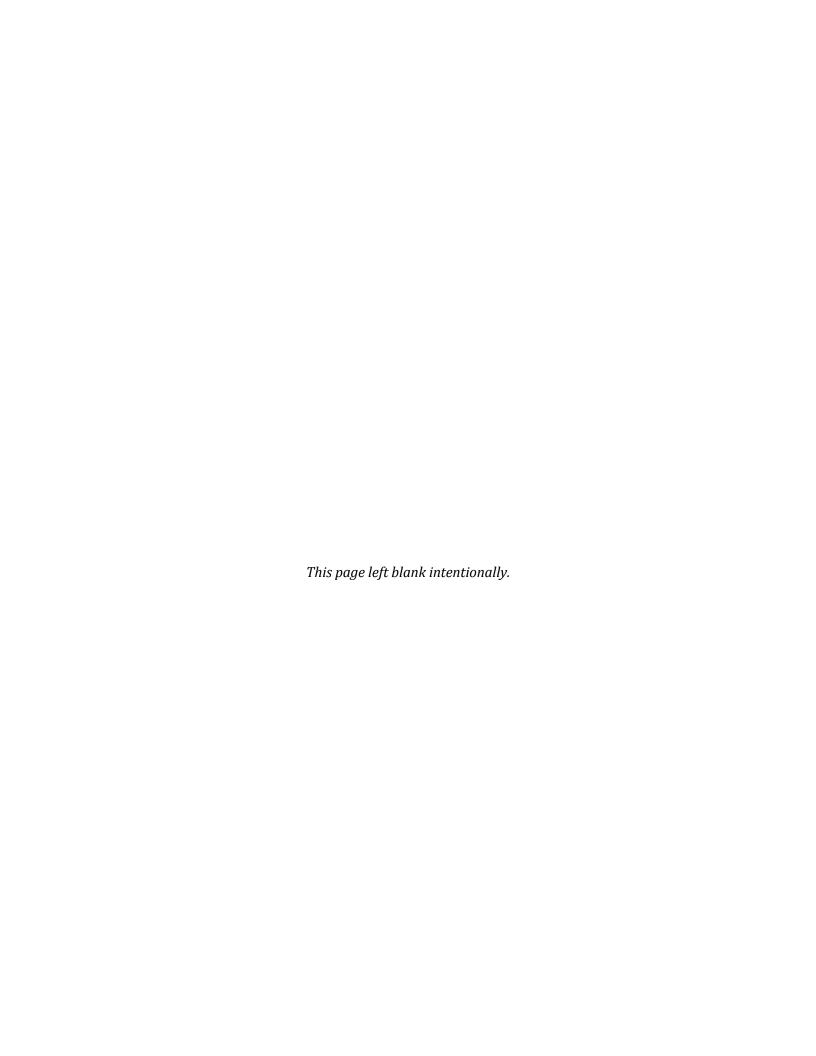
Appendix L2

DWR GHG Emissions Reduction Plan Consistency
Determination Forms



DWR GHG Emissions Reduction Plan Consistency Determination For **Consistency Determination Form**

For Projects Using Contractors or Other Outside Labor

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California Department of Water Resources 1416 9th Steet Sacramento, CA 95814 dwrclimatechange.water.ca.gov

www.water.ca.gov/climatechange

Additional Guidance on filling out this form can be found at: dwrclimatecange.water.ca.gov/quidance resources.cfm

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at: http://www.water.ca.gov/climatechange/CAP.cfm

Project Name:	Yolo Bypass Salmonid Habitat Restoration and Fish Passage
Environmental Document type:	Draft EIS/EIR
Manager's Name:	
Manager's email:	
Division:	
Office, Branch, or Field Division	

Short Project Description:

Alternative 1, East Side Gated Notch, would allow increased flow from the Sacramento River to enter the Yolo Bypass through a gated notch on the east side of Fremont Weir. The gated notch would create an opening in Fremont Weir, that is deeper than Fremont Weir, with gates to control water going through the facility into the Yolo Bypass. The invert of the new notch would be at an elevation of 14 feet, which is approximately 18 feet below the existing Fremont Weir crest. Water would be able to flow through the notch during periods when the river elevations are not high enough to go over the crest of Fremont Weir (at an elevation of 32 feet).

Alternative 1 would connect the new gated notch to Tule Pond with a channel that parallels the existing east levee of the Yolo Bypass. Alternative 1 would have the shortest and most direct access to the Tule Canal for migrating fish. Alternative 1 would allow flows up to 6,000 cfs, depending on Sacramento River elevation, through the gated notch to provide open channel flow for adult fish passage, juvenile emigration, and floodplain inundation. This alternative would include a supplemental fish passage facility on the west side of Fremont Weir and improvements to allow fish to pass through Agricultural Road Crossing 1 and the channel north of Agricultural Road Crossing 1.

Project GHG Emissions Summary		
Total Construction Emissions	4,866	mtCO ₂ e
Maximum Annual Construction Emissions	4,866	mtCO2e
		r above will occur as ongoing operational, maintenance, or been accounted for and analyzed in the GGERP.
Extraordinary Construction Project Deter Do total project construction emissions exce mtCO ₂ e in any single year of construction.	ed 25,000 mt0	CO_2 e for the entire construction phase or exceed 12,500 es - Addition analysis is required, consult with C4
_ , , , ,		o - Additional analysis not required

All Project Level G	HG Emissions Red lan for the project	uction Measures have been incorporated i . (Project Level GHG Emissions Reduction	nto the design or Measures)
		Or	
design or implem	entation plan for t	ions Reduction Measures have been incorp he project and and Measures not incorpora to the proposed project (include as an atta	ated have been
	onflict with any of HG Emissions Redu	the Specific Action GHG Emissions Reduct uction Measures)	ion Measures
Would implementation	on of the project re	esult in additional energy demands on the	
SWP system of 15 GW	/h/yr or greater?		
○ Yes ● No			
If you answered Yes, approval letter from t		e Power Procurement Plan update er and Risk Office.	
	standing the prop	fects of the proposed project may be cuminosed project's compliance with the require	-
○ Yes			
1 *		eligible for streamlined analysis of GHG emi see CEQA Guidelines, section 15183.5, subd	-
completed pursuant to the above	referenced project, t stent with the DWR (ation provided in associated environmental doo the DWR CEQA Climate Change Committee has Greenhouse Gas Reduction Plan and the greenl sis.	determined
	Project Manager Signature:		Date:
	C4 Approval Signature:		Date:
		Attachments:	
		☐ List and Explanation of exc	-
		Plan to update Renewable Plan from DWR SWP Powe	

DWR GHG Emissions Reduction Plan Consistency Determination For **Consistency Determination Form**

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			•		
Project Name:		Yolo Bypass Salmonid Habitat Restoration and Fish Passage			
Environmental Do	ocument type:	Draft EIS/EIR			
Manager's Name:					
Manager's email:					
Division:					
Office, Branch, or	Field Division				
Short Project Description:	Alternative 2, Central Gated Notch, would provide a new gated notch through Fremont Weir similar to the notch described for Alternative 1. The primary difference between Alternatives 1 and 2 is the location of the notch; Alternative 2 would site the notch near the center of Fremont Weir. This gated notch would be similar in size to Alternative 1 but would have an invert elevation that is higher (14.8 feet) because the river is higher at this upstream location. This location is on an outside bend of the river. Studies have indicated that juvenile fish may be found in greater numbers on the outside edge of river bends (DWR 2017). The new gated notch would allow flow to pass into the Yolo Bypass at lower river elevations than under existing conditions, where flows only enter the Yolo Bypass when Fremont Weir overtops.				

facility on the western end of Fremont Weir and improvements downstream of Tule Pond.

Project GHG Emissions Summary				
Total Construction Emissions	9,924	mtCO2e		
Maximum Annual Construction Emissions	9,924	mtCO ₂ e		
All other emissions from the project not a business activity emissions and therefore	accounted for have already	r above will occur as ongoing operational, maintenance, or been accounted for and analyzed in the GGERP.		

Alternative 2 would include facilities to connect the gated notch to the existing Tule Pond. Alternative 2 would allow flows up to 6,000 cfs, depending on Sacramento River elevation, through the gated notch to provide open channel flow for adult fish passage, juvenile emigration, and floodplain inundation. This alternative would also include a supplemental fish passage

Extraordinary Construction Project Determination

Do total project construction emissions exceed 25,000 mtCO₂e for the entire construction phase or exceed 12,500 mtCO₂e in any single year of construction. Yes - Addition analysis is required, consult with C4

No - Additional analysis not required

	eduction Measures have been incorporated into the design or ct. (Project Level GHG Emissions Reduction Measures)
	Or
design or implementation plan for	ssions Reduction Measures have been incorporated into the the project and and Measures not incorporated have been y to the proposed project (include as an attachment)
Project does not conflict with any of (Specific Action GHG Emissions Red	of the Specific Action GHG Emissions Reduction Measures duction Measures)
Would implementation of the project	result in additional energy demands on the
SWP system of 15 GWh/yr or greater?	
○ Yes	
If you answered Yes, attach a Renewak approval letter from the DWR SWP Pov	·
	effects of the proposed project may be cumulatively posed project's compliance with the requirements of the
DWR GHG Reduction Plan?	posed project's compliance with the requirements of the
○ Yes	
'	eligible for streamlined analysis of GHG emissions using the (See CEQA Guidelines, section 15183.5, subdivision (b)(2).)
completed pursuant to the above referenced project	nation provided in associated environmental documentation t, the DWR CEQA Climate Change Committee has determined R Greenhouse Gas Reduction Plan and the greenhouse gasses lysis.
Project Manager Signature:	Date:
C4 Approval Signature:	Date:
	Attachments:
	□ GHG Emissions Inventory
	☐ List and Explanation of excluded Project Level GHG Emissions Reduction Measures
	Plan to update Renewable Energy Procurement Plan from DWR SWP Power and Risk Office

DWR GHG Emissions Reduction Plan Consistency Determination For **Consistency Determination Form**

For Projects Using Contractors or Other Outside Labor



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Extraordinary Construction Project Determination

mtCO₂e in any single year of construction.

dwrclimatechange.water.ca.gov www.water.ca.gov/climatechange

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at: http://www.water.ca.gov/climatechange/CAP.cfm

Project Name:		Yolo Bypass Salmoni	id Habitat Resto	ration and Fish Passage	
Environmental D	Document type:	Draft EIS/EIR	Draft EIS/EIR		
Manager's Name	e:				
Manager's email	:				
Division:					
Office, Branch, o	r Field Division				
Alternative 3, West Side Gated Notch, would provide a new gated notch through Fremont Weir similar to the notch described for Alternative 1. The primary difference between Alternatives 1 and 3 is the location of the notch; Alternative 3 would site the notch on the western side of Fremont Weir. This gated notch would be similar in size to Alternative 1 but would have an invert elevation that is higher (16.1 feet) because the river is higher at this location. The western location is on the outside of a river bend, similar to Alternative 2, but would be easier to access for operations and maintenance (O&M) than a central location. The new gated notch would allow flow to pass into the Yolo Bypass at lower river elevations than under existing conditions where flows only enter the Yolo Bypass when Fremont Weir overtops. Alternative 3 would include facilities to connect the gated notch to the existing Tule Pond. Alternative 3 would allow flows up to 6,000 cfs, depending on Sacramento River elevation, through the gated notch to provide open channel flow for adult fish passage, juvenile emigration, and floodplain inundation. This alternative would also include a supplemental fish passage facility on the eastern side of Fremont Weir and improvements downstream of Tule Pond.					
Project GHG	i Emissions S	ummary			
Total Constru	ction Emission	S	9,008	mtCO2e	
Maximum Annual Construction Emissions		9,008	mtCO2e		

All other emissions from the project not accounted for above will occur as ongoing operational, maintenance, or

Yes - Addition analysis is required, consult with C4

No - Additional analysis not required

business activity emissions and therefore have already been accounted for and analyzed in the GGERP.

Do total project construction emissions exceed 25,000 mtCO₂e for the entire construction phase or exceed 12,500

		uction Measures have been incorporated into the design or (Project Level GHG Emissions Reduction Measures)
		Or
	design or implementation plan for t	ions Reduction Measures have been incorporated into the he project and and Measures not incorporated have been to the proposed project (include as an attachment)
	Project does not conflict with any of Specific Action GHG Emissions Red	the Specific Action GHG Emissions Reduction Measures uction Measures)
Woo	uld implementation of the project re	esult in additional energy demands on the
SWF	system of 15 GWh/yr or greater?	
○ Y	es No	
•	ou answered Yes, attach a Renewabl roval letter from the DWR SWP Pow	·
con		fects of the proposed project may be cumulatively osed project's compliance with the requirements of the
\bigcirc Y	es No	
-		eligible for streamlined analysis of GHG emissions using the
DVV	N GHG EITHSSIONS NEGUCTION FIAM. (3	See CEQA Guidelines, section 15183.5, subdivision (b)(2).)
pleted pur the propos	suant to the above referenced project,	ation provided in associated environmental documentation the DWR CEQA Climate Change Committee has determined Greenhouse Gas Reduction Plan and the greenhouse gasses sis.
	Project Manager Signature:	Date:
	C4 Approval Signature:	Date:
		Attachments:
		□ GHG Emissions Inventory
		List and Explanation of excluded Project Le GHG Emissions Reduction Measures
		Plan to update Renewable Energy Procurer Plan from DWR SWP Power and Risk Office

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dwrclimatechange.water.ca.gov www.water.ca.gov/climatechange

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at: http://www.water.ca.gov/climatechange/CAP.cfm

Project Name:	Yolo Bypass Salmor	onid Habitat Restoration and Fish Passage			
Environmental Document type	Draft EIS/EIR				
Manager's Name:					
Manager's email:					
Division:					
Office, Branch, or Field Divisio	n				
maintain inu the same ga maximum in Alternative 4 would be co are controlli a supplemer	through the gated notch in Fremont Weir than the other alternatives, but it would incorporate water control structures to maintain inundation in defined areas for longer periods of time within the northern Yolo Bypass. Alternative 4 would include the same gated notch and associated facilities as described for Alternative 3. However, it would be operated to limit the maximum inflow to approximately 3,000 cfs. Alternative 4 includes two water control structures on Tule Canal to extend periods of inundation locally. A bypass channel would be constructed around each water control structure to provide adult fish passage when the water control structures are controlling flow. This alternative would also provide means for fish passage on the eastern side of Fremont Weir through a supplemental fish passage facility. In addition, improvements to Agricultural Road Crossing 1 and the downstream channe would be implemented under this alternative.				
Project GHG Emissions	Summary				
Total Construction Emissi	ons	18,034 mtCO ₂ e			
Maximum Annual Constru	ction Emissions	18,034 mtCO ₂ e			
11 🗸 1		accounted for above will occur as ongoing operational, maintenance, or re have already been accounted for and analyzed in the GGERP.			
Extraordinary Construct	•				
mtCO ₂ e in any single year		eed 25,000 mtCO ₂ e for the entire construction phase or exceed 12,500 • Yes - Addition analysis is required, consult with C4			

No - Additional analysis not required

	eduction Measures have been incorporated into the design or ct. (Project Level GHG Emissions Reduction Measures)
	Or
design or implementation plan for	ssions Reduction Measures have been incorporated into the the project and and Measures not incorporated have been y to the proposed project (include as an attachment)
Project does not conflict with any of (Specific Action GHG Emissions Red	of the Specific Action GHG Emissions Reduction Measures duction Measures)
Would implementation of the project	result in additional energy demands on the
SWP system of 15 GWh/yr or greater?	
○ Yes	
If you answered Yes, attach a Renewak approval letter from the DWR SWP Pov	·
	effects of the proposed project may be cumulatively posed project's compliance with the requirements of the
DWR GHG Reduction Plan?	posed project's compliance with the requirements of the
○ Yes	
'	eligible for streamlined analysis of GHG emissions using the (See CEQA Guidelines, section 15183.5, subdivision (b)(2).)
completed pursuant to the above referenced project	nation provided in associated environmental documentation t, the DWR CEQA Climate Change Committee has determined R Greenhouse Gas Reduction Plan and the greenhouse gasses lysis.
Project Manager Signature:	Date:
C4 Approval Signature:	Date:
	Attachments:
	□ GHG Emissions Inventory
	☐ List and Explanation of excluded Project Level GHG Emissions Reduction Measures
	Plan to update Renewable Energy Procurement Plan from DWR SWP Power and Risk Office

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mtCO₂e in any single year of construction.

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at: http://www.water.ca.gov/climatechange/CAP.cfm

Project Name: Yolo Byp		Yolo Bypass Salmor	nid Habitat Resto	ration and Fish Passage	
Environmental Do	ocument type:	Draft EIS/EIR			
Manager's Name:					
Manager's email:					
Division:					
Office, Branch, or	Field Division				
					1
Through the strategy of using multiple gates and intake channels at Fremont Weir, Alternative 5, Central Multiple Gated Notches, has the goal of increasing the number of out-migrating juvenile fish that enter the Yolo Bypass. Trapezoidal channels create some limitations for fish passage because they have smaller flows at lower river elevations (because the channel is smaller at this elevation) when winter-run Chinook salmon are out-migrating. Alternative 5 includes multiple gates so that the deeper gate could allow more flow to enter the bypass when the river is at lower elevations. Flows would move to other gates when the river is higher to control inflows while maintaining fish passage conditions. Alternative 5 incorporates multiple gated notches in the central location on the existing Fremont Weir that would allow combined flows of up to 3,400 cfs. As the river rises, the deeper gate would close and the next gate would open. This alternative would include a supplemental fish passage facility on the western side of Fremont Weir and improvements to allow fish to pass through Agricultural Road Crossing 1.					that enter the Yolo Bypass. Trapezoidal flows at lower river elevations (because the -migrating. Alternative 5 includes multiple in the river is at lower elevations. Flows would ning fish passage conditions. he existing Fremont Weir that would allow lose and the next gate would open. This
Dura in at CUC					
Project GHG	Emissions S	ummary			
Total Construction Emissions		21,179	mtCO2e		
Maximum Annual Construction Emissions		20,672	mtCO ₂ e		
1171					ongoing operational, maintenance, or and analyzed in the GGERP.
		n Project Deterr		CO₂e for the entire co	onstruction phase or exceed 12,500

Yes - Addition analysis is required, consult with C4

No - Additional analysis not required

	eduction Measures have been incorporated into the design or ct. (Project Level GHG Emissions Reduction Measures)
	Or
design or implementation plan for	ssions Reduction Measures have been incorporated into the the project and and Measures not incorporated have been y to the proposed project (include as an attachment)
Project does not conflict with any of (Specific Action GHG Emissions Red	of the Specific Action GHG Emissions Reduction Measures duction Measures)
Would implementation of the project	result in additional energy demands on the
SWP system of 15 GWh/yr or greater?	
○ Yes	
If you answered Yes, attach a Renewak approval letter from the DWR SWP Pov	·
	effects of the proposed project may be cumulatively posed project's compliance with the requirements of the
DWR GHG Reduction Plan?	posed project's compliance with the requirements of the
○ Yes	
'	eligible for streamlined analysis of GHG emissions using the (See CEQA Guidelines, section 15183.5, subdivision (b)(2).)
completed pursuant to the above referenced project	nation provided in associated environmental documentation t, the DWR CEQA Climate Change Committee has determined R Greenhouse Gas Reduction Plan and the greenhouse gasses lysis.
Project Manager Signature:	Date:
C4 Approval Signature:	Date:
	Attachments:
	□ GHG Emissions Inventory
	☐ List and Explanation of excluded Project Level GHG Emissions Reduction Measures
	Plan to update Renewable Energy Procurement Plan from DWR SWP Power and Risk Office

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Environmental Document type: Draft EIS/EIR

Project Name:

dwrclimatechange.water.ca.gov www.water.ca.gov/climatechange

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at: http://www.water.ca.gov/climatechange/CAP.cfm

Manager's Name:					
Manager's email:					
Division:					
Office, Branch, or	Field Division				
Description:	Yolo Bypass. It v Sacramento Riv event of the sea into the bypass salmon out-mig facility on the ea	vas designed with t er is at lower elevat Ison. This flow even under Alternatives Iration, potentially I astern side of Freme	the goal of entrain tions. Typically, wi nt is sometimes no 1 through 5. The o maximizing fish er ont Weir and impr	ing more fish while allow nter-run Chinook salmon t high enough to result in gated notch could allow in ntrainment. This alternati rovements to allow fish p	would allow flows up to 12,000 cfs to enter the ving more flow into the bypass when the move downstream during the first high flow in what would be considered substantial flows more flow to enter during winter-run Chinook ive would include a supplemental fish passage is assage through Agricultural Road Crossing 1 ame as shown for Alternative 3.
Project GHG I	Emissions S	ummary			
Total Construct	ion Emission	S	17,669	mtCO2e	
Maximum Annı	ual Construct	ion Emissions	17,669	mtCO2e	
					ongoing operational, maintenance, or and analyzed in the GGERP.
Extraordinary Do total project mtCO ₂ e in any s	construction	n emissions exce	eed 25,000 mtC	=	onstruction phase or exceed 12,500 required, consult with C4
,	·			- Additional analysis r	•

Yolo Bypass Salmonid Habitat Restoration and Fish Passage

	All Dollar Louis Education		
		luction Measures have been incorporated in t. (Project Level GHG Emissions Reduction N	
		Or	
	design or implementation plan for t	ions Reduction Measures have been incorpo the project and and Measures not incorpora to the proposed project (include as an attac	ted have been
	Project does not conflict with any of (Specific Action GHG Emissions Red	f the Specific Action GHG Emissions Reducti- uction Measures)	on Measures
	Would implementation of the project re	esult in additional energy demands on the	
	SWP system of 15 GWh/yr or greater?		
	○ Yes • No		
	If you answered Yes, attach a Renewab approval letter from the DWR SWP Pow	·	
		ffects of the proposed project may be cumu posed project's compliance with the require	
	Yes No		
	, ,	eligible for streamlined analysis of GHG emis See CEQA Guidelines, section 15183.5, subdi	
completed that the p	d pursuant to the above referenced project,	ation provided in associated environmental doco the DWR CEQA Climate Change Committee has Greenhouse Gas Reduction Plan and the greenh rsis.	determined
	Project Manager Signature:		Date:
	C4 Approval Signature:		Date:
		Attachments:	
		⊠ GHG Emissions Inventory	
		\Box List and Explanation of excl	
		Plan to update Renewable Plan from DWR SWP Power	

Table LM-1. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	1
02 - Relocations	_ <u> </u>	, , , , , , , , , , , , , , , , , , ,			К / С		, ,	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
, ,	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals		· ·						<u> </u>
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	28	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
(::::::::::::::::::::::::;	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Earthen Backfill	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1 1	0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
- mp. mp	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1 1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
pp	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1 1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86

Construction Noise - Equipment Alternative 1 - East Alignment

Washinzation and Demobilization Flistbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (3) Pickup Truck Conventional (3) Pickup Truck Conventional (4) Pickup Truck Conventional (5) Pickup Truck Conventional (7) Pickup Truck Conventional (8) Pickup Truck Conventional (9) Pickup Truck Conventional (1) Pickup Truck (1) Pickup Truck Conventional (1) Pickup Truck (1) Pickup	22 23 24 25 26 27
Mobilization and Demobilization Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Fremont Weir Demo 3.5 CV Hydraulic Excavator (1) 3.5 CV Frort End Loader (Neel (1) 400 Gal Water Truck (1) Pickup Truck Conventional (6) 16 CV 3.Aste Dump Truck (1) Pickup Truck Conventional (6) Pickup Truck Conventional (7) 16 CV 3.Aste Dump Truck (1) Pickup Truck Conventional (7) Pickup Truck Conventional (8) Pickup Truck Conventional (9) Pickup Truck Conventional (7) Pickup Truck Conventional (7) Pickup Truck Conventional (7) Pickup Truck Conventional (8) Pickup Truck Conventional (9) Pickup Truck Conventional (1) Pickup Truck (1) Pickup Truck Conventional (1) Pickup Truck Convent	2 23 24 25 26 27
Mobilization and Demobilization Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (3) Pickup Truck Conventional (3) Pickup Truck Conventional (4) Pickup Truck Conventional (5) Pickup Truck Conventional (7) Pickup Truck Conventional (7) Pickup Truck Conventional (8) Pickup Truck Conventional (9) Pickup Truck Conventional (1) Pickup Truck Convent	22 23 24 25 26 27
Mobilization and Demobilization Flatibod Truck (1 per piece of equipment) Extended Boon Pallet Loader (1) Pickup Truck Conventional (1) 3.5 CY Front End Loader. Wheel (1) 400 Gal Water Truck (1) 16 CY 3 Asb Dump Truck (1) 17 Pickup Truck Conventional (6) Levee O&M Road Regrading (6* AB) 12 Blade Grader (1) 18 CY 3 Asb Dump Truck (1) 19 Pickup Truck Conventional (1) 16 CY 3 Asb Dump Truck (6) 19 Pickup Truck Conventional (2) 99 - Chennels and Ganals Mobilization and Demobilization Extended Boon Pallet Loader (1) Pickup Truck Conventional (6) Pickup Truck Conventional (6) Pickup Truck Conventional (7) Pickup Truck Conventional (8) Pickup Truck Conventional (9) Pickup Truck Conventional (7)	
Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Pickup Truck (1) Pickup	
Pickup Truck Conventional (1)	
Fremont Weir Demo	
3.5 CY Front End Loader, Nebel (1) 0.8 CY Loader/Backhoe, Wheel (1) 4000 Gal Water Truck (1) 16 CY 3 Avide Dump Truck (1) 16 CY 3 Avide Dump Truck (1) 16 CY 3 Avide Dump Truck (1) 17 Elabed Grader (1) 18 Even Description (1) 18 Even D	
0.8 CY Loader/Backhoe, Wheel (1)	
4000 Gal Water Truck (1) 16 CY 3 Axie Dump Truck (1) Pickup Truck Conventional (6)	
16 CY 3 Akle Dump Truck (1) Pickup Truck Conventional (6)	
Pickup Truck Conventional (6) Levee O&M Road Regrading (6" AB) 12' Blade Grader (1) 4000 Gal Water Truck (1) Pickup Truck Conventional (1) 16' CY 3 Axle Dump Truck (5) Temporary Electrical Power Flatbed Truck (1) Pickup Truck Conventional (2) 89 - Channels and Canals Mobilization and Demobilization Eletended Boom Pallet Loader (1) Pickup Truck Conventional (1) Clearing and Grubbing 1.5 CY Front End Loader Crawler (1) Trailer Mounted Brush Chipper (1) Chainsaw (1) Pickup Truck Conventional (6) 15 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (6) 15 CY 3 Axle Dump Truck (1) Excavation (Wet Conditions) 4.5 CY Hydraulic Excavator (1) 300 HP Dozer (2) 1.5 CY Front End Loader, Wheel (2) 16 CY 3 Axle Dump Truck (9) Pickup Truck Conventional (7) Excavation/Grading (Dry Conditions) 300 HP Dozer (1) 21 CY Scrappers (4) 12' Blade Grader (1) 4000 Gal Water Truck (1) 400 Gal Water Truck (1) Pickup Truck Conventional (7)	
Levee O&M Road Regrading (6" AB) 12" Blade Grader (1) 4000 Gal Water Truck (1) Pickup Truck Conventional (1) 16 CY 3 Axle Dump Truck (5) Flatbed Truck (1) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (3) Pickup Truck Conventional (1) Pickup Truck Conventional (6) Pickup Truck Conventional (7) Pickup Truck Conventi	
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16 CY 3 Axle Dump Truck (5)	
Temporary Electrical Power Flatbed Truck (1) Pickup Truck Conventional (2) 09 - Channels and Canals Mobilization and Demobilization Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Clearing and Grubbing 1.5 CY Front End Loader Crawler (1) Trailer Mounted Brush Chipper (1) Chainsaw (1) 4000 Gal Water Truck (1) Pickup Truck Conventional (6) 16 CY 3 Axle Dump Truck (1) Excavation (Wet Conditions) 4.5 CY Hydraulic Excavator (1) 300 HP Dozer (2) 3.5 CY Front End Loader, Wheel (2) 16 CY 3 Axle Dump Truck (9) Pickup Truck Conventional (7) Excavation/Grading (Dry Conditions) 300 HP Dozer (1) 21 CY Scrapers (4) 12 Blade Grader (1) 4000 Gal Water Truck (1)	
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21 CY Scrapers (4) 12' Blade Grader (1) 4000 Gal Water Truck (1)	
12' Blade Grader (1) 4000 Gal Water Truck (1)	
4000 Gal Water Truck (1)	
Pickup Truck Conventional (7)	
Earthen Backfill 300 HP Dozer (1)	
4000 Gal Water Truck (1)	
10 TN Smooth Roller (1)	
Pickup Truck Conventional (3)	
Riprap - Class 2 2.5 CY Hydraulic Excavators (2)	
300 HP Dozer Crawler (1)	
Pickup Truck Conventional (5)	
16 CY 3 Axle Dump Trucks (23)	
Riprap - Class 3 2.5 CY Hydraulic Excavators (2)	
300 HP Dozer Crawler (1)	
Pickup Truck Conventional (5)	
16 CY 3 Axle Dump Trucks (23)	

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
S	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
C	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
11-Levees and Floodwalls		<u> </u>			•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	7	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
Ì	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Soil Cement Bentonite Cutoff Wall	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	2.5 CY Hydraulic Excavators (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Flash Mixer (1)	Soil Mix Drill Rig	50%	80	77	1	0	77
i	Slurry Pump (1)	Pumps	50%	81	78	1	0	78
i	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
15 - Floodway Control and Diversion Struc	tures	<u> </u>			•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	14	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Concrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77

Construction Noise - Equipment Alternative 1 - East Alignment

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	T
RSP Bedding Material	300 HP Dozer Crawler (1)	
	Pickup Truck Conventional (5) 16 CY 3 Axle Haul Trucks (23)	
Fracian Control Conding		
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	
11-Levees and Floodwalls	Pickup Truck Conventional (4)	
	Flethod Truck (4 per piece of equipment)	T
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
	Extended Boom Pallet Loader (1) Picture Truck Convertional (1)	
Cail Coment Dontonite Cutoff Wall	Pickup Truck Conventional (1) 4.5 OV Undersulin Everyotes (4)	
Soil Cement Bentonite Cutoff Wall	4.5 CY Hydraulic Excavator (1)	
	300 HP Dozer (1)	
	2.5 CY Hydraulic Excavators (1)	
	16 CY 3 Axle Dump Truck (1)	
	Flash Mixer (1)	
	Slurry Pump (1) Bisland Track Convertional (5)	
45 Floodson Control and Disconian Otania	Pickup Truck Conventional (5)	
15 - Floodway Control and Diversion Struc		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
	Extended Boom Pallet Loader (1) Bislam Track Converting (4)	
Occasional discontinuous City December 1	Pickup Truck Conventional (1)	
Construction Site Dewatering	Flatbed Truck (1) 75 TN Grane Gravular Bile Hommon (1)	
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	
Construction City Deveatoring (Dumping)	Pickup Truck Conventional (6)	
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	
Execution (Met Conditions)	Pickup Truck Conventional (3)	
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	
	300 HP Dozer (2)	
	3.5 CY Front End Loader, Wheel (2)	
	16 CY 3 Axle Dump Truck (9) Pickup Truck Conventional (7)	
Object Dile Mell	Pickup Truck Conventional (7)	
Sheet Pile Wall	Flatbed Truck (1) 75 TN Crane Crawler Pile Hammer (1)	
Handwarks Chrystyns Comercts Diles	Pickup Truck Conventional (6)	
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	
	100 FT Auger Track Mounted Drill Rig (1)	
	Concrete Pump Boom Truck Mounted (1) Concrete Mixer Truck (3)	
	0.8 CY Backhoe Loader (1) 24 TN Truck End Dump (2)	
	24 TN Truck End Dump (2) Pickup Truck Conventional (8)	
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	
Headworks Structure	2.5" Dia. Concrete Vibrator (1)	
	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (7)	
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	
Treadworks Chainler Hansillon	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (6)	
Hingad Bottom Catos		
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)	
	Haul Truck Oversize Transport (1) Pickup Truck Conventional (4)	
	Pickup Truck Conventional (4)	

08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
3	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
r oddoman Bridgo opan motanation	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
19 - Buildings, Grounds, and Utilities	Fronce Frank Controllerial (C)	Tionap Track	1070	. 0			,	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Construction	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 GAL Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	Ö	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	Ö	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
Control of Duck Barrie	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment	i long track contentional (1)	Tionap Track	1070	, 0		·		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	• • • • • • • • • • • • • • • • • • • •	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75 75	71	3	5	76
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
Sino Danang Moonanoar Equipmont	Pickup Truck Conventional (3)	Pickup Truck	40%	75 75	71	3	5	76
Electrical Control Equipment CMU Building	1 7	Pickup Truck	40%	75 75	71	3	5	76
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75 75	71	3	5	76
Communication Equipment	i iokap itaok oonvontional (3)	I lokup Huok	TU /0	10	, ,	J		7.0

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Construction Noise - Equipment Alternative 1 - East Alignment

