be much greater than that which would be expected from rail transport.

4.5.4 Wetlands

SEA evaluated the impacts of the proposed rail line and no-action alternative on wetland resources, including the effects from construction, operation, and maintenance. SEA conducted a site visit in the area of the proposed route and also reviewed National Wetland Inventory maps to identify the wetlands in the project area.

Construction Impacts to Wetlands

Based on the its site inspections and map surveys, SEA determined that the only potentially significant impacts to wetlands and other aquatic resources from the proposed rail line would be limited to areas associated with the crossings of several of the larger creeks. The spans carrying the proposed rail line across creeks would involve the placement of fill and could possibly cause a permanent loss of wetland functions. This impact, however, could be avoided by designing spans to avoid the placement of permanent fill material or structures within the

ordinary high water mark (OHWM) of the stream channels. If a crossing would result in creating permanent features within the OHWM of a stream, approval from the Corps would be required under Section 404 of the CWA. Consequently, SEA recommends a condition requiring SGR to obtain and comply with the terms of any Corps approval under Section 404.

There are a variety of small man-made ponds (impoundments) located in upland locations along the proposed rail line. These ponds are largely created for stock watering, and they do not support significant aquatic resources. From SEA's map review, it appears that the proposed rail line would avoid these small aquatic resources. (Many of these ponds are not subject to jurisdiction under Section 404 of the CWA and there are no permitting requirements for activities potentially affecting these ponds.) Nevertheless, to ensure that any potential impacts to these resources are avoided or minimized, SEA recommends that the Board impose a condition requiring SGR to review the exact location of these ponds prior to developing final engineering plans for the proposed rail line and to attempt to avoid the ponds. Under SEA's proposed condition, when avoidance is not possible, SGR would be required to minimize any potential impacts by (1) incorporating adequate BMPs in its SPCC plan and (2) determining, prior to construction, whether a pond that cannot be avoided is subject to a Corps permit, and if so, obtaining and complying with the permit.

Additionally, temporary impacts to stream channels could occur from the access roads needed to transport equipment and personnel during construction of the proposed rail line. These roads would also be subject to regulation under the CWA if they occur within the OHWM of a stream channel. The applicable Corps regulations would require that all materials associated with the temporary access road be removed and the area stabilized after the construction activities are complete. Appropriate erosion control would also be required. Given the fact that SGR would be required to comply with the applicable Corps regulations for temporary access roads in such wetlands and to remove the roads promptly after construction is completed, and that the roads would be temporary, SEA considers the impacts from the roads on wetlands to be minor at most.

Texas Parks and Wildlife Department (TPW) submitted comments recommending that the railroad should follow appropriate practices to prevent erosion and sediment runoff from disturbed areas during construction. TPW recommends a combination of hay bales and silt screens to prevent deposition of silt in wetlands. TPW states that any hay that is used in erosion control should be certified weed free hay to reduce the potential for introduction of exotic weed

species and that graded embankments should not exceed a 4:1 slope. Moreover, runoff-control measures should be maintained until native vegetation has been reestablished on disturbed sites. TPW also points out that reseeding exposed areas with a mixture of native grasses and the limiting of mowing practices could assist enhancement of existing native grasses or prairie remnants. (See Appendix C.) In order to ensure that any potential impacts to wetlands are minimized, SEA recommends that the Board impose a condition requiring SGR to implement TPW's recommendations.

Operational Impacts to Wetlands

Operation of the rail line would not result in significant impacts to wetlands and aquatic resources. Minor alteration of flows to stream channels could occur due to the creation of drainage ditches along the sides of the rail line that would drain into existing streams, but the effects on wetlands and aquatic resources are not expected to be significant under any of the alternatives, as discussed below. There is a very small possibility of a spill of diesel oil into a wetland due to an accident (derailment) involving a locomotive moving along the rail line. SEA's recommended condition requiring creation of, and compliance with, an SPCC for controlling and mediating spills would make impacts from a diesel spill to wetlands less than significant.

Below, SEA discusses the potential impacts to wetlands of the various rail routes and the no-action alternative. The creek crossings of the various rail routes are shown in Figure 3.3-3 and summarized in Table 3.3-4. Figure 3.3-7 shows the 100-year floodplains in the area.

Proposed Route

The proposed route crosses two large streams (Quihi Creek and Elm Creek), several smaller streams (Polecat Creek and Cherry Creek), and tributaries of these creeks. This route tends to remain in a more upland setting and crosses less floodplain than the alternative rail routes. For this reason, SEA believes that there would be fewer impacts to wetlands from the proposed route than the other rail alternatives. In order to ensure that impacts to wetlands (and surface water resources) are minimized, SEA recommends that if the proposed route is approved, the Board require SGR to span stream crossings with a bridge to avoid interference with the natural stream flow of the streams.

Alternative 1

Alternative 1 is two miles longer than the proposed route and it is located closer to the channels of Quihi Creek and Elm Creek, thus crossing more floodplain area. Therefore, Alternative 1 would have a slightly increased chance of affecting surface water resources and possibly adjacent wetlands than the proposed route. Under Alternative 1, the crossings of Quihi Creek and Elm Creek would occur further below the headwaters of these two drainage features than the other alternative routes. In order to ensure that impacts to wetlands and surface water resources are minimized, SEA recommends that if Alternative 1 is approved, the Board require SGR to span these crossings with a bridge to avoid interference with the natural stream flow.

Alternative 2

Alternative 2 is about the same length as the proposed route. It is similar to Alternative 1 in the southern half of the route and it is similar to the proposed route in the northern half of the route. Alternative 2 crosses more floodplain area than the proposed route but less than Alternatives 1 and 3. This route crosses both Unnamed Tributary 2 and Cherry Creek well below the headwaters of these creeks. To ensure that impacts to wetlands and surface water resources are minimized, SEA recommends that if Alternative 2 is approved, the Board require SGR to span these crossings with a bridge to avoid interference with the natural stream flow.

Alternative 3

Alternative 3 is about 2,500 feet longer than the proposed route. This route crosses more floodplain area than the proposed route and Alternative 2, but less than Alternative 1. As with the other rail alternatives, to ensure that impacts to wetlands and surface water resources are minimized, SEA recommends that if Alternative 3 is approved, the Board require SGR to span creek crossings with a bridge to avoid interference with the natural stream flow of the streams.

No-Action Alternative

There would be no stream crossings under this all-truck alternative. However, impacts to wetlands could arise from fugitive dust emissions caused by the additional 1,700 heavy trucks per day on local paved and unpaved roads. This could possibly lead to using local water resources to control dust. In addition, road improvements necessary to handle the additional trucks could cause pollutants to enter water resources and wetlands near existing streams.

4.6 Biological Resource Impacts

In this section, SEA explains the process used to gather information on biological resources (vegetation and animals) in the project area and describes the environmental impacts on biological resources associated with construction and operation of the proposed rail line and no-action alternative. Where appropriate, mitigation measures are identified to reduce potential impacts on biological resources.

The construction and operation of the proposed route would have some effects on biological resources, for example, the clearing of vegetation on the small amount of land to be covered by rail bed and the corresponding wildlife habitat. However, SEA found that the proposed route and alternatives would have no significant impact on biological resources either during construction or during operation of the rail line.

4.6.1 Methodology

To gather and evaluate information on biological resources in area, SEA conducted a field assessment of the proposed route between February and May, 2003. This field assessment included pedestrian (walking) surveys of undeveloped lands and unimproved agricultural lands.

SEA undertook its assessment of biological resources along the alternative rail routes through partial observation by automobile and by a more detailed review of these potential routes, using aerial photography (Texas Digital Ortho Quadrangle False Color Infrared, dated 1995), published soil maps, National Wetland Inventory Maps, and USGS 7.5-minute topographic maps. The proposed route and alternative routes were observed to have similar vegetative cover and habitat characteristics.

4.6.2 Construction Impacts

Because of the need to disturb the earth, construction of the proposed rail line would involve some removal of vegetation and the corresponding wildlife habitat. For the portion of the right-of-way that forms the road bed, the removal would be permanent. For the remainder of the right-of-way, the removal would be temporary because natural vegetation would be restored after construction is completed.

There are no Federally endangered or threatened plants known to occur in Medina County, and therefore construction of the proposed action would not have an impact on such species. SEA's surveys revealed no occurrences of threatened or endangered animal species in

the project area, and no known karst features (caves, caverns), which can harbor endangered species of insects. Nevertheless, it is possible that construction would disturb some endangered, threatened, or rare species, and SEA recommends a condition to minimize these impacts. This condition is described in Section 4.9. SEA believes that, if this mitigation is imposed and implemented, the potential impact of this project on biological resources would not be significant.

Moreover, Texas Parks and Wildlife (TPW) has submitted comments recommending that natural buffers adjacent to floodplains should remain undisturbed to preserve wildlife cover, food sources, travel corridors, and to minimize soil erosion. TPW recommends that mature trees be replaced at a 3:1 ratio and that tree replacement be monitored to ensure a survival rate of 80 percent. If removal of old timber trees[10] is unavoidable, TPW recommends that these be replaced at a ratio of 10 trees for each one lost, and monitored to ensure an 80 percent survival rate. Trees should be planted in locations that would provide habitat for wildlife, such as within conservation easements, parks, or riparian buffer zones.

TPW also notes that if rare plant or animal species are found within or near the proposed route, precautions should be taken to avoid adverse impacts to them. If damages are unavoidable, mitigation plans must be made to reduce adverse impacts and/or compensate for damages that might occur. To protect migratory birds, TPW recommends that construction activities not take place during the March-August migratory bird-nesting season. (See Appendix C.)

Based on the recommendations of TPW, SEA recommends that the Board impose a condition on any decision granting construction and operation authority requiring SGR to implement TPW's recommendations to the maximum extent possible.

Proposed Route

Construction of the proposed route would potentially affect about 86 acres of land, on the basis of SGR's assumed corridor of about 80 feet in width. Of these 86 acres, about 22 acres would be devoted to the 2-mile loading loop (or alternative parallel tracks), an area that likely would be used for quarry-related operations even if no rail line were built. For that reason, this

[10] TPW defines old timber trees as trees that are 100 or more years old and have a diameter at breast height of 25 inches or greater.

discussion of the proposed route will focus on the remaining 64 acres along the 7-mile rail route south of the loading loop. About half of these acres (32) would be cleared as temporary construction right-of-way, then restored with native grasses. The remaining 32 acres would be permanently maintained as a 40-foot wide operational right-of-way containing a 20-foot strip for rail and ballast and 10-foot strips on either side of the rail bed kept clear for vehicle access. Fencing would enclose the entire perimeter of the 80-foot corridor containing both the revegetated (construction) right-of-way and the operational right-of-way.

Most of the impacted acres are shrub lands, particularly in the southern half of the proposed route. The middle portion of the proposed route is largely improved agricultural areas with minimal natural vegetation and habitat. The loading loop would be located in a woodland composed largely of juniper and oaks. All of these types of areas are common in Medina County and elsewhere in central Texas.

Potential impacts to vegetation resources and associated wildlife populations south of the proposed rail loop would consist of temporary displacement of vegetation and wildlife within 64 acres, followed by permanent displacement of those resources in 32 acres. But there would also be a net conversion of about 10 acres of improved agricultural areas to maintained grasslands. Therefore, the total long-term impacts of constructing this rail route would be to convert between 22 and 32 acres of current plant and wildlife habitats to rail line. SEA considers these impacts to be minimal, because existing agricultural activities in the area commonly result in land clearing that has impacts of this magnitude on biological resources, and because the amount of habitat disturbed is a small percentage of the comparable plant and wildlife habitat in Medina County.

Alternative 1

Construction of Alternative 1 would affect about 103 acres, about 82 of which would be south of the loading loop. Except for the increase in affected area, the impacts of this alternative would be similar to those of the proposed route, and about 38 acres would be restored as fenced and maintained grasslands. There would be an increase in small stream crossings due to this route paralleling Quihi Creek, but this would not have a significant impact on biological resources, for the same reasons discussed above for the proposed route.

Alternative 2

Construction of Alternative 2 would affect about 84 acres, 62 of which would be south of the loading loop. Impacts of this alternative would be similar to those of the proposed route, and about 32 acres would be restored as fenced and maintained grasslands.

Alternative 3

Construction of Alternative 3 would affect about 90 acres, about 68 of which would be south of the loading loop. Except for the slight increase in route length, impacts of this alternative would be similar to those of the proposed route, and about 34 acres would be restored as fenced and maintained grasslands.

No-Action Alternative

The no-action alternative would involve the construction of a remote truck-to-rail loading facility and a material stockpile near the UP line and Highway 90. This facility would displace approximately 100 acres of brushland and native pasture as well as about 25 acres for rail tracks needed to connect to the existing UP line. In addition, the no-action alternative would likely require the widening of area roadways, further displacing biological habitat. Although the no-action alternative has a potential for greater displacement of wildlife habitat and populations than the proposed route and Alternatives 1, 2 , and 3, the no-action alternative would not cause a significant impact on biological resources.

4.6.3 Operational Impacts

Proposed Route

Train operations and maintenance of the proposed route's right-of-way would have some potential to adversely affect biological resources, e.g., a moving train could strike animals. However, the slow speed of the trains (and the limited number of planned trains) would minimize the possibility of striking and harming animals. In addition, vegetation control (mowing and shredding grasses) would pose some risk to resident animals, but the impacts on animals are expected to be minimal.

Alternative 1

The impact of train operations and maintenance of Alternative 1 would be similar to those of the proposed route, with the exception of the slight increase in the affected area.

Alternative 2

Train operations and maintenance of Alternative 2 would be identical to those of the proposed route.

Alternative 3

Train operations and maintenance of Alternative 3 would be identical to those of the proposed route.

No-Action Alternative

Operation of a trucking system to deliver materials to the truck-to-rail remote loading facility would entail greater impacts to biological resources than the proposed route and Alternatives 1, 2, and 3. These impacts would be a result of increased truck travel along public roads and the need for additional road improvements, including improved road surfaces. (Without these improvements, impacts related to dust would be greater and could require using water to suppress dust. In turn, increased water use might cause greater impacts to aquatic resources, including wildlife.)

4.7 Air Quality Impacts

In this section, SEA explains the process used to evaluate air-quality impacts and describes the potential impacts of the proposed rail line construction and operation on air quality under any of the proposed alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3), as well as the no-action alternative (transport by trucks). This analysis revealed that there would be no significant effects on air pollution as a result of constructing or operating the proposed route or the alternative routes, but that significant emissions would result from operation of the no-action alternative. The basis for these conclusions is described below.

4.7.1 Methodology

Basis for Calculation

The Board typically applies a threshold level of rail traffic for determining whether to quantify the air pollution that would be generated by rail traffic over a proposed new rail line (see 49 CFR 1105.7(e)(5)). According to the Board's regulations, if the proposed construction is not located either in a Class I or a nonattainment area, pollutant emissions from rail traffic need to be quantified only if the proposed rail operations would result in eight or more trains per day.

The project site is not in a Class I area (defined in the Clean Air Act as areas that, as of August 7, 1977, contained national parks over 6,000 acres, national wilderness areas, national memorial parks over 5,000 areas, and international parks). Medina County's air is clean enough to meet national air quality standards for criteria air pollutants – common air pollutants found across the U.S. In other words, the county is in attainment with all National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. Proposed rail operations also would result in fewer than eight train movements per day. Therefore, a quantitative analysis of air emissions is not required.

However, in response to public comments regarding air-quality impacts, SEA has estimated the potential emissions from operations over the rail alternatives (including the proposed action, Alternative 1, Alternative 2, and Alternative 3), as well as the no-action alternative, to assess in more detail the proposed project's impacts on air quality. Emissions for construction activities were not quantified because they would be short term in duration, and could largely be controlled through work practices.

Emissions Factors

SEA used the U.S. Environmental Protection Agency's (EPA) air pollution emission factors (U.S. EPA, 1995) to estimate air pollutant emissions associated with the proposed route and alternative routes and the no-action alternative. EPA has listed emission factors for various sources in its "Compilation of Air Pollutant Emission Factors" documents, commonly referred to as AP-42. AP-42 includes volumes containing emission factors for both stationary and mobile sources of emissions.

An emission factor relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant, and is usually expressed as the weight of the pollutant divided by a unit weight, volume, distance or duration of the activity that emits the pollutant. So for instance, an emission factor for a heavy-duty truck might be expressed as mass of carbon monoxide emitted per distance traveled.

Emission factors provide scientifically documented estimates of emission rates from various sources (e.g., those from stationary sources such as an aggregate-loading operation and those from mobile (moving) sources such as trucks and cars). Environmental scientists use emission factors as a tool to estimate area-wide emissions rates from types of activities as well

as emissions from a specific facility. On the most basic level, estimated emissions are a product of the emission factor times the activity.

Significance Criteria

As Medina County is in attainment with NAAQS for all criteria air pollutants, there are no specific regulatory mechanisms governing local air concentrations of these pollutants, including particulate matter (PM). The nature of the PM emissions from the rail loading and unloading operations associated with the proposed project or truck loading and unloading operations under the no-action alternative is that these would be suspended limestone particulate that would settle rapidly from the air a short distance from the source. Truck traffic would also result in generation of diesel combustion-related PM emissions. Because PM impacts are expected to be very localized to the areas immediately around the rail line or roadways, no modeling of particulate transport was performed in concert with this study.

Given Medina County's attainment status and the lack of defined significance criteria for these emissions on the part of Federal, state, or local authorities, SEA decided to compare the combined stationary and mobile source emissions for each alternative with EPA's Title V major emission-source threshold for permit applicability. This threshold of 100 tons-per-year emissions of any criteria pollutant is used as an indicator of whether a proposed activity would result in impacts comparable to those for which EPA requires inclusion in the Title V permit program. Emissions of criteria pollutants below this level are considered to be below the threshold of significance.

4.7.2 Construction Impacts

Construction of the Proposed Rail Line

Construction of the proposed rail line under any of the proposed alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would have an effect on air quality as a result of the dust generated by construction equipment as well as possible burning of construction debris. However, because of the short duration of the construction project, these impacts would be temporary, and should not be significant. Moreover, in order to reduce the potential effect on air quality from the construction of the proposed rail line, SEA recommends that the Board impose the following mitigation measures:

- Southwest Gulf Railroad Company shall comply with all applicable Clean Air Act requirements for burning debris generated by construction of the rail line.
- During rail line construction, Southwest Gulf Railroad Company shall take appropriate measures to control fugitive dust, including the use of water trucks.

