

LSA ASSOCIATES, INC.
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DRAFT ENVIRONMENTAL IMPACT REPORT
ALAMITOS BAY MARINA REHABILITATION PROJECT
CITY OF LONG BEACH

APPENDIX J
TRAFFIC IMPACT ANALYSIS

CONSTRUCTION TRAFFIC ANALYSIS

ALAMITOS BAY MARINA REHABILITATION PROJECT
LONG BEACH, CALIFORNIA

This traffic study has been prepared under the supervision of
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Signed _____



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October 2009

CONSTRUCTION TRAFFIC ANALYSIS

ALAMITOS BAY MARINA REHABILITATION PROJECT
LONG BEACH, CALIFORNIA

Submitted to:

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A: CONSTRUCTION SEQUENCE AND EQUIPMENT USAGE

ALAMITOS BAY MARINA REHABILITATION PROJECT CONSTRUCTION TRAFFIC ANALYSIS

LSA Associates, Inc. (LSA) has prepared the following analysis to identify potential construction traffic impacts resulting from the Alamitos Bay Marina Rehabilitation project in the City of Long Beach (City). The project includes reconstruction and upgrading of the Alamitos Bay Marina (Marina) docks, slips, parking areas, and restrooms; none of which are anticipated to significantly affect existing traffic conditions. Implementation of the proposed project would result in the loss of 321 slips, and any changes in the patterns of use at the Marina are expected to be negligible as a result of the proposed rehabilitation. Therefore, the long-term traffic levels resulting from operation of the proposed project are not anticipated to significantly change. Although the proposed project itself would not generate new vehicle trips, implementation of the project would generate a temporary increase in traffic volumes during construction activities. The purpose of this report is to provide an analysis of potential construction traffic impacts to the local street network.

EXECUTIVE SUMMARY

The proposed Alamitos Bay Marina Rehabilitation project would renovate the existing Marina facilities in Basins 1 through 7 by providing upgraded Americans with Disabilities Act (ADA)-compliant facilities and the following: (1) maintenance dredging of the Marina basins to original design depths; (2) replacing and/or upgrading 13 restrooms along with their associated water and sewer laterals; (3) repairing the sea wall where necessary; (4) completing dock and piling replacement; (5) replacing the pavement in the Marina parking lots; and (6) the construction of an approximately 600-foot (ft) long dock located adjacent to Basin 4 at the southeast corner of the Long Beach Yacht Club. The dock includes a 200 ft temporary section that would accommodate boaters during the renovations and would be removed upon project completion.

Based on preliminary analysis, dredging activities would require mitigation for potential impacts to marine eelgrass. The City has identified a site adjacent to the northeast shore of Marine Stadium to convert to an open space/habitat mitigation site (see Figure 2). This mitigation habitat area will therefore be analyzed as part of the project.

The project is anticipated to be completed in 12 phases over approximately 6 years and includes two construction staging areas: one located in the parking lot on Marina Drive near Basin 2; and one located in the parking lot on Marina Drive adjacent to the Marina Shipyard near Basin 3.

Based on the analysis herein, the addition of construction trips associated with the Alamitos Bay Marina Rehabilitation project would not exceed the capacities of the surrounding roadway network.

Basins 1 through 7 currently contain 1,967 slips. The proposed project includes construction of 1,646 slips, resulting in the loss of 321 slips. However, each of the existing 1,430 customers would continue to be provided with a boat slip after project implementation. The proposed project would exceed the City's parking requirement of 0.75 parking spaces per boat slip (i.e., 1,235 spaces for 1,646 slips)

with a parking supply of 2,524 spaces. Therefore, the project would not result in inadequate parking capacity.

INTRODUCTION

The City is considering a project that would renovate the existing Marina amenities and enhance the existing recreational boating facilities within Alamitos Bay. The project encourages boating use by providing upgraded ADA-compliant facilities, new docks and slips, upgraded restrooms, and dredged basins to ensure safe navigation. The Marina facilities are operated by the City of Long Beach Marine Bureau and are primarily accessible from Pacific Coast Highway (PCH) and 2nd Street. The Marina location is shown in Figure 1.