08 - Roads, Railroads, and Bridges												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
INIODIIIZALION AND DEMODIIIZALION	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)											
Dedectries Dridge Constate Diles												
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)											
	100 FT Auger Track Mounted Drill Rig (1)											
	Concrete Pump Boom Truck Mounted (1)											
	Cocnrete Mixer Truck (3)											
	0.8 CY Backhoe Loader (1)											
	24 TN Truck End Dump (2)											
	Pickup Truck Conventional (8)				_							
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)											
and Wingwalls	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)											
	Flatbed Truck (2)											
	Pickup Truck Conventional (5)											
19 - Buildings, Grounds, and Utilities							<u> </u>					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)											
CMU Building and Earthwork Pad	165 HP Dozer (1)											
Construction	Scraper (1)											
	Motor Grader (1)											
	Compactor (1)											
	4000 GAL Water Truck (1)											
	10 TN Smooth Roller (1)											
	Pickup Truck Conventional (7)											
	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Extended Boom Pallet Loader (1)											
	Concrete Mixer Truck (1)											
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
20 -Permanent Operating Equipment												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)		<u> </u>									
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (3)											
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (3)											
Electrical Control Equipment CMU Building												
Communication Equipment	Pickup Truck Conventional (3)											

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Table <u>LM</u> -2. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stima	ted Du	ıratior	ı, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	88	94	94	97	96	96	93	96	97	93	91	91	90	91	93	92	91	92	86	80	83	87	87	87	86	85	87	80
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)							690		690				690								690						690	
Distance Divergence (dBA)	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Atmospheric Attenuation (dBA)	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
1-Hour Construction Noise Level at the Receptor (dBA)	64	71	71	74	73	73	70	73	73	70	68	67	66	68	69	69	68	69	63	57	59	63	63	63	63	62	64	57
CNEL (Construction Noise + Existing) (dBA)	62	67	68	70	69	69	66	69	70	66	65	64	63	65	66	66	65	65	61	58	59	61	61	61	61	60	61	58
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	NA	NA	CA	CA	CA	CA	CA	CA	NA												
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230
Distance Divergence (dBA)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Atmospheric Attenuation (dBA)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
1-Hour Construction Noise Level at the Receptor (dBA)	74	81	81	84	83	83	80	83	83	79	78	77	76	78	79	79	78	79	73	67	69	73	73	73	73	72	74	67
CNEL (Construction Noise + Existing) (dBA)	71	77	77	80	79	79	76	79	79	76	74	74	72	74	75	75	74	75	69	64	66	70	70	70	69	68	70	64
Impact to Agricultural Uses	NA	CA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA								

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Background Noise Normal Suburban Residential

(dBA)

Daytime 55

Nighttime 45

Receptors:

7500 Nearest residential receptor (ft)

Source: Google Earth

Construction Noise - Equipment Alternative 2 - Center Alignment

Table LM-3. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations	Ar h	4-1			1 7 0	1. 1	(- /	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
3 3 ()	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1 1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals	[i ionap i i aon	1 12/1			_		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	28	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
ordening and ordening	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
Executation (trot conditions)	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Excavation/Grading (Bry Conditions)	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1 1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72		0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Earthen Backfill	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Larther Backiii	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	'	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73		0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
πιριάρ - Οιάδο Δ	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	, 14	86
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	23	3	80
πήμαρ - Οιασο Ο	300 HP Dozer Crawler (1)	Dozer	40%	82	78	4	0	78
	` '		1				_	1
	Pickup Truck Conventional (5)	Pickup Truck	40%	75 70	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86

Table <u>LM</u> -3. 8-Hour Construction N	Noise Level at 50 Feet (dBA)						,			,				Estin	ated	Duratio	on, We	ek			1				1			
Dhana	Equipment Description	1			4	5	6	7	١.		10	11	1	2 13	14	4.5	46	47	40	40	20	24	22	22	24	۱ ۵۶ ۱	.	27
Phase 02 - Relocations	Equipment Description	1 1	2	3	4	<u> </u>	0		8	9	10	111	1 1	2 13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)			1	1	1	1		1	Ι		1	1					<u> </u>										
viobilization and Demobilization	Extended Boom Pallet Loader (1)																											
	Pickup Truck Conventional (1)																											
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)													_			+											
-remont well being	3.5 CY Front End Loader, Wheel (1)																											
	0.8 CY Loader/Backhoe, Wheel (1)																											
	4000 Gal Water Truck (1)																											
	16 CY 3 Axle Dump Truck (1)																											
0014 D	Pickup Truck Conventional (6)																											
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																											
	4000 Gal Water Truck (1)																											
	Pickup Truck Conventional (1)																											
	16 CY 3 Axle Dump Truck (5)																											
Temporary Electrical Power	Flatbed Truck (1)																											
	Pickup Truck Conventional (2)																											
9 - Channels and Canals																								1	_			ببط
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																											
	Extended Boom Pallet Loader (1)																											
	Pickup Truck Conventional (1)																											
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																											
	Trailer Mounted Brush Chipper (1)																											
	Chainsaw (1)																											
	4000 Gal Water Truck (1)																											
	Pickup Truck Conventional (6)																											
	16 CY 3 Axle Dump Truck (1)																											
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																											
	300 HP Dozer (2)																											
	3.5 CY Front End Loader, Wheel (2)																											
	16 CY 3 Axle Dump Truck (9)																											
	Pickup Truck Conventional (7)																											
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	1															+	+										
	21 CY Scrapers (4)																											
	12' Blade Grader (1)																											
	4000 Gal Water Truck (1)																											
	Pickup Truck Conventional (7)																											
Earthen Backfill	300 HP Dozer (1)	+												_			+	+				+						-+
Latinett Backiiii	4000 Gal Water Truck (1)																											
	10 TN Smooth Roller (1)																											
	Pickup Truck Conventional (3)																											
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																											-+
iipiap - Class 2	300 HP Dozer Crawler (1)																											
	• • • • • • • • • • • • • • • • • • •																											
	Pickup Truck Conventional (5)																											
Dinger Class 2	16 CY 3 Axle Dump Trucks (23)	+									+														-			
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																											
	300 HP Dozer Crawler (1)																											
	Pickup Truck Conventional (5)																											
	16 CY 3 Axle Dump Trucks (23)																						<u> </u>					

Construction Noise - Equipment Alternative 2 - Center Alignment

DOD De delin i Matarial	0.5.0)(11	IT	1 400/ 1	0.4	77		1 0	T 00
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1 -	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
15 51 1 0 1 1 15: : 01	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
15 - Floodway Control and Diversion Struc		TEL LE LE LE	I 400/ I	7.1	70		- 44	T 04
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	14	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
0 1 1 0 0 0	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Concrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
08 - Roads, Railroads, and Bridges								•
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75

DCD Dadding Material	O. F. CV I Is drawling Experient and (O)		1				 		Т	 	1	 1	—
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)												
	300 HP Dozer Crawler (1)												
	Pickup Truck Conventional (5)												
	16 CY 3 Axle Haul Trucks (23)												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)												
	Pickup Truck Conventional (4)												
15 - Floodway Control and Diversion Struc		 	 									 	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												
	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (1)												
Construction Site Dewatering	Flatbed Truck (1)												
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)												
	Pickup Truck Conventional (6)												
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)												
	Pickup Truck Conventional (3)												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)												
	300 HP Dozer (2)												
	3.5 CY Front End Loader, Wheel (2)												
	16 CY 3 Axle Dump Truck (9)												
	Pickup Truck Conventional (7)												
Sheet Pile Wall	Flatbed Truck (1)												
	75 TN Crane Crawler Pile Hammer (1)												
	Pickup Truck Conventional (6)												
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)												
	100 FT Auger Track Mounted Drill Rig (1)												
	Concrete Pump Boom Truck Mounted (1)												
	Concrete Mixer Truck (3)												
	0.8 CY Backhoe Loader (1)												
	24 TN Truck End Dump (2)												
	Pickup Truck Conventional (8)												
Headworks Structure	Concrete Pump Boom Truck Mounted (1)												
	2.5" Dia. Concrete Vibrator (1)												
	Concrete Mixer Truck (2)												
	Pickup Truck Conventional (7)												
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)												
	Concrete Mixer Truck (2)												
	Pickup Truck Conventional (6)												
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)												\neg
	Haul Truck Oversize Transport (1)												
	Pickup Truck Conventional (4)												
08 - Roads, Railroads, and Bridges													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												
	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (1)												
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)												-
	100 FT Auger Track Mounted Drill Rig (1)												
	Concrete Pump Boom Truck Mounted (1)												
	Cocnrete Mixer Truck (3)												
	0.8 CY Backhoe Loader (1)												
	24 TN Truck End Dump (2)												
	Pickup Truck Conventional (8)												
	i ionap i iuon conventionai (o)												

Construction Noise - Equipment Alternative 2 - Center Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
-	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
19 - Buildings, Grounds, and Utilities								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Construction	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
İ	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
İ	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Control Equipment CMU Building		Pickup Truck	40%	75	71	3	5	76
	. ,	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Dedestries Drides Commets Abutanests	One and Division Dance Touris Manager (4)			1									$\overline{}$
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)												
and Wingwalls	2.5" Dia. Concrete Vibrator (1)												
	Concrete Mixer Truck (2)												
	Pickup Truck Conventional (7)												
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)												
	Flatbed Truck (2)												
10 5 11: 0 1 11::::::	Pickup Truck Conventional (5)												
19 - Buildings, Grounds, and Utilities													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												
	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (1)												
CMU Building and Earthwork Pad	165 HP Dozer (1)												
Construction	Scraper (1)												
	Motor Grader (1)												
	Compactor (1)												
	4000 Gal Water Truck (1)												
	10 TN Smooth Roller (1)												
	Pickup Truck Conventional (7)												
	Concrete Pump Boom Truck Mounted (1)												
	2.5" Dia. Concrete Vibrator (1)												
	Extended Boom Pallet Loader (1)												
	Concrete Mixer Truck (1)												
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)												
	2.5" Dia. Concrete Vibrator (1)												
	Concrete Mixer Truck (2)												
	Pickup Truck Conventional (7)												
20 -Permanent Operating Equipment									1		ı		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												4
	Extended Boom Pallet Loader (1)												4
	Pickup Truck Conventional (1)												
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (3)												
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (3)												
Electrical Control Equipment CMU Building													
Electrical Power Equipment CMU Building													
Communication Equipment	Pickup Truck Conventional (3)												
0 1/00 00/1 1/1 0 0 1		 	 				 			 		 	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Construction Noise - Equipment Alternative 2 - Center Alignment

Table <u>LM</u> -4. 8-Hour Construction Noise Level at the Receptor (dBA)												E	stimat	ed Du	ıratior	ı, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	88	94	94	97	96	96	93	96	96	92	90	90	93	92	92	93	92	91	92	87	83	85	87	87	86	86	87	80
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)			690		690							690				690								690				
Distance Divergence (dBA)	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Atmospheric Attenuation (dBA)	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
1-Hour Construction Noise Level at the Receptor (dBA)	64	71	71	74	73	73	70	73	73	69	66	67	69	68	69	69	68	68	69	64	59	62	63	63	63	63	64	57
CNEL (Construction Noise + Existing) (dBA)	62	67	68	70	69	69	66	69	69	65	63	64	66	65	65	66	65	65	65	61	59	60	61	61	61	61	61	58
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	CA	CA	CA	NA												
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)			230					230					230			230								230				230
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
1-Hour Construction Noise Level at the Receptor (dBA)	74	81	81	84	83	82	80	83	83	79	76	77	79	78	78	79	78	78	79	74	69	72	73	73	73	73	74	67
CNEL (Construction Noise + Existing) (dBA)		77	77	80	79	79	76	79	79	75	72	73	75	75	75	75	75	74	75	70	66	68	70	70	69	69	70	64
Impact to Agricultural Uses	NA	CA	NA	NA	NA	CA	NA	NA	CA	NA																		

^{*}Distances are the minimum distances that can still achieve noise levels within

 $\label{lem:conditionally Acceptable limits, except when there is a closer receptor.$

Significance Level (dBA)

Residential

Normally Acceptable 60 Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft) 4200

Source: Google Earth

Table LM-5. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations			1 4000	<u> </u>	1 = 0 4() @ 00	qp	(4.2.1)	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals	·							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	28	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Earthen Backfill	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86

Construction Noise - Equipment Alternative 3 - West Alignment

Table <u>LM</u> -5. 8-Hour Construction I	Noise Level at 50 Feet (dBA)												E	stima	ted D	uratio	n, We	ek											
_																													ī
																													ı
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												1
	3.5 CY Front End Loader, Wheel (1)																												I
	0.8 CY Loader/Backhoe, Wheel (1)																												I
	4000 Gal Water Truck (1)																												I
	16 CY 3 Axle Dump Truck (1)																												I
	Pickup Truck Conventional (6)																												I
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
3 (1)	4000 Gal Water Truck (1)																												i
	Pickup Truck Conventional (1)																												i
	16 CY 3 Axle Dump Truck (5)																												i
Temporary Electrical Power	Flatbed Truck (1)																												
Tomporary Electrical Fewer	Pickup Truck Conventional (2)																												I
09 - Channels and Canals	r lokap Traok Contoniionai (2)																												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)						1		1							1													
Mobilization and Demobilization	Extended Boom Pallet Loader (1)																												I
	Pickup Truck Conventional (1)																												I
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																+							+					
Cleaning and Grubbing	Trailer Mounted Brush Chipper (1)																												I
																													I
	Chainsaw (1)																												I
	4000 Gal Water Truck (1)																												I
	Pickup Truck Conventional (6)																												I
	16 CY 3 Axle Dump Truck (1)	-																											
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												I
	300 HP Dozer (2)																												I
	3.5 CY Front End Loader, Wheel (2)																												I
	16 CY 3 Axle Dump Truck (9)																												I
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												I
	21 CY Scrapers (4)																												I
	12' Blade Grader (1)																												I
	4000 Gal Water Truck (1)																												I
	Pickup Truck Conventional (7)													,															
Earthen Backfill	300 HP Dozer (1)																												I
	4000 Gal Water Truck (1)																												I
	10 TN Smooth Roller (1)																												I
	Pickup Truck Conventional (3)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																											-	
	300 HP Dozer Crawler (1)																												ı
	Pickup Truck Conventional (5)																												ı
	16 CY 3 Axle Dump Trucks (23)																												ı
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												ı
	Pickup Truck Conventional (5)																												ı
	16 CY 3 Axle Dump Trucks (23)															1													ĺ

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
G	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
15 - Floodway Control and Diversion Struc		·						•
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	14	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Concrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
08 - Roads, Railroads, and Bridges		I= =	1				T =	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1 1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
i	0.8 CY Backhoe Loader (1)	Backhoe	40%	78 70	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76 75	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80

Construction Noise - Equipment Alternative 3 - West Alignment

	To = 0//// / 1/ 1/ 2/ / 2/		 					T		 		
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)											
	300 HP Dozer Crawler (1)											
	Pickup Truck Conventional (5)											
	16 CY 3 Axle Haul Trucks (23)											
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)											
	Pickup Truck Conventional (4)											
15 - Floodway Control and Diversion Struc		 	 	 	 					 		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)											
Construction Site Dewatering	Flatbed Truck (1)											
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)											
	Pickup Truck Conventional (6)											
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)											
	Pickup Truck Conventional (3)											
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)											
,	300 HP Dozer (2)											
	3.5 CY Front End Loader, Wheel (2)											
	16 CY 3 Axle Dump Truck (9)											
	Pickup Truck Conventional (7)											
Sheet Pile Wall	Flatbed Truck (1)						+					
	75 TN Crane Crawler Pile Hammer (1)											
	Pickup Truck Conventional (6)											
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)											
	100 FT Auger Track Mounted Drill Rig (1)											
	Concrete Pump Boom Truck Mounted (1)											
	Concrete Mixer Truck (3)											
	0.8 CY Backhoe Loader (1)											
	24 TN Truck End Dump (2)											
	Pickup Truck Conventional (8)											
Headworks Structure	Concrete Pump Boom Truck Mounted (1)											
Tieadworks Structure	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)											
Headworks Charmer Transition	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (6)											
Llingad Dattom Catao												
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)											
	Haul Truck Oversize Transport (1)											
00 Doods Dailroads and Dridges	Pickup Truck Conventional (4)											
08 - Roads, Railroads, and Bridges	Flathad Truck (4 non piece of aguingment)					T			П		T	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1)											
	` '											
Dadastrian Dridge Consents Diles	Pickup Truck Conventional (1)											
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)											
	100 FT Auger Track Mounted Drill Rig (1)											
	Concrete Pump Boom Truck Mounted (1)											
	Cocnrete Mixer Truck (3)											
	0.8 CY Backhoe Loader (1)											
	24 TN Truck End Dump (2)											
	Pickup Truck Conventional (8)											

Padastrian Pridge Congrete Abutments	Congrete Dump Boom Truck Mounted (1)	Congrete Dump Truels	20%	81	7/	1	0	74
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1) 2.5" Dia. Concrete Vibrator (1)	Concrete Pump Truck	20%	81 80	74 73		0	74
and Wingwalls	` '	Vibratory Concrete Mixer		79		1	ľ	1
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%		75 74	2 7	3	78
Dedestries Dridge Organ Installation	Pickup Truck Conventional (7)	Pickup Truck	40%	75 81	71 73	1	8	79 73
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%		I		0	1
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3 7	73
40 Duildings Converds and Hallians	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	/	78
19 - Buildings, Grounds, and Utilities Mobilization and Demobilization	Fight at Tarab (4 and size of a suite seed)	Flat Dad Tavels	100/	7.4	70	40	40	1 00
Modifization and Demodifization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70 75	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79 75	75 74	1	0	75
0.00	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Construction	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Construction Noise - Equipment Alternative 3 - West Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)									
and Wingwalls	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)									
	Flatbed Truck (2)									
	Pickup Truck Conventional (5)									
19 - Buildings, Grounds, and Utilities			·	· · · · · ·						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
CMU Building and Earthwork Pad	165 HP Dozer (1)									
Construction	Scraper (1)									
	Motor Grader (1)									
	Compactor (1)									
	4000 Gal Water Truck (1)									
	10 TN Smooth Roller (1)									
	Pickup Truck Conventional (7)									
	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Extended Boom Pallet Loader (1)									
	Concrete Mixer Truck (1)									
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
20 -Permanent Operating Equipment	·				·		•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									
Electrical Control Equipment CMU Building										
	Pickup Truck Conventional (3)									
Communication Equipment	Pickup Truck Conventional (3)									
	Habitat Postaration & Fish Passage Project					 	 -	 -		

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Table <u>LM</u> -6. 8-Hour Construction Noise Level at the Receptor (dBA)												E	stimat	ed Du	uration	ı, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	88	94	94	97	96	96	93	96	96	92	92	93	94	94	92	93	92	91	93	92	89	90	87	87	86	86	87	80
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)												700							700			700	700	700				
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
1-Hour Construction Noise Level at the Receptor (dBA)	64	71	71	73	73	72	70	73	73	69	69	70	70	71	68	69	68	68	70	69	65	66	63	63	63	63	64	57
CNEL (Construction Noise + Existing) (dBA)	62	67	67	70	69	69	66	69	69	66	66	67	67	67	65	66	65	65	66	66	63	63	61	61	61	61	61	58
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA												
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)					230																							
																		13.3										
Atmospheric Attenuation (dBA)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
1-Hour Construction Noise Level at the Receptor (dBA)	74	81	81	84	83	82	80	83	83	79	79	80	80	81	78	79	78	78	80	79	75	76	73	73	73	73	74	67
CNEL (Construction Noise + Existing) (dBA)	71	77	77	80	79	79	76	79	79	75	75	76	77	77	75	75	75	74	76	75	72	72	70	70	69	69	70	64
Impact to Agricultural Uses	NA	CA	CA	NA	CA	NA	NA	CA	CA	NA																		

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Background Noise Normal Suburban Residential

(dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 700

Source: Google Earth

Construction Noise - Equipment Alternative 4 - West Alignment

Table LM-7. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations	4. h	4-1			1 1 1 7 0 1 1	1. 1.	()	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
. ,	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals				•				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	28	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Earthen Backfill	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
		1	1	76	72	1	·	

Table <u>LM</u> -7. 8-Hour Construction N	loise Level at 50 Feet (dBA)												E	stima	ted D	uratio	n, We	ek											
																													ı
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations						T	1			_	I	1	ı	<u> </u>	1		1	ı	ı		1		T	T	ı	1		-	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
5	Pickup Truck Conventional (1)	-							-						-	-													
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												İ
	Pickup Truck Conventional (6)	-							-																				
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												İ
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
Tamananan Elastria de Dancan	16 CY 3 Axle Dump Truck (5)								-																				
Temporary Electrical Power	Flatbed Truck (1) Pickup Truck Conventional (2)																												
09 - Channels and Canals	Pickup Truck Conventional (2)																												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)			<u> </u>	Т	l	Τ	T		Т				Τ	Т		1						T			T 1			
Woolinzation and Demobilization	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Crubbing	1.5 CY Front End Loader Crawler (1)	-							-						-	-													
Clearing and Grubbing	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												1
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	-																											
Licavation (wet Conditions)	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	+																											
Excavation/Grading (Dry Goriditions)	21 CY Scrapers (4)																												İ
	12' Blade Grader (1)																												İ
	4000 Gal Water Truck (1)																												İ
	Pickup Truck Conventional (7)																												
Earthen Backfill	300 HP Dozer (1)	1																											
Larthon Backini	4000 Gal Water Truck (1)																												İ
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												İ
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	1																											
1. 45.45	300 HP Dozer Crawler (1)																												ı
	Pickup Truck Conventional (5)																												İ
	16 CY 3 Axle Dump Trucks (23)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	+							1																		+		
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												ı
	16 CY 3 Axle Dump Trucks (23)																												ı
	TO OT 3 AXIE DUITH TRUCKS (23)	1																											

Construction Noise - Equipment Alternative 4 - West Alignment

DOD DO LES MATA SAL	To 5 0 / 11 1 2 15 5 2 2 1 2 2 (0)	Ie	I 400/ I	0.4	77			T 00
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
15 - Floodway Control and Diversion Struc		I=	1 .00/ 1					1 21
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	14	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Concrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
08 - Roads, Railroads, and Bridges			<u> </u>					<u> </u>
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	· · · · · · · · · · · · · · · · · · ·			-	_			

DCD Dadding Material	O. F. C.V. Hudraudia Eva-u-t (O.)			1				 			ı	1	Т	1	$\overline{}$
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	(I													
	300 HP Dozer Crawler (1)	1													
	Pickup Truck Conventional (5)	1													
	16 CY 3 Axle Haul Trucks (23)	\longmapsto													\perp
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	1													
	Pickup Truck Conventional (4)														
15 - Floodway Control and Diversion Struc							 								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	1													4
	Extended Boom Pallet Loader (1)	1													4
	Pickup Truck Conventional (1)	\longrightarrow													
Construction Site Dewatering	Flatbed Truck (1)	1													
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	1													
	Pickup Truck Conventional (6)														
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	1													
	Pickup Truck Conventional (3)														
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	ı I							T						
	300 HP Dozer (2)	(I													
	3.5 CY Front End Loader, Wheel (2)	(I													
	16 CY 3 Axle Dump Truck (9)	1													
	Pickup Truck Conventional (7)	1													
Sheet Pile Wall	Flatbed Truck (1)														
	75 TN Crane Crawler Pile Hammer (1)	1													
	Pickup Truck Conventional (6)	1													
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)														
	100 FT Auger Track Mounted Drill Rig (1)	1													
	Concrete Pump Boom Truck Mounted (1)	1													
	Concrete Mixer Truck (3)	1													
	0.8 CY Backhoe Loader (1)	1													
	24 TN Truck End Dump (2)	1													
	Pickup Truck Conventional (8)	1													
Headworks Structure	Concrete Pump Boom Truck Mounted (1)														
	2.5" Dia. Concrete Vibrator (1)	1													
	Concrete Mixer Truck (2)	1													
	Pickup Truck Conventional (7)	1													
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)														
	Concrete Mixer Truck (2)	1													
	Pickup Truck Conventional (6)	1													
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)														
3	Haul Truck Oversize Transport (1)	1													
	Pickup Truck Conventional (4)	1													
08 - Roads, Railroads, and Bridges															
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)														
	Extended Boom Pallet Loader (1)	1 1													
	Pickup Truck Conventional (1)	1													
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	\vdash													+
	100 FT Auger Track Mounted Drill Rig (1)	1 1													
	Concrete Pump Boom Truck Mounted (1)	1 1													
	Cocnrete Mixer Truck (3)	1 1													
	0.8 CY Backhoe Loader (1)	1 1													
	24 TN Truck End Dump (2)	1 1													
	Pickup Truck Conventional (8)	1 1													
	i ionap iraon conventional (o)														

Construction Noise - Equipment Alternative 4 - West Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
-	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
19 - Buildings, Grounds, and Utilities		•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad Construc	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment		•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Course: UDD 2017 Vola Bungas Colmonia								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Redestrian Pridge Constate Abutments	Congrete Dump Doom Trusk Mounted (4)		ı						
	Concrete Pump Boom Truck Mounted (1)								
and Wingwalls	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)								
	Flatbed Truck (2)								
	Pickup Truck Conventional (5)								
19 - Buildings, Grounds, and Utilities									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
CMU Building and Earthwork Pad Construct	165 HP Dozer (1)								
	Scraper (1)								
	Motor Grader (1)								
	Compactor (1)								
	4000 Gal Water Truck (1)								
	10 TN Smooth Roller (1)								
	Pickup Truck Conventional (7)								
	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Extended Boom Pallet Loader (1)								
	Concrete Mixer Truck (1)								
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
20 -Permanent Operating Equipment	, , , , , , , , , , , , , , , , , , , ,								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (3)								
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)								
• • • • • • • • • • • • • • • • • • • •	Pickup Truck Conventional (3)								
Electrical Control Equipment CMU Building									$\overline{}$
Electrical Power Equipment CMU Building				+					
	Pickup Truck Conventional (3)								
Source: UDD 2017 Vale Burges Salmanid									

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Construction Noise - Equipment Alternative 4 - West Alignment

Table LM-8. 8-Hour Construction Noise Level at the Receptor (dBA)												F	stima	ted Di	uration	n Wed	-k											$\overline{}$
Tubio Lim of official contratation follows by at the recorptor (u.b.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	88	94	94	97	96	96	93	96	96	92	92	93	94	94	92	93	92	91	93	92	89	90	87	87	86	86	87	80
Residential Receptor								•					•	•						•	•							
Distance from the Center of Construction Activity to a Receptor (ft)	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
Distance Divergence (dBA)	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9
Atmospheric Attenuation (dBA)	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
1-Hour Construction Noise Level at the Receptor (dBA)	64	71	71	73	73	72	70	73	73	69	69	70	70	71	68	69	68	68	70	69	65	66	63	63	63	63	64	57
CNEL (Construction Noise + Existing) (dBA)	62	67	67	70	69	69	66	69	69	66	66	67	67	67	65	66	65	65	66	66	63	63	61	61	61	61	61	58
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230
Distance Divergence (dBA)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Atmospheric Attenuation (dBA)																												
1-Hour Construction Noise Level at the Receptor (dBA)	74	81	81	84	83	82	80	83	83	79	79	80	80	81	78	79	78	78	80	79	75	76	73	73	73	73	74	67
CNEL (Construction Noise + Existing) (dBA)	71	77	77	80	79	79	76	79	79	75	75	76	77	77	75	75	75	74	76	75	72	72	70	70	69	69	70	64
Impact to Agricultural Uses	NA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	NA	NA	CA	CA	NA	NA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft)

700

Table <u>LM</u>-9. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals						•		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	23	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
3 3	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1 1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Exactation Stating (Bry Containency	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
pp	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
. Co. Dodding Material	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	_	76	75	1	0	75
Libsion Control Seeding	Pickup Truck Conventional (4)	Pickup Truck	40% 40%	79 75	75	4	6	75

Table <u>⊾M</u> -9. 8-Hour Construction	Noise Level at 50 Feet (dBA)												E	Estima	ted D	uratio	n, We	ek											
						_					4.0		40	4.0			40		40	4.0									
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations	Tel 11 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			T	T	1					I	<u> </u>							T		T	1	<u> </u>	<u> </u>	<u> </u>	ı		1	#
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
5 (W : B	Pickup Truck Conventional (1)	-																											+
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals	<u>_</u>				1																					1	1	_	4
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												
	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Haul Trucks (23)																												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												
Ĭ	Pickup Truck Conventional (4)	1						1																					

Table <u>⊾M</u> -9. 8-Hour Construction	Noise Level at 50 Feet (dBA)					Estir	nated	Dura	tion, \	Neek				
Phase	Equipment Description	29	30	31	32	33	34	35	36	37	38	39	40	41
02 - Relocations														
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)													
	3.5 CY Front End Loader, Wheel (1)													
	0.8 CY Loader/Backhoe, Wheel (1)													
	4000 Gal Water Truck (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (6)													
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)													
	4000 Gal Water Truck (1)													
	Pickup Truck Conventional (1)													
	16 CY 3 Axle Dump Truck (5)													
Temporary Electrical Power	Flatbed Truck (1)													
	Pickup Truck Conventional (2)													
09 - Channels and Canals														
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)													
	Trailer Mounted Brush Chipper (1)													
	Chainsaw (1)													
	4000 Gal Water Truck (1)													
	Pickup Truck Conventional (6)													
	16 CY 3 Axle Dump Truck (1)													
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)													
	300 HP Dozer (2)													
	3.5 CY Front End Loader, Wheel (2)													
	16 CY 3 Axle Dump Truck (9)													
	Pickup Truck Conventional (7)													
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)													
	21 CY Scrapers (4)													
	12' Blade Grader (1)													
	4000 Gal Water Truck (1)													
	Pickup Truck Conventional (7)													
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)													
	300 HP Dozer Crawler (1)													
	Pickup Truck Conventional (5)													
	16 CY 3 Axle Dump Trucks (23)													
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)													
	300 HP Dozer Crawler (1)													
	Pickup Truck Conventional (5)													
	16 CY 3 Axle Haul Trucks (23)													
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)													
	Pickup Truck Conventional (4)													

15 - Floodway Control and Diversion Struc	etures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	13	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Concrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
08 - Roads, Railroads, and Bridges	<u> </u>		,					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

15 - Floodway Control and Diversion Struc											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										
Construction Site Dewatering	Flatbed Truck (1)										
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)										
	Pickup Truck Conventional (6)										
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)										
	Pickup Truck Conventional (3)										
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)										
	300 HP Dozer (2)										
	3.5 CY Front End Loader, Wheel (2)										
	16 CY 3 Axle Dump Truck (9)										
	Pickup Truck Conventional (7)										
Sheet Pile Wall	Flatbed Truck (1)										
	75 TN Crane Crawler Pile Hammer (1)										
	Pickup Truck Conventional (6)										
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)										
	100 FT Auger Track Mounted Drill Rig (1)										
	Concrete Pump Boom Truck Mounted (1)										
	Concrete Mixer Truck (3)										
	0.8 CY Backhoe Loader (1)										
	24 TN Truck End Dump (2)										
	Pickup Truck Conventional (8)										
Headworks Structure	Concrete Pump Boom Truck Mounted (1)										
	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (7)										
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)										
	Flatbed Truck (2)										
	Pickup Truck Conventional (5)										
08 - Roads, Railroads, and Bridges											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										

15 - Floodway Control and Diversion Struc	tures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)							
	Extended Boom Pallet Loader (1)							
	Pickup Truck Conventional (1)							
Construction Site Dewatering	Flatbed Truck (1)							
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)							
	Pickup Truck Conventional (6)							
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)							
	Pickup Truck Conventional (3)							
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)							
	300 HP Dozer (2)							
	3.5 CY Front End Loader, Wheel (2)							
	16 CY 3 Axle Dump Truck (9)							
	Pickup Truck Conventional (7)							
Sheet Pile Wall	Flatbed Truck (1)							
	75 TN Crane Crawler Pile Hammer (1)							
	Pickup Truck Conventional (6)							
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)							
	100 FT Auger Track Mounted Drill Rig (1)							
	Concrete Pump Boom Truck Mounted (1)							
	Concrete Mixer Truck (3)							
	0.8 CY Backhoe Loader (1)							
	24 TN Truck End Dump (2)							
	Pickup Truck Conventional (8)							
Headworks Structure	Concrete Pump Boom Truck Mounted (1)							
	2.5" Dia. Concrete Vibrator (1)							
	Concrete Mixer Truck (2)							
	Pickup Truck Conventional (7)							
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)							
	Flatbed Truck (2)							
	Pickup Truck Conventional (5)							
08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)							
	Extended Boom Pallet Loader (1)							
	Pickup Truck Conventional (1)	1						

Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
19 - Buildings, Grounds, and Utilities								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Construction	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment		·						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
, i, i, i i i i i i i i i i i i i i i i	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
9 4. 1	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Control Equipment CMU Building	()	Pickup Truck	40%	75	71	3	5	76
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
	1		. 3 , 4					

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	
	100 FT Auger Track Mounted Drill Rig (1)	
	Concrete Pump Boom Truck Mounted (1)	
	Cocnrete Mixer Truck (3)	
	0.8 CY Backhoe Loader (1)	
	24 TN Truck End Dump (2)	
	Pickup Truck Conventional (8)	
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	
	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (7)	
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	
	Flatbed Truck (2)	
	Pickup Truck Conventional (5)	
19 - Buildings, Grounds, and Utilities		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
CMU Building and Earthwork Pad	165 HP Dozer (1)	
Construction	Scraper (1)	
	Motor Grader (1)	
	Compactor (1)	
	4000 Gal Water Truck (1)	
	10 TN Smooth Roller (1)	
	Pickup Truck Conventional (7)	
	Concrete Pump Boom Truck Mounted (1)	
	2.5" Dia. Concrete Vibrator (1)	
	Extended Boom Pallet Loader (1)	
	Concrete Mixer Truck (1)	
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	
	2.5" Dia. Concrete Vibrator (1)	
	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (7)	
20 -Permanent Operating Equipment		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
Mechanical Hydraulic Cylinders & Housing		
	Pickup Truck Conventional (3)	
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (3)	
Electrical Control Equipment CMU Building		
Electrical Power Equipment CMU Building		
Communication Equipment	Pickup Truck Conventional (3)	
	id Habitat Dantamilian & Fish Dansam Dariant	

Considerations. March 10.

