

6.0 RECOMMENDATIONS AND CONCLUSIONS

Pursuant to the provisions of the National Environmental Policy Act of 1969, 42 U.S.C. 4321 *et seq.*, the Surface Transportation Board's (Board) Section of Environmental Analysis (SEA) has conducted an environmental review of eight alternatives for Southwest Gulf Railroad's (SGR) proposed rail line construction and operation in Medina County, Texas. In this chapter, SEA sets forth its recommendations to mitigate potential impacts that could be caused by SGR's proposed rail line construction and operation, compares all eight alternatives being considered in the environmental review process for this proceeding (Proposed Route, Alternative 1, Alternative 2, Alternative 3, No-Action Alternative, Eastern Bypass Route, the MCEAA Medina Dam Alternative, and SGR's Modified Medina Dam Route), and preliminarily designates the Environmentally Preferable Alternative(s).

6.1 SEA's Recommendations for Mitigation

In the Draft Environmental Impact Statement (DEIS), SEA recommended 52 mitigation measures. Five of these mitigation measures were voluntary mitigation measures, meaning that SGR had volunteered this mitigation as part of its project development,¹ and 47 of the mitigation measures had been developed by SEA through its environmental analysis to date and its consultation with Federal, state, and local agencies and the public.² In response to the DEIS, commenters suggested that SEA modify several of the mitigation measures and requested that new or additional mitigation measures be recommended. SEA will respond to these comments in the Final Environmental Impact Statement (FEIS) and, in response to those comments, may change the mitigation recommended in the DEIS, as well as recommend additional mitigation measures.

¹ SEA encourages applicants to propose voluntary mitigation. Because applicants gain a substantial amount of knowledge about the issues associated with a proposed right-of-way during project planning and because they consult with regulatory agencies during the permitting process, they are often in a position to offer relevant voluntary mitigation. This mitigation may be more far reaching than the mitigation the Board unilaterally could impose.

² If the Board should issue a decision authorizing SGR to construct and operate its rail line, SGR would be legally obligated to comply with all of the mitigation measures imposed by the Board in its decision.

Based on the additional analysis presented in the preceding chapters of this Supplemental DEIS (SDEIS), SEA has recommended some new mitigation measures, as well as some modifications to the mitigation measures previously recommended in the DEIS. Below, SEA presents the 52 mitigation measures recommended in the DEIS,³ followed by the new or changed mitigation measures recommended in this SDEIS.

6.1.1 Voluntary Mitigation Measures Included in the DEIS

VM1. As agreed to by Southwest Gulf Railroad Company (SGR), SGR shall conduct all maintenance and fueling activities at the designated area off the Edwards Aquifer Recharge Zone. SGR shall ensure that the maintenance and fueling activities occur at a facility with secondary containment to meet the requirements of an approved Texas Commission on Environmental Quality Water Pollution Abatement Plan and a Spill Prevention, Containment, and Countermeasures Plan.

VM2. As agreed to by Southwest Gulf Railroad Company (SGR), SGR shall conduct appropriate hydrological modeling prior to beginning construction and shall incorporate the resulting design criteria into the design of the rail line to avoid or minimize adverse impacts to existing floodplain conditions. As part of this modeling, SGR shall:

- (a) Compile information regarding existing land use, topography, drainage features, impervious surfaces, and other information needed for the modeling effort.
- (b) Conduct additional surveying, as required, to obtain data related to existing channel geometry.
- (c) Coordinate with the Medina County Floodplain Administrator and the U.S. Army Corps of Engineers to discuss the project and address reasonable mitigation requirements.

³ Although some of these previously recommended mitigation measures may now contain dated information (for example, Mitigation Measure #2 in Section 6.1.3, states that Duke Energy is the owner of the active pipeline that would be crossed by any of the rail alternatives; as stated in Chapter 3, Texas FS is now the owner of that pipeline), SEA is presenting the conditions here as they appeared in the DEIS. Aside from the modified conditions being recommended in Section 6.2, any changes and modifications to the conditions recommended in the DEIS will be made in the FEIS.

- (d) Delineate the overall watershed and sub-watersheds and related drainage patterns corresponding to relevant points of interest.
- (e) Compile an existing-conditions hydrologic model, based on existing watershed characteristics and regional design storm information to determine the 2, 5, 10, 25, 50, 100, and 500-year design storm intensities and related stream or flood-flow rates for these recurrence intervals.
- (f) Develop existing-conditions hydraulic models of appropriate points of interest, such as stream crossings, so that the existing conditions-hydraulic model can be compared to the existing floodplain data.
- (g) Analyze the proposed bridges and other proposed structures on the rail line that may impact the floodplain and the watershed, producing a technical report addressing the estimated extent of the existing floodplains in the project vicinity and providing appropriate design criteria for minimum bridge openings, culvert locations and sizes, bridge lengths and low chord heights, bank stabilization, scour protection, and erosion control measures.
- (h) Design a Water Pollution Abatement Plan and a Stormwater Pollution Prevention Plan, and provide a narrative description of plans to mitigate water quality impacts during and after construction of the rail line.

VM3. As agreed to by Southwest Gulf Railroad Company (SGR), SGR shall use continuously welded rail for construction of the rail line.

VM4. 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.

VM5. As agreed to by Southwest Gulf Railroad Company (SGR), SGR shall control weeds and vegetation along its right-of-way, consistent with rail industry standards and the need to minimize fire hazards.

6.1.2 SEA's Recommended Mitigation in the DEIS

Transportation and Traffic Safety

1. Southwest Gulf Railroad Company shall conduct track safety inspections and maintenance in accordance with the Federal Railroad Administration standards set forth at 49 CFR Part 213, to detect potential problems and minimize derailment potential.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. Southwest Gulf Railroad Company (SGR) shall take into account maintenance of emergency response capabilities and school bus schedules in planning and executing the necessary roadwork 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.

8. 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.
9. 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.
10. 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.

Public Health and Safety

11. Southwest Gulf Railroad Company shall take appropriate measures to prohibit public access to the construction site during rail line construction activities.

Worker Health and Safety

12. 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.

Groundwater

13. Southwest Gulf Railroad Company shall develop a Stormwater Pollution Prevention Plan prior to initiating rail line construction activities and implement the measures in the plan during construction and maintenance activities.

14. Southwest Gulf Railroad Company shall use Best Management Practices during rail line construction and maintenance activities to minimize impacts of sediment runoff.
15. Southwest Gulf Railroad Company shall require construction contractors and maintenance crews to maintain their equipment in good operating condition to operate the equipment safely.
16. Prior to construction, Southwest Gulf Railroad Company shall develop a Spill Prevention, Containment, and Countermeasures Plan (SPCC) specifically for stream crossings and for portions of the route constructed over the EARZ. The SPCC plan shall include planning for flood conditions.
17. Prior to construction, Southwest Gulf Railroad Company shall develop a Water Pollution Abatement Plan.
18. During both construction and operation, Southwest Gulf Railroad Company shall monitor the stream beds, land, and water quality in the vicinity of the rail line for indications of diesel or gasoline releases, shall take appropriate action to prevent diesel or gasoline releases, and shall remediate any contaminated soils as soon as practicable.
19. Prior to initiating any rail line construction activities, Southwest Gulf Railroad Company shall develop a contingency plan to protect the health and safety of well owners should any contamination to wells occur as a result of rail line construction and operation.