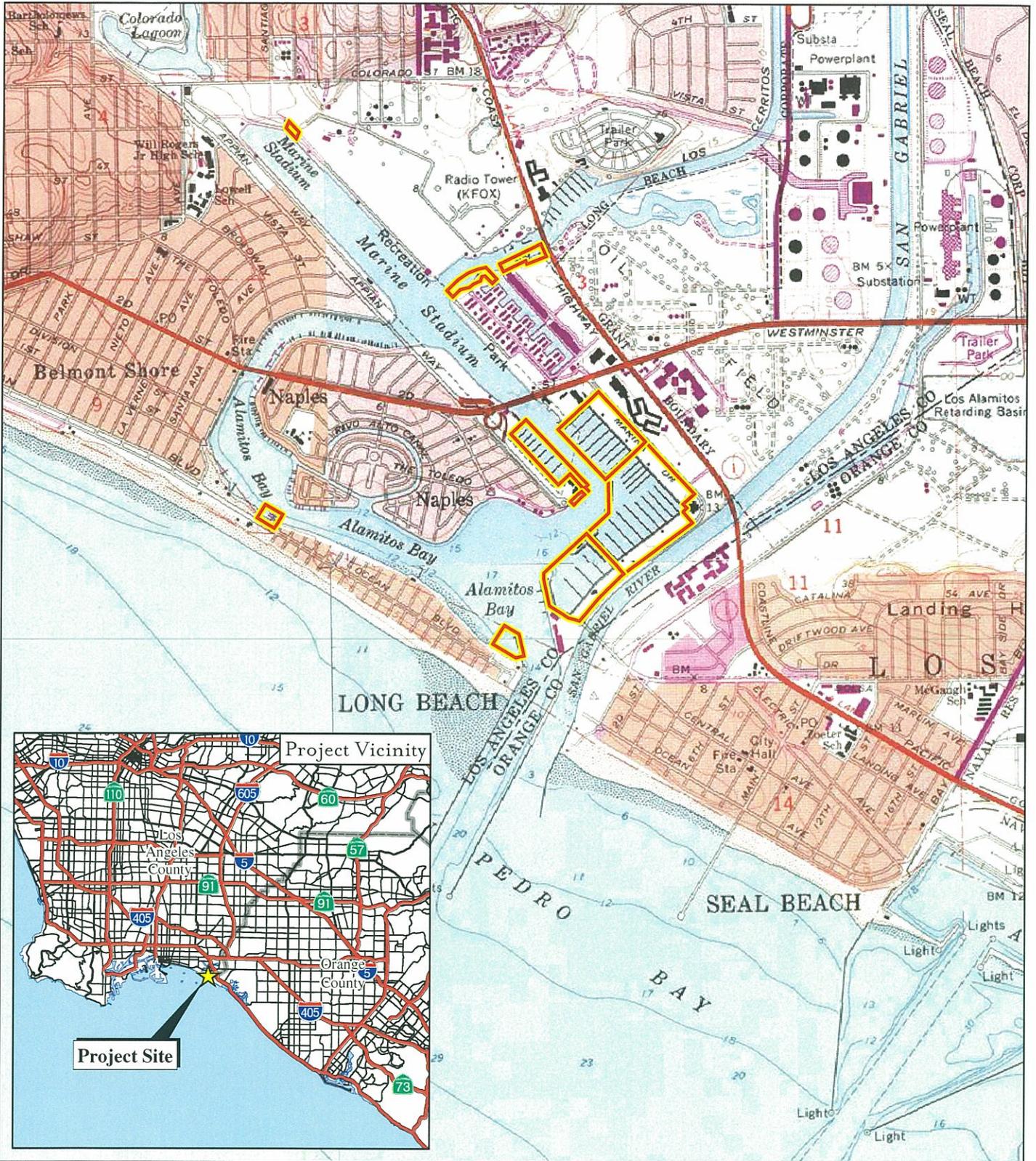
The Marina comprises eight basins; however, the proposed project includes renovations only to Basins 1 through 7. Basin 8 is not part of the project and it is not included in this analysis. The basin locations are illustrated in Figure 2. Basins 1 through 3 are located adjacent to Marina Drive south of 2nd Street; Basin 4 is located along Appian Way adjacent to the Long Beach Yacht Club on the southeast corner of Naples Island; Basin 5 is located adjacent to the Alamitos Bay Yacht Club on Ocean Boulevard; Basin 7 is located northwest of Basin 5 on Ocean Boulevard. Basin 6 comprises two separate areas known as Basin 6-North (Basin 6-N) and Basin 6-South (Basin 6-S). Basin 6-N is located adjacent to the Marina Pacifica Mall on PCH. Basin 6-S is located southwest of Basin 6-N at the northernmost end of Marina Pacifica Drive.

PROPOSED PROJECT IMPACTS

Construction Impacts

The construction operation for the Marina rehabilitation project is anticipated to last for a period of 72 months over 12 phases (approximately 6 months per phase). Each phase involves the removal/installation of gangways and docks, pile removal, seawall and riprap repair, dredging, restroom construction (either rehabilitation or new construction), rerouting of utilities, and parking lot repaving. Phase 1A includes excavation and construction of the open space/habitat mitigation site and will occur concurrently with Phase 1. The detailed construction sequence and equipment usage data for each of the 12 phases is provided in Appendix A. Construction staging areas would be located in one of two locations: one located in a parking lot on Marina Drive near Basin 2; and the second located in a parking lot on Marina Drive near Basin 3, adjacent to the Marina Shipyard.

Commercial and industrial waste resulting from construction, remodeling, repair, and demolition operations would be required to be transported by truck to be disposed of at Class III landfills such as the Puente Hills Landfill, which is the closest Class III landfill. Dredge materials from all Marina basins, except a portion of Basin 1, will be barged to an ocean disposal site (known as LA-2) and would not generate any truck trips. However, due to high levels of mercury discovered during preliminary sampling, approximately 25,504 cubic yards (cy) in Basin 1 will need to be trucked off site and disposed of at an approved landfill, confined aquatic disposal site, or upland confined disposal facility. The analysis prepared for the Environmental Impact Report (EIR) has assumed a worst-case scenario wherein the materials will be trucked to Kettleman Hills Hazardous Waste Facility, a commercial chemical/hazardous waste site located in Kings County, California.



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 Project Locations

FIGURE 1



0 1000 2000
FEET

SOURCE: USGS 7.5' QUAD - LONG BEACH (81), LOS ALAMITOS (81), SEAL BEACH (81); CALIF.