Construction of the No-Action Alternative

Under the no-action alternative, construction impacts on air quality would be those related to area road improvements and construction of the truck-to-rail remote loading facility. The potential air-quality effects from these construction activities would be similar to those identified for the proposed rail line and would also not significantly affect air quality. But construction activities would be longer in duration and would disturb a larger area.

4.7.3 Operation Impacts from Rail Operations

During rail operations, air quality would be affected by two sources:

- Rail car loading at the quarry; and
- Mobile source emissions from locomotive emissions.

As described in the methodology section above, SEA used emission factors found in EPA's AP-42 to calculate emissions from the loading of rail cars at the quarry. These emission factors apply specifically to aggregate handling and storage piles. For all calculations, particle size multipliers and equation constants were assumed for particulate matter less than 10 microns (PM_{10}). These results are included in Table 4.7-1.

SEA estimated the mobile source emissions associated with the proposed route using EPA's emission standards for locomotives. The emission standards are those published in a September 1997 reference guide as well as the final emission standards for locomotives published in December 1997 (U.S. EPA, 1997).

The mobile source emissions calculated by SEA are of nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and particulate matter (PM). Because sulfur dioxide (SO_2) emissions are a direct result of the concentration of sulfur in the fuel, they were not included in the calculations. Diesel fuel is subject to a sulfur concentration standard rather than an emission limit from the sources.

SEA used emission factors for each pollutant that are expressed in grams-per-horsepower-hour for locomotives. The locomotive horsepower was assumed to be 9,000, as provided by SGR. The standard that SEA used are those for locomotives constructed between 1973 and 2000 for switch-duty cycle. SEA selected the switch-duty cycle because the locomotives would be on a loading and unloading loop prior to traveling on the main line.

The hours of operation were calculated for each source based on the average speed and the annual miles traveled for each source.

Table 4.7-1 shows estimated rail car-loading emissions of PM_{10}, and mobile source emissions due to rail operation, for the proposed route and the three alternative routes.

Table 4.7-1. Mobile Source and Rail Loading Emissions for Proposed Route and Alternatives

	Proposed Route	Alternative 1	Alternative 2	Alternative 3
	Ton/year	Ton/year	Ton/year	Ton/year
Mobile Source				
NO_x Emissions	50.0	61.1	50.0	50.0
CO Emissions	28.5	34.9	28.5	28.5
PM Emissions	2.6	3.1	2.6	2.6
HC Emissions	7.5	9.2	7.5	7.5
Rail Loading				
PM Emissions	27.7	27.7	27.7	27.7

As stated above in the methodology section, SEA compared the combined annual rail-loading emissions and the annual rail mobile-source emissions that would be generated by each alignment (Table 4.7-1) to EPA's major emission source thresholds for Title V (facility operating) permit applicability (40 CFR 52). By these standards – less than 100 tons per year of any criteria pollutant – emissions from operations over the proposed route would not result in significant adverse impacts to air quality in Medina County.

Proposed Route

None of the criteria pollutant emissions generated from operation along the proposed route exceed EPA's major emission source thresholds for Title V permit applicability. In addition, as shown in the analysis below (no-action alternative), the rail-line emissions that would result from the proposed route would be significantly lower than those from truck transport (no-action alternative).

Alternative 1

Due to the increase in track length, the mobile source emissions for NO_x, CO, PM, and HC from rail transport along Alternative 1 would be about 22 percent higher than those from the proposed route as shown in Table 4.7-1. These emissions would still be below EPA's major emission source thresholds for Title V permit applicability.

Alternative 2

The impacts from operations over Alternative 2 would be identical to those from the proposed route.

Alternative 3

The impacts from operations over Alternative 3 would be identical to those from the proposed route.

4.7.4 Methodology for Truck Transport Calculations

During truck transport of aggregate between the quarry and the UP rail line, air quality would be affected by emissions from the following sources:

- Transport trucks traveling on unpaved roads (load loss and suspended road dust);
- Transport trucks traveling on paved roads (load loss);
- Loading of transport trucks at the quarry;
- Unloading of transport trucks and loading of rail cars at a remote rail station; and
- Mobile source emissions from transport trucks.

The first four bullets represent fugitive dust emissions, including load losses during product transport, dust suspended along paved and unpaved roads as trucks pass over the roads,

and fugitive emissions lost during loading and unloading operations. SEA used AP-42 emission factors relating to unpaved roads, paved roads, and aggregate handling and storage piles to assess potential operational impacts. Table 4.7-2 summarizes for the no-action alternative the estimated emissions of PM_{10} from truck transport of aggregate on unpaved roads, truck transport of aggregate on paved roads, and loading operations both at the quarry and at the remote loading facility.

The specific equations used for estimating particulate emissions resulting from loading and transport of aggregate may be found in the referenced AP-42 sources. SEA made several assumptions in order to generate the emission factors and emission estimates. For all calculations, particle-size multipliers and equation constants assumed were for particulate matter less than 10 microns (PM_{10}). In addition, a silt loading (weight of silt per unit area) or silt content was required for paved and non-paved road-emission estimates. SEA averaged the silt loading of the normal and worst case conditions for calculating the emission calculation for paved roads. For unpaved roads, SEA used the average silt content for plant road traffic and haul road traffic.

Vehicle weights were also required for the calculations. SEA assumed an empty truck and trailer weight of 20 tons, and calculated the loaded truck and trailer weight based on the tonnage of aggregate transported on an annual basis and the number of trips required.

Mean wind speed was another required variable, which SEA obtained from the "Climate of the States, 3rd edition." The city used for SEA's calculations was San Antonio, Texas.

For addressing the final bullet, mobile source emissions from trucks used to carry aggregate from the quarry to the rail transfer station, SEA used the EPA emission standards for Heavy-Duty Engines and Locomotives (U.S. EPA, 1997). Using this methodology, SEA estimated emissions of nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and particulate matter (PM). The emission standards that SEA used for the transport trucks are applicable to heavy-duty highway engines constructed after 1998; SEA assumed that the transport trucks used would be fairly new.

SEA used emission factors for each pollutant that are expressed in grams-per-horsepower-hour for heavy-duty diesel engines. The horsepower was assumed to be 600 for the

transport trucks. The hours of operation were calculated for each source based on the average speed, number of annual trips taken, and the annual miles traveled for each source.

Because sulfur dioxide (SO_2) emissions are a direct result of the concentration of sulfur in the fuel, these emissions have not been included in the calculations. Diesel fuel is subject to a sulfur concentration standard rather than an emission limit from the sources.

4.7.5 Summary of Impacts from No-Action Alternative Emissions

Under the no-action alternative, 1,700 total truck trips (850 round trips) would be required to transport aggregate from the proposed quarry site to a remote truck-to-rail loading facility to be located at the south terminus of the line. These trucks would be idling during loading and unloading operations at the quarry and at the remote loading facility. SGR provided information on the idling time for the trucks while loading and unloading aggregate. However, the emissions during these times represents a variable and minor addition to the emissions that would be generated by the trucks while hauling aggregate from the quarry to the rail and then returning. Therefore these emissions were not added into the calculations.

Table 4.7-3 provides a summary of the mobile source emissions from internal combustion engines associated with the truck transport of the aggregate. The mobile source emissions of NO_x (337 tons per year), CO (1,306 tons per year), and HC (109.5 tons per year) each far exceed the 100 tons per year for EPA's major emission source thresholds for Title V permit applicability, as do both the paved (1,316 tons per year) and unpaved (3,182 tons/year) fugitive emissions of particulate matter resulting during loading and transport. These are all therefore considered significant air emissions.

The no-action alternative would have significant long term impacts on air quality that would greatly exceed the air quality impacts of construction and operation of the proposed rail line.

Table 4.7-2. No-Action Alternative--Annual PM_{10} Emissions from Transport of Aggregate via Truck

Emissions Summary	Truck (paved road)		Truck (non-paved road)	
	lb PM_{10}	ton PM_{10}	lb PM_{10}	ton PM_{10}
Loading Emissions at Quarry	55,322.0	27.7	55,322.0	27.7
Road Emissions (Loaded)	1,922,771	961.4	3,608,613	1,804.3
Road Emissions (Empty)	598,823	299.4	2,643,864	1,321.9
Loading Emissions at Remote Rail Station	55,322.0	27.7	55,322.0	27.7
Total	1,775,169	1,316.1	6,363,121	3,181.6

Table 4.7-3 Mobile Source Emissions from Truck Transport of Aggregate

Emission Summary	Truck	
	lb/year	ton/year
NO_x Emissions	6.74×10^5	337
CO Emissions	2.61×10^6	1306
PM Emissions	1.69×10^4	8.4
HC Emissions	2.19×10^5	109.5

4.8 Geological Hazards

As stated in Chapter 3, the geological hazards discussed in this section are limited to landslide/mass movement hazards, the most likely geological hazard in the area of the proposed project. SEA determined the likelihood of landslides by examining data derived from USGS and The Bureau of Economic Geology (Garner and Young, 1976), by performing map reconnaissance using USGS maps, and by a site survey of the project area.

Proposed Route and Alternatives 1, 2, and 3

As discussed in Chapter 3, SEA determined that the risk of landslides in the proposed project area would be low. Using USGS maps and data, SEA determined that the areas that would be most susceptible to landslides occur in or near the southern portion of the project area, where the rail line would cross the Escondido Formation outcrop. SEA then conducted a site visit to verify actual field conditions in March 2003. SEA's field assessment indicated that the proposed and alternative rail routes were much lower on the slope of the hills than the area of concern shown on the maps. Therefore, construction of the proposed rail line would not disturb the soils in the areas most susceptible to landslides. As a result, SEA concluded that the risk of landslide hazards in this area would be negligible along the proposed and alternative rail routes.

No-Action Alternative

No geological hazards were identified under the no-action alternative. The new road that might be constructed to connect County Road 353 with County Road 365 (see Figure 2.4-1) would involve earth moving, but is not in the area most susceptible to landslides.

4.9 Karst-Feature Hazards

SEA evaluated the impacts of the proposed rail line and no-action alternative on the development of karst-feature hazards, including the effects from construction, operation, and maintenance. SEA used topographic maps, aerial photographs, available literature, and a field reconnaissance conducted in March 2003 to evaluate the nature of karst features and the likelihood of development of karst-feature hazards in the project area.

The majority of the proposed rail line does not have the potential to be impacted by development of karst features. These substantial portions of the proposed rail line are underlain by rock or sedimentary units that are not conducive for the development of karst features, including the Leona Formation and the Escondido Formation. (See Figure 3.6-3 in Chapter 3 and Table 3.3-1.) While carbonate rocks of the Devil's River Formation exist below these units, the Devil's River Formation is of sufficient depth (greater than 300 feet below ground surface) that it would not have the potential to propagate sinkhole development on the ground surface. However, the area near the loading loop (or alternative parallel lines of loading track) is susceptible to karst-feature development at a higher elevation than the 950 feet contour along Polecat Creek and Elm Creek. Additionally, a portion of the proposed rail line extending approximately 1,500 feet to the south of the loading loop (mapped in Figure 3.6-1 as Quaternary Alluvium to the north of the fault zone) has the potential to develop karst features because the sedimentary deposits overlying the carbonates may only be a few feet or tens of feet thick.

Typically, there are five types of environmental hazards associated with development on karst terrains: (1) groundwater contamination; (2) flooding and siltation; (3) alteration of hydrologic flow paths; (4) land instability and collapse (i.e., sinkholes); and (5) destruction of caves or their contents) (Kasting, 1995).

Construction Impacts to Karst-Feature Hazards

Groundwater Contamination. The high rates of infiltration and groundwater transmission in karst aquifers make them highly susceptible to groundwater contamination. The

potential for impacts to groundwater quality from the proposed rail construction is discussed in Section 4.5.

Flooding and Siltation. Based on its field survey and examination of literature, maps, and photographs, SEA determined that construction of the proposed rail line (all routes) would have the potential to moderately increase the risk of flooding and siltation in karst-prone areas. The typical lack of surface drainage and presence of closed depressions in karst areas commonly results in flash flooding, especially if construction activities disturb or plug natural drainage features or impervious cover is increased. Therefore SEA recommends a condition requiring SGR to employ Best Management Practices (BMPS) to prevent sediments associated with the construction of the rail line from impacting local drainages. Allowing about half of the right-of-way of the rail line to return to native vegetation would also help minimize runoff and siltation. Consequently, SEA recommends a condition requiring SGR to reseed the portion of the right-of-way that does not consist of the roadbed (tracks and ballast) or the ten-foot access area on either side of the roadbed with native vegetation. The limited area of disturbance and minimal impervious cover generated by the rail line would not significantly impact localized drainage if these mitigation conditions are met.

Alteration of Hydrologic Flow Paths. Because the proposed rail line would cover a relatively small area and rail beds are porous, construction would not significantly alter the amount of impervious cover or infiltration rates into the subsurface. Thus, there would be minimal disruption to the natural drainage during construction of the proposed line.

Land Instability and Collapse. Rock dissolution that results in the formation of caves, caverns, and smaller voids obviously impacts the structural integrity of the bedrock. The most common structural hazard associated with karst terrains is the development of sinkholes. A sinkhole develops when the roof of a void or cave within the bedrock collapses either slowly or catastrophically, allowing the overlying materials to fall into the void. The result is the formation of a surface depression or sinkhole. The most common causes of sinkhole development include: overloading of the void roof, lowering of the local water table resulting in dewatering of saturated void spaces, or changing groundwater-flow conditions that result in the removal of sediment or other stabilizing material from the void.

The impact of fluctuation in groundwater flow on sinkhole development is usually associated with more humid climates where the depth to groundwater is less that 50 feet below

ground surface. The climate in the project area is dry. According to the Texas Water Development Board Well Database, the depth to water in groundwater wells located in the Devil's River Formation is greater than 250 feet below ground surface. Therefore, groundwater flow fluctuations are unlikely to impact sinkhole development in the project area.

Based on a review of available aerial photographs and topographic maps, SEA determined that there is no significant sinkhole development within the study area. Additionally, there are no known surveyed cave systems within the immediate vicinity of the proposed route and rail alternatives. (Elliot and Veni 1994). The lack of existing sinkholes or significant cave development in the study area suggests that the potential for sinkhole development would be low. There is, however, some risk of sinkholes developing because of potential overloading of structurally weak bedrock areas during construction.

The ability of the karstified bedrock to accept additional load requirements of structures depends on the degree of rock dissolution that has taken place and the thickness and composition of the overlying materials. There are numerous examples of large cave systems with roads, railroads, and buildings constructed directly on top of passageways. If a sufficient amount of competent rock is present between the roof of the void and the ground surface (usually greater than 10 feet depending on the rock strength), the stability is frequently sufficient to support rail construction and operation. However, when the load-bearing limit of the void roof is exceeded, there is a significant risk of a collapse of the overlying material into the void.

To minimize the risk of a sinkhole developing during construction, SEA recommends that, if the Board authorizes construction of any of the rail routes, it should impose a condition requiring, prior to construction, that SGR identify potential sinkhole-risk areas on the portions of the approved route that are susceptible to karst feature development.[11] There are two possible ways to comply with the this mitigation condition, and SEA recommends that SGR should be permitted to choose the method for compliance.

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[11] While SEA's environmental review has included SGR's loading track (two-mile loading loop or one-mile parallel loading tracks) as part of the proposed action, SGR does not require authorization from the Board to construct and to operate over this track. See 49 U.S.C. 10906. Thus, the Board generally does not impose mitigation conditions on the construction and operation of such track. Nevertheless, such track is subject to the Board's jurisdiction, and the Board has authority to require compliance with environmental conditions as to this track that it deems necessary.

Under the first method, if a significant void or cave were identified during the grading and construction of the rail line, SGR would be required to undertake additional investigation. SGR would have to use qualified personnel to evaluate a void or cave to determine the potential risk of construction causing a sinkhole to develop. In the case of a discovered cave, a full assessment of the cave, including an inventory of possible endangered species inhabiting the environment, would have to be conducted. Any actions to fill, remove, or block off any significant void or cave (to prevent sinkholes) would have be completed in compliance with the Edwards Aquifer Rules as presented in Title 30 Texas Administrative Code Chapter 213, which regulate construction activities in the recharge and transition zones of the Edwards Aquifer.

An alternative method would require use of geophysical and geotechnical investigation to identify areas of sinkhole risk prior to construction. For example, ground penetrating radar (GPR) and electrical resistivity can be used to identify the potential presence of voids. (Memon, et al., 1999). To investigate the presence of shallow voids in the bedrock of the Devil's River Formation (identified as Kdvr on Figure 3.6-1), SGR could choose to use GPR, electrical resistivity, seismic refraction, and/or natural potential surveys (the latter measures naturally occurring voltage from electrical currents within the subsurface). Suspect voids identified by geophysical investigations would then have to be further inspected by geotechnical borings to determine the hazard probability. For locations at which the geotechnical borings reveal voids of significant size and proximity to the ground surface to pose a risk of collapse to the rail line, additional hazard-mitigation efforts would need to be undertaken at the time of construction. These efforts could include moving the rail line to avoid the hazard area, intentionally collapsing or digging out and then filling in the void, grouting the void closed, or additional engineering controls to reinforce the rail line and distribute the weight away from the void.

Destruction of Caves or Their Contents. Caves frequently serve as important groundwater-flow pathways and also support fragile ecosystems that may include one or more endangered species. Should SGR discover any caves that would be affected by the rail line construction, a recommended condition (discussed above) would require the railroad to inventory the cave for endangered and protected species and to comply with the State rules for construction activities in the recharge and transition zones of the Edwards Aquifer. SEA believes that if these conditions are imposed and implemented, any construction-related impacts to caves and their contents would not be significant.

Operation Impacts to Karst-Feature Hazards

Groundwater contamination. The potential for impacts to groundwater quality from operation of the proposed rail line is discussed in Section 4.5.

Flooding and Siltation. SEA anticipates no significant impacts on flooding from the operation of the rail line. Mitigation to reduce the potential for increases in flooding is discussed in Section 4.5.3.

Alteration of Hydrologic Flow Paths. Because the proposed rail line would cover a relatively small area, it would not significantly alter the amount of impervious cover or infiltration rates into the subsurface. Thus, there would be minimal disruption to the natural drainage during operation of the proposed rail line.