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

	T., _, _		1	- 1	-				
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)								
	100 FT Auger Track Mounted Drill Rig (1)								
	Concrete Pump Boom Truck Mounted (1)								
	Cocnrete Mixer Truck (3)								
	0.8 CY Backhoe Loader (1)								
	24 TN Truck End Dump (2)								
	Pickup Truck Conventional (8)								
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)								
and Wingwalls	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)								
	Flatbed Truck (2)								
	Pickup Truck Conventional (5)								
19 - Buildings, Grounds, and Utilities									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
CMU Building and Earthwork Pad	165 HP Dozer (1)								
Construction	Scraper (1)								
	Motor Grader (1)								
	Compactor (1)								
	4000 Gal Water Truck (1)								
	10 TN Smooth Roller (1)								
	Pickup Truck Conventional (7)								
	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Extended Boom Pallet Loader (1)								
	Concrete Mixer Truck (1)								
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
20 -Permanent Operating Equipment				,					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)								
, if it is busing	Pickup Truck Conventional (3)								
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (3)								
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)								
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)								
Communication Equipment	Pickup Truck Conventional (3)								
S S Sation Equipmont	1. ionapaon controllational (c)								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Table <u>LM</u> -10. 8-Hour Construction Noise Level at the Receptor (dBA)												E	stimat	ted Du	uratio	n, Wee	ek											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	89	94	92	96	97	97	96	97	97	96	92	96	97	96	92	92	92	87	87	85	83	83	88	85	82	85	n/a	n/a
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
1-Hour Construction Noise Level at the Receptor (dBA)	65	70	68	73	74	73	72	73	73	73	69	72	73	73	68	68	68	63	63	61	59	59	64	61	59	62	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	62	67	65	69	70	70	69	69	70	69	65	69	69	69	65	65	65	61	61	60	59	59	62	60	59	60	n/a	n/a
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	NA	NA	CA	NA	NA	NA	n/a	n/a
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)													240															
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1-Hour Construction Noise Level at the Receptor (dBA)	75	80	78	83	84	83	82	83	83	82	79	82	83	82	78	78	78	73	73	71	69	69	74	71	69	71	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	71	76	75	79	80	79	78	79	79	79	75	78	79	79	75	74	74	69	69	67	66	66	71	67	65	68	n/a	n/a
Impact to Agricultural Uses	NA	CA	NA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a

^{*}Distances are the minimum distances that can still achieve noise levels within Conditionally Acceptable limits, except when there is a closer receptor.

(dBA)

Significance Level

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft) 3800

Table <u>LM</u> -10. 8-Hour Construction Noise Level at the Receptor (dBA)					Estir	nated	Durat	tion, V	Veek				
	29	30	31	32	33	34	35	36	37	38	39	40	41
Total Construction Leq(h) @ 50'	84	86	86	86	86	86	86	86	86	87	85	84	n/a
Residential Receptor													
Distance from the Center of Construction Activity to a Receptor (ft)	720	720	720	720	720	720	720	720	720	720	720	720	720
Distance Divergence (dBA)	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2
Atmospheric Attenuation (dBA)	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
1-Hour Construction Noise Level at the Receptor (dBA)	60	62	62	62	62	62	62	62	62	63	62	60	n/a
CNEL (Construction Noise + Existing) (dBA)	59	61	61	61	61	61	61	61	61	61	60	59	n/a
Impact to Residential Uses	NA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	n/a
Agricultural Receptor													
Distance from the Center of Construction Activity to a Receptor (ft)	240	240	240	240	240	240	240	240	240	240	240	240	240
Distance Divergence (dBA)	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Atmospheric Attenuation (dBA)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1-Hour Construction Noise Level at the Receptor (dBA)	70	72	72	72	72	72	72	72	72	73	72	70	n/a
CNEL (Construction Noise + Existing) (dBA)	67	69	69	69	69	69	69	69	69	69	68	67	n/a
Impact to Agricultural Uses	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a

^{*}Distances are the minimum distances that can still achieve noise levels within Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level (dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Conditionally Acceptable to

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft) 3800

Construction Noise - Equipment Alternative 6 - West Alignment

Table LM-11. 8-Hour Construction Noise Level at 50 Feet (dBA)

Mobilization and Demobilization Fremont Weir Demo 3. 6. 6. Fremont Weir Demo 3. 6. 6. Fremont Weir Demo 3. 6. 6. 7. Fremont Weir Demo 3. 6. 7. Fremont Weir Demo 4. 6. 8. 8. 8. 8. 8. 8. 8. 8. 8	latbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader, Wheel (1) Extended Boom Pallet Loader, Wheel (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader Crawler (1) Extended Boom Boush Chipper (1)	Flat Bed Truck Front End Loader Pickup Truck Excavator Front End Loader Backhoe Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Flat Bed Truck Pickup Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck Front End Loader	40% 40% 40% 40% 40% 40% 40% 40% 40% 40%	74 79 75 81 79 78 76 76 75 85 76 75 76 74 75	70 75 71 77 75 74 72 71 81 72 71 72 71 70 71 70 71	6 1 1 1 1 6 6 1 1 1 2 2 28	(dBA) 8 0 0 0 0 0 0 0 0 0 0 7 0 3	78 75 71 77 75 74 72 72 79 81 72 71 79 70 74
Mobilization and Demobilization Fremont Weir Demo 3. 3. 0. 40 16 Pi Levee O&M Road Regrading (6" AB) Temporary Electrical Power Pi 109 - Channels and Canals Mobilization and Demobilization FI Expri Clearing and Grubbing Tr Cl 40 Pi 16 Excavation (Wet Conditions) Excavation (Wet Conditions)	extended Boom Pallet Loader (1) Fickup Truck Conventional (1) 5 CY Hydraulic Excavator (1) 5 CY Front End Loader, Wheel (1) 8 CY Loader/Backhoe, Wheel (1) 000 Gal Water Truck (1) 6 CY 3 Axle Dump Truck (1) Fickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) Fickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) Fickup Truck Conventional (2) latbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Fickup Truck Conventional (1) 5 CY Front End Loader Crawler (1)	Front End Loader Pickup Truck Excavator Front End Loader Backhoe Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Pickup Truck Pickup Truck Flat Bed Truck Pickup Truck Pickup Truck Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40% 40% 40%	79 75 81 79 78 76 76 75 85 76 75 76 74 75	75 71 77 75 74 72 72 71 81 72 71 72 70 71	1 1 1 1 1 1 1 6 1 1 1 5	0 0 0 0 0 0 0 8 0 0 0 0 7 0 3	75 71 77 75 74 72 72 79 81 72 71 79 70 74
Fremont Weir Demo 3. 3. 0. 40 16 Pi Levee O&M Road Regrading (6" AB) Temporary Electrical Power FI Pi 09 - Channels and Canals Mobilization and Demobilization FI Excavation (Wet Conditions) Excavation (Wet Conditions) 4. 30 3. 16 Pi	ickup Truck Conventional (1) .5 CY Hydraulic Excavator (1) .5 CY Front End Loader, Wheel (1) .8 CY Loader/Backhoe, Wheel (1) 000 Gal Water Truck (1) 6 CY 3 Axle Dump Truck (1) cickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) cickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) cickup Truck Conventional (2) latbed Truck (1) cickup Truck Conventional (2) latbed Truck (1) cickup Truck Conventional (1) cickup Truck Conventional (1) cickup Truck Conventional (1) cickup Truck Conventional (1)	Pickup Truck Excavator Front End Loader Backhoe Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Pickup Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40% 40% 40%	75 81 79 78 76 76 75 85 76 75 76 74 75	71 77 75 74 72 72 71 81 72 71 72 70 71	1 1 1 1 6 1 1 1 5	0 0 0 0 0 0 0 8 0 0 0 0 7	71 77 75 74 72 72 79 81 72 71 79 70 74
Fremont Weir Demo 3. 3. 0. 40 40 16 Pi Levee O&M Road Regrading (6" AB) 12 Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization Fl Excavation (Wet Conditions) 4. 30 3. 46 Pi	.5 CY Hydraulic Excavator (1) .5 CY Front End Loader, Wheel (1) .8 CY Loader/Backhoe, Wheel (1) 000 Gal Water Truck (1) 6 CY 3 Axle Dump Truck (1) bickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) bickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) bickup Truck Conventional (2) latbed Truck (1) bickup Truck Conventional (2) latbed Truck (1) bickup Truck Conventional (1) bickup Truck Conventional (1) lickup Truck Conventional (1) bickup Truck Conventional (1)	Excavator Front End Loader Backhoe Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Pickup Truck Flat Bed Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40% 40% 40%	81 79 78 76 76 75 85 76 75 76 74 75	77 75 74 72 72 71 81 72 71 72 70 71	1 1 1 1 6 1 1 1 5	0 0 0 0 0 8 0 0 0 7 0 3	77 75 74 72 72 79 81 72 71 79 70 74
3. 0. 40 16 Pi Levee O&M Road Regrading (6" AB) 12 Temporary Electrical Power Pi 16 O9 - Channels and Canals Mobilization and Demobilization Fl Excavation (Wet Conditions) 4. 3. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	.5 CY Front End Loader, Wheel (1) .8 CY Loader/Backhoe, Wheel (1) 000 Gal Water Truck (1) 6 CY 3 Axle Dump Truck (1) cickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) cickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) cickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) cickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Front End Loader Backhoe Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40% 40% 40%	79 78 76 76 75 85 76 75 76 74 75	75 74 72 72 71 81 72 71 72 70 71	1 1 1 1 6 1 1 1 5	0 0 0 0 8 0 0 0 7 0 3	75 74 72 72 79 81 72 71 79 70 74
Devee O&M Road Regrading (6" AB) Levee O&M Road Regrading (6" AB) Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization Flexing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4. 30 3. 16 Pi	.8 CY Loader/Backhoe, Wheel (1) 000 Gal Water Truck (1) 6 CY 3 Axle Dump Truck (1) rickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) rickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) rickup Truck Conventional (2) latbed Truck (1 per piece of equipment) rixtended Boom Pallet Loader (1) rickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Backhoe Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Pickup Truck Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40% 40% 40%	78 76 76 75 85 76 75 76 74 75	74 72 72 71 81 72 71 72 70 71	1 1 1 5 1 2	0 0 0 8 0 0 0 7	74 72 72 79 81 72 71 79 70 74
Levee O&M Road Regrading (6" AB) Levee O&M Road Regrading (6" AB) Temporary Electrical Power O9 - Channels and Canals Mobilization and Demobilization FI Experimental Excavation (Wet Conditions) Excavation (Wet Conditions) 4.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	000 Gal Water Truck (1) 6 CY 3 Axle Dump Truck (1) rickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) rickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) rickup Truck (1) rickup Truck Conventional (2) rickup Truck (1 per piece of equipment) rickup Truck Conventional (1) rickup Truck Conventional (1) rickup Truck Conventional (1)	Dump Truck Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Pickup Truck Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40% 40%	76 75 85 76 75 76 74 75	72 72 71 81 72 71 72 70 71	1 1 1 5 1 2	0 0 8 0 0 0 7 0 3	72 72 79 81 72 71 79 70 74
Levee O&M Road Regrading (6" AB) 12 40 Pi 16 Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization FI Expi Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4.	6 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) Pickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) Pickup Truck Conventional (2) Pickup Truck (1) Pickup Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) 5 CY Front End Loader Crawler (1)	Dump Truck Pickup Truck Grader Dump Truck Pickup Truck Dump Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40%	76 75 85 76 75 76 74 75	72 71 81 72 71 72 70 71	1 1 1 5 1 2	0 8 0 0 0 7 0 3	72 79 81 72 71 79 70 74
Levee O&M Road Regrading (6" AB) 12 40 Pi 16 Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization FI Exp Pi Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4.	Pickup Truck Conventional (6) 2' Blade Grader (1) 000 Gal Water Truck (1) Pickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) Pickup Truck Conventional (2) latbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Pickup Truck Grader Dump Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40% 40% 40%	75 85 76 75 76 74 75	71 81 72 71 72 70 71	1 1 1 5 1 2	8 0 0 0 7 0 3	79 81 72 71 79 70 74
Levee O&M Road Regrading (6" AB) 12 40 Pi 16 Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization FI Excavation (Wet Conditions) 12 40 Pi 16 Excavation (Wet Conditions) 17 40 FI 18 Excavation (Wet Conditions) 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10	2' Blade Grader (1) 000 Gal Water Truck (1) lickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) lickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Grader Dump Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40% 40%	85 76 75 76 74 75	81 72 71 72 70 71	1 1 1 5 1 2	0 0 0 7 0 3	81 72 71 79 70 74
Levee O&M Road Regrading (6" AB) 12 40 Pi 16 Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization FI Excavation (Wet Conditions) 12 40 Pi 16 Excavation (Wet Conditions) 17 40 FI 18 Excavation (Wet Conditions) 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10	2' Blade Grader (1) 000 Gal Water Truck (1) lickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) lickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Dump Truck Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40%	76 75 76 74 75 74 79	72 71 72 70 71	1 1 5 1 2	0 0 7 0 3	72 71 79 70 74
Temporary Electrical Power Temporary Electrical Power FI 09 - Channels and Canals Mobilization and Demobilization FI Excavation (Wet Conditions) 4.0 3.0 3.1 6.0 Pi	lickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) lickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40% 40%	75 76 74 75 74 79	72 71 72 70 71	1 2	0 7 0 3	71 79 70 74
Temporary Electrical Power Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization Fl Excavation (Wet Conditions) Excavation (Wet Conditions) Fl 40 Pi 16 Excavation (Wet Conditions)	lickup Truck Conventional (1) 6 CY 3 Axle Dump Truck (5) latbed Truck (1) lickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Pickup Truck Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40%	75 76 74 75 74 79	72 70 71	1 2	7 0 3	79 70 74
Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization FI Expri Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4. 30 3. 16 Pi	6 CY 3 Axle Dump Truck (5) latbed Truck (1) lickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Dump Truck Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40% 40%	76 74 75 74 79	72 70 71	1 2	0 3	79 70 74
Temporary Electrical Power Pi 09 - Channels and Canals Mobilization and Demobilization FI Expri Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4.	latbed Truck (1) lickup Truck Conventional (2) latbed Truck (1 per piece of equipment) extended Boom Pallet Loader (1) lickup Truck Conventional (1) lickup Truck Conventional (1)	Flat Bed Truck Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40% 40%	74 75 74 79	70 71 70	1 2	3	70 74
Pi O9 - Channels and Canals Mobilization and Demobilization FI Expri Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4. Bri Fi Fi Fi Fi Fi Fi Fi Fi Fi	latbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Pickup Truck Flat Bed Truck Front End Loader Pickup Truck	40% 40% 40%	75 74 79	71			74
09 - Channels and Canals Mobilization and Demobilization FI Ex Pi Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4.	latbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Flat Bed Truck Front End Loader Pickup Truck	40% 40%	74 79	70		14	
Excavation (Wet Conditions) Excavation (Section 1) Excavation (Section 2) Excavation (Section 3) 16 Pi	extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Front End Loader Pickup Truck	40%	79		28	14	84
Excavation (Wet Conditions) Excavation (Section 1) Excavation (Section 2) Excavation (Section 3) 16 Pi	extended Boom Pallet Loader (1) lickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)	Pickup Truck		79				, , ,
Pi Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4. 30 3. 16 Pi	rickup Truck Conventional (1) .5 CY Front End Loader Crawler (1)		40%		()	1	0	75
Clearing and Grubbing 1. Tr Cl 40 Pi 16 Excavation (Wet Conditions) 4. 30 3. 16 Pi	.5 CY Front End Loader Crawler (1)			75	71	1	0	71
Excavation (Wet Conditions) Excavation (Wet Pi 30 3. 16 Pi	• ,		40%	79	75	1	0	75
Excavation (Wet Conditions) Excavation (Wet Conditions) 30 3. 16 Pi	ranci mounteu brush Chippel (I)	Shears (on backhoe)	40%	96	92	1	0	92
Excavation (Wet Conditions) 4. 3. 1.6 Pi	Chainsaw (1)	Chain Saw	20%	84	77	1 1	0	77
Pi 16 Excavation (Wet Conditions) 4. 30 3. 16 Pi	000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
Excavation (Wet Conditions) 4. 30 3. 16 Pi	rickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Excavation (Wet Conditions) 4. 30 3. 16 Pi	6 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
30 3. 16 Pi	.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
3. 16 Pi	00 HP Dozer (2)	Dozer	40%	82	78	2	3	81
16 Pi	.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
Pi	6 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	rickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
n veasanonvaraonno nav condinonar - 197	00 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	1 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	2' Blade Grader (1)	Grader	40%	85	81	1 1	0	81
	000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	rickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	00 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	000 Gal Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	0 TN Smooth Roller (1)	Roller	20%	80	73	1 1	ő	73
	rickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
	.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
· ·	00 HP Dozer Crawler (1)	Dozer	40%	82	78	1 1	0	78
	rickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	6 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
	.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	23	3	80
	-	Dozer	40%	82	78	4	0	78
	OO HD Dozor Crawler (1)		40%				7	1
Pi	00 HP Dozer Crawler (1) rickup Truck Conventional (5)	Pickup Truck	1 4 0%	75	71 72	5 23	14	78 86

Table <u>LM</u> -11. 8-Hour Construction	Noise Level at 50 Feet (dBA)													Est	imat	ed Du	ıratio	n, We	ek						1					
Phone	Equipment Description	1	2	3	4	5	6	7	8	9	10	1	, I	12	13	14	15	16	17	18	19	20	21	22	22	24	25	26	27	28
Phase 02 - Relocations	Equipment Description	1		<u> </u>	4	<u> </u>	10		<u> </u>	9	10	1	1	12	13	14	15	16	17	10	19	20	21		23	24	25	26	21	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)						T			Т																				
Widdinzation and Demobilization	Extended Boom Pallet Loader (1)																													
	Pickup Truck Conventional (1)																													
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)										+												+							_
Flemont Well Dellio	3.5 CY Front End Loader, Wheel (1)																													
	0.8 CY Loader/Backhoe, Wheel (1)																													
	4000 Gal Water Truck (1)																													
	16 CY 3 Axle Dump Truck (1)																													
Lance COM Development (Oll AD)	Pickup Truck Conventional (6)	-									_												-							
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																													
	4000 Gal Water Truck (1)																													
	Pickup Truck Conventional (1)																													
	16 CY 3 Axle Dump Truck (5)																													
Temporary Electrical Power	Flatbed Truck (1)																													
	Pickup Truck Conventional (2)																													_
09 - Channels and Canals																	ı				ı						<u> </u>			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																													
	Extended Boom Pallet Loader (1)																													
	Pickup Truck Conventional (1)																													
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																													
	Trailer Mounted Brush Chipper (1)																													
	Chainsaw (1)																													
	4000 Gal Water Truck (1)																													
	Pickup Truck Conventional (6)																													
	16 CY 3 Axle Dump Truck (1)																													
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																													
	300 HP Dozer (2)																													
	3.5 CY Front End Loader, Wheel (2)																													
	16 CY 3 Axle Dump Truck (9)																													
	Pickup Truck Conventional (7)																													
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																													
	21 CY Scrapers (4)																													
	12' Blade Grader (1)																													
	4000 Gal Water Truck (1)																													
	Pickup Truck Conventional (7)																													
Earthen Backfill	300 HP Dozer (1)																													
	4000 Gal Water Truck (1)																													
	10 TN Smooth Roller (1)																													
	Pickup Truck Conventional (3)																													
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																													
	300 HP Dozer Crawler (1)																													
	Pickup Truck Conventional (5)	1																												
	16 CY 3 Axle Dump Trucks (23)																													
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																													
	300 HP Dozer Crawler (1)																													
	Pickup Truck Conventional (5)	1																												
	16 CY 3 Axle Dump Trucks (23)																													
	10 01 07010 Damp Huono (20)	1		1			1			1										1										

Construction Noise - Equipment Alternative 6 - West Alignment

DOD D. J.E. M. C. J.	To 5 0/11 1 5 1 (0)	le .	1 400/ 1	2.1				1 00 1
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
15 - Floodway Control and Diversion Struc			1 1					T
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	14	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Concrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
Tieddworks Chamier Transition	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75 75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
I linged Bottom Gates	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	7 4 75	70	4	6	77
08 - Roads, Railroads, and Bridges	rickup Truck Conventional (4)	Tickup Truck	1 40 /0	13	7 1	т	U	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
INIODIIIZALION AND DEMIODIIIZALION	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75 75	71	1	0	71
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
l edestriari bridge concrete Files	100 FT Auger Track Mounted Drill Rig (1)		20%	84	73 77	1	0	77
		Auger Drill Rig				1	0	
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74 75		U -	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79 7 0	75 7.4	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78 70	74 70	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80

DCD Radding Material	2.5. CV Hudraulia Everyntera (2)										1		—
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)												
	300 HP Dozer Crawler (1)												1
	Pickup Truck Conventional (5)												
	16 CY 3 Axle Haul Trucks (23)												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)												
	Pickup Truck Conventional (4)												
15 - Floodway Control and Diversion Struc			_	_				1		T T			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												
	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (1)												
Construction Site Dewatering	Flatbed Truck (1)												
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)												
	Pickup Truck Conventional (6)												
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)												
	Pickup Truck Conventional (3)												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)												
	300 HP Dozer (2)												
	3.5 CY Front End Loader, Wheel (2)												
	16 CY 3 Axle Dump Truck (9)												
	Pickup Truck Conventional (7)												
Sheet Pile Wall	Flatbed Truck (1)												
	75 TN Crane Crawler Pile Hammer (1)												
	Pickup Truck Conventional (6)												
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)												
	100 FT Auger Track Mounted Drill Rig (1)												
	Concrete Pump Boom Truck Mounted (1)												
	Concrete Mixer Truck (3)												
	0.8 CY Backhoe Loader (1)												
	24 TN Truck End Dump (2)												
	Pickup Truck Conventional (8)												
Headworks Structure	Concrete Pump Boom Truck Mounted (1)												
	2.5" Dia. Concrete Vibrator (1)												
	Concrete Mixer Truck (2)												
	Pickup Truck Conventional (7)												
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)												
	Concrete Mixer Truck (2)												
	Pickup Truck Conventional (6)												
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)												
-	Haul Truck Oversize Transport (1)												
	Pickup Truck Conventional (4)												
08 - Roads, Railroads, and Bridges													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												
	Extended Boom Pallet Loader (1)												
	Pickup Truck Conventional (1)												
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)												
	100 FT Auger Track Mounted Drill Rig (1)												
	Concrete Pump Boom Truck Mounted (1)												
	Cocnrete Mixer Truck (3)												
	0.8 CY Backhoe Loader (1)												
	24 TN Truck End Dump (2)												
	Pickup Truck Conventional (8)												
	i lokap frack conventional (o)			1									

Construction Noise - Equipment Alternative 6 - West Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
19 - Buildings, Grounds, and Utilities								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Construction	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment		•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)													\Box
	2.5" Dia. Concrete Vibrator (1)													
and wingwans	Concrete Mixer Truck (2)													
	Pickup Truck Conventional (7)													
	90 TN Truck Mounted Hydraulic Crane (1)											-+		-
	Flatbed Truck (2)													
	Pickup Truck Conventional (5)													
19 - Buildings, Grounds, and Utilities	rickap ricek deriversieriar (e)													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
CMU Building and Earthwork Pad	165 HP Dozer (1)													
	Scraper (1)													
	Motor Grader (1)													
	Compactor (1)													
	4000 Gal Water Truck (1)													
	10 TN Smooth Roller (1)													
	Pickup Truck Conventional (7)													
	Concrete Pump Boom Truck Mounted (1)													
	2.5" Dia. Concrete Vibrator (1)													
	Extended Boom Pallet Loader (1)													
	Concrete Mixer Truck (1)													
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)												-	
	2.5" Dia. Concrete Vibrator (1)													
	Concrete Mixer Truck (2)													
	Pickup Truck Conventional (7)													
20 -Permanent Operating Equipment	, ,									,				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (3)													
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (3)													
Electrical Control Equipment CMU Building														
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)													
Communication Equipment	Pickup Truck Conventional (3)													
		 			_	_	 	 				 		

Considerations. March 10.

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Construction Noise - Equipment Alternative 6 - West Alignment

Table <u>LM</u> -12. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stimat	ed Du	uration	ı, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	88	94	97	97	93	93	96	96	91	91	94	94	94	95	94	94	94	94	94	95	94	90	90	89	86	86	87	86
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)			700		700						700		700			700												700
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)		0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
1-Hour Construction Noise Level at the Receptor (dBA)	64	71	74	73	70	69	73	72	67	68	71	71	71	71	71	71	71	71	71	72	71	66	67	66	63	63	64	62
CNEL (Construction Noise + Existing) (dBA)	62	67	70	70	66	66	69	69	64	65	67	67	67	68	67	67	67	67	67	68	67	63	64	63	61	61	62	60
Impact to Residential Uses	CA	CA	S	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230
Distance Divergence (dBA)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Atmospheric Attenuation (dBA)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
1-Hour Construction Noise Level at the Receptor (dBA)	74	81	84	84	80	79	83	82	77	78	81	81	81	81	81	81	81	81	81	82	81	76	77	76	73	73	74	72
CNEL (Construction Noise + Existing) (dBA)	71	77	80	80	76	75	79	79	73	74	77	77	77	77	77	77	77	77	77	78	77	72	73	72	69	69	70	69
Impact to Agricultural Uses	NA	CA	CA	CA	CA	CA	CA	CA	NA	NA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

700

Receptors:

Nearest residential receptor (ft)

Table LM-13. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Noise Level at 50 Feet (dBA) Equipment Description	RCNM Equipment Types	Usage Factor		Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	19	13	83
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Earthen Backfill	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
11-Levees and Floodwalls								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	7	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Soil Cement Bentonite Cutoff Wall	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	2.5 CY Hydraulic Excavators (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Flash Mixer (1)	All Other Equipment > 5 hp	50%	85	82	1	0	82
	Slurry Pump (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Ten Percent Design: Draft Technical Memorandum Constructability and Constructio
 Considerations. March 10.

Construction Noise - Equipment Downstream (Alternatives 1-4, 6)

Table <u>LM</u> -13. 8-Hour Construction	Noise Level at 50 Feet (dBA)												E	stima	ted D	uratio	n, We	ek										
						_	١.		_					l	l		l											_
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26 2	27 28
02 - Relocations					ı		_	_			l	ı		1							ı		<u> </u>	ı				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																											
	Extended Boom Pallet Loader (1)																											
Levee O&M Road Regrading (6" AB)	Pickup Truck Conventional (1)																											
Levee Oxivi Road Regrading (6 Ab)	12' Blade Grader (1) 4000 Gal Water Truck (1)																											
	Pickup Truck Conventional (1)																											
	16 CY 3 Axle Dump Truck (5)																											
Temporary Electrical Power	Flatbed Truck (1)																											$-\!\!\!\!-\!\!\!\!\!-$
Temporary Electrical Fower	Pickup Truck Conventional (2)																											
09 - Channels and Canals	rickap Track Conventional (2)																											_
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													Т													Т	$\overline{}$
	Extended Boom Pallet Loader (1)																											
	Pickup Truck Conventional (1)																											
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																											+
	Trailer Mounted Brush Chipper (1)																											
	Chainsaw (1)																											
	4000 Gal Water Truck (1)																											
	Pickup Truck Conventional (6)																											
	16 CY 3 Axle Dump Truck (1)																											
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																											
	300 HP Dozer (2)																											
	3.5 CY Front End Loader, Wheel (2)																											
	16 CY 3 Axle Dump Truck (9)																											
	Pickup Truck Conventional (7)																											
Earthen Backfill	300 HP Dozer (1)																											
	4000 Gal Water Truck (1)																											
	10 TN Smooth Roller (1)																											
Di Oi	Pickup Truck Conventional (3)																											
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																											
	300 HP Dozer Crawler (1)																											
	Pickup Truck Conventional (5)																											
DCD Dedding Metarial	16 CY 3 Axle Dump Trucks (23)																											$\overline{}$
RSP Bedding Material	2.5 CY Hydraulic Excavators (2) 300 HP Dozer Crawler (1)																											
	Pickup Truck Conventional (5)																											
	16 CY 3 Axle Haul Trucks (23)																											
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	-																										$\overline{}$
Lission control occurry	Pickup Truck Conventional (4)																											
11-Levees and Floodwalls	1. Johap Track Conventional (4)																											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																											
	Extended Boom Pallet Loader (1)																											
	Pickup Truck Conventional (1)																											
Soil Cement Bentonite Cutoff Wall	4.5 CY Hydraulic Excavator (1)	Ī																										\neg
	300 HP Dozer (1)													Ī														
	2.5 CY Hydraulic Excavators (1)																											
	16 CY 3 Axle Dump Truck (1)																											
	Flash Mixer (1)													Ī														
	Slurry Pump (1)																											
	Pickup Truck Conventional (5)																											

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction
Considerations. March 10.

