2.1.2 Growth Inducement

This section discusses the project's "land side" and maritime growth inducement potential, prepared by the POLB, related to the cargo capacity of the Ports and growth outside the ports in the adjacent communities.

2.1.2.1 Regulatory Setting

The CEQ regulations, which implement NEPA, require evaluation of the potential environmental consequences of all proposed federal activities and programs. The regulations also include a requirement to examine indirect consequences that may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 CFR 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

CEQA also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

City of Long Beach General Plan

In the project study area, land uses and future planned growth are designated by the City of Long Beach General Plan. The Long Beach Harbor area falls within General Plan Land Use District Number 12. This district includes existing freeways, the POLB, and the Long Beach Airport. The General Plan indicates that the water and land use designations within the harbor area are separately formulated and adopted by due process known as the Specific Plan of the Long Beach Harbor [also known as the PMP, as amended]. The General Plan indicates that the responsibilities for planning within legal boundaries of the harbor lie with the Board of Harbor Commissioners.

Port Master Plan

The PMP has nine designated land uses and four designated water uses consisting of:

- Primary Port facilities
- Hazardous cargo facilities
- Port-related industries and facilities
- Ancillary Port facilities
- Commercial recreational facilities
- Federal use
- Oil and gas production
- Utilities
- Non-Port-related areas
- Anchorage area
- Maneuvering areas
- Navigable corridors
- Recreational/sportfishing

The PMP Land Use Element has six goals for developing policies involving future POLB development and expansion. The goals are also shaped by the influences of the California Coastal Act, legislative grants of the Tide and Submerged Lands, City of Long Beach Charter, Municipal Code, and the City of Long Beach General Plan (POLB, 1999). The land use goals noted in this element include:

Goal 1: Consolidate similar and compatible land and water areas.

Goal 2: Encourage maximum use of facilities.

Goal 3: Improve internal circulation involving roadways and rail.

Goal 4: Provide for the safe cargo handling and movement of vessels within the Port.

Goal 5: Develop land for primary Port facilities and Port-related uses.

Goal 6: Protect, maintain, and enhance the overall quality of the coastal development.

The Land Use Element also provides a summary of long-range plans for cargo facility and infrastructure requirements to the year 2020. The long-range plans are informational discussions that would not be considered by the California Coastal Commission (CCC) as a submission for certification (POLB, 1999).

2.1.2.2 Affected Environment

The proposed project would provide a replacement surface transportation connection between Terminal Island, SR 710, and downtown Long Beach. Long Beach lies to the north and east of the existing Gerald Desmond Bridge, while the communities of San Pedro and Wilmington (both part of the City of Los Angeles) lie to the northwest and southwest, respectively.

The project site is located within the Port in an area zoned Port-related Industrial (IP). POLB owns most of this land; however, there are several relatively small privately owned and operated landholdings located in the Inner Harbor area and northernmost sections of the Port. Refer to Section 2.1.1.2 (Land Use, Affected Environment) for information about the three Planning Districts in the Long Beach Harbor that encompass the project site.

2.1.2.3 Environmental Consequences

Traffic Growth Inducement Methodology and Assumptions

The additional vehicle trips generated by planned transportation and land development projects (i.e., cumulative traffic growth) within the Ports and surrounding communities are included in the traffic forecasting model used for this study. Refer to Section 2.1.5 (Traffic and Circulation) for details on the development of the traffic forecasting model used for this study.

The traffic model used to develop the travel forecasts for development and growth in the region through the year 2030 is based upon the travel demand forecasting model developed for the Ports of Long Beach and Los Angeles Transportation Study (Ports Transportation Study). That model, completed in 2000, is based upon the SCAG Regional Travel Demand Forecasting Model. Elements of the SCAG heavy-duty truck model were used, as well as input data from the City of Long Beach model and the City of Los Angeles Transportation Improvement Mitigation Program models for Wilmington and San Pedro.

The year 2030 regional trip tables were developed using the SCAG 2030 regional trip tables. These regional trip tables were also augmented with focus area trips from non-port and port zones based on other major developments in the focus study area, as well as port trips based primarily on the Ports Transportation Study. The focus area and regional person trips were then converted into vehicle trips based on SCAG's trip distribution model, mode-split factors, and average auto-occupancy tables. The model was validated to 2005 base year conditions and used to project both year 2015 and year 2030 travel demand.