Surface Water

20. Southwest Gulf Railroad Company shall use Best Management Practices during rail line construction, operation, and maintenance activities to minimize soil erosion and to reduce the potential for oil and fuel spills.
21. Southwest Gulf Railroad Company shall use Best Engineering Practices in the design of rail line stream crossings to avoid increasing floodplain width.
22. Prior to initiating any rail line construction activities, Southwest Gulf Railroad Company shall design and implement site-specific “scour and instability

countermeasures” to minimize local and downstream instability from stream crossings.

23. Prior to beginning construction on the portions of the rail line that encroach into the 100-year floodplain, Southwest Gulf Railroad Company shall comply with the reasonable requirements of the Federal Emergency Management Agency.
24. Southwest Gulf Railroad Company shall conduct a floodplain study, as described above, and shall obtain a Medina County Floodplain permit for each crossing prior to initiating any rail line construction activities.
25. Southwest Gulf Railroad Company shall obtain all required U.S. Army Corps of Engineers permits for stream crossings prior to initiating any rail line construction activities.
26. Southwest Gulf Railroad Company shall use environmentally-friendly solvents and/or absorbent pads to minimize ground contact by engine and oil cleaning materials.
27. Southwest Gulf Railroad Company shall repair and resurface its railroad tracks using manual resurfacing and switch-cleaning methods.
28. Southwest Gulf Railroad Company shall use manual vegetation cutting methods (rather than chemicals or herbicides) for weed control and other right-of-way clearing activities.
29. Southwest Gulf Railroad Company shall incorporate specific Best Management Practices into the Spill Prevention, Containment, and Countermeasures Plan to address the possibility of sediment runoff or diesel spills flowing into privately owned stock watering ponds.

Wetlands

30. Prior to initiating rail line construction activities, Southwest Gulf Railroad Company shall engineer its rail line spans across creek channels in such a way as to minimize impacts to wetlands and aquatic resources, and to avoid the placement of permanent fill material or structures within the ordinary high water mark of the channel.

31. Southwest Gulf Railroad Company (SGR) shall review the location of stock ponds along the right-of-way prior to developing final engineering plans for the rail line and attempt to avoid the ponds. When avoidance is not possible, SGR shall minimize impacts by incorporating adequate Best Management Practices in its Spill Prevention, Containment, and Countermeasures Plan.
32. Prior to initiating rail line construction activities, Southwest Gulf Railroad Company shall develop a plan to prevent erosion and sediment runoff from disturbed areas and shall implement the measures in its plan during construction. Any hay used for erosion control shall be certified weed free. Graded embankments shall not exceed a 4:1 slope. Runoff control measures shall be maintained until native vegetation has been established in all disturbed areas.

Biological Resources

33. During rail construction, Southwest Gulf Railroad Company shall avoid disturbing natural buffers contiguous to floodplains in order to prevent soil erosion and to preserve wildlife cover, food sources, and travel corridors.
34. During rail construction, Southwest Gulf Railroad Company (SGR) shall replace mature trees at a 3:1 ratio and shall monitor these replacement trees to ensure a survival rate of 80 percent. If the removal of old timber trees is unavoidable, SGR shall replace old timber trees at a ratio of 10 trees for each one lost and shall monitor these replacement trees to ensure a survival rate of 80 percent.
35. To protect migratory birds in the area, if construction activities take place during the March-August migratory bird nesting season, Southwest Gulf Railroad Company shall consult with Texas Parks and Wildlife Department to develop and implement measures to avoid impacts on nesting birds prior to initiating construction activities.
36. During rail construction, Southwest Gulf Railroad Company shall promptly reseed the native grasses on 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.

Air Quality

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

Land Use

39. Where construction of the rail line would cause unavoidable property severance, SGR shall negotiate with the appropriate landowner to ensure access to the severed property.

Noise

40. Prior to initiating construction activities, Southwest Gulf Railroad Company (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 to residences.

Vibration

41. Prior to initiating 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.
42. 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 a portable vibration-monitoring instrument that provides a calibrated record of local ground movement/accelerations.
43. 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.

Recreational and Visual Resources

44. 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.

Cultural Resources

45. 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.

Karst Features

46. Southwest Gulf Railroad Company (SGR) shall identify potential risk areas for sinkhole formation prior to construction along the two-mile loading loop or one-mile parallel loading tracks and the first 1,500 feet of rail line south of the loading loop (or loading tracks) and provide engineering alternatives to protect the rail line from future sinkhole development. SGR shall conduct its identification efforts by one of the following two methods:
 - a) If SGR identifies a significant void or cave during the grading and construction of the rail line, SGR shall undertake additional investigation by using qualified personnel to determine the potential risk of construction causing a sinkhole to develop; or
 - b) SGR shall use geophysical and geotechnical investigation to identify areas of sinkhole risk prior to construction. SGR shall further inspect any identified suspect voids by using 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, SGR shall identify and implement additional

hazard-mitigation efforts, such as 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 developing additional engineering controls to reinforce the rail line and to distribute the weight away from the void.

47. If Southwest Gulf Railroad Company (SGR) identifies a significant karst feature during the grading and construction of the two-mile loading loop or one-mile parallel loading tracks and the first 1,500 feet of rail line south of the loading loop (or loading tracks), SGR shall consult with a karst feature specialist and implement appropriate mitigation measures, including an inventory of caves for endangered species and complying with the reasonable requirements of the state of Texas for construction activities in the recharge and transition zones of the Edwards Aquifer.

6.1.3 SEA's New or Modified Mitigation Recommended in this SDEIS

Hazardous Materials/Waste Site and Existing Energy Resources

- 1A. Prior to initiating construction activities, Southwest Gulf Railroad Company shall survey the location of the transmission line poles and avoid them during the construction of the rail line right-of-way.

Wetlands

- 2A. Prior to initiating construction activities, Southwest Gulf Railroad Company (SGR) shall survey the location of privately owned stock ponds and irrigation systems within the project area. If avoidance is not possible, SGR shall minimize intrusion to these water bodies and to important sources to these water bodies to the extent practicable and shall consult with the U.S. Army Corps of Engineers to determine if a full wetland delineation study is required. In addition, SGR shall negotiate with affected landowners regarding the appropriate replacement of these stock ponds/irrigation systems. (This condition is a modification to Mitigation Measures #31 and #44 above, and would replace those conditions.)

Biological Resources

- 3A. Southwest Gulf Railroad Company shall consult with the U.S. Fish and Wildlife Service and the Edwards Aquifer Authority during final engineering of the rail line

and prior to beginning construction to ensure that the material used for the track, ties, and ballast does not pose hazards to the water quality of the Edwards Aquifer or species dependent upon the aquifer (e.g., use of ties not preserved with creosote).