Fable <u>⊾M</u> -14. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stimat	ed Du	ıratior	ı, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	85	93	93	93	93	87	88	88	88	90	90	90	89	91	91	91	91	91	88	79	79	84	84	79	n/a	n/a	n/a	n/a
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	43
Distance Divergence (dBA)						18.7														18.7								
Atmospheric Attenuation (dBA)	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
1-Hour Construction Noise Level at the Receptor (dBA)	66	73	73	73	73	68	69	69	69	71	71	71	69	72	72	72	72	72	69	60	60	65	65	60	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	63	70	70	70	70	64	65	65	65	67	67	67	66	68	68	68	68	68	65	59	59	62	62	59	n/a	n/a	n/a	n/a
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	NA	CA	CA	NA	n/a	n/a	n/a	n/a
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	14
Distance Divergence (dBA)	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Atmospheric Attenuation (dBA)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
1-Hour Construction Noise Level at the Receptor (dBA)	76	83	83	83	83	78	79	79	79	81	81	81	79	82	82	82	82	82	79	70	70	75	75	70	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	73	80	80	80	80	74	75	75	75	77	77	77	76	78	78	78	78	78	75	67	67	71	71	66	n/a	n/a	n/a	n/a
Impact to Agricultural Uses	NA	CA	CA	CA	CA	NA	NA	NA	NA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve noise levels within Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level Residential

(dBA)

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors: Nearest residential receptor (ft) 7000

Table LM-15. 8-Hour Construction Noise Level at 50 Feet (dBA)

							Add to Single	Total
			Usage		Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
02 - Relocations			,					T
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals		_				•		1
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	23	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77

Table <u>⊾M</u> -15. 8-Hour Construction	Noise Level at 50 Feet (dBA)													E	Stima	ated D	uratio	n, We	ek												
Phase	Equipment Description		_	_		_		_	_		<u>,</u>	,	44	40	40		4-	40		1	, ,	؞ ا ؞	, ,	, ,	,	22	0.4	25			20
Phase 02 - Relocations	Equipment Description	1	2	3	4	5	6	7	8	<u>`</u>	9	10	11	12	13	14	15	16	17	18) 1	9 2	0 2	31 Z	2	23	24	25	_ 26	27	28
	Clathod Truck (4 per piece of equipment)			I		T	1	1		<u> </u>				T T	Т	1	T	T	1							ı			1	1	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1)																														
	Pickup Truck Conventional (1)																														
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)														+																_
l lemont well bellio	3.5 CY Front End Loader, Wheel (1)																														
	0.8 CY Loader/Backhoe, Wheel (1)																														
	4000 Gal Water Truck (1)																														
	16 CY 3 Axle Dump Truck (1)																														
	Pickup Truck Conventional (6)																														
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	 							+	+					+					+											
Levee cam regrading (6 712)	4000 Gal Water Truck (1)																														1
	Pickup Truck Conventional (1)																														1
	16 CY 3 Axle Dump Truck (5)																														1
Temporary Electrical Power	Flatbed Truck (1)																														_
	Pickup Truck Conventional (2)																														
09 - Channels and Canals	(=)																														
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)														Τ																
	Extended Boom Pallet Loader (1)																														
	Pickup Truck Conventional (1)																														
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																														$\overline{}$
ů ů	Trailer Mounted Brush Chipper (1)																														
	Chainsaw (1)																														
	4000 Gal Water Truck (1)																														
	Pickup Truck Conventional (6)																														
	16 CY 3 Axle Dump Truck (1)																														
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																														
	300 HP Dozer (2)																														
	3.5 CY Front End Loader, Wheel (2)																														
	16 CY 3 Axle Dump Truck (9)																														
	Pickup Truck Conventional (7)																														
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																														
	21 CY Scrapers (4)																														
	12' Blade Grader (1)																														
	4000 Gal Water Truck (1)																														
	Pickup Truck Conventional (7)																														
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																														
	300 HP Dozer Crawler (1)																														
	Pickup Truck Conventional (5)																														
	16 CY 3 Axle Dump Trucks (23)																														
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)																														
	300 HP Dozer Crawler (1)																														
	Pickup Truck Conventional (5)																														
	16 CY 3 Axle Haul Trucks (23)																														
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																														
-	Pickup Truck Conventional (4)																														

15 - Floodway Control and Diversion Struct	ures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Excavation/Grading (Dry Conditions)	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

res																			
Flatbed Truck (1 per piece of equipment)																			
Extended Boom Pallet Loader (1)																			
Pickup Truck Conventional (1)																			
Flatbed Truck (1)																			
75 TN Crane Crawler Pile Hammer (1)																			
Pickup Truck Conventional (6)																			
Flatbed Truck (1)																			
75 TN Crane Crawler Pile Hammer (1)																			
Pickup Truck Conventional (6)																			
Concrete Pump Boom Truck Mounted (1)																			
2.5" Dia. Concrete Vibrator (1)																			
Concrete Mixer Truck (2)																			
Pickup Truck Conventional (7)																			
2.5" Dia. Concrete Vibrator (1)																			
Concrete Mixer Truck (2)																			
Pickup Truck Conventional (6)																			
90 TN Truck Mounted Hydraulic Crane (1)																			
Haul Truck Oversize Transport (1)																			
Pickup Truck Conventional (4)																			
Flatbed Truck (1 per piece of equipment)																			
Extended Boom Pallet Loader (1)																			
Pickup Truck Conventional (1)																			
Extended Boom Pallet Loader (1)																			
Pickup Truck Conventional (3)																			
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Concrete Vibrator (1) Concrete Mixer Truck (2) Pickup Truck Conventional (7) 2.5" Dia. Concrete Vibrator (1) Concrete Mixer Truck (2) Pickup Truck Conventional (6) 90 TN Truck Mounted Hydraulic Crane (1) Haul Truck Conventional (4) Flatbed Truck (1 per piece of equipment) Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1) Extended Boom Pallet Loader (1)	Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Flatbed Truck (1) 75 TN Crane Crawler Pile Hammer (1) Pickup Truck Conventional (6) Flatbed Truck (1) 75 TN Crane Crawler Pile Hammer (1) Pickup Truck Conventional (6) Flatbed Truck (1) 75 TN Crane Crawler Pile Hammer (1) Pickup Truck Conventional (6) Concrete Pump Boom Truck Mounted (1) 2.5" Dia. Concrete Vibrator (1) Concrete Mixer Truck (2) Pickup Truck Conventional (7) 2.5" Dia. 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Concrete Vibrator (1) Concrete Mixer Truck (2) Pickup Truck Conventional (6) 90 TN Truck Mounted Hydraulic Crane (1) Haul Truck Voersize Transport (1) Pickup Truck Conventional (4) Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Extended Boom Pallet Loader (1)	Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (1) Flatbed Truck (2) Flotan Concrete Vibrator (1) Concrete Mixer Truck (2) Flotan Cruck Conventional (7) Doncrete Mixer Truck (2) Flotan Cruck Conventional (7) Doncrete Mixer Truck (2) Flotan Cruck Conventional (6) Flotan Truck Conventional (6) Flotan Truck Conventional (6) Flotan Truck Conventional (6) Flotan Truck Conventional (6) Flotan Truck Conventional (1) Flotan Truck Conventional (1) Flotan Truck (1 per piece of equipment) Flotan Truck (1 per piece of equipment) Flotand Truck (1 per piece of equipment) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand (1) Flotand Flotand Flotand Flotand (1) Flotand Fl

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Table <u>LM</u> -16. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stima	ted Du	ıratioı	n, Wee	k									•		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	81	83	84	93	87	88	91	79	86	94	94	83	84	79	80	79	78	78	79	n/a	n/a	n/a	n/a	n/a	n/a	n/a	84	80
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)															1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Distance Divergence (dBA)	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1
Atmospheric Attenuation (dBA)		1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
1-Hour Construction Noise Level at the Receptor (dBA)		51	52	60	54	56	58	47	53	62	62	50	51	46	48	46	46	46	46	n/a	n/a	n/a	n/a	n/a	n/a	n/a	51	48
CNEL (Construction Noise + Existing) (dBA)	56	57	57	59	57	57	58	56	57	60	60	57	57	56	56	56	56	56	56	n/a	n/a	n/a	n/a	n/a	n/a	n/a	57	56
Impact to Residential Uses	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	NA	NA
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)			170						170			170																170
Distance Divergence (dBA)									10.6									10.6									10.6	
Atmospheric Attenuation (dBA)	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
1-Hour Construction Noise Level at the Receptor (dBA)	71	73	74	82	76	78	80	68	75	83	83	72	73	68	69	68	68	68	68	n/a	n/a	n/a	n/a	n/a	n/a	n/a	73	69
CNEL (Construction Noise + Existing) (dBA)	67	69	70	78	72	74	76	65	71	80	80	69	69	65	66	65	65	65	65	n/a	n/a	n/a	n/a	n/a	n/a	n/a	69	66
Impact to Agricultural Uses	NA	NA	NA	CA	NA	NA	CA	NA	NA	CA	CA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 1800

Table <u>LM</u>-17. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor		Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations	Equipment Description	KONWI Equipment Types	ractor	Liliax @ 50	Led(II) @ 30	Equipment	(ubA)] 30
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1 1	0	71
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	3.5 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	0.8 CY Loader/Backhoe, Wheel (1)	Backhoe	40%	78	74	1	0	74
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
3 3 ()	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
, , , , , , , , , , , , , , , , , , , ,	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals		<u> </u>						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	23	14	84
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
3	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
,	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
,	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
•	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1 1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1 1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Haul Trucks (23)	Dump Truck	40%	76	72	23	, 14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
2. Color Control County	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77

Table <u>LM</u> -17. 8-Hour Construction	Noise Level at 50 Feet (dBA)												E	stima	ted D	uratio	n, We	ek											
																													_ _
Phase	Equipment Description	4		,	١,	5	_	_	١.		40	44	42	1,2	,,	4.5	46	47	40	40	20	24	22	22	24	25	26	27	20
Phase 02 - Relocations	Equipment Description	1	2	3	4	<u> </u>	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)		I			l			I	I	l	l	I	1	1	<u> </u>	T	1	l				1	T T					
Mobilization and Demobilization	Extended Boom Pallet Loader (1)																												
Francisch Mais Dame	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												i
	3.5 CY Front End Loader, Wheel (1)																												i
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												i
	16 CY 3 Axle Dump Truck (1)																												i
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												i
	4000 Gal Water Truck (1)																												i
	Pickup Truck Conventional (1)																												i
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												i
	Pickup Truck Conventional (2)																												
09 - Channels and Canals																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												i
	Pickup Truck Conventional (1)																												i
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												i
	Chainsaw (1)																												i
	4000 Gal Water Truck (1)																												i
	Pickup Truck Conventional (6)																												i
	16 CY 3 Axle Dump Truck (1)																												i
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
(300 HP Dozer (2)																												i
	3.5 CY Front End Loader, Wheel (2)																												i
	16 CY 3 Axle Dump Truck (9)																												i
	Pickup Truck Conventional (7)																												i
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)												+			+													
(2.) (3	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	 												+															
Tapiap Glaco o	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	-											+	+			1												
TO Deduling Material	• • • • • • • • • • • • • • • • • • • •																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Haul Trucks (23)	<u> </u>												1															
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												
	Pickup Truck Conventional (4)																												

15 - Floodway Control and Diversion Struct	ures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	6	8	78
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Excavation/Grading (Dry Conditions)	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
20 -Permanent Operating Equipment		•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

15 - Floodway Control and Diversion Struct	ures								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
Excavation/Grading (Dry Conditions)	Flatbed Truck (1)								
	75 TN Crane Crawler Pile Hammer (1)								
	Pickup Truck Conventional (6)								
Sheet Pile Wall	Flatbed Truck (1)								
	75 TN Crane Crawler Pile Hammer (1)								
	Pickup Truck Conventional (6)								
Headworks Structure	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (6)								
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)								
	Haul Truck Oversize Transport (1)								
	Pickup Truck Conventional (4)								
20 -Permanent Operating Equipment									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (3)								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Table <u>LM</u> -18. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stimat	ted Du	uration	ı, Wee	k									-		$\overline{}$
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	81	83	84	93	87	88	91	79	86	94	94	83	84	79	80	79	78	78	79	n/a	n/a	n/a	n/a	n/a	n/a	n/a	84	80
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)				510											510					510		510				510		
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
1-Hour Construction Noise Level at the Receptor (dBA)	61	63	64	72	66	68	70	59	65	74	74	62	63	58	60	58	58	58	58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	63	60
CNEL (Construction Noise + Existing) (dBA)	60	61	61	68	63	65	67	58	63	70	70	60	61	58	59	58	58	58	58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	61	59
Impact to Residential Uses	NA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	CA	CA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CA	NA
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
Distance Divergence (dBA)	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Atmospheric Attenuation (dBA)	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
1-Hour Construction Noise Level at the Receptor (dBA)	71	73	74	82	76	78	80	68	75	83	83	72	73	68	69	68	68	68	68	n/a	n/a	n/a	n/a	n/a	n/a	n/a	73	69
CNEL (Construction Noise + Existing) (dBA)	67	69	70	78	72	74	76	65	71	80	80	69	69	65	66	65	65	65	65	n/a	n/a	n/a	n/a	n/a	n/a	n/a	69	66
Impact to Agricultural Uses	NA	NA	NA	CA	NA	NA	CA	NA	NA	CA	CA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Background Noise Normal Suburban Residential

(dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 8600

Source: Google Earth

Construction Noise - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Table <u>LM</u>-19. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations	Equipment Bookington	restan Equipment Types	Ti dotoi	Linux @ 00	204(11) @ 00	Equipment	(abri)	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
3 3 ()	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals		·						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	11	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
,	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	9	81
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
11 - Levees and Flood walls		•	_	-	-			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Reinforced AG Berm	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
15 - Floodway Control and Diversion Structure								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	12	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79

Table <u>LM</u> -19. 8-Hour Construction N	Noise Level at 50 Feet (dBA)												E	Estima	ted D	uratio	n, We	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations	Equipment Description	<u>'</u>		1 3	-		_ •		-	<u> </u>	10	_ ''	12	13	14	13	10	17	10	19	20	21		23	24	25	20	21	20
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)												Ι	Τ															
Modification and Bomodification	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
Fracian Control Conding	Pickup Truck Conventional (7) 0.8 CY Front End Loader, Wheel (1)																												-
Erosion Control Seeding	Pickup Truck Conventional (4)						ŀ																						
11 - Levees and Flood walls	Pickup Truck Conventional (4)																												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)		T			1	1							T															
Mobilization and Demobilization	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (3)																												
Reinforced AG Berm	300 HP Dozer (1)	+																											\dashv
Tremioroca / Co Berni	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
15 - Floodway Control and Diversion Struc																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																							Π					\neg
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)																												\neg
	Pickup Truck Conventional (3)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)	<u> </u>																											

Construction Noise - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Concrete Turnout Structure	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
36-Inch RCP	25 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
Trashrack	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Screw Gate	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Outlet Fish Screen	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Concrete Emergency Spillway	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Concrete Connection Vault	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	5	7	77
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	100 FT Auger Track Mounted Drill Rig (1)	Auger Drill Rig	20%	84	77	1	0	77
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	Cocnrete Mixer Truck (3)	Concrete Mixer Truck	40%	79	75	3	5	80
	0.8 CY Backhoe Loader (1)	Backhoe	40%	78	74	1	0	74
	24 TN Truck End Dump (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (8)	Pickup Truck	40%	75	71	8	9	80
Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
0	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Concrete Turnout Structure	Concrete Pump Boom Truck Mounted (1)	$\overline{}$							
	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
36-Inch RCP	25 TN Truck Mounted Hydraulic Crane (1)								
	Flatbed Truck (1)								
	Pickup Truck Conventional (4)								
Trashrack	Flatbed Truck (1)								
	Pickup Truck Conventional (2)								
Screw Gate	Flatbed Truck (1)								
	Pickup Truck Conventional (2)								
Outlet Fish Screen	Flatbed Truck (1)								
	Pickup Truck Conventional (2)								
Concrete Emergency Spillway	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
Concrete Connection Vault	40 TN Truck Mounted Hydraulic Crane (1)								
	Haul Truck Oversize Transport (1)								
	Pickup Truck Conventional (3)								
08 - Roads, Railroads, and Bridges									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)								
	100 FT Auger Track Mounted Drill Rig (1)								
	Concrete Pump Boom Truck Mounted (1)								
	Cocnrete Mixer Truck (3)								
	0.8 CY Backhoe Loader (1)								
	24 TN Truck End Dump (2)								
	Pickup Truck Conventional (8)								
Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)								
and Wingwalls	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)								
	Flatbed Truck (2)								
	Pickup Truck Conventional (5)								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project – Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Construction Noise - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Table <u>LM</u> -20. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stima	ted Du	uratio	n, Wee	ek										•	•
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	84	93	87	79	79	82	80	81	80	82	88	85	83	83	83	86	83	87	83	80	n/a	85	79	n/a	n/a	n/a	n/a	n/a
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	43
Distance Divergence (dBA)	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7
Atmospheric Attenuation (dBA)	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
1-Hour Construction Noise Level at the Receptor (dBA)	65	73	68	60	60	63	61	62	61	63	69	66	64	64	64	67	64	68	64	61		66	60	n/a	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	62	70	64	59	59	61	60	60	60	61	65	63	61	61	62	64	62	65	62	60	n/a	63	59	n/a	n/a	n/a	n/a	n/a
Impact to Residential Uses	CA	CA	CA	NA	NA	CA	NA	CA	NA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	n/a	CA	NA	n/a	n/a	n/a	n/a	n/a
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
Distance Divergence (dBA)	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Atmospheric Attenuation (dBA)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
1-Hour Construction Noise Level at the Receptor (dBA)	75	83	78	70	70	73	71	72	71	73	79	76	74	74	74	77	74	78	74	71	n/a	76	70	n/a	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	71	80	74	67	67	69	68	69	68	70	75	72	70	70	70	73	70	74	70	68	n/a	72	66	n/a	n/a	n/a	n/a	n/a
Impact to Agricultural Uses	NA	CA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	NA	NA	n/a	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level Residential

(dBA)

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 8000

Source: Google Earth

Table LM-21. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	1
02 - Relocations	· · ·	, , , , , , , , , , , , , , , , , , ,			. , , с		, ,	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals		1 - 1						<u>. </u>
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	15	12	82
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1 1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
croaming and craceing	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1 1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1 1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1 1	0	72
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Excavation of during (Dry Conditions)	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1 1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	'1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75 75	71	7	8	79
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
Triprap - Olass Z	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	70	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	, 14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
Erosion Control Seeding			1			1		1
44 1	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
11 - Levees and Flood walls	Tel 11 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7	Tel (B) T	1 400/					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	4	6	76
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Berm/ Levee Fill	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
15 - Floodway Control and Diversion Struc			1	T = .				T
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	12	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1 1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1 1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Construction Noise - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (A

Table <u>⊾M</u> -21. 8-Hour Construction N	loise Level at 50 Feet (dBA)												E	Estima	ated D	uratio	n, We	ek											
																												1 _	
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations						1	_	1	ı	_	1			_					ı	I			T						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	1																						+			+	.——	
Excavation/Grading (Bry Conditions)	21 CY Scrapers (4)																												ı
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)							ł																					ı
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	+		-													+												
Ripiap - Class 2	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
Francisco Control Condino	16 CY 3 Axle Dump Trucks (23)	 		-													-											.——	
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												
	Pickup Truck Conventional (4)																												
11 - Levees and Flood walls					_							<u> </u>		_									1		1				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (3)																												
Berm/ Levee Fill	300 HP Dozer (1)																												
	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
15 - Floodway Control and Diversion Struc																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)														1														
	Extended Boom Pallet Loader (1)	1																											
	Pickup Truck Conventional (1)	L																											
Construction Site Dewatering	Flatbed Truck (1)																												
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)																												
,	Pickup Truck Conventional (6)																												
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)																												
(4p., a)	Pickup Truck Conventional (3)	1																											
	apaa aaai.tioilai (a)	1	1		1		1	1	L												I.	1				1			

	I	T	1					
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
	16 CY 3 Axle Dump Truck (9)	Dump Truck	40%	76	72	9	10	82
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Sheet Pile Wall	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Culvert head Wall	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
Water Control Structure	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
a.a.a.a.a	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
19 - Buildings, Grounds, and Utilities	i long track contentional (1)	i ionap i iaon	1070	. 0		· ·		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad Construc	. ,	Dozer	40%	82	78	1	0	78
owe ballaring and Earthwork I da Constitue	Scraper (1)	Scraper	40%	84	80	1 1	Ö	80
	Motor Grader (1)	Grader	40%	85	81	, 1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	' '	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	70		0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73		0	73
	` '						1	1 1
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	/	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
İ	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Power, Electrical, & Mechanical Equipment	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
· ·								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Construction Noise - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (A

E (P (Mart O P.C)	IA F OVEL TO BE FOR COMMAN			1												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)															
	300 HP Dozer (2)															
	3.5 CY Front End Loader, Wheel (2)															
	16 CY 3 Axle Dump Truck (9)															
	Pickup Truck Conventional (7)															
Sheet Pile Wall	Flatbed Truck (1)															
	75 TN Crane Crawler Pile Hammer (1)															
	Pickup Truck Conventional (6)															
Culvert head Wall	2.5" Dia. Concrete Vibrator (1)															
	Concrete Mixer Truck (2)															
	Pickup Truck Conventional (6)															
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)															
	Flatbed Truck (2)															
	Pickup Truck Conventional (4)															
Water Control Structure	2.5" Dia. Concrete Vibrator (1)															
	Concrete Mixer Truck (2)															
	Pickup Truck Conventional (6)															
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)	$\overline{}$														
	Haul Truck Oversize Transport (1)															
	Pickup Truck Conventional (4)															
19 - Buildings, Grounds, and Utilities	rickap track conventional (1)															
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								Т							
Woomzation and Bemoomzation	Extended Boom Pallet Loader (1)															
	Pickup Truck Conventional (1)															
CMU Building and Earthwork Pad Constru																
Civio Building and Earthwork Fad Constitu	Scraper (1)															
	Motor Grader (1)															
	Compactor (1)															
	4000 Gal Water Truck (1)															
	10 TN Smooth Roller (1)				-											
	Pickup Truck Conventional (7)				}											
	Concrete Pump Boom Truck Mounted (1)															
	2.5" Dia. Concrete Vibrator (1)															
	Extended Boom Pallet Loader (1)															
	Concrete Mixer Truck (1)															
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)															
	2.5" Dia. Concrete Vibrator (1)															
	Concrete Mixer Truck (2)															
	Pickup Truck Conventional (7)															
20 -Permanent Operating Equipment											1	-				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)															
	Extended Boom Pallet Loader (1)															
	Pickup Truck Conventional (1)															
Power, Electrical, & Mechanical Equipmer		_						T	T						T	
	Pickup Truck Conventional (3)															
Communication Equipment	Pickup Truck Conventional (3)															
Source: HDR 2017 Volo Rypass Salmon	id Habitat Restoration & Fish Passage Project		·													

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

- Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Table <u>LM</u> -22. 8-Hour Construction Noise Level at the Receptor (dBA)												E	stimat	ted Du	uration	n, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	87	94	94	91	92	93	91	95	89	91	95	87	86	84	83	84	84	84	78	80	80	85	79	n/a	n/a	n/a	n/a	n/a
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580	580
Distance Divergence (dBA)	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3
Atmospheric Attenuation (dBA)	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
1-Hour Construction Noise Level at the Receptor (dBA)	65	72	72	70	71	71	70	73	67	69	74	65	64	62	61	62	62	62	57	59	59	63	57	n/a	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	62	68	69	66	67	67	66	70	64	66	70	62	62	61	60	60	60	60	58	58	58	61	58	n/a	n/a	n/a	n/a	n/a
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	NA	CA	NA	n/a	n/a	n/a	n/a	n/a
Agricultural Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)							190	190									190	190						190	190	190		190
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
1-Hour Construction Noise Level at the Receptor (dBA)	75	82	82	80	81	81	80	83	77	79	84	75	74	72	71	72	72	72	67	69	69	73	67	n/a	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)		78	78	76	77	77	76	80	74	76	80	71	70	69	67	69	69	68	64	65	65	70	64	n/a	n/a	n/a	n/a	n/a
Impact to Agricultural Uses	NA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve noise levels within Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level Residential

(dBA)

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels
Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft) 2600

Source: Google Earth

Construction Noise - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (Alternative 4)

Table LM-23. 8-Hour Construction Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
02 - Relocations	•	•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
	16 CY 3 Axle Dump Truck (5)	Dump Truck	40%	76	72	5	7	79
Temporary Electrical Power	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
09 - Channels and Canals	, ,	·						<u> </u>
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	15	12	82
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
3	Trailer Mounted Brush Chipper (1)	Shears (on backhoe)	40%	96	92	1	0	92
	Chainsaw (1)	Chain Saw	20%	84	77	1	0	77
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Dozer	40%	82	78	1	0	78
=nouralion oracling (21) community	21 CY Scrapers (4)	Scraper	40%	84	80	4	6	86
	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
	4000 GAL Water Truck (1)	Dump Truck	40%	76	72	1 1	0	72
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	Excavator	40%	81	77	2	3	80
Tupiup Glaco 2	300 HP Dozer Crawler (1)	Dozer	40%	82	78	1	0	78
	Pickup Truck Conventional (5)	Pickup Truck	40%	75	71	5	7	78
	16 CY 3 Axle Dump Trucks (23)	Dump Truck	40%	76	72	23	14	86
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	Front End Loader	40%	79	75	1	0	75
Erosion control occuring	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
11 - Levees and Flood walls	Fickup Truck Conventional (4)	Гіскир Писк	40 /0	73	71	-	0	11
Mobilization and Demobilization	Flothed Truck (4 per piece of equipment)	Flat Bed Truck	400/	74	70	4	6	76
MODIIIZALION AND DEMODIIIZALION	Flatbed Truck (1 per piece of equipment)		40%	74	70 75	4	6	76 75
	Extended Boom Pallet Loader (1) Pickup Truck Conventional (3)	Front End Loader	40% 40%	79 75	75 71	3	0	75 76
Berm/ Levee Fill		Pickup Truck	40%		71	3	5	78
Bermi Levee Fill	300 HP Dozer (1)	Dozer		82		1	0	
	4000 Gal Water Truck (1) 10 TN Smooth Roller (1)	Dump Truck	40%	76	72	1 1	0	72
	· /	Roller	20%	80	73	1	0	73
45 51 1 2 2 1 1 1 2 1 5 2 1 2 1	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
15 - Floodway Control and Diversion Stru		Flat Dad Truck	400/	7.4	70	10	44	L 04
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74 70	70 75	12	11	81
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79 75	75 74	1 1	0	75 74
Overtee the Oile Burning	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Construction Site Dewatering	Flatbed Truck (1)	Flat Bed Truck	40%	74	70	1	0	70
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1 -	0	94
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	Pumps	50%	81	78	1	0	78
	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76

Table <u>LM</u> -23. 8-Hour Construction N	loise Level at 50 Feet (dBA)										_	_	_	Е	stima	ted Du	uratio	n, We	ek											
											T																			
Dhace	Equipment Description	1	2	,	١,	5		7	١.	١,		40	11	12	13	14	45	46	47	40	40	20	24	,,	22	24	25	26	27	28
Phase 02 - Relocations	Equipment Description	1		3	4] 3	6		8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	21	20
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)					Ι				_						I							Т							
Woomization and Bernoomization	Extended Boom Pallet Loader (1)																													
	Pickup Truck Conventional (2)																													
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)						+									+							1							
Levee oam Road Regrading (o 715)	4000 Gal Water Truck (1)																													
	Pickup Truck Conventional (1)																													
	16 CY 3 Axle Dump Truck (5)																													
Temporary Electrical Power	Flatbed Truck (1)						-																							
Temporary Electrical Fower	Pickup Truck Conventional (2)																													
09 - Channels and Canals	Tickup Truck Conventional (2)																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)						Т		I																					$\overline{}$
Nobilization and Demobilization	Extended Boom Pallet Loader (1)																													,
	Pickup Truck Conventional (1)																													
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)						+			+						+														
Cleaning and Grubbing	Trailer Mounted Brush Chipper (1)																													,
	Chainsaw (1)																													,
																														ļ
	4000 Gal Water Truck (1)																													,
	Pickup Truck Conventional (6)																													•
Franciski sa (Osadisas (Day Osaditisas)	16 CY 3 Axle Dump Truck (1)	<u> </u>														-														\longrightarrow
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																													,
	21 CY Scrapers (4)																													,
	12' Blade Grader (1)																													,
	4000 GAL Water Truck (1)																													,
Discourage Office of the Control of	Pickup Truck Conventional (7)																													
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																													,
	300 HP Dozer Crawler (1)																													,
	Pickup Truck Conventional (5)																													,
	16 CY 3 Axle Dump Trucks (23)	<u> </u>					-																							
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																													,
	Pickup Truck Conventional (4)																													
11 - Levees and Flood walls																				1			_			<u> </u>				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																													ļ
	Extended Boom Pallet Loader (1)																													,
	Pickup Truck Conventional (3)																													
Berm/ Levee Fill	300 HP Dozer (1)																													,
	4000 Gal Water Truck (1)																													,
	10 TN Smooth Roller (1)																													ļ
	Pickup Truck Conventional (3)																													
15 - Floodway Control and Diversion Struc																												,	-	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																													,
	Extended Boom Pallet Loader (1)																													ļ
	Pickup Truck Conventional (1)																													
Construction Site Dewatering	Flatbed Truck (1)																													ļ
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)																													
	Pickup Truck Conventional (6)																													
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)																										T	Ţ	7	7
	Pickup Truck Conventional (3)	1																												,

Construction Noise - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (Alternative 4)

Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
Excavation (vvet conditions)	300 HP Dozer (2)	Dozer	40%	82	78	2	3	81
	3.5 CY Front End Loader, Wheel (2)	Front End Loader	40%	79	75	2	3	78
			40%	79 76	73 72	9	10	82
	16 CY 3 Axle Dump Truck (9)	Dump Truck Pickup Truck	40%	76 75		7	8	79
Chart Dila Mall	Pickup Truck Conventional (7)	Flat Bed Truck		74	71 70			
Sheet Pile Wall	Flatbed Truck (1)		40%			1	0	70
	75 TN Crane Crawler Pile Hammer (1)	Impact Pile Driver	20%	101	94	1	0	94
O L and beautiful	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Culvert head Wall	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79 75	75 74	2	3	78
D	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Flatbed Truck (2)	Flat Bed Truck	40%	74	70	2	3	73
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
Water Control Structure	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (6)	Pickup Truck	40%	75	71	6	8	79
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)	Crane	16%	81	73	1	0	73
	Haul Truck Oversize Transport (1)	Flat Bed Truck	40%	74	70	1	0	70
	Pickup Truck Conventional (4)	Pickup Truck	40%	75	71	4	6	77
19 - Buildings, Grounds, and Utilities								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	10	10	80
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
CMU Building and Earthwork Pad	165 HP Dozer (1)	Dozer	40%	82	78	1	0	78
Construction	Scraper (1)	Scraper	40%	84	80	1	0	80
	Motor Grader (1)	Grader	40%	85	81	1	0	81
	Compactor (1)	Compactor (ground)	20%	83	76	1	0	76
	4000 Gal Water Truck (1)	Dump Truck	40%	76	72	1	0	72
	10 TN Smooth Roller (1)	Roller	20%	80	73	1	0	73
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Concrete Mixer Truck (1)	Concrete Mixer Truck	40%	79	75	1	0	75
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	Concrete Pump Truck	20%	81	74	1	0	74
	2.5" Dia. Concrete Vibrator (1)	Vibratory Concrete Mixer	20%	80	73	1	0	73
	Concrete Mixer Truck (2)	Concrete Mixer Truck	40%	79	75	2	3	78
	Pickup Truck Conventional (7)	Pickup Truck	40%	75	71	7	8	79
20 -Permanent Operating Equipment	p samp week continue (c)	i tottop i totto	1			<u> </u>		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Flat Bed Truck	40%	74	70	3	5	75
	Extended Boom Pallet Loader (1)	Front End Loader	40%	79	75	1	0	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1 1	0	71
Power, Electrical, & Mechanical Equipment		Front End Loader	40%	79	75	1	0	75
, Elocatosi, sa moonamout Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75 75	71	3	5	76
Communication Equipment	Pickup Truck Conventional (3)	Pickup Truck	40%	75	71	3	5	76
	Habitat Restoration & Fish Passage Project		1070	, 0	, ,			

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)											
	300 HP Dozer (2)											
	3.5 CY Front End Loader, Wheel (2)	.										
	16 CY 3 Axle Dump Truck (9)											
	Pickup Truck Conventional (7)											
Sheet Pile Wall	Flatbed Truck (1)											
	75 TN Crane Crawler Pile Hammer (1)											
	Pickup Truck Conventional (6)											
Culvert head Wall	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (6)											
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)											
	Flatbed Truck (2)											
	Pickup Truck Conventional (4)											
Water Control Structure	2.5" Dia. Concrete Vibrator (1)											
Trate: Control Cardotale	Concrete Mixer Truck (2)	.										
	Pickup Truck Conventional (6)	.										
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)											
Innatable Obernieyer Gates	Haul Truck Oversize Transport (1)											
	Pickup Truck Conventional (4)											
19 - Buildings, Grounds, and Utilities	Fickup Truck Conventional (4)											
<u> </u>	Flatbed Truck (1 per piece of equipment)											
Mobilization and Demobilization	Extended Boom Pallet Loader (1)											
OMILE THE STATE OF	Pickup Truck Conventional (1)											
CMU Building and Earthwork Pad	165 HP Dozer (1)											
Construction	Scraper (1)											
	Motor Grader (1)											
	Compactor (1)											
	4000 Gal Water Truck (1)											
	10 TN Smooth Roller (1)											
	Pickup Truck Conventional (7)											
	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Extended Boom Pallet Loader (1)											
	Concrete Mixer Truck (1)											
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)	.										
	Concrete Mixer Truck (2)	.										
	Pickup Truck Conventional (7)	.										
20 -Permanent Operating Equipment												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)	.										
	Pickup Truck Conventional (1)	.										
Power, Electrical, & Mechanical Equipment												
	Pickup Truck Conventional (3)	.										
Communication Equipment	Pickup Truck Conventional (3)											
	Habitat Restoration & Fish Passage Project	$\overline{}$									1	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Construction Noise - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (A

Table <u>LM</u> -24. 8-Hour Construction Noise Level at the Receptor (dBA)												Е	stimat	ted Du	uration	n, Wee	ek											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total Construction Leq(h) @ 50'	87	94	94	94	92	93	93	96	92	91	95	90	90	90	90	90	90	90	89	85	85	85	79	n/a	n/a	n/a	n/a	n/a
Residential Receptor																												
Distance from the Center of Construction Activity to a Receptor (ft)	630	630	630	630	630							630			630						630			630				630
Distance Divergence (dBA)																												
Atmospheric Attenuation (dBA)	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
1-Hour Construction Noise Level at the Receptor (dBA)	64	71	71	71	70	70	71	74	69	69	73	67	67	67	67	67	67	67	67	62	62	62	57	n/a	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	62	68	68	68	67	67	67	70	66	65	69	64	64	64	64	64	64	64	64	60	60	60	58	n/a	n/a	n/a	n/a	n/a
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	n/a	n/a	n/a	n/a	n/a
Agricultural Decentor																												
Agricultural Receptor	240	240	240	1 240	240	1 240	240	240	240	240	240	1 240	240	240	040	240	240	240	240	040	040	240	240	240	240	240	240	240
Distance from the Center of Construction Activity to a Receptor (ft)				210					210				210					210			210			210			210	
Distance Divergence (dBA)															12.5							12.5				12.5		
Atmospheric Attenuation (dBA)		0.17	0.17	0.17		0.17		_		0.17		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17		0.17	0.17		0.17	0.17	0.17		
1-Hour Construction Noise Level at the Receptor (dBA)	74	81	81	81	80	80	80	83	79	79	83	77	77	77	77	77	77	77	76	72	72	72	67	n/a	n/a	n/a	n/a	n/a
CNEL (Construction Noise + Existing) (dBA)	70	77	77	78	76	76	77	80	75	75	79	74	73	74	73	74	74	73	73	69	69	69	64	n/a	n/a	n/a	n/a	n/a
Impact to Agricultural Uses	NA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level Residential

(dBA)

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 800

Source: Google Earth

= <u></u>	Impact Device?	Acoustica I Use Factor	Spec 721.560 Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50 ft (dBA, slow)
All Other Equipment > 5 hp	No	50%	85	N/A
Auger Drill Rig	No	20%	85	84
Backhoe	No	40%	80	78
Bar Bender	No	20%	80	N/A
Blasting	Yes	1%	94	N/A
Boring Jack Power Unit	No	50%	80	83
Chain Saw	No	20%	85	84
Clam Shovel (dropping)	Yes	20%	93	87
Compactor (ground)	No	20%	80	83
Compressor (air)	No	40%	80	78
Concrete Batch Plant	No	15%	83	N/A
Concrete Mixer Truck	No	40%	85	79
Concrete Pump Truck	No	20%	82	81
Concrete Saw	No	20%	90	90
Crane	No	16%	85	81
Dozer	No	40%	85	82
Drill Rig Truck	No	20%	84	79
Drum Mixer	No	50%	80	80
Dump Truck	No	40%	84	76
Excavator	No	40%	85	81
Flat Bed Truck	No	40%	84	74
Front End Loader	No	40%	80	79
Generator Generator	No	50%	82	81
Generator (<25KVA, VMS signs)	No	50%	70	73
Gradall	No	40%	85	83
Grader	No	40%	85	N/A
Grapple (on backhoe)	No	40%	85	87
Horizontal Boring Hydr. Jack	No	25%	80	82
Hydra Break Ram	Yes	10%	90	N/A
Impact Pile Driver	Yes	20%	95	101
Jackhammer	Yes	20%	85	89
Man Lift	No	20%	85	75
Mounted Impact Hammer (hoe ram)	Yes	20%	90	90
Pavement Scarifier	No	20%	85	90
Paver	No	50%	85	77
Pickup Truck	No	40%	55	75
Pneumatic Tools	No	50%	85	85
Pumps	No	50%	77	81
Refrigerator Unit	No	100%	82	73
Rivit Buster/Chipping Gun	Yes	20%	85	79
Rock Drill	No	20%	85	81
Roller	No	20%	85	80
Sand Blasting (Single Nozzle)	No	20%	85	96
Scraper	No	40%	85	84
Shears (on backhoe)	No	40%	85	96
Slurry Plant	No	100%	78	78
Slurry Trenching Machine	No	50%	82	80
Soil Mix Drill Rig	No	50%	80	N/A
Tractor	No	40%	84	N/A
Vacuum Excavator (vac-truck)	No	40%	85	85
Vacuum Street Sweeper	No	10%	80	82
Ventilation Fan	No	100%	85	79
Vibrating Hopper	No	50%	85	87
Vibratory Concrete Mixer	No	20%	80	80
VIDIALOI Y CONCICIO IVIIACI				
Vibratory Pile Driver	Nο	20%	95	101
Vibratory Pile Driver Warning Horn	No No	20% 5%	95 85	101 83

Source: FHWA. RCNM User's Guide - Table 1. CA/T equipment noise emissions and acoustical usage fac

Note: Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power. In case of construction blasting, the equipment gives a very short duration blast and can be quantified by using a 1% usage factor in the RCNM to allow for some prediction.

