TRANSPORTATION REPORT FOR THE CONSTRUCTION OF THE 100-YEAR HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM

US Army Corps of Engineers

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Summary

This document describes and characterizes the environmental impacts of alternatives for transporting the materials necessary to construct the 100-year Hurricane and Storm Damage Risk Reduction System (HSDRRS) for New Orleans, Louisiana. The analyses address the effects of using the public highways, railways, and waterways to supply earthen borrow, structural steel (e.g., sheetpile, pipe pile, H-pile), ready-mix concrete, concrete pile, aggregate, and rock to over 100 different construction projects for the Lake Pontchartrain and Vicinity and West Bank and Vicinity Projects. These construction projects are scheduled for completion by 2011 at a total cost of over $15 billion. The database of projects used to analyze effects contains 105 projects that include material quantities shown below in table S-1.

Table S-1. Major Materials Quantities

Material	Quantity	Units
Earthen Fill	29,616,300	cubic yards
Concrete	1,137,800	cubic yards
Aggregate	3,307,200	tons
Sheet Pile	16,915,000	square feet
H-Pile	9,753,900	linear feet
Pipe Pile	1,066,700	linear feet
Concrete Pile	792,100	linear feet
Rock	1,733,200	tons

The CEMVN is separately preparing a Comprehensive Environmental Document (CED) to address the overall cumulative impacts of construction and future operations and maintenance for the HSDRRS. This analysis is more limited in scope, but will support the CED.

Alternatives

Four transportation alternatives have been developed to provide a range of meaningfully different alternatives for assessing. They are maximum truck use, maximum barge use, maximum rail use, and the likely scenario identifying the actions most likely to occur.

When considering the differences among the alternatives, it is important to note that the majority of all trips necessary to construct the HSRRS are for the transportation of borrow (earthen fill) and this material cannot be economically transported by rail or barge. Borrow can only be transported by truck because the source sites lack the infrastructure to accommodate the use of rail or barge and significant costs accrue when borrow is handled multiple times (the loading and

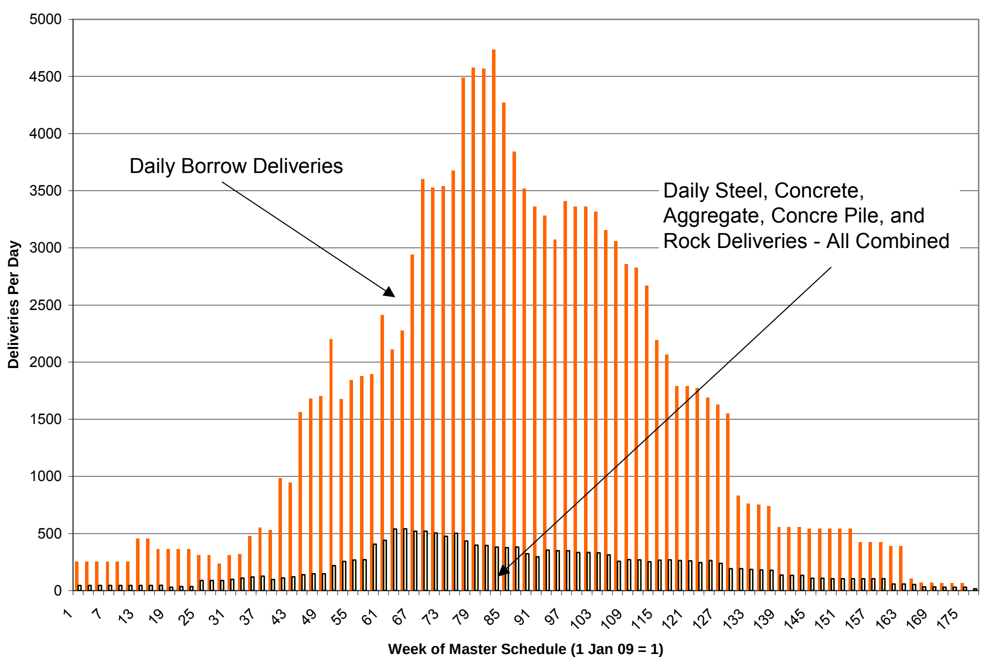
unloading of material). For this reason, multiple modes of transportation (e.g., truck to rail to truck and truck to barge to truck) of borrow were not evaluated.

Figures S-1 through S-4 show truck deliveries per day for all project materials distributed across a master schedule,[1] beginning on 1 January 2009.[2] The figures consistently show daily borrow deliveries of:

- over 1,000 for 100 weeks;
- over 2,000 for 60 weeks;
- over 3,000 for 40 weeks; and
- over 4,000 for 10 weeks.

Most importantly, the figures show that differences in the number of trips between the four alternatives are negligible because the vast majority of trips are made for the delivery of borrow, which is transported exclusively by truck in each of the four alternatives.

Figure S-1 Truck Trips Distributed Across Schedule
Maximum Truck Scenario



[1]The master schedule was established based on CEMVN's milestone database as of July 2009.
[2]The period of analysis includes roughly 380 weeks. Construction at a select few sites began as early as July 2007, and the number trips associated with deliveries to those sites does not exceed 300 per day. Figures S-1 through S-4 show the trips beginning on 1 January 2009 and proceeding for 180 weeks.

Figure S-2 Truck Trips Distributed Across Schedule Maximum Barge Scenario

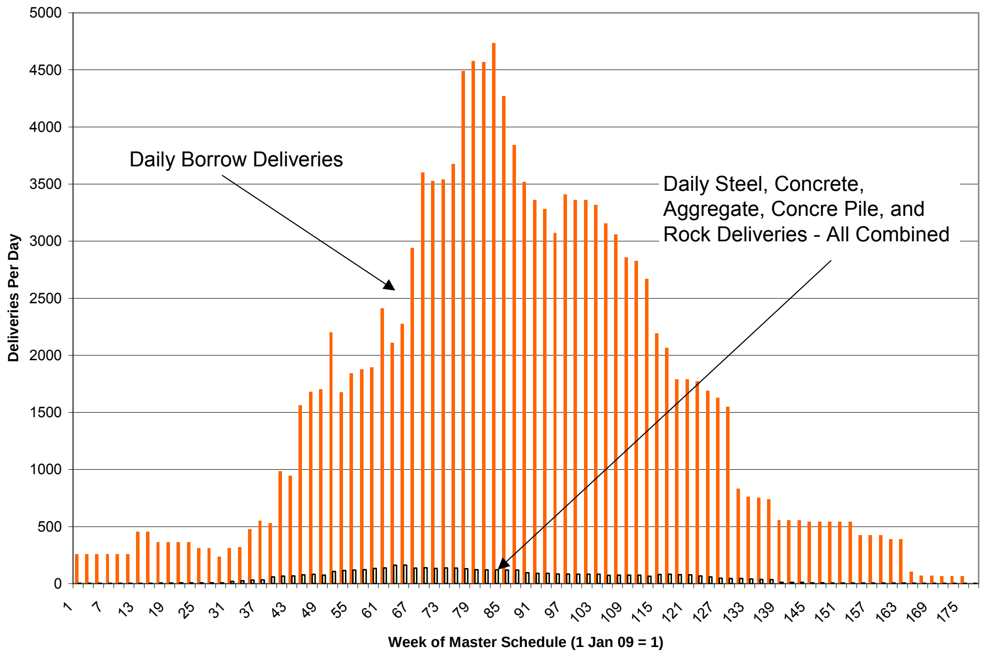


Figure S-3 Truck Trips Distributed Across Schedule Maximum Rail Scenario

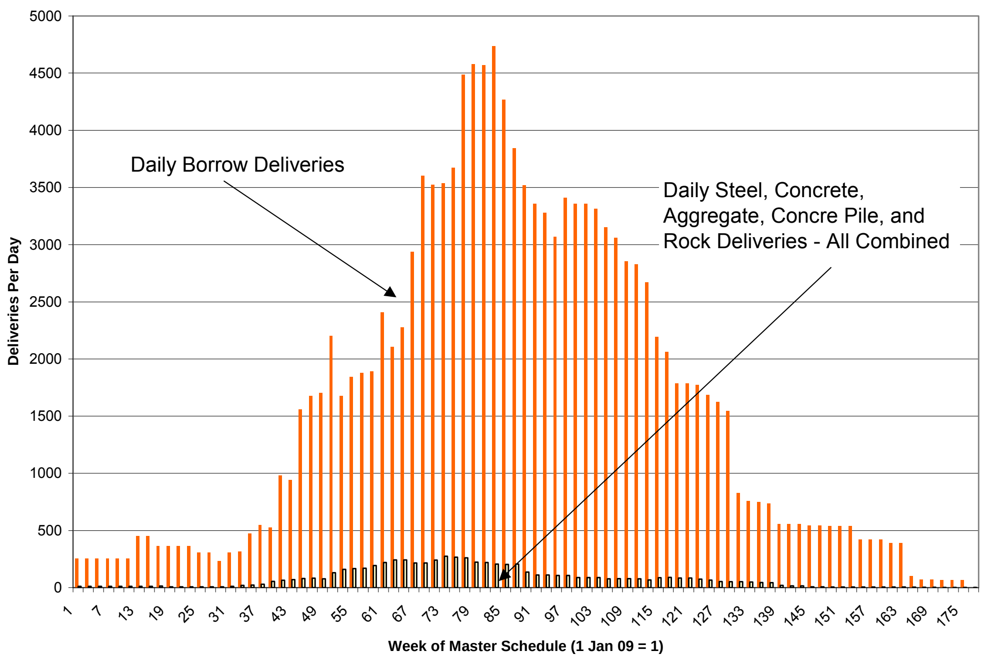
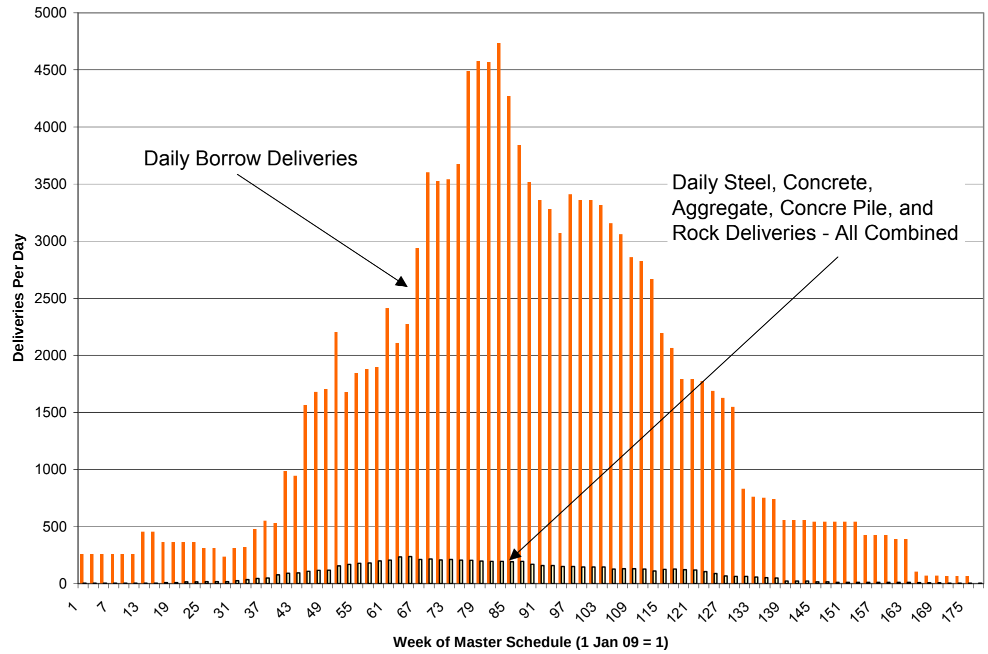


Figure S-4 Truck Trips Distributed Across Schedule
Likely Scenario



Assessment

Transportation impacts were evaluated by attaching the number of truck trips per day, over the course of each project construction, to each road segment traversed, by the route carrying materials, from the material origin to the roadway exit point, and returning to the origin. For each road segment used in each of the four alternative transportation scenarios, the number of trucks traversing each road segment during each week of the construction project was summed. This quantification provided the total number of trucks traversing any part of the transportation network at any time in the project schedule. This allows the estimation of the effects to traffic congestion, infrastructure degradation, accident risks, and diesel emissions.

Findings

The environmental consequences for transportation were modeled using materials quantities from ongoing construction designs in various stages of completion, with associated schedule changes, based on standardized truck, rail, and barge loading factors, and transported along unspecified routes to construction projects. This analysis depicts what the effects would be if there were no design or schedules changes after July 2009, and all of the simplifying assumptions described in this report were uniformly correct. Predicting traffic or road surface conditions on a particular segment of route, on a given day in the project schedule is not a realistic expectation from this analysis.

However, these limitations should not diminish the value of the analysis or the validity of the alternatives comparison. Each of the four alternatives (Max Truck, Max Barge, Max Rail, and Likely Scenario) is evaluated to compare the effects to traffic congestion, infrastructure degradation, accidents, and emissions. The similarities and limited differences between the alternatives are valuable for the consideration of transportation alternatives. There are slight differences in some of the metrics (e.g., truckloads) because of different rounding assumptions as the data were manipulated; this does not diminish the value of the assessment to decision makers.

Congestion

The alternative-specific transportation routes developed were parsed into approximately 8,000 route segments. These route segments, along with schedules for delivery and the demand-driven truck trips, formed the basis for the calculation of incremental changes to the Regional Planning Commission's Congestion Management Index. These changes provide a relative assessment of the predicted changes in traffic. Over 3 million separate changes in the CMI were calculated for the transportation route segments, for the six DOTD classes of roads in greater New Orleans, for each of the 380 weeks of the project analysis period, for each of the four alternatives, moving more than 2 million truckloads.

Table S-2 presents the maximum calculated change in the CMI for any of the 8,000 segments within the six DOTD road classifications. These data indicate no discernable difference between the alternatives with respect to the effects on congestion.

Table S-2. Alternative Comparison – Maximum Change in CMI

LADOTD Road Classification	Class Description	Max Truck	Max Barge	Max Rail	Likely Scenario
1	Interstate	0.007	0.007	0.007	0.007
2	Expressway	0.048	0.048	0.048	0.048
3	Principal Arterial	0.037	0.031	0.033	0.031
4	Minor Arterial	0.052	0.036	0.036	0.036
5	Urban Collector	0.000	0.000	0.000	0.000
8	Local Road	0.023	0.023	0.023	0.023

An additional method was used to increase the understanding and improve the communication of truck congestion resulting from materials delivery. This method was based on the need to identify individual, highly utilized roads for community-level planning and public awareness. A key component of the analysis was the establishment of truck traffic thresholds. The thresholds, shown in table S-3, were used as a proxy to suggest the level of truck traffic at which the roadway users and adjacent property owners would likely perceive an increase.

Table S-3. Truck Frequency Thresholds by Functional Road Class

Functional Road Class	Materials Transportation Trucks Per 12-Hour Workday	Truck Frequency
1	1,500	30 seconds
2	1,500	30 seconds
3	360	2 minutes
4	240	3 minutes
5	150	5 minutes
8	50	15 minutes

To better understand the overall effect on single roadways, multiple segments (of the 8,000 route segments) were dissolved into single road segments where both name and functional classification were shared. By consolidating segments in this fashion, the most impacted roads of each functional classification could be identified within the materials transportation routes. These roads were then examined to determine how many of the roads exceeded the functional-class specific traffic thresholds under each of the four alternatives. Table S-4 summarizes the number of roads, by functional classification, that are predicted to exceed the thresholds.

Table S-4. Numbers of Roads Exceeding Truck Frequency Thresholds by Functional Class and Alternative

DOTD Class	Maximum Truck	Maximum Barge	Maximum Rail	Likely	Used for Transport
1	0	0	0	0	6
2	0	0	0	0	6
3	7	6	7	6	35
4	19	12	13	12	44
5	10	8	8	8	17
8	41	32	35	32	62

Figure S-5 shows the roads included in the routing of project materials deliveries under the likely scenario. Figure S-6 shows the locations of roads that are expected to exceed frequency thresholds for the likely scenario.

Figure S-5. Road Network Used for Project Materials Delivery (Likely Scenario)

Figure S-6. Roads Exceeding Thresholds (Likely Scenario)

The following four tables (S-5 through S-8) identify the functional class-specific roads that exceed the truck frequency thresholds shown in table S-3. For the identified roads, the tables provide the number of months the threshold would be exceeded, the minimum number of trucks per day that triggered the first exceedance, the maximum number of trucks per day, and the average number of trucks per day. The roadways are sorted in descending order by the number of months the truck thresholds are exceeded. Roads listed in these tables are those predicted to be most affected by increases in truck traffic and the durations for which these effects are expected.

Table S-5. DOTD Road Class 3
Number of Days Threshold of 360 Material Delivery Trucks Per Day Exceeded

		Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded		
Roadway	Number of Months Threshold Exceeded	Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
US-90	15	360	1,064	2,252
Lapalco Boulevard	8	497	738	1,250
SR-39	7	372	445	457
US-61	6	383	458	640
SR-23	3	381	425	543
Walker Road	1	378	378	378

Table S-6. DOTD Road Class 4
Number of Days Threshold of 240 Material Delivery Trucks Per Day Exceeded

Roadway	Number of Months Threshold Exceeded	Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
US-61	25	251	840	2,570
US-11	16	287	659	1,043
US-90	16	289	661	1,047
Michoud Boulevard	16	287	657	1,039
SR-46	12	264	459	698
Bayou Road	9	240	267	298
Ames Boulevard	8	326	842	2,147
Westwood Drive	7	291	653	1,248
Engineers Road	5	269	270	273
SR-3134	3	349	349	349
SR-45	3	347	348	349
Lakeshore Drive	2	268	315	346

Table S-7. DOTD Road Class 5
Number of Days Threshold of 150 Material Delivery Trucks Per Day Exceeded

Roadway	Months Threshold is Exceeded	Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
SR-45	9	160	562	1,808
Bayou Road	9	240	267	298
Ames Boulevard	8	347	347	347
Westwood Drive	8	189	588	1,248
41st Street	3	190	190	190
Vintage Drive	3	190	190	190
Ames Boulevard	3	347	347	347
Barriere Road	2	382	382	382

Table S-8. DOTD Road Class 8
Number of Days Threshold of 50 Material Delivery Trucks Per Day Exceeded

Roadway	Months Threshold is Exceeded	Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
Kenner Avenue	29	76	612	2,146
SR-46	27	100	332	698
Live Oak Boulevard	25	127	555	1,676
Bayou Road	19	62	144	298
Walker Road	19	52	198	756
Vintage Drive	18	52	126	348
Lapalco Boulevard	12	60	422	1,248
Concord Road	11	60	104	153
Engineers Road	11	52	142	273
Victory Drive	11	85	432	1,188
Macarthur Avenue	10	52	58	69
Almonaster Avenue	9	108	108	108
SR-3134	8	52	174	349
Carrie Lane	8	50	172	347
Mildred Street	8	57	167	392
40th Street	7	52	109	174
Loyola Drive	7	52	109	174
Beta Street	7	92	92	92
Laroussini Street	7	92	92	92
North Street	7	92	92	92
South Street	7	92	92	92
Vic A Pitre Drive	7	92	92	92
Caryota Drive	7	54	122	190
David Drive	7	54	122	190
Barriere Road	6	57	159	375
SR-23	5	165	165	165
Nashville Avenue	4	50	61	94
Hickory Avenue	3	95	95	95

Infrastructure Degradation

The relatively small number of train and barge trips defined in the alternatives would not be expected to have any discernable effects to the rail or marine terminal infrastructure in greater New Orleans. Therefore, the discussion of the effects to infrastructure focused exclusively on the effects of truck transportation.

As show in table S-9, regardless of which alternative was implemented, between 1,100 and 1,300 lane miles of roadway within greater New Orleans would be traversed with between 2.19 and 2.35 million truck trips; the cost to infrastructure is estimated at between $550 and $650 million dollars for all of the alternatives. These similarities derive from the fact that the extent of truck transportation within greater New Orleans under each of the alternatives is substantially the same, because earthen fill accounts for more than 85-percent of all trips for each of the alternatives. There are no stark contrasts between the alternatives with respect to the number of lane miles potentially affected by the project within greater New Orleans.

Table S-9. Alternative Comparison – Infrastructure Degradation

LADOTD Road Classification	Class Description	Max Truck	Max Barge	Max Rail	Likely Scenario
1	Interstate	334.0	295.3	252.1	335.6
2	Expressway	64.9	48.7	44.7	64.3
3	Principal Arterial	459.5	414.4	418.0	481.5
4	Minor Arterial	312.6	303.2	307.5	311.3
5	Urban Collector	28.0	26.4	27.5	30.6
8	Local Road	57.6	55.1	58.7	57.7
Unknown	Unknown	10.6	10.4	8.3	10.6
Estimated Total Miles		1,267	1,154	1,117	1,292
Estimated Total Truckloads (millions)		2.4	2.2	2.3	2.2
Estimated Infrastructure Cost ($ millions)[3]		633.6	576.8	558.4	645.8

Transportation Risks

As show in table S-10, Maximum Truck reflects the greatest collective accident risk for all three types of accidents. This is because of the significantly larger distance of truck travel (150 million miles traveled vs. less than 70 million) required under the Maximum Truck alternative

[3] Cost of approximately $500,000 per lane mile based on cost per lane mile from the Submerged Road Program (RPC, 2009a).

when compared to the other three alternatives. The accident risks for the other three alternatives are substantially the same and primarily derive from the approximately 60-70 million miles of truck travel that is unavoidable. When transporting materials from remote locations to greater New Orleans by rail or barge, accident risks decrease.

Table S-10. Alternative Comparison - Projected Accidents

Mode	Estimated Miles Traveled	Projected Accidents		
		Property Damage Only	Injury Only	Fatality
Max Truck	150,426,000	230.2	76.9	3.1
Max Barge	60,395,160	111.1	31.3	1.3
Max Rail	62,030,650	104.6	34.5	2.0
Likely Scenario	68,943,520	106.2	35.1	1.4

Emissions

Table S-11 shows the estimated alternative-specific emissions. While the Max Truck alternative requires significantly more miles to be traveled, the per mile emissions from truck transportation are considerably less than emissions from tugboats or locomotives. Therefore, the alternatives that include the usage of barge or rail transportation have greater emissions of VOCs, NOx, CO, and PM than when truck transportation alone was assumed.

Table S-11. Comparison of the Alternatives – Diesel Emissions (tons)

Alternative	Miles (millions)	Gallons of Diesel (millions)	VOCs	NOx	CO_2	CO	$PM_{2.5}$	PM_{10}	SO_2	NH_3
Max Truck	150.4	23.4	76.8	1,393	265,362	371.0	27.9	30.3	2.5	4.4
Max Barge	60.4	25.6	166.4	3,957	278,718	433.5	73.3	79.7	335.8	1.8
Max Rail	62.0	17.3	98.0	2,046	192,379	328.5	44.7	47.6	94.4	1.8
Likely Scenario	68.9	22.3	131.9	3,062	244,557	373.5	57.1	62.0	*239.8	2.0

*No separate emission factor used for SO_2 for tug emissions. Reported as SO_x.

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1 Introduction

This document describes and characterizes the environmental impacts of alternatives for transporting the materials necessary to construct the 100-year Hurricane and Storm Damage Risk Reduction System (HSDRRS) for New Orleans, Louisiana. The analyses address the effects of using the public highways, railways, and waterways to supply earthen borrow, structural steel (e.g., sheetpile, pipe pile, H-pile), ready-mix concrete, concrete pile, aggregate, and rock to approximately 105 different construction projects for the Lake Pontchartrain and Vicinity and West Bank and Vicinity Projects. The magnitude of the construction effort, in conjunction with the schedule for completion, dictates the examination of the cumulative environmental consequences of transportation. Transportation decisions being made will be able to account for the environmental trade offs from changes to traffic congestion, diesel fuel use and emissions, infrastructure degradation, and accidents.

The construction-related negative effects resulting from providing the 100-year level of hurricane damage risk reduction for these projects may potentially represent the largest cumulative environmental consequences in the New Orleans region for the next 4 to 7 years. Cumulative impacts for the actions considered in all of the IERs will be incorporated into the CED. In order to construct the HSDRRS, substantial quantities of building materials need to be brought to and transported within greater New Orleans. Quantifying the cumulative environmental effects from the transportation of these materials to, and within, New Orleans is the focus of this study.

This analysis has been prepared with the engineering design reports for many of the projects not yet finalized. As such, the analysis of transportation effects has been performed prior to the completion of final design and is based on materials quantities estimated to construct the HSDRRS. Estimates were developed from design calculations, best professional judgment, and design reports completed for similar levee and floodwall alignments nearby. The description of the projects, materials, and transportation analysis does not represent a formal commitment to final design, equipment for use, vendors for supply of materials, or methods of construction, but gives an approximation of how the materials needed could be transported to the necessary construction projects.

1.1 Purpose and Need for Corps Action

On 29 August 2005, Hurricane Katrina caused major damage to the Federal and non-Federal flood control and Hurricane and Storm Damage Risk Reduction System (HSDRRS) in southeast Louisiana. Hurricane Rita followed this storm on 24 September 2005, and made landfall on the Louisiana-Texas state border, causing damage to the HSDRRS in southern Louisiana. Since the storms, the USACE has been working with state and local officials to restore the Federal and non-Federal flood control and HSDRRS projects and related works in the affected area.

To date, approximately 60 percent of the New Orleans population has returned to the area. Many residences and businesses are waiting to see positive improvements in the level of protection before returning to the area. A USACE goal of June 2011 has been set for completion of much of the work that will raise the level of protection in the New Orleans area to a new standard and provide a level of security to residents and businesses that will allow and encourage them to return to the area.

The purpose of the proposed action is to construct and maintain 100-year risk reduction for greater New Orleans within the Lake Pontchartrain and Vicinity (LPV) and West Bank and Vicinity (WBV) Projects. The proposed action results from a defined need to reduce flood risk and storm damage to residences, businesses, and other infrastructure from hurricanes (100-year storm events) and other high water events. The completed HSDRRS would lower the risk of harm to citizens, and damage to infrastructure during a storm event. The safety of people in the region is the highest priority of the CEMVN.

The LPV Project (IERs #1-11) extends approximately 125 miles in length from the La Branch Wetlands Levee in St. Charles Parish to the Inner Harbor Navigation Canal Floodgates in Orleans and St. Bernard Parishes. The LPV Project provides risk reduction to the East Bank of New Orleans. The WBV project, (IERs #12-17) extends approximately 66 miles in length from the Western Tie-in (IER #16) in St. Charles and Jefferson Parishes to the Hero Canal Levee and Eastern Terminus in Plaquemines Parish (IER #13).

1.2 Authority for the Projects

The authority for the proposed actions was provided as part of a number of hurricane protection projects spanning southeastern Louisiana, including the Lake Pontchartrain and Vicinity (LPV) Hurricane Protection Project and the West Bank and Vicinity (WBV) Hurricane Protection Project. Congress and the Administration granted a series of supplemental appropriations acts following Hurricanes Katrina and Rita to repair and upgrade the project systems damaged by the storms that gave additional authority to the USACE to construct 100-year HSDRRS projects.

The LPV project was authorized under the Flood Control Act of 1965 (P.L. [Public Law] 89-298, Title II, Sec. 204) which amended, authorized a "project for hurricane protection on Lake Pontchartrain, Louisiana...substantially in accordance with the recommendations of the Chief of Engineers in House Document 231, Eighty-ninth Congress." The original statutory authorization for the LPV Project was amended by the Water Resources Development Acts (WRDA) of 1974 (P.L. 93-251, Title I, Sec. 92) 1986 (P.L. 99-662, Title VIII, Sec. 805 1990 (P.L. 101-640, Sec. 116); 1992 (P.L. 102-580, Sec. 102), 1996 (P.L. 104-303, Sec. 325); 1999 (P.L. 106-53, Sec. 324); and 2000 (P.L. 106-541, Sec. 432); and Energy and Water Development Appropriations Acts of 1992 (PL 102-104, Title I, Construction, General); 1993 (PL 102-377, Title I, Construction, General); and 1994 (PL 103-126, Title I, Construction, General).

The WBV project was authorized under the WRDA, as cited previously. The Westwego to Harvey Canal Hurricane Protection Project was authorized by the WRDA of 1986. The WRDA of 1996 modified the project and added the Lake Cataouatche Project and the East of Harvey Canal Project. The WRDA 1999 (P.L. 106-53, Section 328) combined the three projects into one project under the current name.

The Department of Defense, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act of 2006 (3rd Supplemental - P.L. 109-148, Chapter 3, Construction, and Flood Control and Coastal Emergencies) authorized accelerated completion of the project and restoration of project features to design elevations at 100 percent Federal cost. The Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery of 2006 (4th Supplemental - P.L. 109-234, Title II, Chapter 3, Construction, and Flood Control and Coastal Emergencies) authorizes construction of authorized a 100-year level of protection; the replacement or reinforcement of floodwalls; and the construction of levee armoring at critical locations. Additional Supplemental Appropriations include the U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 H.R. 2206 (pg. 41-44) Title IV, Chapter 3, Flood Control and Coastal Emergencies, (5th Supplemental), General Provisions, Sec. 4302.

1.3 Requirement for Evaluation

The National Environmental Policy Act (NEPA) requires CEMVN to consider the environmental consequences of their major federal actions and to make informed decisions. One component of examining the consequences of decision-making is a consideration of the effects to the human environment from transportation of construction materials. When transportation is such a major component of a proposed action, the environmental impacts of such transport should be analyzed, even when CEMVN is not directly responsible for the transportation.

The CEQ regulations require that in preparing an EIS, an agency consider three types of impacts on the environment: direct, indirect, and cumulative. Indirect impacts are defined as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR §1508.8). A cumulative impact is defined as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

This study quantifies the effects from transportation of large quantities of materials, over the same transportation routes, to and within greater New Orleans. These successive trips, through the same geographic areas, may result in cumulative effects on infrastructure, traffic congestion, air quality, and accident risks to the public.

Both NEPA and the CEQ regulations require that CEMVN consider and evaluate appropriate alternatives to proposed actions that will effect the environment. Section 102(2)(E) of NEPA provides that all agencies of the Federal Government shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."

1.4 Cargo Capacity Assumptions

The dimensions of units used to transport freight vary widely within each of the three modes (rail, truck, and barge) of transportation evaluated in this report. In order to facilitate a meaningful cross-modal comparison, standard dimensions of the units used by each mode were defined. In comparing the modes, the capacity of the unit of transport were analyzed, not the average load. In this manner, all three modes could be evaluated on the same scale.

1.4.1 Truck Transport

The typical bulk commodity truck's body type, axle configuration, fuel, gross, tare, and cargo weight used in this study were developed based on interviews with various trucking entities and comparison to similar studies (e.g., MARAD, 2007). The typical truck for this study is a Heavy Duty Diesel Vehicle with a GVWR of 80,000 lbs providing 40,000 lbs (20 tons) of cargo weight for the transport of steel and concrete pile, 22.5 tons for the transport of rock and aggregate, and 14.5 cubic yards of borrow. The typical axle configuration is that of a typical tractor-trailer truck (i.e., an 18-wheeler) with a steering axle and two tandem axles, or five total axles.

1.4.2 Barge Transport

The most common dimension of shallow draft barges carrying dry bulk are approximately 200 feet long by 35 feet wide. The average cargo capacity for barges of approximately this size is approximately 1,757 short tons (MARAD, 2007), rounded down to 1,200 tons for use in this study in most cases. For direct delivery of rock and concrete pile to Lake Pontchartrain project sites, barges were assumed to be light loaded at 500 tons. The analysis also assumes that barges would not be transported singly by a tug, but would be part of a barge fleet where 10 barges (2 x 5) were moved per tug.

1.4.3 Rail Transport

There is significant variation in railroad carload capacities depending on the specific material being hauled. According to the Association of American Railroads, the average carload for coal was 112.5 tons in 2006 and general-purpose tank cars carry up to 125 tons (MARAD, 2007). For this study, the standard rail car load was assumed to be 110 tons. The standard train was assumed to consist of 100 railcars and three locomotives.

1.4.4 Comparison of Mode Capacity

The standard capacities for the various freight units, across all three modes of transportation are summarized in table 1-1. Table 1-2 provides a comparison of the carrying capacity of each mode of transportation. Table 1-3 provides the standard cargo capacity comparison when considering a shipping unit of a trainload or barge tow that includes multiple railcars or barges within the shipping event.

Table 1-1. Assumed Freight Unit Capacities

Freight Unit	Standard Cargo Capacity (Tons)
Highway – Truck Trailer	20, 22.5, 14.5 CY
Railroad – Single Rail Car	110
Riverine – Single Barge	1,200

Table 1-2. Number of Units Needed to Move 1,500 Tons of Material

Mode of Transport	Units Needed to Move 1,200 Tons of Material
Truck Trailer	60
Single Rail Car	11
Single Barge	1

Table 1-3. Standard Cargo Capacity Comparison

Mode of Transport	Configuration	Cargo Capacity (tons)
Truck Trailer	Single Tractor With Trailer	20, 22.5
Unit Train (multiple rail cars)	100 Railcars, 3 Locomotives	11,000
Barge Tow	10 Barge Tow (5 x 2)	12,000

1.5 Materials Delivery Assumptions

The primary objectives in the transportation and traffic impact analysis were to determine the logical path for delivering construction materials from the respective origins to the project sites (destinations) and assess the impact of this transportation. To assist in this analysis and assessment effort, the LaDOTD highway classification scheme and the Congestion Management Index data from the New Orleans Regional Planning Commission were mapped to the existing street data.

The determination of the logical path of travel required the identification of construction materials source locations (borrow pits, concrete plants, etc.) and locations where project vehicles would leave the roadway to gain access to the construction sites. GIS roadway routing software was used to determine the fastest round-trip route from each material source location to each project roadway exit point, except for borrow. Government-furnished borrow source location and roadway exit point locations were explicitly paired to link origins and destinations. Round-trip route paths were modeled such that routes using divided highways and one-way streets used separate street segments for return paths. Multiple material source locations were modeled for steel and concrete, thereby providing alternative source locations depending on the means of bringing these materials into the greater New Orleans area.

These alternative source locations include New Orleans marine terminals, rail yards, and I-10, if transported by barge, rail, or truck, respectively. From the list of all possible routes, the shortest route for each material to each roadway exit point for each transportation mode was selected as the most likely origin location to be used for each roadway exit point (destination). These most likely routes were matched to the materials used at each project to determine which routes would be presumed to transport materials to each project. This process of matching routes to project materials requirements was performed for all projects and all major materials.

The transportation and traffic impact assessment was conducted by attaching the number of truck trips per day over the course of each project's construction timeframe, to each road segment traversed by the route carrying each type of material from the origin to the destination and returning to the origin. For each road segment used, the number of trucks traversing each road segment during each week of the construction project was aggregated. This quantification provided the total number of trucks traversing any part of the transportation network at any time in the project schedule.[4] These values represent the added traffic load anticipated as a result of project construction.

[4] Construction start date and duration were established based on CEMVN's milestone database as of July, 2009.

2 Projects and Quantities

Sections 2.1 through 2.17 provide quantity estimates for material needed to construct the projects evaluated in all 17 IERs.

The database of projects used to analyze quantities, trips, and timing of trips contains 105 projects, which were analyzed in 17 IERs. In total, 105 projects account total materials quantities of:

Material	Quantity	Units
Earthen Fill	29,616,300	cubic yards
Concrete	1,137,800	cubic yards
Aggregate	3,307,200	tons
Sheet Pile	16,915,000	square feet
H-Pile	9,753,900	linear feet
Pipe Pile	1,066,700	linear feet
Concrete Pile	792,100	linear feet
Rock	1,733,200	tons

For each IER, seven separate tables provide details about the materials used to construct the HSDRRS. The tables reflect quantities data collected from design documents, project management reports, borrow tracking reports, milestone reports, and project management scheduling output.

Tables designated as “a” summarize the quantities and type of materials needed for each of the construction projects associated with that IER. For each project, the “a” tables show the quantities of earthen fill, concrete, aggregate, sheet pile, H-pile, pipe pile, concrete pile, and rock

Tables “b” through “g” provide the scheduled demand for each project’s earthen fill, steel, concrete, aggregate, concrete pile, and rock. Information on duration (in calendar days) and the expected Notice to Proceed (NTP) for each project is also included.

Tables “b” through “g” show demand separated into three equal time periods:

- first third;
- second third;
- and final third.

Separating a project demand schedule into thirds allows a more realistic depiction of the uneven demand for materials during construction. For example, during the first third of any earthen levee project, 10 percent of the earthen material required for construction is assumed to be delivered to the site. This assumption allows time for site preparation and earthwork prior to full-scale production of the earthen levee. Similar assumptions have been made for all other types of materials and projects.

The assumed proportions of materials required for construction during each project third is shown below.

Material	First Third	Second Third	Final Third
Borrow	10%	70%	20%
Steel	100%	0%	0%
Concrete	20%	40%	40%
Aggregate	20%	40%	40%
Concrete Pile	100%	0%	0%
Rock	0%	0%	100%

Note that the data shown for steel in the “c” tables, and concrete pile in the “f” tables do not match the data for quantities shown in the “a” tables. Steel is shown in the “a” tables in square feet for sheet pile, and linear feet for H-pile and pipe pile. Similarly, concrete pile is shown in the “a” tables in linear feet. This is because the quantities shown in the “a” tables are taken from design documents, and provide a traceable link to the data sources. Tables “b” through “f” show materials after any necessary conversion to tons for truckloads.

2.1 IER #1 - La Branche Wetlands Levee, St. Charles Parish, Louisiana

The proposed actions for IER #1 include raising approximately nine miles of earthen levees, replacing over 3,000 feet of floodwalls, rebuilding or modifying four drainage structures, closing one drainage structure, and modifying one railroad gate in St. Charles Parish, Louisiana. Details of the proposed action are available in the Final IER at www.nolaenvironmental.gov. Individual contracts included in IER 1 are listed below, and figure 2-1 provides an overview of the projects.