E:\TSY0701\GIS\Fig1.mxd (5/26/2009)

Alamitos Bay Marina Rehabilitation Project
Project Location Map



LSA
 LEGEND
 Project Locations



SOURCE: DigitalGlobe (4/08); TBM (2008); City of Long Beach (2008, 1/09)
 F:\sy0701\GIS\BasinLocations.mxd (5/26/2009)

FIGURE 2

Alamos Bay Marina Rehabilitation Project
 Alamos Bay Marina Basin Locations

Construction materials would be delivered to one of the two construction staging areas. From there, the construction materials required for renovation of each basin would be loaded onto construction vessels and delivered via the waterway. Similarly, the dock systems would be craned into the water and floated to the appropriate basin during each phase. Therefore, delivery of construction materials would result in truck trips only to the staging areas and not to each individual basin.

Table A indicates the total number of construction truck trips during a typical phase, as well as truck trips for the open space/mitigation site and Phases 2 and 3, which require off-site trucking of Basin 1 dredge materials. The truck trips are based on construction phasing and implementation information provided by the City's Marina Rehabilitation Project Manager, TranSystems, and includes the following assumptions:

Table A: Construction Truck Trips by Phase

Project Phase	Delivery Trucks	Removal Trucks
Typical 6-month Phase (Phase 1, 4-12)		
Remove existing gangways, docks, and piles		9
Install new gangways, docks (inclusive of temporary dock), and piles	48	
Dredge Basin (no truck trips associated with dredging for these phases)		
Seawall repair, restroom and utility rehabilitations, and parking lot repaving	52	9
Total	100	18
Phase 1A (Open Space/Eelgrass Mitigation Site)		
Demolish and remove excavated materials		585
Total	0	585
Total, Phases 1 and 1A	100	603
Phase 2		
Remove existing gangways, docks, and piles		9
Install new gangways, docks (inclusive of temporary dock), and piles	48	
Dredge Basin 1, remove contaminated materials		718
Seawall repair, restroom and utility rehabilitations, and parking lot repaving	52	9
Total	100	736
Phase 3		
Remove existing gangways, docks, and piles		9
Install new gangways, docks (inclusive of temporary dock), and piles	48	
Dredge Basin 1, remove contaminated materials		718
Seawall repair, restroom and utility rehabilitations, and parking lot repaving	52	9
Total	100	736

- During each 6-month phase (approximately 26 weeks), a total of 52 general material deliveries occur, resulting in an average of 2 trucks (4 truck trips [2 inbound and 2 outbound]) per week.
- On average, the transport of the docking system requires 3 to 6 truck loads every other week for 6 to 8 weeks. This results in a maximum of 48 docking delivery trucks per phase, or an average of fewer than 2 trucks (4 truck trips) per week.

- Off-site hauling is anticipated to be 6 loads occurring 1 to 3 days during each phase. This results in 18 trucks (36 truck trips) per phase, or fewer than 2 trucks (4 truck trips) per week.
- The excavated materials from the open space/habitat mitigation site are based on a 20-ton truck and will require 585 trucks (1,170 truck trips).
- The removal of 25,504 cy of contaminated Basin 1 dredge material will occur over both Phases 2 and 3 of the proposed project and will require a total of 718 trucks per phase (1,436 truck trips).

Based on preliminary construction plans and information provided by the City of Long Beach Marine Bureau and TranSystems, approximately 32 construction workers will be on site per day during each phase of the project. These workers will add 64 daily passenger car trips (32 inbound in the morning and 32 outbound in the evening). Worker commute trips will not add a.m. or p.m. peak-hour trips to construction traffic because the workers will arrive on site by 7:00 a.m., before the 7:00 a.m.–9:00 a.m. peak period, and will depart by 4:00, prior to the 4:00 p.m.–6:00 p.m. peak period. Because Phase 1A will occur concurrently with Phase 1, the workers and vehicle trips are included in the estimated trips for Phase 1.

Because of their larger size and limited maneuverability, the roadway impact of a single truck with five axles is approximately equivalent to two passenger cars. Therefore, when calculating vehicle trips, each truck trip was assumed to have a passenger car equivalent (PCE) of two trips. Construction truck trips will be similar for most phases of the project, with the exception of the open space/habitat mitigation site and Phases 2 and 3. Based on the truck trips assumptions described above and included in Table A, a total of 118 trucks are expected during the typical 6-month (26-week) construction phase, resulting in an average of 4–5 trucks per week. Therefore, an average of one truck (2 truck trips [4 PCE]) per day, with a maximum of one truck trip (2 PCE) during the a.m. peak hour, is estimated to occur during a typical construction phase.

Construction truck trips associated with Phase 1A (the open space/habitat mitigation site) for excavation of soils and earth materials are estimated to total 585 truckloads over a duration of 1.5 months (33 days, applying the City of Long Beach County Standard of 22 work days per month), or an average of approximately 18 trucks (36 truck trips [72 PCE]) per day, with a maximum of 9 trucks (18 truck trips [36 PCE]) in the a.m. peak hour. None of these haul trips would occur during the p.m. peak-hour period of 4:00–6:00 p.m. since excavated materials would most likely be disposed of on the same day and would need to arrive at their destinations by early- to mid-afternoon. Similar to the other basins, no delivery truck trips would occur at this site; delivery of construction materials to this location would be via the waterway from one of the construction staging areas.