Land Instability and Collapse. There is a slight risk that a void or cave not discovered (and mitigated) during construction of the proposed rail line could later cause a sinkhole that would affect the alignment of the rails. In turn, rail misalignment could cause a derailment. As discussed above, like any similar railroad, SGR would be required to conduct track safety inspections and follow maintenance procedures according to the Federal Railroad Administration (FRA) standards set forth at 49 CFR Part 213. The inspection program should detect any potential problems with the physical condition of the rail line at an early stage and minimize derailment potential.

While the future development of karst-features cannot be predicted with certainty, SEA believes that compliance with FRA's standards would minimize the potential impacts to karst features from rail line operation.

Destruction of Caves or Their Contents. SEA does not anticipate any potential impacts on caves or their contents from the operation of the proposed rail line.

Proposed Route and Rail Alternatives

The portion of the study area that is susceptible to karst-feature hazards is limited to the loading loop and a portion of the main line extending about 1,500 feet to the south of the loading loop. This area also includes the alternative straight-loading tracks. The alternate routes deviate minimally from the proposed route in this portion of the study area and do not deviate

significantly until they are out of the karst-feature-hazard area. Consequently there is no apparent difference in the susceptibility to karst-feature hazards between the proposed or alternate rail routes.

No-Action Alternative

As previously stated, the no-action alternative would require the addition of 1,700 heavy-truck trips on area roads and would likely require roadway repairs and expansion. Any roadway expansion projects would result in an increase in the impervious cover (which water cannot penetrate) in the study area. While this increase in impervious cover would likely be minimal, it would exceed the amount of impervious cover generated by the rail line.

More importantly, based on recent studies conducted in karst watersheds in Austin, Texas, the increase in truck traffic and the expansion and/or repair of roadways covered in asphalt would have the potential to adversely affect surface water quality. Specifically, in one study, runoff from roofs of buildings in proximity to a major highway was found to have elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and heavy metals as compared to sampling locations away from the highway (Van Metre and Mahler, 2003), resulting from the accumulation of tire debris and exhaust particulates from the highway. In another study, analytical measurements of runoff from asphalt parking lots and roadways, particularly those that had been treated with asphalt sealer, contained concentrations of PAHs that exceeded by several orders of magnitude the regulatory guidelines for protection of aquatic organisms (Mahler, et al., 2004). Both of these studies suggest that the increased truck traffic and roadway expansion and repairs could contribute to the degradation of water quality within the project area, as discussed in Section 4.5.

4.10 Land Use Impacts

In this section, SEA explains the process used to gather information on land use in the project area and describes the land use impacts associated with construction and operation of the proposed route and alternative routes, as well as the no-action alternative.

Acquisition and use of right-of-way for the proposed rail line under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would have some adverse effects on land use that could not be fully mitigated, as would the trucking and remote rail loading operations under the no-action alternative. The no-action alternative would have greater effects on land use than the proposed action. Alternative 1 would have greater effects on land use than

the other alignments, followed by Alternative 3, Alternative 2 and then the proposed route. The effects from the proposed action could be reduced through the implementation of SEA's recommended mitigation.

4.10.1 Methodology

SEA assessed the land use impacts of the proposed route and alternative routes by conducting a detailed review of land use and soils data as shown on aerial photography (Texas Digital Ortho Quadrangle False Color Infrared, dated 1995), National Wetland Inventory Maps, and USGS 7.5 minute topographic maps, and from Medina County soil survey data (Dittmar et al., 1977).

4.10.2 Summary of Impacts

The potential for land use impacts from construction and operation of a new rail line generally arises from acquisition of land for the proposed right-of-way and associated uses, as well as from effects of the rail line on property adjacent to the right-of-way.

Impacts to Existing Land Uses

As set forth in Chapter 3, the proposed project area is in a rural region of Medina County, Texas, approximately 30 miles west of San Antonio. Currently, a majority of the proposed project area is evergreen forest, cropland and pasture, or shrub and brush rangeland. There are several county roads and one state farm to market road in the area that would be crossed by the proposed rail line under any of the potential routes (proposed route, Alternative 1, Alternative 2, or Alternative 3). The average daily traffic (ADT) on the county roads ranges from 40 to 200 vehicles, while the ADT on Farm to Market road (FM) 2676 is 610 vehicles. Six creeks would be crossed at various points by each of the potential rail routes.

The right-of-way for the proposed rail line would primarily traverse land currently owned by SGR, or its affiliate, VCM, including the tract on which VCM plans to develop a new quarry. To the extent property not already owned by SGR or its affiliate would need to be acquired for the proposed line, SGR states that it would locate the line along or near fence lines to reduce impacts to agriculture. However, several properties would be severed by the proposed rail line under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3), as discussed in more detail below in the comparison of alternatives section.

The closest schools are Medina Valley Elementary within seven miles and Hondo High School within 7.9 miles of the proposed project area. The proposed route has 63 homes within half a mile and 166 homes within one mile. There are 27 homes within half a mile of Alternative 1 and 56 homes within one mile. Alternative 2 has 98 homes within half a mile and 145 homes within one mile, and there are 60 homes within half a mile of Alternative 3 and 153 homes within one mile.

If the proposed rail line were built, the residences would be exposed to temporary effects associated with construction of the proposed new rail line, and long-term effects from activities along the rail line during operations. Secondary land use impacts from operations could result from dust, noise, vibration, and exhaust emissions from the locomotives. These potential impacts are further discussed in Section 4.7, Air Quality Impacts, Section 4.12, Noise, and Section 4.13, Vibration. The at-grade road crossings are discussed in Section 4.1, Transportation and Traffic Safety, and the stream crossings are discussed in Section 4.5, Water Resource Impacts.

Some comments to SEA have indicated that the proposed rail line would cross the Gerdes T-4 Ranch, honored in 1986 as a Texas Family Land Heritage property, indicating that the ranch has been in continuous agricultural occupation by the same family for 100 years or more. Each of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would cross this property. Thus, the proposed rail line construction and operation has the potential to adversely affect this ranch. However, SEA believes that any adverse effects would be reduced by the mitigation recommended below.

Some of the soils in the area of the proposed and alternative routes have been classified by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) as prime farmland (NRCS electronic Field Office Technical Guide). Table 4.10-1 lists the acres of prime farmland soils that would be crossed by the proposed alignment and alternative rail routes. As noted in Chapter 3, some of these designations may not be applicable here based on use, as a few of the soil types crossed (CsB, McB, MnC, MoC) are not currently cultivated in the areas that would be impacted by the proposed alignment and alternatives. However, all NRCS designated prime farmland soils are included in the totals regardless of current land use.

The total impact to prime farmland by alternative alignment ranges from 48 to 77 acres. Approximately 45 percent of the 868,480 acres in Medina County are considered prime

farmland (Handbook of Texas Online). Therefore, construction of any of the proposed alignments would permanently remove from agricultural use less than 0.02% of the prime farmland within Medina County. SEA preliminarily concludes that construction and operation of the proposed rail line under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would adversely impact agricultural resources in the area to a small degree. SEA specifically requests comments from NRCS regarding this issue.

Table 4.10-1. Prime Farmland Soils Impacted by Proposed Rail Line and Alternatives

Soil Series	Symbol	Area Cross by Rail Line (acres)			
		Proposed	Alt. 1	Alt 2	Alt 3
Castroville clay loam 0-1% slopes	CsA	0	0.5	0	0
Castroville clay loam 1-3% slopes	CsB	0	1.7	6.2	0
Divot clay loam	Do	0	1.3	0	0
Hanis sandy clay loam 0-1% slopes	HaB	1.8	0	0	0.4
Knippa clay 0-1% slopes	KnA	20.6	35.8	27.6	21.6
Knippa clay 1-3% slopes	KnB	1.3	2.7	2.5	0.8
Mercedes clay 0-1% slopes	McA	0	3.1	0	0
Mercedes clay 1-3% slopes	McB	0	0.8	0.8	0.8
Monteola clay 1-5% slopes	MnC	10.9	6.6	1.8	9.2
Monteola gravelly clay 1-5% slopes	MoC	1.2	5.3	7.8	1.9
Victoria clay 0-1% slopes (if irrigated)	VcA	12.9	19.4	12.6	13.7
Total Prime Farmland (NRCS)		48.6	77.2	59.2	48.4
Total Route Acreage Outside Quarry Property		64.2	81.6	62.2	68.2

Comparison of Alternatives

The construction of the proposed route would directly affect about 86 acres, assuming a construction corridor of about 80 feet. Approximately 64.2 of the 86 acres would be outside the quarry property, with 48.6 acres of that consisting of NRCS designated prime farmland. As discussed in Section 4.6, about 32 acres would be restored as fenced and maintained grasslands after construction, although this area will no longer be available for agricultural use or grazing. SGR states that the proposed route would cross 10 properties not owned by SGR or VCM. About half of them would be severed to some extent by the proposed route.

The construction of Alternative 1 would directly affect about 103 acres, assuming a construction corridor of about 80 feet, approximately 81.6 acres of which would be outside the quarry property, with a high percentage (77.2 acres) consisting of NRCS designated prime farmland. About 38 acres would be restored as fenced and maintained grasslands after

construction, although that area would no longer be available for agricultural use or grazing. According to SGR, Alternative 1 would cross more than 20 properties not owned by SGR or VCM. Approximately half of them would be severed to some degree by this alternative. This alternative would have somewhat greater impacts on land use than the other routes.

The construction of Alternative 2 would directly affect about 84 acres, assuming a construction corridor of about 80 feet, approximately 62 acres of which would be outside the quarry property, with a high percentage (59.2 acres) consisting of NRCS designated prime farmland. About 32 acres would be restored as fenced and maintained grasslands after construction although that area would no longer be available for agricultural use or grazing. According to SGR, Alternative 2 would cross more than 18 properties not owned by SGR or VCM. Approximately half of them would be severed to some extent by this alternative. This alternative would have slightly greater impacts on land use than the proposed route, but less than Alternative 1 or Alternative 3.

The construction of Alternative 3 would directly affect about 90 acres, assuming a construction corridor of about 80 feet, approximately 68.2 acres of which would be outside the quarry property with 48.4 acres consisting of NRCS designated prime farmland. About 34 acres would be restored as fenced and maintained grasslands after construction, although that area would no longer be available for agricultural use or grazing. Alternative 3 would cross more than 16 properties not owned by SGR or VCM. Approximately 12 of them would be severed to some extent by this alternative. This alternative would have slightly greater impacts on land use than the proposed route and Alternative 2, but less than Alternative 1.

Under the no-action alternative, quarry products would be transported by truck from the quarry to a remote rail loading facility. Any secondary land use impacts related to product transport would result from dust, noise, vibration, and exhaust emissions from the high levels of truck traffic along the proposed truck routes. These impacts are discussed in Section 4.7, Air Quality Impacts, Section 4.12, Noise, and Section 4.13, Vibration. The remote rail loading facility would permanently alter the land use of approximately 100 acres of shrub and brush rangeland. This tract consists of approximately 79 acres NRCS designated prime farmland (67 acres Monteola clay, and 18 acres Monteola gravelly clay) which would be no longer available for agricultural use. The Creekwood Subdivision is about 1 mile from, and three residences are within ½ mile of, the proposed remote rail loading facility. Thus, there would be greater impacts to land use under this alternative than under the proposed action.

Conclusions and Mitigation

Construction and operation of the proposed rail line under any of the proposed alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would have some adverse effects upon existing land uses in the proposed project area. SEA recommends that the Board impose the following mitigation conditions to reduce these adverse effects:

- As agreed to by Southwest Gulf Railroad Company (SGR), SGR shall maintain native grass and shrubs inside the rail line right-of-way to allow the rail line to blend with the natural surroundings.
- Where construction of the rail line would cause unavoidable property severance, Southwest Gulf Railroad Company shall negotiate with the appropriate land owner to ensure access to the severed property.

However, even with the implementation of these mitigation conditions, SEA believes that some adverse effects to land use would remain. Alternative 1 would have more impacts to land use than the other potential rail alignments. For this and other reasons, SEA does not recommend Alternative 1.

Condemnation

SEA has received a number of comments requesting information about condemnation of private land for construction of the proposed rail line. In Board-approved rail construction cases, the applicant is responsible for the acquisition of land necessary to implement the approved project. Condemnation (also known as eminent domain) of property needed to complete a Board-approved line occurs in accordance with the state's railroad condemnation law. However, states cannot apply their eminent domain statutes in such a way as to present an "insurmountable barrier" for a Board-approved railroad construction project, because their railroad condemnation statutes would have the effect of state "regulation" of railroads, and accordingly would be preempted under 49 U.S.C. 10501(b), which detail state and Federal regulation of activities related to rail transportation. See Dakota, Minn. & E. R.R. Corp. v. South Dakota, 236 F. Supp. 2d 989, 1006-09 (D.S.D. 2002), aff'd on other grounds, 362 F.3d 512 (8th Cir. 2004).

4.11 Environmental Justice

SEA conducted an analysis of any disproportionate impacts on low-income and minority populations ("environmental justice" assessment) for the proposed rail line, as described below.

Background

Presidential Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations" directs individual Federal agencies to develop approaches that address environmental justice concerns in their programs, policies, and procedures. SEA based its environmental justice analysis for SGR's proposed rail line on Executive Order 12898, as well as the following guidance materials: the U.S. Department of Transportation (U.S. DOT) order providing information on how to address environmental justice concerns; the Council on Environmental Quality (CEQ) guidance on environmental justice; and the U.S. Environmental Protection Agency (EPA) guidance on evaluating environmental justice in the National Environmental Policy Act (NEPA) process (U.S. DOT 1997, CEQ 1997, U.S. EPA 1998).

Approach

SEA conducted an environmental justice analysis to determine the presence or absence of any community of concern (COC) in the area surrounding the proposed rail line. If a COC is present, SEA then determines whether the proposed project would have disproportionately high and adverse human health or environmental effects on the citizens in the COC. Based on the CEQ, EPA, and U.S. DOT guidance documents mentioned above, and consistent with SEA's approach in other environmental reviews, SEA defines a COC as any occurrence within the area potentially affected by a proposed new rail construction where one or more of the following criteria is met:

- At least one-half of the census block being analyzed is minority; or
- At least one-half of the census block being analyzed is low-income status; or
- The percentage minority of the census block being analyzed is more than 10 percent higher than the average for the entire county in which the block is located; or
- The percentage low-income of the census block being analyzed is more than 10 percent higher than the average for the entire county in which the block is located.

Analysis

To conduct an environmental justice analysis on block groups within Medina County that could be affected by construction and operation of the proposed new rail line, SEA analyzed information available from the U.S. Census Bureau from the 2000 Census of Population and Housing. Table 4.11-1 shows the percent minority and percent low-income for all block groups having potentially affected persons, and includes comparison statistics for Medina County.

SEA's analysis was conducted using block groups instead of blocks because the low-income data in the 2000 Census are not reported at the block level.

Table 4.11-1. Minority and Low-Income Status of Block Groups Potentially Affected by Proposed New Rail Construction

Area	Percent Minority[a]	Percent Low-Income	Minority COC?	Low-Income COC?
Tract 990300, Block Group 1	22.7	7	No	No
Medina County	49.3	15.5		

[a] Percent Minority and Percent Living Below Poverty calculated from block group data provided in 2000 Census of Population and Housing.

SEA determined that no environmental justice COC exists this case, since the percent minority and percent low income characteristics of the census block group having populations potentially affected by the proposed new rail construction:

- Are not greater than 50 percent.
- Are not more than ten percentage points higher than the averages for Medina County.

In summary, the project area does not meet SEA environmental justice COC criteria and therefore the proposed new rail line construction and operation does not have the potential to cause disproportionately high and adverse human health or environmental effects on environmental justice communities in the vicinity of the proposed action.

4.12 Noise Impacts

In this section SEA will:

a. Describe the potential noise impacts from the proposed new rail line construction and operation.

b. Propose mitigative measures to reduce or eliminate potential project-related impacts to noise receptors, as appropriate.

This section is organized as follows: (1) summary of SEA's conclusions regarding noise impacts from the proposed rail line construction and operation; (2) discussion of the fundamentals of acoustics (the study of the physical properties of sound) to provide readers with a background for SEA's analysis; (3) summary of the noise methodology SEA used; and (4)

summary of the results of the noise analysis for each potential rail alignment (proposed route, Alternative 1, Alternative 2, and Alternative 3) and the no-action alternative.

4.12.1 Summary of Noise Impacts

While there would be noise impacts from construction of the proposed rail line under any of the potential alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3), the potential impacts are not expected to be significant. Nevertheless, to minimize any adverse impacts area residents could experience from construction activities, SEA recommends that the Board impose mitigation requiring SGR to consult with local residents regarding SGR's project-related construction schedule, including the hours during which construction would take place, to minimize, to the extent practicable, construction-related noise disturbances in residential areas.

The noise from operations over the proposed route, Alternative 2 or Alternative 3 would not trigger the Board's thresholds for analyzing the number of sensitive receptors. Operations over Alternative 1 would trigger the Board's thresholds at two measured locations, as shown in Table 4.12-3.

Horn noise would adversely affect residences close to the grade crossings. However, due to the low level of projected train traffic (four trains per day), the sound levels generated by the horn at the proposed grade crossings along the proposed route, Alternative 1, Alternative 2, or Alternative 3 would not appreciably affect the overall Ldn. Moreover, the blowing of the horns would be of short duration and the horns would likely only be sounded during daytime hours. Thus, SEA preliminarily concludes that the impacts from horn noise from the proposed train operations would not be significant.

Construction activities associated with the no-action alternative would also not result in significant noise impacts. The truck operations under the no-action alternative would increase noise levels by more than 5 dBA at one measurement location, as shown in Table 4.12-5.

4.12.2 Fundamentals of Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities. Although exposure to high noise levels over an extended period has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to noise is diverse and influenced by various factors, including the type of noise, the perceived importance of the noise and its

appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations, which travel through a medium, such as air, and are sensed by the human ear (Harris 1991). Sound is generally characterized by a number of variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB).

Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. An increase (or decrease) in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$
$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$$

Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. A particular tone which makes the drum vibrate 100 times per second generates a sound pressure wave that is oscillating at 100 Hz; this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 Hz and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork (a pure tone) contains a single frequency. In contrast, most sounds a person hears do not consist of a single frequency, but rather a broad band of frequencies

differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). Sound-level meters, which use a filter corresponding to the dBA curve (i.e., the measurement collected with a sound level meter is already accounting for the human hearing sensitivity), measure the level of a noise source.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any particular instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from a variety of other distant sources that creates a relatively steady background noise for which no particular source is identifiable. A single descriptor called the equivalent sound level (Leq) is used to quantify this background noise. Leq is the mean A-weighted sound level during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the fluctuating noise level measured. The Lmax and Lmin indicators represent the RMS (or root-mean-square) maximum and minimum obtainable noise levels during the monitoring interval. The Lmin value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated time. Sound levels associated with the L10 typically describe transient or short-term events, while levels associated with the L90 describe the steady-state (or most prevalent) noise conditions. Table 3.8-1 in Chapter 3 shows the sound-level measurements for the receptors measured in the project area.

Another sound measure known as the Day-Night Average Noise Level (Ldn) is defined as the A-weighted average sound level for a 24-hour day. It is calculated by adding a 10 dBA penalty to sound levels at night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. Sound levels of typical noise sources and environments are provided in Table 4.12-1 to provide a frame of reference.

Table 4.12-1. Sound Levels of Typical Noise Sources and Noise Environments (A-Weighted Sound Levels)

Example Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Example Noise Environment	Human Judgement of Noise Loudness (Relative to a Reference Loudness of 70 Decibels)
Military Jet Take-off with After-burner (50ft)	140	Carrier Flight Deck	
Civil Defense Siren (100 ft)	130		
Commercial Jet Take-off (200 ft)	120		Threshold of Pain 32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	16 times as loud
Ambulance Siren (100 ft)	100		Very loud
Newspaper Press (5 ft)			8 times as loud
Power Lawn Mower (3 ft)			
Motorcycle (25 ft)	90	Boiler Room	4 times as loud
Propeller Plane Flyover (1,000 ft)		Printing Press Plant	
Diesel Truck, 40 mph (50 ft)			
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	2 times as loud
Passenger Car, 65 mph (25 ft)			Moderately Loud
Living room Stereo (15 ft)			70 decibels
Vacuum Cleaner (3 ft)	70		(Reference Loudness)
Electronic Typewriter (10 ft)			
Normal Conversation (5 ft)	60	Data Processing Center	1/2 as loud
Air conditioning Unit (100 ft)		Department Store	
Light Traffic (100 ft)	50	Private Business Office	1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet 1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	Just Audible
	0		Threshold of Hearing

Source: Compiled by URS Corporation. However, URS used such widely-used references as The Handbook of Acoustical Measurements and Noise Control, Third Edition, edited by C.M. Harris, 1998,; and Noise And Vibration Control, Second Edition, edited by L.L. Beranek, 1988 Institute of Noise Control Engineering, to compile the data.

4.12.3 Methodology

SGR's projected train operations over the proposed rail line would be four trains per day (two round trips from the quarry to the UP rail line). Consequently, no noise analysis would be required for this project under the Board's thresholds for noise impact assessment (eight trains per day). (See 49 CFR 1105.7(e).)

Because of the public interest in this project, however, SEA performed a noise analysis to ascertain if the proposed rail line under any of the potential routes (proposed route, Alternative 1, Alternative 2, or Alternative 3) or the no-action alternative would meet the Board's other criteria for quantifying noise receptors: an increase in community noise exposure as measured by Day-Night Average Noise Level (Ldn) of 3 A-weighted decibels (dBA) or more, and an increase to a noise level of 65 dBA Ldn or greater. If the estimated noise increase at a location exceeds these criteria, SEA estimates the number of noise-sensitive receptors (i.e., schools, libraries, hospitals, residences, retirement communities, and nursing homes) that would be subjected to such a noise increase. (See 49 CFR 1105.7(e)(6).)

In addition to applying the Board's thresholds, SEA applied the analogous criteria employed by the Federal Transit Administration (FTA, a unit within the Department of Transportation) to the noise measurements it had made. FTA has published guidelines for assessing the impacts of noise associated with mass transit rail facilities (FTA 1995). The guidelines incorporate both absolute criteria, which consider activity interference caused by the project alone, and relative criteria, which consider annoyance due to the change in the noise environment caused by the project. The noise criteria depend on land use, as defined in Table 4.12-2. As shown in Figure 4.12-1, the criteria also depend on projected noise-exposure increase over the existing community noise levels as a determination of impact. A review of Figure 4.12-1 shows that the criterion for impact considers a noise exposure increase of: (a) 10 dBA significant if the existing noise environment is 42 dBA Ldn or less; (b) 5 dBA Ldn if the existing noise environment is 50 dBA Ldn; (c) 3 dBA Ldn if the existing noise environment is 55 dBA Ldn; and (d) 1 dBA when the existing noise environment is 70 dBA Ldn. Sound levels above 65 dBA Ldn are considered significant regardless of the increase in noise.

Table 4.12-2. Land Use Categories and Metrics from Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor L_{eq} (h)*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with outdoor use.
2	Outdoor L_{eq}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor L_{eq} (h)*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category as well as places for meditation or study associated with cemeteries and monuments. Certain historical sites, parks, and recreational facilities are also included.

*L_{eq} listed here is the noise level measured at the noisiest hour of transit-related activity during hours of noise sensitivity. L_{eq} is the mean A-weighted sound level during a measured time interval. The (h) represents the time-interval and stands for hourly (one hour)
Source: FTA 1995.

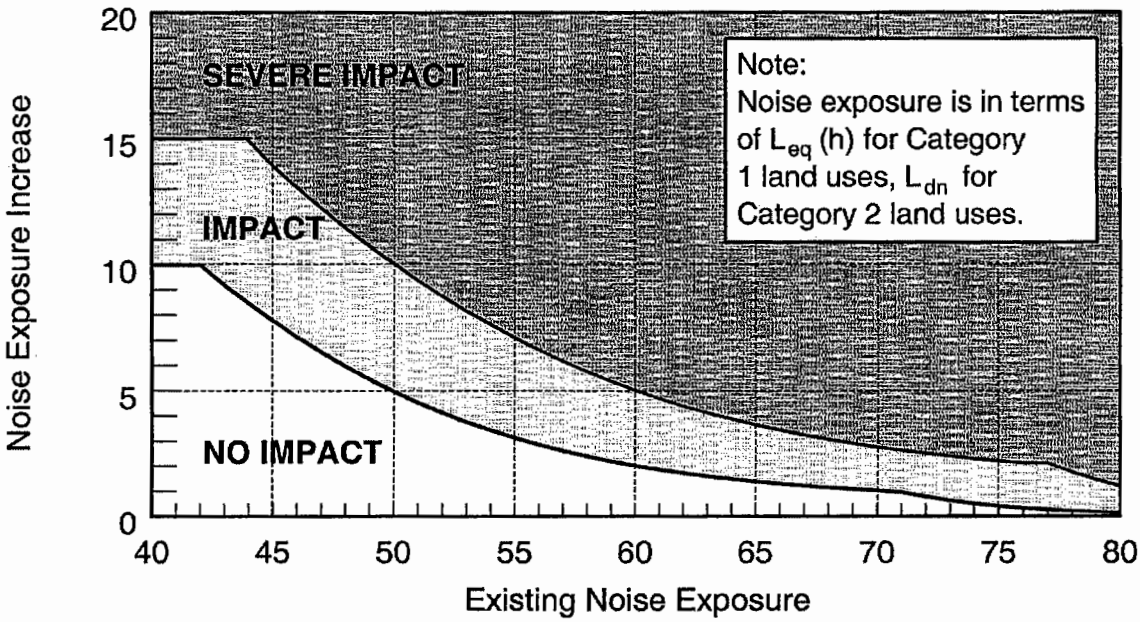

Figure 4.12-1. Increase in Cumulative Noise Level

Construction

Typically, sound levels of construction equipment range from approximately 65 dBA to 95 dBA at 50 feet from the source (U.S. EPA, 1971). Noise from pile driving ranges from approximately 87 dBA to 105 dBA at 50 feet, and may disrupt speech communication and normal routines within residences with a direct line-of-sight to the project area at a distance up to approximately 800 feet from the construction activities.

Rail Operations

SEA's methodology for the noise analysis was based on "Assessment of Noise Environments Around Railroad Operations"(Wyle Laboratories 1973). In assessing potential noise impacts, SEA made the following assumptions, based on information provided by SGR: the proposed rail line would be a welded single-track rail line; all trains would operate only during the daytime (7 a.m. to 10:00 p.m.); the train length would range between 5,200 and 5,800 feet (approximately 100 cars, each 50 to 58 feet in length with variable numbers of engines); the trains would move at a rate of 25 mph; and SGR would limit grades to one percent.

Noise from a freight train can result from noise emitted by the locomotives and the freight cars. Engine noise depends on engine load (power setting) and is unaffected by train speed. Locomotive noise is also dominated by low frequencies. Aside from horn noise (discussed below), freight car noise results primarily from wheel/rail interaction. Thus, SEA's calculations considered noise from the engines and the wheel rail interaction of the cars.

Additional Factors

Approximately 24 employee cars (48 single trips) would be associated with the proposed rail operations. Vehicles would access the rail operations by various routes. As a result of the limited number of trips and the distribution of these vehicles on the access roads involved here, these cars would not appreciably increase the existing ambient sound levels at any given location.

As described in Chapter 3, SEA recorded a series of sound-level measurements on August 6 and 7, 2003 at the closest residences to quantify the existing noise environment in the area of the proposed project. The residences were chosen based on proximity to the proposed route and potential rail alternatives, as well as for ease of access during all measurement periods. Some residences were not chosen because of issues, such as the presence of dogs, gates, or not being able to obtain permission from the resident. SEA believes the measurement locations selected are representative of the residences in the area.

Truck Operations Under the No-Action Alternative

SEA used an acoustic model to calculate sound levels for the trucks that would travel on access roads under the no-action alternative. The California Department of Transportation Sound 32 Traffic Noise Prediction Model (based on Federal Highway Administration (FHWA) RD-77-108) with Federal Reference Energy Mean Emissions Level was used to calculate existing traffic noise levels and project increased traffic noise levels as a result of the no-action alternative. The modeling reflects the estimated average vehicle speed, average daily traffic volume, and vehicle mix. The model assumed so-called "soft" site propagation conditions,[12] which reflects a sound level loss of 4.5 dBA per doubling of distance from the source. The actual sound level at any receptor location would be dependent on such factors as the actual source to receptor distance and the presence of intervening structures, barriers, and topography.

The proposed primary route for the trucks carrying limestone from the quarry to the truck-to-rail remote loading facility under the no-action alternative would be either County Road 353 or County Road 351 to westbound FM 2676 to County Road 4516. According to the Medina County Commissioner, the existing ADT volume on County Road 4516 and County Road 353 was estimated to be 200 and 40 vehicles, respectively (Medina County Commissioner 2003). TxDOT estimates that the existing ADT volume on FM 2676 is 610 vehicles (TxDOT, 2002). SEA assumed that the peak-hour traffic volume would be 10 percent of the ADT and that the estimated average vehicle speed on these county roads would be 30 mph. SEA assumed the current vehicle mix to be 99.5 percent cars, 0 percent medium trucks, and 0.5 percent heavy trucks.

The effect of pavement-surface type on traffic noise levels needs to be considered when determining potential noise impacts. Tire interaction with gravel can be expected to increase the traffic-generated sound levels. Therefore, in order to account for the gravel surface on County Road 353 and County Road 4516, SEA added 3 dBA to the model results for existing conditions. Acoustical calculations show that the existing Ldn on County Road 353 is approximately 51.8 dBA, 51.4 dBA Ldn on FM 2676, and 52.7 dBA Ldn on County Road 4516.

[12] The surface of the ground affects the propagation of sound. Soft site conditions include ground covered by grass, trees, or other vegetation, and all other porous grounds suitable for the growth of vegetation, such as farming land.

Under the no-action alternative there would be 850 heavy-truck round trips (1,700 total trips).[13] SEA assumed that truck traffic would take place on a 24-hour basis; therefore, the truck traffic volume was distributed equally throughout the day. Based on information provided by SGR, SEA assumed that County Road 353 and County Road 4516 would be paved and widened. SEA estimated the average speed on these roadways to be 40 mph. SEA performed acoustical calculations to determine the Ldn at 50 feet from the centerline of CR 353, FM 2676 and CR 4516.

4.12.4 Results

Construction of the Proposed Rail Line

A temporary increase in the ambient noise level would be expected during the construction of the proposed rail line under any of the potential rail alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3). The increase in noise level would be primarily experienced in areas close to the noise source. The magnitude of the impact would depend on the type of construction activity, the noise level generated by the particular type of construction equipment (e.g. miscellaneous trucks, cranes, bulldozers, backhoes, compactors and pile drivers), duration of the particular construction activity, and distance between the noise source and receiver. Construction-related disruptions would last only for several days at each location, however, as construction is expected to occur at an anticipated rate of 140-150 feet per day along most of the proposed alignment.

Inasmuch as construction activities would be temporary and would likely occur during daytime hours (7:00 a.m. to 10:00 p.m.), SEA preliminarily concludes that there would be no significant noise impacts as a result of the construction of the proposed rail line under any of the potential rail alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3).

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[13] In performing its modeling, SEA mistakenly included the increased local truck and vehicular traffic that would be generated by the quarry regardless of whether the rail line is built for the noise calculations under the no-action alternative (about 24 heavy-truck round trips for the local market (48 total trips), and approximately 100 quarry employee cars (200 total trips)). However, as detailed in Section 4.17.8, noise from this increased local traffic to and from the quarry would not appreciably affect the existing ambient noise. Moreover, noise from the 24 local market trucks and 100 quarry employee cars would be negligible in relation to the noise generated by the 850 truck round trips from the quarry to the UP rail line that would occur under the no-action alternative. Therefore, SEA's error does not affect SEA's conclusions regarding noise impacts under the no-action alternative or SEA's comparison of noise impacts from the various alternatives considered in detail in this Draft EIS.

However, in order to minimize any disturbance area residents could experience from potential noise impacts during construction of the proposed action, SEA recommends that the Board impose the following noise condition on any decision approving this line:

- Prior to beginning construction activities, SGR shall consult with local residents regarding SGR's project-related construction schedule, including the hours during which construction takes place, to minimize, to the extent practicable, construction-related noise disturbances in residential areas.

Operations over the Proposed Rail Line

As can be seen from Table 4.12-3 and 4.12-4, operations over the Proposed Route and Alternatives 2 and 3 do not meet the Board's criteria requiring a study of the number of sensitive receptors (an increase in noise level of 3 dbA or more and a resulting level of 65 dbA or more). SEA therefore believes that operations over the proposed route, Alternative 2 and Alternative 3 are not likely to significantly affect noise levels.

Operations over Alternative 1 meet the Board's criteria for a noise study only at two measurement locations: ML 6 (5 dbA increase; resulting level of 66 dBA (61 plus 5); and ML 7 (5 dbA increase; resulting level of 69 dBA (64 plus 5). These two receptor locations also meet FTA's criteria for a significant adverse impact, because the background noise levels are between 55 dBA and 69 dBA and the projected increase from rail operations would be greater than 3 dBA. Consequently, SEA concludes that operations over Alternative 1 would have adverse noise impacts to sensitive receptors at these measurement locations. For this and other reasons, SEA does not recommend Alternative 1.

Horn Noise from Proposed Rail Operations

The Federal Railroad Administration's (FRA) regulations (DOT-T-95-16, 1995 and DTUM60-92-C-4118, 1997) require the train operator to sound the train horn prior to a train entering any grade crossing. The horn is typically sounded approximately 20 seconds before entering the crossing. Although other warning devices are the primary means for warning pedestrians and motorists of the oncoming train, the horn provides a final warning to ensure a clear danger zone.

Federal noise standards for railroads are established by EPA and enforced by FRA. ("Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," U.S. EPA, 1971.) However, because of their primary use as safety devices, train

horns are exempt from EPA's noise emission standards. Freight train horn-noise levels also can vary due to a variety of factors, including the manner in which a particular engineer sounds the horn.

The FRA regulations require freight train locomotives to have horns that generate a minimum of 96 dBA at 100 feet in front of the train (FRA Interim Final Rule 229.129). Studies have shown that horns typically range from 96 to 104 dBA at 100 feet and diminish at a rate of approximately 7.5 dBA for each doubling of distance.

The proposed rail line would cross several roadways at grade under each of the potential alignments (the proposed route would have seven at-grade crossings; Alternative 1 would have eight at-grade crossings; Alternative 2 would have five at-grade crossings; and Alternative 3 would have six at-grade crossings). Although the maximum sound level generated by the horn would adversely affect the residences closest to the grade crossings, due to the low level of projected train traffic (four trains per day), the sound levels generated by the horn at the proposed grade crossings along the proposed route, Alternative 1, Alternative 2, or Alternative 3 would not appreciably affect the overall Ldn. Moreover, the blowing of the horns would be of short duration and the horns would likely only be sounded during daytime hours. Thus, SEA preliminarily concludes that the impacts from horn noise from the proposed train operations would not be significant.

Table 4.12-3. Calculated Sound Levels from Rail Operations

Receptor Identification	Address	Measured L_{dn} (dBA)	Proposed Route			Alternative 1			Alternative 2			Alternative 3		
			Distance (ft)	Calculated L_{dn} (dBA)	Delta*	Distance (ft)	Calculated L_{dn} (dBA)	Delta*	Distance (ft)	Calculated L_{dn} (dBA)	Delta*	Distance (ft)	Calculated L_{dn} (dBA)	Delta*
ML1	187 CR 187	55	3,200	34	-21	3,250	34	-21	3,250	34	-21	3,250	34	-21
ML2	1253 CR 353	57	590	47	-10	590	47	-10	590	47	-10	590	47	-10
ML3	993 CR 354	55	850	44	-11	2,120	36	-19	2,120	36	-19	2,120	36	-19
ML4	5465 FM 2676	56	310	54	--2	650	47	-9	650	47	-9	650	47	-9
ML5	Unknown Address on CR 365 N29.24.360, W99.00.417	59	810	45	-14	780	45	-14	1,560	40	-19	810	45	-14
ML6	190 CR 4512	56	1,200	41	-15	90	60	+4	580	47		3,170	34	-22
ML7	388 CR 356	59	3,500	33	-26	65	64	+5	1,450	40	-19	4,850	30	-29
ML8	4018 CR 4561	59	3,920	31	-28	810	45	-14	1,330	41	-18	4,725	30	-29
ML9	944 CR 4643	62	1,590	40	-22	11,000	<30	-32	8,700	<30	-32	1,585	40	-22
ML10	2560 CR 454	62	450	51	-11	9,610	<30	-32	3,520	34	-28	450	51	-11
ML11	1048 CR 4511	64	4,300	<30	-34	6,630	<30	-34	570	47	-17	3,700	32	-32
ML12	299 CR 4545	66	10,890	<30	-36	2,080	36	-30	6,940	<30	-36	10,510	<30	-36
ML13	915 CR 454	59	8,840	<30	-29	330	54	-5	3,400	33	-26	8,470	<30	-29
ML14	5201 FM 2676	62	3,290	34	-28	1,600	40	-22	1,940	38	-24	1,940	38	-24

Delta = Difference between calculated L_{dn} and measured or existing L_{dn}. In areas where the calculated L_{dn} is less than the measured of existing L_{dn}, noise from individual train movements would still be audible at nearby receptors.