LPV03d.2	Airport Runway 10 Levee - Phase 2
LPV04.1	St. Charles Levee - Reach 1A, 1B & 2A - Phase 1
LPV04.2A	Levee - Reach 1A - Phase 2
LPV04.2B	Levee - Reach 1B - Phase 2
LPV05.2A	Levee - Reach 2A - Phase 2
LPV05.2B	Levee - Reach 2B - Phase 2
LPV06a.2	Bayou Trepagnier Complex Floodwall
LPV06e.2	Floodwall Under I-310 - Phase 2
LPV06f.2	Canadian National Railroad Gate
LPV07b.2	Cross Bayou Drainage Structure Tie-ins - Phase 2
LPV07c.2	St. Rose Drainage Structure - Phase 2
LPV07d.2	Almeidia / Walker Drainage Structure - Phase 2

Figure 2-1. IER #1 Project Area

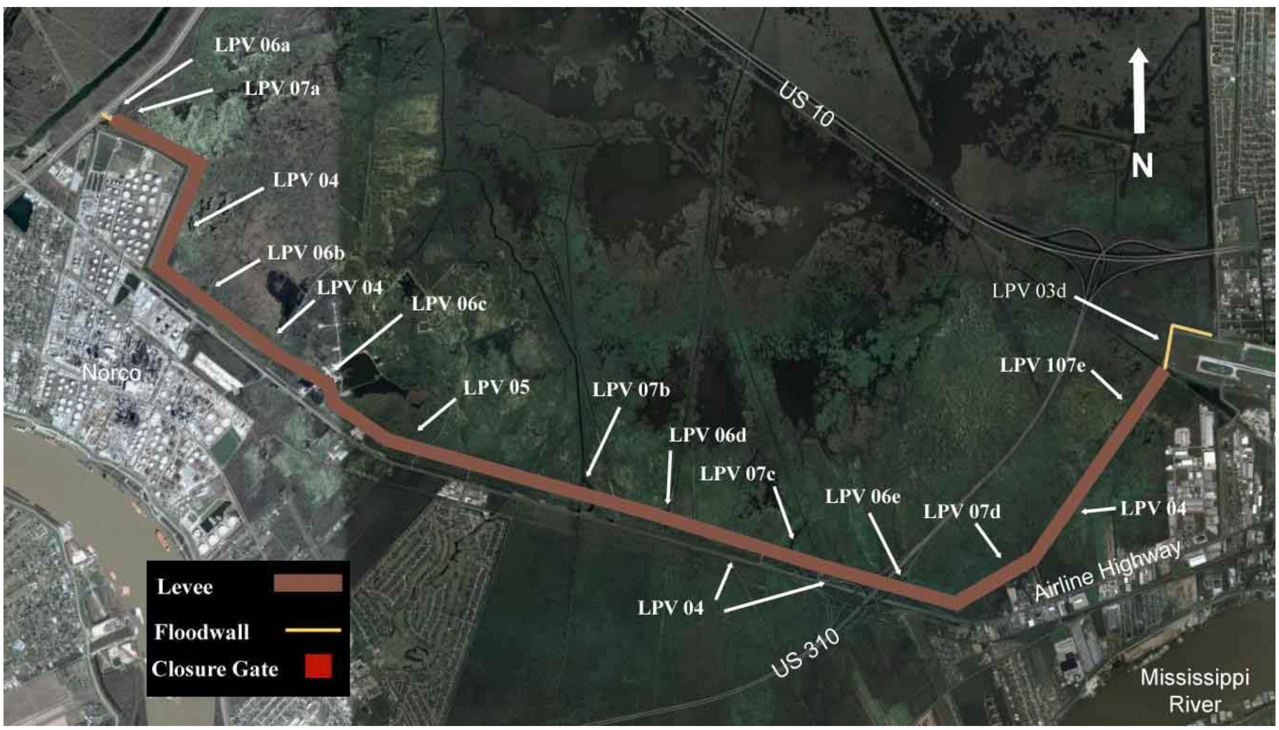

Table 2-1a. Materials Quantities for Construction Reaches in IER #1

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV03d.2	202,000			500				
LPV04.1	1,312,000							
LPV04.2A	408,000							
LPV04.2B	620,000							
LPV05.2A	440,000							
LPV05.2B	1,200,000							
LPV06a.2	10,000	4,800	7,300	127,100	72,300			
LPV06e.2		14,300	21,600	54,800	41,600	2,200		
LPV06f.2	14,000	1,000	1,500	36,600	12,000			
LPV07b.2		1,900	2,800	37,300	38,300	4,100		
LPV07c.2	180,000	1,800	2,800	41,200	34,700	3,700		
LPV07d.2	20,000	1,800	2,800	37,300	32,400	5,600		

Table 2-1b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #1

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03d.2	200	Feb-10	20,200	300	141,400	2,120	40,400	610
LPV04.1	730	Jul-07	131,200	540	918,400	3,770	262,400	1,080
LPV04.2A	420	Sep-09	40,800	290	285,600	2,040	81,600	580
LPV04.2B	420	Oct-09	62,000	440	434,000	3,100	124,000	890
LPV05.2A	420	Nov-09	44,000	310	308,000	2,200	88,000	630
LPV05.2B	530	Sep-09	120,000	680	840,000	4,750	240,000	1,360
LPV06a.2	310	Sep-09	1,000	LT10	7,000	70	2,000	20
LPV06e.2	390	Nov-09						
LPV06f.2	370	Jan-10	1,400	10	9,800	80	2,800	20
LPV07b.2	510	Dec-09						
LPV07c.2	500	Jan-10	18,000	110	126,000	760	36,000	220
LPV07d.2	270	Aug-09	2,000	20	14,000	160	4,000	40

Table 2-1c. Steel Demand (Tons) by Project Period in IER #1

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03d.2	200	Feb-10	10	LT10				
LPV04.1	730	Jul-07						
LPV04.2A	420	Sep-09						
LPV04.2B	420	Oct-09						
LPV05.2A	420	Nov-09						
LPV05.2B	530	Sep-09						
LPV06a.2	310	Sep-09	5,760	60				
LPV06e.2	390	Nov-09	3,090	20				
LPV06f.2	370	Jan-10	1,260	10				
LPV07b.2	510	Dec-09	2,700	20				
LPV07c.2	500	Jan-10	2,600	20				
LPV07d.2	270	Aug-09	2,540	30				

Table 2-1d. Concrete Demand (Cubic Yards) by Project Period in IER #1

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03d.2	200	Feb-10						
LPV04.1	730	Jul-07						
LPV04.2A	420	Sep-09						
LPV04.2B	420	Oct-09						
LPV05.2A	420	Nov-09						
LPV05.2B	530	Sep-09						
LPV06a.2	310	Sep-09	970	LT10	1,940	20	1,940	20
LPV06e.2	390	Nov-09	2,860	20	5,720	40	5,720	40
LPV06f.2	370	Jan-10	200	LT10	410	LT10	410	LT10
LPV07b.2	510	Dec-09	370	LT10	740	LT10	740	LT10
LPV07c.2	500	Jan-10	370	LT10	730	LT10	730	LT10
LPV07d.2	270	Aug-09	370	LT10	730	LT10	730	LT10

Table 2-1e. Aggregate Demand (Tons) by Project Period in IER #1

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03d.2	200	Feb-10						
LPV04.1	730	Jul-07						
LPV04.2A	420	Sep-09						
LPV04.2B	420	Oct-09						
LPV05.2A	420	Nov-09						
LPV05.2B	530	Sep-09						
LPV06a.2	310	Sep-09	1,470	10	2,930	30	2,930	30
LPV06e.2	390	Nov-09	4,320	30	8,650	70	8,650	70
LPV06f.2	370	Jan-10	310	LT10	620	LT10	620	LT10
LPV07b.2	510	Dec-09	560	LT10	1,120	LT10	1,120	LT10
LPV07c.2	500	Jan-10	550	LT10	1,100	LT10	1,100	LT10
LPV07d.2	270	Aug-09	550	LT10	1,100	10	1,100	10

None of the projects require concrete pile, or rock for construction. Tables 2-1f and 2-1g have been omitted.

2.2 IER #2 – West Return Floodwall, Jefferson-St. Charles Parish, Louisiana

The proposed actions for IER #2 is the replacement of approximately 3.4 miles of floodwalls: West Return Floodwall, Floodwall under I-10, and Recurve I-Wall in Northwest Kenner. Details of the proposed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER 2 are listed below, and figure 2-2 provides an overview of the projects.

LPV03.2A	West Return Floodwall - Phase 2
LPV03.2B	West Return Floodwall - Phase 2

Figure 2-2. IER #2 Project Area

Table 2-2a. Materials Quantities for Construction Reaches in IER #2

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV03.2A	42,000	100,100	151,400	616,900	1,467,700			87,700
LPV03.2B	128,000							

Table 2-2b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #2

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03.2A	540	Feb-10	4,200	20	29,400	160	8,400	50
LPV03.2B	540	Feb-10	12,800	70	89,600	500	25,600	140

Table 2-2c. Steel Demand (Tons) by Project Period in IER #2

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03.2A	540	Feb-10	77,650	430				
LPV03.2B	540	Feb-10						

Table 2-2d. Concrete Demand (Cubic Yards) by Project Period in IER #2

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03.2A	540	Feb-10	20,030	110	40,060	220	40,060	220
LPV03.2B	540	Feb-10						

Table 2-2e. Aggregate Demand (Tons) by Project Period in IER #2

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03.2A	540	Feb-10	30,280	170	60,570	340	60,570	340
LPV03.2B	540	Feb-10						

None of the projects require concrete pile for construction. Table 2-2f has been omitted.

Table 2-2g. Rock Demand (Tons) by Project Period in IER #2

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV03.2A	540	Feb-10					87,700	490
LPV03.2B	540	Feb-10						

2.3 IER #3 – Jefferson East Bank, Jefferson Parish Louisiana

The proposed actions for IER #3 are 11 separate construction projects that collectively rebuild 9.5 miles of earthen levees along the Lake Pontchartrain waterfront, upgrade the foreshore protection, replace two floodgates, and construct fronting protection and breakwaters at four pumping stations. Details of the proposed actions are available in the Final IER at www.nolaenvironmental.gov. Individual contracts included in IER 3 are listed below, and figure 2-3 provides an overview of the projects.

LPV00.2	Reach 1 Lakefront Levee - Phase 2
LPV01.2	Foreshore Protection A - Phase 2
LPV02.2	Reach 3 - Lakefront Levee - Phase 2
LPV09.2	Pump Station #1 (Bonnabel) Modification, Fronting Protection - Phase 2
LPV09a.2	Pump Station #1 Breakwater - Phase 2
LPV12a.2	Pump Station #4 Breakwater - Phase 2
LPV16.2	Floodwall and Gate at Bonnabel Boat Launch - Phase 2
LPV17.2	Bridge Abutment and Floodwall Tie-ins at Causeway Bridge - Phase 2
LPV18.2	Floodwall and Gate at Williams Boat Launch - Phase 2
LPV19.2	Reach 4 Lakefront Levee - Phase 2
LPV20.2	Foreshore Protection B

Figure 2-3. IER # 3 Project Area

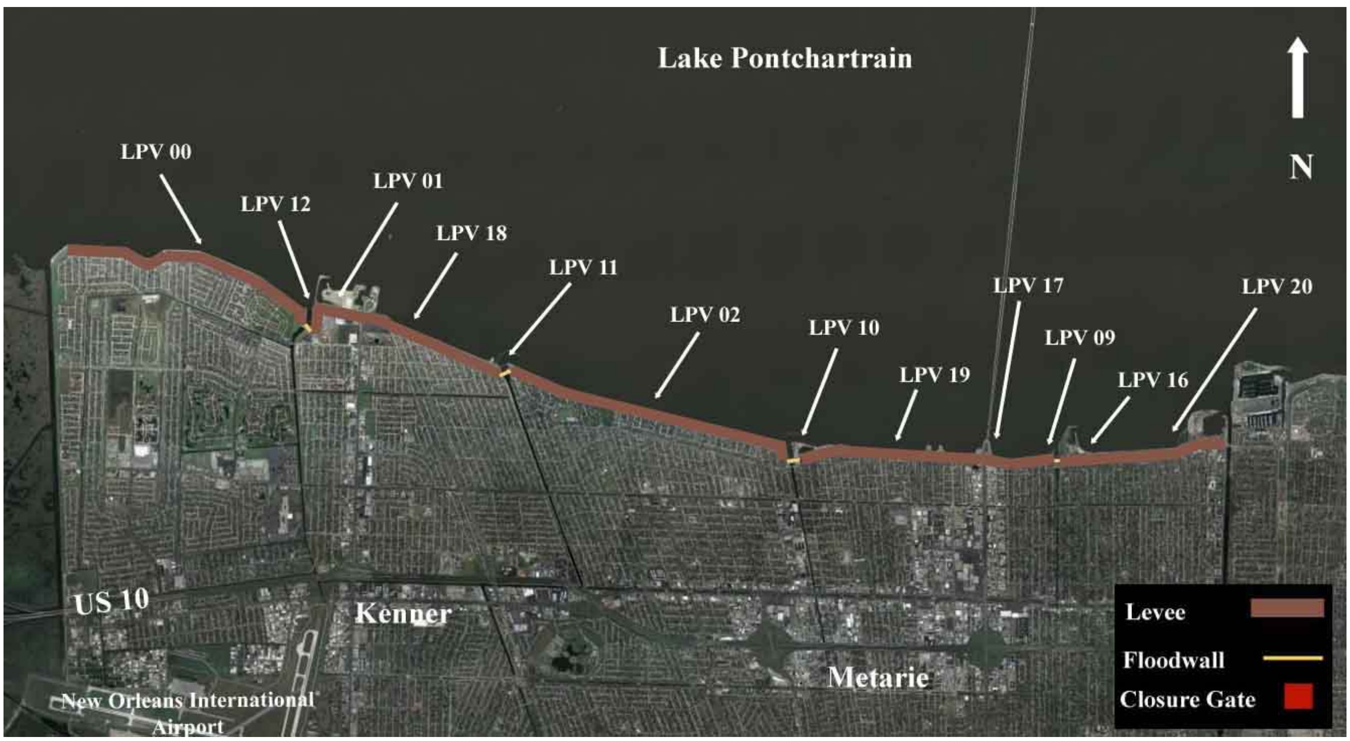

Table 2-3a. Materials Quantities for Construction Reaches in IER #3

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV00.2	149,000							130,900
LPV01.2	202,000							69,900
LPV02.2	184,000							131,000
LPV09.2		27,700	41,800	214,600	212,900	36,200	99,100	33,800
LPV09a.2				15,500			20,200	35,000
LPV12a.2		1,500	2,300	10,800			17,400	3,800
LPV16.2		500	800				3,300	
LPV17.2	76,000	200	300	49,100				
LPV18.2		500	800				1,300	
LPV19.2	116,000							72,900
LPV20.2								61,000

Table 2-3b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #3

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV00.2	280	Sep-09	14,900	160	104,300	1,120	29,800	320
LPV01.2	310	Mar-10	20,200	200	141,400	1,370	40,400	390
LPV02.2	290	Jul-09	18,400	190	128,800	1,330	36,800	380
LPV09.2	1470	Oct-09						
LPV09a.2	190	May-09						
LPV12a.2	250	Aug-09						
LPV16.2	150	Nov-09						
LPV17.2	680	May-10	7,600	30	53,200	230	15,200	70
LPV18.2	130	Sep-09						
LPV19.2	240	Aug-09	11,600	150	81,200	1,020	23,200	290
LPV20.2	300	Mar-10						

Table 2-3c. Steel Demand (Tons) by Project Period in IER #3

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV00.2	280	Sep-09						
LPV01.2	310	Mar-10						
LPV02.2	290	Jul-09						
LPV09.2	1470	Oct-09	16,050	30				
LPV09a.2	190	May-09	310	LT10				
LPV12a.2	250	Aug-09	220	LT10				
LPV16.2	150	Nov-09						
LPV17.2	680	May-10	980	LT10				
LPV18.2	130	Sep-09						
LPV19.2	240	Aug-09						
LPV20.2	300	Mar-10						

Table 2-3d. Concrete Demand (Cubic Yards) by Project Period in IER #3

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV00.2	280	Sep-09						
LPV01.2	310	Mar-10						
LPV02.2	290	Jul-09						
LPV09.2	1470	Oct-09	5,530	10	11,070	20	11,070	20
LPV09a.2	190	May-09						
LPV12a.2	250	Aug-09	300	LT10	600	LT10	600	LT10
LPV16.2	150	Nov-09	100	LT10	200	LT10	200	LT10
LPV17.2	680	May-10	50	LT10	90	LT10	90	LT10
LPV18.2	130	Sep-09	100	LT10	210	LT10	210	LT10
LPV19.2	240	Aug-09						
LPV20.2	300	Mar-10						

Table 2-3e. Aggregate Demand (Tons) by Project Period in IER #3

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV00.2	280	Sep-09						
LPV01.2	310	Mar-10						
LPV02.2	290	Jul-09						
LPV09.2	1470	Oct-09	8,370	20	16,730	30	16,730	30
LPV09a.2	190	May-09						
LPV12a.2	250	Aug-09	460	LT10	910	10	910	10
LPV16.2	150	Nov-09	150	LT10	300	LT10	300	LT10
LPV17.2	680	May-10	70	LT10	140	LT10	140	LT10
LPV18.2	130	Sep-09	160	LT10	310	LT10	310	LT10
LPV19.2	240	Aug-09						
LPV20.2	300	Mar-10						

Table 2-3f. Concrete Pile Demand (Tons) by Project Period in IER #3

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV00.2	280	Sep-09						
LPV01.2	310	Mar-10						
LPV02.2	290	Jul-09						
LPV09.2	1470	Oct-09	26,450	50				
LPV09a.2	190	May-09	5,380	80				
LPV12a.2	250	Aug-09	4,640	60				
LPV16.2	150	Nov-09	880	20				
LPV17.2	680	May-10						
LPV18.2	130	Sep-09	350	LT10				
LPV19.2	240	Aug-09						
LPV20.2	300	Mar-10						

Table 2-3g. Rock Demand (Tons) by Project Period in IER #3

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV00.2	280	Sep-09					130,900	1,400
LPV01.2	310	Mar-10					69,940	680
LPV02.2	290	Jul-09					131,040	1,360
LPV09.2	1470	Oct-09					33,810	70
LPV09a.2	190	May-09					35,000	550
LPV12a.2	250	Aug-09					3,770	50
LPV16.2	150	Nov-09						
LPV17.2	680	May-10						
LPV18.2	130	Sep-09						
LPV19.2	240	Aug-09					72,930	910
LPV20.2	300	Mar-10					60,970	610

2.4 IER #4 – New Orleans Lakefront Levee, West of Inner Harbor Navigation Canal, Orleans Parish, Louisiana

The proposed actions for IER #4 rebuild approximately 4.4 miles of earthen levee, 7,600 feet of floodwall, 16 vehicle access gates, and one sector gate along the Lake Pontchartrain waterfront in Orleans Parish. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 4 are listed below, and figure 2-4 provides an overview of the projects.

LPV101.2	Lakefront Levee OEB -17th St. Canal to Topaz St.- Phase 2
LPV103.01A	Lakefront Levee OEB -LPV 101-103.01A
LPV103.01A2	Lakefront Levee OEB - Orleans Canal to London Ave
LPV104.01a	Lakefront Levee OEB- London Ave Canal to IHNC - Phase 1A
LPV104.02	Lakefront Levee OEB -London Ave Canal to IHNC - Phase 2

Figure 2-4. IER # 4 Project Area

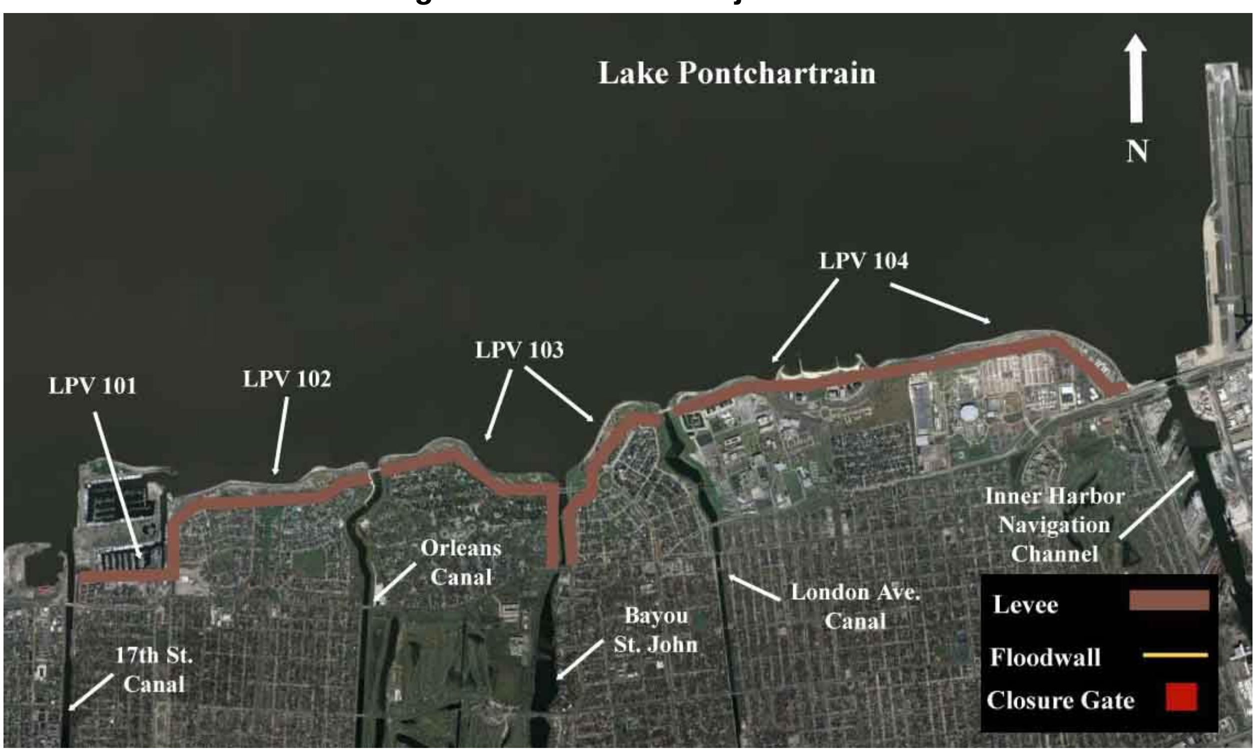

Table 2-4a. Materials Quantities for Construction Reaches in IER #4

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV101.2		16,500	25,000	55,900	77,800		16,500	1,800
LPV103.01A	150,000	5,000	7,600	57,800	28,300		4,700	
LPV103.01A2	150,000	1,700	2,500	19,300	9,400		1,600	
LPV104.01a	102,000							
LPV104.02	10,000	2,400	3,600	46,900	102,000			

Table 2-4b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #4

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV101.2	700	Jul-09						
LPV103.01A	400	Aug-09	15,000	110	105,000	790	30,000	230
LPV103.01A2	200	Jan-10	15,000	230	105,000	1,580	30,000	450
LPV104.01a	390	Sep-09	10,200	80	71,400	550	20,400	160
LPV104.02	560	Oct-09	1,000	LT10	7,000	40	2,000	10

Table 2-4c. Steel Demand (Tons) by Project Period in IER #4

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV101.2	700	Jul-09	4,580	20				
LPV103.01A	400	Aug-09	2,410	20				
LPV103.01A2	200	Jan-10	800	10				
LPV104.01a	390	Sep-09						
LPV104.02	560	Oct-09	5,480	30				

Table 2-4d. Concrete Demand (Cubic Yards) by Project Period in IER #4

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV101.2	700	Jul-09	3,300	10	6,600	30	6,600	30
LPV103.01A	400	Aug-09	1,010	LT10	2,010	20	2,010	20
LPV103.01A2	200	Jan-10	340	LT10	670	10	670	10
LPV104.01a	390	Sep-09						
LPV104.02	560	Oct-09	480	LT10	950	LT10	950	LT10

Table 2-4e. Aggregate Demand (Tons) by Project Period in IER #4

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV101.2	700	Jul-09	4,990	20	9,980	40	9,980	40
LPV103.01A	400	Aug-09	1,520	10	3,040	20	3,040	20
LPV103.01A2	200	Jan-10	510	LT10	1,010	20	1,010	20
LPV104.01a	390	Sep-09						
LPV104.02	560	Oct-09	720	LT10	1,440	LT10	1,440	LT10

Table 2-4f. Concrete Pile Demand (Tons) by Project Period in IER #4

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV101.2	700	Jul-09	4,410	20				
LPV103.01A	400	Aug-09	1,240	LT10				
LPV103.01A2	200	Jan-10	410	LT10				
LPV104.01a	390	Sep-09						
LPV104.02	560	Oct-09						

Table 2-4g. Rock Demand (Tons) by Project Period in IER #4

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV101.2	700	Jul-09					1,770	LT10
LPV103.01A	400	Aug-09						
LPV103.01A2	200	Jan-10						
LPV104.01a	390	Sep-09						
LPV104.02	560	Oct-09						

2.5 IER #5 – Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal, and London Avenue Canal, Orleans and Jefferson Parishes, Louisiana

The proposed actions for IER #5 provide new closure structures and pumping stations for each of three canals (17th Street Canal, Orleans Outfall Canal, and London Avenue Canal) all under a single construction project, PCCP-01. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 5 are listed below, and figure 2-5 provides an overview of the projects.

PCCP-01 PCCP -Pump Stations for Outfall Canal Closures

Figure 2-5. IER # 5 Project Area

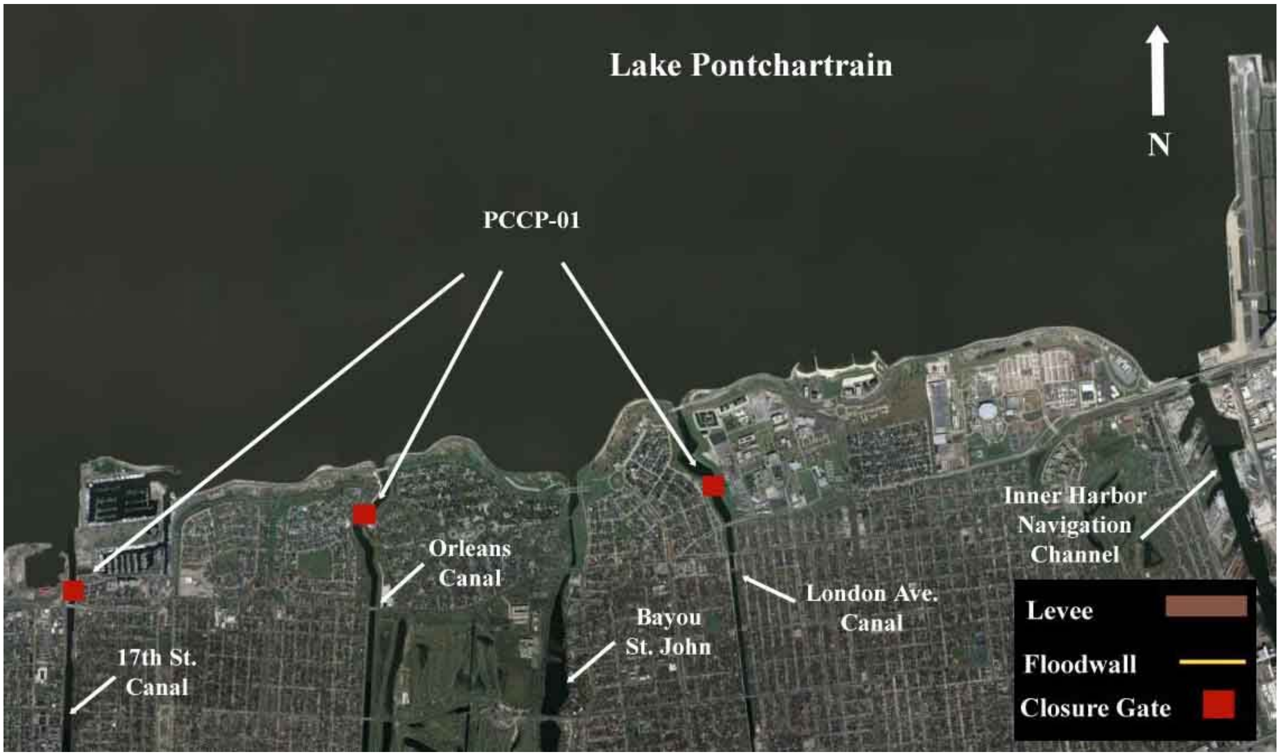

Table 2-5a. Materials Quantities for Construction Reaches in IER #5

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
PCCP01		11,100	16,700	285,800	326,900			

The projects do not require earthen fill, concrete pile, or rock. Tables 2-5b, 2-5f, and 2-5g have been omitted.

Table 2-5c. Steel Demand (Tons) by Project Period in IER #5

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
PCCP-01	1200	Aug-10	20,260	50				

Table 2-5d. Concrete Demand (Cubic Yards) by Project Period in IER #5

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
PCCP-01	1200	Aug-10	2,210	LT10	4,420	10	4,420	10

Table 2-5e. Aggregate Demand (Tons) by Project Period in IER #5

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
PCCP-01	1200	Aug-10	3,340	LT10	6,680	20	6,680	20

2.6 IER #6 – New Orleans East, Orleans Parish, Louisiana

The proposed actions for IER #6 provide 6 miles of levee or 1.9 miles of levee and conversion of 4.1 miles of levees to floodwall and replacement of two miles of floodwalls and four floodgates. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 6 are listed below, and figure 2-6 provides an overview of the projects.

LPV105.01	Lakefront Airport Floodwalls- West
LPV105.02	T-Wall Existing Alignment-Lakefront Airport- East
LPV106	Raise Levee- Paris Rd to Lakefront Airport
LPV106.01	Breakwater / Foreshore Protection NOE Lakefront Levee
LPV107	Replace Gate at Lincoln Beach

Figure 2-6. IER # 6 Project Area

Table 2-6a. Materials Quantities for Construction Reaches in IER #6

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV105.01	12,000	15,300	23,100	155,600	218,000			
LPV105.02	56,000	5,400	8,100	31,300	80,100			
LPV106	52,000	40,500	61,300	1,366,000	696,000			
LPV106.01								80,000
LPV107	40,000	700	1,100	30,000	10,500			

Table 2-6b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #6

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV105.01	380	Jan-10	1,200	LT10	8,400	70	2,400	20
LPV105.02	380	Feb-10	5,600	40	39,200	310	11,200	90
LPV106	360	Dec-09	5,200	40	36,400	300	10,400	90
LPV106.01	740	Sep-09						
LPV107	280	Jan-10	4,000	40	28,000	300	8,000	90

Table 2-6c. Steel Demand (Tons) by Project Period in IER #6

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV105.01	380	Jan-10	12,810	100				
LPV105.02	380	Feb-10	4,190	30				
LPV106	360	Dec-09	58,290	490				
LPV106.01	740	Sep-09						
LPV107	280	Jan-10	1,070	10				

Table 2-6d. Concrete Demand (Cubic Yards) by Project Period in IER #6

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV105.01	380	Jan-10	3,060	20	6,120	50	6,120	50
LPV105.02	380	Feb-10	1,080	LT10	2,150	20	2,150	20
LPV106	360	Dec-09	8,110	70	16,220	140	16,220	140
LPV106.01	740	Sep-09						
LPV107	280	Jan-10	150	LT10	300	LT10	300	LT10

Table 2-6e. Aggregate Demand (Tons) by Project Period in IER #6

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV105.01	380	Jan-10	4,620	40	9,250	70	9,250	70
LPV105.02	380	Feb-10	1,630	10	3,260	30	3,260	30
LPV106	360	Dec-09	12,260	100	24,520	200	24,520	200
LPV106.01	740	Sep-09						
LPV107	280	Jan-10	230	LT10	450	LT10	450	LT10

None of the projects require concrete pile for construction. Table 2-6f has been omitted.

Table 2-6g. Rock Demand (Tons) by Project Period in IER #6

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV105.01	380	Jan-10						
LPV105.02	380	Feb-10						
LPV106	360	Dec-09						
LPV106.01	740	Sep-09					80,000	320
LPV107	280	Jan-10						

2.7 IER #7 – New Orleans East, Orleans Parish, Louisiana

The proposed actions for IER #7 provide 19.3 miles of levee and three floodgates. Details of the proposed actions are available at www.nolaenvironmental.gov. Individual contracts included in IER 7 are listed below, and figure 2-7 provides an overview of the projects.

LPV108	Levee Raise-Paris Rd to South Point
LPV109.02a	Levee raise to 100-Year Elevation
LPV109.02b	I-10 Floodwall & Crossing
LPV109.02c	US11 & US 90 Gates & Crossing
LPV110	Modify CSX RR Gate
LPV111.01	100 Year Levee Raise-CSX RR to Michoud Canal
LPV111.02	Raisewall at Pumpstation#15- CSXRR to Michoud Canal
LPV113	Citrus Back Levee (Michoud Canal to Slip)

Figure 2-7. IER # 7 Project Area

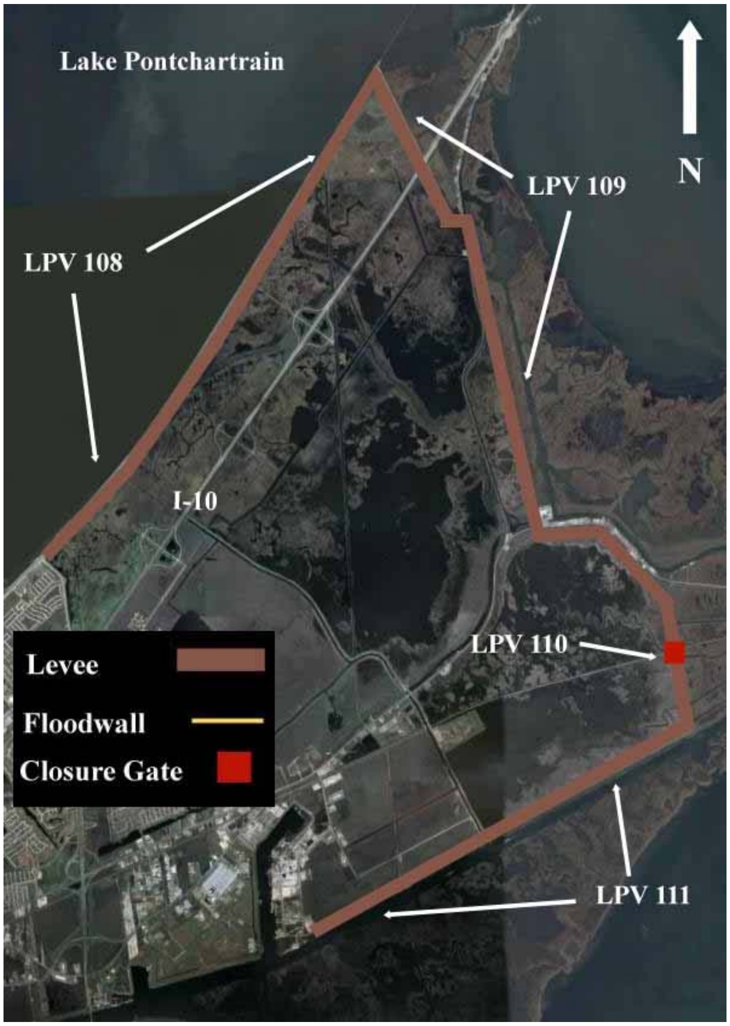

Table 2-7a. Materials Quantities for Construction Reaches in IER #7

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV108	450,000							121,000
LPV109.02a	4,910,000	600	1,000					2,500
LPV109.02b	115,000							
LPV109.02c	40,000	1,700	2,500	21,600	15,700			
LPV110	40,000	300	500	20,400	2,600			
LPV111.01	2,460,000			184,800				
LPV111.02	10,000	11,900	18,000	42,500		7,600		
LPV113	648,000							

Table 2-7b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #7

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV108	280	Dec-08	45,000	480	315,000	3,380	90,000	960
LPV109.02a	710	Mar-10	491,000	2,070	3,437,000	14,520	982,000	4,150
LPV109.02b	510	Mar-10	11,500	70	80,500	470	23,000	140
LPV109.02c	200	Dec-09	4,000	60	28,000	420	8,000	120
LPV110	400	Apr-10	4,000	30	28,000	210	8,000	60
LPV111.01	840	Aug-09	246,000	880	1,722,000	6,150	492,000	1,760
LPV111.02	270	Dec-09	1,000	10	7,000	80	2,000	20
LPV113	240	Jul-09	64,800	810	453,600	5,670	129,600	1,620

Table 2-7c. Steel Demand (Tons) by Project Period in IER #7

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV108	280	Dec-08						
LPV109.02a	710	Mar-10						
LPV109.02b	510	Mar-10						
LPV109.02c	200	Dec-09	1,130	20				
LPV110	400	Apr-10	520	LT10				
LPV111.01	840	Aug-09	3,700	10				
LPV111.02	270	Dec-09	1,330	10				
LPV113	240	Jul-09						

Table 2-7d. Concrete Demand (Cubic Yards) by Project Period in IER #7

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV108	280	Dec-08						
LPV109.02a	710	Mar-10	130	LT10	260	LT10	260	LT10
LPV109.02b	510	Mar-10						
LPV109.02c	200	Dec-09	330	LT10	660	LT10	660	LT10
LPV110	400	Apr-10	60	LT10	120	LT10	120	LT10
LPV111.01	840	Aug-09						
LPV111.02	270	Dec-09	2,380	30	4,760	50	4,760	50
LPV113	240	Jul-09						

Table 2-7e. Aggregate Demand (Tons) by Project Period in IER #7

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV108	280	Dec-08						
LPV109.02a	710	Mar-10	190	LT10	390	LT10	390	LT10
LPV109.02b	510	Mar-10						
LPV109.02c	200	Dec-09	500	LT10	1,000	20	1,000	20
LPV110	400	Apr-10	90	LT10	190	LT10	190	LT10
LPV111.01	840	Aug-09						
LPV111.02	270	Dec-09	3,600	40	7,200	80	7,200	80
LPV113	240	Jul-09						

None of the projects require concrete pile for construction. Table 2-7f has been omitted.

Table 2-7g. Rock Demand (Tons) by Project Period in IER #7

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV108	280	Dec-08					121,000	1,300
LPV109.02a	710	Mar-10					2,540	10
LPV109.02b	510	Mar-10						
LPV109.02c	200	Dec-09						
LPV110	400	Apr-10						
LPV111.01	840	Aug-09						
LPV111.02	270	Dec-09						
LPV113	240	Jul-09						

2.8 IER #8 – Bayou Bienvenue and Bayou Dupre Control Structures, St. Bernard Parish, Louisiana

The proposed actions for IER #8 require the replacement of approximately 1,000 linear feet of floodwalls and the replacement of two navigable floodgates. This project is being completed under one construction projects, LPV 144, Bayou Bienvenue and Bayou Dupre Floodgate Structures. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 8 are listed below, and figure 2-8 provides an overview of the projects.

LPV144	Chalmette Loop Levee, St. Bernard Parish

Figure 2-8. IER #8 Project Area

Table 2-8a. Materials Quantities for Construction Reaches in IER #8

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV144	300	14,900	22,500	33,400	94,100			13,200

Table 2-8b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #8

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV144	510	Dec-09	30	LT10	180	LT10	50	LT10

Table 2-8c. Steel Demand (Tons) by Project Period in IER #8

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV144	510	Dec-09	4,860	30				

Table 2-8d. Concrete Demand (Cubic Yards) by Project Period in IER #8

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV144	510	Dec-09	2,980	20	5,950	40	5,950	40

Table 2-8e. Aggregate Demand (Tons) by Project Period in IER #8

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV144	510	Dec-09	4,500	30	9,000	50	9,000	50

The project does not require concrete pile for construction. Table 2-8f has been omitted.

Table 2-8g. Rock Demand (Tons) by Project Period in IER #8

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV144	510	Dec-09					13,220	80

2.9 IER #9 – Caernarvon Floodwall, St. Bernard Parish, Louisiana

The proposed actions for IER #9 involve the replacement of two floodgates, the reconstruction of 1,500 feet of floodwall, and possible realignment of levee. This project is being completed under a single construction project: LPV 149, Caernarvon Floodwall. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 9 are listed below, and figure 2-9 provides an overview of the projects.

LPV149	Chalmette Loop Levee, St. Bernard Parish

Figure 2-9. IER # 9 Project Area

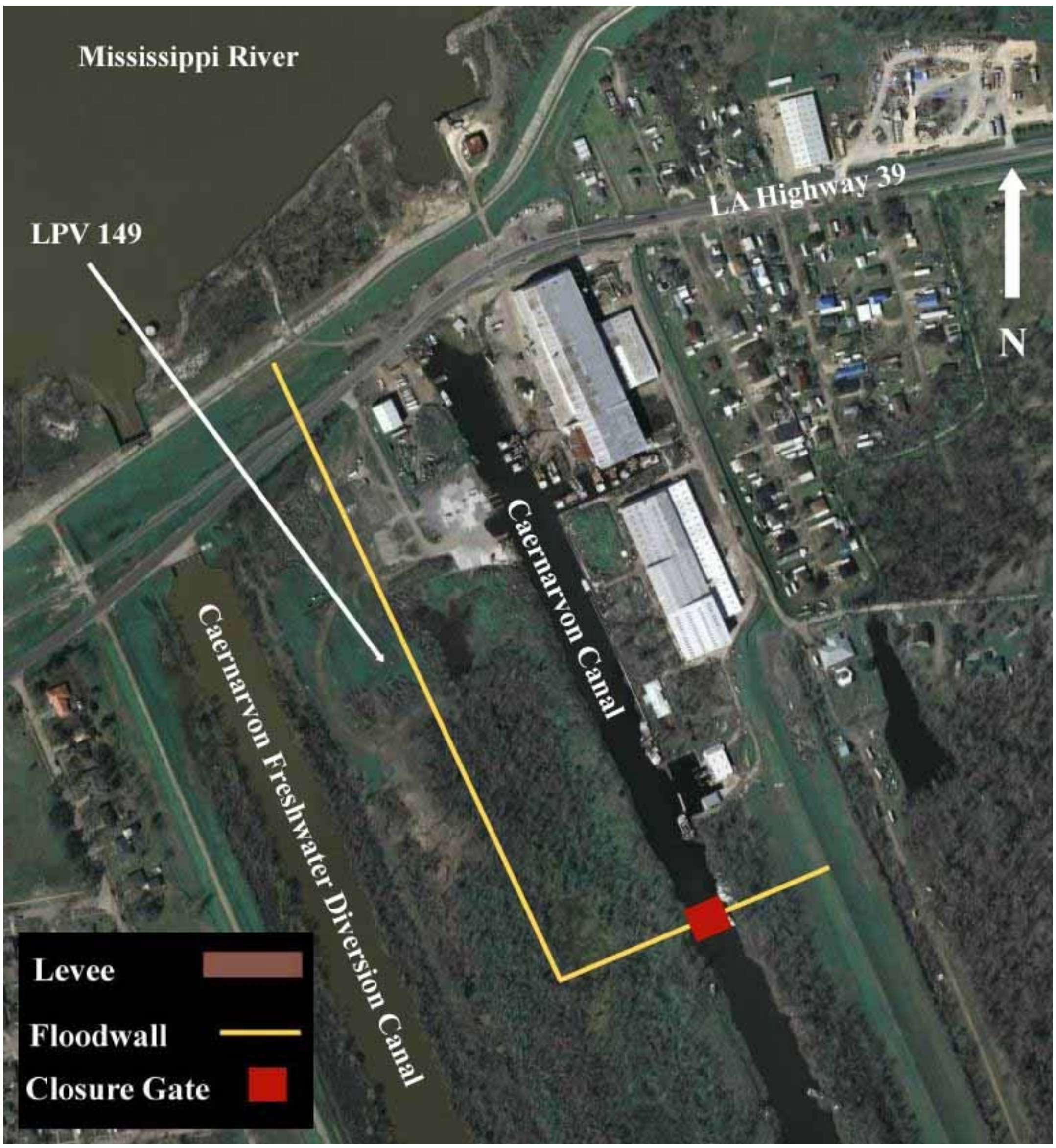

Table 2-9a. Materials Quantities for Construction Reaches in IER #9

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV149	141,000	12,000	18,100	69,200	102,000			

Table 2-9b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #9

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV149	500	Feb-10	14,100	80	98,700	590	28,200	170

Table 2-9c. Steel Demand (Tons) by Project Period in IER #9

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV149	500	Feb-10	5,920	40				

Table 2-9d. Concrete Demand (Cubic Yards) by Project Period in IER #9

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV149	500	Feb-10	2,400	10	4,800	30	4,800	30

Table 2-9e. Aggregate Demand (Tons) by Project Period in IER #9

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV149	500	Feb-10	3,630	20	7,260	40	7,260	40

The project does not require concrete pile or rock for construction. Tables 2-9f and 2-9g have been omitted.