- 4A. Southwest Gulf Railroad Company shall use only Vulcan Materials Company's existing Edwards Aquifer water rights or any other existing Edwards Aquifer water rights that may be acquired when using water from the Edwards Aquifer during construction, maintenance, and operation of the rail line.

Land Use

- 5A. Where construction of the rail line would cause unavoidable property severance, damage to a home or to an irrigation system, or property demolition and/or destruction, Southwest Gulf Railroad Company shall negotiate with the appropriate land owner(s) to ensure access to the severed property and/or replacement of the irrigation system, and, if appropriate, realign the track to avoid taking houses and/or to minimize the impacts. (This condition is a modification to Mitigation Measure #39 above, and would replace this condition.)

Noise

The following conditions would replace Mitigation Measure #40 above.

- 6A. Southwest Gulf Railroad Company (SGR) shall equip all noise-producing project construction equipment and vehicles using internal combustion engines with mufflers, air-inlet silencers, and other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. SGR shall equip mobile or fixed package equipment (e.g., arc-welders, air compressors) with shrouds and noise control features that are readily available for that type of equipment.
- 7A. Southwest Gulf Railroad Company shall comply with all applicable local, state, or Federal regulations that control the noise output produced by mobile or fixed noise-producing equipment during rail construction activities.
- 8A. Southwest Gulf Railroad Company shall use electrically-powered equipment instead of pneumatic or internal combustion powered equipment during rail

construction activities, where such equipment is available to perform the same function.

- 9A. Southwest Gulf Railroad Company shall minimize noise by locating material stockpiles, mobile equipment staging areas, parking areas, and maintenance areas as far as practicable from noise sensitive receptors.
- 10A. Southwest Gulf Railroad Company shall establish and enforce a 10 mile per hour construction site and 25 miles per hour private construction access road speed limits during the rail construction period.
- 11A. Southwest Gulf Railroad Company shall not engage in rail construction activities between 7:00 p.m. and 7:00 a.m. Monday through Saturday or at any time on Sunday or on Federal holidays. Exceptions may be made for emergency situations.
- 12A. Southwest Gulf Railroad Company shall use noise-producing signals, including horns, whistles, alarms, and bells for safety warning purposes only.
- 13A. Southwest Gulf Railroad Company shall ensure that no project-related fixed, mobile, or portable public address or music system is audible at any adjacent noise sensitive receptor, except for emergency purposes.
- 14A. To minimize wheel squeal, if a loop track is used, Southwest Gulf Railroad Company shall design a loop track with a radius greater than 1000 feet or 10 times the wheelbase of the largest car used on the tracks.
- 15A. Southwest Gulf Railroad Company shall provide a track lubrication system for a loop track to mitigate wheel squeal noise if such noise occurs.
- 16A. Southwest Gulf Railroad Company shall provide a movable point crossover (a crossover designed with a spring loaded piece to eliminate the noise producing gap) to mitigate excess noise from a crossover at the neck of a loop track (where the curved track reconnects with the tangent (straight) track).

Vibration

This condition would replace Mitigation Measures #41, 42, and 43, above.

- 17A. Southwest Gulf Railroad Company shall conduct a pre-construction survey to locate nearby wells and shall monitor the vibration levels at these wells during any pile driving activities related to rail construction to ensure that the peak particle velocity

limit of 2.72 inches per second in any axis (in either of the two lateral directions or in the vertical direction) is not exceeded during construction.

6.2 Comparison of Alternatives

The following subsections compare all eight alternatives being studied by SEA in the environmental review process for this proceeding. SEA provides summaries of the potential environmental impacts that could be caused by the construction and operation of each of the eight alternatives for each of the resource areas being evaluated.

6.2.1 Transportation and Traffic Safety

Table 6.2.1-1 presents a summary of the transportation and traffic safety impacts associated with the construction and operation of the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. Based on SEA's analysis, due to fewer county road crossings and a lower risk of accidents, construction and operation of Alternative 2 would cause the fewest impacts to transportation and traffic safety, followed by Alternative 3, the Proposed Route, the MCEAA Medina Dam Alternative, the Eastern Bypass Route, and Alternative 1. SGR's Modified Medina Dam Route would cause the most impacts to transportation and traffic safety of any of the rail line alternatives evaluated because of the number and types of roadway crossings. However, construction and operation of any of the rail line alternatives would not cause significant transportation and traffic safety impacts.

As discussed in Section 4.1.4 of the DEIS, because of the large number of trucks that would be added to area roadways under the No-Action Alternative, SEA believes that the No-Action Alternative would have significant, adverse impacts on the transportation infrastructure and traffic safety of the area, and that these impacts would be worse than the impacts resulting from the use of rail for the traffic at issue here.

Table 6.2.1-1. Transportation and Traffic Safety

Routes	Routes Studied in the DEIS				Routes Studied in the SDEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass	MCEAA Medina Dam	SGR's Modified Medina Dam	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Number of roads crossed (FM)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	---
Name of roads crossed (FM)	FM 2676 (P-S)	FM 2676 (P-S)	FM 2676 (P-S)	FM 2676 (P-S)	FM 2676 (P-S)	FM 2676 (P-S)	FM 2676 (P-S)	---
Number of roads crossed (CR)	6.0	7.0	4.0	5.0	6.0	5.0	7.0	---
Names of roads crossed (CR)	CR 454 (U), 4516 (P), 4512 (U), 365 (GS) 353 (2x) (GS)	CR 353 (GS), 365(GS), 4516 (P), 4517, 454 (U) 4545 (2x)	CR 353 (GS), 365 (GS), 4516 (P), 454 (U)	CR 353 (GS), 365 (GS), 4512 (P), 454 (U)	CR 353 (2x), 364, 4516, 4643, 454	CR 265, 461, 4516, 4643,454	CR 353 (2x), 366 (2x), 4516, 4643, 454	---
Number of roads crossed (private)	3.0	4.0	2.0	2.0	11.0	10.0	8.0	---
Total Number of Roads Crossed	10.0	12.0	7.0	8.0	18.0	16.0	16.0	---
Number of single truck trips/day	48.0 (loc trk mkt)	48.0 (loc trk mkt)	48.0 (loc trk mkt)	48.0 (loc trk mkt)	48.0 (loc trk mkt)	48.0 (loc trk mkt)	48.0 (loc trk mkt)	1700.0
Risk of accident/year at-grade crossings	0.22	0.25	0.16	0.19	0.22	0.19	0.25	---

Table 6.2.1-1. Transportation and Traffic Safety (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SDEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass	MCEAA Medina Dam	SGR's Modified Medina Dam	
Risk of injury/year at-grade crossings	0.08	0.09	0.05	0.07	0.08	0.07	0.09	---
Risk of fatality/year at-grade crossings	0.02	0.03	0.02	0.02	0.02	0.02	0.03	---
Risk of injury/year to human health & safety	0.05	0.06	0.05	0.05	0.06	0.07	0.07	2.60
Risk of fatality/year to human health & safety	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.10
Risk of injury/year (loc trk mkt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Risk of fatality/year (loc trk mkt)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Risk of injury/year (Employee Vehicles)	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Risk of fatality/year (Employee Vehicles)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Table 6.2.1-1. Transportation and Traffic Safety (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SDEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Vehicular Delay at each grade crossing (minutes)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	---
Transportation & Traffic Safety Impacts	Not Significant							Significant

CR – County Road
GS – Gravel Surface

FM – Farm-to-Market
P – Paved

U – Unimproved
P-S – Paved-State

loc trk mkt – Local truck market

- 1 SEA notes that commenters to the DEIS have suggested that SEA's calculations of vehicular delay times at at-grade crossings may not be accurate. SEA will respond to these comments and, if applicable, will provide updated vehicular delay time information in the FEIS.
- 2 Numbers have been rounded to the nearest hundredth.