During Phases 2 and 3, the 1,435 truck trips required to remove contaminated dredge materials from Basin 1 would occur over 12 months (264 work days), resulting in an average of approximately 6 truck trips (12 PCE) per day occurring in the a.m. peak-hour period. Similar to a typical construction phase, additional general deliveries for Phases 2 and 3 are estimated to be one truck (2 truck trips [4 PCE]) per day, with a maximum of one truck trip (2 PCE) during the a.m. peak hour. The estimated daily trip generation for the project is presented in Table B.

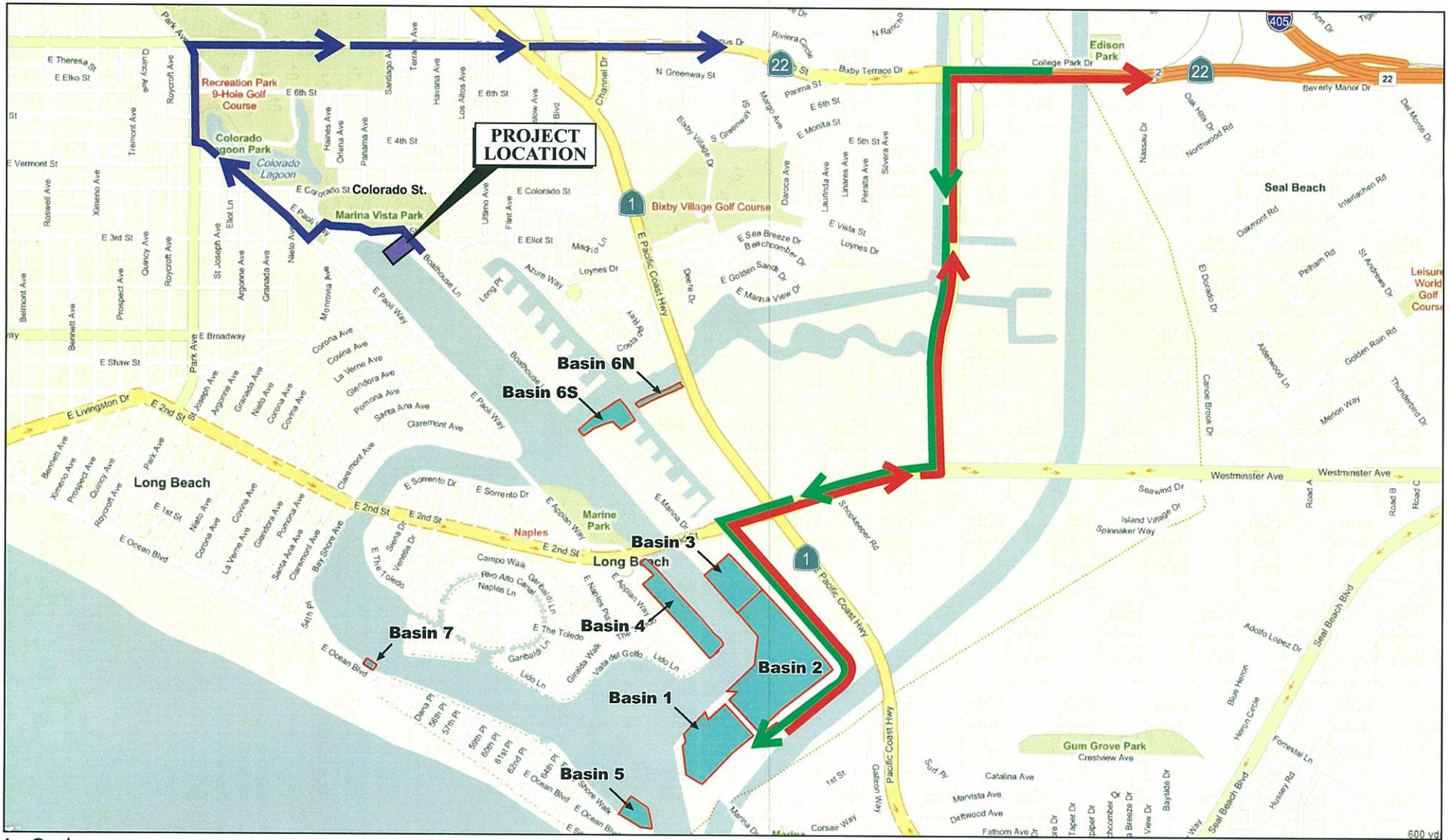
Table B: Project Trip Generation

Generator	Vehicle Trips			PCE Trips		
	ADT	AM Peak Hour	PM Peak Hour	ADT	AM Peak Hour	PM Peak Hour
Typical Phase (Phase 1, 4-12)						
Construction Workers ¹	64	N/A	N/A	64	N/A	N/A
Trucks	2	1	N/A	4	2	N/A
Total	66	1	0	68	2	0
Phase 1A – Habitat Mitigation Site						
Construction Workers	N/A	N/A	N/A	N/A	N/A	N/A
Trucks	36	18	N/A	72	36	N/A
Total	36	18	0	72	36	0
Phases 1/1A Combined	102	19	0	140	38	0
Phase 2						
Construction Workers	64	N/A	N/A	64	N/A	N/A
Trucks	14	7	N/A	28	14	N/A
Total	78	7	0	92	14	0
Phase 3						
Construction Workers	64	N/A	N/A	64	N/A	N/A
Trucks	14	7	N/A	28	14	N/A
Total	78	7	0	92	14	0