2.10 IER #10 – Chalmette Loop, St. Bernard Parish, Louisiana

The proposed actions for IER #10 provide 100-year elevation of risk reduction for 22 miles of levee, 1,500 linear feet of floodwalls, and three floodgates. This project is being completed under four discrete construction projects: LPV 145, Bayou Bienvenue to Bayou Dupre Levee; LPV 146, Bayou Dupre to Hwy 46 Levee; LPV 147, Hwy 46 Crossing and Bayou Road Flood Gate; and LPV 148.02, Verret to Caernarvon Levee. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 10 are listed below, and figure 2-10 provides an overview of the projects.

LPV145	Chalmette Loop: Bayou Bienvenue to Bayou Dupre Levee, St. Bernard Parish
LPV146	Chalmette Loop: Bayou Dupre to Hwy 46 Levee
LPV147	Chalmette Loop: Hwy 46 Crossing and Bayou Road Flood Gate
LPV148.02	Chalmette Loop: Verret to Caernarvon Levee

Figure 2-10. IER # 10 Project Area

Table 2-10a. Materials Quantities for Construction Reaches in IER #10

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
LPV145	600,000	64,900	98,200	1,807,700	1,346,700			77,400
LPV146	600,000	101,200	153,000	2,102,200	1,430,900			197,100
LPV147	16,000	5,700	8,600	12,200	48,000		19,400	
LPV148.02	1,300,000	132,600	200,500	2,164,800	1,155,500			2,500

Table 2-10b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #10

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV145	800	Dec-09	60,000	230	420,000	1,580	120,000	450
LPV146	770	Dec-09	60,000	230	420,000	1,640	120,000	470
LPV147	480	Dec-09	1,600	LT10	11,200	70	3,200	20
LPV148.02	810	Feb-10	130,000	480	910,000	3,370	260,000	960

Table 2-10c. Steel Demand (Tons) by Project Period in IER #10

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV145	800	Dec-09	96,080	360				
LPV146	770	Dec-09	105,720	410				
LPV147	480	Dec-09	2,380	10				
LPV148.02	810	Feb-10	94,720	350				

Table 2-10d. Concrete Demand (Cubic Yards) by Project Period in IER #10

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV145	800	Dec-09	12,990	50	25,970	100	25,970	100
LPV146	770	Dec-09	20,240	80	40,480	160	40,480	160
LPV147	480	Dec-09	1,140	LT10	2,280	10	2,280	10
LPV148.02	810	Feb-10	26,510	100	53,030	200	53,030	200

Table 2-10e. Aggregate Demand (Tons) by Project Period in IER #10

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV145	800	Dec-09	19,640	70	39,270	150	39,270	150
LPV146	770	Dec-09	30,610	120	61,210	240	61,210	240
LPV147	480	Dec-09	1,720	10	3,440	20	3,440	20
LPV148.02	810	Feb-10	40,090	150	80,180	300	80,180	300

Table 2-10f. Concrete Pile Demand (Tons) by Project Period in IER #10

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV145	800	Dec-09						
LPV146	770	Dec-09						
LPV147	480	Dec-09	5,170	30				
LPV148.02	810	Feb-10						

Table 2-10g. Rock Demand (Tons) by Project Period in IER #10

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
LPV145	800	Dec-09					77,440	290
LPV146	770	Dec-09					197,060	770
LPV147	480	Dec-09						
LPV148.02	810	Feb-10					2,460	LT10

2.11 IER #11 – Improved Protection on the Inner Harbor Navigation Canal, Orleans and St. Bernard Parishes, Louisiana

The proposed actions under IER #11 would provide structural barriers to prevent damaging storm surges from entering the IHNC from Lake Pontchartrain and/or the Gulf Intracoastal Waterway (GIWW)-Mississippi River Gulf Outlet (MRGO)-Lake Borgne complex ("Lake Borgne complex"). The first proposed action, referred to as "Borgne 1," encompasses a location range within which a barrier could be built to address storm surge from the Lake Borgne complex. The second proposed action, referred to as "Pontchartrain 2," encompasses a location range within which a barrier could be built to address storm surge from the Lake Pontchartrain. Details of the proposed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER 11 are listed below, and figure 2-11 provides an overview of the projects.

IHNC01	IHNC-1 Protection from Lake Pontchartrain
IHNC02a	IHNC-2 Protection from Lake Borgne a
IHNC02b	IHNC-2 Protection from Lake Borgne b
IHNC02c	IHNC-2 Protection from Lake Borgne c
IHNC02d	IHNC-2 Protection from Lake Borgne d

Figure 2-11. IER # 11 Project Area

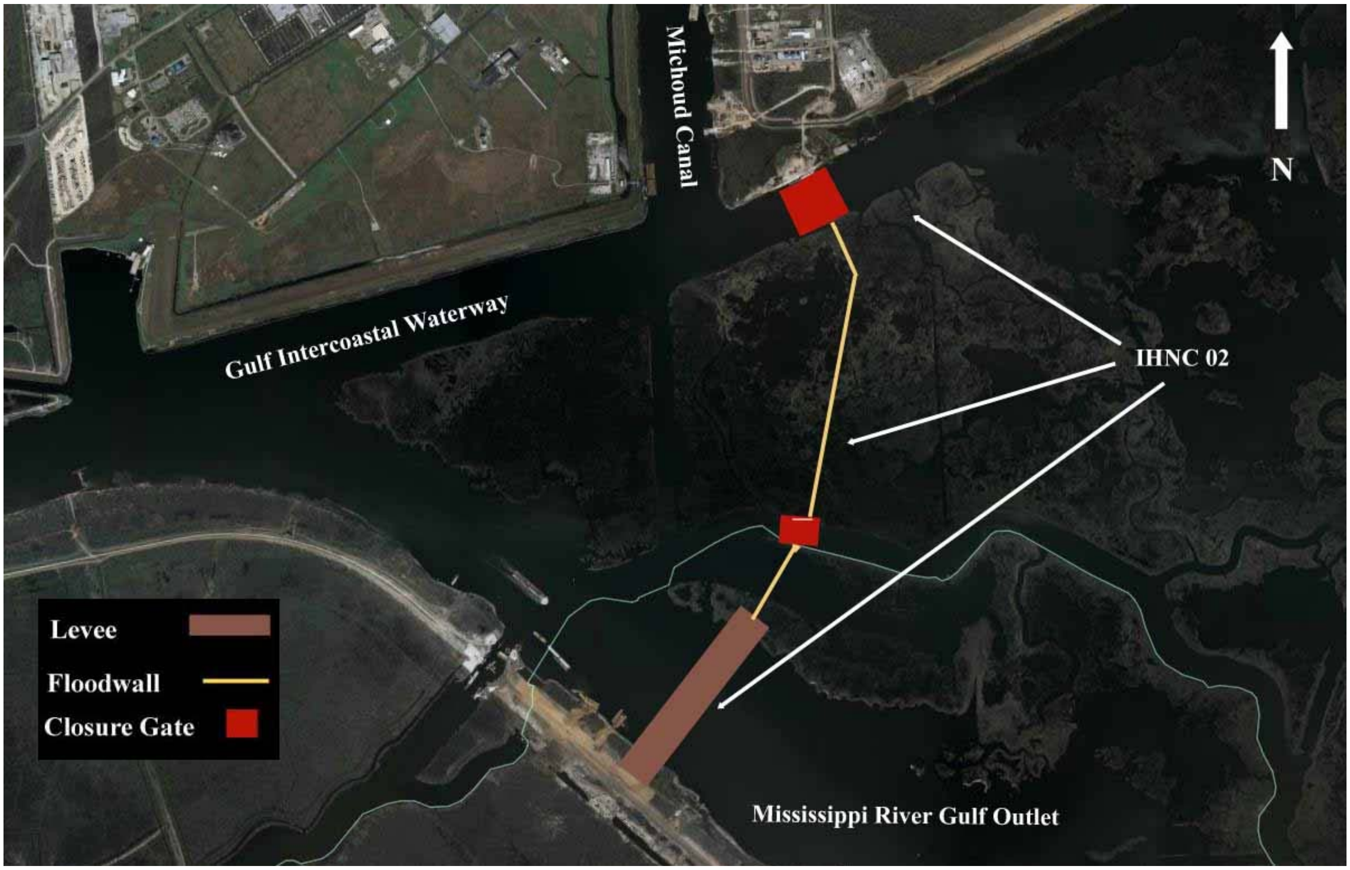

Table 2-11a. Materials Quantities for Construction Reaches in IER #11

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
IHNC01								
IHNC2a		33,900	51,300	110,500		102,000		6,000
IHNC2b		9,600	14,500	54,700		57,900		3,200
IHNC2c		100,900	152,600			265,000	148,200	172,000
IHNC2d		23,000	34,800			113,800	56,200	148,000

The project does not require earthen fill for construction. Table 2-11b has been omitted.

Table 2-11c. Steel Demand (Tons) by Project Period in IER #11

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
IHNC01	700	Feb-10						
IHNC-2a	1150	Apr-08	8,640	20				
IHNC-2b	1150	Apr-08	4,740	10				
IHNC-2c	1150	Apr-08	16,700	40				
IHNC-2d	1150	Apr-08	7,170	20				

Table 2-11d. Concrete Demand (Cubic Yards) by Project Period in IER #11

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
IHNC01	700	Feb-10						
IHNC-2a	1150	Apr-08	6,780	20	13,560	40	13,560	40
IHNC-2b	1150	Apr-08	1,920	LT10	3,840	10	3,840	10
IHNC-2c	1150	Apr-08	20,180	50	40,360	110	40,360	110
IHNC-2d	1150	Apr-08	4,600	10	9,200	20	9,200	20

Table 2-11e. Aggregate Demand (Tons) by Project Period in IER #11

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
IHNC01	700	Feb-10						
IHNC-2a	1150	Apr-08	10,250	30	20,500	50	20,500	50
IHNC-2b	1150	Apr-08	2,900	LT10	5,810	20	5,810	20
IHNC-2c	1150	Apr-08	30,510	80	61,020	160	61,020	160
IHNC-2d	1150	Apr-08	6,960	20	13,910	40	13,910	40

Table 2-11f. Concrete Pile Demand (Tons) by Project Period in IER #11

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
IHNC01	700	Feb-10						
IHNC-2a	1150	Apr-08						
IHNC-2b	1150	Apr-08						
IHNC-2c	1150	Apr-08	90,180	240				
IHNC-2d	1150	Apr-08	34,200	90				

Table 2-11g. Rock Demand (Tons) by Project Period in IER #11

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
IHNC01	700	Feb-10						
IHNC-2a	1150	Apr-08					6,000	20
IHNC-2b	1150	Apr-08					3,200	LT10
IHNC-2c	1150	Apr-08					172,000	450
IHNC-2d	1150	Apr-08					148,000	390

2.12 IER #12 – GIWW, Harvey and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana

The proposed action for IER # 12 would consist of constructing approximately 3 miles of levee and floodwall that would reduce the length of the current alignment by eliminating the need for 25 miles of existing parallel protection. The proposed action also includes providing a 100-year level of risk reduction fronting protection for pump stations and backflow prevention. Existing pump stations in the detention basin behind the surge barrier would receive fronting protection (El. 8.5 ft, less than 100-year level of risk reduction) and backflow prevention. Details of the proposed actions are available in the IER at www.nolaenvironmental.gov.

Individual contracts included in IER 12 are listed below, and figure 2-12 provides an overview of the projects.

WBV03a	Contract 3a, Hero PS to Algiers Canal
WBV03b	Contract 3b, Hero PS to Algiers Canal
WBV04.2	Belle Chasse Hwy to Hero Cutoff - Reach 1 - Phase 2
WBV05.2	Belle Chasse Hwy to Hero Cutoff - Reach 2 - Phase 2
WBV06.2	Belle Chasse Hwy to Hero Cutoff - Reach 3 & 4 - Phase 2
WBV06a.2	Belle Chasse Hwy to Hero Cutoff - Phase 2
WBV07	Planters PS Fronting Protection and Modifications
WBV08	S&WB PS #13 Fronting Protection and Modifications
WBV10	Belle Chasse PS #1 (Plaquemines PS) Fronting Protection and Modifications
WBV11	Belle Chasse PS #2 Fronting Protection and Modifications
WBV13	S&WB PS #11 Fronting Protection and Modifications
WBV14a.2	Estelle PS to Vicinity of LaPalco Overpass - Phase 2
WBV14g.2	Estelle PS Vicinity Floodwalls
WBV23	New Estelle PS Floodwall Modifications
WBV33	Old Estelle PS Fronting Protection and Modifications
WBV38.2	Cousins PS - Phase 2
WBV44	Whitney Barataria PS Floodwall Modifications

WBV46.2	Cousins Canal Walls - Destrehan Bridge to Sector Gate
WBV47.1	Algiers Lock to Belle Chase Hwy (West) - Phase 1
WBV48.2	Belle Chase Hwy to Algiers Lock (West) - Phase 2
WBV49.1	Hero Levee to Belle Chase Hwy (East) - Phase 1
WBV90	GIWW West Closure Complex

Figure 2-12. IER #12 Project Area

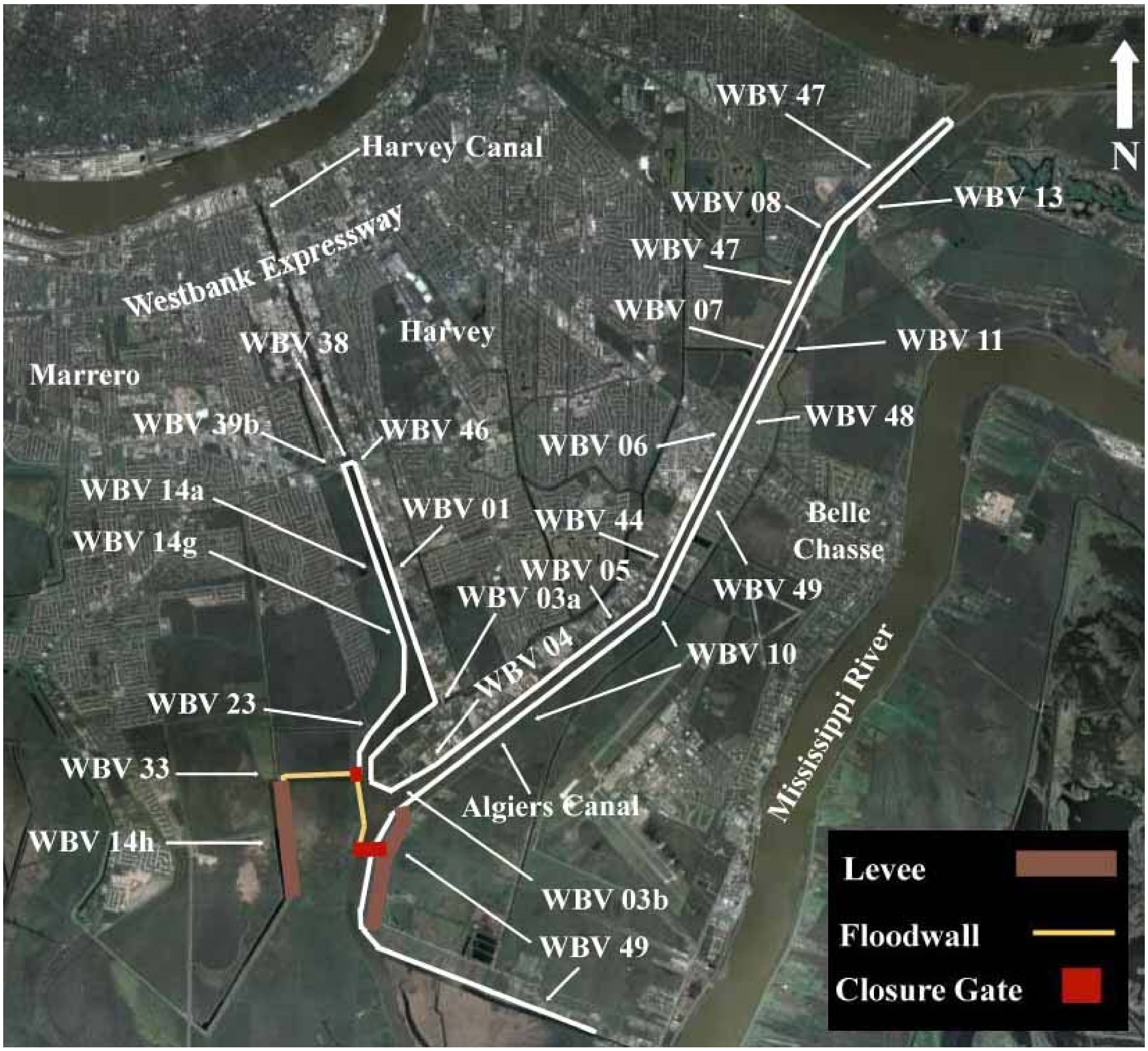

Table 2-12a. Materials Quantities for Construction Reaches in IER #12

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
WBV03a		2,600	4,000	14,800	34,300	1,900	9,900	
WBV03b	444,000	8,700	13,100	31,700			57,600	
WBV04.2		400	600	11,000	8,600			
WBV05.2		1,000	1,600	23,800	22,700			
WBV06.2		5,700	8,600	12,100	57,500			
WBV06a.2		5,300	8,000	1,084,200				
WBV07		2,200	3,300	31,500	21,800	2,300	12,200	
WBV08		2,500	3,700	25,200	29,200	14,800		
WBV10		1,600	2,400	13,200	22,700			
WBV11		900	1,400	10,700	11,800			
WBV13		2,200	3,300	23,800	22,400	2,200	10,300	
WBV14a.2		6,600	10,000	263,300	91,300			
WBV14g.2	28,000	12,400	18,800	210,400	193,900			700
WBV23		2,100	3,200	50,000	28,400			2,000
WBV33		3,300	4,900	36,800	40,200			900
WBV38.2		1,700	2,500	24,700	35,000			200
WBV44		7,000	10,600	42,000	71,200			1,900
WBV46.2		1,900	2,900	24,000	34,800			
WBV47.1	318,000			970,800				
WBV48.2		19,700	29,700	971,200	353,400			
WBV49.1	222,000	3,600	5,400	1,424,000	69,800			
WBV90		199,800	302,200	623,500	268,600	335,400	132,100	240,300

Table 2-12b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #12

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV03a	780	Jul-08						
WBV03b	490	Dec-08	44,400	270	310,800	1,900	88,800	540
WBV04.2	210	Oct-09						
WBV05.2	210	Oct-09						
WBV06.2	250	Jan-10						
WBV06a.2	370	May-10						
WBV07	580	Oct-09						
WBV08	590	Oct-09						
WBV10	620	Oct-09						
WBV11	540	Sep-09						
WBV13	680	Oct-09						
WBV14a.2	360	Dec-09						
WBV14g.2	780	Sep-09	2,800	10	19,600	80	5,600	20
WBV23	380	Feb-10						
WBV33	560	Oct-09						
WBV38.2	320	May-10						
WBV44	470	Feb-10						
WBV46.2	330	Dec-09						
WBV47.1	240	May-10	31,800	400	222,600	2,780	63,600	800
WBV48.2	370	May-10						
WBV49.1	180	Apr-10	22,200	370	155,400	2,590	44,400	740
WBV90	1720	Feb-10						

Table 2-12c. Steel Demand (Tons) by Project Period in IER #12

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV03a	780	Jul-08	1,940	LT10				
WBV03b	490	Dec-08	630	LT10				
WBV04.2	210	Oct-09	610	LT10				
WBV05.2	210	Oct-09	1,480	20				
WBV06.2	250	Jan-10	2,800	30				
WBV06a.2	370	May-10	21,680	180				
WBV07	580	Oct-09	1,750	LT10				
WBV08	590	Oct-09	2,740	10				
WBV10	620	Oct-09	1,270	LT10				
WBV11	540	Sep-09	740	LT10				
WBV13	680	Oct-09	1,620	LT10				
WBV14a.2	360	Dec-09	9,330	80				
WBV14g.2	780	Sep-09	12,830	50				
WBV23	380	Feb-10	2,270	20				
WBV33	560	Oct-09	2,530	10				
WBV38.2	320	May-10	2,050	20				
WBV44	470	Feb-10	4,010	30				
WBV46.2	330	Dec-09	2,030	20				
WBV47.1	240	May-10	19,420	240				
WBV48.2	370	May-10	35,150	280				
WBV49.1	180	Apr-10	31,590	530				
WBV90	1720	Feb-10	45,560	80				

Table 2-12d. Concrete Demand (Cubic Yards) by Project Period in IER #12

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV03a	780	Jul-08	520	LT10	1,050	LT10	1,050	LT10
WBV03b	490	Dec-08	1,730	10	3,460	20	3,460	20
WBV04.2	210	Oct-09	90	LT10	170	LT10	170	LT10
WBV05.2	210	Oct-09	210	LT10	410	LT10	410	LT10
WBV06.2	250	Jan-10	1,140	10	2,270	30	2,270	30
WBV06a.2	370	May-10	1,060	LT10	2,130	20	2,130	20
WBV07	580	Oct-09	440	LT10	880	LT10	880	LT10
WBV08	590	Oct-09	490	LT10	980	LT10	980	LT10
WBV10	620	Oct-09	310	LT10	630	LT10	630	LT10
WBV11	540	Sep-09	180	LT10	370	LT10	370	LT10
WBV13	680	Oct-09	440	LT10	880	LT10	880	LT10
WBV14a.2	360	Dec-09	1,320	10	2,640	20	2,640	20
WBV14g.2	780	Sep-09	2,490	LT10	4,970	20	4,970	20
WBV23	380	Feb-10	420	LT10	830	LT10	830	LT10
WBV33	560	Oct-09	650	LT10	1,310	LT10	1,310	LT10
WBV38.2	320	May-10	340	LT10	670	LT10	670	LT10
WBV44	470	Feb-10	1,410	LT10	2,820	20	2,820	20
WBV46.2	330	Dec-09	390	LT10	780	LT10	780	LT10
WBV47.1	240	May-10						
WBV48.2	370	May-10	3,930	30	7,870	60	7,870	60
WBV49.1	180	Apr-10	710	10	1,420	20	1,420	20
WBV90	1720	Feb-10	39,970	70	79,930	140	79,930	140

Table 2-12e. Aggregate Demand (Tons) by Project Period in IER #12

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV03a	780	Jul-08	790	LT10	1,590	LT10	1,590	LT10
WBV03b	490	Dec-08	2,620	20	5,240	30	5,240	30
WBV04.2	210	Oct-09	130	LT10	260	LT10	260	LT10
WBV05.2	210	Oct-09	310	LT10	620	LT10	620	LT10
WBV06.2	250	Jan-10	1,720	20	3,440	40	3,440	40
WBV06a.2	370	May-10	1,610	10	3,220	30	3,220	30
WBV07	580	Oct-09	670	LT10	1,330	LT10	1,330	LT10
WBV08	590	Oct-09	740	LT10	1,490	LT10	1,490	LT10
WBV10	620	Oct-09	470	LT10	950	LT10	950	LT10
WBV11	540	Sep-09	280	LT10	550	LT10	550	LT10
WBV13	680	Oct-09	670	LT10	1,330	LT10	1,330	LT10
WBV14a.2	360	Dec-09	2,000	20	3,990	30	3,990	30
WBV14g.2	780	Sep-09	3,760	10	7,520	30	7,520	30
WBV23	380	Feb-10	630	LT10	1,260	LT10	1,260	LT10
WBV33	560	Oct-09	990	LT10	1,980	10	1,980	10
WBV38.2	320	May-10	510	LT10	1,010	LT10	1,010	LT10
WBV44	470	Feb-10	2,130	10	4,260	30	4,260	30
WBV46.2	330	Dec-09	590	LT10	1,180	10	1,180	10
WBV47.1	240	May-10						
WBV48.2	370	May-10	5,950	50	11,900	100	11,900	100
WBV49.1	180	Apr-10	1,080	20	2,150	40	2,150	40
WBV90	1720	Feb-10	60,430	110	120,860	210	120,860	210

Table 2-12f. Concrete Pile Demand (Tons) by Project Period in IER #12

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV03a	780	Jul-08	2,650	10				
WBV03b	490	Dec-08	15,390	90				
WBV04.2	210	Oct-09						
WBV05.2	210	Oct-09						
WBV06.2	250	Jan-10						
WBV06a.2	370	May-10						
WBV07	580	Oct-09	3,260	20				
WBV08	590	Oct-09						
WBV10	620	Oct-09						
WBV11	540	Sep-09						
WBV13	680	Oct-09	2,760	10				
WBV14a.2	360	Dec-09						
WBV14g.2	780	Sep-09						
WBV23	380	Feb-10						
WBV33	560	Oct-09						
WBV38.2	320	May-10						
WBV44	470	Feb-10						
WBV46.2	330	Dec-09						
WBV47.1	240	May-10						
WBV48.2	370	May-10						
WBV49.1	180	Apr-10						
WBV90	1720	Feb-10	35,280	60				

Table 2-12g. Rock Demand (Tons) by Project Period in IER #12

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV03a	780	Jul-08						
WBV03b	490	Dec-08						
WBV04.2	210	Oct-09						
WBV05.2	210	Oct-09						
WBV06.2	250	Jan-10						
WBV06a.2	370	May-10						
WBV07	580	Oct-09						
WBV08	590	Oct-09						
WBV10	620	Oct-09						
WBV11	540	Sep-09						
WBV13	680	Oct-09						
WBV14a.2	360	Dec-09						
WBV14g.2	780	Sep-09					710	LT10
WBV23	380	Feb-10					2,000	20
WBV33	560	Oct-09					940	LT10
WBV38.2	320	May-10					200	LT10
WBV44	470	Feb-10					1,860	10
WBV46.2	330	Dec-09						
WBV47.1	240	May-10						
WBV48.2	370	May-10						
WBV49.1	180	Apr-10						
WBV90	1720	Feb-10					240,340	420

2.13 IER #13 – Hero Canal Levee and Eastern Terminus, Plaquemines Parish, Louisiana

The proposed actions for IER #13 include raising approximately nine miles of earthen levees, replacing over 3,000 feet of floodwalls, rebuilding or modifying four drainage structures, closing one drainage structure, and modifying one railroad gate. Details of the proposed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER 13 are listed below, and figure 2-13 provides an overview of the projects.

WBV09a	Hero Canal to Oakville - Levees
WBV09b	Hero Canal to Oakville - Structures
WBV12	Hero Canal Reach 1 - 2nd Enlgt

Figure 2-13. IER #13 Project Area

Table 2-13a. Materials Quantities for Construction Reaches in IER #13

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
WBV09a	500,000							
WBV09b		5,000	7,600	59,000	87,900			
WBV12	550,000							800

Table 2-13b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #13

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV09a	450	Mar-10	50,000	330	350,000	2,330	100,000	670
WBV09b	470	Feb-10						
WBV12	390	Jun-10	55,000	420	385,000	2,960	110,000	850

Table 2-13c. Steel Demand (Tons) by Project Period in IER #13

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV09a	450	Mar-10						
WBV09b	470	Feb-10	5,090	30				
WBV12	390	Jun-10						

Table 2-13d. Concrete Demand (Cubic Yards) by Project Period in IER #13

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV09a	450	Mar-10						
WBV09b	470	Feb-10	1,000	LT10	2,000	10	2,000	10
WBV12	390	Jun-10						

Table 2-13e. Aggregate Demand (Tons) by Project Period in IER #13

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV09a	450	Mar-10						
WBV09b	470	Feb-10	1,510	LT10	3,020	20	3,020	20
WBV12	390	Jun-10						

None of the projects require concrete pile for construction. Table 2-13f has been omitted.

Table 2-13g. Rock Demand (Tons) by Project Period in IER #13

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV09a	450	Mar-10						
WBV09b	470	Feb-10						
WBV12	390	Jun-10					840	LT10

2.14 IER #14 – Westwego to Harvey Levee, Jefferson Parish, Louisiana

The proposed actions for IER #14 would increase the elevation of five existing levee reaches to meet the 100-year level of risk reduction and replace all existing pumping station fronting protection floodwalls with higher floodwall. Details of the proposed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER 14 are listed below, and figure 2-14 provides an overview of the projects.

WBV14b.2	Orleans Village to Hwy 45 Levee - Phase 2
WBV14c.2	New Westwego PS to Vicinity Orleans Village - Phase 2
WBV14d	V- Line Floodwall
WBV14e.2	V- Line Levee,East of Vertex - Phase 2
WBV14f.2	Hwy 45 Levee - Phase 2
WBV14i	WBV-14i V-Line Levee, LA 3134 Highway Crossing
WBV30	Westminister PS Fronting Protection and Modifications
WBV37	Ames / Mt;. Kennedy Pump Station

Figure 2-14. IER #14 Project Area

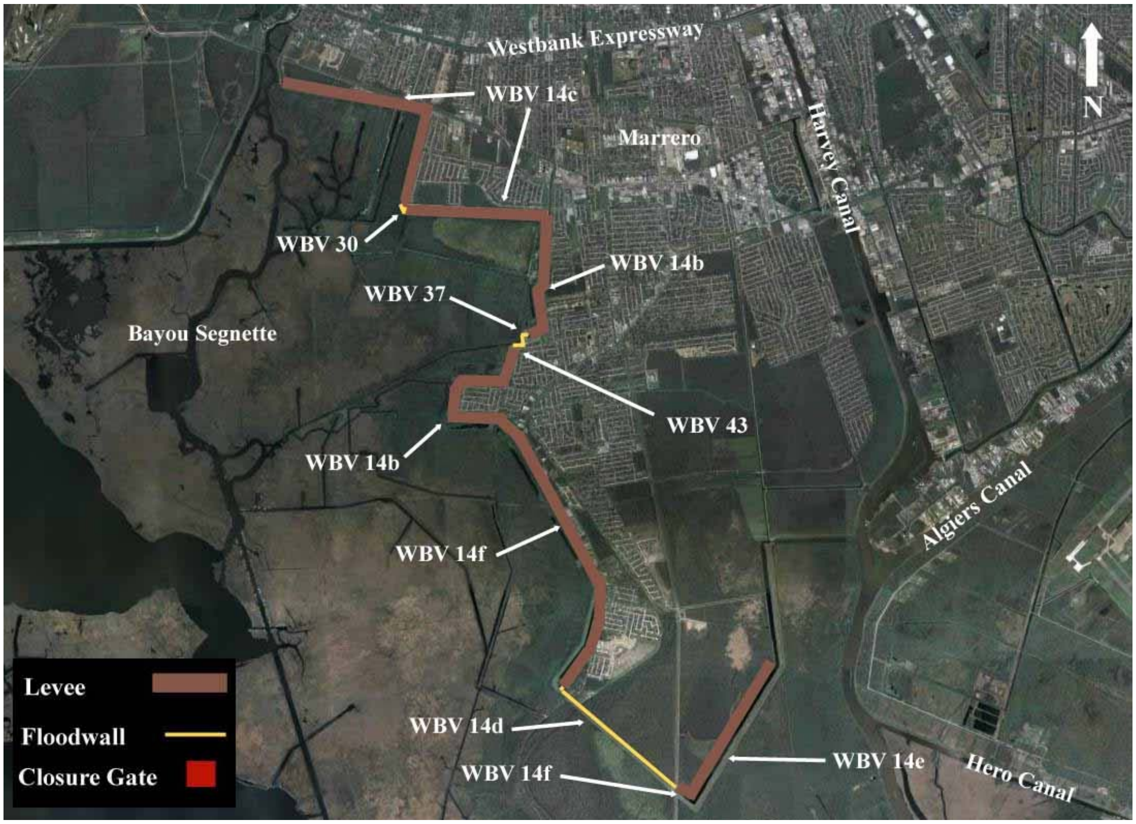

Table 2-14a. Materials Quantities for Construction Reaches in IER #14

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
WBV14b.2	520,000							200
WBV14c.2	1,350,000							100
WBV14d	120,000	7,500	11,300	202,700			96,900	
WBV14e.2	570,000	100	200					
WBV14f.2	188,000	600	800					
WBV14i	210,000							
WBV30	4,000	200	300	24,400	25,600			1,200
WBV37	4,000	2,500	3,700	29,900	13,600		12,900	800

Table 2-14b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #14

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV14b.2	170	Sep-09	52,000	920	364,000	6,420	104,000	1,840
WBV14c.2	330	Dec-09	135,000	1,230	945,000	8,590	270,000	2,450
WBV14d	580	Jul-09	12,000	60	84,000	430	24,000	120
WBV14e.2	240	Sep-09	57,000	710	399,000	4,990	114,000	1,430
WBV14f.2	270	Aug-09	18,800	210	131,600	1,460	37,600	420
WBV14i	240	Sep-09	21,000	260	147,000	1,840	42,000	530
WBV30	450	Aug-09	400	LT10	2,800	20	800	LT10
WBV37	730	Mar-10	400	LT10	2,800	10	800	LT10

Table 2-14c. Steel Demand (Tons) by Project Period in IER #14

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV14b.2	170	Sep-09						
WBV14c.2	330	Dec-09						
WBV14d	580	Jul-09	4,050	20				
WBV14e.2	240	Sep-09						
WBV14f.2	270	Aug-09						
WBV14i	240	Sep-09						
WBV30	450	Aug-09	1,630	10				
WBV37	730	Mar-10	1,200	LT10				

Table 2-14d. Concrete Demand (Cubic Yards) by Project Period in IER #14

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV14b.2	170	Sep-09						
WBV14c.2	330	Dec-09						
WBV14d	580	Jul-09	1,500	LT10	2,990	20	2,990	20
WBV14e.2	240	Sep-09	20	LT10	40	LT10	40	LT10
WBV14f.2	270	Aug-09	110	LT10	220	LT10	220	LT10
WBV14i	240	Sep-09						
WBV30	450	Aug-09	30	LT10	70	LT10	70	LT10
WBV37	730	Mar-10	490	LT10	980	LT10	980	LT10

Table 2-14e. Aggregate Demand (Tons) by Project Period in IER #14

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV14b.2	170	Sep-09						
WBV14c.2	330	Dec-09						
WBV14d	580	Jul-09	2,260	10	4,530	20	4,530	20
WBV14e.2	240	Sep-09	30	LT10	70	LT10	70	LT10
WBV14f.2	270	Aug-09	170	LT10	340	LT10	340	LT10
WBV14i	240	Sep-09						
WBV30	450	Aug-09	50	LT10	100	LT10	100	LT10
WBV37	730	Mar-10	740	LT10	1,490	LT10	1,490	LT10

Table 2-14f. Concrete Pile Demand (Tons) by Project Period in IER #14

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV14b.2	170	Sep-09						
WBV14c.2	330	Dec-09						
WBV14d	580	Jul-09	25,880	130				
WBV14e.2	240	Sep-09						
WBV14f.2	270	Aug-09						
WBV14i	240	Sep-09						
WBV30	450	Aug-09						
WBV37	730	Mar-10	3,440	10				

Table 2-14g. Rock Demand (Tons) by Project Period in IER #14

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV14b.2	170	Sep-09					170	LT10
WBV14c.2	330	Dec-09					110	LT10
WBV14d	580	Jul-09						
WBV14e.2	240	Sep-09						
WBV14f.2	270	Aug-09						
WBV14i	240	Sep-09						
WBV30	450	Aug-09					1,160	LT10
WBV37	730	Mar-10					840	LT10

2.15 IER #15 – Lake Cataouatche Levee, Jefferson Parish, Louisiana

The proposed actions for IER #15 would increase the elevation of approximately 8 miles of the Lake Cataouatche Levee and the Lake Cataouatche Pumping Station fronting protection to meet the 100-year level of risk reduction. Details of the proposed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER 15 are listed below, and figure 2-15 provides an overview of the projects.

WBV15a.2	Lake Cataouatche PS to Segnette State Park - Phase 2
WBV15b.2	Lake Cataouatche PS Fronting Protection, Modifications - Phase 2
WBV17b.1	Station 160+00 to Hwy 90 - Phase 1
WBV17b.2	Station 160+00 to Hwy 90 - Phase 2
WBV18.2	Hwy 90 to Lake Cataouatche PS - Phase 2

Figure 2-15. IER #15 Project Area

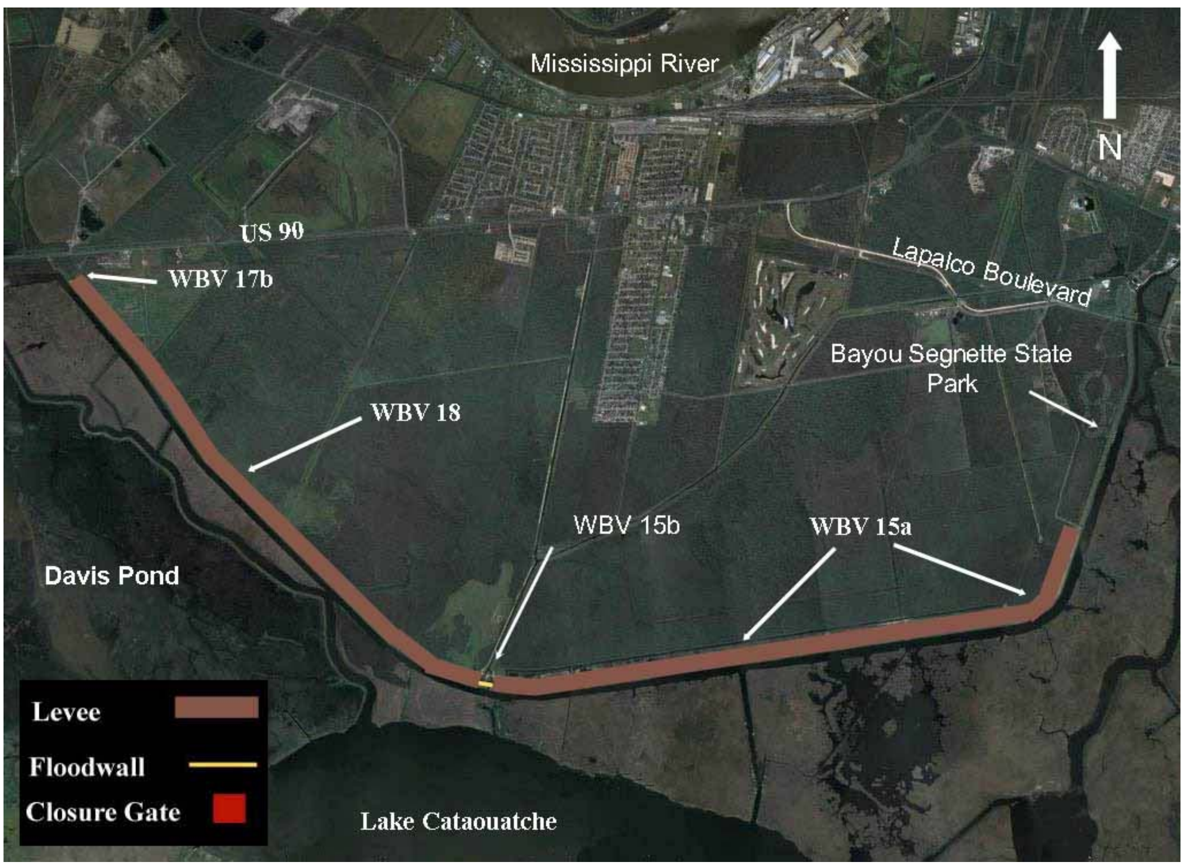

Table 2-15a. Materials Quantities for Construction Reaches in IER #15

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
WBV15a.2	1,284,000							
WBV15b.2		4,700	7,100	22,400	91,600			
WBV17b.1	500,000							
WBV17b.2	160,000							
WBV18.2	1,880,000							

Table 2-15b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #15

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV15a.2	430	Nov-09	128,400	900	898,800	6,270	256,800	1,790
WBV15b.2	550	Apr-09						
WBV17b.1	560	Mar-08	50,000	270	350,000	1,880	100,000	540
WBV17b.2	160	Dec-09	16,000	300	112,000	2,100	32,000	600
WBV18.2	550	Aug-09	188,000	1,030	1,316,000	7,180	376,000	2,050

Table 2-15c. Steel Demand (Tons) by Project Period in IER #15

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV15a.2	430	Nov-09						
WBV15b.2	550	Apr-09	4,520	20				
WBV17b.1	560	Mar-08						
WBV17b.2	160	Dec-09						
WBV18.2	550	Aug-09						

Table 2-15d. Concrete Demand (Cubic Yards) by Project Period in IER #15

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV15a.2	430	Nov-09						
WBV15b.2	550	Apr-09	930	LT10	1,870	10	1,870	10
WBV17b.1	560	Mar-08						
WBV17b.2	160	Dec-09						
WBV18.2	550	Aug-09						

Table 2-15e. Aggregate Demand (Tons) by Project Period in IER #15

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV15a.2	430	Nov-09						
WBV15b.2	550	Apr-09	1,410	LT10	2,820	20	2,820	20
WBV17b.1	560	Mar-08						
WBV17b.2	160	Dec-09						
WBV18.2	550	Aug-09						

None of the projects require concrete pile or rock for construction. Tables 2-15f and 2-15g have been omitted.