6.2.2 Public Health and Safety

Table 6.2.2 presents a summary of the public health and safety impacts associated with the construction and operation of the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. The degree of potential environmental impacts caused by rail construction often relates to the length of the project, therefore, the Proposed Route, Alternative 2, and Alternative 3 would be slightly more favorable than the other rail alternatives because they are shorter. With appropriate mitigation, SEA does not anticipate that any alternative would cause significant public health and safety impacts. However, the No-Action Alternative could cause the greatest adverse impacts, due to the large number of trucks that would be needed to transport the aggregate, which would increase the risk for potential highway accidents.

Table 6.2.2-1 Public Health and Safety

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Criteria Air Pollutant Emissions from Construction	Short Duration							Short Duration
Chance of Train Collisions	Very small							----
Chance of Derailment	Very small							----
Public Health and Safety Impacts	Not Significant							Larger risk of accidents due to the large number of trucks

6.2.3 Hazardous Materials/Waste Sites and Existing Energy Resources

Table 6.2.3-1 presents a summary of the hazardous materials/energy resources impacts associated with the construction and operation of the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. SEA concluded that there is no risk of disturbing known hazardous materials or sites from the construction and operation of any of the rail alternatives or the No-Action Alternative and that the potential for disturbing undocumented sites is extremely low. The rail line alternatives would each cross one active natural gas pipeline right-of-way, as well as one high-tension transmission line

Table 6.2.3-1 Hazardous Materials/Energy Resources

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Number of hazardous waste sites (500 ft.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Number of hazardous waste spill sites (500 ft.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CERCLIS ⁴ sites (500 ft.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Impacts to energy resources	None							
High-tension transmission line ROW crossings	1.0	1.0	1.0	1.0	2.0	2.0	2.0	---

⁴ CERCLIS is the acronym for Comprehensive Environmental Response, Compensation and Liability Information System.

Table 6.2.3-1 Hazardous Materials/Energy Resources (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Number of gas pipeline ROWs	2.0	2.0	2.0	2.0	2.0	2.0	2.0	---
Number of active pipelines	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Hazardous materials/energy resources impacts	Not significant							

6.2.4 Worker Health and Safety

Table 6.2.4-1 presents a summary of the worker health and safety impacts associated with the construction and operation of the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. The risk of non-fatal injuries and fatalities from construction activities (during the entire construction period) associated with any of the rail alternatives and with the No-Action Alternative is very minor. However, the risk of non-fatal injuries and fatalities associated with operations (30-year operation life cycle) is greater for truck transportation under the No-Action Alternative than for any of the rail transportation alternatives.

Table 6.2.4-1 Worker Health and Safety

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Impacts from dust	Minor							Minor
Criteria air pollutant emissions from construction	Minor							Minor
Hazards associated with normal rail construction and operation activities	Minor							Minor
Chance non-fatal injuries related to construction (entire construction period)	Minor (1.5)							Minor Similar to rail alternatives
Chance fatalities related to construction (entire construction period)	Minor (less than 0.0005)							Minor Similar to rail alternatives
Fatalities related to construction and upgrade of roads	---	---	---	---	---	---	---	Not significant
Worker non-fatal injuries related to normal operation (30 years)	24	24	24	24	24	24	24	75

Table 6.2.4-1 Worker Health and Safety (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Worker fatalities related to normal operation (30 years)	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.22
Chance of worker injuries or fatalities	Not significant							
Worker health and safety impacts	Not significant							

Note : In the DEIS, SEA stated that the work force needed for construction activities under the No-Action Alternative would likely be larger than for the rail alternatives and the construction activities would be longer in duration. Based on additional information provided by SGR about possible road upgrades under the No-Action Alternative and information regarding construction of the truck-to-rail remote loading facility, SEA now believes that the work force for construction activities under the No-Action Alternative might not be larger than for the rail alternatives, and that construction activities would likely be completed in less time than would be needed for the rail line construction.

6.2.5 Water Resources

SEA preliminarily concludes that Alternative 1 would be the rail route that has the potential to cause the greatest adverse impacts to surface waters, since it would cross the greatest number of streamlines of higher order (five streamlines of orders 3 and 4). As discussed in Chapter 3, lower order crossings are easier to traverse without impact than higher order crossings. Crossings of lower order typically have fewer intermittent flows, and wider, more mature riparian zones. Alternative 2 and SGR's Modified Medina Dam Route would each have

four higher order crossings. The Proposed Route, Alternative 3, the Eastern Bypass Route, and the MCEAA Medina Dam Alternative would have the fewest higher order crossings (three each).

The MCEAA Medina Dam Alternative would cross the most streamlines of lower order (10 crossings of orders 1 and 2), followed by Alternative 3 (eight crossings of order 1 and 2), the Proposed Route (seven crossings of order 1 and 2), the Eastern Bypass Route and SGR's Modified Medina Dam Route (five crossings each of orders 1 and 2), and finally Alternatives 1 and 2 (three crossings of orders 1 and 2).

In terms of the amount of floodplain that would be crossed, the Eastern Alternatives (the Eastern Bypass Route, the MCEAA Medina Dam Alternative, and SGR's Modified Medina Dam Route) would cross less floodplain than the four rail line alternatives studied in the DEIS (the Proposed Route, Alternative 1, Alternative 2, and Alternative 3). The MCEAA Medina Dam Alternative would cross the least length of floodplain (3,996 feet), followed by SGR's Modified Medina Dam Route (4,335 feet), the Eastern Bypass Route (4,557 feet), the Proposed Route (6,220 feet), Alternative 2 (8,570 feet), Alternative 3 (9,970 feet), and Alternative 1 (12,220 ft). The Eastern Bypass Route would cross the floodplain only twice, while Alternative 2 would cross three times, the MCEAA Medina Dam Alternative and SGR's Modified Medina Dam Route would cross the floodplain four times, and the Proposed Route, Alternative 1, and Alternative 3 would cross the floodplain five times.⁵

Accounting for all the parameters discussed above, SEA preliminarily concludes that the Eastern Bypass Route would cause the fewest adverse impacts to surface water resources, closely followed by SGR's Modified Medina Dam Route, Alternative 2, the MCEAA Medina Dam Alternative, the Proposed Route, and Alternative 3. Alternative 1 would cause the greatest adverse impacts to surface water resources of all of the rail alternatives. The No-Action Alternative would cause more adverse impacts to water resources than the rail alternatives,

⁵ The floodplain lengths and number of floodplain crossings used for this comparison do not include the 4,080 feet of floodplain associated with the loading loop, as it did in the DEIS.

because non-point source pollutant deposits would be carried as runoff to the local stream flow network from the operation and maintenance of the large amount of truck traffic.