Table 4.12-4. Increased Sound Levels from Rail Operations

– Measured Ldn Plus Calculated Ldn	Proposed Route		Alternative 1		Alternative 2		Alternative 3	
	Cumulative Sound Level	Increased Sound Level From Project	Cumulative Sound Level	Increased Sound Level From Project	Cumulative Sound Level	Increased Sound Level From Project	Cumulative Sound Level	Increased Sound Level From Project
ML1	55	0	55	0	55	0	55	0
ML2	57	0	57	0	57	0	57	0
ML3	55	0	55	0	55	0	55	0
ML4	58	2	56	0	56	0	56	0
ML5	59	0	59	0	59	0	59	0
ML6	56	0	61	5	56	0	56	0
ML7	59	0	64	5	59	0	59	0
ML8	59	0	59	0	59	0	59	0
ML9	62	0	62	0	62	0	62	0
ML10	62	0	62	0	62	0	62	0
ML11	64	0	64	0	64	0	64	0
ML12	66	0	66	0	66	0	66	0
ML13	59	0	60	1	59	0	59	0
ML14	62	0	62	0	62	0	62	0

Cumulative sound level is the measured Ldn plus the calculated Ldn

Side Track

The proposed project includes a side track that could be used to temporarily store a loaded or unloaded train. (See Figure 2.1-2.) The sidetrack also could be used as a transfer point to the UP line. The primary noise expected from operations on the side track would be from the periodic coupling and uncoupling of the rail cars. This would generally be a discrete noise of short duration, usually less than one second, in which the sound-pressure level would rise rapidly before falling below the level of the background noise. Sound-level measurements conducted during railcar coupling at other locations ranged from 79 dBA to 94 dBA (maximum sound level) at 50 feet from the source with an average maximum sound level of 87 dBA (U.S. Army Corps of Engineers, Galveston District, 2003).

SEA performed acoustical calculations to estimate the sound level from coupling and uncoupling activities at the closest residences, based on the highest measured maximum sound level. Impact noise was considered a point source which attenuates a rate of 6 dBA per doubling of distance from the source. Assuming a direct line-of-sight, impact sound levels could be as high as 56 dBA at the closest residences. Intervening topography, structures and heavy vegetation typically would reduce the impact noise level. Noise from train-related impacts could be periodically audible at the closest residences, but would not increase the Ldn, and therefore, would not significantly impact any residence.

Construction of the No-Action Alternative

Under the no-action alternative, construction of the proposed rail line would not occur. Therefore, no rail construction noise impacts would occur. However, additional roadway paving and construction of the remote truck-to-rail loading facility would take place. These construction activities, like those associated with the construction of the proposed rail line, would be short term and would likely take place during daytime hours (7 a.m. to 10 p.m.). Therefore, construction-related noise impacts likely would not be significant.

Operations Under the No-Action Alternative

Under the no-action alternative, VCM would use trucks to transport limestone from the quarry to the truck-to-rail remote loading facility. SEA performed acoustical calculations to determine the Ldn at 50 feet from the centerline of each roadway, as well as to determine the distance from the 55 dBA, 60 dBA, 65 dBA, and 70 dBA Ldn contour, from existing and new vehicular traffic. The results of the calculations are summarized in Table 4.12.5. Sound levels at the closest receptors to the route roadways are summarized in Table 4.12.6. A review of table

4.12.6 shows that the noise level from vehicular traffic would range from approximately 54 dBA Ldn to 63 dBA Ldn. Truck operations would increase noise levels by more than 5 dBA at one measurement location (ML3).

Table 4.12-5. Calculated Contours From Trucks for the No-Action Alternative

Roadway	Level at 50 feet (dBA Ldn)	Distance to Contour (feet)			
		55 dBA Ldn	50 dBA Ldn	65 dBA Ldn	70 dBA Ldn
No-Action Alternative					
CR 253	68	370	170	80	<50
FM 2676	69	430	200	95	<50
FM 4516	68	370	170	80	<50

Table 4.12-6. Calculated Sound Levels from Vehicular Traffic at Measurement Locations

Measurement Location	Distance to Roadway (feet)	Measured Ldn (dBA)	No-Action Alternative	
			Calculated Level (Ldn dBA)	Delta
CR 353				
ML2	214	57	58	-1
ML3	115	55	63	+8
ML4	265	56	57	+1
FM 2676				
ML4	368	56	55	-1
ML14	455	55	54	-1
CR 4516				
ML8	110	59	63	+4

Delta is difference between Calculated L_{dn} and Measured L_{dn}.

Remote Loading Facility

The no-action alternative would include the construction and operation of a remote truck-to-rail loading facility. (See Figure 2.4-1.) The facility would contain a material stockpile for the transfer of material to railcars on the UP line. The facility would include a loading system, which would include conveyor belts, loaders, etc. The material would be transferred from the quarry to the remote loading facility by trucks. Noise sources would include various motors, diesel engines, haul trucks, and impact noise from coupling and uncoupling rail cars. Based on measurements conducted at other locations, continuous sound levels typically range from 70 dBA to 85 dBA at 50 feet from the source with impact sound levels ranging from 79 to 94 dBA at 50 feet.

Since the plan for the facility is only conceptual, SEA could not perform a detailed noise analysis for the facility. Rough acoustical calculations indicate that the continuous and impact sound level at the closest residences could be as high as 58 dBA and 60 dBA, respectively. Noise from the remote loading facility would likely adversely impact the closest residences.

4.13 Vibration

In this section SEA will:

a. Describe the potential vibration impacts from the proposed new rail line construction and operation.

b. Propose mitigative measures to reduce or eliminate potential project impacts from vibration, as appropriate.

4.13.1 Summary of Impacts

Vibration from construction and operation of the proposed rail line could have adverse impacts on historic buildings or other sensitive structures in the area.[14] To assess potential vibration impacts, SEA conducted a detailed vibration study of the proposed rail line construction and operation. Based on the results of this study, SEA preliminarily concludes that construction and operation of the rail line under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would not cause significant vibration impacts to sensitive structures. Although pile driving activities associated with the rail line construction could cause adverse vibration effects to sensitive structures, these impacts could be reduced by

[14] For the purposes of this discussion, the term "sensitive structures" encompasses cultural resources, pipelines, ancillary equipment, and private wells.

the implementation of mitigation measures, as discussed below and in Section 4.15. Operation of the rail line would also cause adverse vibration effects to sensitive structures located in close proximity to the rail line, but these impacts could be reduced and minimized if the mitigation measures, as discussed below and in Section 4.15, are imposed and implemented. Under the no-action alternative, construction activities and truck operations would not cause significant vibration impacts to sensitive structures.

4.13.2 Methodology

SEA conducted a vibration study in conjunction with the Preliminary Cultural Resources Assessment (see Section 4.15) to assess potential vibration impacts to identified cultural resources located near the proposed route and Alternatives 1, 2 and 3. Prior to conducting the study, SEA consulted with the Texas Historical Commission (THC) regarding established standards for assessing vibration impacts to cultural resources. THC provided SEA with a guidance document prepared by the National Park Service (National Park Service 1984), which sets forth suggested standards. SEA has used the standards recommended by the National Park Service to assess vibration impacts in this case. SEA's vibration study is included in Appendix I-5 of this Draft EIS.

SEA made this vibration study available to parties receiving copies of the Preliminary Cultural Resources Assessment and to the public through the Board's website (www.stb.dot.gov). SEA received several comments regarding the study as well as additional comments regarding vibration. A response to the comments received to date is incorporated into the discussion below.

4.13.3 Summary of Results

Vibration impacts depend on the type of soil between the source of vibration and the structure of concern. This is because the soil acts as an elastic medium. Clay soils provide resistance to vibration and therefore, generate higher vibration levels near the source than do sandy soils. However, vibration in clay soils tends to drop off more rapidly with distance than does vibration in sandy soils. SEA's vibration study was based on the General Vibration Assessment methods contained in the FTA Transit Noise and Vibration Impact Assessment manual (FTA 1995); SEA did not consider specific project area soil conditions as part of the study because the exact alignment of the proposed rail line is not yet known.

SEA determined that construction of the proposed rail line along any of the potential alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3), aside from pile driving activities, would not impact sensitive structures that are located more than 25 feet away. Calculations of worst-case pile driving vibration levels indicate that adverse vibration impacts could occur within 200 feet of extremely fragile historic structures (Caltrans 1996). Actual vibration levels would depend on the source type and specific equipment needed to perform the work and the type of soil between the pile driver and the structure of concern.[15]

SEA determined that operation of the proposed rail line along any of the potential alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would not impact sensitive structures that are located more than 45 feet from the tracks.

Construction activities associated with the no-action alternative would also not impact sensitive structures that are located more than 25 feet away. Truck transportation under the no-action alternative would not cause adverse vibration impacts to sensitive structures.

4.13.4 Discussion and Mitigation

Vibration impacts to specific cultural resources located near the proposed route, Alternative 1, Alternative 2, or Alternative 3 are discussed in Section 4.15.

It is possible that pipelines, ancillary equipment, and private wells could be located close enough to the proposed route, Alternative 1, Alternative 2 or Alternative 3 to experience adverse vibration impacts from pile driving during construction and operation of the rail line along any of the alignments, if the line were built too close to private wells, ancillary stuctures and pipelines. In order to reduce potential adverse impacts to these sensitive structures, SEA recommends that the Board impose the following mitigation on any decision approving the proposed rail line:

- Prior to initiating rail construction activities, Southwest Gulf Railroad Company shall consult with property owners located adjacent to the rail right-of-way regarding the location and design of their private wells, ancillary structures, and pipelines in order to make appropriate modifications to the design of the rail line to maintain well, structure, and pipeline integrity.
- Southwest Gulf Railroad Company shall monitor all pile driving activities done in connection with the construction of its rail line. Monitoring shall be conducted using

[15] As discussed below, SEA has proposed mitigation that would apply to pile driving activities.

a portable vibration-monitoring instrument that provides a calibrated record of local ground movement/accelerations.

- Prior to pile driving, Southwest Gulf Railroad Company shall inspect all structures within 200 feet of the pile driving activity and shall record these structures by videotape to document existing conditions.

It should be noted that the first proposed condition would assure that the rail line is designed so as to maintain integrity and minimize the number of sensitive structures located 45 feet or less from the tracks (the distance where there would be vibration impacts during railroad operations). The Programmatic Agreement, discussed in detail in Section 4.15.2, further addresses sensitive structures that would be located within this distance of the tracks.

4.14 Recreational and Visual Resources Impacts

In this section, SEA explains the process used to evaluate recreational and visual resource impacts and describes the potential impacts of the proposed rail line construction and operation under any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) and the no-action alternative on recreational and visual resources.

Because there are no public recreation sites within the project area, construction and operation of the proposed new rail construction and operation would have no public recreational resources impacts. Although a new rail line through a rural area would have some adverse visual impacts, these impacts would be reduced by SGR's proposed voluntary mitigation measures. SEA recommends that SGR's proposed voluntary mitigation measures be imposed in any decision approving the proposed rail line, and preliminarily concludes that, as mitigated, no significant visual or recreational impacts would result from the proposed action.

4.14.1 Methodology

SEA evaluated the visual and recreation impacts associated with constructing and operating a new rail line by reviewing aerial photography (Texas Digital Ortho Quadrangle False Color Infrared, dated 1995), National Wetland Inventory Maps, and USGS 7.5 minute topographic maps.

4.14.2 Proposed Rail Line

Because there are no public recreation sites within the project area, construction and operation of the proposed rail line along any of the alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would have no public recreational resources impacts.

Some of the numerous stock-watering ponds distributed throughout this area may provide private recreational opportunities. Based on SEA's review of the National Wetland Inventory Maps, these ponds vary in size from less than an acre to as much as two acres. SEA did not identify any pond that would be adversely impacted by the proposed route, or by any of the alternative routes. However, to ensure that these stock-watering ponds would not be affected by the proposed rail line, SEA recommends that the Board impose the following condition:

- Prior to initiating construction activities, Southwest Gulf Railroad Company (SGR) shall identify the location of privately-owned stock ponds within the project area and attempt to avoid them. If avoidance is not possible, SGR shall minimize intrusion to these water bodies to the extent practicable and minimize disturbances to important sources of influent to these water bodies.

In a rural setting, visual aesthetics are dominated by natural appearing landforms and vegetation. In general, the proposed rail line would traverse undeveloped shrub and wooded areas. The primary water-related visual resources in the area are the intermittent streams that the proposed rail line would cross. The proposed rail line would terminate at the quarry site, allowing 1,000 feet of buffer zone from the beginning point of the quarry. According to SGR, the length of the rail line from the quarry site and extending to the UP rail line would be bounded on both sides of the right-of-way by appropriate fencing. Inside the right-of-way, native grass and shrubs would be maintained to allow the rail line to blend with the natural surroundings. Thus, SEA preliminarily concludes that the proposed rail line construction and operation would not significantly impact visual resources, and recommends that the Board impose the following condition:

- As agreed to by Southwest Gulf Railroad Company (SGR), SGR shall maintain native grass and shrubs inside the rail line right-of-way to allow the rail line to blend with the natural surroundings.

Visual and aesthetic impacts to cultural resources are addressed in Section 4.15.

4.14.3 No-Action Alternative

Under the no-action alternative, 1,700 trucks per day would be traveling on area local roads, resulting in a greater visual impact to the rural community than the proposed action. In addition, the no-action alternative would require construction and operation of a 100-acre, truck-to-rail remote loading facility along County Road 4643 just north of U.S. Highway 90 and the UP rail line, along with a short rail spur to connect to the UP line. Construction of this loading facility could represent a visual impact both to local residents who use County Road 4643, and possibly (depending on final positioning of the facility) to motorists along U.S. Highway 90.

4.15 Cultural Resources

This section summarizes the potential adverse effects to cultural resources or historic properties within 1000 feet of the proposed route and each potential rail alternative (this is also the area of potential effect or APE). Also included is an assessment of the potential impacts from the no-action alternative. This analysis is followed by a discussion of recommendations to mitigate impacts to historic properties within each of the alternatives including the proposed route.[16]

4.15.1 Potential Impacts to Cultural Resources

SEA has determined that SGR's proposed project would have adverse effects to National Register eligible or listed historic properties within the APE's for all of the potential alternatives including the proposed route. (See Figure 3.11-1.). Proposed measures to avoid, minimize, or mitigate these impacts, where possible, are set forth in the draft Programmatic Agreement. (See Appendix I-3).

Adverse visual effects, obstruction of views, and changes in the aesthetic character of the rural Quihi area, could result from the proposed action and would therefore adversely affect potentially eligible National Register sites, buildings, structures, districts,[17] or objects within the

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[16] See Appendices I-2 and I-4 for details about historic properties within the project area including photographs.

[17] A historic district is a cluster of properties that are connected through some association such as architectural style, time period, or some common theme. A district can include all types of properties including buildings, structures, archaeological sites, fences, roads, and other features.

APE's for the project area and perhaps beyond. What is presented in this section are the likely adverse effects from the proposed action based on the cultural resources studies conducted to date (see Appendices I-2.2 and I-4). Potential vibration impacts to buildings within the project area have also been assessed, as discussed in Section 4.13. (See Appendix I-5.).

For the purposes of comparing impacts to historic properties that would result from the proposed route and each of the potential rail alternatives, SEA considered resources not formally determined to be eligible for the National Register as "potentially eligible." Adverse effects to either eligible or potentially eligible National Register historic properties have been treated equally when assessing impacts to those resources within the project's APE's.

A preliminary assessment of these impacts, including resources potentially impacted within each alternative and the proposed route, is presented below, followed by a discussion of measures that would be taken to mitigate any adverse effects to historic properties under the Programmatic Agreement. In addition to assessing impacts to individual resources, the area encompassing the Quihi community may constitute a rural historic landscape[18] that is eligible for the National Register as a composite entity (as a district). Therefore, potential impacts to this potential Quihi Rural Historic Landscape also have been assessed.

Proposed Route

Construction of a rail line along the proposed route has the potential to adversely affect five potentially eligible National Register historic properties and one historic property currently listed on the National Register (the listed property is the 19th-century Schuele-Saathoff German-Alsatian House). (See Table 4.15-1.) The resources within the proposed route that could be adversely affected include two 20th-century frame houses (Resources A and B), three 19th-century German-Alsatian houses (Resources G, M, and N), and one 19th-century historic stone wall (Resource P). (See Table 4.15-1; see also Figure 3.11-1.) The stone wall would be directly physically impacted by the construction of the rail line along this route. The Henry Schweers German-Alsatian House (Resource G), located just west of the proposed route, could have visual, and vibration impacts due to its close proximity. (See Appendix I-5 for report on vibration impacts). Potential adverse effects to the remaining properties would be limited to visual impacts.

[18] See National Register publication, Guidelines for Evaluating and Documenting Rural Historic Landscapes at http://www.cr.nps.gov/nr/publications/bulletins/arch/pt4.htm .

The Schweers/Balzen family cemetery (Resource H) is located far west of the proposed route and would not be adversely affected by the proposed action.[19]

The proposed route could also adversely affect the potential rural historic landscape that likely encompasses the entire project area. Although the potential historic district has not been formally identified or assessed, historic maps of the region suggest that most of this potential district centers around the historic road network and in the area surrounding Quihi. (See Appendix I-4, Figures 29 and 30). Although the proposed route avoids some historic roads at the southern end, impacts to the potential rural historic landscape would still occur, especially in the area where the proposed route would cross Quihi Creek.