2.16 IER #16 – Western Tie-In, Jefferson and St. Charles Parishes, Louisiana

The proposed actions for IER #16 would require construction of new levee, floodwall, and closure structures to complete the western terminus of the West Bank and Vicinity Project; although authorized, the western tie in (connecting to the Mississippi River Levee) was never completed. The proposed action is an alignment south of Hwy 90 and south of the Outer Cataouatche Canal and then north along the eastern side of the Davis Pond Freshwater Diversion Canal to the Mississippi River Levee. The western tie in is being completed under six separate construction projects: WBV 70, 71, 72, 73, 74, and 75. Details of the proposed action are available at www.nolaenvironmental.gov.

Individual contracts included in IER 16 are listed below, and figure 2-16 provides an overview of the projects.

WBV70	Western Tie-In Levees (South)
WBV71	Western Tie-In Levees (North)
WBV72	Western Tie-In Levees (East - West)
WBV73	Western Tie-In Hwy 90 X-ing
WBV74	Western Tie-In Sector Gate / Drainage
WBV75	Western Tie-In Railroad

Figure 2-16. IER #16 Project Area

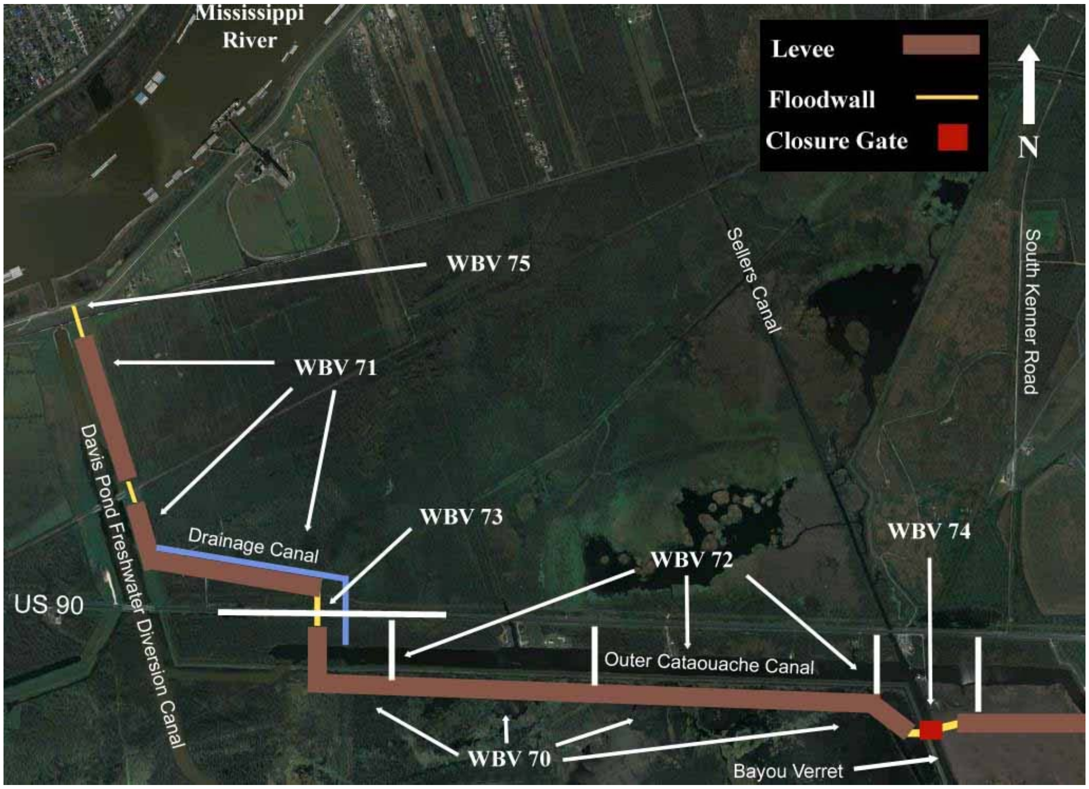

Table 2-16a. Materials Quantities for Construction Reaches in IER #16

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
WBV70								1,586,800
WBV71	150,000							
WBV72	3,000,000							1,600
WBV73	170,000	10,100	15,300	27,900	37,600		66,500	12,800
WBV74		5,500	8,400	102,800	39,600			6,400
WBV75		700	1,000	16,900	5,200		5,700	100

Table 2-16b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #16

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV70	240	Aug-09						
WBV71	150	Sep-09	15,000	300	105,000	2,100	30,000	600
WBV72	450	Jan-10	300,000	2,000	2,100,000	14,000	600,000	4,000
WBV73	540	Nov-09	17,000	90	119,000	660	34,000	190
WBV74	600	Nov-09						
WBV75	150	Sep-09						

Table 2-16c. Steel Demand (Tons) by Project Period in IER #16

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV70	240	Aug-09						
WBV71	150	Sep-09						
WBV72	450	Jan-10						
WBV73	540	Nov-09	2,230	10				
WBV74	600	Nov-09	3,820	20				
WBV75	150	Sep-09	570	10				

Table 2-16d. Concrete Demand (Cubic Yards) by Project Period in IER #16

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV70	240	Aug-09						
WBV71	150	Sep-09						
WBV72	450	Jan-10						
WBV73	540	Nov-09	2,020	10	4,040	20	4,040	20
WBV74	600	Nov-09	1,110	LT10	2,210	10	2,210	10
WBV75	150	Sep-09	140	LT10	270	LT10	270	LT10

Table 2-16e. Aggregate Demand (Tons) by Project Period in IER #16

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV70	240	Aug-09	317,360	3,970	634,720	7,930	634,720	7,930
WBV71	150	Sep-09						
WBV72	450	Jan-10						
WBV73	540	Nov-09	3,050	20	6,100	30	6,100	30
WBV74	600	Nov-09	1,670	LT10	3,340	20	3,340	20
WBV75	150	Sep-09	210	LT10	410	LT10	410	LT10

Table 2-16f. Concrete Pile Demand (Tons) by Project Period in IER #16

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV70	240	Aug-09						
WBV71	150	Sep-09						
WBV72	450	Jan-10						
WBV73	540	Nov-09	17,750	100				
WBV74	600	Nov-09						
WBV75	150	Sep-09	1,530	30				

Table 2-16g. Rock Demand (Tons) by Project Period in IER #16

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV70	240	Aug-09						
WBV71	150	Sep-09						
WBV72	450	Jan-10					1,600	10
WBV73	540	Nov-09					12,750	70
WBV74	600	Nov-09					6,400	30
WBV75	150	Sep-09					140	LT10

2.17 IER #17 – Company Canal Floodwall, Jefferson Parish, Louisiana

The proposed action for IER #17 would provide 100-year level of risk reduction for the Company Canal Floodwall from the Bayou Segnette State Park to the New Westwego Pumping Station. The existing floodwall is approximately 15,000 feet long and includes fronting protection for two pumping stations. A segment of the proposed action is on a new alignment; details of the proposed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER 17 are listed below, and figure 2-17 provides an overview of the projects.

WBV16.2	Bayou Segnette Complex
WBV16b	Segnette PS Fronting Protection and Modifications
WBV20	New Westwego PS Fronting Protection and Modifications
WBV21	Old Westwego PS Fronting Protection and Modifications
WBV22	Westwego Floodwall
WBV24	Segnette State Park Floodwall

Figure 2-17. IER # 17 Project Area

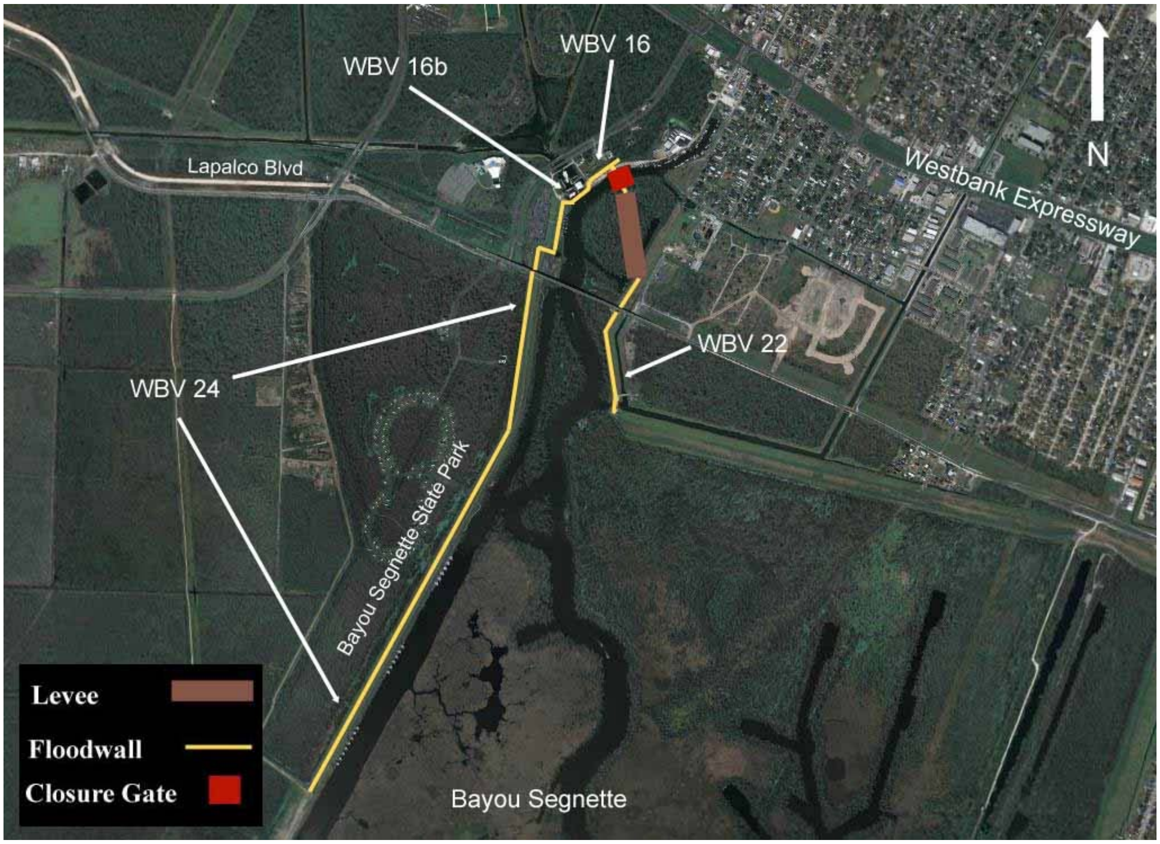

Table 2-17a. Materials Quantities for Construction Reaches in IER #17

Reach	Earthen Fill (CY)	Concrete (CY)	Aggregate (Tons)	Sheet Pile (SF)	H Pile (LF)	Pipe Pile (LF)	Concrete Pile (LF)	Rock (Tons)
WBV16.2	194,000	11,500	17,400	118,200	112,400	2,300		9,700
WBV16b		3,900	5,900	27,200	27,800	8,000		700
WBV20		2,200	3,300	29,700	25,700	1,900		
WBV21		1,100	1,700	24,200	15,000			300
WBV22		3,100	4,700	42,800	73,000		200	1,800
WBV24	45,000	20,000	30,200	350,000	125,000	100,000		

Table 2-17b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #17

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV16.2	610	Feb-10	19,400	100	135,800	670	38,800	190
WBV16b	600	Dec-09						
WBV20	450	Nov-09						
WBV21	400	Nov-09						
WBV22	220	Nov-09						
WBV24	640	Nov-09	4,500	20	31,500	150	9,000	40

Table 2-17c. Steel Demand (Tons) by Project Period in IER #17

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV16.2	610	Feb-10	7,510	40				
WBV16b	600	Dec-09	2,280	10				
WBV20	450	Nov-09	1,860	10				
WBV21	400	Nov-09	1,150	LT10				
WBV22	220	Nov-09	4,100	60				
WBV24	640	Nov-09	18,860	90				

Table 2-17d. Concrete Demand (Cubic Yards) by Project Period in IER #17

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV16.2	610	Feb-10	2,300	10	4,610	20	4,610	20
WBV16b	600	Dec-09	790	LT10	1,570	LT10	1,570	LT10
WBV20	450	Nov-09	440	LT10	880	LT10	880	LT10
WBV21	400	Nov-09	220	LT10	440	LT10	440	LT10
WBV22	220	Nov-09	620	LT10	1,240	20	1,240	20
WBV24	640	Nov-09	4,000	20	8,000	40	8,000	40

Table 2-17e. Aggregate Demand (Tons) by Project Period in IER #17

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV16.2	610	Feb-10	3,480	20	6,960	30	6,960	30
WBV16b	600	Dec-09	1,190	LT10	2,380	10	2,380	10
WBV20	450	Nov-09	660	LT10	1,330	LT10	1,330	LT10
WBV21	400	Nov-09	340	LT10	670	LT10	670	LT10
WBV22	220	Nov-09	930	10	1,870	30	1,870	30
WBV24	640	Nov-09	6,050	30	12,100	60	12,100	60

Table 2-17f. Concrete Pile Demand (Tons) by Project Period in IER #17

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV16.2	610	Feb-10						
WBV16b	600	Dec-09						
WBV20	450	Nov-09						
WBV21	400	Nov-09						
WBV22	220	Nov-09	40	LT10				
WBV24	640	Nov-09						

Table 2-17g. Rock Demand (Tons) by Project Period in IER #17

			First Third		Second Third		Final Third	
Reach	Project Duration	NTP Mo & Yr	Total In Period	Total Per Day	Total In Period	Total Per Day	Total In Period	Total Per Day
WBV16.2	610	Feb-10					9,690	50
WBV16b	600	Dec-09					670	LT10
WBV20	450	Nov-09						
WBV21	400	Nov-09					330	LT10
WBV22	220	Nov-09					1,750	20
WBV24	640	Nov-09						

3 Transportation Alternatives

Both NEPA and the President's Council on Environmental Quality (CEQ) regulations require that the CEMVN consider and evaluate appropriate alternatives to proposed actions that have the potential for significant effects on the environment. Section 102(2)(E) of NEPA provides that all agencies of the Federal Government shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." Given the quantities of materials to be moved, the accessibility of different modes of transportation, the origin and destination pairs, and different routes that could be used, thousands of 'alternatives' could be identified and assessed.

While CEMVN is not required to select any particular materials transportation alternative, and the examination of alternatives need not be exhaustive, it must be sufficient to demonstrate reasoned decision making. Four transportation alternatives have been developed to provide a range of meaningfully different alternatives for assessing. They are:

- Maximum Truck Use (3.1),
- Maximum Barge Use (3.2),
- Maximum Rail Use (3.3), and
- The Likely Scenario (3.4)

When considering the differences among the alternatives, bear in mind that the vast majority of all trips necessary to construct the HSRRS are for the transportation of borrow material that is not able to be moved by rail or barge; borrow can only be moved by truck.

The alternatives were developed assuming that the materials movement would still be bound by rational decision-making. For example, when the price of material being transported is low relative to the cost of transportation, barge transportation was assumed (e.g., rock being brought to greater New Orleans).

3.1 Maximum Truck Use

The Maximum Truck Use Scenario assumes that no material will be moved by any transportation mode other than truck. Assumptions used in the assignment of materials origins are described below.

3.1.1 Earthen Fill

Trucks would be used to haul earthen fill from assigned government-furnished borrow sites designated by CEMVN (USACE, 2009) to construction sites (roughly 21 million CY). Contractor furnished earthen fill (roughly 9 million CY) cannot be assigned to specific construction projects until those contracts are awarded. Therefore, the contractor furnished earthen fill was assumed to be truck hauled 28.3 miles one-way.[5, 6]

3.1.2 Steel

Under maximum truck use, all Sheet Pile, H-Pile, and Pipe Pile would be shipped by truck from the manufacturing facility to the powder-coating facility, and then to construction sites. Sheetpile was assumed to originate in Petersburg, Virginia and Blytheville, Arkansas shipped directly to New Orleans, LA by truck (an average of the distances from both origins was used). H-pile and Pipe Pile were assumed to be shipped via truck from Blytheville, Arkansas.[7]

3.1.3 Concrete and Aggregate

Under maximum truck use, the contracts requiring less than 25,000 CY of concrete would have the aggregate trucked from Covington, Louisiana and Bogalusa, Louisiana to local ready-mix plants.[8] Ready-mix concrete would then be supplied by truck from major local ready-mix plants closest to the project. For contracts requiring more than 25,000 CY of concrete, it was assumed that batch plants would be used at the construction sites. In these cases, aggregate would be trucked directly to the batch plants from Covington, Louisiana and Bogalusa, Louisiana.

3.1.4 Stone

Under maximum truck use, all stone and rock would be trucked to construction sites in New Orleans from Pine Bluff, Arkansas.[9]

[5] Distance based on the median distance from the 24 contractor furnished sites in IERs 19, 23, 26, 29, and 30 to center city New Orleans using Google Maps.
[6] These miles traveled are included in total miles, for use in estimating emissions and accident rates. These vehicle trips cannot be routed or included in the congestion modeling because "origin-destination" pairings cannot be assigned until the contracts are issued. However, an escalation factor will be applied to the congestion modeling in order to estimate the effects of the contractor furnished trips.
[7] The analyses assumed the use of sheetpile suppliers from Blytheville, AR and Petersburg, VA that had provided specialty sheetpile to CEMVN for initial HSDRRS construction projects. Although the supply of other types of steel products (e.g., H-pile, pipe pile) could come from a myriad of other locations, for the purpose of analysis, it was assumed that all steel products would originate from Blytheville, AR and Petersburg, VA. While this simplification may not reflect the distances for these steel products outside of the greater New Orleans area, local miles traveled for the delivery of steel within greater New Orleans has been accurately assessed.
[8] At the time of this analysis, the majority of aggregate used for concrete in initial HSDRRS construction projects was provided from facilities in or near Covington, Louisiana and Bogalusa, Louisiana.
[9] At the time of this analysis, the majority of stone and rock used for initial HSDRRS construction projects originated from Pine Bluff, AR.

3.1.5 Concrete Pile

Under maximum truck use, all Concrete Pile would be trucked directly to construction sites from Pass Christian, Mississippi.

3.1.6 Maximum Truck Use - Miles Traveled By Mode and Material

Tables 3-1 to 3-5 provide summary information on miles, trips, and mode of transportation used to transport materials to project sites. These tables are:

- Table 3-1: Maximum Truck Use - Miles Traveled By Mode and Material shows local and non-local round-trip miles required to deliver project materials. Local and non-local miles are provided for each material class.
- Table 3-2. Maximum Truck Use - Trips By Mode and Material shows the total number of trips required to deliver project materials. Trips are provided for each material class.
- Table 3-3. Summary of Local Truck Miles By IER parses the local miles data provided in table 3-1, aggregated to the IER level.
- Table 3-4. Summary Table of Non-Local Truck Miles By IER parses the non-local miles data provided in table 3-1, aggregated to the IER level.
- Table 3-5. Summary Table of Miles By Mode of Transportation shows the number of local truck miles, non-local truck miles, barge miles, and rail miles incurred in the transportation of project materials. These data also are aggregated to the IER level.

In addition to the tables, figures 3-1, 3-2, and 3-3 graphically depict the magnitude of, and differences between, truck miles, truck trips, and delivery timing for all materials included in the analysis.

Figure 3-1 Truck Miles Traveled shows both local and non-local truck round trip miles traveled for the delivery of materials to project sites. Data used to generate this figure are directly traceable to table 3-1. As shown in the figure, the local miles traveled for the delivery of earthen fill, or borrow (over 57 million miles), vastly outnumber the local miles traveled for the delivery of all other project materials. In this scenario, non-local miles traveled for the delivery of steel also are significant, at a total of nearly 48 million miles.

Figure 3-2 Truck Trips shows all truck trips summarized by material. Data used to generate this figure are directly traceable to table 3-2. As shown in the figure, the number of borrow deliveries (over 2 million) is significantly higher than the number of deliveries for all other materials combined (approximately 310,000).

Figure 3-3 Truck Trips Distributed Across Schedule shows truck deliveries per day for all project materials distributed across a master schedule, beginning on 1 January 2009. The distribution of truck trips across the schedule is based on:

- individual project Notice to Proceed date;
- individual project expected construction duration; and
- individual project sequencing of demand timing for materials (see introduction to section 2 for a discussion of the separation of materials demand schedule separation).

The figure shows daily borrow deliveries of:

- over 1,000 for 100 weeks;
- over 2,000 for 60 weeks;
- over 3,000 for 40 weeks; and
- over 4,000 for 10 weeks.

Figure 3-3 also depicts the magnitude of the differences between the number of borrow deliveries and the number of deliveries for all other materials combined.

Table 3-1. Maximum Truck Use - Miles Traveled By Mode and Material

	Quantity	Units	Truck Miles (Local)	Truck Miles (Non-Local)	Barge Miles	Train Miles
Borrow (trucked)	29,616,300	CY	57,270,000			
Steel Sheet Pile (trucked)	338,300	Tons	1,116,900	24,061,900		
Steel H-Pile (trucked)	434,000	Tons	1,493,300	20,429,000		
Steel Pipe Pile (trucked)	67,200	Tons	237,800	3,165,900		
Steel (SP,HP,PP barged to project site)		Tons				
Steel (SP,HP,PP barged & intermodal)		Tons				
Steel (SP,HP,PP by rail & intermodal)		Tons				
Concrete Pile (trucked)	281,300	Tons	697,300	1,327,700		
Concrete Pile (barged to project site)		Tons				
Concrete Pile (barged & intermodal)		Tons				
Concrete Pile (by rail & intermodal)		Tons				
Ready-Mix Concrete	283,500	CY	408,100			
On-Site Batch Concrete	854,300	CY				
Aggregate (barged to project batch plants)		Tons				
Aggregate (barged to suppliers)		Tons				
Trucked: suppliers to ready-mix plants						
Trucked: suppliers to project						
Aggregate (by rail to suppliers)		Tons				
Trucked: suppliers to ready-mix plants						
Trucked: suppliers to project						
Aggregate (trucked to project)	2,878,500	Tons	4,000,600	4,353,800		
Aggregate (trucked to ready-mix plants)	428,700	Tons	670,600	232,400		
Rock (barged to project site)		Tons				
Rock (barged & intermodal)		Tons				
Rock (by rail & intermodal)		Tons				
Rock (trucked to project site)	1,733,200	Tons	2,381,700	28,579,100		
TOTAL MILES			68,276,300	82,149,800		

Table 3-2. Maximum Truck Use - Trips By Mode and Material

	Quantity	Units	Truck Trips	Barge Trips	Train Trips
Borrow (trucked)	29,616,300	CY	2,042,500		
Steel Sheet Pile (trucked)	338,300	Tons	16,900		
Steel H-Pile (trucked)	434,000	Tons	21,700		
Steel Pipe Pile (trucked)	67,200	Tons	3,400		
Steel (SP,HP,PP barged to project site)		Tons			
Steel (SP,HP,PP barged & intermodal)		Tons			
Steel (SP,HP,PP by rail & intermodal)		Tons			
Concrete Pile (trucked)	281,300	Tons	14,100		
Concrete Pile (barged to project site)		Tons			
Concrete Pile (barged & intermodal)		Tons			
Concrete Pile (by rail & intermodal)		Tons			
Ready-Mix Concrete	283,500	CY	28,400		
On-Site Batch Concrete	854,300	CY			
Aggregate (barged to project batch plants)		Tons			
Aggregate (barged to suppliers)		Tons			
Trucked from suppliers to ready-mix plants					
Trucked from suppliers to project					
Aggregate (by rail to suppliers)		Tons			
Trucked from suppliers to ready-mix plants					
Trucked from suppliers to project					
Aggregate (trucked to project)	2,878,500	Tons	127,900		
Aggregate (trucked to ready-mix plants)	428,700	Tons	19,100		
Rock (barged to project site)		Tons			
Rock (barged & intermodal)		Tons			
Rock (by rail & intermodal)		Tons			
Rock (trucked to project site)	1,733,200	Tons	77,000		
TOTAL TRIPS			2,351,000		

Figure 3-1 Truck Miles Traveled – Maximum Truck Scenario

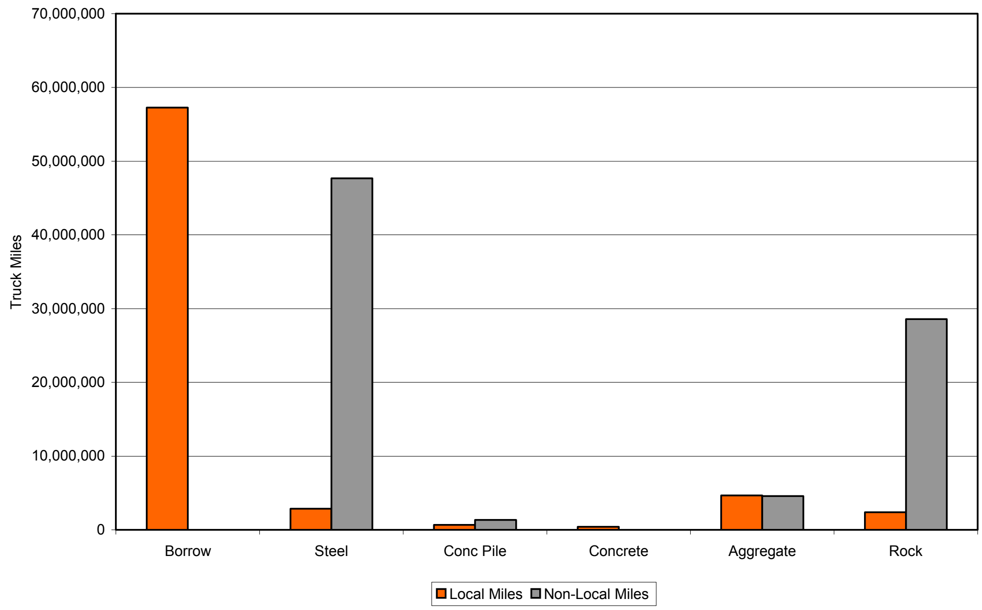

Figure 3-2 Truck Trips – Maximum Truck Scenario

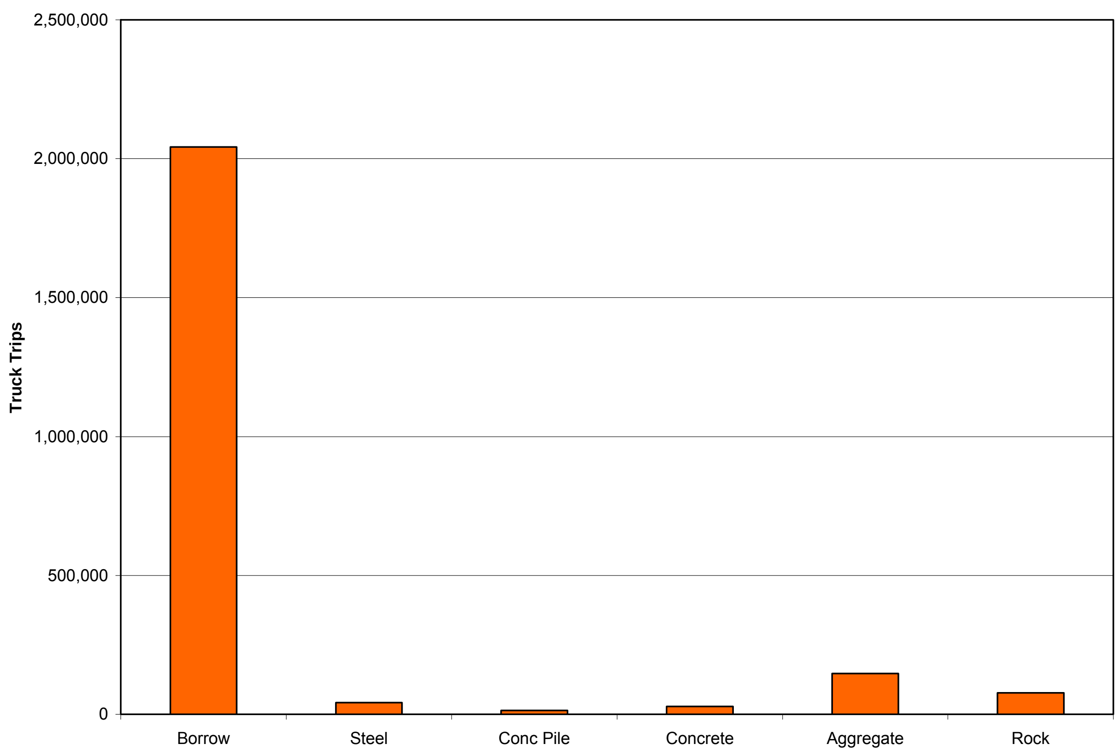

Figure 3-3 Truck Trips Distributed Across Schedule Maximum Truck Scenario

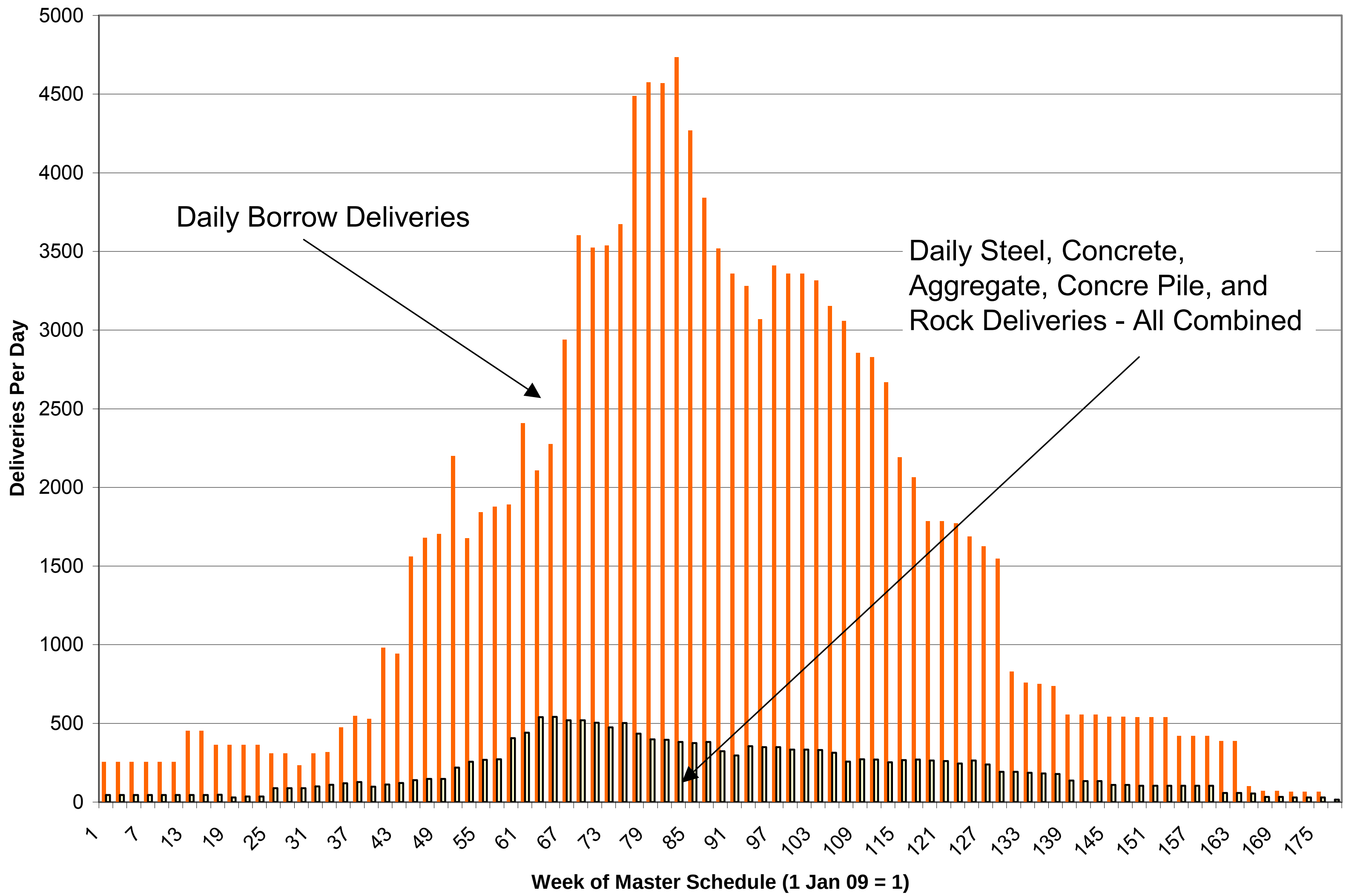

Table 3-3. Summary Table of Local Truck Miles By IER
Maximum Truck Use

IER	Earthen Fill Truck Miles Local	Steel Truck Miles Local	Conc Pile Truck Miles Local	Concrete Truck Miles Local	Aggregate Truck Miles Local	Rock Truck Miles Local	Total Truck Miles Local
1	2,764,800	32,720		16,270	60,740		2,874,530
2	305,600	128,350			483,200	58,980	976,130
3	1,604,400	38,680	97,480	3,770	102,090	431,890	2,278,310
4	1,376,900	34,220	14,030	34,340	60,530	1,890	1,521,910
5		50,230		16,120	26,140		92,490
6	323,600	224,460		27,080	100,800	127,850	803,790
7	20,465,100	18,830		18,810	34,310	198,400	20,735,450
8	800	16,370		7,630	35,200	20,590	80,590
9	139,700	24,180		37,240	28,390		229,510
10	7,134,800	1,205,560	16,310	23,740	1,107,240	549,000	10,036,650
11		139,140	148,900		269,970	563,060	1,121,070
12	1,702,000	733,660	233,490	129,430	1,067,510	377,610	4,243,700
13	2,680,200	21,720		15,160	11,830	1,670	2,730,580
14	4,497,000	26,730	110,250	14,740	25,490	3,780	4,677,990
15	2,013,800	14,060		10,380	11,030		2,049,270
16	11,961,900	20,710	76,740	29,650	1,096,410	26,640	13,212,050
17	299,100	118,460	130	23,710	150,320	20,360	612,080
Total	57,269,700	2,848,080	697,330	408,070	4,671,200	2,381,720	68,276,100

Table 3-4. Summary Table of Non-Local Truck Miles By IER Maximum Truck Use

IER	Earthen Fill Truck Miles Non-Local	Steel Truck Miles Non-Local	Conc Pile Truck Miles Non-Local	Concrete Truck Miles Non-Local	Aggregate Truck Miles Non-Local	Rock Truck Miles Non-Local	Total Truck Miles Non-Local
1		1,015,300			21,050		1,036,350
2		3,946,180			164,210	1,446,080	5,556,470
3		967,360	177,980		47,630	8,876,950	10,069,920
4		712,920	28,640		20,970	29,120	791,650
5		1,090,440			9,060		1,099,500
6		4,353,000			253,470	1,319,110	5,925,580
7		445,920			11,890	2,037,040	2,494,850
8		245,680			12,200	217,930	475,810
9		312,780			9,840		322,620
10		16,974,780	24,420		1,743,080	4,566,770	23,309,050
11		1,832,780	587,060		974,190	5,428,140	8,822,170
12		12,459,340	280,050		1,237,850	4,056,950	18,034,190
13		268,020			4,100	13,850	285,970
14		449,080	138,390		8,840	37,540	633,850
15		224,420			3,820		228,240
16		384,060	90,990		13,360	344,580	832,990
17		1,974,780	190		50,700	205,000	2,230,670
Total		47,656,840	1,327,720		4,586,260	28,579,060	82,149,880

Table 3-5. Summary Table of Miles By Mode of Transportation
Maximum Truck Use

IER	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles	Total Rail Miles	Total Miles
1	2,874,600	1,036,350			3,910,950
2	976,100	5,556,470			6,532,570
3	2,278,300	10,069,920			12,348,220
4	1,521,900	791,650			2,313,550
5	92,500	1,099,500			1,192,000
6	803,900	5,925,580			6,729,480
7	20,735,400	2,494,850			23,230,250
8	80,600	475,810			556,410
9	229,500	322,620			552,120
10	10,036,700	23,309,050			33,345,750
11	1,121,100	8,822,170			9,943,270
12	4,243,900	18,034,190			22,278,090
13	2,730,600	285,970			3,016,570
14	4,678,200	633,850			5,312,050
15	2,049,300	228,240			2,277,540
16	13,212,100	832,990			14,045,090
17	612,000	2,230,670			2,842,670
Total	68,276,700	82,149,880			150,426,580

3.2 Maximum Barge Use

The Maximum Barge Use Scenario routes materials from their point of origin to greater New Orleans on barges to the extent that such an assumption is reasonable. For all materials other than borrow, this assumption is valid in this scenario. That said, trucks remain a major mode of transportation under this scenario, even for materials shipped on barges. This is because many projects do not have direct water access, and materials would need to be transported from a New Orleans marine terminal to the project site via truck. Those projects with direct water access would receive materials (other than borrow) delivered directly by barge.

3.2.1 Earthen Fill

Trucks would be used to haul earthen fill from assigned government-furnished borrow sites designated by CEMVN (USACE, 2009) to construction sites (roughly 21 million CY). Contractor furnished earthen fill (roughly 9 million CY) cannot be assigned to specific construction projects until those contracts are awarded. Therefore, the contractor furnished earthen fill was assumed to be truck hauled 28.3 miles one-way.[10, 11]

3.2.2 Steel

Under the maximum barge use alternative, steel would be shipped by barge from Blytheville, Arkansas to destinations within greater New Orleans. Sheet Pile, H-Pile, and Pipe Pile supplied to contracts with direct water access to offload steel to construction sites (e.g., Chalmette Loop, IHNC, Harvey Canal) would be shipped from Blytheville, Arkansas directly to the construction site by barge. For maximum barge use, the Sheet Pile, H-pile and Pipe Pile for all other contracts would be shipped by barge from Blytheville, Arkansas to New Orleans marine terminals and unloaded for local truck delivery to the project sites.

3.2.3 Concrete and Aggregate

Under maximum barge use, it was assumed that projects that require less than 25,000 CY of concrete would be supplied by existing major local ready-mix plants. For these projects, the aggregate was assumed to be shipped by barge from Smithland, Kentucky to New Orleans marine terminals, unloaded onto trucks and driven to the local ready-mix plants. Once blended, the ready-mix concrete would then be driven to the construction project.

When construction contracts require more than 25,000 CY of concrete, new batch plants were assumed to be established at the project site. Contracts with direct water access were assumed to receive aggregate via barge from Smithland, Kentucky and blended with cement and water at the site. Those contracts needing more than 25,000 CY of concrete, but without direct water access were assumed to receive aggregate via truck from New Orleans marine terminals after barge transport from Smithland, Kentucky.

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[10] Distance based on the median distance from the 24 contractor furnished sites in IERs 19, 23, 26, 29, and 30 to center city New Orleans using Google Maps.

[11] These miles traveled are included in total miles, for use in estimating emissions and accident rates. These vehicle trips cannot be routed or included in the congestion modeling because “origin-destination” pairings cannot be assigned until the contracts are issued. However, an escalation factor will be applied to the congestion modeling in order to estimate the effects of the contractor furnished trips.

3.2.4 Stone

Under the maximum barge use alternative, stone would be shipped by barge to New Orleans from Pine Bluff, Arkansas. If direct water access to the construction project is available, rock would be barged directly to the site. All stone necessary for the foreshore protection projects on Lake Pontchartrain would be shipped by light-loaded 500-TON barges directly to the project.

If no direct water access is available at the construction project, stone would be barged from Pine Bluff, Arkansas to a New Orleans marine terminal, offloaded onto trucks and then trucked to the construction site.

3.2.5 Concrete Pile

Under the maximum barge use alternative, concrete pile would be shipped with barge from Pass Christian, Mississippi to projects with direct water access and offloaded at construction sites (e.g., Chalmette Loop, IHNC, Harvey Canal). Concrete pile for those projects without direct water access would be shipped by barge to a local New Orleans marine terminal for local delivery by truck.

3.2.6 Maximum Barge Use - Miles Traveled By Mode and Material

Tables 3-6 to 3-10 provide summary information on miles, trips, and mode of transportation used to transport materials to project sites. These tables are:

- Table 3-6: Maximum Barge Use - Miles Traveled By Mode and Material shows local and non-local round-trip miles required to deliver project materials. Local and non-local miles are provided for each material class. Table 3-6 also includes tons of each type of material shipped by barge directly to the project site, as well as tons of each type of material shipped to a marine terminal for off-loading onto trucks for final delivery to the project site.
- Table 3-7. Maximum Barge Use - Trips By Mode and Material shows the total number of trips required to deliver project materials. Trips are provided for each material class, by each mode of transportation.
- Table 3-8. Summary Table of Local Truck Miles By IER parses the local miles data provided in table 3-6, aggregated to the IER level. It is important to note that local truck miles will remain significant, even with barge delivery of all materials other than borrow.
- Table 3-9. Summary Table of Non-Local Truck Miles By IER parses the non-local truck miles data provided in table 3-6, aggregated to the IER level. Under this alternative, as shown in the table, non-local truck miles for all materials is zero.
- Table 3-10. Summary Table of Miles By Mode of Transportation shows the number of local truck miles, non-local truck miles, barge miles, and rail miles incurred in the transportation of project materials. These data also are aggregated to the IER level.