Appendix M Noise and Vibration Calculations

Table LM-26. Atmospheric Attenuation

Assumptions	
Ambient pressure (kPa)	101.3
Temperature (F)	68
Relative humidity (%)	90
Frequency of noise source (Hz)	500
Air Attenuation Coefficient (α, dB/km)	2.7
(dB/ft)	0.0008

 $A_{air} = \alpha d$

0.3048 m/ft 1000 m/km

Conversion:

Weather in Yolo County

Average temperature 60.8 °F Average relative humidity 81.35 %

Reference:

Harris, Cyril M. 1998. Handbook of Acoustical Measurements and Noise Control. 3rd ed. - Chapter 3 Calculation of Attenuation https://www.ncdc.noaa.gov/cdo-web/datatools/normals, Sacramento Metropolitan Airport annual average temperature 1981-2010 http://www.usa.com/yolo-county-ca-weather.htm

Land Use Description	Average Ldn (dBA)	Daytime Leq (dBA)	Nighttime Leq (dBA)
Wilderness	35	35	25
Rural Residential	40	40	30
Quiet Suburban Residential	50	50	40
Normal Suburban Residential	55	55	45
Urban Residential	60	60	50
Noisy Urban Residential	65	65	55
Very Noisy Urban Residential	70	70	60

Source: U.S. EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974.

Table <u>LM</u>-28. Noise Reductions from Mitigation Measures

Mitigation Type	Reduction (dBA)
Noise barrier or other obstruction just barely breaks the line-of-sight between the noise source and the receptor	3
Noise source completely enclosed or completely shielded with solid barrier located close to the source	8
Enclosure and/or barrier with some gaps	5
Noise source completely enclosed and completely shielded with a solid barrier located close to the source	10
Noise source enclosed or shielded with heavy vinyl noise curtain material	5

Source: FHWA. RCNM User's Guide Appendix A Best Practices for Calculating Estimated Shielding for Use in the RCNM

2015 AADT Equivalency Factor for Substantial without **Peak Daily Peak Daily Heavy-Duty** Equivalent Total with Noise Level **Noise Increase** Construction Above Truck Trips Worker Trips | Average Speed Vehicles Vehicles **Project** Increase Ratio Increase (dBA) (dBA) Threshold? Roadway Segment Traffic Type Sacramento/Yolo County Line to CR 63,895 Interstate I-5 56,400 682 404 55 10.4 7,495 1.1 12 No 117 Interstate I-5 CR 117 to CR 102 56,200 682 404 55 10.4 7,495 63,695 1.1 12 No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table <u>LM</u>-30. Alt 1 Peak Hourly Construction Traffic - Equivalent Noise Levels

			Peak Hourly	Peak Hour	Peak Hour		Equivalency Factor for Heavy-Duty	Equivalent	Total with		Noise Level	Substantial Noise Increase	Above
Type	Roadway	Segment	Volume	Truck Trips	Worker Trips	Average Speed	Vehicles	Vehicles	Project	Increase Ratio	Increase (dBA)	(dBA)	Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		682	202	55	10.4	7,293	12,933	2.3	4	12	No
Interstate	I-5	CR 117 to CR 102	5,620	682	202	55	10.4	7,293	12,913	2.3	4	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-31. Alt 2 Daily Construction Traffic - Equivalent Noise Levels

Type	Roadway	Segment	2015 AADT without Construction Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		599	446	55	10.4	6,676	63,076	1.1	0	12	No
Interstate	I-5	CR 117 to CR 102	56,200	599	446	55	10.4	6,676	62,876	1.1	0	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-32. Alt 2 Peak Hourly Construction Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		599	223	55	10.4	6,453	12,093	2.1	3	12	No
Interstate	I-5	CR 117 to CR 102	5,620	599	223	55	10.4	6,453	12,073	2.1	3	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-33. Alt 3 Daily Construction Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	2015 AADT without Construction Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio	Noise Level Increase (dBA)	Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117	56,400	597	554	55	10.4	6,768	63,168	1.1	0	12	No
Interstate	I-5	CR 117 to CR 102	56,200	597	554	55	10.4	6,768	62,968	1.1	0	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table <u>LM</u>-34. Alt 3 Peak Hourly Construction Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	1-5	Sacramento/Yolo County Line to CR 117		597	277	55	10.4	6,491	12,131	2.2	3	12	No
Interstate	I-5	CR 117 to CR 102	5,620	597	277	55	10.4	6,491	12,111	2.2	3	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-35. Alt 4 Daily Construction Traffic - Equivalent Noise Levels

			2015 AADT without Construction	Peak Daily	Peak Daily		Equivalency Factor for Heavy-Duty	Equivalent	Total with		Noise Level	Substantial Noise Increase	Above
Type	Roadway	Segment	Traffic	Truck Trips	Worker Trips	Average Speed	Vehicles	Vehicles	Project	Increase Ratio	Increase (dBA)	(dBA)	Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		1,645	726	55	10.4	17,836	74,236	1.3	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	1,645	726	55	10.4	17,836	74,036	1.3	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table <u>LM</u>-36. Alt 4 Peak Hourly Construction Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio	Noise Level Increase (dBA)	Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117	5,640	1,645	363	55	10.4	17,473	23,113	4.1	6	12	No
Interstate	I-5	CR 117 to CR 102	5,620	1,645	363	55	10.4	17,473	23,093	4.1	6	12	No

ssume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

2015 AADT Equivalency Factor for Substantial without **Peak Daily Peak Daily Heavy-Duty** Equivalent Total with Noise Level **Noise Increase** Construction Above Truck Trips Worker Trips | Average Speed Vehicles Vehicles **Project** Increase Ratio Increase (dBA) (dBA) Threshold? Roadway Segment Traffic Type Sacramento/Yolo County Line to CR 634 63,590 Interstate I-5 56,400 598 55 10.4 7,190 1.1 12 No 117 Interstate I-5 CR 117 to CR 102 56,200 634 598 55 10.4 7,190 63,390 1.1 12 No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table <u>LM</u>-38. Alt 5 Peak Hourly Construction Traffic - Equivalent Noise Levels

			Peak Hourly	Peak Hour	Peak Hour		Equivalency Factor for Heavy-Duty	Equivalent	Total with		Noise Level	Substantial Noise Increase	Above
Type	Roadway	Segment	Volume	Truck Trips	Worker Trips	Average Speed	Vehicles	Vehicles	Project	Increase Ratio	Increase (dBA)	(dBA)	Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		634	299	55	10.4	6,891	12,531	2.2	3	12	No
Interstate	I-5	CR 117 to CR 102	5,620	634	299	55	10.4	6,891	12,511	2.2	3	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-39. Alt 6 Daily Construction Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	2015 AADT without Construction Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		895	828	55	10.4	10,137	66,537	1.2	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	895	828	55	10.4	10,137	66,337	1.2	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-40. Alt 6 Peak Hourly Construction Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		895	414	55	10.4	9,723	15,363	2.7	4	12	No
Interstate	I-5	CR 117 to CR 102	5,620	895	414	55	10.4	9,723	15,343	2.7	4	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Traffic Calculations

Maximum Daily Haul Trucks

Table M-41. Alternative 1 Maximum Daily Truck Trips by Component

																			Est	mated	Dura	tion, V	<u>Veek</u>																				
Alternative 1	1	2	<u>3</u>	4	<u>5</u>	<u>6</u>	7	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	20	<u>21</u>	<u>22</u>	<u>23</u>	24	<u> 2</u>	25	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	32	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	41	<u>Maximum</u>
Channel E	88	43	<u>71</u>	38	<u>10</u>	0	20	<u>14</u>	602	602	602	<u>35</u>	198	279	295	301	180	211	<u>56</u>	0	8	<u> </u>	(0	0	0	0	105	12														<u>602</u>
<u>Downstream</u>	<u>44</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	120	120	<u>14</u>	<u>0</u>	0	<u>0</u>	<u>105</u>	<u>182</u>	182	182	182	<u>182</u>	<u>91</u>	<u>0</u>	0	38	69	9	<u>6</u>	0	<u>0</u>	<u>0</u>	0														<u>182</u>
Fish Passage West	<u>12</u>	<u>5</u>	<u>46</u>	<u>0</u>	0	230	130	<u>0</u>	<u>58</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>13</u>	<u>0</u>	12	<u>6</u>	0	<u>0</u>	<u>6</u>	<u>0</u>	0	<u> </u>	<u>(</u>	0	<u>0</u>	0	<u>0</u>	<u>69</u>	12														<u>230</u>
Ag Crossing 1	<u>28</u>	<u>0</u>	20	<u>0</u>	<u>0</u>	22	<u>8</u>	89	<u>8</u>	<u>24</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>4</u>	10	<u>24</u>	<u>12</u>	<u>0</u>	0	36	<u> </u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>														<u>89</u>
<u>Total</u>	<u>172</u>	<u>48</u>	<u>137</u>	<u>38</u>	<u>10</u>	<u>252</u>	<u>278</u>	223	682	<u>626</u>	<u>602</u>	<u>41</u>	<u>316</u>	<u>461</u>	<u>490</u>	<u>494</u>	372	<u>418</u>	<u>165</u>	<u>0</u>	8	<u>74</u>	<u>7</u> !	<u>5</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>174</u>	<u>24</u>														<u>682</u>
East Alternative Route	160	43	91	38	10	22	148	223	624	626	602	35	303	<u>461</u>	478	488	372	418	159	0	8	74	7:	5	6	0	0	105	12														626
West Alternative Route	<u>12</u>	<u>5</u>	<u>46</u>	<u>0</u>	0	230	<u>130</u>	<u>0</u>	<u>58</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>13</u>	<u>0</u>	<u>12</u>	<u>6</u>	0	<u>0</u>	<u>6</u>	<u>0</u>	0	<u> </u>	(0	<u>0</u>	<u>0</u>	<u>0</u>	<u>69</u>	12														<u>230</u>

Table M-42	Alternative	2 Maximum	Daily Truck	Trips by Componen	t

Table III 42. Alternative																			East	matad	Dure	tion M	la a l																			
																			ESI	imated	Dura		eek																			
Alternative 2	1	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>Maximum</u>
Channel C	88	44	72	39	12	0	84	0	0	() (<u>18</u>	389 <u>389</u>	389	405	395	377	7 367	277	<u>66</u>	8	0	0	0	0	0	105	<u>12</u>														<u>405</u>
<u>Downstream</u>	44	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	120	120	<u>14</u>	(<u>)</u>	<u>)</u>	<u>105</u>	182	<u>182</u>	182	182	2 <u>182</u>	<u>91</u>	<u>0</u>	<u>0</u>	<u>38</u>	<u>69</u>	<u>6</u>	<u>0</u>	0	<u>0</u>	<u>0</u>														<u>182</u>
Fish Passage West	<u>12</u>	<u>5</u>	<u>46</u>	<u>0</u>	<u>0</u>	<u>230</u>	130	<u>0</u>	58	<u> </u>	<u>)</u>	<u>)</u>	<u>6 13</u>	<u> </u>	12	6	<u> </u>	<u>0</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	69	<u>12</u>														230
Ag Crossing 1	<u>28</u>	<u>0</u>	20	<u>0</u>	<u>0</u>	22	<u>8</u>	<u>89</u>	8	24	<u>1</u> ()	0 0	<u> </u>	0	4	10	24	12	<u>0</u>	0	<u>36</u>	<u>6</u>	0	<u>0</u>	0	<u>0</u>	<u>0</u>														<u>89</u>
<u>Total</u>	<u>172</u>	<u>49</u>	<u>138</u>	<u>39</u>	<u>12</u>	<u>252</u>	342	209	80	24	<u>1</u> (<u>18</u>	9 <u>507</u>	572	<u>599</u>	587	570	<u>574</u>	386	<u>66</u>	8	<u>74</u>	<u>75</u>	<u>6</u>	0	0	<u>174</u>	24														<u>599</u>
Option 1																																										
East Alternative Route	160	44	92	39	12	22	212	209	22	24	1 (18	<u>3 49</u> 4	572	<u>587</u>	581	570	574	380	66	8	74	<u>75</u>	6	0	0	105	12														<u>587</u>
West Alternative Route	<u>12</u>	<u>5</u>	<u>46</u>	<u>0</u>	0	230	130	<u>0</u>	<u>58</u>	<u> </u>	<u>)</u>)	<u>6 13</u>	<u> </u>	12	6	<u>(</u>	<u>0</u>	6	<u>0</u>	0	<u>0</u>	<u>0</u>	0	<u>0</u>	0	69	<u>12</u>														230
Option 2																																										
East Alternative Route	<u>72</u>	0	<u>20</u>	0	0	22	128	<u>209</u>	22	24	<u>1</u> ()	<u>10</u> 5	182	182	186	192	206	103	0	0	<u>74</u>	<u>75</u>	6	0	0	<u> </u>	0														<u>209</u>
West Alternative Route	100	<u>49</u>	<u>118</u>	<u>39</u>	12	230	214	<u>0</u>	<u>58</u>	<u> </u>	<u>)</u>	18	9 402	389	417	401	377	<u>367</u>	283	<u>66</u>	<u>8</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	0	174	24														<u>417</u>
Option 3																																										
East Alternative Route	<u>116</u>	22	56	19	6	22	170	209	22	24	1 (9	2 300	377	385	384	38′	390	242	33	4	74	<u>75</u>	6	0	0	53	6			<u> </u>							<u> </u>				<u>390</u>
West Alternative Route	56	27	82	19	6	230	172	0	58) () 9	8 208	195	214	203	189	184	145	33	4	0	0	0	0	0	122	18														230

						,																																					
																				Estim	ated D	Duratio	on, We	<u>eek</u>																			
Alternative 3	1	2	3	4	<u>5</u>	<u>6</u>	7	8	9	<u>10</u>	<u>11</u>	12	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	1	9	20	21	22	23	24	25	26	27	28	<u>29</u>	30	<u>31</u>	32	33	34	<u>35</u>	36	37	38	<u>39</u>	<u>40</u>	41	Maximum
Channel W	<u>88</u>	<u>5</u>	<u>33</u>	<u>0</u>	<u>12</u>	0	143	123	123	123	123	184	206	387	403	393	<u>3</u> <u>37</u>	7 <u>6</u> 36	<u>36</u>	<u>471</u>	<u>432</u>	<u>190</u>	182	0	0	0	(<u>10</u> :	<u>5</u> <u>1</u>	12													<u>471</u>
<u>Downstream</u>	<u>44</u>	0	<u>0</u>	0	<u>0</u>	0	120	120	14	<u>0</u>	<u>C</u>	0	105	<u>182</u>	182	2 <u>182</u>	<u>2 18</u>	32 <u>18</u>	<u>32</u>	<u>91</u>	0	0	38	69	<u>6</u>	0	<u>(</u>	<u>0</u>	<u>0</u>	0													<u>182</u>
Fish Passage E	12	<u>5</u>	46	0	<u>0</u>	<u>260</u>	127	<u>0</u>	<u>58</u>	0	<u>C</u>	<u>6</u>	13	<u>0</u>	12	2 6	<u>6</u>	0	<u>0</u>	<u>6</u>	0	0	0	0	<u>0</u>	0	<u>(</u>	0 6	<u>9</u> <u>1</u>	12													<u>260</u>
Ag Crossing 1	<u>28</u>	<u>0</u>	<u>20</u>	<u>0</u>	0	22	8	<u>89</u>	8	24	<u>C</u>	0	<u>C</u>	0	() 4	<u>4</u> <u>1</u>	<u>10</u> 2	<u>24</u>	<u>12</u>	<u>0</u>	<u>0</u>	<u>36</u>	<u>6</u>	0	<u>0</u>	(0 (0	0													<u>89</u>
<u>Total</u>	<u>172</u>	<u>10</u>	<u>99</u>	<u>0</u>	<u>12</u>	<u>282</u>	398	332	<u>203</u>	<u>147</u>	<u>123</u>	<u>190</u>	<u>32</u> 4	570	<u>597</u>	<u>585</u>	<u>56</u>	<u>58</u> 57	<u>72</u>	<u>580</u>	432	<u>190</u>	<u>256</u>	<u>75</u>	<u>6</u>	<u>0</u>	(<u>17</u>	4 2	24													<u>597</u>
East Alternative Route	<u>84</u>	<u>5</u>	66	0	0	282	255	209	80	24	0	<u>6</u>	118	182	194	<u>192</u>	2 19	92 20	06	109	0	0	74	<u>75</u>	6	0	(0 6	<u>9</u> 1	12													<u>282</u>
West Alternative Route	88	<u>5</u>	33	<u>0</u>	12	0	143	123	123	123	123	184	206	387	403	393	3 37	76 36	<u> 66</u>	471	432	190	182	0	0	0	(0 10	<u>5</u> 1	12													<u>471</u>

Table M-44. Alternative 4 Maximum Daily Truck Trips by Component

			_ ,,,,																																								
																			Es	timate	d Dura	ation,	Week																				
Alternative 4	1	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>2</u>	24 2	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>Maximum</u>
Channel W	<u>88</u>	<u>5</u>	<u>33</u>	0	12	0	<u>143</u>	<u>123</u>	123	123	123	184	206	387	403	393	376	366	471	432	<u>19</u>	<u>0 18</u>	2	0	0	0	0	105	12														<u>471</u>
<u>Downstream</u>	<u>44</u>	<u>0</u>	<u>0</u>	0	0	0	120	120	14	<u>0</u>	<u>0</u>	<u>0</u>	<u>105</u>	182	182	182	182	182	91	<u>C</u>) (<u>0</u> <u>3</u>	<u>8</u> <u>6</u>	69	<u>6</u>	<u>0</u>	0	<u>0</u>	0														<u>182</u>
Fish Passage E	<u>12</u>	<u>5</u>	<u>46</u>	0	0	<u>260</u>	127	<u> 0</u>	<u>58</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>13</u>	<u>0</u>	12	<u>6</u>	<u>C</u>	<u> </u>) 6	<u> </u>) (<u>0</u>	0	0	<u>0</u>	<u>0</u>	0	69	12														<u>260</u>
Ag Crossing 1	<u>28</u>	<u>0</u>	<u>20</u>	<u>0</u>	0	22	8	89	8	24	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	4	10	24	12	<u> </u>) !	<u>0</u> <u>3</u>	<u>6</u>	<u>6</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	0														<u>89</u>
<u>Northern</u>	<u>56</u>	<u>20</u>	<u>28</u>	677	709	677	359	339	339	339	339	<u>8</u>	<u>36</u>	<u>14</u>	<u>0</u>	<u>6</u>	<u>C</u>	24	<u> </u>	<u> </u>) !	<u>0</u> 8	<u>7</u>	<u>6</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	0														<u>709</u>
<u>Southern</u>	<u>56</u>	<u>39</u>	<u>47</u>	288	<u>716</u>	<u>684</u>	888	868	868	433	<u>433</u>	<u>433</u>	<u>439</u>	<u>447</u>	<u>433</u>	439	433	457	433	<u>8</u>	3	<u>0</u> 9	0	<u>6</u>	<u>0</u>	0	0	<u>0</u>	0														888
<u>Total</u>	<u>284</u>	<u>69</u>	<u>174</u>	<u>965</u>	1,437	1,643	<u>1,645</u>	1,539	<u>1,410</u>	<u>919</u>	<u>895</u>	<u>631</u>	<u>799</u>	1,030	1,030	1,030	1,001	1,053	1,013	440	22	<u>0 43</u>	<u>3</u> <u>8</u>	<u>87</u>	<u>6</u>	0	0	<u>174</u>	<u>24</u>														<u>1,645</u>
East Alternative Route	140	<u>25</u>	94	677	709	959	614	548	419	363	339	14	154	196	194	198	192	230	109	<u> </u>) (<u>0 16</u>	1 8	<u>81</u>	6	0	0	69	12														959
West Alternative Route	144	44	80	288	728	684	1.031	991	991	556	556	617	644	834	836	832	809	823	904	440) 22	0 27	2	6	0	0	0	105	12														1.031

Table M-45. Alternative 5 Maximum Daily Truck Trips by Component

																			Estir	nated l	Duratio	on, We	<u>ek</u>																			
Alternative 5	<u>1</u>	2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u> 32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40 4</u>	1 N	<u>laximum</u>
Channel C	92	<u>14</u>	40	0	<u>12</u>	<u>12</u>	<u>12</u>	286	568	<u>548</u>	548	548	548	548	548	<u>619</u>	<u>619</u>	<u>81</u>	0	<u>6</u>	0	0	127	<u>71</u>	26	81	0	0	34	0	0	0	0	0	0	0	0	0	0	34	0	<u>619</u>
Fish Passage W	12	<u>5</u>	46	0	0	<u>230</u>	130	0	<u>58</u>	0	0	<u>6</u>	13	0	12	6	0	0	<u>6</u>	0	0	0	0	0	0	0	69	<u> 12</u>	=	=	<u></u>		=	=		_ =	_ =	_ =	_ =	=		<u>230</u>
Ag Crossing 1	<u>28</u>	<u>0</u>	<u>20</u>	<u>0</u>	0	22	<u>8</u>	<u>89</u>	<u>8</u>	<u>24</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	4	<u>10</u>	<u>24</u>	<u>12</u>	<u>0</u>	<u>0</u>	<u>36</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	==	=	==	=	=	=		_ :	_ =	= =	= =	=		<u>89</u>
Tule Canal	<u>54</u>	<u>120</u>	<u>120</u>	<u>120</u>	<u>152</u>	<u>120</u>	140	1,732	1,843	1,843	2,288	2,288	2,183	2,193	2,169	2,169	2,169	2,204	<u>445</u>	<u>445</u>	<u>10</u>	<u>28</u>	<u>85</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	=	=	==	==	=	_		_ :		= =	_ =	<u> </u>		2,288
Total (w/o Tule Canal)	<u>132</u>	<u>19</u>	<u>106</u>	<u>0</u>	<u>12</u>	<u>264</u>	<u>150</u>	375	634	<u>572</u>	<u>548</u>	<u>554</u>	<u>561</u>	<u>548</u>	<u>560</u>	629	629	<u>105</u>	<u>18</u>	<u>6</u>	<u>0</u>	<u>36</u>	<u>133</u>	<u>71</u>	<u>26</u>	<u>81</u>	<u>69</u>	<u>12</u>	<u>34</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>34</u>	0	<u>634</u>
Option 1 (w/o Tule Canal)	186	139	226	120	163	383	289	2,106	2,477	2,415	2,836	2,842	2,744	2,741	2,729	2,798	2,798	2,310	463	451	<u>10</u>	64	219	<u>77</u>	26	81	69	<u>12</u>	34	0	0	0	<u>0</u>	0	0	0	0	0	<u>0</u>	<u>34</u>	0	
East Alternative Route	120	<u>14</u>	60	0	<u>12</u>	<u>34</u>	20	375	576	572	548	548	548	548	548	623	<u>629</u>	<u>105</u>	<u>12</u>	<u>6</u>	0	<u>36</u>	<u>133</u>	<u>71</u>	<u>26</u>	81	0	0	34	0	0	0	0	0	0	0	0	0	0	<u>34</u>	0	629
West Alternative Route	<u>12</u>	<u>5</u>	<u>46</u>	<u>0</u>	<u>0</u>	230	130	<u>0</u>	<u>58</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>13</u>	<u>0</u>	12	<u>6</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	69	<u>12</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	230
Option 2 (w/o Tule Canal)																																										
East Alternative Route	<u>28</u>	<u>0</u>	<u>20</u>	0	0	22	<u>8</u>	89	8	<u>24</u>	0	0	0	0	0	4	<u>10</u>	<u>24</u>	<u>12</u>	0	0	<u>36</u>	<u>6</u>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<u>89</u>
West Alternative Route	104	<u>19</u>	86	<u>0</u>	<u>12</u>	242	142	286	626	<u>548</u>	548	<u>554</u>	<u>561</u>	548	<u>560</u>	625	<u>619</u>	<u>81</u>	<u>6</u>	<u>6</u>	<u>0</u>	<u>0</u>	127	<u>71</u>	<u>26</u>	81	<u>69</u>	<u>12</u>	<u>34</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>34</u>	0	626
Option 3 (w/o Tule Canal)																																										
East Alternative Route	74	7	40	0	6	28	14	232	292	298	274	274	274	274	274	314	<u>320</u>	65	12	3	0	<u>36</u>	70	36	13	41	0	0	17	0	0	0	0	0	0	0	0	0	0	17	0	<u>320</u>
West Alternative Route	<u>58</u>	<u>12</u>	<u>66</u>	<u>0</u>	<u>6</u>	<u>236</u>	<u>136</u>	<u>143</u>	342	<u>274</u>	<u>274</u>	280	<u>287</u>	<u>274</u>	<u>286</u>	<u>316</u>	310	<u>41</u>	<u>6</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>64</u>	<u>36</u>	<u>13</u>	<u>41</u>	<u>69</u>	<u>12</u>	<u>17</u>	0	<u>0</u>	<u>0</u>	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>	0	<u>342</u>

Table M-46. Alternative 6 Maximum Daily Truck Trips by Component

																			Estir	nated I	Durati	on, We	ek																			
Alternative 6	1	2	3	4	<u>5</u>	<u>6</u>	7	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	22	<u>23</u>	<u>24</u>	<u> 25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>Maximum</u>
Channel W	88	<u>38</u>	<u>10</u>	0	<u>12</u>	0	112	0	0	22	667	667	694	672	682	644	667	<u>689</u>	652	<u>733</u>	<u>733</u>	368	368	<u>56</u>	0	0	69	48														<u>733</u>
<u>Downstream</u>	<u>44</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>0</u>	120	120	<u>14</u>	<u>0</u>	<u>0</u>	<u>0</u>	105	182	182	182	182	<u>182</u>	<u>91</u>	<u>0</u>	<u>0</u>	<u>38</u>	<u>69</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>														<u>182</u>
Fish Passage E	<u>12</u>	<u>5</u>	<u>46</u>	<u>0</u>	0	<u>260</u>	127	<u>0</u>	<u>58</u>	<u>0</u>	<u>0</u>	<u>6</u>	13	<u>0</u>	<u>12</u>	<u>6</u>	0	<u>0</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	69	<u>12</u>														<u>260</u>
Ag Crossing 1	<u>28</u>	<u>0</u>	<u>20</u>	<u>0</u>	0	<u>22</u>	<u>8</u>	<u>89</u>	<u>8</u>	<u>24</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>10</u>	<u>24</u>	<u>12</u>	<u>0</u>	<u>0</u>	<u>36</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0														<u>89</u>
<u>Total</u>	<u>172</u>	<u>42</u>	<u>76</u>	<u>0</u>	<u>12</u>	282	<u>367</u>	209	<u>80</u>	<u>46</u>	667	<u>673</u>	<u>812</u>	<u>854</u>	<u>876</u>	837	<u>859</u>	<u>895</u>	<u>762</u>	733	<u>733</u>	442	<u>443</u>	<u>62</u>	<u>0</u>	0	<u>138</u>	<u>60</u>														<u>895</u>
East Alternative Route	84	<u>5</u>	66	0	0	282	255	209	80	24	0	6	118	182	194	192	192	206	109	0	0	74	<u>75</u>	<u>6</u>	0	0	69	12														<u>282</u>
West Alternative Route	<u>88</u>	<u>38</u>	<u>10</u>	<u>0</u>	<u>12</u>	<u>0</u>	<u>112</u>	<u>0</u>	<u>0</u>	<u>22</u>	<u>667</u>	<u>667</u>	<u>694</u>	<u>672</u>	<u>682</u>	<u>644</u>	667	<u>689</u>	<u>652</u>	<u>733</u>	<u>733</u>	<u>368</u>	<u>368</u>	<u>56</u>	0	<u>0</u>	<u>69</u>	48														<u>733</u>

Traffic Calculations

Maximum Daily Employee Trips

										*									Estin	nated [Ouratio	on, We	ek_																			
Alternative 1	1	2	3	<u>4</u>	<u>5</u>	<u>6</u>	7	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	22	<u>23</u>	24	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	41	<u>Maximum</u>
Channel E	<u>48</u>	<u>38</u>	88	<u>35</u>	34	29	64	<u>58</u>	<u>59</u>	<u>52</u>	44	70	86	92	<u>116</u>	112	<u>66</u>	<u>91</u>	<u>34</u>	<u>3</u>	<u>5</u>	29	29	29	29	23	60	<u>5</u>														<u>116</u>
<u>Downstream</u>	<u>18</u>	9	9	9	9	20	24	24	27	28	28	28	<u>35</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	28	<u>4</u>	4	13	8	2	0	0	0	0														<u>56</u>
Fish Passage West	<u>8</u>	10	18	9	8	20	<u>56</u>	4	36	<u>8</u>	7	9	14	<u>6</u>	18	2	4	4	2	<u>0</u>	0	<u>0</u>	0	0	0	0	8	<u>5</u>														<u>56</u>
Ag Crossing 1	<u>15</u>	<u>9</u>	<u>20</u>	<u>4</u>	<u>4</u>	<u>10</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	<u>23</u>	<u>12</u>	<u>9</u>	<u>9</u>	<u>12</u>	<u>21</u>	<u>8</u>	<u>31</u>	<u>9</u>	<u>7</u>	<u>0</u>	<u>13</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	0	0														<u>31</u>
<u>Total</u>	<u>89</u>	<u>66</u>	<u>135</u>	<u>57</u>	<u>55</u>	<u>79</u>	<u>147</u>	<u>90</u>	<u>125</u>	<u>106</u>	<u>102</u>	<u>119</u>	<u>144</u>	<u>163</u>	202	<u>191</u>	<u>134</u>	<u>182</u>	<u>73</u>	<u>14</u>	9	<u>55</u>	<u>39</u>	<u>31</u>	<u>29</u>	<u>23</u>	<u>68</u>	<u>10</u>														202
East Alternative Route	<u>81</u>	<u>56</u>	<u>117</u>	<u>48</u>	47	<u>59</u>	91	86	89	98	<u>95</u>	<u>110</u>	130	157	184	189	130	178	<u>71</u>	<u>14</u>	9	<u>55</u>	39	31	29	23	60	<u>5</u>														<u>189</u>
West Alternative Route	<u>8</u>	<u>10</u>	<u>18</u>	<u>9</u>	<u>8</u>	<u>20</u>	<u>56</u>	<u>4</u>	<u>36</u>	<u>8</u>	<u>7</u>	<u>9</u>	<u>14</u>	<u>6</u>	<u>18</u>	2	4	<u>4</u>	2	<u>0</u>	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>5</u>														<u>56</u>
-																																							Ма	aximum	Trips	<u>378</u>