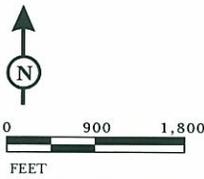
¹ Workers arrive by 7:00 a.m. and depart by 4:00 p.m. Trips are based on one person per vehicle
ADT = average daily traffic N/A = not applicable PCE = passenger car equivalent

Construction Haul Routes. The docking systems will be transported to the project site via delivery trucks from Dixon, California to Alamilos Bay and would travel south on Interstate 405 (I-405), west on State Route 22 (SR-22), south on Studebaker Road, west on 2nd Street, and then south on Marina Drive into the project site. The docking systems would be unloaded at one of the two staging areas off Marina Drive. The docking systems, as well as all other construction materials, will be delivered to the staging area and subsequently craned into the water and floated to the appropriate basin locations, as required by phase. It is assumed that trucks delivering general construction materials would enter the project area via a similar route, primarily utilizing Studebaker Road, 2nd Street, and Marina Drive. The locations of the basins and the corresponding construction routes are illustrated in Figure 3.

Demolition material and debris from gangways, docks, restrooms, and road debris will be transported by truck to be disposed of at Class III landfills such as the Puente Hills Landfill, which is the closest Class III landfill. Removal trucks destined for the Puente Hills Class III Landfill will initially leave the project site from one of the two staging areas located in the Marina parking lots on Marina Drive.



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- Project Area
- Open Space/Habitat Mitigation Site
- To Landfill Facilities
- From Concrete Float Facility
- Removal Truck Route

FIGURE 3

Alamos Bay Marina Rehabilitation Project EIR
Construction Haul Routes

SOURCE: Microsoft, Bing Maps, 2009
 I:\TSY0701B\G\Const Haul_v2.cdr (9/21/09)

Similar to the delivery of construction materials, construction debris from each phase will be taken via the waterway from the Basins to the construction staging area, where it will be loaded onto trucks for removal. The exceptions to this removal process are Basin 4 and the open space/habitat mitigation site. Due to the number of docks being removed from Basin 4, and because there is plenty of parking lot area available, construction debris from Basin 4 will be removed directly from the land side. Due to the amount of excavated earth material to be removed from the open space/habitat mitigation site, trucks will leave via the local street system. Construction trucks leaving the project site will be routed through the local street network as follows:

- Trucks from Basins 1–3 and Basins 5–7 will depart from the staging areas and be routed north on Marina Drive, east on 2nd Street, and north on Studebaker Road
- Trucks from Basin 4 will be routed north on Appian Way, east on 2nd Street, and north on Studebaker Road
- Trucks from the open space/habitat mitigation site will be routed west on Eliot Street, west on Colorado Street, north on Park Avenue, and east on Seventh Street

All removal trucks will continue out of the project area via SR-22 and then north on Interstate 605 (I-605). Removal trucks for the contaminated dredge materials from Basin 1 will use the same route as removal trucks from Basins 1–3, but will continue from I-605 to north on Interstate 5 (I-5) toward Kettleman City, California.

Based on the estimated trip generation presented in Table B, the construction activity during Phases 1/1A will add approximately 140 daily PCE trips. Based on these estimates, this is the most intense trucking phase of the project. As stated above, the truck trips associated with Phases 1/1A would travel two separate routes leaving the project area. Trucks associated with Phase 1 (Basin 4) would utilize Appian Way, 2nd Street, and Studebaker Road to SR-22. Trucks associated with Phase 1A would utilize Eliot Street, Colorado Street, Park Avenue, and 7th Street to SR-22. Delivery trucks coming to the project site would travel via Studebaker Road, 2nd Street, and Marina Drive. 7th Street and 2nd Street are designated as Major Arterials in the City's General Plan and Studebaker Road is designated as a Minor Arterial. Appian Way, Eliot Street, Colorado Street, Park Avenue, and Marina Drive are Local and Collector Streets.

The addition of 68 daily PCE associated with Phase 1 is expected to be insignificant to traffic flows along Appian Way, 2nd Street, and Studebaker Road. The 72 daily PCE of Phase 1A is also expected to be insignificant to traffic flows along Eliot Street, Colorado Street, Park Avenue, and 7th Street.

The total construction-related trips of 140 are also expected to be insignificant to traffic flows along any of the roadways as described above. In addition, most truck trips would occur during the off-peak hours of the day, when ambient traffic is less. Therefore, construction of the proposed project would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. In addition, construction traffic effects are temporary during the period of construction, and the number of construction workers and truck trips would vary depending on the specific construction activities. Although no adverse traffic impacts are anticipated, and no mitigation measures are required, several construction traffic recommendations are proposed in order to minimize the effects of construction traffic on the local roadway system.

Cumulative Traffic with Proposed Project Construction Traffic

According to the project schedule, Phase 1 will commence in 2011. Cumulative projects include any committed and/or approved developments in the project study area that will generate future vehicle trips. The following projects are included in the cumulative impacts analysis for the proposed project:

- Colorado Lagoon Restoration Project, currently under construction
- Second+PCH Mixed Use Commercial/Hotel/Residential Project
- Proposed Home Depot Project at Loynes Drive and Studebaker Road
- Termino Drain Project, various segments terminating at the northern end of Marine Stadium

Of the related projects, the Second+PCH Project and the Home Depot Project are the only ones located where there is a potential to affect some of the same streets as construction of the proposed project would. Because the proposed project is scheduled to begin in 2011 and be implemented over 6 years, it is possible that the construction activity for the proposed project and construction for one of the cumulative projects identified above may occur at the same time.