In addition to the resources described above, the proposed route has the potential to affect previously unidentified historic and archaeological sites. A sensitivity model completed by SEA for determining the likely location of unknown historic and prehistoric sites, indicates the proposed route would be the third most sensitive route for these types of resources. (See Appendix I-4, Table 2 and Section 3.11 for a discussion on the sensitivity model). There are no known historic or prehistoric sites located within the APE for the proposed route.

[19] Cemeteries are not normally eligible for listing in the National Register. See eligibility criteria for listing of cemeteries in the National Register publication, Listing A Property, What is the Process? at http://www.cr.nps.gov/nr/listing.htm.

Table 4.15-1. Potential Impacts to Known Historic Properties Within the APE for Proposed Route

Property Name/Type	Location	National Register eligibility	Potential Effect	Map Designation[20]
Saathoff 20th century frame house	At northern edge of project area, east of all routes, west of CR 353	Potentially eligible	Adverse effect-Visual impact	A
Dittmar 20th century frame House	At northern edge of project area, east of the proposed route, west of CR 353	Potentially eligible	Adverse effect-Visual impact	B
Henry Schweers German-Alsatian House	Just west of proposed route, west side of CR 365	Potentially eligible	Adverse effect - Visual, and vibration impacts	G
Schweers/Balzen Family cemetery	Between Alternatives 1 and 2, west side CR 365	Unknown	Unknown	H
Schuele-Saathoff German-Alsatian House	Between Alternative 2 and the proposed route, south side CR 4512	Listed	Adverse effect-Visual impact	M
Pichot German-Alsatian House	Just east of Alternative 2, south side of CR 4512	Potentially eligible	Adverse effect-Visual impact	N
Historic Stone Wall	Intersected by proposed route, South of CR 4512	Potentially eligible	Adverse effect - Direct physical impact to site	P
Quihi Rural Historic Landscape	Generally encompasses the entire project area	Potentially eligible	Adverse effect-Visual and other impacts	None, see historic maps of project area

Alternative 1

Due to the greater length of the line and proximity to Quihi Creek and historic roads, Alternative 1 has the greatest potential to adversely affect known historic period resources and unknown historic and prehistoric archaeological sites, although this alternative would not have any direct physical impacts to any known historic properties. (See Table 4.15-2; see also Figure 3.11-1). Historic maps of the region indicate that at least three historic properties formally were located within the APE for Alternative 1, but are no longer standing. (See Appendix I-4, Figures 29 and 30; Figure 3.11-1.).

In total, construction of a rail line along Alternative 1 could have adverse visual effects to three 20th-century frame houses (Resources A, K and V), eight 19th century German-Alsatian buildings (Resources G, I, L, N, Q, R, X and Z), one 19th century Victorian frame house (Resource T), and one potential historic district. Four of the German-Alsatian buildings (Resources I, Q, R, X) may be close enough to Alternative 1 to also have vibration impacts. (See Figure 3.11-1 and

[20] See Figure 3.11-1 for a map of the project area showing location of historic properties using these designations.

Appendix I-5.) Although three cemeteries (Resources H, AA and DD) are located within the APE for Alternative 1, cemeteries are generally not eligible for the National Register. They also are far enough away from this alternative to not be subject to any direct physical impacts. The APE for this alternative also includes six German-Alsatian ruins (Resources J, O, S, U, W, and CC), although these also would not be directly impacted by construction of Alternative 1.

Table 4.15-2. Potential Impacts to Known Historic Properties Within the APE for Alternative 1

Property Name/Type	Location	National Register eligibility	Potential Effect	Map Designation
Saathoff 20th Century Frame House	At northern edge of project area, east of all routes, west of CR 353	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual impact	A
Henry Schweers German-Alsatian House	Just west of proposed route, west side of CR 365, east of Alternative 1	Potentially eligible individually and as contributing element to potential historic district	Adverse effect-Visual	G
Schweers/Balzen Family cemetery	Between Alternatives 1 and 2, west side CR 365	Unknown	Unknown	H
William Schweers German-Alsatian House	Just east of Alternative 1, west side CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual, Vibration	I
Heyo/Schweers German-Alsatian Ruins	West of Alternative 1, west side of CR 365	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	J
M. Walden 20th-Century Frame House	West of Alternative 1, west of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual, Vibration	K
Ben-Ivey German-Alsatian House	West side of Alternative 1, west side of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual	L
Pichot German-Alsatian House	Just east of Alternative 2, south side of CR 4512	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual	N
German- Alsatian Ruins	Adjacent to east side of Alternative 2, south of CR 4512	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	O

Table 4.15-2. (continued)

Property Name/Type	Location	National Register eligibility	Potential Effect	Map Designation
German-Alsatian Barn (Q) and House (R)	Adjacent to Alternative 1, east of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual, Vibration	Q and R
German -Alsatian Ruins	West of Alternative 1, at intersection of CR 365and CR 4516	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	S
19th century Victorian Frame House	West of Alternative 1, at intersection of CR 365and CR 4516	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual	T
German-Alsatian Ruins	West of Alternative 1, at the intersection of CR 365and CR 4516	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	U
20th century Frame House	West of Alternative 1 at the intersection of CR 365 and CR 4516	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual	V
German -Alsatian Ruins	Adjacent to Alternative1, north side of CR 4516	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	W
German -Alsatian House	Adjacent to Alternative 1, north side of CR 4516	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual, Vibration	X
German -Alsatian House	Between Alternatives 1 and 2, north side of CR 4516	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect-Visual	Z
Quihi Cemetery	West of Alternative 1, west side of CR 4517	Unknown	Unknown	AA
Schorobiny German - Alsatian Ruins	West of Alternative 1, south of CR454	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	CC
Schorobiny Family Cemetery	West of Alternative 1, just east of CR 4545	Unknown	Unknown	DD
Quihi Rural Historic Landscape	Generally encompasses all of the project area	Potentially eligible	Adverse effect-Visual and other impacts	None, see historic maps of project area

Alternative 2

The construction of the rail line along Alternative 2 could adversely affect five eligible or listed National Register historic properties and one potential historic district. (See Table 4.15-3.). The potentially affected resources include one 20th century frame house (Resource A), four German-Alsatian buildings (Resources G, I, M [the National Register listed Schuele-Saathoff House] and N), and the potential Quihi Rural Historic Landscape. All of these could have potential adverse visual effects, while the Henry Schweers and William Schweers German-Alsatian houses (Resources G and I) could be subjected to adverse affects from vibration impacts do to their nearness to Alternative 2. The impacts to the potential Quihi Rural Historic Landscape are unknown at this time. However, an examination of historic maps from this area suggests some impacts, particularly near historic roads and in the regions near Quihi Creek. (See Appendix I-4, Figures 29 and 30.). Adverse effects to the remaining historic properties located within the APE for Alternative 2, a German-Alsatian ruin [Resource O] and the Schweers/Balzen Cemetery [Resource H]), are not expected as these resources would not be subjected to direct physical impacts from the proposed action.

Table 4.15-3. Potential Impacts to Known Historic Properties Within the APE for Alternative 2

Property Name/Type	Location	National Register eligibility	Potential Effect	Map Designation
Saathoff 20th Century Frame House	Northern edge of project area, east of all routes, west of CR 353	Potentially eligible individually and as contributing element to potential historic district	Adverse effect- Visual impact	A
Henry Schweers German-Alsatian House	Just west of Proposed Route, west side of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse effect- Visual, vibration	G
Schweers/Balzen Family Cemetery	Between Alternatives 1 and 2, west side CR 365	Unknown	Unknown	H
William Schweers German-Alsatian House	Just east of Alternative 1, west side CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse Effect- Visual, Vibration	I
Schuele-Saathoff German-Alsatian House	Between Alt. 2 and Proposed Route, south CR 4512	Listed, could be contributing element to potential historic district	Adverse effect- Visual impact	M
Pichot German-Alsatian House	Just east of Alternative 2, south side of CR 4512	Potentially eligible	Adverse effect- Visual impact	N
German- Alsatian Ruins	Adjacent to east side of Alternative 2, south of CR 4512	Potentially eligible individually and as contributing element to potential historic district	No Adverse Effect	O
Quihi Rural Historic Landscape	Generally encompasses all of the project area	Potentially eligible	Adverse effect- Visual and other impacts	None, see historic maps of project area

Alternative 3

The selection of Alternative 3 for construction of the proposed rail line could adversely affect two German-Alsatian homes (Resources C and E), a 20th Century house (Resource A), a 19th Century Victorian style house (Resource D), and the potential Quihi Rural Historic Landscape. The impacts to these properties would be largely visual in nature, although the Oeffinger German-Alsatian House (Resource E) could also be subject to vibration impacts due to its close proximity to the proposed alignment. Impacts to the potential Quihi Rural Historic Landscape are not certain. Although Alternative 3 skirts further east of Quihi than the other alternatives, some impacts to the district from this alternative would be expected. The potential rural historic landscape likely encompasses the entire project area and any intrusion from the new construction of a rail line would have adverse effects to the potential historic district.

In addition to the above historic properties, the proposed alignment for Alternative 3 skirts just west of known archaeological Site 41ME133. However, based on current information about the site boundaries, no impacts and therefore no adverse effects to this site are likely.

Alternative 3 also includes a potential historic archaeological site located between Resources E and C (shown as "unidentified resource" on Figure 3.11-1). Historic maps of the region indicate the location of a building at this location that is no longer standing. (See Appendix I-4, Figures 29 and 30.)

No-Build Alternative

Since many of the potentially significant historic buildings are clustered along narrow unpaved roads in Quihi that would be utilized by a high volume of gravel truck traffic, a variety of adverse effects are likely under the no-action alternative. This includes road widening which would likely impact sites associated with any historic buildings, and associated archaeological sites, or artifacts. The high truck traffic volume would also have adverse visual effects to historic properties including the potential rural historic district during operational hours. Impacts from the no-build alternative to prehistoric archaeological sites are unknown.

Table 4.15-4. Potential Impacts to Known Historic Properties Within the APE for Alternative 3

Property Name/Type	Location	National Register eligibility	Potential Effect	Map Designation
Saathoff 20th Century Frame House	At northern edge of project area, east of all routes, west of CR 353	Potentially eligible individually and as contributing element to potential historic district	Adverse effect-Visual impact	A
Saathoff German-Alsatian House	East of Alternative 3, east side of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse effect-Visual impact	C
19th Century Saathoff Victorian House	East of Alternative 3, east side of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse effect-Visual impact	D
Oeffinger German-Alsatian House	Just east of Alternative 3, west side of CR 365	Potentially eligible individually and as contributing element to potential historic district	Adverse effect-Visual, vibration	E
German-Alsatian Ruins	West of Alternative 3, east side of CR 365	Potentially eligible individually and as contributing element to potential historic district	No Adverse effect	F
Historic Stone Wall	Intersected by Proposed Route, South of CR 4512	Potentially eligible	No Adverse effect	P
Archaeological Site 41ME133	100 feet east of Alternative 3	Potentially eligible	No Adverse effect	Not shown
Quihi Rural Historic Landscape	Generally encompasses all of the project area	Potentially eligible	Adverse effect-Visual and other impacts	None, see historic maps of project area

Conclusions Regarding Potential Impacts

In general, the routes do not directly impact known individual cultural resources. The exception to this is the stone wall (Resource P) on the Lindsey property, which would be crossed by the proposed route. However, Alternative 1 is located near many more known and suspected historic properties relative to Alternative 2, Alternative 3 and the proposed route. Alternative 1 stands out as having the most potential to adversely affect known and suspected historic properties within the project area. The other three alignments are more difficult to differentiate as the impacts are similar. Alternative 3 may have slightly fewer impacts than the other potential

alternatives as it is located east of most of the known and suspected historic properties in the project area.

If the Quihi community constitutes a rural historic landscape that is eligible for the National Register as a composite entity (as a district), then all four potential rail alignments would cross this cultural resource. Further analysis would be required to fully evaluate the relative impact of each alignment on the potential Quihi Rural Historic Landscape, but Alignments 1 and 2 would appear to have more of an impact on this landscape than do the proposed route and Alternative 3. Alternative 3 appears to have the least impact on the potential historic district of all four potential rail routes, based on its peripheral siting. The no-action alternative would have a substantial effect on the character of this district as a composite entity due to the large increase in truck traffic and associated road widening. The greater impacts on historic resources including the potential historic district and historic period sites is one reason SEA is not recommending Alternative 1.

4.15.2 Proposed Mitigation

In March 2004, SEA, SGR and the Texas Historical Commission (State Historic Preservation Officer or (SHPO)) drafted a Programmatic Agreement (PA), per 36 CFR Part 800.14(b), in order to outline additional historic property identification, evaluation, effect and potential mitigation measures to be implemented prior to construction of any approved alternative (see Appendix I-3 to view the draft PA in full). The PA stipulates the development of APE(s) for the approved alternative in consultation with SGR, the SHPO and the Board to consider potential adverse visual, vibration, flooding, and future development effects from the proposed action.

The PA also provides for the development of a Scope of Work (SOW) to implement measures of the PA, and a Resolution Plan that will include steps to avoid, minimize or mitigate any adverse effects to historic properties identified within the APE(s).

The PA stipulates the identification of historic properties within the APE(s) through a combination of reconnaissance and intensive level field surveys. Mitigation of adverse effects would include, as appropriate, avoidance, archaeological data recovery, monitoring, landscaping, documentation, salvage, and the relocation of historic properties that would suffer direct impacts. These efforts would be summarized and disseminated to the consulting parties, Federally recognized tribes, and the public through the development of a technical report, brochures, pamphlets and public outreach efforts.

The PA also includes provisions for consultation, tribal input, treatment of human remains, repatriation, curation of artifacts and records, dispute resolution, amendment and termination. The PA is attached as at Appendix I-3. Prior to its finalization, the PA will be subject to changes pending input from the public and consulting parties, including SGR, the SHPO, Federally recognized tribes, the Advisory Council on Historic Preservation, and those listed in Appendix I-1, and commenters on this Draft EIS.

4.15.3 Recommendations

In order to ensure that the provisions of the PA are fully implimented and complied with, SEA recommends that the Board impose the following condition on any decision approving the proposed action:

- Southwest Gulf Railroad Company shall comply with the terms of the Programmatic Agreement, developed pursuant to 36 CFR 800.14(b), which shall be finalized and executed by all required parties prior to the issuance of any Surface Transportation Board decision granting construction and operation authority in this proceeding.

4.16 Socioeconomic Impacts

In this section, SEA describes the potential socioeconomic impacts of constructing and operating the proposed rail line under any of the alignments (the proposed route, Alternative 1, Alternative 2, or Alternative 3), as well as the no-action alternative. Demographics and employment can be affected by activities conducted during the construction and operational phases of a proposed project, in both the short and long-term. After collecting and evaluating data on how the proposed project might affect the local economy, SEA preliminarily concludes that there would be no significant socioeconomic impacts as a result of the proposed action or the no-action alternative. A more detailed explanation of the potential impacts follows.

Proposed Route and Alternatives 1, 2, and 3

SGR expects that, on average, approximately 15 to 20 people would be employed during construction of the proposed rail line. This number could increase to as many as 25 at the peak of activity during rail placement. The average time of employment would be four to six months, at an average base salary of $15 to $20 per hour. To the extent that employee wages might be spent within the local area, the construction phase of the proposed action would positively affect the local economy. However, the impact on the local economy would be slight, given the relatively small number of construction employees and the limited duration of the construction activities (approximately 12 months).

Any net change in employment and other effects on the local economy resulting from operation of the proposed rail operations also would be small. According to SGR, up to 24 employees would be needed to operate the rail line. The addition of these jobs to the local market would have a positive effect on Medina County. The number of jobs involved in rail construction and operation is not expected to vary by routing alternative.

SEA received several comments questioning the impacts of the proposed rail line on property values in the local area. Property values are determined by myriad factors, including visual aesthetics, availability of schools, employment opportunities, transportation infrastructure, access to commercial establishments, land use, water quality, and air quality. Because local property values depend on so many factors and are somewhat subjective, the impacts to property values from the proposed project cannot be predicted accurately at this time.

No-Action Alternative

Under the no-action alternative, the rail line would not be built and the quarry products would be transported to the truck-to-rail remote loading facility via truck. VCM would need to employ a number of workers to construct the truck-to-rail remote loading facility. Workers also would be needed to perform roadway upgrades. To the extent that employee wages might be spent within the local area, the construction phase of the no-action alternative would positively affect the local economy. However, this effect would be minimal (as it would be for rail line construction) because of the small number of construction employees and the limited duration of the construction-related employment.

Any net change in employment and other effects on the local economy from operation of the no-action alternative would likely be too small to measure. SGR did not provide information on how many employees would be needed to operate the truck-to-rail remote loading facility. However, SGR stated that VCM would employ between 20 to 30 drivers for the 1,700 truck trips per day that would be needed to transport limestone from the proposed quarry to the truck-to-rail remote loading facility. The addition of these jobs in the local market would provide a benefit to Medina County.

4.17 Cumulative Impacts

The CEQ regulations implementing NEPA define a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from

individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). To assist Federal agencies in assessing cumulative impacts under NEPA, CEQ developed a handbook titled Considering Cumulative Effects under the National Environmental Policy Act (CEQ, 1997). SEA followed CEQ's guidelines in its evaluation of whether the potential impacts of the proposed rail line construction and operation in combination with projects in the area would cumulatively result in significant adverse environmental impacts.

SEA consulted with local, state, and Federal agencies, as well as with SGR, and conducted public outreach and scoping activities to identify other past, present, and reasonably foreseeable future actions in the proposed project area, as described in Chapter 1. SEA also contacted the Medina County Floodplain Administrator by telephone in August 2004 to determine whether any new proposals for projects in the area had been made. SEA determined that VCM's proposed quarry was the only project that overlaps with the proposed action in terms of geographic area and time frame. Because the quarry and the rail line are related to the extent that the rail line would serve the quarry and because development and operation of the quarry has the potential to impact some of the same resources as the rail line at about the same time as the rail line construction and operation, SEA determined that analysis of the quarry is an appropriate part of the cumulative impacts analysis for this case. Thus, SEA's cumulative impacts analysis has assessed the combined effects of the rail line and the quarry on the environment.