																			Estin	nated D	Duratio	on, We	ek_																			
Alternative 2	1	2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	7	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	22	23	<u>24</u>	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	41	<u>Maximum</u>
Channel C	<u>70</u>	<u>38</u>	88	<u>35</u>	<u>50</u>	41	100	87	87	80	<u>56</u>	72	<u>155</u>	142	<u>136</u>	144	124	122	121	61	<u>5</u>	<u>19</u>	29	29	29	29	60	<u>5</u>														<u>155</u>
<u>Downstream</u>	<u>18</u>	9	9	9	9	20	24	24	27	28	28	28	35	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	28	<u>4</u>	4	13	8	2	0	0	0	0														<u>56</u>
Fish Passage West	8	<u>10</u>	<u>18</u>	9	8	20	<u>56</u>	4	<u>36</u>	8	7	9	14	<u>6</u>	18	2	4	4	2	<u>0</u>	0	0	0	0	0	0	8	<u>5</u>														<u>56</u>
Ag Crossing 1	<u>15</u>	<u>9</u>	<u>20</u>	<u>4</u>	<u>4</u>	<u>10</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	<u>23</u>	<u>12</u>	<u>9</u>	9	<u>12</u>	<u>21</u>	<u>8</u>	<u>31</u>	<u>9</u>	<u>7</u>	<u>0</u>	<u>13</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>0</u>														<u>31</u>
<u>Total</u>	<u>111</u>	<u>66</u>	<u>135</u>	<u>57</u>	<u>71</u>	<u>91</u>	<u>183</u>	<u>119</u>	<u>153</u>	<u>134</u>	<u>114</u>	<u>121</u>	<u>213</u>	<u>213</u>	222	223	<u>192</u>	<u>213</u>	<u>160</u>	<u>72</u>	9	<u>45</u>	<u>39</u>	<u>31</u>	<u>29</u>	<u>29</u>	<u>68</u>	<u>10</u>														223
Option 1																																										
East Alternative Route	103	<u>56</u>	<u>117</u>	48	63	<u>71</u>	127	<u>115</u>	<u>117</u>	<u>126</u>	<u>107</u>	112	199	207	204	221	188	209	<u>158</u>	<u>72</u>	9	<u>45</u>	<u>39</u>	<u>31</u>	<u>29</u>	29	60	<u>5</u>														<u>221</u>
West Alternative Route	8	<u>10</u>	<u>18</u>	<u>9</u>	<u>8</u>	<u>20</u>	<u>56</u>	<u>4</u>	<u>36</u>	<u>8</u>	<u>7</u>	<u>9</u>	<u>14</u>	<u>6</u>	<u>18</u>	2	<u>4</u>	<u>4</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>5</u>														<u>56</u>
Option 2																																										
East Alternative Route	<u>33</u>	<u>18</u>	29	<u>13</u>	13	30	27	28	30	46	<u>51</u>	40	44	65	<u>68</u>	77	<u>64</u>	<u>87</u>	37	<u>11</u>	4	26	<u>10</u>	2	0	0	0	0														<u>87</u>
West Alternative Route	<u>78</u>	<u>48</u>	<u>106</u>	<u>44</u>	<u>58</u>	<u>61</u>	<u>156</u>	<u>91</u>	<u>123</u>	<u>88</u>	<u>63</u>	<u>81</u>	<u>169</u>	<u>148</u>	<u>154</u>	<u>146</u>	<u>128</u>	<u>126</u>	<u>123</u>	<u>61</u>	<u>5</u>	<u>19</u>	<u>29</u>	<u>29</u>	<u>29</u>	<u>29</u>	<u>68</u>	<u>10</u>														<u>169</u>
Option 3																																										
East Alternative Route	<u>68</u>	37	73	31	38	51	77	72	74	<u>86</u>	79	76	122	136	<u>136</u>	<u>149</u>	126	148	98	42	7	36	25	17	<u>15</u>	<u>15</u>	30	3														<u>149</u>
West Alternative Route	<u>43</u>	<u>29</u>	<u>62</u>	<u>27</u>	<u>33</u>	<u>41</u>	<u>106</u>	<u>48</u>	<u>80</u>	<u>48</u>	<u>35</u>	<u>45</u>	<u>92</u>	<u>77</u>	<u>86</u>	74	<u>66</u>	<u>65</u>	<u>63</u>	<u>31</u>	<u>3</u>	<u>10</u>	<u>15</u>	<u>15</u>	<u>15</u>	<u>15</u>	<u>38</u>	<u>8</u>														<u>106</u>
																																							Ma	ximum	Trips	442

Table M-49. Alternative 3 Maximum Daily Construction Worker Trips by Component

																			Est	imated	Durati	on, W	<u>eek</u>																			
Alternative 3	<u>1</u>	2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>Maximum</u>
Channel W	<u>70</u>	<u>38</u>	88	<u>35</u>	<u>50</u>	<u>41</u>	100	<u>91</u>	91	<u>84</u>	<u>84</u>	136	<u>163</u>	<u>206</u>	<u>136</u>	144	<u>124</u>	122	<u>177</u>	<u>173</u>	<u>61</u>	<u>75</u>	29	<u>29</u>	29	<u>29</u>	<u>60</u>		<u>5</u>													<u>206</u>
<u>Downstream</u>	<u>18</u>	9	<u>9</u>	<u>9</u>	9	20	<u>24</u>	<u>24</u>	<u>27</u>	28	28	28	<u>35</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	28	<u>4</u>	<u>4</u>	<u>13</u>	<u>8</u>	2	<u>0</u>	<u>0</u>	<u>0</u>		0													<u>56</u>
Fish Passage E	<u>8</u>	10	<u>18</u>	9	8	20	<u>56</u>	4	36	8	7	9	14	<u>6</u>	18	2	4	4	2	<u>0</u>	0	<u>0</u>	0	0	0	0	8		<u>5</u>													<u>56</u>
Ag Crossing 1	<u>15</u>	9	<u>20</u>	<u>4</u>	<u>4</u>	<u>10</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	<u>23</u>	<u>12</u>	9	9	<u>12</u>	<u>21</u>	<u>8</u>	<u>31</u>	9	<u>7</u>	<u>0</u>	<u>13</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>		0													<u>31</u>
<u>Total</u>	<u>111</u>	<u>66</u>	<u>135</u>	<u>57</u>	<u>71</u>	<u>91</u>	<u>183</u>	<u>123</u>	<u>157</u>	<u>138</u>	<u>142</u>	<u>185</u>	<u>221</u>	<u>277</u>	<u>222</u>	223	<u>192</u>	<u>213</u>	<u>216</u>	<u>184</u>	<u>65</u>	<u>101</u>	<u>39</u>	<u>31</u>	<u>29</u>	<u>29</u>	<u>68</u>	<u>1</u>	0													<u>277</u>
East Alternative Route	<u>41</u>	28	47	22	21	<u>50</u>	83	32	66	<u>54</u>	58	49	<u>58</u>	71	86	79	68	<u>91</u>	39	<u>11</u>	4	26	<u>10</u>	2	0	0	8		5													<u>91</u>
West Alternative Route	<u>70</u>	<u>38</u>	<u>88</u>	<u>35</u>	<u>50</u>	<u>41</u>	<u>100</u>	<u>91</u>	<u>91</u>	<u>84</u>	<u>84</u>	<u>136</u>	<u>163</u>	<u>206</u>	<u>136</u>	<u>144</u>	124	122	<u>177</u>	<u>173</u>	<u>61</u>	<u>75</u>	<u>29</u>	<u>29</u>	<u>29</u>	<u>29</u>	<u>60</u>		<u>5</u>													<u>206</u>
																																							Ma	aximum	Trips	412

Table M-50. Alternative 4 Maximum Daily Construction Worker Trips by Component

Table W-30. Alternative	TIVIUA	IIIIuIII	Duny	70113ti t	uction	TTOIN		JUNE	Joinipo	Michit																																
																			Estir	nated I	Duratio	on, We	<u>ek</u>																			
Alternative 4	1	2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>Maximum</u>
Channel W	<u>70</u>	<u>38</u>	88	<u>35</u>	<u>50</u>	41	100	91	91	84	84	136	163	206	<u>136</u>	144	124	122	177	173	61	<u>75</u>	29	29	29	29	<u>60</u>		<u>5</u>													<u>206</u>
<u>Downstream</u>	<u>18</u>	9	9	9	9	20	24	24	27	28	28	28	<u>35</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	28	<u>4</u>	4	13	8	2	<u>0</u>	0	<u>0</u>		0													<u>56</u>
Fish Passage E	<u>8</u>	<u>10</u>	<u>18</u>	9	<u>8</u>	20	<u>56</u>	4	<u>36</u>	<u>8</u>	7	9	14	<u>6</u>	18	2	<u>4</u>	<u>4</u>	2	0	0	0	0	0	<u>0</u>	0	<u>8</u>		<u>5</u>													<u>56</u>
Ag Crossing 1	<u>15</u>	9	<u>20</u>	<u>4</u>	<u>4</u>	<u>10</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	<u>23</u>	<u>12</u>	<u>9</u>	<u>9</u>	<u>12</u>	<u>21</u>	<u>8</u>	<u>31</u>	<u>9</u>	<u>7</u>	<u>0</u>	<u>13</u>	2	<u>0</u>	<u>0</u>	0	<u>0</u>		0													<u>31</u>
<u>Northern</u>	<u>26</u>	<u>19</u>	<u>24</u>	<u> 26</u>	44	<u>46</u>	<u>65</u>	<u>43</u>	<u>39</u>	<u>59</u>	<u>46</u>	<u>20</u>	21	<u>11</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>13</u>	<u>4</u>	<u>8</u>	<u>8</u>	<u>10</u>	2	<u>0</u>	<u>0</u>	0	<u>0</u>		0													<u>65</u>
Southern	<u>30</u>	<u>28</u>	<u>33</u>	<u>36</u>	<u>44</u>	<u>46</u>	<u>101</u>	<u>79</u>	<u>75</u>	<u>87</u>	<u>74</u>	<u>75</u>	<u>73</u>	<u>75</u>	<u>73</u>	<u>75</u>	<u>77</u>	<u>77</u>	<u>68</u>	<u>17</u>	<u>24</u>	<u>10</u>	2	<u>0</u>	<u>0</u>	0	0		0													<u>101</u>
<u>Total</u>	<u>167</u>	<u>113</u>	<u>192</u>	<u>119</u>	<u>159</u>	<u>183</u>	<u>349</u>	<u>245</u>	<u>271</u>	<u>284</u>	<u> 262</u>	280	<u>315</u>	363	<u>304</u>	309	282	303	<u>288</u>	209	<u>97</u>	<u>121</u>	<u>43</u>	<u>31</u>	<u>29</u>	<u>29</u>	<u>68</u>	1	10													<u>363</u>
East Alternative Route	67	47	71	48	<u>65</u>	96	148	75	105	113	104	69	79	82	95	90	81	104	<u>43</u>	19	12	36	12	2	0	0	8		5													148
West Alternative Route	100	66	121	<u>71</u>	94	87	201	170	166	<u>171</u>	158	211	236	281	209	219	201	199	245	190	85	85	31	29	29	29	60		5													281

Maximum Trips

562

																			Estim	ated D	uratio	n, We	<u>ek</u>																			
Alternative 5	<u>1</u>	2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u> 25</u>	<u> 26</u>	<u> 27</u>	<u> 28</u>	<u> 29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u> 4	1 <u>Ma</u>	ximum
Channel C	148	130	183	120	202	182	119	203	<u>260</u>	231	214	182	251	231	210	225	225	<u>65</u>	<u>16</u>	<u>12</u>	<u>10</u>	<u>10</u>	<u>156</u>	<u>57</u>	103	<u>19</u>	0	0	<u>105</u>	<u>43</u>	43	43	43	43	<u>43</u>	43	43	<u>47</u>	23	105	0	260
Fish Passage W	<u>8</u>	<u>10</u>	<u>18</u>	9	<u>8</u>	20	<u>56</u>	<u>4</u>	<u>36</u>	<u>8</u>	<u>7</u>	<u>9</u>	<u>14</u>	<u>6</u>	<u>18</u>	2	<u>4</u>	<u>4</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	8	<u>5</u>	=	==	=	==	=	==	<u>=</u>	==	=	==	: =	==		<u>56</u>
Ag Crossing 1	<u>15</u>	<u>9</u>	20	<u>4</u>	<u>4</u>	10	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	23	<u>12</u>	9	9	<u>12</u>	<u>21</u>	8	<u>31</u>	<u>9</u>	<u>7</u>	<u>0</u>	<u>13</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	=	=	=	=	=	=	=	=	=	=	=	. =		<u>31</u>
Tule Canal	<u>50</u>	<u>64</u>	<u>64</u>	64	82	84	83	<u>42</u>	39	<u>59</u>	86	87	84	88	94	<u>94</u>	94	92	<u>51</u>	<u>51</u>	<u>13</u>	<u>44</u>	<u>16</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	=	=	=	=	=	=	=	=	=	=	=	. =		94
Total w/o Tule Canal	<u>171</u>	<u>149</u>	<u>221</u>	<u>133</u>	<u>214</u>	<u>212</u>	<u>178</u>	<u>211</u>	<u>299</u>	<u>257</u>	<u>244</u>	<u>203</u>	<u>274</u>	<u>246</u>	<u>240</u>	<u>248</u>	<u>237</u>	<u>100</u>	<u>27</u>	<u>19</u>	<u>10</u>	<u>23</u>	<u>158</u>	<u>57</u>	<u>103</u>	<u>19</u>	<u>8</u>	<u>5</u>	<u>105</u>	<u>43</u>	<u>43</u>	<u>43</u>	<u>43</u>	<u>43</u>	<u>43</u>	<u>43</u>	<u>43</u>	<u>47</u>	<u>23</u>	<u>105</u>	0	<u>299</u>
Option 1 (w/o Tule Canal)																																										
East Alternative Route	<u>163</u>	139	203	124	206	192	122	207	<u>263</u>	249	237	194	260	240	222	246	233	<u>96</u>	<u>25</u>	<u>19</u>	<u>10</u>	23	158	<u>57</u>	103	<u>19</u>	0	0	<u>105</u>	<u>43</u>	43	43	43	43	<u>43</u>	43	43	<u>47</u>	23	<u>105</u>	0	<u>263</u>
West Alternative Route	<u>8</u>	<u>10</u>	<u>18</u>	<u>9</u>	<u>8</u>	20	<u>56</u>	<u>4</u>	<u>36</u>	<u>8</u>	<u>7</u>	<u>9</u>	<u>14</u>	<u>6</u>	<u>18</u>	2	<u>4</u>	<u>4</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>56</u>
Option 2 (w/o Tule Canal)																																										
East Alternative Route	<u>15</u>	9	20	<u>4</u>	<u>4</u>	<u>10</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	23	12	9	9	<u>12</u>	<u>21</u>	8	<u>31</u>	9	7	0	<u>13</u>	2	<u>0</u>	0	<u>0</u>	0	0	0	0	0	0	0	0	<u>0</u>	0	0	0	0	<u>0</u>	0	<u>31</u>
West Alternative Route	156	140	<u>201</u>	129	<u>210</u>	202	<u>175</u>	207	296	239	221	<u>191</u>	265	237	228	227	229	69	<u>18</u>	<u>12</u>	<u>10</u>	<u>10</u>	<u>156</u>	<u>57</u>	103	<u>19</u>	<u>8</u>	<u>5</u>	105	<u>43</u>	<u>43</u>	<u>43</u>	<u>43</u>	43	<u>43</u>	43	<u>43</u>	47	<u>23</u>	<u>105</u>	0	296
Option 3 (w/o Tule Canal)																																										
East Alternative Route	<u>89</u>	<u>74</u>	112	64	<u>105</u>	101	63	106	133	134	130	103	<u>135</u>	125	117	134	121	<u>64</u>	17	<u>13</u>	5	18	80	<u>29</u>	52	10	0	0	<u>53</u>	22	22	22	22	22	22	22	22	<u>24</u>	12	<u>53</u>	0	<u>135</u>
West Alternative Route	<u>82</u>	<u>75</u>	<u>110</u>	<u>69</u>	<u>109</u>	<u>111</u>	<u>116</u>	<u>106</u>	<u>166</u>	<u>124</u>	<u>114</u>	<u>100</u>	140	122	<u>123</u>	<u>115</u>	<u>117</u>	<u>37</u>	<u>10</u>	<u>6</u>	<u>5</u>	<u>5</u>	<u>78</u>	<u>29</u>	<u>52</u>	<u>10</u>	<u>8</u>	<u>5</u>	<u>53</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>24</u>	<u>12</u>	<u>53</u>	0	<u>166</u>
																																							May	imum Tr	ine	592

<u>Table M-52. Alternative 6 Maximum Daily Construction Worker Trips by Component</u>

																			Estin	nated	Duratio	on, We	ek_																			
Alternative 6	<u>1</u>	2	<u>3</u>	4	<u>5</u>	<u>6</u>	<u>7</u>	8	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	22	<u>23</u>	<u>24</u>	<u>25</u>	<u> 26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	32	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	41	Maximum
Channel W	<u>96</u>	134	<u>71</u>	<u>51</u>	<u>74</u>	<u>65</u>	94	<u>81</u>	<u>74</u>	101	318	318	312	320	<u>316</u>	298	325	323	293	<u>335</u>	303	<u>131</u>	147	<u>111</u>	<u>35</u>	<u>35</u>	27	7 8	7													<u>335</u>
<u>Downstream</u>	<u>18</u>	9	9	9	9	20	<u>24</u>	<u>24</u>	<u>27</u>	<u>28</u>	<u>28</u>	28	<u>35</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>56</u>	<u>28</u>	<u>4</u>	<u>4</u>	<u>13</u>	<u>8</u>	2	<u>0</u>	0	<u>(</u>	0	0													<u>56</u>
Fish Passage E	<u>8</u>	<u>10</u>	<u>18</u>	9	<u>8</u>	20	<u>56</u>	<u>4</u>	<u>36</u>	<u>8</u>	<u>7</u>	9	<u>14</u>	<u>6</u>	<u>18</u>	2	<u>4</u>	<u>4</u>	2	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	0	<u>8</u>	<u>8</u>	<u>5</u>													<u>56</u>
Ag Crossing 1	<u>15</u>	9	<u>20</u>	<u>4</u>	<u>4</u>	<u>10</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>18</u>	<u>23</u>	<u>12</u>	9	<u>9</u>	<u>12</u>	<u>21</u>	<u>8</u>	<u>31</u>	<u>9</u>	<u>7</u>	<u>0</u>	<u>13</u>	2	<u>0</u>	<u>0</u>	0	<u>(</u>	0	0													<u>31</u>
<u>Total</u>	<u>137</u>	<u>162</u>	<u>118</u>	<u>73</u>	<u>95</u>	<u>115</u>	<u>177</u>	<u>113</u>	<u>140</u>	<u>155</u>	<u>376</u>	<u>367</u>	<u>370</u>	<u>391</u>	<u>402</u>	<u>377</u>	393	<u>414</u>	<u>332</u>	<u>346</u>	<u>307</u>	<u>157</u>	<u>157</u>	<u>113</u>	<u>35</u>	<u>35</u>	35	<u>5</u> 9	2													<u>414</u>
East Alternative Route	41	28	<u>47</u>	22	21	<u>50</u>	83	32	66	<u>54</u>	<u>58</u>	49	<u>58</u>	71	86	79	68	<u>91</u>	<u>39</u>	<u>11</u>	4	26	<u>10</u>	2	0	0	<u>3</u> (8	5													<u>91</u>
West Alternative Route	<u>96</u>	<u>134</u>	<u>71</u>	<u>51</u>	<u>74</u>	<u>65</u>	<u>94</u>	<u>81</u>	<u>74</u>	<u>101</u>	<u>318</u>	<u>318</u>	<u>312</u>	320	<u>316</u>	<u>298</u>	<u>325</u>	<u>323</u>	293	335	303	<u>131</u>	<u>147</u>	<u>111</u>	<u>35</u>	<u>35</u>	27	7 8	7													<u>335</u>
																																							Ma	ximum '	<u> Frips</u>	<u>670</u>

Construction Vibration - Equipment Alternative 1 - East Alignment

Table LM-53. Construction Vibration and Ground-Borne Vibration

_				Single		Single		
				Equipment		Equipment	Add to Single	
			Number of	PPV at 25 ft	Total PPV at	Lv at 25 ft	Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1	-	_	-	0	-
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1	_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	_	16	_
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	_	_	_	0	 -
Levee earn Road Regrading (o 715)	4000 GAL Water Truck (1)	Loaded Trucks	'	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	'	0.070	0.070		0	
		Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	16 CY 3 Axle Dump Truck (5) Flatbed Truck (1)	Loaded Trucks Loaded Trucks	1	0.076		86		86
Temporary Electrical Power	` '		· ·	0.076	0.076	80	0	86
09 - Channels and Canals	Pickup Truck Conventional (2)	n/a	2	-			6	
Mobilization and Demobilization	Flath and Twick (4 now piece of actions and)	II and ad Trucks	20	0.070	0.400	0.0	20	145
Modifization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	28	0.076	2.128	86	29	115
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	-	-	12	-
	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	_	_	_	17	_
Earthen Backfill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0	0	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	_	_	0	_
	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2		-	_	6	_
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	In/a	, ,	0.009	0.009	"	14	"
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	5 23	0.076	1.748	86	27	113
Pinran Class 2				0.076	1./40	00		113
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	2	- 0.000	0.000	-	6	0.7
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	<u>-</u>	14	
1	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113

Table <u>LM</u> -53. Construction Vibration	on and Ground-Borne Vibration	Estimated Duration, Week																											
_																													
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations				•		•				<u> </u>				<u>. </u>	•	•	•		•	•		<u>. </u>	<u>'</u>	<u> </u>					_
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	İ																											
	4000 GAL Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)															1			 										
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	1																											
Executation (vvet conditions)	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	 		+												+				+									
	21 CY Scrapers (4)	1																											
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Earthen Backfill	300 HP Dozer (1)	1																											
Lartion Backini	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	1		+																									
	300 HP Dozer Crawler (1)	1																											
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	1		+																	+	+							
1	300 HP Dozer Crawler (1)	1																											
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
	TO CT 3 AXIE DUITIP TRUCKS (23)	1																											

Construction Vibration - Equipment Alternative 1 - East Alignment

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	2	_	_	_	6	_
The bedding waterial	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.003	0.003	07	14	07
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	0.070	1.740	-	0	113
Elosion Control Seeding	Pickup Truck Conventional (4)	n/a	4	_	-	_	12	-
11-Levees and Floodwalls	Pickup Truck Conventional (4)	Jii/a	4	-	-	-	12	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	7	0.076	0.532	86	17	103
INIODIIIZALION AND DEMODIIIZALION	Extended Boom Pallet Loader (1)		1 1	0.076	0.552	00	l	103
		n/a		-	-	-	0	-
Soil Cement Bentonite Cutoff Wall	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Soil Cement Bentonite Cutori Wali	4.5 CY Hydraulic Excavator (1)	n/a	1 1	-	-	-	0	-
	300 HP Dozer (1)	Large Bulldozer		0.089	0.089	87	0	87
	2.5 CY Hydraulic Excavators (1)	n/a		-	-	-	0	-
	16 CY 3 Axle Dumpt Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Flash Mixer (1)	n/a	1	-	-	-	0	-
	Slurry Pump (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
15 - Floodway Control and Diversion Struc								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	14	0.076	1.064	86	23	109
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	1	-	10	-
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	-	_	0	-
	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1 1	_	-	-	0	-
	Concrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	-	-	_	0	-
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	-	-	18	-
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	_	_	_	0	_
Tieddworks Ctructure	2.5" Dia. Concrete Vibrator (1)	n/a	'1	_	_	_	0	_
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	0.070	0.132		17	- JZ
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
I I I GAUWUINS CHAIHICH HAHSILIUH	Concrete Mixer Truck (2)			0.076	- 0.152	-		<u>-</u>
	` '	Loaded Trucks	2	0.076	0.152	86	6	92
His and Dathers Onto	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1 1	-	-	-	0	-
	Haul Truck Oversize Transport (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	\Box									
3 111	300 HP Dozer Crawler (1)										
	Pickup Truck Conventional (5)										
	16 CY 3 Axle Haul Trucks (23)										
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)										
3	Pickup Truck Conventional (4)									1	
11-Levees and Floodwalls	i ionap i iona como inacina. (1)										
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	$\overline{}$									
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										
Soil Cement Bentonite Cutoff Wall	4.5 CY Hydraulic Excavator (1)										
	300 HP Dozer (1)										
	2.5 CY Hydraulic Excavators (1)										
	16 CY 3 Axle Dumpt Truck (1)										
	Flash Mixer (1)										
	Slurry Pump (1)										
	Pickup Truck Conventional (5)										
15 - Floodway Control and Diversion Struc	tures										
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)									ı	
	Pickup Truck Conventional (1)									ı	
Construction Site Dewatering	Flatbed Truck (1)										
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)										
	Pickup Truck Conventional (6)										
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)										
	Pickup Truck Conventional (3)										
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)										
	300 HP Dozer (2)										
	3.5 CY Front End Loader, Wheel (2)										
	16 CY 3 Axle Dump Truck (9)										
	Pickup Truck Conventional (7)										
Sheet Pile Wall	Flatbed Truck (1)										
	75 TN Crane Crawler Pile Hammer (1)										
	Pickup Truck Conventional (6)										
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)										
	100 FT Auger Track Mounted Drill Rig (1)										
	Concrete Pump Boom Truck Mounted (1)										
	Concrete Mixer Truck (3)										
	0.8 CY Backhoe Loader (1)										
	24 TN Truck End Dump (2)										
	Pickup Truck Conventional (8)										
Headworks Structure	Concrete Pump Boom Truck Mounted (1)										
	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (7)										
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (6)										
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)										
	Haul Truck Oversize Transport (1)										
	Pickup Truck Conventional (4)										

Construction Vibration - Equipment Alternative 1 - East Alignment

08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	5	0.076	0.38	86	14	100
	Extended Boom Pallet Loader (1)	n/a	1	_	_	_	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
ŭ	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1	_	_	_	0	_
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	_	_	_	0	_
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	_	_	18	-
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	n/a	1	_	-	_	0	_
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	n/a	1	_	_	_	0	_
and thingstand	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	_
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	_
19 - Buildings, Grounds, and Utilities	i ionap i aon comonacia (c)	1						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	_
	Pickup Truck Conventional (1)	n/a	1	_	_	_	0	_
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a	1 1	-	-	_	0	_
	Motor Grader (1)	n/a	1 1	_	_	_	0	_
	Compactor (1)	n/a	1 1	_	_	_	ő	_
	4000 GAL Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	_	_	_	0	_
	Pickup Truck Conventional (7)	n/a	7	_	_	_	17	_
	Concrete Pump Boom Truck Mounted (1)	n/a	1	_	_	_	0	_
	2.5" Dia. Concrete Vibrator (1)	n/a	1	_	_	_	0	_
	Extended Boom Pallet Loader (1)	n/a	1 1	_	_	_	0	_
	Concrete Mixer Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1 1	-	-	-	0	-
Control Buot Burnt	2.5" Dia. Concrete Vibrator (1)	n/a	1 1	_	_	_	0	_
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-		_	17	_
20 -Permanent Operating Equipment	Tionap Track Conventional (1)	1100	,				.,	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1 1	-	-	_	0	_
	Pickup Truck Conventional (1)	n/a	1 1	_	_	_	0	_
	Temp. Mobile Office Building (1)	n/a	1 1	_	_	_	ő	_
Mechanical Hydraulic Cylinders & Housing		n/a	1	_	_		0	_
Modification rigardano Oyintacio & ribusing	Pickup Truck Conventional (3)	n/a	3		_		10	_
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	<u>-</u>	-	-	0	<u>-</u>
ONO Dunding Medianical Equipment	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Electrical Control Equipment CMU Building		n/a	3	-	-	-	10	-
Electrical Control Equipment CMU Building	, , ,	n/a	3		-		10	-
, ,	. ,	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	III/a	3	-	-	-	10	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

08 - Roads, Railroads, and Bridges		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
MODINZALION AND DEMODINZALION	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	
li edestriari bridge Concrete i iles	100 FT Auger Track Mounted Drill Rig (1)	
	Concrete Pump Boom Truck Mounted (1)	
	Connete Mixer Truck (3)	
	0.8 CY Backhoe Loader (1)	
	24 TN Truck End Dump (2)	
	Pickup Truck Conventional (8)	
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	
and wingwaiis	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (7)	
Dedectrian Bridge Chan Installation		
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1) Flatbed Truck (2)	
	Pickup Truck Conventional (5)	
19 - Buildings, Grounds, and Utilities	Trickup Huck Conventional (3)	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
Mobilization and Demobilization	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
CMU Building and Earthwork Pad	165 HP Dozer (1)	
Construction	Scraper (1)	
Construction	Motor Grader (1)	
	Compactor (1)	
	4000 GAL Water Truck (1)	
	10 TN Smooth Roller (1)	
	Pickup Truck Conventional (7)	
	Concrete Pump Boom Truck Mounted (1)	
	2.5" Dia. Concrete Vibrator (1)	
	Extended Boom Pallet Loader (1)	
	Concrete Mixer Truck (1)	
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	
Controllere Duct Dalik	2.5" Dia. Concrete Vibrator (1)	
	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (7)	
20 -Permanent Operating Equipment	I lokup Huck Conventional (1)	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
moszatori ana bomobilization	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
	Temp. Mobile Office Building (1)	
Mechanical Hydraulic Cylinders & Housing		
incondition rigardano dymidera di ricusting	Pickup Truck Conventional (3)	
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	
omo Ballaling Moonariloar Equipmont	Pickup Truck Conventional (3)	
Electrical Control Equipment CMU Building		
Electrical Power Equipment CMU Building		
Communication Equipment	Pickup Truck Conventional (3)	
	Fickup Truck Conventional (3)	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Construction Vibration - Equipment Alternative 1 - East Alignment

Table <u>⊾M</u> -54. Construction Vibration Level at the Receptor												Е	stima	ted Du	uration	ı, Wee	k											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Building Damage																												
Total PPV @ 25'																								0.08	0.08	n/a	1.82	0.46
Distance from the Center of Construction Activity to a Receptor (ft)																					200	200	200	200	200	200	200	200
PPV at the Receptor (in/sec)	0.15	0.02	0.07	0.05	0.06	0.06	0.12	0.12	0.11	0.07	0.07	0.09	0.09	0.18	0.19	0.18	0.17	0.19	0.09	n/a	0.01	0.00	0.00	0.00	0.00	n/a	0.08	0.02
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	no	no	no	no	no	n/a	no	no
Human Annoyance																												
Total Lv @ 25'								117								120					98		86	86	86		114	
Distance from the Center of Construction Activity to a Receptor (ft)	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080
Distance Divergence (dBA)	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Lv at the Receptor (VdB)	70	54	63	60	61	61	68	68	67	64	63	65	65	71	72	71	71	72	66	n/a	49	37	37	37	37	n/a	65	52
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	no	no	no	no	no	n/a	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

7500

Source: Google Earth

Table LM-55. Construction Vibration and Ground-Borne Vibration

Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations	Equipment Description	Lookup Equipment Types	Equipment	(III/Sec)	25 it (iii/Sec)	(VUB)	(VUB)	25 It (VUB)
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
Woomzation and Demobilization	Extended Boom Pallet Loader (1)	n/a	1	0.070	0.430	_	0	102
	Pickup Truck Conventional (1)	n/a	1 1				0	
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1		-	_	0	
Tremont Well Dellio	3.5 CY Front End Loader, Wheel (1)	n/a	'	_	_	_	0	_
	0.8 CY Loader/Backhoe, Wheel (1)	n/a		_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)			0.076	0.076	00	16	00
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a n/a	6	-	-	-	0	-
Levee Odivi Road Regrading (6 Ab)	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	- 0.076	- 06		-
	` '		1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1 5	- 0.070		-	0	100
Towns are reflective at Device	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100 86
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
09 - Channels and Canals	Pickup Truck Conventional (2)	n/a	2	-		_	6	
Mobilization and Demobilization	Clathod Truck (1 per piece of equipment)	Loaded Trucks	20	0.076	2 420	86	20	115
Modifization and Demobilization	Flatbed Truck (1 per piece of equipment)		28	0.076	2.128	80	29	115
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
Olassian and Ombhinn	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a		-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	-	-	12	-
	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Earthen Backfill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113

Construction Vibration - Equipment Alternative 2 - Center Alignment

Table <u>LM</u> -55. Construction Vibratio	on and Ground-Borne Vibration													Estima	ted D	uratio	n, Wee	ek_											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations	,																												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												A
	Pickup Truck Conventional (1)																												A
	16 CY 3 Axle Dump Truck (5)																												A
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals			•																				<u>' </u>						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												T
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
(300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												
]	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Earthen Backfill	300 HP Dozer (1)																												
	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												+
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	1																											+
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
	10 01 3 Axie Dullip Hucks (23)																												

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	ln/a	2	_	-	_	6	
. to:	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-		_	14	_
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
Liberary Cooding	Pickup Truck Conventional (4)	n/a	4	_	_	_	12	_
15 - Floodway Control and Diversion Struc		1170					12	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	14	0.076	1.064	86	23	109
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	_	_	_	0	_
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
(composally concreamly	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	_	-	_	0	_
oonen determinente granden in gra	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	_	_	_	0	_
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-		-	17	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Check ine Wall	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1 1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	- 0.011	-	16	-
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
Trodumorno curaciaro concrete i mec	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1 1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1 1	-	- 0.000	-	0	
	Concrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	-		_	0	_
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	0.102	-	18	_
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	_	_	_	0	_
Trodaworko otraolaro	2.5" Dia. Concrete Vibrator (1)	n/a	1 1	_	_	_	0	_
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	0.102	_	17	_
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a	1	_	_	_	0	_
Treadworks Chamier Transition	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	-	0.102	_	16	
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
Thinged Bottom Cates	Haul Truck Oversize Transport (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	-	0.070	_	12	_
08 - Roads, Railroads, and Bridges	rickap ridok derivertional (1)	11/4					12	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	5	0.076	0.38	86	14	100
Weblinzation and Bomosinzation	Extended Boom Pallet Loader (1)	n/a	1	-		-	0	-
	Pickup Truck Conventional (1)	n/a	1	_	_	_	0	_
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
. Saccaran Enage Controlote i nec	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1 1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	'1	-	- 5.555	-	0	
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1 1	-	- 5.220	_	0	50
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	0.070	0.102		18	52
	I locap truck conventional (o)	lina	O				10	