In addition to the tables, figures 3-4, 3-5, and 3-6 graphically depict the magnitude of, and differences between, truck miles, truck trips, and delivery timing for all materials included in the analysis.

Figure 3-4 Truck Miles Traveled shows both local and non-local truck round trip miles traveled for the delivery of materials to project sites. Non-local truck miles are zero for all materials.

Data used to generate this figure are directly traceable to table 3-6. As shown in the figure, the local miles traveled for the delivery of earthen fill, or borrow (over 57 million miles), vastly outnumber the local miles traveled for the delivery of all other project materials.

Figure 3-5 Truck Trips shows all truck trips summarized by material. Data used to generate this figure are directly traceable to table 3-7. As shown in the figure, the number of borrow deliveries (over 2 million) is significantly higher than the number of deliveries for all other materials combined (approximately 150,000).

Figure 3-6 Truck Trips Distributed Across Schedule shows truck deliveries per day for all project materials distributed across a master schedule, beginning on 1 January 2009. The distribution of truck trips across the schedule is based on:

- individual project Notice to Proceed date;
- individual project expected construction duration; and
- individual project sequencing of demand timing for materials (see introduction to section 2 for a discussion of the separation of materials demand schedule separation).

The figure shows daily borrow deliveries of:

- over 1,000 for 100 weeks;
- over 2,000 for 60 weeks;
- over 3,000 for 40 weeks; and
- over 4,000 for 10 weeks.

Figure 3-6 also depicts the magnitude of the differences between the number of borrow deliveries and the number of deliveries for all other materials combined.

Table 3-6. Maximum Barge Use - Miles Traveled By Mode and Material

	Quantity	Units	Truck Miles (Local)	Truck Miles (Non-Local)	Barge Miles	Train Miles
Borrow (trucked)	29,616,300	CY	57,270,000			
Steel Sheet Pile (trucked)		Tons				
Steel H-Pile (trucked)		Tons				
Steel Pipe Pile (trucked)		Tons				
Steel (SP,HP,PP barged to project site)	571,200	Tons			96,600	
Steel (SP,HP,PP barged & intermodal)	268,400	Tons	401,900		72,400	
Steel (SP,HP,PP by rail & intermodal)		Tons				
Concrete Pile (trucked)		Tons				
Concrete Pile (barged to project site)	229,000	Tons			4,800	
Concrete Pile (barged & intermodal)	52,300	Tons	49,300		500	
Concrete Pile (by rail & intermodal)		Tons				
Ready-Mix Concrete	283,500	CY	408,100			
On-Site Batch Concrete	854,300	CY				
Aggregate (barged to project batch plants)	1,219,600	Tons			203,300	
Aggregate (barged to suppliers)	500,800	Tons			153,900	
Trucked: suppliers to ready-mix plants			294,500			
Trucked: suppliers to project			38,700			
Aggregate (by rail to suppliers)		Tons				
Trucked: suppliers to ready-mix plants						
Trucked: suppliers to project						
Aggregate (trucked to project)	1,586,800	Tons	1,057,900			
Aggregate (trucked to ready-mix plants)		Tons				
Rock (barged to project site)	1,537,300	Tons			185,200	
Rock (barged & intermodal)	195,900	Tons	142,200		16,100	
Rock (by rail & intermodal)		Tons				
Rock (trucked to project site)		Tons				
TOTAL MILES			59,662,600		732,800	

Table 3-7. Maximum Barge Use - Trips By Mode and Material

	Quantity	Units	Truck Trips	Barge Trips	Train Trips
Borrow (trucked)	29,616,300	CY	2,042,500		
Steel Sheet Pile (trucked)		Tons			
Steel H-Pile (trucked)		Tons			
Steel Pipe Pile (trucked)		Tons			
Steel (SP,HP,PP barged to project site)	571,200	Tons		68	
Steel (SP,HP,PP barged & intermodal)	268,400	Tons	13,400	51	
Steel (SP,HP,PP by rail & intermodal)		Tons			
Concrete Pile (trucked)		Tons			
Concrete Pile (barged to project site)	229,000	Tons		58	
Concrete Pile (barged & intermodal)	52,300	Tons	2,600	6	
Concrete Pile (by rail & intermodal)		Tons			
Ready-Mix Concrete	283,500	CY	28,400		
On-Site Batch Concrete	854,300	CY			
Aggregate (barged to project batch plants)	1,219,600	Tons		107	
Aggregate (barged to suppliers)	500,800	Tons		81	
Trucked from suppliers to ready-mix plants			19,100		
Trucked from suppliers to project			3,200		
Aggregate (by rail to suppliers)		Tons			
Trucked from suppliers to ready-mix plants					
Trucked from suppliers to project					
Aggregate (trucked to project)	1,586,800	Tons	70,500		
Aggregate (trucked to ready-mix plants)		Tons			
Rock (barged to project site)	1,537,300	Tons		322	
Rock (barged & intermodal)	195,900	Tons	8,700	28	
Rock (by rail & intermodal)		Tons			
Rock (trucked to project site)		Tons			
TOTAL TRIPS			2,188,400	721	

Figure 3-4 Truck Miles Traveled – Maximum Barge Scenario

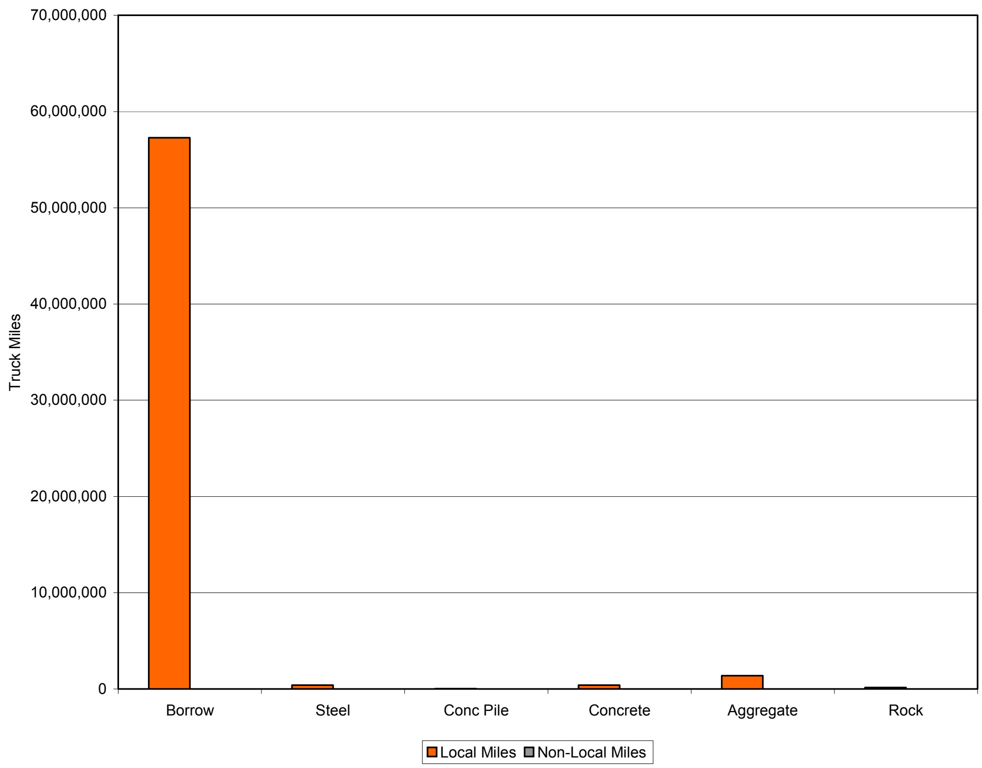

Figure 3-5 Truck Trips – Maximum Barge Scenario

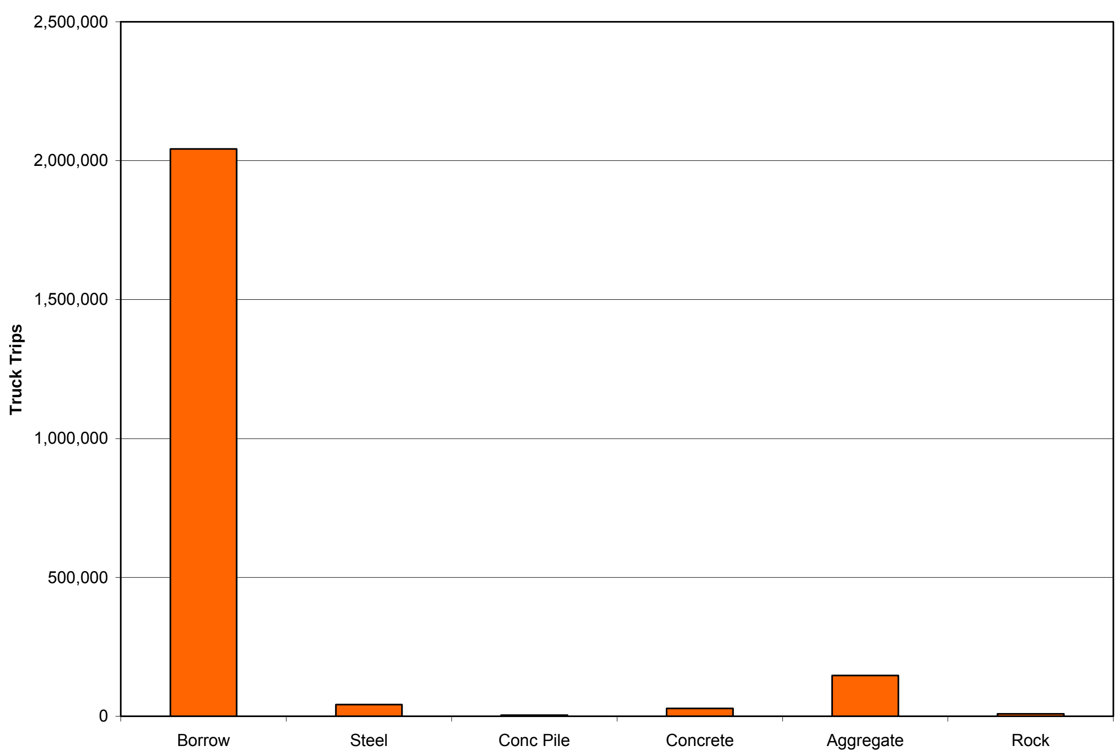

Figure 3-6 Truck Trips Distributed Across Schedule
Maximum Barge Scenario

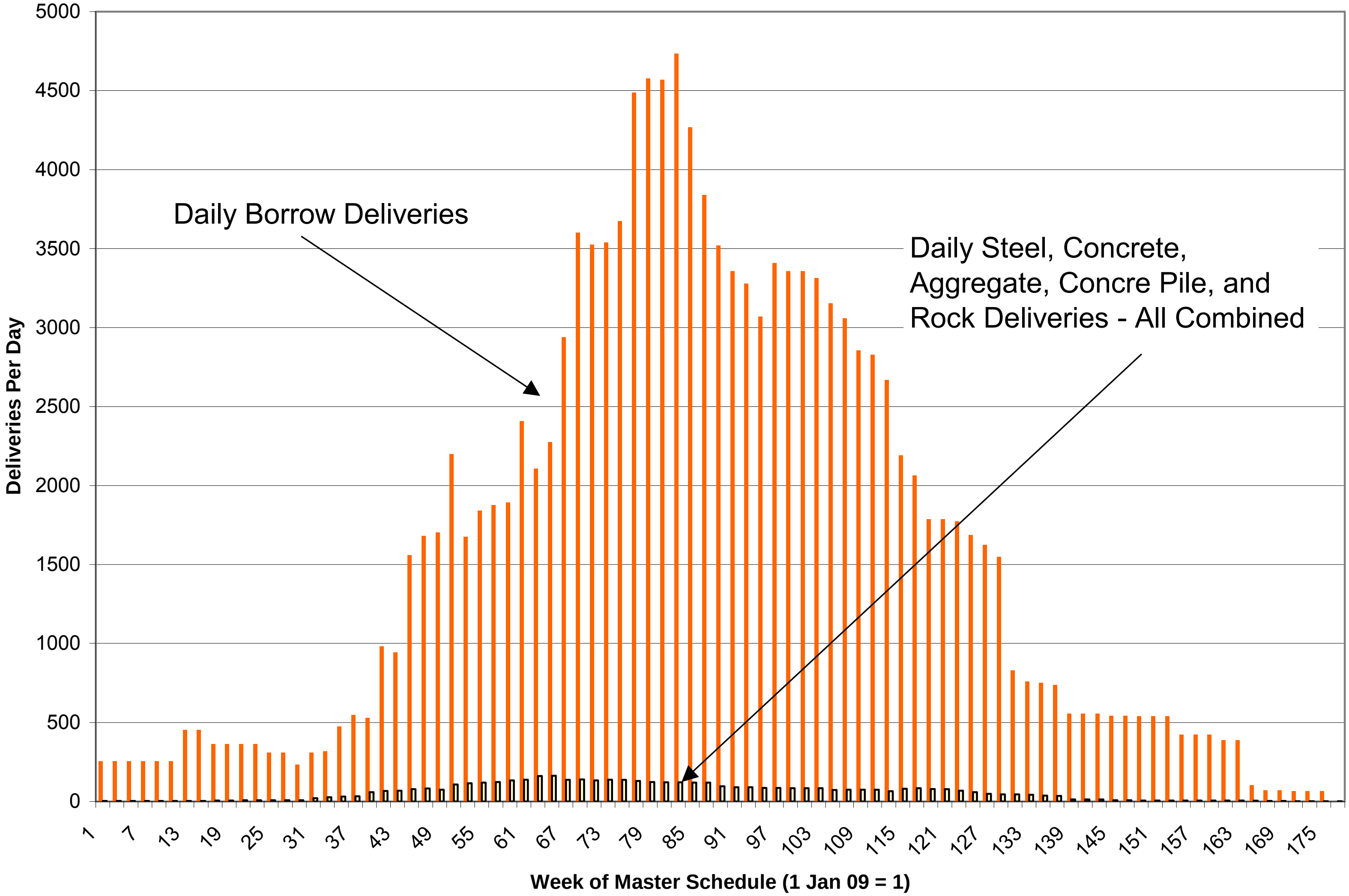

Table 3-8. Summary Table of Local Truck Miles By IER
Maximum Barge Use

IER	Earthen Fill Truck Miles Local	Steel Truck Miles Local	Conc Pile Truck Miles Local	Concrete Truck Miles Local	Aggregate Truck Miles Local	Rock Truck Miles Local	Total Truck Miles Local
1	2,764,800	30,360		16,270	26,680		2,838,110
2	305,600	137,050				70,290	512,940
3	1,604,400	17,990	26,790	3,770	28,020	44,410	1,725,380
4	1,376,900	15,240		34,340	26,580		1,453,060
5				16,120	11,480		27,600
6	323,600	147,630		27,080	22,260		520,570
7	20,465,100	16,060		18,810	15,060		20,515,030
8	800			7,630	15,460		23,890
9	139,700			37,240	12,470		189,410
10	7,134,800			23,740	5,910		7,164,450
11							
12	1,702,000			129,430	94,930		1,926,360
13	2,680,200	8,740		15,160	5,190		2,709,290
14	4,497,000	4,710	22,530	14,740	11,200	1,520	4,551,700
15	2,013,800	4,450		10,380	4,840		2,033,470
16	11,961,900	7,320		29,650	1,074,800	21,550	13,095,220
17	299,100	12,320		23,710	36,210	4,460	375,800
Total	57,269,700	401,870	49,320	408,070	1,391,090	142,230	59,662,280

Table 3-9. Summary Table of Non-Local Truck Miles By IER Maximum Barge Use

IER	Earthen Fill Truck Miles Non-Local	Steel Truck Miles Non-Local	Conc Pile Truck Miles Non-Local	Concrete Truck Miles Non-Local	Aggregate Truck Miles Non-Local	Rock Truck Miles Non-Local	Total Truck Miles Non-Local
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Table 3-10. Summary Table of Miles By Mode of Transportation Maximum Barge Use

IER	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles	Total Rail Miles	Total
1	2,838,000		23,240		2,861,240
2	512,900		39,240		552,140
3	1,725,400		82,210		1,807,610
4	1,453,100		17,900		1,471,000
5	27,600		6,640		34,240
6	520,500		40,980		561,480
7	20,515,000		30,140		20,545,140
8	23,900		6,950		30,850
9	189,400		5,220		194,620
10	7,164,500		147,290		7,311,790
11			92,070		92,070
12	1,926,300		172,750		2,099,050
13	2,709,300		3,900		2,713,200
14	4,551,800		16,410		4,568,210
15	2,033,500		3,320		2,036,820
16	13,095,200		15,160		13,110,360
17	375,900		29,440		405,340
Total	59,662,300		732,860		60,395,160

3.3 Maximum Rail Use

The Maximum Rail Use Scenario routes materials from their point of origin to greater New Orleans on rail cars to the extent that such an assumption is reasonable. For all materials other than borrow, this assumption is reasonable in this scenario. Like the maximum barge use alternative, trucks remain a major mode of transportation under this scenario because none of the projects have direct rail access, and materials would need to be transported from a New Orleans rail terminal to the project site via truck.

3.3.1 Earthen Fill

Trucks would be used to haul earthen fill from assigned government-furnished borrow sites designated by CEMVN (USACE, 2009) to construction sites (roughly 21 million CY). Contractor furnished earthen fill (roughly 9 million CY) cannot be assigned to specific construction projects until those contracts are awarded. Therefore, the contractor furnished earthen fill was assumed to be truck hauled 28.3 miles one-way.[12, 13]

3.3.2 Steel

Under maximum rail use, Sheet Pile, H-Pile, and Pipe Pile would be shipped by rail from Blytheville, Arkansas to rail yards within New Orleans. At the rail yards, the steel would be unloaded onto trucks and then trucked to construction projects.

3.3.3 Aggregate

Under the maximum rail use alternative, construction contracts requiring less than 25,000 CY of concrete would be supplied by major local ready-mix plants. For those projects, aggregate would be shipped to New Orleans by rail from Covington, Louisiana and Bogalusa, Louisiana, offloaded at the nearest rail yard, and trucked to the local ready-mix plants. Once blended, the ready-mix concrete would then be driven to the construction project.

For contracts requiring more than 25,000 CY of concrete, new batch plants were assumed to be constructed at the project site. For those projects, aggregate would be shipped to New Orleans by rail from Covington, Louisiana and Bogalusa, Louisiana, offloaded at the nearest rail yard, then trucked to the project batch plant and blending into ready-mix concrete at the site.

3.3.4 Stone

Under the maximum rail alternative, all stone needed for the foreshore protection on Lake Pontchartrain would be shipped from Pine Bluff, AR by 500 TON barges directly to the project (all LPV levee foreshore protection projects). All other rock would be shipped by rail to New Orleans from Pine Bluff, AR offloaded at rail yards, loaded onto trucks and then trucked to the construction sites for local delivery.

[12] Distance based on the median distance from the 24 contractor furnished sites in IERs 19, 23, 26, 29, and 30 to center city New Orleans using Google Maps.

[13] These miles traveled are included in total miles, for use in estimating emissions and accident rates. These vehicle trips cannot be routed or included in the congestion modeling because “origin-destination” pairings cannot be assigned until the contracts are issued. However, an escalation factor will be applied to the congestion modeling in order to estimate the effects of the contractor furnished trips.

3.3.5 Concrete Pile

Under the maximum rail alternative, concrete pile supplied to contracts with direct water access and offloaded at construction sites (e.g., Chalmette Loop, IHNC, Harvey Canal) would be shipped from Pass Christian, Mississippi by barge. All other concrete pile would be shipped by train from Pass Christian, Mississippi to a New Orleans rail terminal for local delivery by truck.

3.3.6 Maximum Rail Use - Miles Traveled By Mode and Material

Tables 3-11 to 3-15 provide summary information on miles, trips, and mode of transportation used to transport materials to project sites. These tables are:

- Table 3-11: Maximum Rail Use - Miles Traveled By Mode and Material shows local and non-local round-trip miles required to deliver project materials. Local and non-local miles are provided for each material class. Table 3-11 also includes tons of each type of material shipped by barge directly to the project site, as well as tons of each type of material shipped to a rail terminal for off-loading onto trucks for final delivery to the project site.
- Table 3-12. Maximum Rail Use - Trips By Mode and Material shows the total number of trips required to deliver project materials. Trips are provided for each material class, by each mode of transportation.
- Table 3-13. Summary Table of Local Truck Miles By IER parses the local miles data provided in table 3-6, aggregated to the IER level. It is important to note that local truck miles will remain significant, even with barge and rail delivery of all materials other than borrow.
- Table 3-14. Summary Table of Non-Local Truck Miles By IER parses the non-local truck miles data provided in table 3-11, aggregated to the IER level. Under this alternative, as shown in the table, non-local truck miles for all materials is zero.
- Table 3-15. Summary Table of Miles By Mode of Transportation shows the number of local truck miles, non-local truck miles, barge miles, and rail miles incurred in the transportation of project materials. These data also are aggregated to the IER level.

In addition to the tables, figures 3-7, 3-8, and 3-9 graphically depict the magnitude of, and differences between, truck miles, truck trips, and delivery timing for all materials included in the analysis.

Figure 3-7 Truck Miles Traveled shows both local and non-local truck round trip miles traveled for the delivery of materials to project sites. Non-local truck miles are zero for all materials. Data used to generate this figure are directly traceable to table 3-11. As shown in the figure, the local miles traveled for the delivery of earthen fill, or borrow (over 57 million miles), vastly outnumber the local miles traveled for the delivery of all other project materials.

Figure 3-8 Truck Trips shows all truck trips summarized by material. Data used to generate this figure are directly traceable to table 3-12. As shown in the figure, the number of borrow deliveries (over 2 million) is significantly higher than the number of deliveries for all other materials combined (approximately 230,000).

Figure 3-9 Truck Trips Distributed Across Schedule shows truck deliveries per day for all project materials distributed across a master schedule, beginning on 1 January 2009. The distribution of truck trips across the schedule is based on:

- individual project Notice to Proceed date;
- individual project expected construction duration; and
- individual project sequencing of demand timing for materials (see introduction to section 2 for a discussion of the separation of materials demand schedule separation).

The figure shows daily borrow deliveries of:

- over 1,000 for 100 weeks;
- over 2,000 for 60 weeks;
- over 3,000 for 40 weeks; and
- over 4,000 for 10 weeks.

Figure 3-9 also depicts the magnitude of the differences between the number of borrow deliveries and the number of deliveries for all other materials combined.

Table 3-11. Maximum Rail Use – Miles Traveled By Mode and Material

	Quantity	Units	Truck Miles (Local)	Truck Miles (Non-Local)	Barge Miles	Train Miles
Borrow (trucked)	29,616,300	CY	57,270,000			
Steel Sheet Pile (trucked)		Tons				
Steel H-Pile (trucked)		Tons				
Steel Pipe Pile (trucked)		Tons				
Steel (SP,HP,PP barged to project site)		Tons				
Steel (SP,HP,PP barged & intermodal)		Tons				
Steel (SP,HP,PP by rail & intermodal)	839,500	Tons	1,062,700			58,800
Concrete Pile (trucked)		Tons				
Concrete Pile (barged to project site)	189,800	Tons			3,700	
Concrete Pile (barged & intermodal)		Tons				
Concrete Pile (by rail & intermodal)	91,500	Tons	87,500			1,000
Ready-Mix Concrete	283,500	CY	408,100			
On-Site Batch Concrete	854,300	CY				
Aggregate (barged to project batch plants)		Tons				
Aggregate (barged to suppliers)		Tons				
Trucked: suppliers to ready-mix plants						
Trucked: suppliers to project						
Aggregate (by rail to suppliers)	1,720,400	Tons				9,400
Trucked: suppliers to ready-mix plants			294,500			
Trucked: suppliers to project			1,456,700			
Aggregate (trucked to project)	1,586,800	Tons	1,057,900			
Aggregate (trucked to ready-mix plants)		Tons				
Rock (barged to project site)	1,537,300	Tons			185,200	
Rock (barged & intermodal)		Tons				
Rock (by rail & intermodal)	195,900	Tons	123,600			11,100
Rock (trucked to project site)		Tons				
TOTAL MILES			61,761,000		188,900	80,300

Table 3-12. Maximum Rail Use - Trips By Mode and Material

	Quantity	Units	Truck Trips	Barge Trips	Train Trips
Borrow (trucked)	29,616,300	CY	2,042,500		
Steel Sheet Pile (trucked)		Tons			
Steel H-Pile (trucked)		Tons			
Steel Pipe Pile (trucked)		Tons			
Steel (SP,HP,PP barged to project site)		Tons			
Steel (SP,HP,PP barged & intermodal)		Tons			
Steel (SP,HP,PP by rail & intermodal)	839,500	Tons	42,000		125
Concrete Pile (trucked)		Tons			
Concrete Pile (barged to project site)	189,800	Tons		44	
Concrete Pile (barged & intermodal)		Tons			
Concrete Pile (by rail & intermodal)	91,500	Tons	4,600		16
Ready-Mix Concrete	283,500	CY	28,400		
On-Site Batch Concrete	854,300	CY			
Aggregate (barged to project batch plants)		Tons			
Aggregate (barged to suppliers)		Tons			
Trucked from suppliers to ready-mix plants					
Trucked from suppliers to project					
Aggregate (by rail to suppliers)	1,720,400	Tons			199
Trucked from suppliers to ready-mix plants			19,100		
Trucked from suppliers to project			57,400		
Aggregate (trucked to project)	1,586,800	Tons	70,500		
Aggregate (trucked to ready-mix plants)		Tons			
Rock (barged to project site)	1,537,300	Tons		322	
Rock (barged & intermodal)		Tons			
Rock (by rail & intermodal)	195,900	Tons	8,700		30
Rock (trucked to project site)		Tons			
TOTAL TRIPS			2,273,200	366	370

Figure 3-7 Truck Miles Traveled – Maximum Rail Scenario

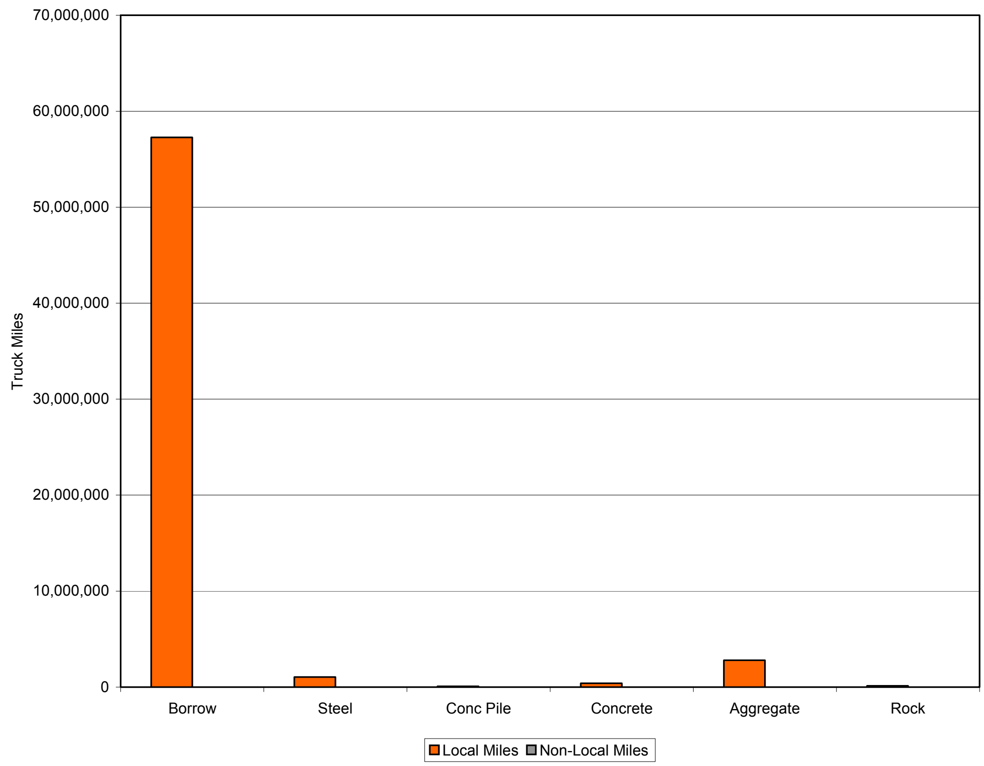

Figure 3-8 Truck Trips – Maximum Rail Scenario

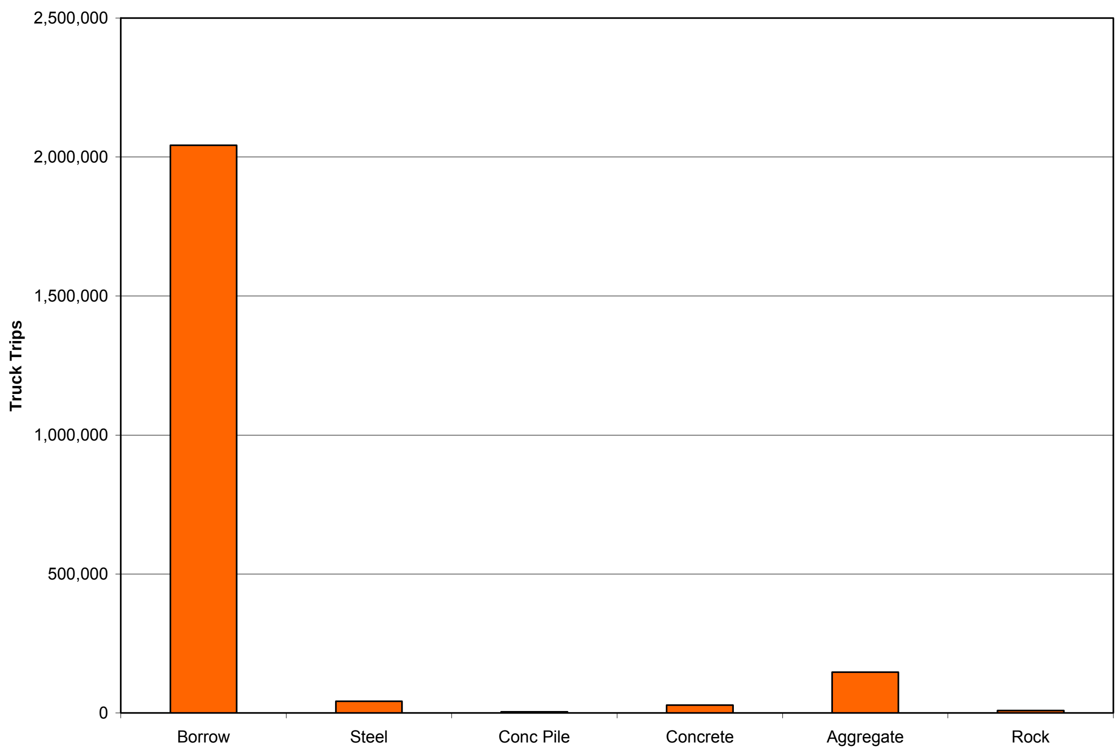

Figure 3-9 Truck Trips Distributed Across Schedule Maximum Rail Scenario

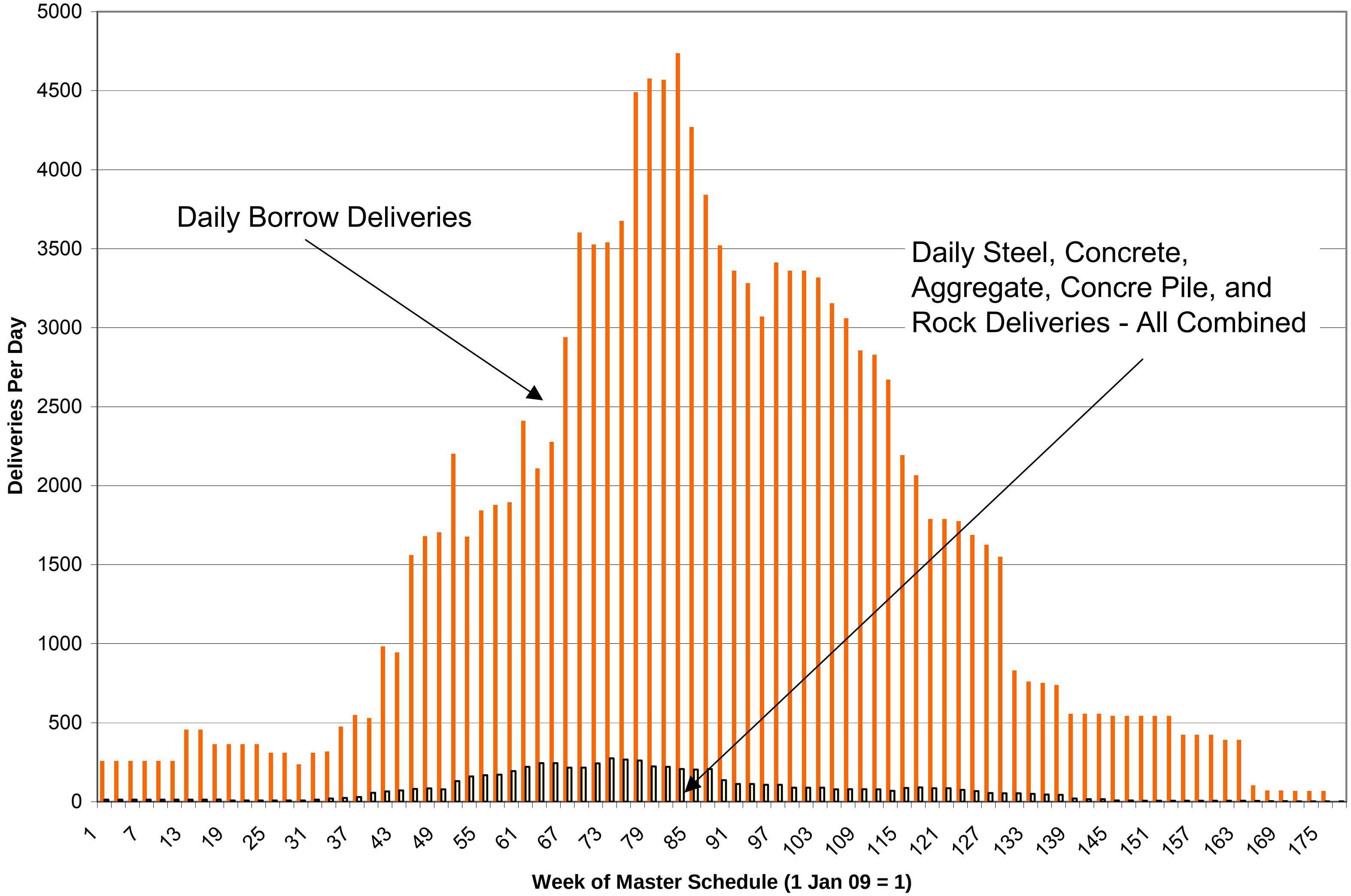

Table 3-13. Summary Table of Local Truck Miles By IER Maximum Rail Use

IER	Earthen Fill Truck Miles Local	Steel Truck Miles Local	Conc Pile Truck Miles Local	Concrete Truck Miles Local	Aggregate Truck Miles Local	Rock Truck Miles Local	Total Truck Miles Local
1	2,764,800	17,090		16,270	26,680		2,824,840
2	305,600	63,340			121,350	63,580	553,870
3	1,604,400	10,610	23,640	3,770	28,020	39,460	1,709,900
4	1,376,900	7,780		34,340	26,580		1,445,600
5		14,550		16,120	11,480		42,150
6	323,600	51,720		27,080	71,860		474,260
7	20,465,100	7,580		18,810	15,060		20,506,550
8	800	3,370		7,630	15,460		27,260
9	139,700	9,950		37,240	12,470		199,360
10	7,134,800	519,520	11,550	23,740	757,580		8,447,190
11		38,620			256,740		295,360
12	1,702,000	274,870		129,430	333,610		2,439,910
13	2,680,200	12,110		15,160	5,190		2,712,660
14	4,497,000	7,670	36,860	14,740	11,200	1,730	4,569,200
15	2,013,800	2,480		10,380	4,840		2,031,500
16	11,961,900	4,440	15,460	29,650	1,074,800	13,260	13,099,510
17	299,100	17,020	20	23,710	36,210	5,590	381,650
Total	57,269,700	1,062,720	87,530	408,070	2,809,130	123,620	61,760,770

Table 3-14. Summary Table of Non-Local Truck Miles By IER
Maximum Rail Use

IER	Earthen Fill Truck Miles Non-Local	Steel Truck Miles Non-Local	Conc Pile Truck Miles Non-Local	Concrete Truck Miles Non-Local	Aggregate Truck Miles Non-Local	Rock Truck Miles Non-Local	Total Truck Miles Non-Local
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Table 3-15. Summary Table of Miles By Mode of Transportation Maximum Rail Use

IER	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles	Total Rail Miles	Total
1	2,824,900			3,630	2,828,530
2	553,900			7,390	561,290
3	1,709,900		55,220	6,520	1,771,640
4	1,445,600		820	2,170	1,448,590
5	42,200			1,030	43,230
6	474,200		9,200	5,220	488,620
7	20,506,500		14,960	2,120	20,523,580
8	27,300		1,730	610	29,640
9	199,400			560	199,960
10	8,447,300		32,780	15,730	8,495,810
11	295,400		41,270	3,530	340,200
12	2,440,100		32,310	18,480	2,490,890
13	2,712,700		580	520	2,713,800
14	4,569,300			3,440	4,572,740
15	2,031,500			520	2,032,020
16	13,099,500			3,640	13,103,140
17	381,700			5,270	386,970
Total	61,761,400		188,870	80,380	62,030,650

3.4 Likely Scenario

The Likely Scenario routes materials from their point of origin to greater New Orleans on barges and trucks under the assumption that the choice of transportation mode is driven by transportation cost efficiencies and project access by water and over-land limitations.

3.4.1 Earthen Fill

Trucks would be used to haul earthen fill from assigned government-furnished borrow sites designated by CEMVN (USACE, 2009) to construction sites (roughly 21 million CY). Contractor furnished earthen fill (roughly 9 million CY) cannot be assigned to specific construction projects until those contracts are awarded. Therefore, the contractor furnished earthen fill was assumed to be truck hauled 28.3 miles one-way.[14, 15]

3.4.2 Steel

For the likely scenario, Sheet Pile, H-Pile, and Pipe Pile would be shipped from Blytheville, Arkansas directly to projects with direct water access (e.g., Chalmette Loop, IHNC, Harvey Canal). Steel for projects that require more than 10,000 tons would be shipped by barge to a local marine terminal and unloaded for local truck delivery to the project sites. Those projects that require less than 10,000 tons of steel were assumed to be supplied by truck as follows:

- Sheetpile from Petersburg, Virginia and Blytheville, Arkansas shipped directly to construction projects by truck.
- H-pile from Blytheville, Arkansas shipped directly to construction projects by truck.
- Pipe pile from Blytheville, Arkansas shipped directly to construction projects by truck.

3.4.3 Concrete and Aggregate

Under the likely scenario, projects that require less than 25,000 CY of concrete would be supplied by major local ready-mix plants. For these projects, aggregate would be shipped by truck directly to ready-mix plants from Covington, Louisiana and Bogalusa, Louisiana. Once blended, the ready-mix concrete would be driven to the construction project.

For projects requiring more than 25,000 CY of concrete, batch plants were assumed to be constructed at the project site. For those projects requiring more than 25,000 CY and with direct water access, aggregate would be shipped to the project site by barge from Smithland, Kentucky. For projects requiring more than 25,000 CY of concrete without direct water access, aggregate would be supplied by aggregate via truck from Covington, Louisiana and Bogalusa, Louisiana. In both cases, project the aggregate would be blended with cement and water at the project site.

[14] Distance based on the median distance from the 24 contractor furnished sites in IERs 19, 23, 26, 29, and 30 to center city New Orleans using Google Maps.

[15] These miles traveled are included in total miles, for use in estimating emissions and accident rates. These vehicle trips cannot be routed or included in the congestion modeling because “origin-destination” pairings cannot be assigned until the contracts are issued. However, an escalation factor will be applied to the congestion modeling in order to estimate the effects of the contractor furnished trips.

3.4.4 Rock

Under the likely scenario, all rock would be shipped by barge to New Orleans from Pine Bluff, Arkansas. If direct water access to the construction site is available, rock would be barged directly to the site. All rock used for foreshore protection on Lake Pontchartrain would be shipped on light-loaded 500-ton barges directly to the project (all LPV levee foreshore protection projects). If no direct water access is available for the project, rock would be barged to local New Orleans marine terminal, offloaded onto trucks and then trucked to the construction sites.