Table 6.2.5-1 presents a summary of the surface water impacts associated with the construction and operation of the seven rail route alternatives and the No-Action Alternative. The MCEAA Medina Dam Alternative would cross more intermittent streams/creeks (13 crossings) than any of the other six rail alternatives, followed by Alternative 3 (11 crossings), the Proposed Route (10 crossings), SGR’s Modified Medina Dam Route (9 crossings), Alternative 1 and the Eastern Bypass Route (8 crossings each), and then Alternative 2 (7 crossings).

Table 6.2.5-1 Surface Water Resources

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action	Loading Loop ⁶
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR’s Modified Medina Dam Route		
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---	2.0
Number intermittent creeks/streams crossed ⁷	10.0	8.0	7.0	11.0	8.0	13.0	9.0	---	2
Number watersheds crossed	5.0	6.0	5.0	3.0	5.0	5.0	5.0	---	1

⁶ The loading track would either be a two-mile loading loop or a series of one-mile parallel tracks. Because the exact configuration and location of the series of parallel tracks is not yet known, SEA has assessed impacts from the stream crossings of the loading loop configuration.

⁷ Total number of stream crossings for each alternative rail route include the two crossings for the loading loop.

Table 6.2.5-1 Surface Water Resources (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action	Loading Loop ⁸
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route		
Number main stem creeks/streams crossed (order 3 and 4) ⁹	3.0	5.0	4.0	3.0	3.0	3.0	4.0	---	0
Names of main stem creeks/streams crossed ⁹	Quihi Creek, Elm Creek, Polecat Creek	Quihi Creek, Elm Creek, Polecat Creek, Cherry Creek, Unnamed 2	Quihi Creek, Elm Creek, Polecat Creek, Cherry Creek	Quihi Creek, Elm Creek, Polecat Creek	Elm Creek, Polecat Creek, Quihi Creek	Quihi Creek, Elm Creek, Polecat Creek	Elm Creek, Polecat Creek, Quihi Creek (twice)	---	---
Number of low order stream crossings (order 1 and 2) ⁹	7.0	3.0	3.0	8.0	5.0	10.0	5.0	---	2
Number of floodplain crossing points	5.0	5.0	3.0	5.0	2.0	4.0	4.0	---	1

⁸ The loading track would either be a two-mile loading loop or a series of one-mile parallel tracks. Because the exact configuration and location of the series of parallel tracks is not yet known, SEA has assessed impacts from the stream crossings of the loading loop configuration.

⁹ Total number of stream crossings for each alternative rail route include the two crossings for the loading loop.

Table 6.2.5-1 Surface Water Resources (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action	Loading Loop ¹⁰
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route		
Floodplain length crossed ¹¹	6220.0	12,220.0	8570.0	9970.0	4557.0	3996.0	4335.0	---	4080.0
Surface water resources impacts	Not significant with appropriate mitigation							See below ¹²	Not significant with appropriate mitigation

Table 6.2.5-2 provides a summary of the potential impacts to groundwater resources from the construction and operation of the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. All rail alternatives would have an equivalent low risk of causing adverse impacts to groundwater resources. All rail alternatives would cross the same major and minor aquifers and would avoid areas that are environmentally unfavorable. Implementing SEA's recommended mitigation could further reduce potential impacts. The No-

¹⁰ The loading track would either be a two-mile loading loop or a series of one-mile parallel tracks. Because the exact configuration and location of the series of parallel tracks is not yet known, SEA has assessed impacts from the stream crossings of the loading loop configuration.

¹¹ In order to make the floodplain crossing comparison easier, the floodplain lengths shown in this table do not include the 4,080 feet of floodplain length crossed by the loading loop. In the DEIS, the floodplain lengths presented included the 4,080 feet associated with the loading loop.

¹² Greater impacts than proposed action because non-point source pollution deposits on roadways would be carried as runoff to local stream flow network. Maintenance activity on roadways would also impact water resources.

Action Alternative would have the greatest potential for adverse impacts to groundwater due to the increased truck traffic.

Table 6.2.5-2 Groundwater Resources

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action	Loading Loop ¹³
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route		
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---	2.0
Number of major or minor groundwater spring sites along or near the routes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	---	0
Number of major or minor aquifers crossed	2.0	2.0	2.0	2.0	2.0	2.0	2.0	---	2.0
Names of aquifers crossed	Edwards (artesian zone) and Leona Gravel Aquifers								
Construction impacts	Minimal								
Operational impacts	Minimal								
Avoids areas that are environmentally unfavorable	Yes								
Groundwater resources impacts	Not significant with appropriate mitigation								

¹³ The loading track would either be a two-mile loading loop or a series of one-mile parallel tracks. Because the exact configuration and location of the series of parallel tracks is not yet known, SEA has assessed impacts from the construction and operation of the loading loop configuration.

Table 6.2.5-3 provides a summary of the potential impacts to wetland resources that would be crossed by the seven rail route alternatives and the No-Action Alternative. Based on SEA's analysis, the alternatives were ranked from the least to the greatest impacts, according to the number of aquatic features crossed. The following conclusions summarize this analysis: Alternative 3 would have the least impacts of all the rail alternatives as it would not cross any aquatic features; SGR's Modified Medina Dam Route would cross one aquatic feature; the Proposed Route, Alternative 2, and the Eastern Bypass Route would all cross two aquatic features; Alternative 1 would cross three aquatic features; and the MCEAA Medina Dam Alternative would cross four aquatic features. The No-Action Alternative would not cross any aquatic features, but has the potential to add pollutants to nearby wetlands from maintenance and widening of roads and from the water that would be used to control dust emissions.

Table 6.2.5-3 Wetland Resources

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	Medina Dam Alternative	Modified Medina Dam Route	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Number of aquatic features crossed (NWI)	2.0	3.0	2.0	0.0	2.0	4.0	1.0	0.0
Construction impacts	Minimal							Road improvements could add pollutants to wetlands near existing streams.
Operation impacts	Not significant							Impacts could arise from dust emissions generated by truck traffic and possible water resources for controlling dust.

6.2.6 Biological Resources

Table 6.2.6-1 provides a summary of the potential impacts to biological resources from the construction and operation of the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. Based on SEA's analysis, the alternatives were ranked from those having the greatest impacts to those having the least. Each of the rail routes would cross habitat that is appropriate for the state listed species, the Texas Tortoise and Texas Horned Lizard; therefore, SEA used the total acreage that would be disturbed as the factor to compare the routes.