The Second+PCH Project is proposing to redevelop the approximately 10-acre (ac) site located at 2nd Street and PCH, currently developed with the Seaport Marina Hotel. The current plan proposes 192,000 square feet (sf) of retail, 20,000 sf of restaurant uses, a 100-room hotel, 325 condominium units, a Coastal Science Center, and a Community Theater.¹ Construction of the proposed Second+PCH would occur in close proximity to the primary construction activity for the proposed project, and adjacent to the trucks being routed to and from Marina Drive and 2nd Street.

Similarly, the proposed Home Depot Project site is located on Studebaker Road, which will be utilized by construction traffic coming to and leaving from the Marina project site.

Construction workers, equipment, and haul vehicles associated with these two projects may utilize the same haul routes as the proposed Marina project. Therefore, when combined, these projects have the potential to contribute to short-term construction traffic impacts. However, with implementation of the construction traffic recommendations discussed below, including the Construction Traffic Management Plan (which restricts trucks to no more than 19 during the a.m. peak hour for any one phase of the project, prohibits truck trips after 3:30 p.m., and requires that a minimum of one travel lane in each direction on Marina Drive and 2nd Street be open during construction activities), cumulative impacts would be reduced.

Nevertheless, should either the Second+PCH Project or the Home Depot Project be under construction at the same time as the proposed Marina Rehabilitation Project, implementation of the construction traffic control measure requiring the City of Long Beach Traffic Engineer to address the truck route and circulation effects of the Home Depot Project and/or the Second+PCH Project construction traffic is warranted to ensure that potential cumulative construction traffic is addressed. Implementation of this measure would ensure that cumulative construction impacts have a less than significant impact.

¹ <http://www.secondandpch.com/>

The proposed project would retain the existing marina recreation uses of the project site, and no intensification of uses would occur. Implementation of the Marina Rehabilitation Project would result in approximately 321 fewer slips, and no long-term operational traffic impacts are expected. Therefore, the traffic levels resulting from operation of the proposed project are not anticipated to change as a result of the proposed project, and no cumulative operational traffic impacts would occur.

PARKING

There are currently 1,430 customers in the Marina and 1,967 boat slips in Basins 1–7. The proposed project includes approximately 1,646 slips, resulting in the loss of approximately 321 slips. The City of Long Beach Zoning Ordinance requires that not less than 0.75 parking spaces per boat slip be maintained for noncommercial use boat slips. The 1,967 existing slips in the Marina require a minimum of 1,476 parking spaces. Currently there are 2,515 spaces in the Marina basin parking lots, which exceed the City’s parking requirement by 1,039 spaces. The project will reduce the total number of slips in the Marina by 321, thereby requiring 241 fewer parking spaces, for a requirement of 1,235 spaces, as indicated in Table C. However, the proposed project improvements would result in the addition of 9 parking spaces, for a total supply of 2,524 spaces. Based on the proposed number of slips, 23 ADA-accessible parking spaces are required and will be provided. The overall number of spaces provided at project completion exceeds the City’s requirements by 1,289 spaces, and impacts related to adequate parking are considered less than significant.

Table C: Alamitos Bay Marina Parking Requirements

	Number of Slips	Parking Required per City Code	Parking Provided	Net Difference Over Requirement
Existing Condition	1,967	1,476	2,515	+1,039
Proposed Project	1,646	1,235	2,524	+1,289

REQUIRED MITIGATION MEASURES AND/OR RECOMMENDATIONS

Based on the results of this analysis, the addition of construction traffic associated with the proposed project can occur without significantly impacting the surrounding roadway system. Therefore, mitigation is not required. Although no mitigation measures are required, several recommended construction traffic control recommendations are proposed in order to minimize the effects of construction traffic on the local roadway system.

- Prior to the issuance of demolition or building permits, the City of Long Beach (City) shall, under the direction of the City of Long Beach Traffic Engineer, design and implement a Construction Traffic Management Plan. The plan shall be designed by a registered Traffic Engineer and shall address traffic control for any street closure, detour, or other disruption to traffic circulation and public transit routes. The plan shall identify the routes that construction vehicles will use to access the site, the hours of construction traffic, traffic controls and detours, and off-site vehicle staging areas. The plan shall also restrict construction trucks to no more than 19 during the a.m. peak hour for any one phase of the project, prohibit truck trips after 3:30 p.m., and require that a minimum of one travel lane in each direction on Marina Drive and 2nd Street be kept open during construction activities. The plan shall also require the City to keep all haul routes clean and free of debris including, but not limited to, gravel and dirt.

- Prior to the issuance of demolition or building permits, the City of Long Beach shall, under the direction of the City of Long Beach Traffic Engineer, address the truck route and circulation effects of the Home Depot Project and/or the Second+PCH Project construction, should either of these projects be under construction in the vicinity of the project site during construction of the Alamitos Bay Marina Rehabilitation project. The coordination shall identify the construction routes, the hours of construction traffic, traffic controls and detours, and off-site vehicle staging areas, and address traffic control for any street closure, detour, or other disruption to traffic circulation and public transit routes.