Land-side Direct Growth Inducement Potential: The North-side Alignment Alternative and the South-side Alignment Alternative (Bridge Replacement Alternatives) would not result in changes to zoning or land use designations that would have the potential to directly influence growth in the area. It is likely that adjacent areas would be utilized by the Port for marine terminals and infrastructure. These potential uses would compensate for the areas occupied by the new bridge and would represent additional land-side growth pressure. In effect, the Bridge Replacement Alternatives would not result in a greater amount of land available for redevelopment within the Port than that which exists today. Future Port development projects would be evaluated per the Port's Environmental Protocol and approved as required by the PMP, as amended.

The congestion relief benefits of the Bridge Replacement Alternatives would not likely be a direct cause of new vehicle trips (i.e., traffic growth) in the region because the bridge in and of itself is not the destination of vehicle trips. Rather, the congestion relief benefits of the Bridge Replacement Alternatives are expected to redirect traffic to the bridge to avoid other more-congested roadways. This redistribution could have the effect of freeing up capacity on other roadways within the vicinity of the Port. This redistribution of traffic is expected to increase traffic on the bridge. As discussed in Section 2.1.5 (Traffic and Circulation), the improvements provided by the proposed Bridge Replacement Alternatives would result in an estimated 9 percent more traffic (135,930 vpd) on the new bridge in year 2030 than would be on the bridge under the No Action/Rehabilitation Alternatives (124,670 vpd). The additional traffic, approximately 11,260 vpd, would likely be the result of motorists changing their paths rather than the result of additional trips associated with additional land development directly induced by the Bridge Replacement Alternatives; therefore, the Bridge Replacement Alternatives would not be a direct cause of traffic growth.

Land-side Indirect Growth Inducement Potential: The proposed bridge replacement project likely would indirectly induce growth. When considered in the context of future cumulative development that is likely to occur within the Ports and surrounding communities, the traffic congestion relief benefits associated with the Bridge Replacement Alternatives would have the potential to indirectly influence growth as a result of more-efficient or improved access to and from areas within the Port and surrounding communities. Indirectly induced growth associated with future land development could result from the traffic congestion relief benefits provided by the new bridge and the lessening of congestion on other roadways within the vicinity of the Port as more vehicles utilize the bridge as a preferred route. Thus, the proposed new bridge would reduce future traffic congestion that might otherwise serve to limit future development or cargo movement potential. This type of growth is highly speculative; therefore, it is extremely difficult to quantify in an urban environment that is already developed. In terms of land-site acreage, there are limited opportunities for additional development beyond what is already included in the land use forecasts used in the traffic forecasting process. The Ports themselves are assumed to reach build-out before year 2030. Any indirectly induced growth that involved a new project would be subject to the regulatory process at the time that it occurs.

It is possible that the improved access to and from areas within the Port could also contribute to more intense use of existing cargo terminals. The key question is whether the new bridge would have the potential to cause a greater amount of cargo to be brought in the Port than would otherwise occur with the existing bridge left in place. The amount of cargo brought into the Port directly influences the volume of truck and train trips needed to carry away the cargo to its ultimate destination. The maximum amount of cargo that can be accommodated by the Ports is directly related to the capacity of the marine terminals. The capacity of the Ports container terminals is generally considered to be a function of the following:

- The size and configuration of the wharfs and backland storage yards
- Labor practices
- The type and quantity of yard equipment
- The type of containers (imports/exports/ empties and intermodal/local)
- The size distribution of the ships calling at the terminals

The maximum Ports container cargo capacity is estimated to be 42 million TEUs, which will be reached between years 2020 and 2025 based on projected market demand. The estimated capacity of the Ports would not be directly affected by the Bridge Replacement Alternatives. The market demand for goods would be neither directly nor indirectly affected by bridge replacement.

Because the truck traffic associated with the maximum capacity cargo volumes (42 million TEUs) has been provided to SCAG and is incorporated in SCAG's RTP, the regional transportation system already takes into account the estimated capacity of the Ports.