Due to the need for a remote truck-to-rail loading facility, a material stockpile site near the UP line and U.S. Highway 90, and necessary road widening, the No-Action Alternative would impact the greatest amount of potential habitat, which would total at least 125 acres (this acreage includes the 100 acres for the remote truck-to-rail loading facility and 25 acres for rail tracks needed to connect to the existing UP line) plus additional undetermined acreage for road widening that would further displace additional habitat. SGR's Modified Medina Dam Route would impact the second largest amount of potential habitat – 52.9 acres. The MCEAA Medina Dam Alternative would impact 48 acres, the third largest amount of potential habitat. These alternatives are followed by the Eastern Bypass Route (44.6 acres of impact to potential habitat), Alternative 1 (44 acres), Alternative 3 (34 acres), the Proposed Route (32 acres), and Alternative 2 (30 acres).

Table 6.2.6-1 Biological Resources

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Temporary displacement of biological habitat (acres) ¹⁴	64.0	82.0	62.0	68.0	89.2	96.0	105.7	---
Permanent displacement of biological habitat (acres) ¹⁴	32.0	44.0	30.0	34.0	44.6	48.0	52.9	125.0 (truck-to-rail remote loading)
Impacts from construction	Minimal disturbance to Texas Tortoise and Texas Horned Lizard Habitats							Additional permanent habitat displacement for road widening
Operation impacts related to potential of striking animals and risks from mowing and vegetation control	Minimal							Greater than for rail line alternatives
Sensitive plant communities (yes/no)	No							---
Sensitive wildlife resources (yes/no)	No							---
Threatened and endangered species	Not likely to adversely affect							---

¹⁴ These areas do not include the 22 acres of disturbance from the rail loading area.

Table 6.2.6-1 Biological Resources (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Disturbance to Texas Tortoise and Texas Horned Lizard habitats during operation	Minimal							
Biological Resources impacts	Not significant with appropriate mitigation						Not significant	

6.2.7 Air Quality

Table 6.2.7-1 provides a summary of the potential impacts to air quality from the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, SGR's Modified Medina Dam Route, and the No-Action Alternative. The air quality impacts are largely a function of the length of the route. Operations over the Proposed Route and Alternatives 2 and 3 would produce the fewest mobile source emissions, followed by Alternative 1, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, and lastly, SGR's Modified Medina Dam Route. However, operations over none of the rail routes would exceed 100 tons-per-year of any criteria pollutant, which is the U.S. Environmental Protection Agency's major emission-source threshold for Title V permit applicability and the threshold for significance that SEA used here.

Proposed truck operations under the No-Action Alternative would cause significantly greater air emissions from mobile sources, and would also produce significant air emissions from truck loading and unloading activities.

Table 6.2.7-1 Air Quality

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Mobile source emissions (NOx) (ton/year)	50.0	61.1	50.0	50.0	62.2	66.1	71.6	337.0
Mobile source emissions (CO) (ton/year)	28.5	34.9	28.5	28.5	35.5	37.7	40.9	1306.0
Mobile source emissions (PM) (ton/year)	2.6	3.1	2.6	2.6	3.2	3.4	3.7	8.4
Mobile source emissions (HC) (ton/year)	7.5	9.2	7.5	7.5	9.3	9.9	10.7	109.5
Rail loading emissions (PM) (ton/year)	27.7	27.7	27.7	27.7	27.7	27.7	27.7	---
Truck loading emissions-paved road (PM) (ton/year)	---	---	---	---	---	---	---	1316.01
Truck loading emissions-Non-paved road (PM) (ton/year)	---	---	---	---	---	---	---	3181.6
Construction impacts	Not significant							
Operation impacts	Minor							Significant

6.2.8 Geological Hazards and Soils

None of the seven rail alternatives would cross the Escondido formation outcrop where landslide hazards have the potential to occur. The Natural Resources Conservation Service (NRCS) reviewed all seven rail alternatives to determine impacts to prime farmlands. The Farmland Conversion Impact Rating (FCIR) prepared by NRCS for each of the rail alternatives indicates that no alternatives would significantly impact prime farmland soils in the area. Although Alternative 3 and the Proposed Route received slightly lower (better) FCIR scores

from NRCS, the MCEAA Medina Dam Alternative would impact the least acreage of prime farmland soil of any of the rail line routes.

6.2.9 Karst Features

As shown in Table 6.2.9-1, none of the alternatives studied would cause adverse impacts to karst features. The MCEAA Medina Dam Alternative would cross less area that is susceptible to karst feature development than the other rail alternatives.

Table 6.2.9-1 Karst Features

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam	SGR's Modified Medina Dam	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Sensitive karst features crossed within 1 mile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	---
Impacts to karst features with recommended mitigation	None							---
Karst features impacts	No impacts							No impacts

6.2.10 Land Use

Table 6.2.10-1 provides a summary of the potential impacts to land use from the seven rail alternative routes and from the No-Action Alternative. Due to its shorter length, Alternative 2 would disturb the least amount of land. However, the MCEAA Medina Dam Alternative would impact the least acreage of prime farmland soil, and Alternative 3 and the Proposed Route received the lowest FCIR (best) scores from the NRCS. The Proposed Route would cross the least number of properties not owned by SGR or its affiliates. Alternative 1 has the least number

of houses within 0.5 miles from the alignment while and within 1 mile of the alignment. The No-Action Alternative would cause the greatest impacts to land use. It would permanently alter the land use of approximately 125 acres of shrub and brush rangeland for the remote truck-to-rail remote loading facility and for the rail tracks needed for the UP connection, in addition to undetermined acreage associated with road widening and upgrades.

Table 6.2.10-1 Land Use

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Temporary area disturbed length x 80 ft ROW (ac), excluding loading track ¹⁵	64.0	82.0	62.0	68.0	89.2	96.0	105.7	---
Permanent area disturbed (ac), excluding loading track ¹⁶	32.0	44.0	30.0	34.0	44.6	47.9	52.9	125 (remote rail-to-truck loading facility and tracks, without including additional acreage for road widening)

¹⁵ Land use displaced does not consider the 22 acres associated with the rail loading area.

Table 6.2.10-1 Land Use (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Prime farmland soils impacted (NRCS) (ac) ¹⁶	48.6	77.2	59.2	48.4	48.0	35.0	69.0	79
Important farmland AD-1006 score (NRCS)	123.0	142.0	138.0	120.0	130.0	125.0	134.0	---
Total number of properties crossed according to Medina County Appraisal District	22.0	31.0	24.0	24.0	32.0	22.0	26.0	Creekwood subdivision is within 1 mile of remote truck-to-rail loading facility and 3 residences are within ½ mile from the facility
Number of properties crossed (not owned by SGR or affiliates)	10.0	20.0	18.0	16.0	32.0	22.0	26.0	---

¹⁶ SEA notes that NRCS used a 100 foot right-of-way to compute the amount of prime farmland acreage that would be impacted by each of the Eastern Alternatives, as opposed to the 80 foot right-of-way that was used to compute the amount of acreage that would be impacted by the other alternatives. While use of an 80 foot right-of-way could yield slightly different numbers in terms of acreage of prime farmland soils impacted by each of the Eastern Alternatives, these different numbers would not change SEA's overall results or conclusions.