3.4.5 Concrete Pile:

For the likely alternative, concrete pile supplied to contracts with direct water access would be barged from Pass Christian, Mississippi and offloaded at construction sites (e.g., Chalmette Loop, IHNC, Harvey Canal). Contracts requiring in excess of 20,000 tons in a single project without direct water access would be shipped by barge to a New Orleans marine terminal for local delivery by truck. Those contracts requiring less than 20,000 tons of concrete pile or where there is no direct offload to construction site would be shipped by truck from Pass Christian, Mississippi.

3.4.6 Likely Scenario - Miles Traveled By Mode and Material

Tables 3-16 to 3-20 provide summary information on miles, trips, and mode of transportation used to transport materials to project sites. These tables are:

- <u>Table 3-16: Likely Scenario - Miles Traveled By Mode and Material</u> shows local and non-local round-trip miles required to deliver project materials. Local and non-local miles are provided for each material class. Table 3-16 also includes tons of each type of material shipped by barge directly to the project site, as well as tons of each type of material shipped to a rail terminal for off-loading onto trucks for final delivery to the project site.

- <u>Table 3-17. Likely Scenario - Trips By Mode and Material</u> shows the total number of trips required to deliver project materials. Trips are provided for each material class, by each mode of transportation.

- <u>Table 3-18. Summary Table of Local Truck Miles By IER</u> parses the local miles data provided in table 3-16, aggregated to the IER level. It is important to note that local truck miles will remain significant, even with barge and rail delivery of all materials other than borrow.

- <u>Table 3-19. Summary Table of Non-Local Truck Miles By IER</u> parses the non-local truck miles data provided in table 3-17, aggregated to the IER level. Under this alternative, as shown in the table, non-local truck miles for all materials is zero.

- <u>Table 3-20. Summary Table of Miles By Mode of Transportation</u> shows the number of local truck miles, non-local truck miles, barge miles, and rail miles incurred in the transportation of project materials. These data also are aggregated to the IER level.

In addition to the tables, figures 3-10, 3-11, and 3-12 graphically depict the magnitude of and differences between truck miles, truck trips, and delivery timing for all materials included in the analysis.

Figure 3-10 Truck Miles Traveled shows both local and non-local truck round trip miles traveled for the delivery of materials to project sites. Data used to generate this figure are directly traceable to table 3-16. As shown in the figure, the local miles traveled for the delivery of earthen fill, or borrow (over 57 million miles), vastly outnumber the local miles traveled for the delivery of all other project materials.

Figure 3-11 Truck Trips shows all truck trips summarized by material. Data used to generate this figure are directly traceable to table 3-17. As shown in the figure, the number of borrow deliveries (over 2 million) is significantly higher than the number of deliveries for all other materials combined (approximately 150,000).

Figure 3-12 Truck Trips Distributed Across Schedule shows truck deliveries per day for all project materials distributed across a master schedule, beginning on 1 January 2009. The distribution of truck trips across the schedule is based on:

- individual project Notice to Proceed date;
- individual project expected construction duration; and
- individual project sequencing of demand timing for materials (see introduction to section 2 for a discussion of the separation of materials demand schedule separation).

The figure shows daily borrow deliveries of:

- over 1,000 for 100 weeks;
- over 2,000 for 60 weeks;
- over 3,000 for 40 weeks; and
- over 4,000 for 10 weeks.

Figure 3-12 also depicts the magnitude of the differences between the number of borrow deliveries and the number of deliveries for all other materials combined.

Tables 3-21 through 3-25 provide information on a project-by-project basis for the likely scenario. Data shown in the tables mirrors that of tables 3-16 through 3-20, though the data are shown at the project level, rather than aggregated to the IER level. Table titles are:

- Table 3-21. Local Truck Miles By Construction Project
- Table 3-22. Local Truck Trips By Construction Project
- Table 3-24. Non-Local Truck Trips, and Barge Trips By Construction Project
- Table 3-25. Miles By Mode of Transportation by Project

Table 3-16. Likely Scenario – Miles Traveled By Mode and Material

	Quantity	Units	Truck Miles (Local)	Truck Miles (Non-Local)	Barge Miles	Train Miles
Borrow (trucked)	29,616,300	CY	57,270,000			
Steel Sheet Pile (trucked)	47,400	Tons	138,500	3,385,300		
Steel H-Pile (trucked)	74,200	Tons	209,700	3,503,400		
Steel Pipe Pile (trucked)	10,800	Tons	29,300	510,400		
Steel (SP,HP,PP barged to project site)	571,200	Tons			96,600	
Steel (SP,HP,PP barged & intermodal)	135,900	Tons	256,400		17,000	
Steel (SP,HP,PP by rail & intermodal)		Tons				
Concrete Pile (trucked)	39,200	Tons	136,500	185,000		
Concrete Pile (barged to project site)	189,800	Tons			3,700	
Concrete Pile (barged & intermodal)	52,300	Tons	49,300		500	
Concrete Pile (by rail & intermodal)		Tons				
Ready-Mix Concrete	283,500	CY	408,100			
On-Site Batch Concrete	854,300	CY				
Aggregate (barged to project batch plants)	1,219,600	Tons			203,300	
Aggregate (barged to suppliers)		Tons				
Trucked: suppliers to ready-mix plants						
Trucked: suppliers to project						
Aggregate (by rail to suppliers)		Tons				
Trucked: suppliers to ready-mix plants						
Trucked: suppliers to project						
Aggregate (trucked to project)	1,658,900	Tons	1,252,100	78,200		
Aggregate (trucked to ready-mix plants)	428,700	Tons	670,600	232,400		
Rock (barged to project site)	1,537,300	Tons			185,200	
Rock (barged & intermodal)	195,900	Tons	142,200		16,100	
Rock (by rail & intermodal)		Tons				
Rock (trucked to project site)		Tons				
TOTAL MILES			60,562,700	7,894,700	522,400	

Table 3-17. Likely Scenario - Trips By Mode and Material

	Quantity	Units	Truck Trips	Barge Trips	Train Trips
Borrow (trucked)	29,616,300	CY	2,042,500		
Steel Sheet Pile (trucked)	47,400	Tons	2,400		
Steel H-Pile (trucked)	74,200	Tons	3,700		
Steel Pipe Pile (trucked)	10,800	Tons	500		
Steel (SP,HP,PP barged to project site)	571,200	Tons		68	
Steel (SP,HP,PP barged & intermodal)	135,900	Tons	6,800	12	
Steel (SP,HP,PP by rail & intermodal)		Tons			
Concrete Pile (trucked)	39,200	Tons	2,000		
Concrete Pile (barged to project site)	189,800	Tons		44	
Concrete Pile (barged & intermodal)	52,300	Tons	2,600	6	
Concrete Pile (by rail & intermodal)		Tons			
Ready-Mix Concrete	283,500	CY	28,400		
On-Site Batch Concrete	854,300	CY			
Aggregate (barged to project batch plants)	1,219,600	Tons		107	
Aggregate (barged to suppliers)		Tons			
Trucked from suppliers to ready-mix plants					
Trucked from suppliers to project					
Aggregate (by rail to suppliers)		Tons			
Trucked from suppliers to ready-mix plants					
Trucked from suppliers to project					
Aggregate (trucked to project)	1,658,900	Tons	73,700		
Aggregate (trucked to ready-mix plants)	428,700	Tons	19,100		
Rock (barged to project site)	1,537,300	Tons		322	
Rock (barged & intermodal)	195,900	Tons	8,700	28	
Rock (by rail & intermodal)		Tons			
Rock (trucked to project site)		Tons			
TOTAL TRIPS			2,190,400	587	

Figure 3-10 Truck Miles Traveled – Likely Scenario

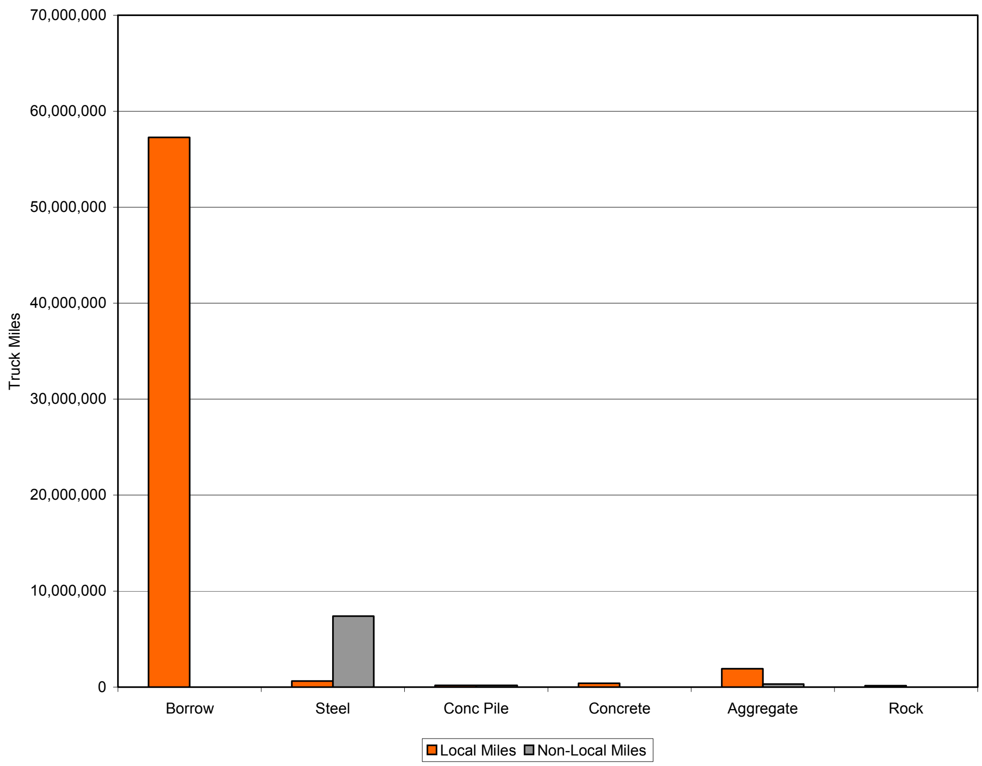

Figure 3-11 Truck Trips – Likely Scenario

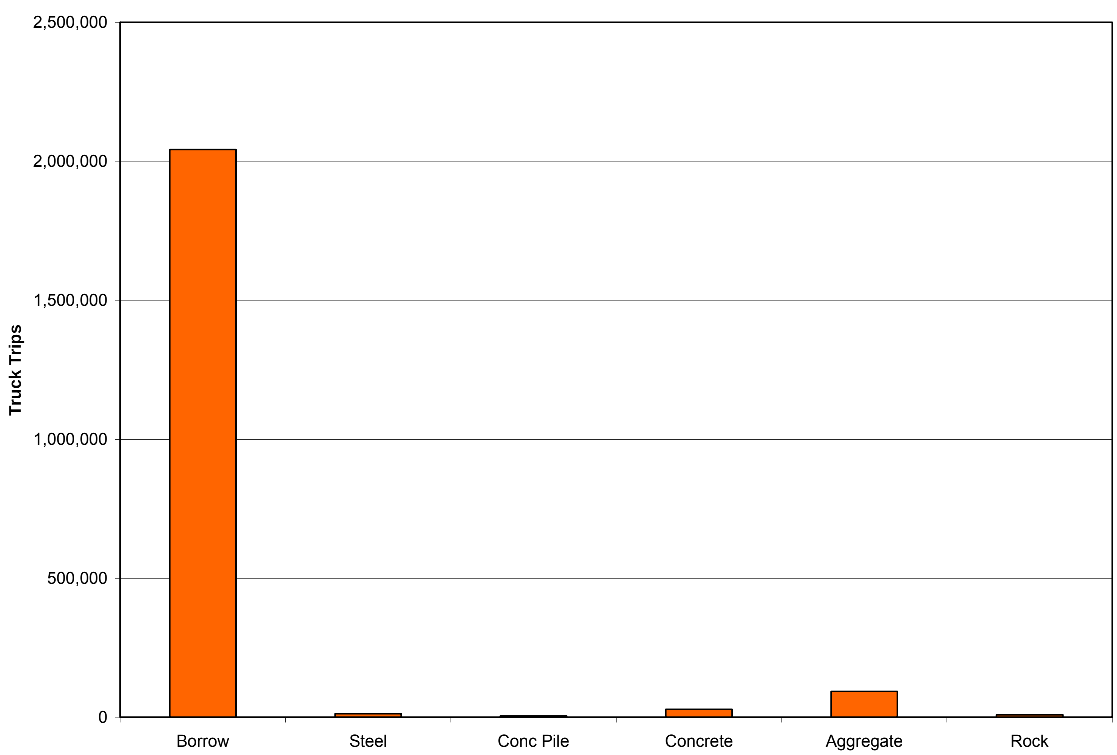

Figure 3-12 Truck Trips Distributed Across Schedule
Likely Scenario

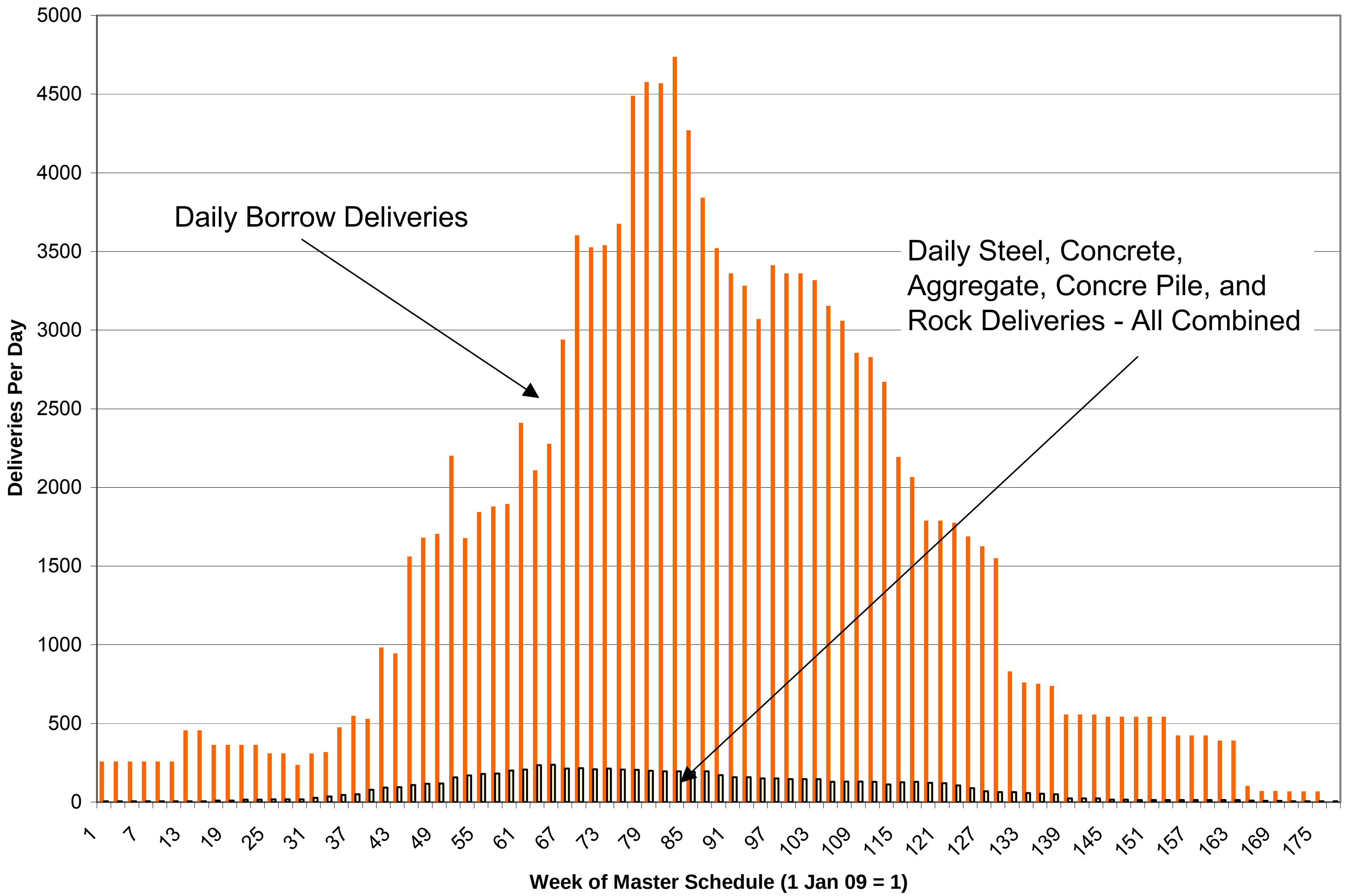

Table 3-18. Summary Table of Local Truck Miles By IER Likely Scenario

IER	Earthen Fill Truck Miles Local	Steel Truck Miles Local	Conc Pile Truck Miles Local	Concrete Truck Miles Local	Aggregate Truck Miles Local	Rock Truck Miles Local	Total Truck Miles Local
1	2,764,800	32,720		16,270	60,740		2,874,530
2	305,600	137,050				70,290	512,940
3	1,604,400	38,680	58,580	3,770	102,090	44,410	1,851,930
4	1,376,900	34,220		34,340	60,530		1,505,990
5				16,120	26,140		42,260
6	323,600	170,740		27,080	50,680		572,100
7	20,465,100	18,830		18,810	34,310		20,537,050
8	800			7,630	35,200		43,630
9	139,700			37,240	28,390		205,330
10	7,134,800		16,310	23,740	13,450		7,188,300
11							
12	1,702,000			129,430	216,110		2,047,540
13	2,680,200	21,720		15,160	11,830		2,728,910
14	4,497,000	26,730	34,070	14,740	25,490	1,520	4,599,550
15	2,013,800	14,060		10,380	11,030		2,049,270
16	11,961,900	20,710	76,740	29,650	1,096,410	21,550	13,206,960
17	299,100	118,460	130	23,710	150,320	4,460	596,180
Total	57,269,700	633,920	185,830	408,070	1,922,720	142,230	60,562,470

Table 3-19. Summary Table of Non-Local Truck Miles By IER Likely Scenario

IER	Earthen Fill Truck Miles Non-Local	Steel Truck Miles Non-Local	Conc Pile Truck Miles Non-Local	Concrete Truck Miles Non-Local	Aggregate Truck Miles Non-Local	Rock Truck Miles Non-Local	Total Truck Miles Non-Local
1		1,015,300			21,050		1,036,350
2							
3		967,360	53,140		47,630		1,068,130
4		712,920			20,970		733,890
5					9,060		9,060
6		957,220			17,560		974,780
7		445,920			11,890		457,810
8					12,200		12,200
9					9,840		9,840
10			24,420		4,660		29,080
11							
12					74,890		74,890
13		268,020			4,100		272,120
14		449,080	16,220		8,840		474,140
15		224,420			3,820		228,240
16		384,060	90,990		13,360		488,410
17		1,974,780	190		50,700		2,025,670
Total		7,399,080	184,960		310,570		7,894,610

Table 3-20. Summary Table of Miles By Mode of Transportation Likely Scenario

IER	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles	Total Rail Miles	Total
1	2,874,600	1,036,350			3,910,950
2	512,900		39,240		552,140
3	1,851,900	1,068,130	59,510		2,979,540
4	1,506,000	733,890	820		2,240,710
5	42,300	9,060	2,840		54,200
6	572,100	974,780	27,700		1,574,580
7	20,537,000	457,810	14,960		21,009,770
8	43,600	12,200	3,150		58,950
9	205,300	9,840	1,420		216,560
10	7,188,300	29,080	145,220		7,362,600
11			92,070		92,070
12	2,047,600	74,890	127,150		2,249,640
13	2,728,900	272,120	580		3,001,600
14	4,599,700	474,140	2,570		5,076,410
15	2,049,300	228,240			2,277,540
16	13,207,100	488,410	2,890		13,698,400
17	596,200	2,025,670	2,320		2,624,190
Total	60,562,800	7,894,610	522,440		68,979,850

Table 3-21. Local Truck Miles By Construction Project Likely Scenario

IER	Project	Earthen Fill Miles	Steel Miles	Concrete Pile Miles	Concrete Miles	Aggregate Miles	Rock Miles
1	LPV03d.2	210,800	50				
1	LPV04.1	423,500					
1	LPV04.2A	131,700					
1	LPV04.2B	478,800					
1	LPV05.2A	339,800					
1	LPV05.2B	926,700					
1	LPV06a.2	39,000	10,330		5,000	11,460	
1	LPV06e.2		5,660		7,890	33,830	
1	LPV06f.2	54,600	2,740		160	2,420	
1	LPV07b.2		4,310		1,920	4,390	
1	LPV07c.2	139,000	4,720		1,010	4,320	
1	LPV07d.2	20,900	4,910		290	4,320	
2	LPV03.2A	75,500	137,050				70,290
2	LPV03.2B	230,100					
3	LPV00.2	267,900					
3	LPV01.2	490,800					
3	LPV02.2	330,800					
3	LPV09.2		35,100	26,790		95,570	20,330
3	LPV09a.2		740	13,370			21,050
3	LPV12a.2		530	15,190	2,410	3,580	3,030
3	LPV16.2			2,190	330	1,180	
3	LPV17.2	203,800	2,310		150	540	
3	LPV18.2			1,040	880	1,220	
3	LPV19.2	311,100					
3	LPV20.2						
4	LPV101.2		11,040		21,200	39,050	
4	LPV103.01A	476,900	5,780		6,450	11,890	
4	LPV103.01A2	476,900	1,960		2,150	3,960	
4	LPV104.01a	385,300					
4	LPV104.02	37,800	15,440		4,540	5,630	

IER	Project	Earthen Fill Miles	Steel Miles	Concrete Pile Miles	Concrete Miles	Aggregate Miles	Rock Miles
5	PCCP-01				16,120	26,140	
6	LPV105.01	46,200	36,190		19,580	36,170	
6	LPV105.02	215,800	12,150		6,890	12,740	
6	LPV106	34,800	119,320				
6	LPV106.01						
6	LPV107	26,800	3,080		610	1,770	
7	LPV108	303,200					
7	LPV109.02a	7,229,900			1,280	1,510	
7	LPV109.02b	448,900					
7	LPV109.02c	156,100	4,080		3,320	3,930	
7	LPV110	156,100	1,510		510	720	
7	LPV111.01	9,602,500	9,250				
7	LPV111.02	39,000	3,990		13,700	28,150	
7	LPV113	2,529,400					
8	LPV144	800			7,630	35,200	
9	LPV149	139,700			37,240	28,390	
10	LPV145	1,233,100					
10	LPV146	819,300					
10	LPV147	7,900		16,310	23,740	13,450	
10	LPV148.02	5,074,500					
11	IHNC01						
11	IHNC-2a						
11	IHNC-2b						
11	IHNC-2c						
11	IHNC-2d						
12	WBV03a				5,980	6,200	
12	WBV03b	851,300			19,750	20,480	
12	WBV04.2				980	1,010	
12	WBV05.2				2,350	2,430	
12	WBV06.2				12,960	13,440	

IER	Project	Earthen Fill Miles	Steel Miles	Concrete Pile Miles	Concrete Miles	Aggregate Miles	Rock Miles
12	WBV06a.2				8,690	12,590	
12	WBV07				3,380	5,220	
12	WBV08				3,420	5,820	
12	WBV10				2,980	3,700	
12	WBV11				1,590	2,160	
12	WBV13				3,300	5,220	
12	WBV14a.2				2,720	15,620	
12	WBV14g.2	109,300			5,120	29,410	
12	WBV23				860	4,930	
12	WBV33				1,350	7,730	
12	WBV38.2				690	3,960	
12	WBV44				11,490	16,650	
12	WBV46.2				800	4,600	
12	WBV47.1	447,400					
12	WBV48.2				34,250	46,530	
12	WBV49.1	294,000			6,770	8,410	
12	WBV90						
13	WBV09a	533,300					
13	WBV09b		21,720		15,160	11,830	
13	WBV12	2,146,900					
14	WBV14b.2	674,200					150
14	WBV14c.2	1,247,600					50
14	WBV14d	468,400	16,320	22,530	11,350	17,700	
14	WBV14e.2	1,336,600			220	260	
14	WBV14f.2	339,300			840	1,310	
14	WBV14i	399,700					
14	WBV30	15,600	5,930		110	410	670
14	WBV37	15,600	4,480	11,540	2,220	5,810	650
15	WBV15a.2						
15	WBV15b.2		14,060		10,380	11,030	
15	WBV17b.1	1,951,700					
15	WBV17b.2	62,100					

IER	Project	Earthen Fill Miles	Steel Miles	Concrete Pile Miles	Concrete Miles	Aggregate Miles	Rock Miles
15	WBV18.2						
16	WBV70					1,057,860	
16	WBV71	117,900					
16	WBV72	11,710,300					1,460
16	WBV73	133,700	6,560	70,660	16,740	23,860	14,150
16	WBV74		12,330		11,780	13,080	5,770
16	WBV75		1,820	6,080	1,130	1,610	170
17	WBV16.2	123,400	27,670		12,380	27,240	3,480
17	WBV16b		6,970		4,460	9,310	230
17	WBV20		6,880		2,360	5,190	
17	WBV21		4,290		1,190	2,620	120
17	WBV22		15,170	130	3,320	7,310	630
17	WBV24	175,700	57,480			98,650	

Table 3-22. Local Truck Trips By Construction Project Likely Scenario

IER	Project	Earthen Fill Local Truck Trips	Steel Local Truck Trips	Conc Pile Local Truck Trips	Concrete Local Truck Trips	Aggregate Local Truck Trips	Rock Local Truck Trips
1	LPV03d.2	13,900					
1	LPV04.1	90,500					
1	LPV04.2A	28,100					
1	LPV04.2B	42,800					
1	LPV05.2A	30,300					
1	LPV05.2B	82,800					
1	LPV06a.2	700	290		480	330	
1	LPV06e.2		160		1,430	960	
1	LPV06f.2	1,000	60		100	70	
1	LPV07b.2		140		190	120	
1	LPV07c.2	12,400	130		180	120	
1	LPV07d.2	1,400	130		180	120	
2	LPV03.2A	2,900	3,880				3,900
2	LPV03.2B	8,800					
3	LPV00.2	10,300					
3	LPV01.2	13,900					
3	LPV02.2	12,700					
3	LPV09.2		800	1,320		1,860	1,500
3	LPV09a.2		20	270			1,560
3	LPV12a.2		10	230	150	100	170
3	LPV16.2			50	50	30	
3	LPV17.2	5,200	50		20	20	
3	LPV18.2			20	50	30	
3	LPV19.2	8,000					
3	LPV20.2						
4	LPV101.2		230		1,650	1,110	
4	LPV103.01A	10,300	120		500	340	
4	LPV103.01A2	10,300	40		170	110	
4	LPV104.01a	7,000					

IER	Project	Earthen Fill Local Truck Trips	Steel Local Truck Trips	Conc Pile Local Truck Trips	Concrete Local Truck Trips	Aggregate Local Truck Trips	Rock Local Truck Trips
4	LPV104.02	700	270		240	160	
5	PCCP-01				1,110	740	
6	LPV105.01	800	640		1,530	1,030	
6	LPV105.02	3,900	210		540	360	
6	LPV106	3,600	2,920				
6	LPV106.01						
6	LPV107	2,800	50		70	50	
7	LPV108	31,000					
7	LPV109.02a	338,600			60	40	
7	LPV109.02b	7,900					
7	LPV109.02c	2,800	60		170	110	
7	LPV110	2,800	30		30	20	
7	LPV111.01	169,700	190				
7	LPV111.02	700	70		1,190	800	
7	LPV113	44,700					
8	LPV144				1,490	1,000	
9	LPV149	9,700			1,200	810	
10	LPV145	41,400					
10	LPV146	41,400					
10	LPV147	1,100		260	570	380	
10	LPV148.02	89,700					
11	IHNC01						
11	IHNC-2a						
11	IHNC-2b						
11	IHNC-2c						
11	IHNC-2d						
12	WBV03a				260	180	
12	WBV03b	30,600			870	580	
12	WBV04.2				40	30	

IER	Project	Earthen Fill Local Truck Trips	Steel Local Truck Trips	Conc Pile Local Truck Trips	Concrete Local Truck Trips	Aggregate Local Truck Trips	Rock Local Truck Trips
12	WBV05.2				100	70	
12	WBV06.2				570	380	
12	WBV06a.2				530	360	
12	WBV07				220	150	
12	WBV08				250	170	
12	WBV10				160	110	
12	WBV11				90	60	
12	WBV13				220	150	
12	WBV14a.2				660	440	
12	WBV14g.2	1,900			1,240	840	
12	WBV23				210	140	
12	WBV33				330	220	
12	WBV38.2				170	110	
12	WBV44				700	470	
12	WBV46.2				190	130	
12	WBV47.1	21,900					
12	WBV48.2				1,970	1,320	
12	WBV49.1	15,300			360	240	
12	WBV90						
13	WBV09a	34,500					
13	WBV09b		260		500	340	
13	WBV12	37,900					
14	WBV14b.2	35,900					10
14	WBV14c.2	93,100					10
14	WBV14d	8,300	200	1,290	750	500	
14	WBV14e.2	39,300			10	10	
14	WBV14f.2	13,000			60	40	
14	WBV14i	14,500					
14	WBV30	300	80		20	10	50
14	WBV37	300	60	170	250	170	40
15	WBV15a.2	88,600					

IER	Project	Earthen Fill Local Truck Trips	Steel Local Truck Trips	Conc Pile Local Truck Trips	Concrete Local Truck Trips	Aggregate Local Truck Trips	Rock Local Truck Trips
15	WBV15b.2		230		470	310	
15	WBV17b.1	34,500					
15	WBV17b.2	11,000					
15	WBV18.2	129,700					
16	WBV70						
16	WBV71	10,300					
16	WBV72	206,900					70
16	WBV73	11,700	110	890	1,010	680	570
16	WBV74		190		550	370	290
16	WBV75		30	80	70	50	10
17	WBV16.2	13,400	380		1,150	770	430
17	WBV16b		120		390	260	30
17	WBV20		90		220	150	
17	WBV21		60		110	70	20
17	WBV22		210		310	210	80
17	WBV24	3,100	940			1,340	

Table 3-23. Non-Local Truck Miles and Barge Miles By Construction Project Likely Scenario

IER	Project	Steel Truck Miles Non-Local	Steel Barge Miles Total	Conc Pile Truck Miles Non-Local	Conc Pile Barge Miles Total	Aggrgte Truck Miles Non-Local	Aggrgte Barge Miles Total	Rock Barge Miles Total
1	LPV03d.2	1,420						
1	LPV04.1							
1	LPV04.2A							
1	LPV04.2B							
1	LPV05.2A							
1	LPV05.2B							
1	LPV06a.2	333,100				3,970		
1	LPV06e.2	172,100				11,720		
1	LPV06f.2	77,920				840		
1	LPV07b.2	147,020				1,520		
1	LPV07c.2	144,240				1,500		
1	LPV07d.2	139,500				1,500		
2	LPV03.2A		9,940				24,700	4,600
2	LPV03.2B							
3	LPV00.2							15,530
3	LPV01.2							8,050
3	LPV02.2							15,530
3	LPV09.2	858,020			250	45,370		1,730
3	LPV09a.2	22,720		25,410				1,730
3	LPV12a.2	15,620		21,920		1,240		580
3	LPV16.2			4,160		410		
3	LPV17.2	71,000				190		
3	LPV18.2			1,650		420		
3	LPV19.2							8,630
3	LPV20.2							7,480
4	LPV101.2	243,080			80	13,530		580
4	LPV103.01A	141,580			80	4,120		
4	LPV103.01A2	48,140			80	1,370		
4	LPV104.01a							

IER	Project	Steel Truck Miles Non-Local	Steel Barge Miles Total	Conc Pile Truck Miles Non-Local	Conc Pile Barge Miles Total	Aggrgte Truck Miles Non-Local	Aggrgte Barge Miles Total	Rock Barge Miles Total
4	LPV104.02	280,120				1,950		
5	PCCP-01		2,840			9,060		
6	LPV105.01	678,360				12,540		
6	LPV105.02	213,700				4,410		
6	LPV106		7,100				11,400	
6	LPV106.01							9,200
6	LPV107	65,160				610		
7	LPV108							14,380
7	LPV109.02a					520		580
7	LPV109.02b							
7	LPV109.02c	64,140				1,360		
7	LPV110	35,460				250		
7	LPV111.01	262,700						
7	LPV111.02	83,620				9,760		
7	LPV113							
8	LPV144		1,420			12,200		1,730
9	LPV149		1,420			9,840		
10	LPV145		12,780				17,100	9,200
10	LPV146		12,780				24,700	23,000
10	LPV147		1,420	24,420		4,660		
10	LPV148.02		11,360				32,300	580
11	IHNC01							
11	IHNC-2a		1,420				9,500	1,150
11	IHNC-2b		1,420				3,800	580
11	IHNC-2c		2,840		1,590		24,700	20,130
11	IHNC-2d		1,420		580		5,700	17,250
12	WBV03a		1,420		80	2,150		
12	WBV03b		1,420		330	7,100		
12	WBV04.2		1,420			350		

IER	Project	Steel Truck Miles Non-Local	Steel Barge Miles Total	Conc Pile Truck Miles Non-Local	Conc Pile Barge Miles Total	Aggrgte Truck Miles Non-Local	Aggrgte Barge Miles Total	Rock Barge Miles Total
12	WBV05.2		1,420			840		
12	WBV06.2		1,420			4,660		
12	WBV06a.2		2,840			4,360		
12	WBV07		1,420		80	1,810		
12	WBV08		1,420			2,020		
12	WBV10		1,420			1,280		
12	WBV11		1,420			750		
12	WBV13		1,420		80	1,810		
12	WBV14a.2		1,420			5,410		
12	WBV14g.2		2,840			10,190		580
12	WBV23		1,420			1,710		580
12	WBV33		1,420			2,680		580
12	WBV38.2		1,420			1,370		580
12	WBV44		1,420			5,770		580
12	WBV46.2		1,420			1,590		
12	WBV47.1		2,840					
12	WBV48.2		4,260			16,130		
12	WBV49.1		4,260			2,910		
12	WBV90		5,680		670		49,400	28,180
13	WBV09a							
13	WBV09b	268,020				4,100		
13	WBV12							580
14	WBV14b.2							580
14	WBV14c.2							580
14	WBV14d	288,260			250	6,140		
14	WBV14e.2					90		
14	WBV14f.2					460		
14	WBV14i							
14	WBV30	89,080				140		580
14	WBV37	71,740		16,220		2,010		580
15	WBV15a.2							

IER	Project	Steel Truck Miles Non-Local	Steel Barge Miles Total	Conc Pile Truck Miles Non-Local	Conc Pile Barge Miles Total	Aggrgte Truck Miles Non-Local	Aggrgte Barge Miles Total	Rock Barge Miles Total
15	WBV15b.2	224,420				3,820		
15	WBV17b.1							
15	WBV17b.2							
15	WBV18.2							
16	WBV70							
16	WBV71							
16	WBV72							580
16	WBV73	118,720		83,780		8,270		1,150
16	WBV74	229,920				4,530		580
16	WBV75	35,420		7,210		560		580
17	WBV16.2	412,440				9,440		580
17	WBV16b	122,480				3,230		580
17	WBV20	102,760				1,800		
17	WBV21	67,460				910		580
17	WBV22	214,280		190		2,530		580
17	WBV24	1,055,360				32,790		

Table 3-24. Non-Local Truck Trips, and Barge Trips By Construction Project Likely Scenario

IER	Project	Steel Truck Trips Non-Local	Steel Barge Trips Total	Conc Pile Truck Trips Non-Local	Conc Pile Barge Trips Total	Aggrgte Truck Trips Non-Local	Aggrgte Barge Trips Total	Rock Barge Trips Total
1	LPV03d.2							
1	LPV04.1							
1	LPV04.2A							
1	LPV04.2B							
1	LPV05.2A							
1	LPV05.2B							
1	LPV06a.2	290				330		
1	LPV06e.2	160				960		
1	LPV06f.2	60				70		
1	LPV07b.2	140				120		
1	LPV07c.2	130				120		
1	LPV07d.2	130				120		
2	LPV03.2A		7				13	8
2	LPV03.2B							
3	LPV00.2							27
3	LPV01.2							14
3	LPV02.2							27
3	LPV09.2	800			3	1,860		3
3	LPV09a.2	20		270				3
3	LPV12a.2	10		230		100		1
3	LPV16.2			50		30		
3	LPV17.2	50				20		
3	LPV18.2			20		30		
3	LPV19.2							15
3	LPV20.2							13
4	LPV101.2	230			1	1,110		1
4	LPV103.01A	120			1	340		
4	LPV103.01A2	40			1	110		
4	LPV104.01a							

IER	Project	Steel Truck Trips Non-Local	Steel Barge Trips Total	Conc Pile Truck Trips Non-Local	Conc Pile Barge Trips Total	Aggrgte Truck Trips Non-Local	Aggrgte Barge Trips Total	Rock Barge Trips Total
4	LPV104.02	270				160		
5	PCCP-01		2			740		
6	LPV105.01	640				1,030		
6	LPV105.02	210				360		
6	LPV106		5				6	
6	LPV106.01							16
6	LPV107	50				50		
7	LPV108							25
7	LPV109.02a					40		1
7	LPV109.02b							
7	LPV109.02c	60				110		
7	LPV110	30				20		
7	LPV111.01	190						
7	LPV111.02	70				800		
7	LPV113							
8	LPV144		1			1,000		3
9	LPV149		1			810		
10	LPV145		9				9	16
10	LPV146		9				13	40
10	LPV147		1	260		380		
10	LPV148.02		8				17	1
11	IHNC01							
11	IHNC-2a		1				5	2
11	IHNC-2b		1				2	1
11	IHNC-2c		2		19		13	35
11	IHNC-2d		1		7		3	30
12	WBV03a		1		1	180		
12	WBV03b		1		4	580		
12	WBV04.2		1			30		

IER	Project	Steel Truck Trips Non-Local	Steel Barge Trips Total	Conc Pile Truck Trips Non-Local	Conc Pile Barge Trips Total	Aggrgte Truck Trips Non-Local	Aggrgte Barge Trips Total	Rock Barge Trips Total
12	WBV05.2		1			70		
12	WBV06.2		1			380		
12	WBV06a.2		2			360		
12	WBV07		1		1	150		
12	WBV08		1			170		
12	WBV10		1			110		
12	WBV11		1			60		
12	WBV13		1		1	150		
12	WBV14a.2		1			440		
12	WBV14g.2		2			840		1
12	WBV23		1			140		1
12	WBV33		1			220		1
12	WBV38.2		1			110		1
12	WBV44		1			470		1
12	WBV46.2		1			130		
12	WBV47.1		2					
12	WBV48.2		3			1,320		
12	WBV49.1		3			240		
12	WBV90		4		8		26	49
13	WBV09a							
13	WBV09b	260				340		
13	WBV12							1
14	WBV14b.2							1
14	WBV14c.2							1
14	WBV14d	200			3	500		
14	WBV14e.2					10		
14	WBV14f.2					40		
14	WBV14i							
14	WBV30	80				10		1
14	WBV37	60		170		170		1
15	WBV15a.2							

IER	Project	Steel Truck Trips Non-Local	Steel Barge Trips Total	Conc Pile Truck Trips Non-Local	Conc Pile Barge Trips Total	Aggrgte Truck Trips Non-Local	Aggrgte Barge Trips Total	Rock Barge Trips Total
15	WBV15b.2	230				310		
15	WBV17b.1							
15	WBV17b.2							
15	WBV18.2							
16	WBV70							
16	WBV71							
16	WBV72							1
16	WBV73	110		890		680		2
16	WBV74	190				370		1
16	WBV75	30		80		50		1
17	WBV16.2	380				770		1
17	WBV16b	120				260		1
17	WBV20	90				150		
17	WBV21	60				70		1
17	WBV22	210				210		1
17	WBV24	940				1,340		

Table 3-25. Miles By Mode of Transportation by Project Likely Scenario

IER	Project	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles
1	LPV03d.2	210,900	1,420	
1	LPV04.1	423,500		
1	LPV04.2A	131,700		
1	LPV04.2B	478,800		
1	LPV05.2A	339,800		
1	LPV05.2B	926,700		
1	LPV06a.2	65,800	337,070	
1	LPV06e.2	47,400	183,820	
1	LPV06f.2	59,900	78,760	
1	LPV07b.2	10,600	148,540	
1	LPV07c.2	149,100	145,740	
1	LPV07d.2	30,400	141,000	
2	LPV03.2A	282,800		39,240
2	LPV03.2B	230,100		
3	LPV00.2	267,900		15,530
3	LPV01.2	490,800		8,050
3	LPV02.2	330,800		15,530
3	LPV09.2	177,800	903,390	1,980
3	LPV09a.2	35,200	48,130	1,730
3	LPV12a.2	24,700	38,780	580
3	LPV16.2	3,700	4,570	
3	LPV17.2	206,800	71,190	
3	LPV18.2	3,100	2,070	
3	LPV19.2	311,100		8,630
3	LPV20.2			7,480
4	LPV101.2	71,300	256,610	660
4	LPV103.01A	501,000	145,700	80
4	LPV103.01A2	485,000	49,510	80
4	LPV104.01a	385,300		

IER	Project	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles
4	LPV104.02	63,400	282,070	
5	PCCP-01	42,300	9,060	2,840
6	LPV105.01	138,100	690,900	
6	LPV105.02	247,600	218,110	
6	LPV106	154,100		18,500
6	LPV106.01			9,200
6	LPV107	32,300	65,770	
7	LPV108	303,200		14,380
7	LPV109.02a	7,232,700	520	580
7	LPV109.02b	448,900		
7	LPV109.02c	167,400	65,500	
7	LPV110	158,800	35,710	
7	LPV111.01	9,611,800	262,700	
7	LPV111.02	84,800	93,380	
7	LPV113	2,529,400		
8	LPV144	43,600	12,200	3,150
9	LPV149	205,300	9,840	1,420
10	LPV145	1,233,100		39,080
10	LPV146	819,300		60,480
10	LPV147	61,400	29,080	1,420
10	LPV148.02	5,074,500		44,240
11	IHNC01			
11	IHNC-2a			12,070
11	IHNC-2b			5,800
11	IHNC-2c			49,250
11	IHNC-2d			24,950
12	WBV03a	12,200	2,150	1,500
12	WBV03b	891,500	7,100	1,750
12	WBV04.2	2,000	350	1,420
12	WBV05.2	4,800	840	1,420

IER	Project	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles
12	WBV06.2	26,400	4,660	1,420
12	WBV06a.2	21,300	4,360	2,840
12	WBV07	8,600	1,810	1,500
12	WBV08	9,200	2,020	1,420
12	WBV10	6,700	1,280	1,420
12	WBV11	3,800	750	1,420
12	WBV13	8,500	1,810	1,500
12	WBV14a.2	18,300	5,410	1,420
12	WBV14g.2	143,800	10,190	3,420
12	WBV23	5,800	1,710	2,000
12	WBV33	9,100	2,680	2,000
12	WBV38.2	4,700	1,370	2,000
12	WBV44	28,100	5,770	2,000
12	WBV46.2	5,400	1,590	1,420
12	WBV47.1	447,400		2,840
12	WBV48.2	80,800	16,130	4,260
12	WBV49.1	309,200	2,910	4,260
12	WBV90			83,920
13	WBV09a	533,300		
13	WBV09b	48,700	272,120	
13	WBV12	2,146,900		580
14	WBV14b.2	674,400		580
14	WBV14c.2	1,247,700		580
14	WBV14d	536,300	294,400	250
14	WBV14e.2	1,337,100	90	
14	WBV14f.2	341,500	460	
14	WBV14i	399,700		
14	WBV30	22,700	89,220	580
14	WBV37	40,300	89,970	580
15	WBV15a.2			
15	WBV15b.2	35,500	228,240	
15	WBV17b.1	1,951,700		

IER	Project	Total Truck Miles Local	Total Truck Miles Non-Local	Total Barge Miles
15	WBV17b.2	62,100		
15	WBV18.2			
16	WBV70	1,057,900		
16	WBV71	117,900		
16	WBV72	11,711,800		580
16	WBV73	265,700	210,770	1,150
16	WBV74	43,000	234,450	580
16	WBV75	10,800	43,190	580
17	WBV16.2	194,200	421,880	580
17	WBV16b	21,000	125,710	580
17	WBV20	14,400	104,560	
17	WBV21	8,200	68,370	580
17	WBV22	26,600	217,000	580
17	WBV24	331,800	1,088,150	

4 Effects Analysis Overview

Assessment of the environmental consequences from the four alternatives for materials transport to and within greater New Orleans focuses on four primary areas:

- Effects to traffic congestion,
- Effects to transportation infrastructure (e.g., road surfaces, bridges, culverts),
- Accident risks (increased risks of fatalities, injuries, and property damage accidents), and
- Diesel emissions.