The new bridge would result in travel time savings (2.2 minutes per truck in both directions [Port of Long Beach Traffic Model]) for trucks moving the cargo. This reduction on one small segment of the global distribution network is not likely to cause a shipper to shift cargo to POLB or POLA from other ports. The 2.2-minute savings is a negligible part of the total cargo transit time from manufacturer to the ultimate destination, which is measured in days (typically ranging from 9 to 15 days) (*Pacific Shipper Magazine,* 2006).

The *Port and Model Elasticity Study* (Leachman & Associates, 2005), which was prepared for SCAG, and supplemental analyses conducted by SCAG indicate that a container fee of under $200 per forty-foot equivalent unit (FEU), combined with transportation congestion relief projects, would not alter shipper supply chain logistics. Another study, *Cargo on the Move through California* (Energy and Environmental Research Associates, 2006) prepared for the Natural Resources Defense Council (NRDC) concluded that a $30 container fee for capital improvements would not result in the diversion of cargo. The estimated value of time for goods movement estimated by SCAG in their supplemental diversion study analyses indicates that the time savings for the proposed replacement bridge could equate to approximately $2.66 per trip. Given the thresholds of elasticity estimated in the aforementioned studies, it is reasonable to assume that supply cost savings of $2.66 would not result in the shifting of cargo from other ports.

The Port has concluded that the reduction in traffic congestion and the improved efficiency and enhanced capacity resulting from the Bridge Replacement Alternatives and the relatively small savings in overall cargo transit time attributable to the new bridge would not provide a meaningful incentive for shippers to divert their cargo from other ports to the POLB/POLA; however, it is not possible to predict whether the improved and enhanced access to and from areas of the Port would have other indirect effects on the intensity of cargo movement through existing Port terminals. Some of the factors that suggest there is unlikely to be an increase in cargo movement as a result of the new bridge and roadway improvements include (1) the capacity of the Ports' container terminals generally is limited by factors other than the surrounding roadway system, such as berth capacity, backland capacity, crane capacity, and terminal gate capacity; (2) the market demand for goods traveling through the Ports would be neither directly nor indirectly affected by bridge replacement; and (3) the potential travel time savings is not sufficient to induce the shifting of cargo from other ports. Nonetheless, to be conservative, this DEIR/EA assumes there is a potential for indirect growth inducement associated with the Bridge Replacement Alternatives and that the Bridge Replacement Alternatives could result in some level of growth-related adverse effects on the environment. Quantifying any such effects would be highly speculative and is made more difficult by the fact that the project is occurring in an urban environment and port complex that are already highly developed with very limited opportunities for additional development. For this reason, while the potential for growth inducement in cargo movement is identified as a possible impact of the roadway improvements associated with the bridge replacement project, the effects are too speculative to reliably evaluate and essentially remain unknown.

It is also important to note that future development growth within the Port and surrounding communities is planned for in the PMP and the City of Long Beach General Plan. In addition, the additional vehicle trips generated by planned transportation and land development projects (i.e., cumulative traffic growth) within the Port and surrounding communities are included in the traffic forecasting model used for this study.

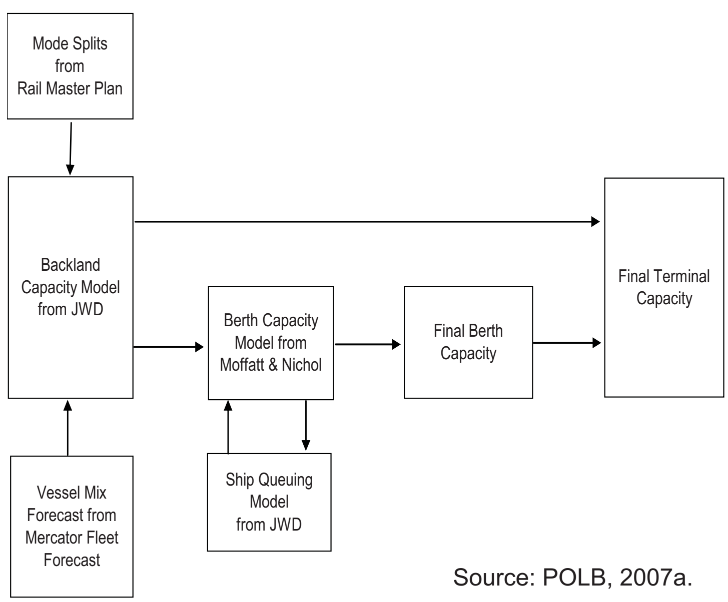
Maritime Growth Inducement Potential

Container Terminal Capacity

The key question in assessing the potential for the Bridge Replacement Alternatives to induce port growth is whether the additional 44 ft (13.4 m) of clearance for ships passing under the bridge will lead to more cargo being handled by the terminals upstream of the bridge. In other words, if the current bridge height had served as a constraint on cargo throughput at those upstream terminals, then the removal of that constraint would be “growth inducing.”