Table 6.2.10-1 Land Use (Continued)

Routes	Routes Studied in the DEIS				Routes Studied in the SEIS (Eastern Alternatives)			No-Action
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Number of properties bisected by the rail line	11.0	23.0	23.0	23.0	32.0	22.0	26.0	---
Houses within 0.5 miles (based on updated 2004 aerials) ¹⁷	74.0	41.0	104.0	88.0	78.0	72.0	76.0	3.0 (remote loading facility)
Houses within 1.0 miles (based on updated 2004 aerials) ¹⁸	190.0	103.0	169.0	182.0	167.0	145.0	166.0	Creekwood subdivision
Adverse impacts that could not be fully mitigated	Potentially for all rail alternatives							Greater adverse impacts than any of the rail line alternatives

6.2.11 Environmental Justice

SEA determined that there are no environmental justice communities of concern within the project area, and thus, none of the alternatives would cause disproportionately high and adverse human health or environmental effects on environmental justice communities of concern.

¹⁷ The number of houses within ½ and 1 mile of each alignment presented in the DEIS were updated based on the most current aerial photography available (2004) and field visit verifications conducted in 2006.

6.2.12 Noise

As discussed in Chapter 4, construction and operation of Alternative 3 would cause the fewest noise impacts, followed by the Proposed Route. Alternative 2, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, and SGR's Modified Medina Dam Route would cause slightly greater noise impacts than Alternative 3 and the Proposed Route, but less than Alternative 1 and the No-Action Alternative. Potential noise impacts from construction and operation of Alternative 1 would be more than for any of the other rail line alternatives, although the No-Action Alternative would cause more noise impacts than any of the rail alternatives.

6.2.13 Vibration

Operations over Alternative 1 would cause vibration impacts to two houses. None of the other rail alternatives would create operations-related vibration impacts. Chapter 5 discusses the potential vibration impacts to cultural resources from operations over all of the rail alternatives and from truck traffic under the No-Action Alternative.

Conventional construction activities under any of the rail alternatives or the No-Action alternative would not cause vibration impacts; pile driving activities could cause impacts to water wells, though potential impacts would be reduced by SEA's recommended mitigation.

6.2.14 Recreation and Visual Resources

None of the alternatives studied would cause significant adverse impacts to recreation and visual resources. However, the increased truck traffic from the No-Action Alternative may be perceived as worse than any of the rail alternatives with respect to visual resources.

6.2.15 Cultural Resources

Table 6.2.15-1 summarizes all of the information that SEA has gathered concerning historic and prehistoric cultural resources in the region crossed by the rail alternatives and the No-Action Alternative. This table illustrates that Alternative 1 and the No-Action Alternative would have the most potential impacts on cultural resources. Alternative 1 would be located near many more known and suspected historic structures (over twice as many as any other alternative); it would intersect the largest acreage within two historic districts (including the core

of original Quihi), and it would cross the most amount of terrain that has high potential for containing archeological resources. The No-Action Alternative would likely have fewer archaeological impacts (because it would probably involve less ground disturbance than the rail alternatives), but it would have a greater impact on the historic districts due to extensive modification of the historic road network and the visual, vibration (depending on the distance from the roadway to the historic structures) and auditory effects of the high volumes of truck traffic.

Alternative 2 is ranked second highest in potential cultural resources impacts. Although it ranks fourth in total historic district acreage impacted, it is second in the number of individual National Register-eligible resources within the Area of Potential Effect (APE)¹⁸ and has higher potential to affect archaeological resources.

The Proposed Route and Alternative 3 are ranked third and fourth in potential cultural resources impacts. They both have relatively large areas within two historic districts, but they would be situated further east from the core of the Quihi Rural Historic District than Alternative 1 and Alternative 2, and they would encounter fewer individual National Register-eligible resources.

The Eastern Alternatives appear to have fewer cultural resource impacts than the original four rail routes studied. The Eastern Bypass Route is ranked fifth overall among the combined group. Although the SGR Modified Medina Dam route would have more acreage within the Upper Quihi Rural Historic District, the Eastern Bypass Route likely would have a greater impact because it would intersect an older portion of the district in relatively close proximity to two German-Alsatian farms and an historic road remnant. It also is more likely to include more prehistoric and historic archaeological sites.

¹⁸ The APE was defined as 1000 feet on either side of each alignment to coincide with the historic resources assessments that were completed for the Proposed Route, and Alternatives 1-3 (see DEIS, Section 3.11, Section 4.15, and Appendix I). Thus, the APE for each route is a corridor about 2000 feet in width.

SGR's Modified Medina Dam Route and the MCEAA Medina Dam Alternative are ranked the least likely of all the alternatives to have potential cultural resource impacts. The SGR Modified Medina Dam Route would cross FM 2676 and Quihi Creek in a portion of the landscape that has more modern landscape elements, such as more widely spaced farms, larger open fields, and fewer visual boundaries. The MCEAA Medina Dam Alternative would cross more archaeologically sensitive terrain than the SGR Modified Medina Dam Route, but it would skirt the northern and eastern margins of the Upper Quihi Rural Historic District.

Table 6.2.15-1 Cultural Resources

Routes	Rail Routes Studied in the DEIS				Rail Routes Studied in the SDEIS			No-Action Alternative
	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Eastern Bypass Route	MCEAA Medina Dam Alternative	SGR's Modified Medina Dam Route	
Historic Resources (within 1000 feet unless stated otherwise)								
Length (miles)	7.5	9.0	7.0	7.5	9.2	9.9	10.9	---
Known Prehistoric Sites within about 1000 feet (National Register eligible)	None	None	None	41ME133 (100 ft east)	None	41ME132 (1200 ft west)	None	---
Overall Ranking of Potential Archaeological Site Impacts (1=highest)	3	1	2	4	6	5	7	Possibly less impacts than rail alternatives
Known Historic Resources	7	22	10	8	7	5	8	---
National Register Listed Historic Resources	1	0	1	0	0	0	0	---
Total Acreage of Rural Historic District(s) Crossed	1169	1280	1161	1217	709	636	863	More impact on districts than rail alternatives
Overall Ranking of Cultural Resources Impacts	3	1	2	4	5	6	6	1

6.2.16 Socioeconomics

All of the alternatives studied would cause similar impacts to the socioeconomics of the region.

6.3 Environmentally Preferable Alternative(s)

SEA has conducted a thorough environmental review of seven rail line alternatives (the Proposed Route, Alternative 1, Alternative 2, Alternative 3, the Eastern Bypass Route, the MCEAA Medina Dam Alternative, and SGR's Modified Medina Dam Route) and the No-Action Alternative (the use of trucks to transport the limestone from VCM's quarry to the UP rail line), as presented in the DEIS and this SDEIS.