To predict the effects transportation, the quantities of materials were compiled and converted to trips as described in section 2. Within a GIS environment, the transportation of all quantities was then modeled via all modes. The alternatives described in section 3 compile rational combinations of the transportation modes for the various materials evaluated and the section 3 tables summarize quantities, trips, and distances traveled for each of the four alternatives. With these trips and distances, by alternative, the estimated consequences could be evaluated and the alternatives compared.

Functional classification is the grouping of highways, roads and streets by the character of service they provide and was developed for transportation planning purposes. Basic to this construct is the recognition that each class has a different capacity to assimilate increases in truck traffic.

LADOTD Functional Classification

The Louisiana Department of Transportation and Development (LADOTD) has published a highway functional classification for New Orleans (LADOTD, 2008), segregating the public roads into different categories (1-5, and 8) as follows:

1. Interstate – interstate highways typically receive substantial federal funding and are owned, built, and operated by the state of Louisiana. These roads are controlled access, multiple lane divided highway with the highest rates of speed for traveling in a given area. Interstate 10 is such a road within greater New Orleans.

2. Expressway - an expressway is a divided highway for high-speed traffic with at least partial control of access. The difference between an expressway and the interstate highway or freeway is that expressways have a limited number of driveways and at-grade intersections. The West Bank Expressway (US 90) is an example of this type of road in greater New Orleans.

3. Principal arterial – the principal arterial roads represent the integrated system within greater New Orleans that connect the major centers of activity, are the highest traffic volume corridors, and facilitate the longest trips. These roads carry the major portion of trips entering and leaving the area, as well as the majority of trips simply passing through New Orleans.

   Because of the nature of the travel served by the principal arterial system, almost all fully and partially controlled access roads are part of this functional system including the interstate, other expressways, and other principal arterials (with no control of access).

4. Minor arterial - The minor arterial street system interconnects with and augments the principal arterial system and provides service for trips of moderate length at a somewhat lower level of travel mobility than principal arterials. This system also distributes travel to geographic areas smaller than those identified with the principal arterial system. Such roads typically carry local bus routes, provide intra-community continuity, but typically would not penetrate identifiable neighborhoods. Airline Highway would be an example of a minor arterial.

5. Urban collector - The collector street system provides land access service and traffic circulation within residential neighborhoods, commercial, and industrial areas. It differs from the arterial system in that roads on the collector system may penetrate residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination. Conversely, the collector street also collects traffic from local streets in residential neighborhoods and channels it into the arterial system.

8. Local roads – The local roads offer the lowest level of mobility and are residential or commercial where service for through-traffic movement is deliberately discouraged. Typically these roads do not have public transportation service and are linked to the urban collectors.

It is important to note that roads frequently change functional classification as the same road passes through residential, commercial, or rural areas. This is because the same road may be a 2-lane 30-mph local road with 4-way stops at most intersections (class 8), transition to a 45-mph minor arterial with 4-lane signalized intersections (class 4), and then transition to a 55-mph principal arterial with no signalized intersections (class 3).

Table 4-1 shows the number of roads, sorted by functional classification, identified for the transportation of materials under the likely scenario.[16] Examples of each road functional class are shown in the table. The table also shows that there are six different roads of functional class 1 (Interstate) used for the materials transportation and 62 different segments of local roads (functional class 8) used for materials transportation. Figure 4-1 depicts the network of roads enumerated in table 4-1 that are included in the routing of project materials deliveries under the likely scenario.

[16] Section 1.5 (Materials Delivery Assumptions) described how routes were selected for materials transportation and impact evaluation.

Table 4-1. Roads in DOTD Functional Classes Used to Transport Materials (Likely Scenario)

LADOTD Functional Classification	Classification Description	Example of Road	Number of Roads Used
1	Interstate	I-310; I-10	6
2	Expressway	Westbank Expressway	6
3	Principal Arterial	Lapalco Boulevard Airline Highway (US 61)	35
4	Minor Arterial	Tchoupitoulas Street	44
5	Urban Collector	Bayou Road	17
8	Local Road	Kenner Avenue	62

Figure 4-1. Road Network Used for Project Materials Delivery (Likely Scenario)

4.1 Congestion

4.1.1 Truck Traffic

The Highway Capacity Manual[17] (HCM) is published by the National Science Foundation's Transportation Research Board (TRB) and provides state-of-the-art techniques for estimating the capacity and determining the level of service for transportation facilities (TRB, 2000). The HCM's analyses are based on determining the capacity of a facility (e.g., road, intersection, exit ramp) compared to the demand to use the facility.

The capacity of a facility is the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or a uniform section of lane or roadway during a given time period under prevailing conditions (TRB, 2000). Capacity analysis examines segments or points of a facility under uniform traffic conditions with the reasonable expectancy that the stated capacity for a given facility is a flow rate that can be achieved repeatedly for peak periods of sufficient demand (TRB, 2000). Passenger cars per hour and vehicles per hour are measures that can define capacity.

Demand is the principal measure of the amount of traffic using a given facility. The traffic demand on the facility is based on either traffic data collected or a projection of traffic anticipated to use the facility due to anticipated developments. These traffic volumes are adjusted for many factors including the types of vehicles in the traffic stream, the grade of the roadway, and the characteristics of the traffic flow during peak times. The methodology, in its simplest form, compares the demand to the capacity and identifies the operational conditions as a "level of service" (Terry, 2009).

4.1.1.1 Level of Service

Level of service (LOS) is a quality measure describing the operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, traffic interruptions, freedom to maneuver, and driving comfort and convenience (TRB, 2000). Six LOS are defined with letters A through F designating each level; LOS A representing the best operating conditions and LOS F, the worst. Each LOS represents a range of operating conditions and the driver's perception of those conditions.

Level of service A represents virtually free-flowing conditions, in which the speed of individual vehicles is controlled only by the driver's desire and by prevailing condition, not by the presence of interference from other vehicles. Ability to maneuver within the traffic stream is unrestricted. LOS A occurs late at night in urban areas and frequently in rural areas.

Level of services B, C, and D represent increasing levels of flow rate with correspondingly more interferences from other vehicles in the traffic stream. Average running speed of the stream remains relatively constant through a portion of this range, but the ability of individual drivers to freely select their speed becomes increasingly restricted as the level of serviced worsens (goes from B to C to D). LOS B would have some impingement of maneuverability; two motorists

[17] The Highway Capacity Manual is a publication of the Transportation Research Board and contains concepts, guidelines, and computational procedures for evaluating the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

might be forced to drive side-by-side, limiting lane changes. LOS C would have more congestion than B, where ability to pass or change lanes would not always be assured.

Level of service C is the target for urban highways in many places. At LOS C most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained. LOS D is perhaps the level of service of a busy shopping corridor in the middle of a weekday, or a functional urban highway during commuting hours: speeds are somewhat reduced, motorists are hemmed in by other cars and trucks.

Level of service E is representative of operation at or near capacity conditions. Few gaps in traffic are available, the ability to maneuver within the traffic stream is severely limited, and speeds are low. Operations at this level are unstable and a minor disruption may cause rapid deterioration of flow to level of service F. On highways, this condition is consistent with a road over its designed capacity.

Level of service F represents breakdown or forced flow, where every vehicle moves in lockstep with the vehicle in front of it, with frequent drops in speed to nearly zero mph. At this level, stop-and-go patterns and waves have already been set up in the traffic stream, and operations at a given point may vary widely from minute to minute, as would operations in short, adjacent highway segments, as congestion waves propagate through the traffic stream. Operations at this level are highly unstable and unpredictable. For LOS F, it is difficult to predict flow due to stop-and-start conditions. As a result, the Highway Capacity Manual does not include analytical methods to establish or predict the maximum flow rate for facilities at LOS F (TRB, 2000). LOS F describes a road for which the travel time cannot be predicted and facilities operating at LOS F have more demand than capacity.

4.1.1.2 Factors Affecting Capacity and LOS

In most capacity analyses, prevailing conditions differ from the base conditions, and computation of capacity, service flow rate, and level of service must include adjustments based on roadway conditions. Base conditions assume good weather, good pavement conditions, users familiar with the facility, and no impediments to traffic flow. Examples of base conditions that affect capacity include width of lanes, speed limit, terrain, and impediments to through traffic (e.g., traffic control devices or turning vehicles (TRB, 2000).

Traffic conditions that influence capacity and levels of service include the vehicle type, specifically the effect of heavy vehicles (TRB, 2000). The entry of heavy vehicles (vehicles other than passenger vehicles) into the traffic stream affects the number of vehicles that can be carried on a particular facility (i.e., capacity). Heavy vehicles adversely affect traffic in two ways: (1) they are larger than passenger cars and occupy more road space, and (2) they have poorer operating capabilities than passenger cars, particularly with respect to acceleration, deceleration, and the ability to maintain speed on upgrades (TRB, 2000). The second impact is more critical because heavy vehicles cannot keep pace with passenger cars in many situations creating large gaps in the traffic stream that are difficult to fill by passing maneuvers (TRB, 2000).

4.1.1.3 Regional Planning Commission Traffic Analysis

The Regional Planning Commission (RPC) was created in 1962 by the Louisiana state legislature and local governing body authorization to fulfill federal and state requirements for regional comprehensive and economic development planning in greater New Orleans. Five of the parishes represented in greater New Orleans (Jefferson, Orleans, Plaquemines, St. Bernard and St. Tammany Parishes) are represented by the RPC. A staff of professionals with broad experience and expertise supports the RPC in urban and regional planning, including transportation analyses.

The development, manipulation and dissemination of transportation-related data is an ongoing task for the RPC. In that role, the RPC advances original data research, collects new data sets, and formulates management strategies to make the data available (RPC, 2007). In addition, the RPC staff create needed subsets of data by maintaining an on-going reconnaiassance and transportation surveillance effort including collecting original data (e.g., vehicle counts, travel times, intersection turning movements, classification of vehicles) (RPC, 2007).

Among the tools used to analyze the compiled data is a computerized transportation demand model. This tool allows the RPC staff to simulate existing and projected traffic volumes for various transportation scenarios. The RPC has also conducted extensive travel surveys in order to amass up-to-date data on typical travel patterns within greater New Orleans. The Congestion Management Planning Process has gathered comprehensive congestion measurements (travel time data, level of service, volume to capacity ratios, speed) and linked it with existing roadway segments in a geographic information database (GIS) (RPC, 2007) to evaluate expected future traffic conditions of traffic congestion using a Congestion Management Index.

4.1.1.4 Congestion Management Index - Quantifying the Effects to LOS from HSDRRS Construction

Within greater New Orleans, the LADOTD reports ADT data at approximately 300 nodes (LADOTD, 2009); the RPC supplements the LADOTD data with additional traffic count data that typically include directional data as well as vehicle classification (passenger vs. commercial). Because of the quality of the RPC's data, the effects of the HSDRRS-traffic on the existing traffic congestion in greater New Orleans was calculated using the RPC's Congestion Management Index.

The CM Index has three primary components – Average Daily Traffic (ADT) per Lane, Travel Speed Ratio (Average Speed to Posted Speed), and percent commercially occupied vehicles (% CVO). Each roadway segment on a congestion management (CM) route is assigned an ordinal rank, 1-5, for each of these measures. Ranking categories are predetermined and summarized in the sections below. Those scores are then applied to a formula, in which each of the measures is weighted for its relative importance to overall congestion.

The formula is:

CM Index = (.75) Travel Speed Ratio Score + (.15) ADT Score + (.10) % CVO Score

The index is calculated for each segment on the region's 32 CM routes. The routes, segments, and their logical termini were determined by RPC staff in consultation with stakeholders from a variety of agencies. Together they make up a road network that carries the vast majority of the region's vehicle miles traveled. Each CM segment can have a possible Index score of 1-5, with five representing the worst congestion and one representing near-free-flow conditions. The RPC asserts that any score over 3.25 is considered "congested." Since the components of the formula are ranked on an ordinal scale, the Index provides a relative score by which the CM segments can be compared against each other. In this sense the Index provides the RPC with a more specific method for determining which of the region's roadways have the "worst" congestion than other measures. Each component of the formula is briefly described below.

Travel Speed Ratio is calculated as the average observed speed on a road segment divided by the posted speed limit. Average travel speeds are determined through actual drive-time testing utilizing GPS tracking equipment. The higher the ratio, the more quickly traffic moves on a roadway segment. The ordinal scores for Travel Speed Ratio are:

Score	Travel Speed Ratio
1	> 1
2	≤ 1
3	≤ 0.75
4	≤ 0.5
5	≤ 0.25

Average Daily Traffic (ADT) data are obtained through a variety of sources, including RPC's consultant contracts, the Parishes and municipalities, and LaDOTD's traffic data collection program. ADT per lane rankings are used in order to normalize data on road segments with varying numbers of lanes. The ADT per lane ordinal scores are:

Score	ADT Per Lane
1	< 4,999
2	≤ 9,999
3	≤ 14,999
4	≤ 19,999
5	≥ 20,000

The percentage of Commercially Operated Vehicles (%COV) is the percentage of total vehicle traffic that is comprised of Class 4 and above vehicles (See FHWA *Traffic Monitoring Guide*, section 4). This data is collected through a variety of sources, including automatic and manual counting methods. The % COV ordinal scores are:

Score	% COV
1	< 3.99%
2	≤ 6.99%
3	≤ 9.99%
4	≤ 12.99%
5	≥ 13%

This congestion management index represents the most complete characterization of the existing congestion conditions within greater New Orleans and serves as the basis for estimating the effects to congestion from the HSDRRS construction.

4.1.1.5 Truck Trip Thresholds

An additional method was used to increase the understanding and improve the communication of truck congestion resulting from materials delivery. This method was based on the need to identify individual, highly utilized roads for community-level planning and public awareness. A key component of the analysis was the establishment of truck traffic thresholds. The thresholds were used as a proxy to suggest the level of truck traffic at which the roadway users and adjacent property owners would likely perceive an increase.

Thresholds of project-related truck traffic increases were identified for each functional road class, and are shown in table 4-2. The table shows the functional-class specific thresholds as a total number of trucks within a 12-hour workday, and indicates the frequency a truck would pass a fixed location.

Table 4-2. Truck Frequency Thresholds by Functional Road Class

Functional Road Class	Materials Transportation Trucks Per 12-Hour Workday	Truck Frequency
1	1,500	30 seconds
2	1,500	30 seconds
3	360	2 minutes
4	240	3 minutes
5	150	5 minutes
8	50	15 minutes

4.1.2 Rail Congestion

In the year 2000, 17 freight railroads operated in Louisiana and these railroads carried more than 1.8 million carloads on 3,187 route-miles of track with interstate movements accounting for 94 percent of Louisiana's 74 million tons of rail traffic (LADOTD, 2003). Overall, rail was projected to grow by 40 percent, though there was a great variance across commodities and regions (LADOTD, 2003).

Because railways operate on a dedicated right-of-way, there are characteristically no congestion problems for rail transportation (MARAD, 1994). However, increased rail traffic, because of its sheer volume, can cause congestion problems for surface roads where road traffic intersects rail traffic. However, because none of the construction sites for the WBV or LPV projects have direct access or offloading facilities from rail cars to construction sites, rail use would require an intermodal transfer to trucks for local transportation to the various construction reaches. While using rail transport for commodities such as steel could decrease the number of truck miles driven, the end result--with respect to congestion--would be similar to the decrease in levels of service observed if only trucks were used to move materials. This would lead to surface road congestion and degradation of levels of service, but the "origin" of materials entering the surface road network in greater New Orleans would be at rail yards.

4.1.3 Barge Congestion

Louisiana is located at the intersection of the two largest waterway networks, the Mississippi River System and the Gulf Intra-Coastal Waterway, comprising 86 percent of the national network in terms of length and 97 percent of the system's overall tonnage (LADOTD, 2003). Louisiana domestic barge tonnage totaled 281 million tons in the Year 2000 (LADOTD, 2003). These highly developed transportation systems are efficient modes of transportation with increasing economies of scale, especially for low-value, high-volume bulk cargoes.

Water transport has few congestion problems (MARAD, 1994). Waterway operators encounter little traffic other than pleasure boaters who steer clear of commercial traffic, and as a rule, each keeps to their 'own' area within a river. The waterway industry has met the increases in additional cargo demand, by building towboats with greater horsepower that are capable of pushing more barges at a time. The result has been fewer, but bigger, tows often with 15 barges in a single tow (MARAD, 1994).

4.2 Infrastructure Impacts

The extent of damage to the existing infrastructure of the New Orleans Metropolitan Area from the Hurricanes Katrina and Rita has been the subject of ongoing investigation. In Jefferson, Orleans, Plaquemines, and St. Bernard Parishes, much of the roadway network was submerged for at least several days and in many cases for weeks (LADOTD, 2005). The South Louisiana Submerged Roads Program (www.pavinglaroads.com) is addressing more than 50 street repair projects in Jefferson, Orleans, Plaquemines, St. Bernard, and St. Tammany parishes in Phase A, but much of the remaining New Orleans Metropolitan Area has significant maintenance, rehabilitation, and reconstruction issues.[18] These roads are typically receiving a new wearing

[18] Maintenance refers to the least intensive and least costly group of activities – those designed to address minor or spot distress to make the ride more comfortable or to extend the life of the pavement by preventing deterioration. Rehabilitation refers to an intermediate level of roadwork on streets with moderate to severe distress.

course as well as other components at an average cost of approximately $500,000 per lane mile (RPC, 2009a).

According to a 2008 report by the Bureau of Governmental Research, New Orleans' last city street survey (2004) identified 32 percent of New Orleans' streets needed major rehabilitation or total reconstruction and another 34 percent were in need of immediate maintenance prior to Hurricane Katrina (BGR, 2008). The problem allegedly stems from chronic under-funding of necessary maintenance (BRG, 2008). Prior to the disaster, the city was spending $20 million to $30 million a year on major street repairs and reconstruction (BRG, 2008). The City of expects to spend $162 million of locally generated capital funds during the next three years, but spends only $3 million a year on maintenance. The Department of Public Works estimates that it would cost $3 billion to meet rehabilitation and reconstruction needs and another $40 million to $45 million a year to properly maintain the streets (BRG, 2008). While these statistics are only relative to Orleans Parish, they are assumed to be representative of the general pavement conditions within greater New Orleans.

Over the past 10 years Louisiana Department of Transportation and Development (LADOTD) has funded or conducted extensive studies on the effects of heavy load truck transportation on the roadway infrastructure of Louisiana (Roberts, et al, 2005; Roberts and Kjakfar, 1999; Fletcher, 1997) as well as estimating the effects from inundation during Hurricane Katrina (Gaspard et al, 2007). These references provide relevant examples of analyses of the effects of heavy truckloads on road surfaces as well as bridges in Louisiana. However, the vehicle axle configuration of any particular truck strongly affects roadway and bridge degradation. For example, the unit pavement cost per mile for a 3-axle 54,000 GVWR truck is 50-percent higher than the cost of a 5-axle 80,000 GVWR truck on the same road because the per-axle weight is less for the heavier truck (LADOTD, 1999). Projecting actual roadway damage and bridge fatigue is speculative because the fleet of trucks completing the work will be at the discretion contractors that are selected.

4.2.1 Truck Damage to Infrastructure

Roadway pavement, bridges, and culverts are designed and constructed to withstand the repeated loadings inflicted by the number of heavy trucks that were anticipated to use the route. The useful life of a new pavement is typically 20 years, at which point the structural integrity has been worn from the roadway and major rehabilitation is required. The total load expected over the pavement's "lifetime" due to heavy truck traffic, is the primary input in calculating the thickness of the pavement (MARAD, 2007). The design of road, bridge, and culvert construction and the robustness thereof are also, in part, based on the anticipated demand for daily usage by large trucks.

The most robust roadway designs are for the facilities designed to carry the largest number of the heaviest loads on a daily basis: the interstate, expressway, and arterial roads. The design loads expected for the minor arterial, urban collector, and local roads do not account for frequent heavy loads. As such, the effect of using the minor arterial, urban collector, and local roads to haul large quantities of heavy loads would be the accelerated wearing of road surfaces, bridges,

Reconstruction refers to the most intensive and costly approach. It applies to streets that have deteriorated to the point of failure and involves complete removal and replacement of the surface and substructure of the roadway.

and culverts. These facilities were simply not designed to support the anticipated heavy truck traffic demand needed for transporting materials for the HSDRRS.

Using GIS-based routing, distances modeled for truck transportation may be sorted according to road functional classifications of the transportation routes. Minor arterial, urban collector, and local roads are the least robust surface roads that would be used for truck transportation. These three functional classes of roads were designed anticipating the fewest heavy truckloads being applied to their surfaces. According to Louisiana DOTD's "Preliminary Assessment of Pavement Damage Due to Heavier Loads on Louisiana Highways (LADOTD, 1999)," the pavement degradation cost of a 3-axle truck at 54,000 GVWR on a local road is more than 60 times the pavement degradation cost for that same vehicle to travel on an interstate highway.

In addition to the road surfaces themselves, culverts and bridges integral to the transportation routes were designed and constructed based on the functional classification of the road they are within. A statewide examination of bridges identified 13,426 bridges in Louisiana including bridges on local roads and those within the national highway system roads (LADOTD, 2003). Of the 10,851 non-National Highway System bridges, 2,320 (21-percent) were structurally deficient[19] and 1,636 (15-percent) were functionally obsolete[20] (LADOTD, 2003). Of the 2,575 bridges within the National Highway System, 105 were classified as structurally deficient and 530 were functionally obsolete (LADOTD, 2003).

There are approximately 300 crossings where roads likely to be used for materials transportation intersect a bridge, culvert, or similar water conveyance structure. Approximately 103 of the crossings are within roadways classified as minor arterial (62), urban collector (19), or local roads (22). These locations would be the least capable of withstanding the increased burden of heavy truckloads necessary to transport materials to the construction sites.

According to LADOTD's 2005 study "Effects of Hauling Timber, Lignite Coal, and Coke Fuel on Louisiana Highways and Bridges (Roberts et al, 2005)," fatigue costs to state bridges crossed by 80,000 GVWR trucks are minimal because the stresses caused by such loads are within design load. However, parish bridges crossed by the same 80,000 GVWR trucks are subject to substantial damage (Roberts et al, 2005).

4.2.2 Rail and Barge Damage to Infrastructure

The relatively small number of train and barge trips under the Max Barge, Max Rail, and Likely Scenario would not be expected to have any discernable effects to the rail or marine terminal infrastructure in greater New Orleans.

4.3 Accident Risks

Risk identification is an organized approach to synthesizing engineering or scientific information in order to assess the extent of risk to human health, safety, or the environment. Because the assessment of transportation risk involves different modes of transportation, with varying numbers of shipments, over different routes of varying lengths, the relative risks are compared

[19] "Structurally deficient" means the bridge is in need of rehabilitation in order to carry loads for which it was originally designed (LADOTD, 2003).
[20] "Functionally obsolete" means the bridge is structurally sound, yet in most cases with width and/or clearance restrictions.

based on the average impacts estimated for each mile traveled (i.e., "per-mile" unit risks). These unit risks, and the total risks they predict when multiplied by the distances traveled, are intended for comparison purposes only and provide a benchmark with which to understand the relative differences between the risks of the different modes of transport. The unit risks in the comparison were based on data from two primary references: "State-Level Accident Rates of Surface Freight Transportation: A Reexamination" (Saricks and Tompkins, 1999), and "Large Truck Crash Facts – 2005" (USDOT, 2007).

4.3.1 Truck

Transportation of construction materials involves a risk to members of the public and accidents during transportation may cause property damage, injures, and fatalities. The U.S. Department of Transportation's Federal Motor Carrier Safety Administration's motor carrier reporting rules (49 CFR § 390.5) define an accident as an occurrence involving a commercial motor vehicle operating on a public road that results in (1) a fatality and/or (2) bodily injury to a person that requires medical treatment away from the accident scene; and/or (3) one or more involved motor vehicles incurring disabling damage as a result of the accident such that the vehicle must be towed from the scene (Saricks and Tompkins, 1999).

The most recent edition of the U.S. Department of Transportation's Large Truck Crash Facts (USDOT, 2007) contains descriptive statistics about fatal, injury, and property damage only (PDO) crashes involving large trucks from 2005. These summary statistics report the occurrence rates, in events per 100 million miles traveled, for all three categories of large truck accident (fatal, injury, PDO) nationwide. Large trucks are defined as trucks with a gross vehicle weight rating (GVRW) exceeding 10,000 pounds.

For the calendar year 2005 data, the rates of occurrence per 100,000,000 miles traveled are presented in table 4-3 (USDOT, 2007). For every 100,000,000 miles traveled for large trucks, there were 2.34 fatalities, 51.1 injuries, and 159 PDO events.

Table 4-3. Large Truck Accident Rates per 100 Million Miles

Fatalities	Persons Injured	Vehicles With Property Damage Only
2.34	51.1	159

Source: USDOT, 2007.

Estimating the number and type of accidents that could occur under the different transportation alternative scenarios requires multiplying the large truck accident rates (table 4-3) by the number of large truck miles traveled under the respective alternatives.

4.3.2 Rail

Within the Federal Railway Administration's (FRA) rules for the reporting of accidents and incidents (49 USC 20901), rail carriers must file a report with the Secretary of Transportation, not later than 30 days after the end of each month in which an accident or incident occurs, that states the nature, cause, and circumstances of the reported accident or incident.

The criteria for a reportable accident or incident currently encoded in 49 CFR Part 225 are as follows:

- An impact occurs between railroad on-track equipment and (a) a motorized or non-motorized highway or farm vehicle, (b) a pedestrian, or (c) other highway user at a highway-rail crossing,
- A collision, derailment, fire, explosion, act of God, or other event involving the operation of standing or moving railroad on-track equipment results in aggregate damage (to on-track equipment, signals, track and/or other track structures, and/or roadbed) of more than $6,700, and
- An event arising from railroad operation that results in (a) the death of one or more persons; (b) injury to one or more persons, other than railroad employees, that requires medical treatment; (c) injury to one or more employees that requires medical treatment or results in restriction of work or motion for one or more days, one or more lost work days, transfer to another job, termination of employment, or loss of consciousness; and/or (d) any occupational illness of a railroad employee diagnosed by a physician.

Accident rates for railroad operations (accidents/incidents/fatalities) were not based on train miles traveled because construction materials would not always be moved in uniform-length dedicated trains. Instead, unit risk factors for train hauling were based on the railcar-mile of movement (Saricks and Tompkins, 1999). For ease in comparison to the truck risks, these factors were converted to rates per railcar-mile.

Louisiana-specific unit risks were developed by Saricks and Tompkins (1999) by using state accident data for the years 1994-1996 in the numerator and the estimated total in-state railcar distances traveled (loaded and unloaded) as the denominator. Using these numbers, annual risk factors were developed as an accident rate per railcar-mile. The three year’s risk factors were averaged to get an average rate per railcar-mi and those risk factors were then multiplied by 100,000,000 miles to provide a basis for comparison between the truck, rail, and barge risks (see table 4-4).

Table 4-4. Rail Car Accident Rates Per 100 Million Rail Car Miles

Fatalities	Persons Injured	Property Damage Only
9	33	20

Estimating the number and type of accidents that could occur under the different transportation alternative scenarios requires multiplying the rail car accident rates (table 4-4) by the number of railcar miles traveled under the respective alternatives.

4.3.3 Barge

Under 46 USC Part 61, Reporting Marine Casualties, criteria have been established required reporting (by vessel operators and owners) of marine casualties and incidents involving all US flag vessels occurring anywhere in the world and any foreign flag vessel operating on waters subject to the jurisdiction of the US. An incident must be reported within five days if it results in:

- Death of an individual,
- Serious injury to an individual,
- Substantial loss of property,
- Damage affecting the seaworthiness or efficiency of the vessel, or
- Significant harm to the environment.

Saricks and Tompkins' (1999) accident rates for waterway operations were developed by combining data from the Coast Guard's Marine Casualty and Pollution Database and summary information from USACE annual publication Waterborne Commerce of the United States. Accident types included allisions (striking of/scraping against stationary structures), collisions (between vessels or involving a vessel and another moving vehicle), barge breakaways, fires, explosions, groundings, structural failures, flooding, capsizing, and sinking that occurred in US inland waters or (identifiably) within 100 miles of the coastline (Saricks and Tomkins, 1999).

Their analyses developed unit risk factors for waterway operations (accidents, injuries, and fatalities) that standardized the risk factors to rates per 500-ton shipment mile by waterway type and by state. The ton-mile estimates were divided by the 500-ton shipment weight to produce a unit risk factor similar to "railcar" and "truckload" as shown in table 4-5.

Table 4-5. Waterborne Vessel Accident Rates per 100 Million Shipment Miles

Fatalities	Persons Injured	Property Damage Only
1	11	270

Estimating the number and type of accidents that could occur under the different transportation alternative scenarios requires multiplying the barge travel accident rates (table 4-5) by the number of railcar miles traveled under the respective alternatives.

4.4 Air Quality - Diesel Emissions

As of April 30, 2004, the four parishes surrounding the New Orleans urbanized area (Jefferson, Orleans, St. Bernard and St. Charles parishes) were determined to be in compliance with the new, 8-hour standard for ozone in accordance with the Clean Air Act Amendments of 1990 (RPC, 2009). The determination was based on three consecutive years of air quality monitoring data that demonstrated compliance with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. On May 27, 2008, new air quality standards for ozone went into effect as promulgated by the US Environmental Protection Agency and the newer, more stringent standards may have an impact on the region's ability to meet the NAAQS (RPC, 2009).[21]

[21] This standard is currently under reconsideration by the USEPA. USEPA could propose a lower standard by December 2009 and promulgate a final ruling by August 2010.

There are three primary methods for transporting materials to and within greater New Orleans: truck, rail, and barge. However, few construction projects are accessible by barge, none are directly accessible by rail, and all are accessible by truck. To use rail or barge, the material would need to be offloaded from the bulk containers at rail yards and marine terminals, loaded onto trucks, and delivered to the construction projects. In addition, the opportunity to use rail or barge is restricted to the transport of steel, rock, and the aggregate materials used in the production of concrete because no feasible method exists for using barge or rail for earthen material delivery. As such, the emissions from the truck transport for the distribution of earthen borrow within greater New Orleans cannot be reduced by the use of rail or barge.

Sections 4.4.1 through 4.4.3 show the differences in emissions that would be produced for truck, rail, and barge transportation of materials to and within greater New Orleans.

4.4.1 Truck Emissions

The 1990 Federal Clean Air Act Amendments directed the Environmental Protection Agency (EPA) to develop two separate Federal conformity rules. Those rules (promulgated as 40 CFR Parts 51 and 93) are designed to ensure that Federal actions do not cause, or contribute to, air quality violations in areas that do not meet the national ambient air quality standards. The two rules include transportation conformity, which applies to transportation plans, programs, and projects (i.e., projects that involve the building of roads); and general conformity, which applies to all other non transportation-related projects, including the construction of the HSDRRS.

The EPA has set National Ambient Air Quality Standards (NAAQS) for six principal air quality pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone,[22] lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide.

The Clean Air Act General Conformity Rule (58 FR 63214, November 30, 1993, Final Rule, Determining Conformity of General Federal Actions to State or Federal Implementation Plans) was designed to ensure that Federal actions do not impede local efforts to control air pollution. It is called a conformity rule because Federal agencies are required to demonstrate that their actions "conform with" (i.e., do not undermine) the approved State Implementation Plan[23] (SIP) for their geographic area. The final rule dictates that a conformity review be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more of the six NAAQS criteria pollutants.

All of the Parishes within greater New Orleans are in "attainment" of the NAAQS for each of the six criteria pollutants. Because of this, no detailed conformity analyses were required[24] for the IERs. Although not required for a conformity assessment and evaluation of Clean Air Act

[22] Ozone is the only parameter not directly emitted into the air but forms in the atmosphere when three atoms of oxygen (0^3) are combined by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOC, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air.

[23] A State Implementation Plan (SIP) is the federally-approved plan by which each state identifies how it will attain and/or maintain the health-related primary and welfare-related secondary National Ambient Air Quality Standards (NAAQS).

[24] If one or more of the priority pollutants had not been in attainment, then the proposed actions would have been subject to detailed conformity determinations unless these actions were clearly *de minimus* emissions. Use of the *de minimus* thresholds assures that the conformity rule covers only major Federal actions (USEPA, 1993).

compliance, the quantification of the mobile source, direct emissions from the materials transportation is necessary to address the cumulative effects under NEPA. The Mobile Source Emission Factor (MOBILE) model is an EPA emission factor model for predicting gram per mile emissions of the priority pollutants and other toxics from on-road vehicles under various conditions.[25] The MOBILE model was used to quanitify the emissions from construction materials transportation. This analysis does not include non-road emissions from demolition, construction equipment used to build the HSDRRS, or emissions from materials transportation off of the public roads within temporary work area easements or at construction sites.

In order to use the MOBILE model to quantify on-road emissions from materials transport, three variables needed to be established:

1. Types of trucks assumed to transport materials,
2. Distances those trucks would travel to complete the project, and
3. Rates at which those trucks would emit pollutants [i.e., emissions factors (grams/mile)] during transportation.

The MOBILE model provides only two classes of heavy-duty diesel vehicles (HDDV). Class 8A are the smaller vehicles where their gross vehicle weight restriction is between 33,001-60,000 pounds; Class 8B represents the larger heavy-duty diesel vehicles where the gross vehicle weight restriction is greater than 60,000 pounds. The assumptions made regarding hypothetical distribution of truck miles traveled in each of the classes (HDDV8A and HDDV8B) are shown in table 4-6. The percentages are different for each of the construction materials based on an assumed distribution of truck size in the fleet.

Table 4-6. Assumed Distances by MOBILE 6.2 HDDV Class

	Earthen Fill	Steel	Ready-Mix Concrete	Concrete Pile	Aggregate	Rock
Assumed Percent HDDV8A	10%	20%	60%	20%	10%	20%
Assumed Percent HDDV8B	90%	80%	40%	80%	90%	80%

MOBILE 6.2 was used to generate emission factors for volatile organic hydrocarbon (VOC), carbon monoxide (CO), oxides of nitrogen (NOx), exhaust particulate matter (PM), sulfur dioxide (SO_2), ammonia (NH_3), and carbon dioxide (CO_2). The model calculates emission rates under various conditions affecting in-use emission levels (e.g., ambient temperatures, average traffic speeds).

The model includes default values for a wide range of conditions that affect emissions. These defaults are designed to represent "national average" input data values. For this analysis,

[25] Online at: http://epa.gov/OMSWWW/m6.htm

additional values were specified in the input file[26] to represent regional atmospheric and climactic conditions for the New Orleans area (e.g., elevation above sea level, time of year, daily high and low temperature, absolute humidity). Based on these input parameters, composite emissions factors or emission rates in grams/mile as well as average fuel efficiency (miles/gallon) were generated by the model, and are shown in table 4-7.

Table 4-7. Composite Emission Factors and Diesel Fuel Use

	Vehicle Class from Mobile 6.2	
Pollutant	HDDV8A (33,001 – 60,000 lbs GVWR) Emission Factor (g/mi)	HDDV8B (>60,000 lbs GVWR) Emission Factor (g/mi)
VOCs	0.4010	0.4800
NOx	7.1800	8.7220
CO_2	1,550.2000	1,626.6000
CO	1.7640	2.3520
PM_{10}	0.1655	0.1880
$PM_{2.5}$	0.1523	0.1731
SO_2	0.0144	0.0152
NH_3	0.0270	0.0270
Miles/Gallon	6.6000	6.3000

4.4.2 Rail Emissions

The USEPA has established emission standards for NOx, HC, CO, and PM for newly manufactured and remanufactured diesel-powered locomotives and locomotive engines (EPA, 2009). Three separate sets of emission standards have been adopted, depending on the date a locomotive was first manufactured. The first set of standards (Tier 0) apply to locomotives and locomotive engines originally manufactured from 1973 through 2001. The second set of standards (Tier 1) apply to locomotives and locomotive engines originally manufactured from 2002 through 2004. The final set of standards (Tier 2) apply to locomotives and locomotive engines originally manufactured in 2005 and later. It is important to emphasize that the emission factors provided by EPA (EPA, 2009) rely on many simplifying assumptions and therefore the emission rates calculated should be considered as approximations.

[26] The input parameters and input file as well as the output file are included as appendix A.

Calculating the non-road emission factors rely on estimates of the amount of a pollutant emitted by a particular type of equipment during a unit of use. Typically, emission factors for non-road sources are reported in grams per horsepower-hour (g/hp-hr), but they also may be reported in grams per mile, grams per hour, and grams per gallon. The EPA has established standards to calculate emissions from railroad locomotives in the form of an expected fleet average for emissions of NOx, PM_{10}, and HC emission factors by calendar year (EPA, 2009); the emissions factors for 2010 were used for this analysis and are presented in table 4-8. The emission factor used to estimate the CO emissions is from previous EPA guidance (EPA, 1997). The EPA guidance (EPA, 2009) does not provide an emission factor for ammonia (NH_4) so the data are reported as not available (N/A).

These EPA emission factors provide a method for estimating emissions when fuel gallons are known. Detailed data for train fuel consumption or composition are generally proprietary, but estimates of average fuel efficiencies have been developed and are approximately 2 to 3 gallons per mile (MARAD, 2007).