CONCLUSIONS

Based on the analysis of the surrounding roadway network under existing and cumulative conditions, the addition of construction trips associated with the Alamitos Bay Marina Rehabilitation project would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. In addition, construction traffic effects are temporary during the period of construction, and the number of construction workers and truck trips would vary depending on the specific construction activities. Although no adverse traffic impacts are anticipated and no mitigation measures are required, several recommendations have been made to minimize the effects of construction traffic on the local roadway system.

The reduction of 321 boat slips (from 1,967 existing slips to 1,646 proposed slips) would not significantly affect the existing 1,430 customers, as each customer would continue to be provided with a boat slip. With a parking supply of 2,524 spaces, the proposed project would exceed the City's requirement of 0.75 spaces per boat slip (i.e., 1,235 spaces for 1,646 slips). Therefore, the project would not result in inadequate parking capacity.

APPENDIX A

CONSTRUCTION SEQUENCE AND EQUIPMENT USAGE

Construction Sequence and Construction Equipment Usage		
Phase 1	Phase Duration	LB County Standard→Work days per month=22 days
Basin 4	6 months	LB County Standard→Work Hrs per month=176hrs (176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment	Potential running times
Remove existing gangways 36-41, Docks 25-32	One diesel crane	2 days---minimal use ₂
	Two gas skiffs for dock removal	3 days---minimal use
Install new gangways 36-41, Docks 25-32	One diesel crane	8 days--minimal use
	One diesel powered pile driver for new piles	20 days---full time use ₄
Install temporary long dock	One diesel crane for new docks	3 days---minimal use
	One diesel powered pile driver for new piles	4 days---partial use
Dredge to -10'	One diesel clam bucket and a floating barge with a diesel tender	10 days---full time use ₄
Complete pile removal	One diesel crane for pile removal	10 days--partial use
Seawall and rip rap repair	One gas skiff (destination usage only)	4 days---minimal use
Existing restroom to be demolished and replaced with new restroom;	One diesel backhoe, one front loader,one bobcat (gas or diesel)	3 days---full time use
Parking lot asphalt and upgrade utilities	One diesel backhoe, one front loader,one bobcat (gas or diesel)	10 days--partial use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use
₂minimal use--equipment operating only on an as need basis
₃partial use--equipment operating periodically during the day
₄full time use--equipment operating 6-8 hrs. a day

Construction Sequence and Construction Equipment Usage		
Phase 1A		LB County Standard→Work days per month=22 days
Marine Stadium	1.5 months	LB County Standard→Work Hrs per month=176hrs
Eelgrass Mitigation Site		(176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment	Potential running times
Demolition	Loader	3 days--minimal use ¹
	Excavator	2 day--full time use
	Bobcat, Water truck	2 day--part time use
Reroute Utilities	Excavator, Bobcat	2 full days--minimal use
Excavation	Loader	4 days--full time use ³
	Water Truck	8.5 days--minimal use ³
	Excavator	8.5 days--full time use ³
Salvage Stone	Loader, Excavator	5 full days--part-time use
Place new Stone-riprap construction	Loader, Excavator	1.5 days--part time use
Install new sidewalk	Loader	2 day--part time use
	Bobcat	5 full days--part-time use
	Water Truck	2 days--very minimal use
Haul Truck (off-site)	Diesel Dump Truck	585 Loads

Notes: ¹Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use
²minimal use--equipment operating only on an as need basis
³partial use--equipment operating periodically during the day
⁴full time use--equipment operating 6-8 hrs. a day

Construction Sequence and Construction Equipment Usage		
Phase 2	Phase Duration	LB County Standard → Work days per month = 22 days
Basin 1	6 months	LB County Standard → Work Hrs per month = 176hrs (176hrs/month X 6 months) = 1056hrs/Phase
Activity	Construction equipment	Potential running times
Remove existing gangways 1-4, Docks 1 & 2	One diesel crane	2 days--minimal use ₂
	Two gas skiffs for dock removal	1 day--minimal use
Install new gangways 1-4, Docks 1 & 2	One diesel crane	2 days--minimal use
	One diesel powered pile driver for new piles	17 days--full time use ₄
Dredge to -15'	One diesel clam bucket and a floating barge with a diesel tender	7 days--full time use ₄
Complete pile removal	One diesel crane for pile removal	12 days--full time use
Trucking to upland disposal site	20 tons per truck	718 Loads
Seawall and rip rap repair	One gas skiff (destination usage only)	3 days--very minimal use
Two existing restroom to be demolished and replaced with new restroom;	One diesel backhoe, one front loader, one bobcat (gas or diesel)	6 days--full time use
Parking lot asphalt and upgrade utilities	One diesel backhoe, one front loader, one bobcat (gas or diesel)	4 days--partial use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use
₂minimal use--equipment operating only on an as need basis
₃partial use--equipment operating periodically during the day
₄full time use--equipment operating 8-8 hrs. a day

Construction Sequence and Construction Equipment Usage			
Phase 3		Phase Duration	LB County Standard→Work days per month=22 days
Basin 1		6 months	LB County Standard→Work Hrs per month=176hrs (176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment		Potential running times
Remove existing gangways 5-9, Docks 3-5	One diesel crane		2 days--minimal use ₂
	Two gas skiffs for dock removal		1 day--minimal use
Install new gangways 5-9, Docks 3-5	One diesel crane		2 full days--minimal use
	One diesel powered pile driver for new piles		23 days--partial use ₃
Dredge to -12' and -15'	One diesel clam bucket		14 days--full time use ₄
Dredge to contaminated spoils (approx. 25504c.y.)	and a floating barge with a diesel tender		
Trucking to upland disposal site	20 tons per truck		718 Loads
Complete pile removal	One diesel crane for pile removal		19 days--full time use
Seawall and rip rap repair	One gas skiff (destination usage only)		3 days--very minimal use
Existing restroom to be demolished and replaced with new restroom;	One diesel backhoe, one front loader, one bobcat (gas or diesel)		3 full days--full time use
Parking lot asphalt and upgrade utilities	One diesel backhoe, one front loader, one bobcat (gas or diesel)		6 days--partial use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use