As outlined above in Section 6.2, SEA's analysis indicates that the No-Action Alternative has the potential to cause much greater environmental impacts than any of the rail route alternatives under consideration. Due to the large amount of truck traffic that would be needed to transport the limestone from the quarry to the UP rail line under this alternative (approximately 850 loaded and 850 empty trucks per day), the No-Action Alternative would cause significant adverse impacts on the transportation infrastructure and traffic safety of the project area, and would produce significant emissions of criteria air pollutants. The truck transportation also has the potential to cause more adverse impacts to groundwater and surface water from the non-point source pollutants (e.g., oils, greases, and rubber) that would be deposited on area roadways and carried as runoff into the local streamflow network. Moreover, the construction of the remote truck-to-rail loading facility that would be necessary under the No-Action Alternative would displace more potential biological habitat than would construction of any of the rail route alternatives, and visual impacts from the construction of this facility and from the operation of trucks could also be greater than if the proposed rail line were constructed and operated.

In addition, the truck operations would cause more adverse noise impacts. The No-Action Alternative would also have a greater impact on the historic districts due to roadway upgrades causing extensive modification of the historic road network and the visual and auditory effects of the high volumes of truck traffic. Thus, for all of the above reasons, SEA concludes

that the No-Action Alternative is less environmentally preferable than construction and operation of the proposed rail line under any of the rail alternatives.

Of the seven rail line alternatives that SEA has studied, it appears that Alternative 1 has the potential to cause the greatest environmental impacts. Alternative 1 would cross the most number of streamlines of higher order,¹⁹ as well as the most amount of floodplain. In addition, potential adverse noise impacts from operations over Alternative 1 would be greater than for any of the other rail alternatives, and operations over Alternative 1 would cause vibration impacts to two houses in the area. Construction and operation of Alternative 1 would also cause the greatest impact to cultural resources. This route would be located near many known and suspected historic structures, would intersect a large acreage within two historic districts (including the core of original Quihi), and would cross the most amount of terrain that has high potential for containing archeological resources. Thus, SEA concludes that Alternative 1 is the least environmentally preferable rail route alternative.

Comparison of the six other rail line alternatives is more complicated. The Proposed Route, Alternative 2, Alternative 3, and the Eastern Alternatives (the Eastern Bypass Route, the MCEAA Medina Dam Alternative, and SGR's Modified Medina Dam Route) would each have certain advantages and disadvantages over the other rail routes studied. Due to fewer county road crossings and a lower risk of accidents, construction and operation of Alternative 2 would cause the fewest impacts to transportation and traffic safety of any of the rail alternatives. Alternative 3 would have the fewest impacts to wetland resources, as it would not cross any aquatic features or stock ponds; Alternative 3 is also the one rail alternative that would not cause any adverse noise impacts to noise sensitive receptors from rail operations. The Proposed Route would cross the fewest number of private properties that are not owned by SGR or its affiliates.

All three Eastern Alternatives would have the potential to cause fewer impacts to cultural resources and the 100-year floodplain than the Proposed Route, Alternative 2, or Alternative 3.

¹⁹ Stream order is a method of numbering streams as part of a drainage basin network. The smallest unbranched mapped tributary is called first order; the stream receiving the tributary is called second order, and so on. Lower order streams typically have fewer intermittent flows, and wider, more mature riparian zones. Thus, lower order streams are easier to traverse without impact.

SGR's Modified Medina Dam Route and the MCEAA Medina Dam Alternative would cause the fewest impacts to cultural resources of any of the rail alternatives; the MCEAA Medina Dam Alternative would also be the least intrusive to the historic districts and would cross the least amount of floodplain. The Eastern Bypass Route has the potential to cause more cultural resource impacts than the other two Eastern Alternatives, but would have fewer floodplain crossing points. However, the Eastern Alternatives are all longer than the Proposed Route, Alternative 2, and Alternative 3 and thus, have the potential to cause proportionally greater environmental impacts in the areas of transportation and traffic safety, biological resources, air quality and land use.

Although the longer lengths of the Eastern Alternatives would result in greater environmental impacts than the Proposed Route, Alternative 2, and Alternative 3 in some resource areas,²⁰ as discussed throughout the DEIS and SDEIS, SEA believes that the majority of potential environmental impacts from the construction and operation of the proposed rail line under any of the alternatives would either be minimal or could be substantially reduced through SEA's recommended mitigation. Moreover, SEA does not believe that the increased impacts from the longer lengths of the Eastern Alternatives would be significantly different from the impacts that would be caused by the construction and operation of the Proposed Route, Alternative 2, or Alternative 3 (i.e., the differences in terms of transportation and traffic safety, biological resources, air quality and land use impacts would be minor).

On the other hand, as discussed in Chapter 5 of this document, SEA believes that the three historic districts, particularly the Quihi Rural Historic District, are a significant resource in the project area. Thus, the fact that the Eastern Alternatives would cause fewer impacts to cultural resources and would not traverse the boundaries of the Quihi Rural Historic District, suggests that the Eastern Alternatives are environmentally preferable to the Proposed Route, Alternative 2, and Alternative 3.

²⁰ The lengths of these six rail line routes are as follows: Proposed Route (about 7.5 miles); Alternative 2 (about 7.0 miles); Alternative 3 (about 7.5 miles); the Eastern Bypass Route (about 9.2 miles); the MCEAA Medina Dam Alternative (about 9.9 miles); and SGR's Modified Medina Dam Route (about 10.9 miles).

As stated above, aside from the potential impacts to cultural resources (specifically the Quihi Rural Historic District), SEA believes that the potential impacts from the construction and operation of the rail line under each of the alternatives that have been studied would generally be similar. Because all three of the Eastern Alternatives would avoid traversing the Quihi Rural Historic District, SEA has compared the Eastern Alternatives in terms of potential impacts to other resources to determine whether one or more of the Eastern Alternatives should be designated as the most environmentally preferable alternative at this time.

SEA's analysis shows that SGR's Modified Medina Dam Route would cause more impacts to transportation and traffic safety than the Eastern Bypass Route or the MCEAA Medina Dam Alternative, would require more higher order stream crossings, and is the longest of the Eastern Alternatives (which would cause slightly more environmental impacts in certain resource areas, as discussed above). Thus, SEA believes that SGR's Modified Medina Dam Route is the least environmentally preferable of the three Eastern Alternatives.

The Eastern Bypass Route would have fewer floodplain crossing points than the MCEAA Medina Dam Alternative, would cross fewer aquatic features, have fewer total stream crossings, and would be slightly shorter in length. On the other hand, the MCEAA Medina Dam Alternative would have slightly fewer impacts to transportation and traffic safety than the Eastern Bypass Route, would cross less amount of floodplain, would impact prime farmland soils to a lesser degree, would cross less area that is susceptible to karst feature development, would have less overall impacts to existing land uses, and would have slightly fewer impacts to cultural resources than the Eastern Bypass Route. SEA believes that based on all information to date, these distinctions are not sufficient to differentiate between these two routes and designate either the Eastern Bypass Route or the MCEAA Medina Dam Alternative as the environmentally preferable alternative. Thus, SEA is preliminarily designating both the Eastern Bypass Route and the MCEAA Medina Dam Alternative as the environmentally preferable alternatives out of the eight alternatives studied in the environmental review process for this proceeding. SEA specifically requests comments on this issue from all interested parties and the public and will assess these comments and make a final determination on environmentally preferable alternatives in the FEIS.