Below SEA provides a description of VCM's proposed new quarry and then discusses SEA's cumulative impacts analysis, separated into environmental resource categories. SEA evaluated cumulative impacts to those environmental resources to which both the proposed action and the proposed quarry could cause environmental impacts. SEA preliminarily concludes that the proposed construction of approximately seven miles of new rail line and the operation of four trains per day (two round trips from the quarry to the UP rail line), under the proposed action, would not create any notable cumulative impacts in the project area.

4.17.1 Past, Present, and Reasonably Foreseeable Future Actions

Vulcan Construction Materials' New Quarry

SGR submitted to SEA two biological assessments prepared by Vulcan Materials Company (Vulcan) that contain information about VCM's proposed quarry. **(See Appendix F.)** These documents will be referred to as the 2001 BA and the 2003 BA. The area covered by the 2001 and 2003 BAs is shown in **Figure 4.17-1.** According to the 2001 BA, development of the proposed quarry would be a multi-phased project, including the limestone quarry itself and

associated crushing and screening facilities for the production and sale of construction aggregates for the building of roads, bridges, and other related construction-industry needs. The quarry project would be composed of: a plant maintenance and fueling facility; production, mining; environmental management; and buffer zones, green belts, and habitat conservation and enhancement areas. A major portion of the quarry site lies over the Edwards Aquifer Recharge Zone (EARZ) with the southeastern corner extending into the Edwards Aquifer transition zone. The plant maintenance and fueling facility, as discussed in Chapter 2 (**See Figure 2.1-2**), would be located off the EARZ on the transition zone.

According to the 2001 BA, the area where the quarry would be developed consists of about 1,700 acres, which is more than what is required for the proposed quarry and plant area themselves, thus providing a buffer zone. The mining operation would consist of breaking the in-place limestone using modern blasting and conventional mining techniques. Explosive material components (typically ammonium nitrate and diesel fuel) used for the blasting would be brought into the quarry area by outside contractors (with no onsite bulk storage of explosive materials). The explosives themselves would be consumed in the detonation, and any residues would adhere to the broken aggregate and be transported out of the quarry with the excavated limestone. The broken limestone would then be removed by heavy equipment and transported to the production facility for crushing, washing, and transport preparation.

According to the 2001 BA, the entire quarry site has been used primarily for cattle grazing with small areas used for hay and other crop production. The creeks located on the quarry site flow only for a very short period after rainfall events. VCM's plans called for the establishment of a 400-foot buffer zone that would extend completely around the project site, offering both a north-south and an east-west buffer-zone corridor.

The quarry would require, on a long-term basis, about 100 employees, which would result in positive economic effects on the community, as well as additional traffic loads on local roads. Based on information submitted by SGR, Table 4.17-1 presents a summary of regulations for the stone industry in Texas that would be applicable to the VCM quarry (as they would for any other quarry).

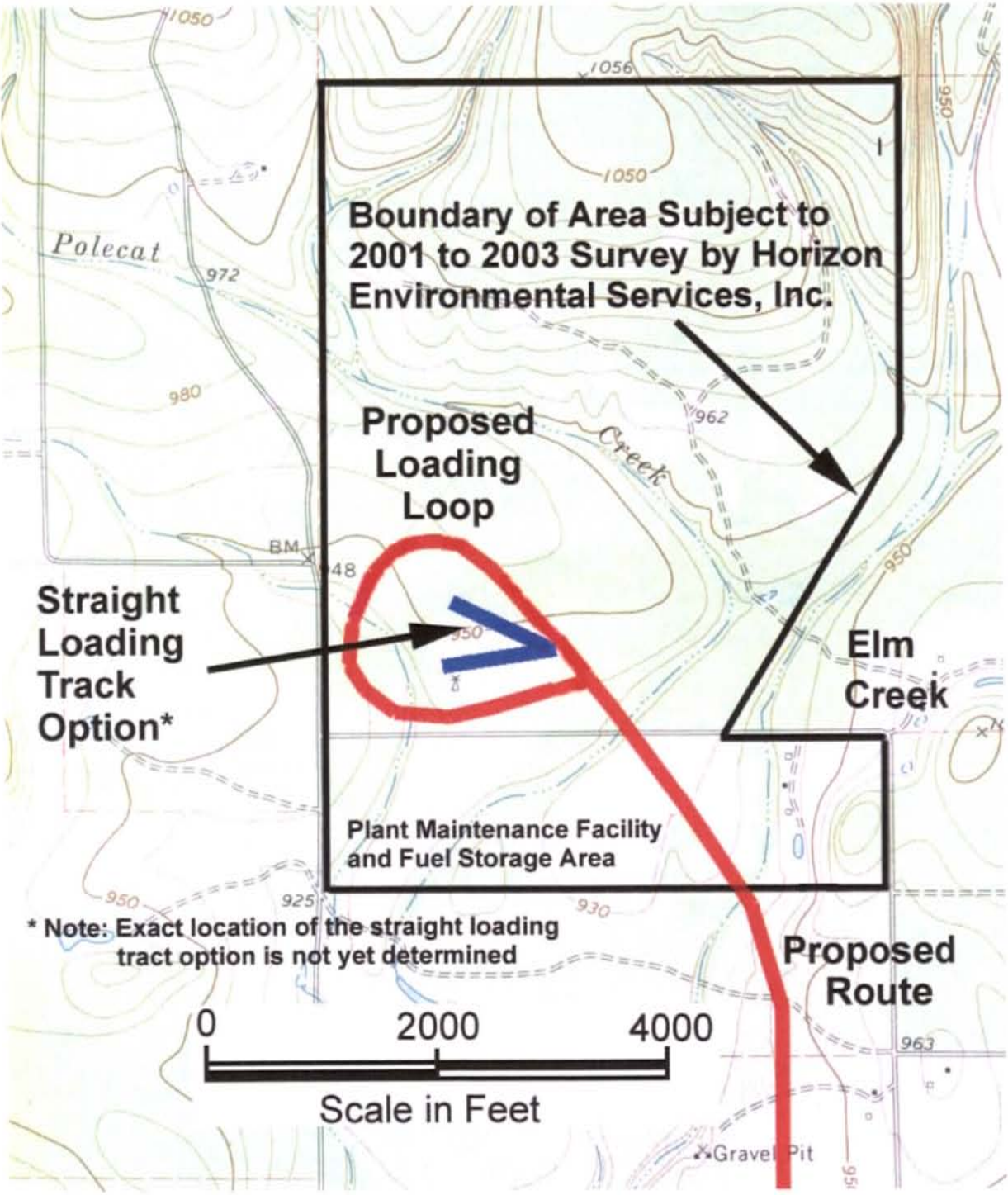

Figure 4.17-1. Survey Area of Vulcan Material Company's Biological Assessments

Table 4.17-1. Regulations of the Stone Industry in Texas

Issue	Agency	Description
Blasting	-ATF -MSHA -OSHA -City or County Fire Marshal	-Use, storage, and sale of explosives -Onsite use, transport & storage of explosives -Onsite use, transport & storage of explosives -Onsite use of explosives, vibration
Dust	-MSHA -OSHA -EPA -TCEQ	-Defines permissible exposure limits -Dictates sampling -Dictates controls -Regulates stack and fugitive air pollution emissions
Noise	-MSHA -OSHA	-Defines action levels (85 dBA) -Requires sampling, hearing conservation program, and controls
Traffic	-Federal DOT -Texas DOT	-Requires vehicle inspection and maintenance, defines driver qualifications -Requires driver licensing, dictates requirements for transporting certain materials, defines weigh limits for trucks, defines speed limits for roads and highways
Water	-EPA -TCEQ -Edwards Aquifer Authority -Medina County Underground Conservation District -Local River Authority	-Discharges of process wastewater -Discharges of stormwater -Aboveground storage tanks on recharge and transition zones -Discharges of storm water over recharge zone -Water use from Edwards aquifer and provides source protection -Groundwater activities other than Edwards aquifer and provides source protection -Surface water use and provides source protection
Petroleum products	-EPA -TCEQ -MSHA -OSHA	-Handling, storage, & disposal of petroleum waste -Spill prevention plans -Spill prevention requirements -Storage and handling -Storage and handling safety
Biology	-Fish and Wildlife -EPA -CORPS -Texas State and Parks and Wildlife	-Protection of endangered and threatened species -Protection of Wetlands
Cultural Resources	-THC	-Protects resources that have been determined eligible for listing with the National Register of Historic Places or formally designated as State Archaeological landmarks

Acronyms
ATF- Alcohol Tobacco and Fire Arms
MSHA-Mine Safety and health Administration
OSHA- Occupational health and Safety Administration
EPA- U.S. Environmental Protection Agency
DOT- Department of Transportation
TCEQ- Texas Commission on Environmental Quality
CORPS- Army Corps of Engineers
THC- Texas Historical Commission

Transportation to Local Markets

According to SGR, VCM would use trucks to transport limestone from the proposed quarry to local markets, whether or not the proposed rail line is built. There would also be an increase in local traffic from the approximately 100 quarry-employee cars. SGR anticipates that about 100,000 tons/year of limestone from the quarry would be distributed to the local market, including areas in Medina County such as Quihi, Castroville, and Hondo. SGR estimates that an average of about 24 round trips per day (48 single trips) would be required to meet local market demands.[16] These local trucks would most likely take either County Road 353 to County Road 354 or County Road 364 to FM 2676 west to Hondo or east to County Road 471 and then travel south to Castroville. (See Figure 4.17-2 for possible local truck transportation routes.) These trucks could also serve markets in western Bexar County. SGR estimates that these trucks would travel distances ranging from a few miles to as much as 40 miles. VCM plans to pave County Road 353 to accommodate this increased local truck traffic.

4.17.2 Transportation and Traffic Safety

Local traffic generated by the proposed quarry would impact transportation and traffic safety in the project area. SEA preliminarily concludes that the combined risk of accidents to human health and safety from the potential impacts of the proposed rail construction and operation and the proposed quarry would not be significant. The methodology used to calculate the risks of accidents, injuries and fatalities from the local traffic that would be generated by the quarry is described below; the methodology used to calculate the risks of accidents, injuries, and fatalities from the proposed rail line (proposed route, Alternative 1, Alternative 2, or Alternative 3) and the no-action alternative is described in Section 4.1. The annual risks for accidents, injuries and fatalities for the proposed route, the other rail route alternatives, and the no-action alternative, in addition to the quarry-related local traffic, is presented in Table 4.17-2.

Table 4.17-2. Comparison of Cumulative Accident, Related Injury, and Fatality Risks

Risk	Proposed Route	Alternative			No-Action	Local Market Trucks	Employee Vehicles	Medina County 2000
		1	2	3				
Injuries/year	0.048	0.061	0.048	0.051	2.6	0.062	0.61	394
Fatalities/year	0.026	0.033	0.026	0.027	0.096	0.0022	0.0068	8

[16] SGR provided information estimating that between 20 to 30 loaded trucks per day would deliver limestone to local markets (see Appendix G).

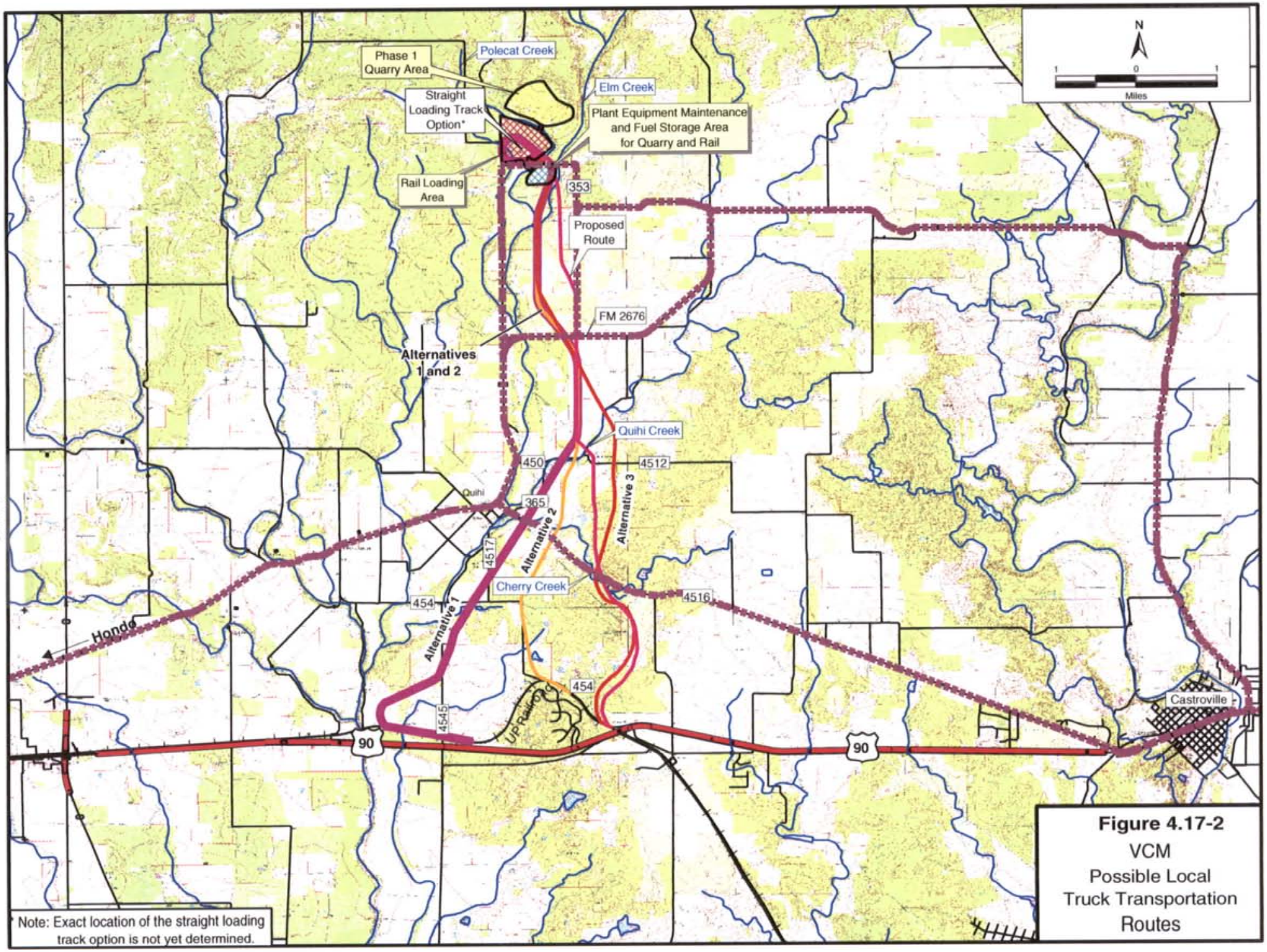

Figure 4.17-2
VCM
Possible Local
Truck Transportation
Routes

Methodology

VCM would use about 24 trucks per day to transport limestone from the proposed quarry to local markets. Each of these trucks would travel 15 miles round trip, 7.5 miles in each direction from the quarry to the main highways, in the area that would be impacted either by SGR's proposed rail line or the trucks that would be used under the no-action alternative. The total local truck-miles per year in the area impacted by SGR's proposed rail line would be:

(24 truck round trips/day) x (15 truck-miles in affected area/truck round trip) = 360 truck-miles/day

Using the formula set forth in Section 4.1, SEA calculated that the risk to the public from the operation of the local trucks on an annual basis would be:

(0.69 injuries/million truck-miles) x (360 truck-miles) x (250 days/year) = 0.062 injuries, and
(0.025 fatalities/million truck-miles) x (360 truck-miles) x (250 days/year) = 0.0022 fatalities

There would also be an increase in local road traffic from the approximate 100 quarry-employee cars. The death and injury rates on Texas highways for 2000 was 0.018 fatalities and 1.62 injuries per million vehicle-miles traveled (Texas Department of Public Safety, 2000). Applying these rates, the risk to the public from the increased employee traffic, assuming 15 miles in the project area per employee car (7.5 miles in each direction from the quarry to the main highways) would be:

(100 cars/day) x (15 miles round trip in affected area/car) = 1500 vehicle miles/day

(1.62 injuries/million vehicle-miles) x (1500 vehicle miles/day) x (250 days/year) = 0.61 injuries/year, and
(0.018 fatalities/million vehicle-miles) x (1500 vehicle miles/day) x (250 days/year) = 0.0068 fatalities/year.

As stated above, SEA preliminarily concludes that the combined risk of accidents to human health and safety is low enough to not be significant.

4.17.3 Water Resources

The proposed quarry has the potential to affect water resources in the area. SEA evaluated the cumulative impacts of the proposed new quarry and of the proposed rail line construction and

operation to surface water and groundwater. SEA preliminarily concludes that the cumulative impacts to water resources, including surface water and groundwater, would not be significant.

Surface Water

According to the 2001 BA, quarry excavations would not alter the course of surface water resources in the area (e.g., Elm Creek). The proposed quarry would be built in the topographically higher elevations of the project site. Because of this, only minor run-off water and water from direct rainfall would enter the area around the quarry. In addition, the use of Best Management Practices would prevent and control any stormwater run-off from the quarry site, as well as prevent the release of suspended sediment into local surface waters. Accordingly, no potentially significant adverse cumulative effects to water quality or surface waters resources in the proposed project area are expected as a result of the quarry.

Groundwater

All quarry-related construction activities would be regulated under the Edwards Aquifer Rule at Title 30 Texas Administrative Code Chapter 213. These rules are administered by the Texas Commission on Environmental Quality (TCEQ). Plans for regulated activities in Medina County are reviewed by TCEQ staff in the San Antonio Regional Office. Compliance with these rules would mitigate any potential impacts to the local aquifer. Given that construction and normal operations over the proposed rail line (any rail alternative) would result in little or no impacts to groundwater resources, SEA preliminarily concludes that cumulative impacts to groundwater resources and groundwater quality would not be significant.

4.17.4 Biological Resources

The quarry development and operation would have potential impacts to biological resources in the area. However, according to the 2001 and 2003 BAs, quarry operations would avoid riparian areas and there would be no impacts to aquatic biological resources. Moreover, the quarry will include establishing naturally vegetated corridors and buffer zones to minimize impacts to terrestrial biological resources.