₂minimal use--equipment operating only on an as need basis

₃partial use--equipment operating periodically during the day

₄full time use--equipment operating 6-8 hrs. a day

Construction Sequence and Construction Equipment Usage		
Phase 4	Phase Duration	LB County Standard→Work days per month=22 days
Basin 2	6 months	LB County Standard→Work Hrs per month=176hrs (176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment	Potential running times
Remove existing gangways 10-13, Docks 6-8	One diesel crane	2 days—minimal use ₂
	Two gas skiffs for dock removal	1 day--minimal use
Install new gangways 10-13, Docks 6-8	One diesel crane	2 days—minimal use
	One diesel powered pile driver for new piles	17 days—full time use ₄
Dredge to -10'	One diesel clam bucket and a floating barge with a diesel tender	5 days—full time use ₄
Complete pile removal	One diesel crane for pile removal	19 days--full time use
Seawall and rip rap repair	One gas skiff (destination usage only)	3 days--very minimal use
Existing restroom to be demolished and replaced with new restroom;	One diesel backhoe, one front loader, one bobcat (gas or diesel)	3 days—full time use
Parking lot asphalt and upgrade utilities	One diesel backhoe, one front loader, one bobcat (gas or diesel)	6 days—partial use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use

₂minimal use--equipment operating only on an as need basis

₃partial use--equipment operating periodically during the day

₄full time use--equipment operating 6-8 hrs. a day

Construction Sequence and Construction Equipment Usage		
Phase 5	Phase Duration	LB County Standard→Work days per month=22 days
Basin 2	6 months	LB County Standard→Work Hrs per month=176hrs (176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment	Potential running times
Remove existing gangways 18-22, Docks 13 & 14	One diesel crane	2 days---minimal use ₂
	Two gas skiffs for dock removal	1 day---minimal use
Install new gangways 18-22, Docks 13 & 14	One diesel crane	2 days---minimal use
	One diesel powered pile driver for new piles	7 days---full time use ₄
Dredge to -10'	One diesel clam bucket and a floating barge with a diesel tender	6.5 days---full time use ₄
Complete pile removal	One diesel crane for pile removal	6.5 days--full time use
Seawall and rip rap repair	One gas skiff (destination usage only)	3 days--very minimal use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use

₂minimal use--equipment operating only on an as need basis

₃partial use--equipment operating periodically during the day

₄full time use--equipment operating 6-8 hrs. a day

Construction Sequence and Construction Equipment Usage		
Phase 6	Phase Duration	LB County Standard→Work days per month=22 days
Basin 2	6 months	LB County Standard→Work Hrs per month=176hrs (176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment	Potential running times
Remove existing gangways 16-17, Docks 11 & 12	One diesel crane	2 days--minimal use ₂
	Two gas skiffs for dock removal	1 day--minimal use
Install new gangways 16-17 Docks 11 & 12	One diesel crane	2 days--minimal use
	One diesel powered pile driver for new piles	3.5 days--full time use ₄
Dredge to -10'	One diesel clam bucket and a floating barge with a diesel tender	3 days--full time use ₄
Complete pile removal	One diesel crane for pile removal	4 days--full time use
Seawall and rip rap repair	One gas skiff (destination usage only)	3 days--very minimal use
Existing restroom to be demolished and replaced with new restroom;	One diesel backhoe, one front loader,one bobcat (gas or diesel)	3 full days--full time use
Parking lot asphalt and upgrade utilities	One diesel backhoe, one front loader,one bobcat (gas or diesel)	6 days--partial use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use

₂minimal use--equipment operating only on an as need basis

₃partial use--equipment operating periodically during the day

₄full time use--equipment operating 6-8 hrs. a day

Construction Sequence and Construction Equipment Usage		
Phase 7	Phase Duration	LB County Standard→Work days per month=22 days
Basin 2	6 months	LB County Standard→Work Hrs per month=176hrs (176hrs/month X 6 months)=1056hrs/Phase
Activity	Construction equipment	Potential running times
Remove existing gangways 14-15, Docks 9 & 10	One diesel crane	2 days---minimal use ₂
	Two gas skiffs for dock removal	1 day---minimal use
Install new gangways 14-15, Docks 9 & 10	One diesel crane	2 days---minimal use
	One diesel powered pile driver for new piles	6 days---full time use ₄
Dredge to -10'	One diesel clam bucket and a floating barge with a diesel tender	3.5 days---full time use ₄
Complete pile removal	One diesel crane for pile removal	4.5 days--full time use
Seawall and rip rap repair	One gas skiff (destination usage only)	3 days--very minimal use

Notes: ₁Potential running times- equipment operating at varying RPMs not to be assumed at high to full RPMs during use

₂minimal use--equipment operating only on an as need basis

₃partial use--equipment operating periodically during the day

₄full time use--equipment operating 6-8 hrs. a day