The Port’s process for determining the capacity of any Port container terminal begins by estimating the terminal’s backland throughput capacity. Given this estimate, a collection of vessels that can accommodate that throughput is determined from a container fleet forecast. The physical constraints of the terminal (e.g., wharf length, channel width, or air draft) will be accommodated by the selected vessels. The selected vessels are assigned an arrival schedule that is assessed for acceptable LOS at the berth, measured by the expected probability of queuing. Port terminal capacities reflect existing, known development and expansion plans.

Exhibit 2.1.2-1 summarizes the process for calculating container terminal capacity.



Source: POLB, 2007a.

Exhibit 2.1.2-1
Marine Terminal Capacity Flow Chart

Backland Capacity

JWD Group (an engineering consulting group that specializes in marine planning capabilities) developed a spreadsheet model used by ports nationwide to calculate maximum container-yard capacity for a given existing or planned terminal.

Key model variables include the size of the storage area, how the containers are stored (i.e., chassis versus grounded) and how long the containers remain in storage. Container storage and dwell times[4], in turn, are largely a function of where the container is destined and whether it is loaded with cargo. Tables 2.1.2-1 and 2.1.2-2 provide a list of assumptions about the types of containers handled and various backland operations that feed into the model.

The model uses these inputs along with the size of the container yard and expected split of cargo among the various container types (Table 2.1.2-1) to estimate the overall capacity of the yard.

Table 2.1.2-1
Detailed Container-Type Assumptions for Calculating Backland Capacity

Container Type	Mean Dwell Time (days)	% Wheeled	Mean Stack Height
Import local load	4.0	10	3.5
Import on-dock intermodal load	2.0	10	3.5
Import off-dock intermodal load	1.5	10	3.5
Export local load	6.0	5	3.5
Export on-dock intermodal load	6.0	0	3.5
Export off-dock intermodal load	6.0	10	3.5
Import empty	NA	NA	5.5
Export empty	7.0	5	5.5

Source: POLB, 2007e.

Berth Capacity

The number and size of vessels expected to call at the terminal are taken from the San Pedro Bay distribution of vessels forecast for 2020. This forecast is taken from the 2005 fleet forecast prepared by Mercator Transport Group (MTG). This fleet forecast is designed to accommodate San Pedro Bay's expected 2020 container cargo (identified as the "Base-Case Scenario" in the MTG study). The projected fleet will be a representative subset of the San Pedro Bay fleet capable of handling the container yard capacity throughput.

An initial projected fleet is developed by selecting a diverse collection of ships from the 2020 Mercator distribution that can handle terminal throughput approximately equal to the estimated container yard capacity. (In certain cases, the collection of services for a given terminal may have an expected annual capacity greater than the capacity of the terminal's container yard.) This fleet is input to the Moffatt & Nichol (M&N) berth capacity model to determine if the initial fleet can be accommodated at the wharf. The model considers the overall length of each ship, the number of containers discharged and loaded, and various assumptions about berth operations to estimate how long each vessel will remain at berth and how much berth space it will use.

Table 2.1.2-2
Utilization Rate and Static Density Assumptions for Calculating Backland Capacity

Utilization rate for stocked storage area	1/ (peak/mean)	85%
Maximum wheeled utilization	–	90%
Wheel shape efficiency factor	–	80%
Slot density for wheeled storage	TEU slots per acre	50
Slot density for top and side pick (T/SP)*	TEU slots per acre	100
Slot density for rubber tire gantry (RTG)*	TEU slots per acre	115

* Stacks of loaded containers to be handled by RTGs; Stacks of empty containers to be handled by T/SP.

Source: POLB, 2007.