Based on the 2001 BA, FWS determined that potential habitat for the endangered Golden-cheeked Warbler (GCW) existed within and adjacent to the quarry site. However, those areas with the highest potential to support GCW habitat (approximately 200 acres) are to be set aside as buffer zones and undisturbed wildlife preserve areas surrounding the quarry operations. FWS stated that it is not clear exactly how much of the total quarry property would remain undisturbed over the life of the quarry project, but estimates that as much as half of the tract could be set aside.

VCM initiated presence/absence surveys for Phase I of the BA for the GCW in the spring of 2001. Phase I encompasses the area shown in Figure 4.17-1. VCM plans to survey other areas of the quarry site in four other phases, pursuant to quarry development. Three years of surveys were performed within Phase I. Results from these surveys (2003 BA) were submitted to FWS in August of 2003. These surveys indicated that take[17] of GCW is not likely to occur on the quarry site because of lack of suitable habitat. FWS also recommended that VCM consider limiting clearing of vegetation on the quarry site to outside of the breeding season for the GCW (from March 1 to August 15) to further reduce the chance of take occurring incidental to quarry operations. FWS determined that, if VCM needed to clear vegetation during the breeding season, FWS should be contacted for further guidance. In addition, FWS indicated that VCM would need to conduct additional surveys for the future phases of quarry development prior to initiating quarrying activities in those areas.

VCM has indicated that additional surveys and coordination with FWS would be completed as appropriate. Therefore, in combination with the proposed action and the alternatives identified, significant cumulative impacts to protected species are not likely.

4.17.5 Air Quality

Various quarry operations would generate air quality impacts in the project area. These air emissions from quarry operations would require consistency with the State Implementation Plan (SIP) to ensure that emissions do not prevent the Medina County/San Antonio Metropolitan Area from attaining National Ambient Air Quality Standards (NAAQS). Moreover, VCM would need to apply to the Texas Commission on Environmental Quality (TCEQ) for an air permit for the construction and operation of the quarry.

Truck transport of aggregate from the quarry to local markets would affect air quality due to fugitive dust emissions and diesel combustion exhaust. See Section 4.7 for the methodology used to calculate these emissions and the significance criteria. As discussed below, the impacts are not expected to be significant.

Local truck transport would require 48 total truck trips daily (24 round trips) to transport aggregate from the proposed quarry site to nearby markets. Table 4.17-3 shows the results of calculations of fugitive particulate emissions from truck loading and transport in the project area.

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[17] Under the Endangered Species Act, "The term 'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct," 16 U.S.C. §1532 (19).

Table 4.17-4 provides a summary of the cumulative fugitive and mobile source emissions associated with the truck transport of the aggregate to service local markets and the proposed action.

The mobile source emissions of NO_x, CO, PM10 and HC from local truck traffic, as well as the additive sum from local truck traffic and the proposed action, are all below EPA's 10- ton per-year major emission-source thresholds for Title V permit applicability.

Table 4.17-3. Annual PM_{10} Emissions from Transport of Aggregate via Trucks Serving Local Markets

Emissions Summary	Truck (paved road)	
	lb PM_{10}	ton PM_{10}
Loading Emissions at Quarry	1,106	0.6
Road Emissions (Loaded)	73,628	36.8
Road Emissions (Empty)	16,908	8.5
Total	91,642	45.8

Table 4.17-4. Cumulative Emissions from Truck Transport of Aggregate to Local Markets and Proposed Action

Emission Summary	Truck	Proposed Action	Cumulative Emissions
	ton/year	ton/year	ton/year
NO_x Emissions	9.5	50	59.5
CO Emissions	36.9	28.5	65.4
HC Emissions	3.1	7.5	10.6
PM Emissions (mobile source)	0.2	2.6	
PM Emissions (fugitive)	45.8	27.7	
PM Emissions (total)	46.0	30.3	76.3

SEA preliminarily concludes that construction and operation of the proposed rail line, when combined with proposed quarry operations, would not have a significant cumulative adverse impact on air quality. The emissions from the local market truck traffic will be low, and construction and operation activities at the quarry will require a permit from TCEQ, thus assuring compliance will all relevant air quality standards.

4.17.6 Karst-Feature Impacts

The portion of the quarry site lying over the Edwards Aquifer Recharge Zone has the potential for karst features such as caves, caverns, and voids. In addition to the features that have been catalogued at the site through Vulcan's biological assessments, quarry operations including

blasting and excavation could potentially expose or damage caves or caverns that have not before been charted.

Actions that damage or otherwise affect karst features could impact both local water resources and biology. The destruction of caves, voids, and conduits would locally impact subsurface permeability and subsequent groundwater recharge to the underlying Edwards Aquifer. Subsurface voids could also provide habitat for several cave-adapted species of arachnids and insects protected under the Endangered Species Act that are known to inhabit caves in the region. See Table 3.4-1.

On a regional scale, impacts to inflows to the Edwards Aquifer would be minimal, because neither the quarry nor the portion of the proposed rail line over the Edwards Aquifer Recharge Zone represent a significant amount of recharge capacity.

Field surveys conducted by Vulcan within southern portions of the quarry have not found any surficial karst features that provide habitat for known threatened and endangered species. While quarry operations may expose previously uncharted voids, voids that do not communicate directly to the surface are not known to provide habitat for protected species. Therefore it is unlikely that impacts to voids with no surficial karst features during quarry operations or rail construction would impact protected species' habitat.

SEA believes that the quarry operation, when combined with the proposed action and alternatives, would not impact karst features in a way that would result in significant impact to either the Edwards Aquifer or to known threatened and endangered species.

4.17.7 Land Use

Development and operation of the proposed quarry would result in permanent alteration of the land use to the areas that would be mined.

The current land use is typically unimproved or minimally improved rangelands created by removal of woody plants. The U.S. Geological Survey (USGS) classifies land uses in the area of the quarry as: evergreen forest; cropland and pasture; and shrub and brush rangeland (USGS, 2001). The land within the proposed quarry area is low in agricultural value, and the U.S. Department of Agriculture Natural Resources Conservation Service does not classify this land as prime farmland. Currently, VCM is leasing the quarry property, and there are three homes within

½ mile of the proposed quarry operations. Impacts to uses of surrounding properties would be minimal due to proposed establishment of buffer zones, as described above.

As discussed in Section 4.10, construction and operation of the proposed rail line would have some adverse effects on land use, which could be reduced, but not entirely eliminated with appropriate mitigation measures. The potential impacts on land use from the quarry will be significant and permanent, nothwithstanding the planned buffer zone. Therefore, SEA preliminarily concludes that construction and operation of the proposed rail line, when combined with proposed quarry operations, would have cumulative impacts on land use.

4.17.8 Environmental Justice

The location of the quarry operation and the proposed new rail line are shown in Figure 2.1-2. The potential communities of concern (COC) for the quarry operation would be the same as for the proposed new rail line. As discussed in Section 4.11, SEA has determined that no environmental justice COC exists for the proposed new rail construction. The minority and low income characteristics of the census block groups having populations potentially affected by the proposed new rail construction and the quarry development and operation:

- Are not greater than 50 percent.
- Are not more than ten percentage points higher than the averages for Medina County.

Therefore, there is no potential for the proposed rail construction and operation, together with the proposed quarry development and operation, to contribute to disproportionately high and adverse cumulative human health or environmental effects on environmental justice COC.

4.17.9 Noise

Based on sound level measurements conducted at other quarries and rough acoustical calculations conducted at this quarry, sound levels from quarry operations, including rock drilling and rock crushing and processing, could impact adjacent residences. The degree of impact would depend on several factors specific to the quarry operations that are not available to SEA at this time. However, there would not be a cumulative significant impact at any residence along any of the rail alignments. The noise impacts experienced by these residences would either be from the quarry or from the rail line, but not from both.

Quarry operations would also include increased local traffic. SEA performed acoustical calculations in a similar manner as described for the no-action alternative in Section 4.12 and assessed the potential noise impacts from the increased local traffic to determine whether this traffic would increase the existing measured ambient sound levels. SEA determined that the increased local traffic would not appreciably increase the existing ambient sound levels. The methodology for this analysis is described below.

Therefore, SEA preliminarily concludes that construction and operation of the proposed rail line, when combined with proposed quarry operations, would not have cumulative noise impacts.

Methodology

According to SGR, the proposed primary route for trucks going to local market would be County Road 353 to FM 2676 heading west and County Road 353 to FM 2676 to FM 471 heading east. The Medina County Commissioner estimates that the existing average daily traffic (ADT) volume on County Road 353 is 40 vehicles (Medina County Commissioner 2003). SEA estimated that average vehicle speed would be 30 miles per hour (mph). Based on SEA's acoustic field observations, as verified by the County Commissioner, the vehicle mix was assumed to be 99.5 percent cars, 0 percent medium trucks, and 0.5 percent heavy trucks. TxDOT estimates that the existing ADT volume on FM 2676 is 610 vehicles (TxDOT, 2002). SEA assumed that the average vehicle speed would be 65 mph. The vehicle mix was assumed to be 99 percent cars, 0 percent medium trucks, and 1 percent heavy trucks. According to TxDOT, the existing ADT volume on FM 471 is estimated to be 1,950 vehicles (TxDOT 2002). The estimated average vehicle speed was assumed to be 65 mph. The vehicle mix was assumed to be 99 percent cars, 0 percent medium trucks, and 1 percent heavy trucks.

Local traffic related to the quarry would include 24 round-trips of heavy trucks to the local market (48 single trips) and approximately 100 employee cars (200 single trips). SEA assumed that increased local traffic would operate for a period of eight hours any time between the hours of 7:00 a.m. and 7:00 p.m. SEA assumed that County Road 353 would be paved and widened to accommodate the increase in local traffic. The estimated average speed on county roads was assumed to be 30 mph. SEA performed acoustical calculations to determine the Ldn at 50 feet from the centerline of each roadway. Sound levels at the closest receptors to the truck routes are summarized in Table 4.17-5.

A review of Table 4.17-5 shows that SEA calculated that the noise level from increased local traffic would range from 45 dBA Ldn to 51 dBA Ldn. Vehicular traffic noise would be 9 to 17 dBA Ldn below the measured ambient sound level. Therefore, the increased local traffic would not appreciably increase the existing ambient sound levels.

Table 4.17-5. Calculated Sound Levels from Increased Local Traffic at Measurement Locations

Measurement Location	Distance to Roadway (feet)	Measured Ldn (dBA)	Increased Local Traffic		
			Calculated Level (Ldn dBA)	Delta	Increase as a Result of the Project
CR 353					
ML2	214	57	46	-9	0
ML3	115	55	51	-4	0
ML4	265	56	45	-9	0
FM 2676					
ML4	368	56	46	-10	0
ML14	455	62	45	-17	0
CR 4516					
ML8	110	59	--	--	0

Delta is difference between Calculated L_{dn} and Measured L_{dn}.

4.17-10. Vibration

Operations at the quarry would generate ground-borne vibration from mechanical equipment and blasting. The degree of impact to residences and other structures would depend on several factors specific to the quarry operations that are not available to SEA at this time. Several commenters raised concerns about potential impacts to the Medina Dam from blasting operations at the quarry site. However, SEA believes that, because of the distance between the quarry and the dam, quarry blasting activities would not impact the integrity of the dam nor the integrity of any other structures outside the immediate area of the quarry site.

Rail operations on the quarry site over the two-mile loading loop or one-mile straight track would also generate groundborne vibration at the quarry site. However, the quarry and the rail line would not result in a cumulative significant impact at any residence or structure along any of the rail alignments. Because groundborne vibration is localized and occurs only close to the source, the impacts experienced by these structures would either be from the quarry or from the rail line, but not from both.

4.17.11 Cultural Resources

SEA preliminarily concludes that execution of the Programmatic Agreement, drafted pursuant to 36 CFR Part 800.14(b), would address any potential cumulative impacts to historic properties stemming from implementation of the proposed action. (See Appendix I-3.)

4.17.12 Socioeconomics

The quarry construction and operation would create new jobs in the project area in addition to the jobs generated by the rail line. The quarry would also yield an increase to the tax base in the county. This tax base could benefit local schools and other local services. Several commenters stated that the quarry would adversely affect the socioeonomics of the area in the following ways: 1) potential loss of income and/or revenue associated with subdividing and/or developing private properties; 2) loss of hunting revenues due to wildlife disruption; and 3) decrease in property values. SEA does not have the information to quantity these effects at this time, and therefore, cannot determine whether the overall impacts from the quarry construction and operation to the socioeconomics of the area would be beneficial or adverse. However, because the socioeconomic impacts from the proposed rail line construction and operation likely would be small, for the reasons discussed above in Section 4.16, SEA preliminarily concludes that the proposed action would not significantly contribute to socioeconomic impacts in the project area.

4.18 Indirect Impacts

Indirect impacts are those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. (See 40 CFR 1508.8.)

Impacts farther removed in distance. As discussed in Chapter 1, if the proposed rail line were not built, according to SGR, VCM would use trucks to transport the limestone aggregate from the quarry for the approximately seven miles to the UP rail line. Therefore, any impacts that are related to the proposed action and are farther removed in distance from the proposed project area would occur regardless of the proposed action and thus, would not be caused by the proposed action itself.

Impacts later in time. The Texas Historical Commission submitted a letter stating that because SGR would hold itself out as a common carrier to other shippers that may locate to the area in the future, a potential increase in area development should be assessed as an indirect impact of the proposed action. (See Appendix C.) However, as discussed above, aside from the proposed quarry (assessed as part of the cumulative impacts analysis), SEA has identified no

current proposals for other projects in the area. Thus, there is no way, based on the information available at this point, to predict whether there would be an increase in area development (other than that caused by the quarry itself) as a result of this project.

4.19 Unavoidable Adverse Impacts

This section summarizes the impacts that could not be completely mitigated by the measures that are set forth in Chapter 5, and SEA's preliminary conclusions regarding these impacts.

1. There would be train related noise.

   SEA's Preliminary Conclusion: As detailed in Section 4.12, SEA preliminarily concludes that the potential noise impacts from operations over the proposed route, Alternative 2 or Alternative 3 would not trigger the Board's thresholds for analysis. Nevertheless, SEA is recommending that the Board impose SGR's voluntary noise mitigation (a requirement that SGR use continuously welded rail). Operations over Alternative 1 would trigger the Board's thresholds at two measurement locations. But SEA is recommending that the Board not approve that alternative. Therefore, there are no additional noise mitigation recommendations in the Draft EIS.

2. Some residences may be adversely affected by the maximum sound level generated by train horns at grade crossings.

   SEA's Preliminary Conclusion: The proposed rail operations for SGR's rail line would be four train movements (two round trips) per day, and thus, noise from train horns would not appreciably increase the existing Day-Night Average Noise Levels (Ldn). Impacts from train horns would also be of short duration and would likely be sounded during daytime hours. SEA preliminarily concludes that potential impacts from train horns would not be significant.

3. Four trains per day would directly impact local traffic at grade level crossings. Each train would block an intersection at a grade crossing for approximately four minutes. During this period there would be some interference with traffic flow and possibly movement of emergency vehicles and school buses.

   SEA's Preliminary Conclusion: SEA generally does not quantify traffic delays at crossings where the average daily traffic (ADT) is less than 5,000 vehicles. SEA considers these crossings to have relatively few drivers who would experience the potential effects of train operations, and the associated vehicle delays would be minimal. All of the roadways that would be crossed by the proposed route or any of the alternative rail routes would have an ADT substantially less than 5,000 vehicles. FM 2676 is the busiest roadway that would be crossed, which has an ADT of 610 vehicles. Thus, due to the relatively low level of proposed train traffic (four trains per day – two round trips from the quarry to the UP rail line) and the relatively low level of

vehicular traffic, SEA preliminarily concludes that the potential traffic delays at the at-grade crossings of area roadways (approximately four minutes at each grade crossing) would not be significant.

4. There would be a risk to human health and safety from accidents from proposed train operations.

   SEA's Preliminary Conclusion: The risks of accidents from proposed train operations would be unlikely, due to the limited amount of proposed rail operations (four trains per day – two round trips from the quarry to the UP rail line), the relatively short length of the proposed rail line (the proposed route would be seven miles in length, Alternative 1 would be nine miles in length, Alternative 2 would be approximately miles in length, and Alternative 3 would be 7.5 miles in length), the relatively low level of vehicular traffic, and the relatively slow speed of proposed train operations (25 miles per hour). The risk of derailments would also be reduced due to the newness of the track and required track maintenance procedures.

5. Displacement of between 22 and 40 acres of current plant and wildlife habitats would occur as a result of the rail line and service roads.

   SEA's Preliminary Conclusion: SEA considers these impacts to be minimal, because existing agricultural activities in the area commonly result in land clearing that has similar impacts, and because the amount of habitat disturbed is a small percentage of the comparable plant and wildlife habitat in Medina County.

6. Conversion of 84 to 103 acres of land from existing land use to a rail line corridor. (Twenty-two of these acres would be used for the loading track on the quarry property.)

   SEA's Preliminary Conclusion: Construction and operation of the rail line under any of the proposed alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3) would have some adverse effects upon existing land uses in the proposed project area that could not be fully mitigated.

7. Adverse effects on cultural resources in the project area.

   SEA's Preliminary Conclusion: Construction and operation would have adverse effects to cultural resources within the areas of potential effect for all of the potential rail alignments (proposed route, Alternative 1, Alternative 2, or Alternative 3). However, the extensive proposed mitigation measures in the Programmatic Agreement would appropriately address adverse effects to cultural resources.

4.20 Short-Term Uses Versus Long-Term Productivity of the Environment

The Council on Environmental Quality's NEPA regulations require discussion of the short-term, or temporary, uses of the environment from a proposed action, as well as discussion of

effects on the long-term productivity of the environment. The temporary uses of the environment would result from the activities associated with construction of the proposed rail line, as discussed in the preceding sections of this chapter. The effects on long-term productivity of the environment would primarily be associated with the conversion of between 84 to 103 acres of land (twenty-two of these acres would be for the loading track on the quarry property) from existing land uses to rail line right-of-way, as discussed in more detail in Section 4.10.

4.21 Irreversible and Irretrievable Commitment of Resources

NEPA guidelines request that EISs address the irreversible and irretrievable commitment of natural resources. Land used for the construction of the proposed rail line right-of-way would commit that property to rail line use for as long as rail operations continued. However, if the rail line is no longer needed, the land could be converted to prior or other uses.