Gram per gallon emissions of sulfur dioxide (SO_2) and carbon dioxide (CO_2) are largely independent of engine parameters and are primarily dependent on fuel properties (EPA, 2009). As such, locomotive-specific emission rates are not provided by the EPA emission factor guidance (EPA, 2009). Instead, the Technical Highlights (EPA, 2009) recommends that SO_2 and CO_2 emission rates be calculated based on the properties of the specific fuel being used by the locomotives and the emission rates can be assumed to be the same as for other diesel engines operating on similar fuel. Therefore, the emission factors for SO_2 and CO_2 will be the same as was used for estimating SO_2 and CO_2 emissions for trucks.

Table 4-8. Estimated Emission Rates for Locomotives for Calendar Year 2010

	VOC grams/gal	NOx grams/gal	CO_2 grams/gal	CO grams/gal	$PM_{2.5}$ grams/gal	PM_{10} grams/gal	SO_2 grams/gal
Large Line-Haul	8.7	157.0	10,084.6	26.6	4.6	4.7	1.9

Sources: USEPA, 2009; USEPA, 1997.

4.4.3 Barge (Tug) Emissions

There are different types of tugs and barges that commonly operate on the lower Mississippi: towboats and pushboats. A river tug or pushboat is generally a flat-bottomed boat with a flat bow. The bow meets up against the flat stern of a river barge, the two are secured to each other, and the tug pushes the barge or barges up or down the river. In one variation, the pushboat has a rounded or pointed bow that fits in a notch on the stern of a barge (notch barge) and then commences to push the barge. Less commonly seen are towboats. Unlike a pushboat, the hull of the towboat does not, generally speaking, touch the barge. Instead a long line passes between the towboat and the barge as the towboat pulls the barge forward. Towboats are more commonly used for ocean going barges and on the Great Lakes than they are in the rivers (USEPA, 1999). Tows may be as large as 40 barges per tow on the lower Mississippi River (USEPA, 1999), however table 4-9 summarizes an EPA-published rule of thumb for estimating barge-to-tug ratios per tow.

Table 4-9. Barges Per Tug Assumptions

Tug Horsepower Range	Barges/Tug
3,500 and above	15
1,500-3,500	10
<1,500	5

Source: USEPA, 1999.

Strictly speaking, barges do not emit pollutants; emissions come from the tugboats that push or pull them. The EPA has promulgated emissions standards for marine vessel engines and classifies the barge tugs as non-oceangoing ships. The EPA data on non-oceangoing ships indicate that, based on a sample of approximately 100 vessels, the average rated horsepower for tugs was 4,268 hp (USEPA, 2000). The same source provides suggested load factors of 80-percent (cruise speed), 40-percent (slow cruise), and 20-percent (maneuvering) as a percent of the maximum continuous rating. These loading factors represent the varying conditions under which a tug would operate and the corresponding changes in emissions. Table 4-10 provides emission factors in grams emitted per hour of operation assuming EPA's average horsepower of 4,268 HP for non-oceangoing tugs (USEPA, 2000).

Table 4-10. Emission Factors (grams/hour) For Tugboats

NOx	CO	HC	SOx	PM 2.5	PM 10	CO_2	NO_2
42,015.6	3,501.3	1,591.5	4,144.3	768	834.9	2,132,610	63.66

Source: Capital Regional District Air Contaminant Emissions Inventory for 2004 (2008 Revision), 2008.

5 Transportation Alternatives Assessed and Compared

These analyses evaluate the effects from moving materials to, and within greater New Orleans in order to construct projects with a total cost of over $15 billion. It is important to realize that applied numerical models describe processes and make predictions about where, when and how the modeled phenomenon will occur, but have limits because of the assumptions used in the model.

The environmental consequences for transportation were modeled using materials quantities from ongoing construction designs in various stages of completion, with associated schedule changes, based on standardized truck, rail, and barge loading factors, and transported along unspecified routes to construction projects. This analysis depicts what the effects would be if there were no design or schedules changes after July 2009, and all of the simplifying assumptions described in this report were uniformly correct. Predicting traffic or road surface conditions on a particular segment of route, on a given day in the project schedule is not a realistic expectation from this analysis.

However, these limitations should not diminish the value of the analysis or the validity of the alternatives comparison. Each of the four alternatives (Max Truck, Max Barge, Max Rail, and theLikely Scenario) is evaluated to compare the effects to traffic congestion (5.1), infrastructure degradation (5.2), accidents (5.3), and emissions (5.4). The similarities and limited differences between the alternatives are valuable for the consideration of transportation alternatives. Slight differences in some of the metrics (e.g., truckloads) because of different rounding assumptions as the data were manipulated; this does not diminish the value of the assessment to decisions makers.

5.1 Congestion

Congestion resulting from project implementation was addressed using two methods: RPC's Congestion Management Index (CMI), and by defining thresholds at which the public would be likely to perceive the increase in traffic and identifying which specific roads exceeded those thresholds.

5.1.1 Congestion Impacts Evaluated using the CMI

Using the analytical approach discussed in section 4.1 Congestion, effects to local traffic were estimated for each of the transportation alternatives using the RPC's CMI. Each of the transportation routes are made up of many different road classes as the truck proceeds from origin to destination. In order to assess effects to traffic along the route, each route was parsed into segments by road class. This allows the analysis of the effects to traffic at distinct points along the route.

Likely transportation routes developed as part of this analysis were parsed into approximately 8,000 route segments. These route segments, along with schedules for delivery and the demand-driven truck trips, formed the basis for the calculation of incremental changes to the CMI.

These changes provide a relative assessment of the predicted changes in traffic. Over 3 million separate changes in the CMI were calculated for all transportation route segments, for six classes of roads, for each of the 380 weeks of the project analysis period, for each of the four alternatives, moving more than 2 million truckloads.

Table 5-1. Maximum Truck Use – Changes in CMI

	Minimum			Median			Maximum		
DOTD Class	Existing	With Project	Change	Existing	With Project	Change	Existing	With Project	Change
1	2.814	2.817	0.003	2.814	2.817	0.003	2.814	2.821	0.007
2	2.785	2.790	0.005	2.785	2.790	0.005	2.785	2.833	0.048
3	2.891	2.906	0.015	2.891	2.906	0.015	2.891	2.928	0.037
4	2.822	2.836	0.014	2.822	2.836	0.014	2.822	2.874	0.052
5	2.270	2.270	0.000	2.270	2.270	0.000	2.270	2.270	0.000
8	3.137	3.153	0.016	3.137	3.153	0.016	3.137	3.161	0.023

Table 5-2. Maximum Truck Use – Percent Change in Commercial Vehicles

	Percentile								
DOTD Class	Min	50%	60%	70%	80%	90%	95%	99%	100%
1	0	0	0	1	1	4	7	14	64
2	0	0	1	1	3	5	13	145	317
3	0	0	0	0	2	10	22	89	688
4	0	0	0	0	0	2	15	75	240
5	0	0	0	0	1	3	4	18	72
8	0	0	0	0	0	2	4	32	116

Table 5-3. Maximum Barge Use – Changes in CMI

	Minimum			Median			Maximum		
DOTD Class	Existing	With Project	Change	Existing	With Project	Change	Existing	With Project	Change
1	2.814	2.817	0.003	2.814	2.817	0.003	2.814	2.821	0.007
2	2.785	2.790	0.005	2.785	2.790	0.005	2.785	2.833	0.048
3	2.891	2.906	0.015	2.891	2.906	0.015	2.891	2.922	0.031
4	2.822	2.836	0.014	2.822	2.836	0.014	2.822	2.858	0.036
5	2.270	2.270	0.000	2.270	2.270	0.000	2.270	2.270	0.000
8	3.137	3.153	0.016	3.137	3.153	0.016	3.137	3.161	0.023

Table 5-4 Maximum Barge Use – Percent Change in Commercial Vehicles

	Percentile								
DOTD Class	Min	50%	60%	70%	80%	90%	95%	99%	100%
1	0	0	0	0	0	1	2	9	64
2	0	0	0	0	0	2	9	143	315
3	0	0	0	0	1	5	14	77	688
4	0	0	0	0	0	1	3	47	240
5	0	0	0	0	1	3	3	18	70
8	0	0	0	0	0	0	2	22	116

Table 5-5. Maximum Rail Use – Changes in CMI

	Minimum			Median			Maximum		
DOTD Class	Existing	With Project	Change	Existing	With Project	Change	Existing	With Project	Change
1	2.814	2.817	0.003	2.814	2.817	0.003	2.814	2.821	0.007
2	2.785	2.790	0.005	2.785	2.790	0.005	2.785	2.833	0.048
3	2.891	2.906	0.015	2.891	2.906	0.015	2.891	2.923	0.033
4	2.822	2.836	0.014	2.822	2.836	0.014	2.822	2.858	0.036
5	2.270	2.270	0.000	2.270	2.270	0.000	2.270	2.270	0.000
8	3.137	3.153	0.016	3.137	3.153	0.016	3.137	3.161	0.023

Table 5-6 Maximum Rail Use – Percent Change in Commercial Vehicles

	Percentile								
DOTD Class	Min	50%	60%	70%	80%	90%	95%	99%	100%
1	0	0	0	0	0	1	3	9	64
2	0	0	0	0	1	3	9	145	316
3	0	0	0	0	1	6	15	86	688
4	0	0	0	0	0	1	5	48	240
5	0	0	0	0	1	3	5	18	72
8	0	0	0	0	0	0	2	23	116

Table 5-7. Likely Scenario – Changes in CMI

	Minimum			Median			Maximum		
DOTD Class	Existing	With Project	Change	Existing	With Project	Change	Existing	With Project	Change
1	2.814	2.817	0.003	2.814	2.817	0.003	2.814	2.821	0.007
2	2.785	2.790	0.005	2.785	2.790	0.005	2.785	2.833	0.048
3	2.891	2.906	0.015	2.891	2.906	0.015	2.891	2.923	0.033
4	2.822	2.836	0.014	2.822	2.836	0.014	2.822	2.858	0.036
5	2.270	2.270	0.000	2.270	2.270	0.000	2.270	2.270	0.000
8	3.137	3.153	0.016	3.137	3.153	0.016	3.137	3.161	0.023

Table 5-8 Likely Scenario – Percent Change in Commercial Vehicles

	Percentile								
DOTD Class	Min	50%	60%	70%	80%	90%	95%	99%	100%
1	0	0	0	0	1	2	3	9	64
2	0	0	0	0	1	3	11	148	315
3	0	0	0	0	2	6	20	102	688
4	0	0	0	1	1	5	22	166	240
5	0	0	0	0	0	1	3	18	70
8	0	0	0	0	0	1	3	27	116

Table 5-9 presents the maximum calculated change in the CMI for any of the 8,000 segments within the six DOTD road classifications. These data indicate no discernable difference between the alternatives with respect to the effects on congestion.

Table 5-9. Alternative Comparison – Maximum Change in CMI

LADOTD Road Classification	Class Description	Max Truck	Max Barge	Max Rail	Likely Scenario
1	Interstate	0.007	0.007	0.007	0.007
2	Expressway	0.048	0.048	0.048	0.048
3	Principal Arterial	0.037	0.031	0.033	0.031
4	Minor Arterial	0.052	0.036	0.036	0.036
5	Urban Collector	0.000	0.000	0.000	0.000
8	Local Road	0.023	0.023	0.023	0.023

5.1.2 Congestion Impacts Evaluated using Truck Trip Thresholds

Evaluating the effects to traffic using the CMI calculations did not distinguish the predicted effects to traffic at a street level. In order to improve the public's understanding of the expected increase in truck traffic from materials transportation, truck traffic was evaluated by defining thresholds at which the public would be likely to perceive the increases in traffic. As introduced in section 4.1.1.5, this analysis identifies which specific roads exceeded those thresholds, and the duration of exceedance. Table 5-10 repeats the information shown in table 4-2, but is included again below to support communication of the analysis.

Table 5-10. Truck Frequency Thresholds by Functional Road Class

Functional Road Class	Materials Transportation Trucks Per 12-Hour Workday	Truck Frequency
1	1,500	30 seconds
2	1,500	30 seconds
3	360	2 minutes
4	240	3 minutes
5	150	5 minutes
8	50	15 minutes

Alternative-specific transportation routes, and the discrete roads within those routes, were parsed into approximately 8,000 route segments to evaluate traffic along very small segments for each route. However, to understand the overall effect on single roadways, multiple segments were dissolved into single road segments where both name and functional classification were shared. By consolidating segments in this fashion, the most impacted roads of each functional classification could be identified within the materials transportation routes.

These roads were then examined to determine how many of the roads exceeded the functional-class specific thresholds (table 5-10 above) under each of the four alternatives. Table 5-11 below summarizes the number of roads, by functional classification, that are predicted to exceed the thresholds. For example, none of the six functional class 1 or 2 roads are predicted to exceed the truck frequency threshold of 1,500 trucks per day during the project schedule. However, 19 of the 44 functional class 4 roads used in the materials transportation would be predicted to exceed the threshold of 240 trucks/day under the maximum truck alternative. Only 12 of the 44 functional class 4 roads would be predicted to exceed the threshold of 240 trucks/day for both maximum barge and likely scenarios.

With the exception of the number of functional class 8 (local roads) under the maximum truck alternative, table 5-11 indicates that a substantially similar number of roads would be predicted to exceed the truck frequency thresholds. Because the number of truck trips and routes used for the transportation of borrow is identical for all four scenarios, this result is not unexpected. Given the similarities, the remaining analyses report only the likely scenario.

Table 5-11. Numbers of Roads Exceeding Truck Frequency Thresholds by Functional Class and Alternative

DOTD Class	Maximum Truck	Maximum Barge	Maximum Rail	Likely	Used for Transport
1	0	0	0	0	6
2	0	0	0	0	6
3	7	6	7	6	35
4	19	12	13	12	44
5	10	8	8	8	17
8	41	32	35	32	62

Figure 5-1 (repeated from figure 4-1) shows the roads included in the routing of project materials deliveries under the likely scenario. Figure 5-2 shows the locations of roads within the transportation network that are expected to exceed frequency thresholds for the likely scenario.

Figure 5-1. Road Network Used for Project Materials Delivery (Likely Scenario)

Figure 5-2. Roads Exceeding Thresholds (Likely Scenario)

5.1.2.1 Likely Alternative - Duration of Truck Frequency Threshold Exceedence

Identifying the roads that exceed the truck frequency thresholds omits two important parameters: the duration of the effect (time) and the magnitude of the exceedance. The duration that truck traffic exceeds the frequency thresholds, and the extent to which the thresholds are exceeded is important in characterizing the intensity of the effect. The following four tables (5-12 through 5-15) identify the functional class-specific roads that exceed the truck frequency thresholds shown in figure 5-2. For the identified roads, the tables provide the number of months the threshold is exceeded, the minimum number of trucks per day that triggered the first exceedance, the maximum number of trucks per day, and the average number of trucks per day.

For example, table 5-12 identifies each of the six functional class 3 roads that exceed the truck frequency threshold of 360 trucks per day. In addition, table 5-12 identifies the number of months the threshold is exceeded as well as the minimum, average, and maximum number of trucks per day for the road in question. Within tables 5-12 through 5-15, the roadways are sorted in descending order by the number of months the truck thresholds are exceeded. Roads listed in these tables are those predicted to be most affected by increases in truck traffic and the durations for which these effects are expected.

Table 5-12. DOTD Road Class 3
Number of Days Threshold of 360 Material Delivery Trucks Per Day Exceeded

		Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded		
Roadway	Number of Months Threshold Exceeded	Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
US-90	15	360	1,064	2,252
Lapalco Boulevard	8	497	738	1,250
SR-39	7	372	445	457
US-61	6	383	458	640
SR-23	3	381	425	543
Walker Road	1	378	378	378

Table 5-13. DOTD Road Class 4
Number of Days Threshold of 240 Material Delivery Trucks Per Day Exceeded

		Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded		
Roadway	Number of Months Threshold Exceeded	Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
US-61	25	251	840	2,570
US-11	16	287	659	1,043
US-90	16	289	661	1,047
Michoud Boulevard	16	287	657	1,039
SR-46	12	264	459	698
Bayou Road	9	240	267	298
Ames Boulevard	8	326	842	2,147
Westwood Drive	7	291	653	1,248
Engineers Road	5	269	270	273
SR-3134	3	349	349	349
SR-45	3	347	348	349
Lakeshore Drive	2	268	315	346

Table 5-14. DOTD Road Class 5
Number of Days Threshold of 150 Material Delivery Trucks Per Day Exceeded

		Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded		
Roadway	Months Threshold is Exceeded	Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
SR-45	9	160	562	1,808
Bayou Road	9	240	267	298
Ames Boulevard	8	347	347	347
Westwood Drive	8	189	588	1,248
41st Street	3	190	190	190
Vintage Drive	3	190	190	190
Ames Boulevard	3	347	347	347
Barriere Road	2	382	382	382

Table 5-15. DOTD Road Class 8
Number of Days Threshold of 50 Material Delivery Trucks Per Day Exceeded

		Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded		
Roadway	Months Threshold is Exceeded	Minimum Trucks per Day	Average Trucks per Day	Maximum Trucks per Day
Kenner Avenue	29	76	612	2,146
SR-46	27	100	332	698
Live Oak Boulevard	25	127	555	1,676
Bayou Road	19	62	144	298
Walker Road	19	52	198	756
Vintage Drive	18	52	126	348
Lapalco Boulevard	12	60	422	1,248
Concord Road	11	60	104	153
Engineers Road	11	52	142	273
Victory Drive	11	85	432	1,188
Macarthur Avenue	10	52	58	69
Almonaster Avenue	9	108	108	108
SR-3134	8	52	174	349
Carrie Lane	8	50	172	347
Mildred Street	8	57	167	392
40th Street	7	52	109	174
Loyola Drive	7	52	109	174
Beta Street	7	92	92	92
Laroussini Street	7	92	92	92
North Street	7	92	92	92
South Street	7	92	92	92
Vic A Pitre Drive	7	92	92	92
Caryota Drive	7	54	122	190
David Drive	7	54	122	190
Barriere Road	6	57	159	375
SR-23	5	165	165	165
Nashville Avenue	4	50	61	94
Hickory Avenue	3	95	95	95

5.2 Infrastructure Degradation

The relatively small number of train and barge trips under the Max Barge, Max Rail, and Likely Scenario would not be expected to have any discernable effects to the rail or marine terminal infrastructure in greater New Orleans. Therefore, the discussion of the effects to infrastructure focuses exclusively on the effects of truck transportation.

As described in section 4.2, the effects to infrastructure are a function of vehicle axle configuration, load, number of trips, road design, and the pre-project condition of the road. Estimating the effect to infrastructure from the alternatives is perforce speculative because essential factors cannot be predicted with certainty. Routes used are uncertain because contractors are allowed to select any route on public roads not specifically prohibited for use by a Parish. Rational assumptions regarding typical truck equipment can be made, but the effects to infrastructure are more highly correlated to the axle configuration of any particular truck than a vehicle's gross vehicle weight.[27] Contractors are not restricted from using any type of trucks, provided they are within the legal weight limits or are permitted as overweight. There will be multiple axle configurations for dump trucks/flatbeds/cement mixers/etc. with different weights per axle. Estimating the damage to infrastructure, based on a hypothetical fleet of trucks, on possible, but not certain routes, necessarily leads to extensive caveats on the use of the results.

When estimating the effects to roads, the concept of lane-mile is important because lane miles are a typical unit used to measure the surface area of a roadway. For example, a two-lane street that is one mile long has two lane miles, and a four-lane street that is one mile long has four lane miles. The width of lane used for this analysis was assumed to be 12 feet, so the area of a lane-mile would be the 12-foot lane width x 5,280 feet/mile = 63,360 square feet or one lane-mile.

Using the GIS route evaluation developed to estimate the effects to congestion (sections 4.1 and 5.1) and a map of the Louisiana DOTD road classifications for greater New Orleans (LADOTD, 2008) the routes used to transport materials were mapped according to their DOTD road classification. Tables 5-16 through 5-19 provide the single path length and the approximate conversion of these distances to lane miles, for each alternative. For each of the alternatives, there were a small number of miles (< 1 %) that could not be classified according to the DOTD road classification for New Orleans and they are reported as "unknown."

To estimate the additional number of lane miles that could be affected by the Contractor Furnished earthen material (~ 9 million cubic yards for which routes are not yet available), the lane miles for DOTD road classes 4, 5, and 8 were multiplied by a scaling factor of 1.428. The scaling factor represents the additional truckloads of Contractor-Furnished earthen fill for which routes are not yet available (9 million cy / 21 million cy = 0.428 or 42.8%). The scaling factor was not applied to the DOTD classes 1-3 as the road segments of this classification within greater New Orleans have already been accounted for in the materials routing.

The number of estimated lane-miles, by road classification is summed in each table to provide an alternative-specific total number of lane miles. When the total number of lane miles is juxtaposed to the total number of truckloads (taken from section 3), the similarity between the alternatives is noteworthy. Regardless of which alternative was implemented, between 1,100 and 1,300 lane miles of roadway within greater New Orleans would be traversed with between

[27] As described in section 4.2, the unit pavement cost per mile for a 3-axle 54,000 GVWR truck is 50-percent higher than the cost of a 5-axle 80,000 GVWR truck on the same road (LADOTD, 1999).

2.19 and 2.35 million truck trips. These similarities derive from the fact that the extent of truck transportation under each of the alternatives is substantially the same with earthen fill more than 85-percent of all trips for each of the alternatives. There are no stark contrasts between the alternatives with respect to the number of lane miles potentially affected by the project with greater New Orleans.

Table 5-16. Maximum Truck Use – Local Truck Transportation Distance and Lane Miles by Functional Road Classification

LADOTD Road Classification	Class Description	Length in Miles	Estimated Number of 12-ft Lane Miles	Number of Truckloads
1	Interstate	111.3	334.0	
2	Expressway	32.4	64.9	
3	Principal Arterial	229.8	459.5	
4	Minor Arterial	109.5	312.6	
5	Urban Collector	19.6	28.0	
8	Local Road	40.3	57.6	
Unknown	Unknown	7.4	10.6	
		Total	1,267.2	2,351,000

Table 5-17. Maximum Barge Use – Local Truck Transportation Distance and Lane Miles by Functional Road Classification

LADOTD Road Classification	Class Description	Length in Miles	Estimated Number of 12-ft Lane Miles	Number of Truckloads
1	Interstate	98.4	295.3	
2	Expressway	24.4	48.7	
3	Principal Arterial	207.2	414.4	
4	Minor Arterial	106.2	303.2	
5	Urban Collector	18.5	26.4	
8	Local Road	38.6	55.1	
Unknown	Unknown	7.3	10.4	
		Total	1,153.7	2,188,400

Table 5-18. Maximum Rail Use – Local Truck Transportation Distance and Lane Miles by Functional Road Classification

LADOTD Road Classification	Class Description	Length in Miles	Estimated Number of 12-ft Lane Miles	Number of Truckloads
1	Interstate	84.0	252.1	
2	Expressway	22.4	44.7	
3	Principal Arterial	209.0	418.0	
4	Minor Arterial	107.7	307.5	
5	Urban Collector	19.3	27.5	
8	Local Road	41.1	58.7	
Unknown	Unknown	5.8	8.3	
		Total	1,116.8	2,273,200

Table 5-19. Likely Scenario– Local Truck Transportation Distance and Lane Miles by Functional Road Classification

LADOTD Road Classification	Class Description	Length in Miles	Estimated Number of 12-ft Lane Miles	Number of Truckloads
1	Interstate	111.9	335.6	
2	Expressway	32.1	64.3	
3	Principal Arterial	240.8	481.5	
4	Minor Arterial	109.0	311.3	
5	Urban Collector	21.4	30.6	
8	Local Road	40.4	57.7	
Unknown	Unknown	7.4	10.6	
		Total	1,291.6	2,190,400

As described in section 4.2, the potential to damage infrastructure is not limited to the road surfaces, but also includes bridges, culvert, and any other crossings. Using GIS layers depicting the bridges and other crossings within the surface road network (provided by the Regional Planning Commission), an intersection of the alternative-specific routing and the RPC's bridges data was performed in GIS. The results have been sorted by DOTD road classification and are presented in table 5-20. As with the road surface, between 4 and 6-percent of the crossings were outside the classified roads, but the majority is identified. For all alternatives, more than 85-percent of all crossings are within roads classes 1, 2, or 3. The robustness of design and construction for these crossings should enable them to withstand an increased load of truck traffic. However, only 8-percent of crossings (23-25 depending on the alternative) are within road classes 4, 5, and 8. These roads are the least able to withstand the effects of large truck traffic and significant increases in loads beyond their design assumptions.

Table 5-20. Local Bridge, Culvert, or Crossings: Materials Routes by Road Type

LADOTD Road Classification	Class Description	Max Truck	Max Barge	Max Rail	Likely Scenario
1	Interstate	205	204	203	205
2	Expressway	81	52	54	81
3	Principal Arterial	71	62	70	71
4	Minor Arterial	25	24	23	25
5	Urban Collector	3	3	3	3
8	Local Road	4	4	5	4
Unknown	Unknown	16	23	18	16
	Total	405	372	376	405
Percent Class 1, 2, and 3		88%	85%	87%	88%
Percent Class 4, 5, and 8		8%	8%	8%	8%

Segments of interstate, expressway, and arterial roads (classifications 1, 2, and 3) have the largest number of truck-trips because these are the most-shared links (i.e., bottle-necks) within most routes. However, these road classifications are the most robust being designed to handle large numbers of trucks on a daily basis. The facility designs for the minor arterial, urban collector, and local roads (classifications 4, 5, and 8) carry fewer trips, but were not designed to support frequent heavy loads. The effect of extensively using the minor arterial, urban collector, and local roads to haul large quantities of heavy loads would be the accelerated wearing of road surfaces, bridges, and culverts.

Section 4.2 cites the Submerged Roads Program cost per lane mile (RPC, 2009a) to rehabilitate roads at approximately $500,000 per lane mile and this cost is assumed to include repair to road surfaces and crossings (i.e., bridges) within the roadway. Table 5-21 summarizes the alternative-specific data from tables 5-16 through 5-19, and approximates a cost to infrastructure for each of the alternatives assuming that all of the lane miles used in the truck transportation would need repair after the project was complete. The costs are similar because between 1,100 and 1,300 lane miles of roadway within greater New Orleans would be traversed with between 2.19 and 2.35 million truck trips, regardless of the alternative.

Table 5-21. Alternative Comparison - Lane Miles by Functional Road Classification

LADOTD Road Classification	Class Description	Max Truck	Max Barge	Max Rail	Likely Scenario
1	Interstate	334.0	295.3	252.1	335.6
2	Expressway	64.9	48.7	44.7	64.3
3	Principal Arterial	459.5	414.4	418.0	481.5
4	Minor Arterial	312.6	303.2	307.5	311.3
5	Urban Collector	28.0	26.4	27.5	30.6
8	Local Road	57.6	55.1	58.7	57.7
Unknown	Unknown	10.6	10.4	8.3	10.6
Estimated Total Miles		1,267	1,154	1,117	1,292
Estimated Total Truckloads (millions)		2.4	2.2	2.3	2.2
Estimated Infrastructure Cost ($ millions)[28]		633.6	576.8	558.4	645.8

5.3 Accident Risks

Using the analytical approach discussed in section 4.3 Accident Risks, the transportation risks were estimated for each of the transportation alternatives. For each alternative, the total collective risk for property damage only, injury only, or fatalities represents the aggregate of risks from each mode of transportation assumed under that alternative. Tables 5-22 through 5-25 present the estimated accident risks for each of the alternatives.

As show in table 5-26, Projected Accidents - Comparison of the Alternatives, Maximum Truck reflects the greatest collective risk of all three types of accidents. This is because of the significantly larger distance of truck travel (150 million miles traveled vs. less than 70 million) required under the Maximum Truck alternative when compared to the other three alternatives. The accident risks for the other three alternatives are substantially the same and primarily derive from the approximately 60-70 million miles of truck travel that is unavoidable. When transporting materials from remote locations to greater New Orleans by rail or barge, accident risks decrease.

[28] Cost of approximately $500,000 per lane mile based on cost per lane mile from the Submerged Road Program (RPC, 2009a).

Table 5-22. Projected Accidents - Maximum Truck

Mode	Estimated Miles Traveled	Projected Accidents		
		Property Damage Only	Injury Only	Fatality
Truck	150,426,000	230.2	76.9	3.1
Barge	0	0	0	0
Rail	0	0	0	0
SUM		230.2	76.9	3.1

Table 5-23. Projected Accidents - Maximum Barge

Mode	Estimated Miles Traveled	Projected Accidents		
		Property Damage Only	Injury Only	Fatality
Truck	59,662,300	91.3	30.5	1.2
Barge	732,860	19.8	0.8	0.1
Rail	0	0.0	0.0	0.0
SUM		111.1	31.3	1.3

Table 5-24. Projected Accidents - Maximum Rail

Mode	Estimated Miles Traveled	Projected Accidents		
		Property Damage Only	Injury Only	Fatality
Truck	61,761,400	94.5	31.6	1.3
Barge	188,870	5.1	0.2	0.0
Rail	80,380	5.0	2.7	0.7
SUM		104.6	34.5	2.0

Table 5-25. Projected Accidents – Likely Scenario

Mode	Estimated Miles Traveled	Projected Accidents		
		Property Damage Only	Injury Only	Fatality
Truck	68,457,410	104.7	35.0	1.4
Barge	522,440	1.4	0.1	0.0
Rail	0	0.0	0.0	0.0
SUM		106.2	35.1	1.4

Table 5-26. Projected Accidents - Comparison of Alternatives

Mode	Estimated Miles Traveled	Projected Accidents		
		Property Damage Only	Injury Only	Fatality
Max Truck	150,426,000	230.2	76.9	3.1
Max Barge	60,395,160	111.1	31.3	1.3
Max Rail	62,030,650	104.6	34.5	2.0
Likely Scenario	68,943,520	106.2	35.1	1.4

5.4 Emissions

Utilizing the alternative-specific distances traveled from section 3, emissions were calculated using the emissions factors described in section 4.4. To enhance the comparison, the total distance traveled (miles) and the calculated quantity of diesel fuel needed (gallons) is also provided. Truck miles have also been segregated into local (within greater New Orleans) and non-local miles to indicate the quantity of local emissions. Because all of the Parishes are currently designated as “in attainment” of all criteria pollutants, further requirements by the Clean Air Act general conformity rule (Section 176.(c)) would not apply. Emissions were therefore not segregated by Parish or separated by the calendar year in which the emissions would occur. Tables 5-27 through 5-30 illustrate the alternative-specific emissions estimated and table 5-31 compares the emissions, by alternative. While the Max Truck requires significantly more miles to be traveled, the per mile emissions from truck transportation are considerably less than emissions from barges or locomotives. Therefore, the alternatives that include the usage of barge or rail transportation have greater emissions of VOCs, NOx, CO, and PM than when truck transportation alone was assumed.

Table 5-27. Maximum Truck Use – Diesel Emissions (tons)

Mode	Miles	Gallons of Diesel	VOCs	NOx	CO_2	CO	$PM_{2.5}$	PM_{10}	SO_2	NH_3
Local Truck	68,276,000	10,717,500	35.5	643	121,768.50	172	12.9	14.0	1.1	2
Non-Local Truck	82,150,000	12,715,600	41.4	750	143,593.00	199	15.1	16.4	1.3	2.4
TOTALS	150,426,000	23,433,000	76.8	1,393	265,361.60	371	27.9	30.3	2.5	4.4

Table 5-28. Maximum Barge Use – Diesel Emissions (tons)

Mode	Miles	Gallons of Diesel	VOCs	NOx	CO_2	CO	$PM_{2.5}$	PM_{10}	SO_2	NH_3
Local Truck	59,662,300	9,417,500	31.0	563.0	106,451.0	150.6	11.2	12.2	1	1.8
Tug / Barge	732,860	16,222,320	135.4	3,393.9	172,266.6	282.8	62.0	67.4	334.8	N/A
TOTALS	60,395,160	25,639,820	166.4	3,956.9	278,717.6	433.5	73.3	79.7	335.8	1.8

Table 5-29. Maximum Rail Use – Diesel Emissions (tons)

Mode	Miles	Gallons of Diesel	VOCs	NOx	CO_2	CO	$PM_{2.5}$	PM_{10}	SO_2	NH_3
Local Truck	61,761,400	9,742,600	32.1	582.7	110,190.2	155.9	11.6	12.6	1.0	1.8
Tug/Barge	188,870	4,181,100	33.1	874.7	44,399.6	72.9	16.0	17.4	86.3	N/A
Rail	80,380	3,399,700	32.8	588.4	37,789.6	99.7	17.1	17.6	7.0	N/A
TOTALS	62,030,650	17,323,400	98.0	2,045.7	192,379.4	328.5	44.7	47.6	94.4	1.8

Table 5-30. Likely Scenario – Diesel Emissions (tons)

Mode	Miles	Gallons of Diesel	VOCs	NOx	CO_2	CO	$PM_{2.5}$	PM_{10}	SO_2	NH_3
Local Truck	60,526,470	9,538,000	31.5	571.4	108,054.4	152.9	11.4	12.4	1.0	1.8
Non-Local Truck	7,894,610	1,212,860	3.9	71.5	13,696.3	19.0	1.4	1.6	0.1	0.2
Tug / Barge	522,440	11,564,600	96.5	2,419.5	122,805.8	201.6	44.2	48.1	*238.6	N/A
TOTALS	68,943,520	22,315,460	131.9	3,062.4	244,556.5	373.5	57.1	62.0	*239.8	2.0

*No separate emission factor used for SO_2 for tug emissions. Reported as SO_x.

Table 5-31. Comparison of the Alternatives – Diesel Emissions (tons)

Alternative	Miles (millions)	Gallons of Diesel (millions)	VOCs	NOx	CO_2	CO	$PM_{2.5}$	PM_{10}	SO_2	NH_3
Max Truck	150.4	23.4	76.8	1,393	265,362	371.0	27.9	30.3	2.5	4.4
Max Barge	60.4	25.6	166.4	3,957	278,718	433.5	73.3	79.7	335.8	1.8
Max Rail	62.0	17.3	98.0	2,046	192,379	328.5	44.7	47.6	94.4	1.8
Likely Scenario	68.9	22.3	131.9	3,062	244,557	373.5	57.1	62.0	*239.8	2.0

*No separate emission factor used for SO_2 for tug emissions. Reported as SO_x.

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Appendix A – MOBILE 6.2 Input File Parameters and Output File

MOBILE 6.2 INPUT FILE

```
MOBILE6 INPUT FILE : EMISSION FACTOR CALCULATION FOR HSDRRS MATERIALS TRANSPORTATION
*CEMVN NOLA HSDRRS MATERIALS TRANSPORTATION AIR QUALITY MODEL
POLLUTANTS        : HC  CO  NOx CO2
PARTICULATES      : SO4 LEAD SO2 NH3 BRAKE TIRE OCARBON ECARBON GASPM
DATABASE OUTPUT   :
WITH FIELDNAMES   :
EMISSIONS TABLE   : NOLARUN.TB1 REPLACE
*EMISSIONS TABLE  : REPLACE
DATABASE VEHICLES : 11111 11111111 1 111 11111122 111
AGGREGATED OUTPUT :
AIR TOXICS        :
*ALL VALUES FOR AIR TOXICS BELOW ARE DUMMY VALUES FOR THE GASOLINE FUEL PROPERTIES, EMISSIONS ARE FOR DIESEL ONLY
*GAS AROMATIC%    : 25
*GAS OLEFIN%      : 15
*GAS BENZENE%     : 1.5
*E200             : 50
*E300             : 85
*OXYGENATE        : MTBE   15.1   0.50
*                 : ETBE   17.6   0.05
*                 : ETOH   10.0   0.45
*                 : TAME    6.0   0.00
REPORT FILE       : NOLARPT.TXT REPLACE
RUN DATA
EXPRESS HC AS VOC :

FUEL RVP          : 9.0
*FUEL REID VAPOR PRESSURE - SUMMER RVP LIMIT IS 9 PSI OR 7.8 PSI.
MIN/MAX TEMPERATURE: 65.  90.
NO REFUELING      :
EXPAND HDDV EFS   :
EXPAND EXHAUST    :
```

EXPAND EVAPORATIVE :
IDLE PM EMISSIONS :
SCENARIO RECORD : NEW ORLEANS, LA
CALENDAR YEAR : 2010
EVALUATION MONTH : 7
*EVALUATION MONTH 7 IS JULY
ABSOLUTE HUMIDITY : 130.0
*ABSOLUTE HUMIDITY CONVERSION AT www.vaisala.com/humiditycalculator/vaisala_humidity_calculator.html?lang=eng
ALTITUDE : 1
*VALUE OF 1 FOR ALTITUDE IS "LOW"
PARTICULATE EF : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE : 10
*REPEAT RUN WITH PARTICLE SIZE 10.0 TO GET THE OTHER DATA SET?
DIESEL SULFUR : 15.00
*HDDV 8A (GVRW 33,001 - 60,000 LBS) AND 8B (>60,000 LBS GVWR)
*AVERAGE SPEED : CONDUCT MULTIPLE RUNS WITH THIS ADJUSTED TO ILLUSTRATE THE EFFECT OF SPEED ON EMISSIONS
*DIESEL RQD TO BE <15PPM PER EPA RULE
END OF RUN

Mobile 6.2 Output File (NOLARPT.txt)

```
* #########################
* NEW ORLEANS, LA
* File 1, Run 1, Scenario 1.
* #########################

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV

* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
            there are no sales for vehicle class HDGV8b

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D
```

Calendar Year: 2010
Month: July
Altitude: Low
Minimum Temperature: 65.0 (F)
Maximum Temperature: 90.0 (F)
Absolute Humidity: 130. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.6 psi
Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: NA (See Air Toxics Output)

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3478	0.3890	0.1336		0.0359	0.0003	0.0020	0.0860	0.0054	1.0000
Fuel Economy (mpg):	24.1	18.6	14.3	17.2	9.7	32.4	17.0	7.2	50.0	16.5
Composite Emission Factors (g/mi):										
Composite VOC :	0.795	0.812	1.393	0.961	0.978	0.180	0.439	0.392	2.58	0.862
Composite CO :	8.81	9.92	13.63	10.87	9.64	0.903	0.757	1.751	15.85	9.328
Composite NOX :	0.488	0.599	0.920	0.682	2.242	0.415	0.724	6.868	0.97	1.204
Composite CO2 :	368.2	477.8	620.5	514.3	914.7	314.2	597.0	1417.3	177.4	553.75
Exhaust emissions (g/mi):										
VOC Start:	0.153	0.195	0.309	0.224		0.062	0.153		0.398	
VOC Running:	0.169	0.208	0.349	0.244		0.118	0.286		1.225	
VOC Total Exhaust:	0.322	0.403	0.658	0.468	0.282	0.180	0.439	0.392	1.62	0.410
CO Start:	2.10	3.29	4.88	3.70		0.354	0.311		3.386	

CO Running:	6.71	6.63	8.75	7.17		0.549	0.446		12.460	
CO Total Exhaust:	8.81	9.92	13.63	10.87	9.64	0.903	0.757	1.751	15.85	9.328
NOx Start:	0.078	0.110	0.169	0.125		0.017	0.029		0.306	
NOx Running:	0.409	0.489	0.751	0.556		0.399	0.695		0.667	
NOx Total Exhaust:	0.488	0.599	0.920	0.682	2.242	0.415	0.724	6.868	0.97	1.204

Non-Exhaust Emissions (g/mi):

Hot Soak Loss:	0.156	0.140	0.252	0.169	0.223	0.000	0.000	0.000	0.338	0.152
Diurnal Loss:	0.029	0.027	0.047	0.032	0.057	0.000	0.000	0.000	0.284	0.030
Resting Loss:	0.074	0.077	0.149	0.095	0.142	0.000	0.000	0.000	0.332	0.082
Running Loss:	0.207	0.155	0.278	0.187	0.265	0.000	0.000	0.000	0.000	0.179
Crankcase Loss:	0.008	0.010	0.010	0.010	0.010	0.000	0.000	0.000	0.000	0.009
Refueling Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Non-Exhaust:	0.474	0.409	0.735	0.494	0.696	0.000	0.000	0.000	0.953	0.452

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B
	------	------	------	------	------	------	------	------
VMT Mix:	0.0091	0.0028	0.0028	0.0013	0.0065	0.0094	0.0112	0.0400
Fuel Economy (mpg):	12.9	11.6	10.2	9.9	8.7	7.5	6.6	6.3

Composite Emission Factors (g/mi):

Composite VOC :	0.163	0.174	0.233	0.246	0.314	0.389	0.401	0.480
Composite CO :	0.612	0.644	0.923	0.937	1.046	1.312	1.764	2.352
Composite NOX :	2.454	2.569	3.632	3.787	4.787	5.971	7.170	8.722
Composite CO2 :	789.1	875.2	1000.9	1032.7	1171.4	1352.5	1550.2	1626.6

Exhaust emissions (g/mi):

VOC Total Exhaust:	0.163	0.174	0.233	0.246	0.314	0.389	0.401	0.480
CO Total Exhaust:	0.612	0.644	0.923	0.937	1.046	1.312	1.764	2.352
NOx Total Exhaust:	2.454	2.569	3.632	3.787	4.787	5.971	7.170	8.722

Non-Exhaust Emissions (g/mi):

Hot Soak Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Diurnal Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Resting Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Running Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crankcase Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Refueling Loss:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Non-Exhaust:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