The vessel distribution produced from this process is then evaluated to determine the probability of vessel queuing using JWD's terminal resources model. If the vessel distribution *exceeds a queuing probability of 5 percent,* then the distribution will be modified by adjusting the mix of vessels to find a combination of weekly services that can accommodate the container yard capacity throughput while avoiding a queuing expectation of 5 percent or greater. These modified vessel schedules may no longer be representative of the overall distribution of vessels forecast for San Pedro Bay; however, the POLB fleet should remain as close to representative of the San Pedro Bay total as possible.

[4] Dwell Time: The number of days that a ton of cargo remains in port.

The need for calculating queuing probability stems from the fact that a terminal wharf cannot be occupied 100 percent of the time (i.e., its theoretical capacity). To the extent that ship arrival times will vary, a certain amount of useable wharf will need to remain unoccupied for a period of time to avoid unacceptable ship queuing. JWD's terminal resources model calculates this queuing probability using vessel call schedules developed from the M&N model and empirical data on the frequency and length of time that container vessels calling San Pedro Bay arrive late due to weather and other factors.

Overall Capacity

Comparing the berth capacity to the container yard capacity reveals where terminal capacity constraints arise, the greater constraint will dictate the overall constraint of the terminal. A berth-constrained terminal has a container yard capacity greater than the berth capacity (i.e., the berth cannot accommodate the vessel activity required to deliver the entire throughput that the container yard could handle). A container yard-constrained terminal has a berth capacity greater than the capacity of the storage yard (i.e., the terminal's berths will be underutilized because the container yard cannot handle all of the containers that could be moved over the wharf).

Maritime Growth Inducement Potential: The existing Gerald Desmond Bridge is approximately 156 ft (47.5 m) above the Back Channel at MHWL. Given the size and type of existing and planned marine terminals located north of the Gerald Desmond Bridge, only the existing Pier A and the planned Pier S container terminals are potentially affected by the Bridge Replacement Alternatives. This is because the only other container terminal north of the Gerald Desmond Bridge is Pier C, which is a small facility leased by Matson Navigation Company primarily for its Hawaii trade, which does not warrant the use of larger container vessels. The other terminals north of the bridge are bulk or automobile terminals serviced by different types of vessels for which the height of the current Gerald Desmond Bridge is not expected to be a limitation in the foreseeable future.

The Port's pilots can navigate under the bridge with a minimum 3-ft (1-m) overhead clearance for their vessels. Accordingly, this guideline limits ships to a height, or air draft, of approximately 153 ft (46.6 m) (POLB, 2005a). Air draft is defined as the height of a vessel from the keel to the antenna, minus its draft in the water. The actual draft of a container vessel varies depending on the cargo it carries. Generally this variation ranges from the design draft, or the draft associated with what the vessel is expected to carry, to the scantling draft, or the draft at maximum possible load.

The projected capacities of Piers A and S are approximately 2.1 and 1.4 million TEUs, respectively. These capacities were calculated using a computer modeling system developed for the Port in 2005 by JWD Group and M&N. Key model factors include the amount of container yard acreage, length of the wharf, and size of the ships expected to call at the terminal. A projection of the San Pedro Bay container fleet was prepared in 2005 for the Ports by MTG. Table 2.1.2-3 shows the distribution of all vessels by TEU capacity expected to call at the two ports by year 2020.

Table 2.1.2-3
San Pedro Bay 2020 Vessel Forecast

Vessel Size Categories (TEUs)	Number of Weekly Services
1000-1099	1
2000-2999	9
3000-3999	10
4000-4999	23
5000-5999	16
6000-6999	15
7000-7999	12
8000-8999	11
11000-11999	11
Total	108

Both Piers A and S would be capable of handling any forecasted vessel above if there were no navigational constraints; however, the expectation is that ships in the largest size category would not likely call at Pier S given that in year 2020 Pier S would be one of the smallest container terminals in San Pedro Bay. Excluding Pier C, the San Pedro Bay Ports will have 13 container terminals, but they project only 11 weekly services of the largest vessels (see Table 2.1.2-3). Because not every terminal will have a weekly service of the largest vessels, it is highly unlikely that these vessels will call at a smaller terminal such as Pier S.

Given the current plans for Pier A, which for the purpose of this analysis was assumed to include the 30 acres (12 ha) of the old Wilmington Rail yard to the east that currently are not part of Pier A, the facilities are constrained by the size of the container storage yard (i.e., the berth can accommodate more cargo than the container storage yard can handle). Table 2.1.2-4 shows a projected fleet for Terminal A that provides cargo flows equal to container yard capacities. The projected fleet is consistent with the overall San Pedro Bay fleet distribution, as well as the assumption that Pier A would be able to receive the largest vessels.

Table 2.1.2-4
Pier A Vessel Forecast at Capacity – No Navigational Constraints

Vessel Size Categories (TEUs)	Pier A	
	Number of Weekly Services	Annual TEUs
1000-1099	–	–
2000-2999	–	–
3000-3999	–	–
4000-4999	1	173,160
5000-5999	–	–
6000-6999	1	509,860
7000-7999	1	596,440
8000-8999	–	–
11000-11999	1	822,510
Total	4	2,101,970

Without the proposed bridge replacement project, it is assumed that the weekly service by vessels in the 11,000 to 11,999 TEU size category would not service Pier A due to air draft constraints; however, it should be noted that the Gerald Desmond Bridge is not the only navigational constraint for Piers A and S. As identified in the Port's Pier S Marine Terminal and Back Channel Navigational Safety Improvements Project, navigational safety concerns would require the Port to widen the navigable width of the channel to approximately 315 ft (96 m) at a minimum and maximum water depth of 52 ft (15.8 m) and 54 ft (16.5 m), respectively, at mean lower low water (MLLW). Even with the proposed bridge replacement, the largest ship that would be able to navigate the channel safely would be between 8,000 and 8,999 TEUs. Larger vessels would require a wider channel and deeper water, which are not considered feasible or cost effective for the foreseeable future; however, this growth inducement analysis considered larger ships in case the channel constraints are removed in the future.

Table 2.1.2-5 shows that a distribution of ships from the current San Pedro Bay fleet can provide terminal throughput within the capacity of Pier A and is not substantially constrained by the existing bridge height. According to the Port's model, which calculates each vessel's time at berth and factors in periodic late ship arrivals, even with the two additional weekly services, there would be no ship queuing problem. Based on this modeling, it does not appear that the Bridge Replacement Alternatives will meaningfully enhance terminal capacity at Pier A even though they facilitate larger ships calling at the terminal. In other words, even though the height constraint on larger ships getting into the Back Channel would be removed with the Bridge Replacement Alternatives, this does not appear to translate into substantially more cargo being handled through Pier A. Thus, raising the height of the bridge does not appear to serve to generate meaningfully more container throughput than would occur without the project. Based upon the modeling shown in Tables 2.1.2-4 and 2.1.2-5, it is possible that there would be some modest increase in throughput. This potential increase in throughput would likely have environmental effects typically associated with cargo transport. The effects would typically include additional truck, train, ship, and cargo

Table 2.1.2-5
Pier A Vessel Forecast at Capacity – Air Draft Constraints

Vessel Size Categories (TEUs)	Number of Weekly Services	Annual TEUs
1000-1099	–	–
2000-2999	–	–
3000-3999	1	211,640
4000-4999	2	346,320
5000-5999	1	384,800
6000-6999	1	509,860
7000-7999	1	596,440
8000-8999	–	–
11000-11999	–	–
Total	6	2,049,060

handling equipment operational emissions and cumulative contribution to greenhouse gases (GHGs) and additional effects on the Port, City, and State roadways to accommodate potential additional truck trips to move the additional throughput into the State and national distribution networks. Because predicting the level of any such increase in throughput is speculative, further analysis of the environmental impacts associated with any possible increase cannot be performed. This is consistent with the recommendation of CEQA Guidelines 15145 and NEPA.

No Action/Rehabilitation Alternatives

Under the No Action/Rehabilitation Alternatives, the Gerald Desmond Bridge would continue to operate in its existing configuration. There would be no changes in land use or zoning, no changes to the existing surface transportation system or terminal cargo capacity in the vicinity of the existing bridge, no congestion relief associated with additional traffic capacity on the bridge, and no travel time savings achieved. As such, there would be no potential for the No Action or Rehabilitation Alternatives to directly or indirectly induce growth in the project area.

2.1.2.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.