Construction Vibration - Equipment Alternative 2 - Center Alignment

DCD Dadding Material	2.5. CV Hydraulia Evenyeters (2)	
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	
	300 HP Dozer Crawler (1)	
	Pickup Truck Conventional (5)	
	16 CY 3 Axle Haul Trucks (23)	
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	
15 51 1 0 1 1 1 1 1 1 1	Pickup Truck Conventional (4)	
15 - Floodway Control and Diversion Struc		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
Construction Site Dewatering	Flatbed Truck (1)	
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	
	Pickup Truck Conventional (6)	
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	
	Pickup Truck Conventional (3)	
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	
	300 HP Dozer (2)	
	3.5 CY Front End Loader, Wheel (2)	
	16 CY 3 Axle Dump Truck (9)	
	Pickup Truck Conventional (7)	
Sheet Pile Wall	Flatbed Truck (1)	
	75 TN Crane Crawler Pile Hammer (1)	
	Pickup Truck Conventional (6)	
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	
	100 FT Auger Track Mounted Drill Rig (1)	
	Concrete Pump Boom Truck Mounted (1)	
	Concrete Mixer Truck (3)	
	0.8 CY Backhoe Loader (1)	
	24 TN Truck End Dump (2)	
	Pickup Truck Conventional (8)	
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	
	2.5" Dia. Concrete Vibrator (1)	
	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (7)	
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	
	Concrete Mixer Truck (2)	
	Pickup Truck Conventional (6)	
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	
	Haul Truck Oversize Transport (1)	
	Pickup Truck Conventional (4)	
08 - Roads, Railroads, and Bridges		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	
	Extended Boom Pallet Loader (1)	
	Pickup Truck Conventional (1)	
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	
	100 FT Auger Track Mounted Drill Rig (1)	
	Concrete Pump Boom Truck Mounted (1)	
	Cocnrete Mixer Truck (3)	
	0.8 CY Backhoe Loader (1)	
	24 TN Truck End Dump (2)	
	Pickup Truck Conventional (8)	
	r localy tradit controllations (c)	

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
19 - Buildings, Grounds, and Utilities								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a	1	-	-	-	0	-
	Motor Grader (1)	n/a	1	-	-	-	0	-
	Compactor (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3				10	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

- Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Construction Vibration - Equipment Alternative 2 - Center Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)										
and Wingwalls	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (7)										
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)										
	Flatbed Truck (2)										
	Pickup Truck Conventional (5)										
19 - Buildings, Grounds, and Utilities			•								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										
CMU Building and Earthwork Pad	165 HP Dozer (1)										
Construction	Scraper (1)										
	Motor Grader (1)										
	Compactor (1)										
	4000 Gal Water Truck (1)										
	10 TN Smooth Roller (1)										
	Pickup Truck Conventional (7)										
	Concrete Pump Boom Truck Mounted (1)										
	2.5" Dia. Concrete Vibrator (1)										
	Extended Boom Pallet Loader (1)										
	Concrete Mixer Truck (1)										
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)										
	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (7)										
20 -Permanent Operating Equipment											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (3)										
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (3)										
Electrical Control Equipment CMU Buildin											
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)										
Communication Equipment	Pickup Truck Conventional (3)										
0 UDD 0047 Vala Dimana 0-linas	id Habitat Pastaration & Fish Passage Project	•				•	•		•		*

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Table <u>LM</u> -56. Construction Vibration Level at the Receptor												E	stima	ted Du	ıratior	ı, Wee	k											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	3.42	0.55	1.61	1.11	1.28	1.13	2.81	2.22	2.22	1.5	1.33	2.31	4.3	3.83	4.21	4.3	3.83	3.83	3.98	2.51	0.3	n/a	0.08	80.0	0.08	0.08	1.82	0.46
Distance from the Center of Construction Activity to a Receptor (ft)	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
PPV at the Receptor (in/sec)	0.16	0.03	0.07	0.05	0.06	0.05	0.13	0.10	0.10	0.07	0.06	0.11	0.20	0.18	0.19	0.20	0.18	0.18	0.18	0.12	0.01	n/a	0.00	0.00	0.00	0.00	0.08	0.02
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	no	no	no	no	no	no
Human Annoyance	_																											
Total Lv @ 25'		103		109									121				120			116			86		86		114	
Distance from the Center of Construction Activity to a Receptor (ft)																					1090	1090	1090	1090	1090	1090	1090	1090
Distance Divergence (dBA)	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2
Lv at the Receptor (VdB)	70	54	63	60	61	60	68	66	66	63	62	66	72	71	72	72	71	71	71	67	49	n/a	37	37	37	37	64	52
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	no	no	no	no	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

4200

Receptors:

Nearest residential receptor (ft)

Source: Google Earth

Construction Vibration - Equipment Alternative 3 - West Alignment

Table <u>⊾M</u> -57. Construction Vibration Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations				Ì				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1	-	_	-	0	_
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1 1	_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	_	16	_
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1		_	_	0	
Leves eam rioda riograamig (e 7.2)	4000 Gal Water Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	'1	0.070	0.070	_	0	_
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Temporary Electrical Fower	Pickup Truck Conventional (2)	n/a	2	0.070	0.070	-	6	00
09 - Channels and Canals	Fickup Truck Conventional (2)	III/a		-	_	_	U	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	28	0.076	2.128	86	29	115
Woomization and Demobilization	Extended Boom Pallet Loader (1)	n/a	1 1	0.070	2.120	_	0	-
	Pickup Truck Conventional (1)	n/a	'1	_		_	0	
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	Trailer Mounted Brush Chipper (1)	n/a		-	_	_	0	-
	Chainsaw (1)	n/a		-	_	_	0	-
	4000 Gal Water Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	0.076	0.076	00	16	00
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	0.076	0.076	00	0	00
Excavation (vvet Conditions)	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	In/a	2	0.009	0.176	07	6	93
		Loaded Trucks	9	0.076	0.684	- 06	_	105
	16 CY 3 Axle Dump Truck (9) Pickup Truck Conventional (7)	n/a	7	0.076	0.004	86	19 17	105
Everystian/Crading (Dry Conditions)	300 HP Dozer (1)	-	1	0.089	0.089	87	0	87
Excavation/Grading (Dry Conditions)	` '	Large Bulldozer		0.069	0.069	07		0/
	21 CY Scrapers (4)	n/a	4	-	-	-	12 0	-
	12' Blade Grader (1) 4000 Gal Water Truck (1)	n/a Loaded Trucks		0.076	0.076	- 06		86
	` '		7	0.076	0.076	86	0	00
Conthon Doolefill	Pickup Truck Conventional (7)	n/a	<u> </u>	- 0.000	- 0.000	- 07	17	- 07
Earthen Backfill	300 HP Dozer (1)	Large Bulldozer	1 1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
Discussion Oliver O	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	-	- 0.000	-	6	
	300 HP Dozer Crawler (1)	Large Bulldozer	1 1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-		-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	2	-		-	6	
	300 HP Dozer Crawler (1)	Large Bulldozer	1 1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113

Table <u>LM</u> -57. Construction Vibration	on and Ground-Borne Vibration																												
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations							<u> </u>			<u> </u>		<u> </u>	•	<u> </u>		<u>. </u>	•	<u> </u>	<u>. </u>	•			<u>. </u>	<u> </u>					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												ı
	0.8 CY Loader/Backhoe, Wheel (1)																												I
	4000 Gal Water Truck (1)																												ı
	16 CY 3 Axle Dump Truck (1)																												ı
	Pickup Truck Conventional (6)																												ı
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	1																											
15 15 (1 1 1 2)	4000 Gal Water Truck (1)																												i
	Pickup Truck Conventional (1)																												i
	16 CY 3 Axle Dump Truck (5)																												i
Temporary Electrical Power	Flatbed Truck (1)																												
Tomporary Electrical Ferrei	Pickup Truck Conventional (2)																												I
09 - Channels and Canals	Florage Frank Conventional (2)																												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										Τ				Τ									Π		Т			_
Wideling and Bernesingation	Extended Boom Pallet Loader (1)																												ı
	Pickup Truck Conventional (1)																												ı
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
Cleaning and Grubbing	Trailer Mounted Brush Chipper (1)																												ı
	Chainsaw (1)																												ı
	4000 Gal Water Truck (1)																												ı
	Pickup Truck Conventional (6)																												ı
	16 CY 3 Axle Dump Truck (1)																												ı
Everystian (Met Conditions)		-																											
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												ı
	300 HP Dozer (2)																												ı
	3.5 CY Front End Loader, Wheel (2)																												ı
	16 CY 3 Axle Dump Truck (9)																												I
For a vertical Open diagram (D. C. C. C. C. C. C. C. C. C. C. C. C. C.	Pickup Truck Conventional (7)	1																											
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												ı
	21 CY Scrapers (4)																												I
	12' Blade Grader (1)																												ı
	4000 Gal Water Truck (1)																												I
5 H D 16"	Pickup Truck Conventional (7)	-																											
Earthen Backfill	300 HP Dozer (1)																												I
	4000 Gal Water Truck (1)																												I
	10 TN Smooth Roller (1)																												ı
	Pickup Truck Conventional (3)																												—
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												ı
	300 HP Dozer Crawler (1)																												I
	Pickup Truck Conventional (5)																												ı
	16 CY 3 Axle Dump Trucks (23)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												ı
	Pickup Truck Conventional (5)																												I
	16 CY 3 Axle Dump Trucks (23)																												ı

Construction Vibration - Equipment Alternative 3 - West Alignment

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	2	I -	I -	_	6	
To bedding waterial	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87		87
	Pickup Truck Conventional (5)	n/a	5	0.003	0.003	01	14	07
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	0.070	1.740	00	0	113
Erosion Control Seeding	Pickup Truck Conventional (4)	n/a	1	-	-	-	12	-
15 Floodway Control and Divorsion Struc		Пиа	4	-	<u> </u>	-	12	<u> </u>
15 - Floodway Control and Diversion Structure Mobilization and Demobilization		Loaded Trucks	1 44	0.076	1.064	0.0	I 00	109
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)		14	0.076	1.004	86	23	109
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
Operator ation Oita Daviatasia	Pickup Truck Conventional (1)	n/a	1	- 0.070	- 0.070	-	0	-
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1			-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	-	-	-	0	-
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	-	-	18	-
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Hinged Bottom Gates		n/a	1	-	-	-	0	-
	Haul Truck Oversize Transport (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	_	_	-	12	_
08 - Roads, Railroads, and Bridges					•			•
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	5	0.076	0.38	86	14	100
	Extended Boom Pallet Loader (1)	n/a	1	_	_	-	0	-
	Pickup Truck Conventional (1)	n/a	1	_	_	_	0	_
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
1.50	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1 1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0] -
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1 1]	3.220	-	l	55
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	3.576	3.132	_	18	52
	I lokup Huck Collivelitional (0)	III.a	l o				10	

DOD De delie e Mekanial	0.5.0\(\text{11dec.dis.}\) \(Fig. 1			1										—
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)													
	300 HP Dozer Crawler (1)	Í												
	Pickup Truck Conventional (5)													
	16 CY 3 Axle Haul Trucks (23)	Д												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)													
	Pickup Truck Conventional (4)	$ldsymbol{f eta}$												
15 - Floodway Control and Diversion Struc		_									1			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)	<u> </u>												
Construction Site Dewatering	Flatbed Truck (1)													
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)													
	Pickup Truck Conventional (6)													
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)													
	Pickup Truck Conventional (3)													
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)													
	300 HP Dozer (2)													
	3.5 CY Front End Loader, Wheel (2)													
	16 CY 3 Axle Dump Truck (9)													
	Pickup Truck Conventional (7)													
Sheet Pile Wall	Flatbed Truck (1)													
	75 TN Crane Crawler Pile Hammer (1)													
	Pickup Truck Conventional (6)													
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)													
	100 FT Auger Track Mounted Drill Rig (1)													
	Concrete Pump Boom Truck Mounted (1)													
	Concrete Mixer Truck (3)													
	0.8 CY Backhoe Loader (1)													
	24 TN Truck End Dump (2)													
	Pickup Truck Conventional (8)													
Headworks Structure	Concrete Pump Boom Truck Mounted (1)													
	2.5" Dia. Concrete Vibrator (1)													
	Concrete Mixer Truck (2)													
	Pickup Truck Conventional (7)													
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)													
	Concrete Mixer Truck (2)													
	Pickup Truck Conventional (6)			<u>L</u>										
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)													
	Haul Truck Oversize Transport (1)													
	Pickup Truck Conventional (4)													
08 - Roads, Railroads, and Bridges														
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)													
-	100 FT Auger Track Mounted Drill Rig (1)													
	Concrete Pump Boom Truck Mounted (1)													
	Cocnrete Mixer Truck (3)													
	0.8 CY Backhoe Loader (1)													
	24 TN Truck End Dump (2)													
	Pickup Truck Conventional (8)													
				1									1	

Construction Vibration - Equipment Alternative 3 - West Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
19 - Buildings, Grounds, and Utilities		•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
İ	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
İ	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a	1	-	-	-	0	-
İ	Motor Grader (1)	n/a	1	-	-	-	0	-
Ì	Compactor (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
İ	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
Ì	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
Ì	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
Ì	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	1	-	17	-
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
Ì	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
İ	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Ĺ	Temp. Mobile Office Building (1)	n/a	1	-	1	-	0	-
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
İ	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
İ	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)											
and Wingwalls	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)											
	Flatbed Truck (2)											
	Pickup Truck Conventional (5)											
19 - Buildings, Grounds, and Utilities												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)											
CMU Building and Earthwork Pad	165 HP Dozer (1)											
Construction	Scraper (1)											
	Motor Grader (1)											
	Compactor (1)											
	4000 Gal Water Truck (1)											
	10 TN Smooth Roller (1)											
	Pickup Truck Conventional (7)											
	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Extended Boom Pallet Loader (1)											
	Concrete Mixer Truck (1)											
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
20 -Permanent Operating Equipment												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											4
	Pickup Truck Conventional (1)											4
	Temp. Mobile Office Building (1)											1
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (3)											
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (3)											
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)											
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)											
Communication Equipment	Pickup Truck Conventional (3)											

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Construction Vibration - Equipment Alternative 3 - West Alignment

Table LM-58. Construction Vibration Level at the Receptor												Е	stimat	ted Du	uratio	n, We	ek											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	3.42	0.55	1.61	1.11	1.28	1.13	2.81	2.38	2.38	1.66	1.66	3.33	3.49	4.85	4.21	4.3	3.83	3.83	5.82	6.18	2.14	1.84	0.08	0.08	0.08	0.08	1.82	0.46
Distance from the Center of Construction Activity to a Receptor (ft)	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
PPV at the Receptor (in/sec)	0.11	0.02	0.05	0.04	0.04	0.04	0.09	0.08	0.08	0.05	0.05	0.11	0.11	0.15	0.13	0.14	0.12	0.12	0.18	0.20	0.07	0.06	0.00	0.00	0.00	0.00	0.06	0.01
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Human Annoyance	_																											
Total Lv @ 25'			112	109	110		117						119				120	120	124	124	115	114	86	86	86	86	114	102
Distance from the Center of Construction Activity to a Receptor (ft)	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
Distance Divergence (dBA)	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
Lv at the Receptor (VdB)	76	60	69	66	67	66	74	72	72	69	69	75	76	79	77	78	77	77	80	81	72	70	43	43	43	43	70	58
Impact to Receptor	YES	no	no	no	no	no	YES	YES	YES	no	no	YES	YES	YES	YES	YES	YES	YES	YES	YES	no	no	no	no	no	no	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

700

Source: Google Earth

Table LM-59. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -59. Construction Vibration Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
09 - Channels and Canals					•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	28	0.076	2.128	86	29	115
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	_	-	16	_
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
,	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	_	-	6	_
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	-	-	12	-
	12' Blade Grader (1)	n/a	1	_	_	-	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	_
Earthen Backfill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Zartifori Baokiiii	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	_	-	_	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.000	0.505		14	
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	23	0.070	1./40	00	6	113
ripiap - Ciass s	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	- 87	0	87
		1 -		0.009	0.009	01	-	01
	Pickup Truck Conventional (5)	n/a	5	0.070	4740	-	14	440
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113

Construction Vibration - Equipment Alternative 4 - West Alignment

Table <u>LM</u> -59. Construction Vibratio	on and Ground-Borne Vibration												E	Stima	ted Du	ıratior	n, Wee	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												i
	4000 Gal Water Truck (1)																												i
	Pickup Truck Conventional (1)																												i
	16 CY 3 Axle Dump Truck (5)																												İ
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												
	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Earthen Backfill	300 HP Dozer (1)																												
	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																												
· .	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
	10 01 0 / Mic Dullip Hucks (20)	1			1																		1						

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	2	_	I -	_	6	
The bedding Material	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.009	0.009	07	_	67
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	- 1.748	86	14 27	113
Franian Control Sooding	0.8 CY Front End Loader, Wheel (1)	n/a	1	0.076	1.740	00	0	113
Erosion Control Seeding	Pickup Truck Conventional (4)		4	-	-	-	12	-
15 - Floodway Control and Diversion Struc	1 7	n/a	4	-	_	_	12	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	14	0.076	1.064	86	23	109
INIODIIIZALIOIT AITU DEITIODIIIZALIOIT	Extended Boom Pallet Loader (1)	n/a	1	0.070	1.004	00	0	109
	Pickup Truck Conventional (1)	n/a	1 1	_	_	_	0	_
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1 1	0.644	0.644	104	0	104
(Temporary Conerdam)	Pickup Truck Conventional (6)	n/a	6	0.044	0.044	104	16	104
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
Construction Site Dewatering (Fumping)	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Everyation (Met Conditions)		n/a	1	-	-	-	0	-
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1) 300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	` '	In/a	2	0.069	0.176	07	6	93
	3.5 CY Front End Loader, Wheel (2)			- 0.070	0.004	-	_	105
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9 7	0.076	0.684	86	19 17	105
Sheet Pile Wall	Pickup Truck Conventional (7) Flatbed Truck (1)	n/a Loaded Trucks	1	0.076	0.076	86	0	86
Sheet Pile Wali	` '							I I
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1 6	0.644	0.644	104	0	104
Headworks Structure Concrete Piles	Pickup Truck Conventional (6) 40 TN Truck Mounted Hydraulic Crane (1)	n/a		-	-	-	16	-
Headworks Structure Concrete Piles		n/a	1	- 0.000	- 0000	- 07	0	- 07
	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a Loaded Trucks	3	0.076	0.228	86	0	96
	Concrete Mixer Truck (3)		1	0.076	0.220	00	10	90
	0.8 CY Backhoe Loader (1)	n/a		- 0.070	0.450	-	0 6	- 00
	24 TN Truck End Dump (2)	Loaded Trucks	2 8	0.076	0.152	86	_	92
I leady saide Chrystian	Pickup Truck Conventional (8) Concrete Pump Boom Truck Mounted (1)	n/a	0	-	-	-	18	-
Headworks Structure		n/a		-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1) Concrete Mixer Truck (2)	n/a Loaded Trucks		0.076	0.152	- 06	0 6	92
	Pickup Truck Conventional (7)		2 7	0.076	0.152	86	17	92
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a n/a	1	-	-	-	0	-
Headworks Channel Transition	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	0.076	0.152	00	16	92
Llingad Dattom Catao	90 TN Truck Mounted Hydraulic Crane (1)		<u> </u>	<u>-</u>	-	-		<u>-</u>
Hinged Bottom Gates	Haul Truck Oversize Transport (1)	n/a	1	0.076	0.076	- 06	0	- 06
	Pickup Truck Conventional (4)	Loaded Trucks	4	0.076	0.076	86	12	86
08 - Roads, Railroads, and Bridges	Fickup Truck Conventional (4)	n/a	4	-	-	-	12	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks		0.076	0.38	86	14	100
INODITIZATION AND DEMODITIZATION	Extended Boom Pallet Loader (1)	n/a	5	0.076	0.36	00	0	100
	Pickup Truck Conventional (1)	n/a	1 1	_	-	_	, and the second	_
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1 1	-	-	-	0	-
r edesilian bridge Concrete Piles	100 FT Auger Track Mounted Drill Rig (1)	1		0.089	0.089	- 87	0	- 87
		Caisson Drilling		0.009	0.009	07	0	01
	Concrete Pump Boom Truck Mounted (1)	n/a		0.076	0.000	- 00	0	-
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a		- 0.076	0.450		0	-
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	-	-	18	-

Construction Vibration - Equipment Alternative 4 - West Alignment

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)								
RSP Bedding Material									
	300 HP Dozer Crawler (1)								
	Pickup Truck Conventional (5) 16 CY 3 Axle Haul Trucks (23)								
Francisco Control Conding	` '								
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)								
AE Electron Control and Disconian Otaco	Pickup Truck Conventional (4)								
15 - Floodway Control and Diversion Struc									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
Construction Site Dewatering	Flatbed Truck (1)								
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)								
	Pickup Truck Conventional (6)								
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)								
	Pickup Truck Conventional (3)								
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)								
	300 HP Dozer (2)								
	3.5 CY Front End Loader, Wheel (2)								
	16 CY 3 Axle Dump Truck (9)								
	Pickup Truck Conventional (7)								
Sheet Pile Wall	Flatbed Truck (1)								
	75 TN Crane Crawler Pile Hammer (1)								
	Pickup Truck Conventional (6)								
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)								
	100 FT Auger Track Mounted Drill Rig (1)								
	Concrete Pump Boom Truck Mounted (1)								
	Concrete Mixer Truck (3)								
	0.8 CY Backhoe Loader (1)								
	24 TN Truck End Dump (2)								
	Pickup Truck Conventional (8)								
Headworks Structure	Concrete Pump Boom Truck Mounted (1)								
	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (7)								
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)								
	Concrete Mixer Truck (2)								
	Pickup Truck Conventional (6)								
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)								
	Haul Truck Oversize Transport (1)								
	Pickup Truck Conventional (4)								
08 - Roads, Railroads, and Bridges				·		· '	<u> </u>		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)								
	Extended Boom Pallet Loader (1)								
	Pickup Truck Conventional (1)								
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)								
	100 FT Auger Track Mounted Drill Rig (1)								
	Concrete Pump Boom Truck Mounted (1)								
	Cocnrete Mixer Truck (3)								
	0.8 CY Backhoe Loader (1)								
	24 TN Truck End Dump (2)								
	Pickup Truck Conventional (8)								
	i lokup Truok Ooliveliiiollai (0)		1						

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	ln/a	1 1	<u> </u>	<u> </u>	_	0	_
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	n/a		_	_		0	_
and wingwans	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	0.070	0.152	00	17	92
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_		-	0	_
Pedestriari Bridge Spari iristaliation	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	0.076	0.152	-	14	92
19 - Buildings, Grounds, and Utilities	Pickup Truck Conventional (5)	III/a] 3	-	-	-	14	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
INIODIIIZALIOIT ATIU DEITIODIIIZALIOIT	Extended Boom Pallet Loader (1)	n/a	10	0.076	0.76	00	0	100
	Pickup Truck Conventional (1)	n/a		_	_	_	0	_
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)			0.069	0.069	07	0	07
Construction	Motor Grader (1)	n/a		-	-	-	0	_
	Compactor (1)	n/a n/a		-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a		0.070	0.070	00	0	00
	Pickup Truck Conventional (7)	n/a	7	_	_	_	17	_
	Concrete Pump Boom Truck Mounted (1)	n/a	1 1	-	-	-	0	-
				_	_	_	0	_
	2.5" Dia. Concrete Vibrator (1)	n/a		-	-	-	0	-
	Extended Boom Pallet Loader (1)	n/a		-	-	-	0	-
	Concrete Mixer Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
20 -Permanent Operating Equipment				T	T			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Mechanical Hydraulic Cylinders & Housing	` '	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Electrical Control Equipment CMU Building		n/a	3	-	-	-	10	-
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Construction Vibration - Equipment Alternative 4 - West Alignment

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)									
and Wingwalls	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)									
	Flatbed Truck (2)									
	Pickup Truck Conventional (5)									
19 - Buildings, Grounds, and Utilities										
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
CMU Building and Earthwork Pad	165 HP Dozer (1)									
Construction	Scraper (1)									
	Motor Grader (1)									
	Compactor (1)									
	4000 Gal Water Truck (1)									
	10 TN Smooth Roller (1)									
	Pickup Truck Conventional (7)									
	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Extended Boom Pallet Loader (1)									
	Concrete Mixer Truck (1)									
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
20 -Permanent Operating Equipment				·		•	•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									
Electrical Control Equipment CMU Buildin										
Electrical Power Equipment CMU Building										
Communication Equipment	Pickup Truck Conventional (3)									
Source: HDP 2017 Valo Pypass Salmon	. ,		 	 		 	-			

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Table <u>LM</u> -60. Construction Vibration Level at the Receptor												Е	stima	ted Du	ıratior	ı, Wee	k											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	3.42	0.55	1.61	1.11	1.28	1.13	2.81	2.38	2.38	1.66	1.66	3.33	3.49	4.85	4.21	4.3	3.83	3.83	5.82	6.18	2.14	1.84	0.08	0.08	0.08	0.08	1.82	0.46
Distance from the Center of Construction Activity to a Receptor (ft)								250															250			250		250
PPV at the Receptor (in/sec)	0.11	0.02	0.05	0.04	0.04	0.04	0.09	0.08	80.0	0.05	0.05	0.11	0.11	0.15	0.13	0.14	0.12	0.12	0.18	0.20	0.07	0.06	0.00	0.00	0.00	0.00	0.06	0.01
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Human Annoyance																												
Total Lv @ 25'	119	103	112	109	110	109	117	116	116	113	113	119	119	122	121	121	120	120	124	124	115	114	86	86	86	86	114	102
Distance from the Center of Construction Activity to a Receptor (ft)		700		700						700			700				700						700		700			700
Distance Divergence (dBA)	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
Lv at the Receptor (VdB)	76	60	69	66	67	66	74	72	72	69	69	75	76	79	77	78	77	77	80	81	72	70	43	43	43	43	70	58
Impact to Receptor	YES	no	no	no	no	no	YES	YES	YES	no	no	YES	YES	YES	YES	YES	YES	YES	YES	YES	no	no	no	no	no	no	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

700

Source: Google Earth

Table <u>LM</u>-61. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -61. Construction Vibratio	Sir and Ground Borne Vibration			Single	I	Single		
				Equipment		Equipment	Add to Single	
			Number of	PPV at 25 ft	Total PPV at	Lv at 25 ft	Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	_
09 - Channels and Canals	, , ,		•		•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	23	0.076	1.748	86	27	113
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	_	-	0	_
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
3 1 1 1 1 1 3	Trailer Mounted Brush Chipper (1)	n/a	1 1	_	_	_	0	_
	Chainsaw (1)	n/a	1 1	_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	_	-	6	_
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Executations Studing (Bry Sentations)	21 CY Scrapers (4)	n/a	4	-	-	_	12	_
	12' Blade Grader (1)	n/a	1	_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	0.070	"-	17	_
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	_	_	_	6	_
Tripidp Old35 Z	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.000	0.000	"	14	0,
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	23	0.070	1./40	- 00	6	- 113
TVOI DECIDING INIGICITAL	300 HP Dozer Crawler (1)		1	0.000	0.000			97
		Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.076	1 740	-	14	140
Francis Control Con direct	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	-	_	-	0	-
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-

Table <u>LM</u> -61. Construction Vibration	on and Ground-Borne Vibration													stima	ated D	uratio	n, We	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												$\overline{}$
	Pickup Truck Conventional (2)																												
09 - Channels and Canals					-																								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)							Т					Т																
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
3 3	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	1									+											1							\vdash
	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)												+																\vdash
	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												\vdash
Tuprup Glado 2	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	+			+	1	+	+													+	1	+						\vdash
1.C. Deading Material	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Haul Trucks (23)																												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												\vdash
Liberary Control Occurry	Pickup Truck Conventional (4)																												
	Fickup Truck Conventional (4)	<u> </u>						1																					

Table <u>LM</u> -61. Construction Vibration	on and Ground-Borne Vibration					Estir	nated	Dura	tion, \	Neek				
Phase	Equipment Description	29	30	31	32	33	34	35	36	37	38	39	40	41
02 - Relocations	qp						<u> </u>							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)													
	3.5 CY Front End Loader, Wheel (1)													
	0.8 CY Loader/Backhoe, Wheel (1)													
	4000 Gal Water Truck (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (6)													
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)													
To roo committee roograming (c 7.2)	4000 Gal Water Truck (1)													
	Pickup Truck Conventional (1)													
	16 CY 3 Axle Dump Truck (5)													
Temporary Electrical Power	Flatbed Truck (1)													
	Pickup Truck Conventional (2)													
09 - Channels and Canals	Tionap Track Conventional (2)													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
The sine and beine sine and beine sine and beine sine and beine sine and beine sine and beine sine and beine sine and beine sine sine sine sine sine sine sine	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	+												
Croaming and Grassing	Trailer Mounted Brush Chipper (1)													
	Chainsaw (1)													
	4000 Gal Water Truck (1)													
	Pickup Truck Conventional (6)													
	16 CY 3 Axle Dump Truck (1)													
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	+												
Excavation (vvct conditions)	300 HP Dozer (2)													
	3.5 CY Front End Loader, Wheel (2)													
	16 CY 3 Axle Dump Truck (9)													
	Pickup Truck Conventional (7)													
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)													
Executation Grading (Bry Contaction)	21 CY Scrapers (4)													
	12' Blade Grader (1)													
	4000 Gal Water Truck (1)													
	Pickup Truck Conventional (7)													
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)													
Tripidp Glade 2	300 HP Dozer Crawler (1)													
	Pickup Truck Conventional (5)													
	16 CY 3 Axle Dump Trucks (23)													
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	+												
Tito. Bodding Material	300 HP Dozer Crawler (1)													
	Pickup Truck Conventional (5)													
	16 CY 3 Axle Haul Trucks (23)													
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	1												
Lission control occurry	Pickup Truck Conventional (4)													
1	i lokup Truck Conventional (4)	1						1						

15 - Floodway Control and Diversion Struc	etures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	13	0.076	0.988	86	22	108
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	-	-	-	0	-
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	-	-	18	-
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	5	0.076	0.38	86	14	100
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-

15 - Floodway Control and Diversion Struc	tures						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)		П				
	Extended Boom Pallet Loader (1)						
	Pickup Truck Conventional (1)						
Construction Site Dewatering	Flatbed Truck (1)						
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)						
	Pickup Truck Conventional (6)						
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)						
	Pickup Truck Conventional (3)						
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)						
	300 HP Dozer (2)						
	3.5 CY Front End Loader, Wheel (2)						
	16 CY 3 Axle Dump Truck (9)						
	Pickup Truck Conventional (7)						
Sheet Pile Wall	Flatbed Truck (1)						
	75 TN Crane Crawler Pile Hammer (1)						
	Pickup Truck Conventional (6)						
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)						
	100 FT Auger Track Mounted Drill Rig (1)						
	Concrete Pump Boom Truck Mounted (1)						
	Concrete Mixer Truck (3)						
	0.8 CY Backhoe Loader (1)						
	24 TN Truck End Dump (2)						
	Pickup Truck Conventional (8)						
Headworks Structure	Concrete Pump Boom Truck Mounted (1)						
	2.5" Dia. Concrete Vibrator (1)						
	Concrete Mixer Truck (2)						
	Pickup Truck Conventional (7)						
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)						
	Flatbed Truck (2)						
	Pickup Truck Conventional (5)						
08 - Roads, Railroads, and Bridges							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)						
	Extended Boom Pallet Loader (1)						
	Pickup Truck Conventional (1)						

15 - Floodway Control and Diversion Struc	ctures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)							
	Extended Boom Pallet Loader (1)							1
	Pickup Truck Conventional (1)							ı
Construction Site Dewatering	Flatbed Truck (1)							
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)							1
	Pickup Truck Conventional (6)							ı
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)							
	Pickup Truck Conventional (3)							1
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)							
	300 HP Dozer (2)							ı
	3.5 CY Front End Loader, Wheel (2)							1
	16 CY 3 Axle Dump Truck (9)							1
	Pickup Truck Conventional (7)							1
Sheet Pile Wall	Flatbed Truck (1)							
	75 TN Crane Crawler Pile Hammer (1)							1
	Pickup Truck Conventional (6)							
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)							
	100 FT Auger Track Mounted Drill Rig (1)							1
	Concrete Pump Boom Truck Mounted (1)							1
	Concrete Mixer Truck (3)							1
	0.8 CY Backhoe Loader (1)							1
	24 TN Truck End Dump (2)							1
	Pickup Truck Conventional (8)							
Headworks Structure	Concrete Pump Boom Truck Mounted (1)							1
	2.5" Dia. Concrete Vibrator (1)							ı
	Concrete Mixer Truck (2)							ı
	Pickup Truck Conventional (7)							
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)							
	Flatbed Truck (2)							ı
	Pickup Truck Conventional (5)							
08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)							ı
	Extended Boom Pallet Loader (1)							
	Pickup Truck Conventional (1)							

Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
li edestriari bridge Concrete i lies	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling		0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a		0.009	0.009	07	0	07
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	0.070	0.220	00	0	30
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	0.070	0.152	-	18	92
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	_	-	0	-
I	2.5" Dia. Concrete Vibrator (1)	n/a		_	_	_	0	-
and Wingwalls	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	0.076	0.152		17	92
Dedestries Pridge Chan Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
Pedestrian Bridge Span Installation		Loaded Trucks	1	0.076	0.152	-	6	92
	Flatbed Truck (2)		2	0.076	0.152	86	_	92
40 Duildings Crounds and Hillitias	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
19 - Buildings, Grounds, and Utilities	Flathad Touch (A name and a set a surject and)	It and ad Tourist	40	0.070	0.70	00	00	400
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a	1	-	-	-	0	-
	Motor Grader (1)	n/a	1	-	-	-	0	-
	Compactor (1)	n/a	1	-		-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Mechanical Hydraulic Cylinders & Housing	·	n/a	1	-	-	-	0	-
,	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	_
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	
1 - 3 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Electrical Control Equipment CMU Building	1	n/a	3	-	_	-	10	_
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	_	_	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3	_	_	-	10	-
Communication Equipment	I long Truck Conventional (0)	μπα				_	10	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

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Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)											ı
	100 FT Auger Track Mounted Drill Rig (1)											1
	Concrete Pump Boom Truck Mounted (1)											I
	Cocnrete Mixer Truck (3)											ı
	0.8 CY Backhoe Loader (1)											ı
	24 TN Truck End Dump (2)											I
	Pickup Truck Conventional (8)											I
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)											
and Wingwalls	2.5" Dia. Concrete Vibrator (1)											I
_	Concrete Mixer Truck (2)											I
	Pickup Truck Conventional (7)											I
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)											
	Flatbed Truck (2)											I
	Pickup Truck Conventional (5)											I
19 - Buildings, Grounds, and Utilities												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											I
	Pickup Truck Conventional (1)											I
CMU Building and Earthwork Pad	165 HP Dozer (1)											
Construction	Scraper (1)			i								I
	Motor Grader (1)			i								I
	Compactor (1)			i								I
	4000 Gal Water Truck (1)			i								I
	10 TN Smooth Roller (1)											I
	Pickup Truck Conventional (7)											I
	Concrete Pump Boom Truck Mounted (1)											I
	2.5" Dia. Concrete Vibrator (1)											I
	Extended Boom Pallet Loader (1)			i								I
	Concrete Mixer Truck (1)			-								I
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)											
Concrete Buct Burns	2.5" Dia. Concrete Vibrator (1)		+									ı
	Concrete Mixer Truck (2)											ı
	Pickup Truck Conventional (7)											I
20 -Permanent Operating Equipment	i ickup ituck conventional (1)											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	1			1							
INIODINZALION AND DEMODINZALION	Extended Boom Pallet Loader (1)											I
	Pickup Truck Conventional (1)											ı
Mechanical Hydraulic Cylinders & Housin		+ +			+ +	 +		+ +	1	+ +		
Inviction in yuraunc Cynnuers & Housin	Pickup Truck Conventional (3)											l
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	+ +			+ +	 +		+ +	1	+ +		
Civio Building Mechanical Equipment	Pickup Truck Conventional (3)											ı
Floatrical Control Equipment CMLL Building					+ +							
Electrical Control Equipment CMU Buildin												
Electrical Power Equipment CMU Building					+ +							
Communication Equipment	Pickup Truck Conventional (3)											1

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

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	_									
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)									
	100 FT Auger Track Mounted Drill Rig (1)									
	Concrete Pump Boom Truck Mounted (1)									
	Cocnrete Mixer Truck (3)									
	0.8 CY Backhoe Loader (1)									
	24 TN Truck End Dump (2)									
	Pickup Truck Conventional (8)									
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)									
and Wingwalls	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)									
	Flatbed Truck (2)									
	Pickup Truck Conventional (5)									
19 - Buildings, Grounds, and Utilities										
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
CMU Building and Earthwork Pad	165 HP Dozer (1)									
Construction	Scraper (1)									
	Motor Grader (1)									
	Compactor (1)									
	4000 Gal Water Truck (1)									
	10 TN Smooth Roller (1)									
	Pickup Truck Conventional (7)									
	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Extended Boom Pallet Loader (1)									
	Concrete Mixer Truck (1)									
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
20 -Permanent Operating Equipment			<u>'</u>	·	•	·		•		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									
Electrical Control Equipment CMU Building										
Electrical Power Equipment CMU Building										
Communication Equipment	Pickup Truck Conventional (3)									
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Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Table <u>LM</u> -62. Construction Vibration Level at the Receptor												E	stimat	ted Du	uratio	n, Wee	ek											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'																										0.91	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)																											260	260
PPV at the Receptor (in/sec)			0.05	0.06	0.10	0.08	0.06	0.11	0.19	0.14	0.12	0.13	0.17	0.14	0.12	0.11	0.11	0.02	0.01	0.00	0.00	0.00	0.07	0.00	0.03	0.03	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a
Human Annoyance																												
Total Lv @ 25'	118	103	112	114	119	117	114	120	125	122	121	121	123	122	121	120	120	103	102	92	92	92	116	92				
Distance from the Center of Construction Activity to a Receptor (ft)																												
Distance Divergence (dBA)	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
Lv at the Receptor (VdB)	66	50	59	61	66	64	61	67	72	69	68	69	71	69	68	67	67	50	49	39	39	39	63	39	56	55	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft) 3800

0

Table LM-62. Construction Vibration Level at the Receptor					Estir	nated	Dura	tion, V	Veek				
Building Damage	29	30	31	32	33	34	35	36	37	38	39	40	41
Total PPV @ 25'	1.29	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	n/a	1.29	n/a
Distance from the Center of Construction Activity to a Receptor (ft)	260	260	260	260	260	260	260	260	260	260	260	260	260
PPV at the Receptor (in/sec)	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.04	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	n/a	no	n/a
Human Annoyance	_												
Total Lv @ 25'	111	92	92	92	92	92	92	92	92	92	n/a	111	n/a
Distance from the Center of Construction Activity to a Receptor (ft)	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420
Distance Divergence (dBA)	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
Lv at the Receptor (VdB)	58	39	39	39	39	39	39	39	39	39	n/a	58	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft) 3800

0

Table <u>LM</u>-63. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -63. Construction Vibration Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
. ,	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
09 - Channels and Canals					•			•
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	28	0.076	2.128	86	29	115
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	_	-	16	_
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
,	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	_	-	6	_
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	-	-	12	-
	12' Blade Grader (1)	n/a	1	_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	_	_	17	_
Earthen Backfill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	_
	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	_	-	_	6	-
r - r	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	_	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.000	0.000	57	14	
			1	0.076	1 740	0.6	27	112
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	21	113

Construction Vibration - Equipment Alternative 6 - West Alignment

Table <u>LM</u> -63. Construction Vibratio	n and Ground-Borne Vibration												E	stima	ted D	uratio	n, We	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																											. /	
	Pickup Truck Conventional (1)																											/	
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals			•										1					ı				1				•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)	<u> </u>																											
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
Francistics (One die s. (Dec. One ditions)	Pickup Truck Conventional (7)	-		-																								.——	
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												
	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
Earthen Backfill	Pickup Truck Conventional (7) 300 HP Dozer (1)	1																											
Earther Backiiii	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	1																											
ιτιριαρ - Οιασο Δ	300 HP Dozer Crawler (1)																											.	
	Pickup Truck Conventional (5)																											.	
	16 CY 3 Axle Dump Trucks (23)																											.	
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	+																											
ττιριαρ - Οιασο υ																													
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																											.	
	16 CY 3 Axle Dump Trucks (23)																												

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	2	_	I -	_	6	
The bedding Material	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.009	0.009	07	_	67
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	- 1.748	86	14 27	113
Franian Control Sooding	0.8 CY Front End Loader, Wheel (1)	n/a	1	0.076	1.740	00	0	113
Erosion Control Seeding	Pickup Truck Conventional (4)		4	-	-	-	12	-
15 - Floodway Control and Diversion Struc	1 7	n/a	4	-	_	_	12	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	14	0.076	1.064	86	23	109
INIODIIIZALIOIT AITU DEITIODIIIZALIOIT	Extended Boom Pallet Loader (1)	n/a	1	0.070	1.004	00	0	109
	Pickup Truck Conventional (1)	n/a	1 1	_	_	_	0	_
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1 1	0.644	0.644	104	0	104
(Temporary Conerdam)	Pickup Truck Conventional (6)	n/a	6	0.044	0.044	104	16	104
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
Construction Site Dewatering (Fumping)	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Everyation (Met Conditions)		n/a	1	-	-	-	0	-
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1) 300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	` '	In/a	2	0.069	0.176	07	6	93
	3.5 CY Front End Loader, Wheel (2)			- 0.070	0.004	-	_	105
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9 7	0.076	0.684	86	19 17	105
Sheet Pile Wall	Pickup Truck Conventional (7) Flatbed Truck (1)	n/a Loaded Trucks	1	0.076	0.076	86	0	86
Sheet Pile Wali	` '							I I
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1 6	0.644	0.644	104	0	104
Headworks Structure Concrete Piles	Pickup Truck Conventional (6) 40 TN Truck Mounted Hydraulic Crane (1)	n/a		-	-	-	16	-
Headworks Structure Concrete Piles		n/a	1	- 0.000	- 0000	- 07	0	- 07
	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a Loaded Trucks	3	0.076	0.228	86	0	96
	Concrete Mixer Truck (3)		1	0.076	0.220	00	10	90
	0.8 CY Backhoe Loader (1)	n/a		- 0.070	0.450	-	0 6	- 00
	24 TN Truck End Dump (2)	Loaded Trucks	2 8	0.076	0.152	86	_	92
I leady saile Chrystine	Pickup Truck Conventional (8) Concrete Pump Boom Truck Mounted (1)	n/a	0	-	-	-	18	-
Headworks Structure		n/a		-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1) Concrete Mixer Truck (2)	n/a Loaded Trucks		0.076	0.152	- 06	0 6	92
	Pickup Truck Conventional (7)		2 7	0.076	0.152	86	17	92
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a n/a	1	-	-	-	0	-
Headworks Channel Transition	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	0.076	0.152	00	16	92
Llingad Dattom Catao	90 TN Truck Mounted Hydraulic Crane (1)		<u> </u>	<u>-</u>	-	-		<u>-</u>
Hinged Bottom Gates	Haul Truck Oversize Transport (1)	n/a	1	0.076	0.076	- 06	0	- 06
	Pickup Truck Conventional (4)	Loaded Trucks	4	0.076	0.076	86	12	86
08 - Roads, Railroads, and Bridges	Fickup Truck Conventional (4)	n/a	4	-	-	-	12	-
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks		0.076	0.38	86	14	100
INODITIZATION AND DEMODITIZATION	Extended Boom Pallet Loader (1)	n/a	5	0.076	0.36	00	0	100
	Pickup Truck Conventional (1)	n/a	1 1	_	_	_	, and the second	_
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1 1	-	-	-	0	-
r edesilian bridge Concrete Piles	100 FT Auger Track Mounted Drill Rig (1)	1		0.089	0.089	- 87	0	- 87
		Caisson Drilling		0.009	0.009	07	0	01
	Concrete Pump Boom Truck Mounted (1)	n/a		0.076	0.000	- 00	0	-
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a		- 0.076	0.450		0	-
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	-	-	18	-

Construction Vibration - Equipment Alternative 6 - West Alignment

RSP Bedding Material	2.5 CY Hydraulic Excavators (2)									
RSP Bedding Material	300 HP Dozer Crawler (1)									
	Pickup Truck Conventional (5)									
Facility Octobrill Continue	16 CY 3 Axle Haul Trucks (23)									
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)									
45. Flankuss On the Land Discouries Of the	Pickup Truck Conventional (4)									
15 - Floodway Control and Diversion Struct									<u> </u>	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Construction Site Dewatering	Flatbed Truck (1)									
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)									
	Pickup Truck Conventional (6)									
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)									
	Pickup Truck Conventional (3)									
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)									
	300 HP Dozer (2)									
	3.5 CY Front End Loader, Wheel (2)									
	16 CY 3 Axle Dump Truck (9)									
	Pickup Truck Conventional (7)									
Sheet Pile Wall	Flatbed Truck (1)									
	75 TN Crane Crawler Pile Hammer (1)									
	Pickup Truck Conventional (6)									
Headworks Structure Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)									
	100 FT Auger Track Mounted Drill Rig (1)									
	Concrete Pump Boom Truck Mounted (1)									
	Concrete Mixer Truck (3)									
	0.8 CY Backhoe Loader (1)									
	24 TN Truck End Dump (2)									
	Pickup Truck Conventional (8)									
Headworks Structure	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (6)									
Hinged Bottom Gates	90 TN Truck Mounted Hydraulic Crane (1)									
	Haul Truck Oversize Transport (1)									
	Pickup Truck Conventional (4)									
08 - Roads, Railroads, and Bridges		 								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Pedestrian Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)									
	100 FT Auger Track Mounted Drill Rig (1)									
	Concrete Pump Boom Truck Mounted (1)									
	Cocnrete Mixer Truck (3)									
	0.8 CY Backhoe Loader (1)									
	24 TN Truck End Dump (2)									
	Pickup Truck Conventional (8)									

Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	n/a	1	_	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
19 - Buildings, Grounds, and Utilities								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a	1	-	-	-	0	-
	Motor Grader (1)	n/a	1	-	-	-	0	-
	Compactor (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
20 -Permanent Operating Equipment	•							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3		-		10	
Electrical Control Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Electrical Power Equipment CMU Building	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
			-					

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

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Construction Vibration - Equipment Alternative 6 - West Alignment

D 1 (1 D11 D 1 A) (1	To (B B T) M () (4)											
Pedestrian Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)											
and Wingwalls	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
Pedestrian Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)											
	Flatbed Truck (2)											
	Pickup Truck Conventional (5)											
19 - Buildings, Grounds, and Utilities												
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)											
CMU Building and Earthwork Pad	165 HP Dozer (1)											
Construction	Scraper (1)											
	Motor Grader (1)											
	Compactor (1)											
	4000 Gal Water Truck (1)											
	10 TN Smooth Roller (1)											
	Pickup Truck Conventional (7)											
	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Extended Boom Pallet Loader (1)											
	Concrete Mixer Truck (1)											
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)											
	2.5" Dia. Concrete Vibrator (1)											
	Concrete Mixer Truck (2)											
	Pickup Truck Conventional (7)											
20 -Permanent Operating Equipment	, , , , , , , , , , , , , , , , , , , ,		-			 			<u>' </u>			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)											
	Extended Boom Pallet Loader (1)											
	Pickup Truck Conventional (1)											
Mechanical Hydraulic Cylinders & Housing												
, and a second s	Pickup Truck Conventional (3)											
CMU Building Mechanical Equipment	Extended Boom Pallet Loader (1)											
1 0 11 11 11 11 11	Pickup Truck Conventional (3)											
Electrical Control Equipment CMU Building	` '											
Electrical Power Equipment CMU Building												
Communication Equipment	Pickup Truck Conventional (3)											
	d Habitat Danta wation & Field Danas on Duniant			1		 1						

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Table <u>LM</u> -64. Construction Vibration Level at the Receptor												E	stimat	ed Du	ıratioı	n, Wee	ek											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'																									0.08	0.08	0.46	1.82
Distance from the Center of Construction Activity to a Receptor (ft)																												
PPV at the Receptor (in/sec)	0.10	0.05	0.04	0.03	0.04	0.04	0.07	0.04	0.02	0.02	0.14	0.14	0.16	0.16	0.15	0.14	0.15	0.16	0.15	0.19	0.19	0.05	0.06	0.07	0.00	0.00	0.01	0.05
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Human Annoyance																												
Total Lv @ 25'													123				122	123	122	125	124	114	114	115	86	86	102	114
Distance from the Center of Construction Activity to a Receptor (ft)													700								700		700					
Distance Divergence (dBA)	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
Lv at the Receptor (VdB)	76	69	67	66	68	67	72	67	61	63	79	79	79	79	79	79	79	79	79	81	81	70	71	72	43	43	58	70
Impact to Receptor	YES	no	no	no	no	no	no	no	no	no	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	no	no	no	no	no	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

700

Construction Vibration - Equipment Downstream (Alternatives 1-4, 6)

Table LM-65. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -65. Construction Vibrati	on and Ground-Borne Vibration							
Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	14	0.076	1.064	86	23	109
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1			-	0	
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1 1	-	-	-	0	-
Tanananan Flashiaal Dawas	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1 2	0.076	0.076	86	0 6	86
09 - Channels and Canals	Pickup Truck Conventional (2)	n/a				-	0	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	108	0.076	8.208	86	41	127
IVIODIIIZALIOTI ATIQ DETTIODIIIZALIOTI	Extended Boom Pallet Loader (1)	n/a	1	0.076	0.200	00	0	127
	Pickup Truck Conventional (1)	n/a		_	_	-	0	_
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1		-	-	0	-
Ocaring and Grabbing	Trailer Mounted Brush Chipper (1)	n/a		_	_	_	0	_
	Chainsaw (1)	n/a	1	_	_	_	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Earthen Backfill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1 4	-	-	-	0	-
11-Levees and Floodwalls	Pickup Truck Conventional (4)	n/a	4	-		-	12	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	14	0.076	1.064	86	23	109
INODIIIZALION AND DEMODIIIZALION				0.070	1.004	00		109
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
Soil Cement Bentonite Cutoff Wall	Pickup Truck Conventional (1) 4.5 CY Hydraulic Excavator (1)	n/a n/a	1 1		-	-	0	-
Son Cement Dentonile Cuton wall			1	0.000	0.000	l	0	97
	300 HP Dozer (1) 2.5 CY Hydraulic Excavators (1)	Large Bulldozer n/a	1 1	0.089	0.089	87	0	87
	16 CY 3 Axle Dump Truck (1)	n/a Loaded Trucks	1	0.076	0.076		0	86
	Flash Mixer (1)	n/a	1	0.076	0.076	86	0	00
	Slurry Pump (1)	n/a n/a	1 1	_	_		0	I - !
	Pickup Truck Conventional (5)	n/a	5	_	_		14	_
	i lokup Truck Conventional (3)	ıııa	l o	-		-	14	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

- Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Table <u>LM</u> -65. Construction Vibrati	ion and Ground-Borne Vibration												<u> </u>	stima	ted Du	uratio	n, vve	eĸ											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												↓
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals			•	ı	ı	1		ı			ı							1		1	_			•	1	1			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
0 10 11:	Pickup Truck Conventional (1)																												+
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
Function (Mat Conditions)	16 CY 3 Axle Dump Truck (1)																												+
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1) 300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Earthen Backfill	300 HP Dozer (1)														-				-					-					+
Lattrer Backilli	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												+
Triprap - Olass 2	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)																												+-
Tion Dodding Material	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Haul Trucks (23)																												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												+
3	Pickup Truck Conventional (4)																												
11-Levees and Floodwalls				ı	1	_	_	-	_			_					_				_	_	_						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)										L_				L													<u> </u>	
Soil Cement Bentonite Cutoff Wall	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (1)																												
	2.5 CY Hydraulic Excavators (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Flash Mixer (1)																												
	Slurry Pump (1)	l																											
	Ciarry ramp (1)																												

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction
Considerations. March 10.

Construction Vibration - Equipment Downstream (Alternatives 1-4, 6)

Table <u>LM</u> -66. Construction Vibration Level at the Receptor												Е	stimat	ed Du	uratio	n, Wee	ek											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	9.35	0.15	0.15	0.15	0.15	0.86	1.03	1.03	1.93	1.03	1.03	1.03	2.9	3.67	3.67	3.67	3.67	3.67	1.84	n/a	n/a	8.21	0.46	1.06	n/a	n/a	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)																										330	330	330
PPV at the Receptor (in/sec)	0.19	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.04	0.02	0.02	0.02	0.06	0.08	0.08	0.08	0.08	0.08	0.04	n/a	n/a	0.17	0.01	0.02	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a	no	no	no	n/a	n/a	n/a	n/a
Human Annoyance																												
Total Lv @ 25'				92				109					114							n/a				109		n/a		n/a
Distance from the Center of Construction Activity to a Receptor (ft)																												
Distance Divergence (dBA)	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9
Lv at the Receptor (VdB)	72	36	36	36	36	51	53	53	51	51	51	51	58	64	64	64	64	64	58	n/a	n/a	71	46	53	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a	no	no	no	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level
Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:
Nearest residential receptor (ft) 7000

Table <u>LM</u>-67. Construction Vibration and Ground-Borne Vibration

Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations	Equipment Description	Lookup Equipment Types	Equipment	(III/SCC)	2011 (11//300)	(VGD)	(Vab)	ZO II (VGB)
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	_
	Pickup Truck Conventional (1)	n/a	1	_	_	_	0	_
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1	-	_	-	0	-
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1	-	_	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
09 - Channels and Canals	•		•		•			•
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	23	0.076	1.748	86	27	113
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	-	-	12	-
	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-

Construction Vibration - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

Table <u>LM</u> -67. Construction Vibratio	on and Ground-Borne Vibration												E	stima	ted Du	uratio	n, We	ek											\neg
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations						•		•		<u> </u>		•	<u> </u>		<u> </u>														
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals	· · · · · · · · · · · · · · · · · · ·			<u> </u>			<u> </u>	<u> </u>	<u> </u>		<u> </u>	<u> </u>	<u> </u>	<u> </u>	,	<u> </u>	<u> </u>	<u> </u>			<u> </u>	-	<u>'</u>					<u> </u>	
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
,	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												
	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Haul Trucks (23)																												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																										+		
I	Pickup Truck Conventional (4)																												

15 - Floodway Control and Diversion Struct	ures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Excavation/Grading (Dry Conditions)	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Haul Truck Oversize Transport (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Construction Vibration - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

15 - Floodway Control and Diversion Struct	ures									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Excavation/Grading (Dry Conditions)	Flatbed Truck (1)									
	75 TN Crane Crawler Pile Hammer (1)									
	Pickup Truck Conventional (6)									
Sheet Pile Wall	Flatbed Truck (1)									
	75 TN Crane Crawler Pile Hammer (1)									
	Pickup Truck Conventional (6)									
Headworks Structure	Concrete Pump Boom Truck Mounted (1)									
	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (7)									
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)									
	Concrete Mixer Truck (2)									
	Pickup Truck Conventional (6)									
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)									
	Haul Truck Oversize Transport (1)									
	Pickup Truck Conventional (4)									
20 -Permanent Operating Equipment										
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)									
	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (1)									
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)									
	Pickup Truck Conventional (3)									

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Table <u>⊾M</u> -68. Construction Vibration Level at the Receptor												Е	stimat	ted Du	ıratior	ı, Wee	k											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	0.53	0.15	1.75	0.15	0.86	0.17	3.67	n/a	2.2	0.72	0.72	0.15	0.23	0.08	0.46	0.23	n/a	n/a	0.23	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.46	0.46
Distance from the Center of Construction Activity to a Receptor (ft)	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
PPV at the Receptor (in/sec)	0.03	0.01	0.09	0.01	0.04	0.01	0.19	n/a	0.11	0.04	0.04	0.01	0.01	0.00	0.02	0.01	n/a	n/a	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.02	0.02
Impact to Receptor	no	no	no	no	no	no	no	n/a	no	no	no	no	no	no	no	no	n/a	n/a	no	n/a	n/a	n/a	n/a	n/a	n/a	n/a	no	no
Human Annoyance	_																											
Total Lv @ 25'				92				n/a			105		96		102		n/a		96	n/a			n/a				_	
Distance from the Center of Construction Activity to a Receptor (ft)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Distance Divergence (dBA)	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7
Lv at the Receptor (VdB)	47	36	58	36	51	37	64	n/a	60	49	49	36	40	30	46	40	n/a	n/a	40	n/a	n/a	n/a	n/a	n/a	n/a	n/a	46	46
Impact to Receptor	no	no	no	no	no	no	no	n/a	no	no	no	no	no	no	no	no	n/a	n/a	no	n/a	n/a	n/a	n/a	n/a	n/a	n/a	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

1800

Receptors:

Nearest residential receptor (ft)

Construction Vibration - Equipment Supplemental Fish Passage East (Alternatives 3, 4, and 6)

Table LM-69. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -69. Construction Vibration	on and Ground-Borne vibration				1			
Dhasa	Fourier mont Decembration	Laskun Fautamant Turas	Number of	Single Equipment PPV at 25 ft	Total PPV at	Single Equipment Lv at 25 ft	Add to Single Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
02 - Relocations Mobilization and Demobilization	Clathad Twick (4 nor piece of acuipment)	Loaded Trucks		0.070	0.450	0.0	40	100
Modifization and Demodifization	Flatbed Truck (1 per piece of equipment)		6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
Francisco A Maio Danes	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	3.5 CY Front End Loader, Wheel (1)	n/a	1 1	-	-	-	0	- 1
	0.8 CY Loader/Backhoe, Wheel (1)	n/a	1	-	- 0.70	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	- 1
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
09 - Channels and Canals								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	23	0.076	1.748	86	27	113
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	•	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	- 1
	Chainsaw (1)	n/a	1	-	-	-	0	- 1
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
,	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	- 1
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	_	-	17	_
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
]	21 CY Scrapers (4)	n/a	4	_	_	_	12	_
	12' Blade Grader (1)	n/a	1	_	_	-	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	_
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	n/a	2	_	_	_	6	 _
Thiprop Globs o	300 HP Dozer Crawler (1)	Large Bulldozer	1 1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	0.003	0.003	-	14	
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
RSP Bedding Material	2.5 CY Hydraulic Excavators (2)	n/a	23	0.070	1.740	00	6	113
INOI DEGUING MALENAI	300 HP Dozer Crawler (1)	-	4	0.000	0.000	07		87
	()	Large Bulldozer		0.089	0.089	87	0	01
	Pickup Truck Conventional (5)	n/a	5	- 0.70	1 740	-	14	-
Francisco Control Con Page	16 CY 3 Axle Haul Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-

Table <u>LM</u> -69. Construction Vibration	on and Ground-Borne Vibration												E	stima	ted D	uratio	n, We	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Fremont Weir Demo	3.5 CY Hydraulic Excavator (1)																												
	3.5 CY Front End Loader, Wheel (1)																												
	0.8 CY Loader/Backhoe, Wheel (1)																												
	4000 Gal Water Truck (1)																												
	16 CY 3 Axle Dump Truck (1)																												
	Pickup Truck Conventional (6)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)	1																											
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																												
09 - Channels and Canals																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
ZXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	300 HP Dozer (2)																												
	3.5 CY Front End Loader, Wheel (2)																												
	16 CY 3 Axle Dump Truck (9)																												
	Pickup Truck Conventional (7)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	+																											
Executation Grading (Bry Conditions)	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Riprap - Class 3	2.5 CY Hydraulic Excavators (2)	+																	+										
11(prap - 01833 0	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
DSD Rodding Material	16 CY 3 Axle Dump Trucks (23) 2.5 CY Hydraulic Excavators (2)	+																											
RSP Bedding Material		1																											
	300 HP Dozer Crawler (1)	1																											
	Pickup Truck Conventional (5)	1																											
	16 CY 3 Axle Haul Trucks (23)	+																				-							
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	1																											
	Pickup Truck Conventional (4)																												

Construction Vibration - Equipment Supplemental Fish Passage East (Alternatives 3, 4, and 6)

15 - Floodway Control and Diversion Struct	ures							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	6	0.076	0.456	86	16	102
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Excavation/Grading (Dry Conditions)	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Headworks Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Haul Truck Oversize Transport (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-
20 -Permanent Operating Equipment								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1			-	0	
Mechanical Hydraulic Cylinders & Housing	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-		-	10	

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15 - Floodway Control and Diversion Struc	tures									
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1)									
Excavation/Grading (Dry Conditions)	Flatbed Truck (1) 75 TN Crane Crawler Pile Hammer (1) Pickup Truck Conventional (6)									
Sheet Pile Wall	Flatbed Truck (1) 75 TN Crane Crawler Pile Hammer (1) Pickup Truck Conventional (6)									
Headworks Structure	Concrete Pump Boom Truck Mounted (1) 2.5" Dia. Concrete Vibrator (1) Concrete Mixer Truck (2) Pickup Truck Conventional (7)									
Headworks Channel Transition	2.5" Dia. Concrete Vibrator (1) Concrete Mixer Truck (2) Pickup Truck Conventional (6)									
Hinged Bottom Gates	40 TN Truck Mounted Hydraulic Crane (1) Haul Truck Oversize Transport (1) Pickup Truck Conventional (4)									
20 -Permanent Operating Equipment		 <u> </u>	· · · · · ·							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment) Extended Boom Pallet Loader (1) Pickup Truck Conventional (1)									
Mechanical Hydraulic Cylinders & Housing										

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Construction Vibration - Equipment Supplemental Fish Passage East (Alternatives 3, 4, and 6)

Table <u>LM</u> -70. Construction Vibration Level at the Receptor												Е	stimat	ed Du	uratio	n, Wee	ek											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'				0.15	0.86	0.17	3.67	n/a	2.2	0.72	0.72	0.15	0.23	0.08	0.46	0.23	n/a	n/a	0.23	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.46	0.46
Distance from the Center of Construction Activity to a Receptor (ft)	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
PPV at the Receptor (in/sec)	0.03	0.01	0.09	0.01	0.04	0.01	0.19	n/a	0.11	0.04	0.04	0.01	0.01	0.00	0.02	0.01	n/a	n/a	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.02	0.02
Impact to Receptor	no	no	no	no	no	no	no	n/a	no	no	no	no	no	no	no	no	n/a	n/a	no	n/a	n/a	n/a	n/a	n/a	n/a	n/a	no	no
Human Annoyance	_																											
Total Lv @ 25'		92							115			92		86		96		n/a					n/a				102	
Distance from the Center of Construction Activity to a Receptor (ft)	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980	980
Distance Divergence (dBA)	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8
Lv at the Receptor (VdB)	55	44	65	44	59	45	72	n/a	67	57	57	44	48	38	54	48	n/a	n/a	48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	54	54
Impact to Receptor	no	no	no	no	no	no	no	n/a	no	no	no	no	no	no	no	no	n/a	n/a	no	n/a	n/a	n/a	n/a	n/a	n/a	n/a	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

8600

Table <u>LM</u>-71. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -71. Construction Vibration				Single		Single		
			ll	Equipment		Equipment	Add to Single	.
		l	Number of	PPV at 25 ft	Total PPV at	Lv at 25 ft	Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
02 - Relocations		I						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	•	-	-	6	-
09 - Channels and Canals								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	11	0.076	0.836	86	21	107
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	_	-	0	_
	4000 Gal Water Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	_	_	16	_
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	- 0.070	-	0	
Exactation (vvet conditions)	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	0.000	0.170	-	6	_
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	0.070	0.004		17	103
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1		-	-	0	-
Elosion Control Seeding			4	-	-	-	12	-
11 - Levees and Flood walls	Pickup Truck Conventional (4)	n/a	4	-			12	<u> </u>
	Flathad Truck (4 nor piece of agricument)	II and ad Trucks	4	0.070	0.204	00	40	1 00
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
D : (140 B	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Reinforced AG Berm	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	<u> </u>
15 - Floodway Control and Diversion Struc								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	12	0.076	0.912	86	22	108
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-		-	10	-
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	_	_	_	17	_

Construction Vibration - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Table <u>LM</u> -71. Construction Vibration	and Ground-Borne Vibration												Е	stima	ted Di	uratio	n, Wee	ek											\Box
																												i	
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations			_								- 14																		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												\neg
	Extended Boom Pallet Loader (1)																										1	1	
	Pickup Truck Conventional (1)																										'		
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																										1	1	
	Pickup Truck Conventional (1)																										1	1	
	16 CY 3 Axle Dump Truck (5)																										'		
Temporary Electrical Power	Flatbed Truck (1)																												
	Pickup Truck Conventional (2)																										1	1	
09 - Channels and Canals															•	•													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																										'		
	Pickup Truck Conventional (1)																										1	1	
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																										1	1	
	Chainsaw (1)																										1	1	
	4000 Gal Water Truck (1)																										1	1	
	Pickup Truck Conventional (6)																										'		
	16 CY 3 Axle Dump Truck (1)																										1	1	
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																												
	300 HP Dozer (2)																										1	1	
	3.5 CY Front End Loader, Wheel (2)																										'		
	16 CY 3 Axle Dump Truck (9)																										1	1	
	Pickup Truck Conventional (7)																										1	1	
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												
	Pickup Truck Conventional (4)																												
11 - Levees and Flood walls																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																										1	1	
	Pickup Truck Conventional (3)																												
Reinforced AG Berm	300 HP Dozer (1)																										1	1	
	4000 Gal Water Truck (1)																										1	1	
	10 TN Smooth Roller (1)																										1	1	
	Pickup Truck Conventional (3)																												
15 - Floodway Control and Diversion Struc				1																						1			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																										'		
	Extended Boom Pallet Loader (1)																										l '		
	Pickup Truck Conventional (1)																										 '		
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)																										'		
	Pickup Truck Conventional (3)																										<u> </u>		
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)																										'		
	300 HP Dozer (2)																										'		
	3.5 CY Front End Loader, Wheel (2)																										1		
	16 CY 3 Axle Dump Truck (9)																										'		
	Pickup Truck Conventional (7)																										<u> </u>		

Concrete Turnout Structure	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
36-Inch RCP	25 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-
Trashrack	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Screw Gate	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Outlet Fish Screen	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Concrete Emergency Spillway	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Concrete Connection Vault	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Haul Truck Oversize Transport (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
08 - Roads, Railroads, and Bridges								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	5	0.076	0.38	86	14	100
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	100 FT Auger Track Mounted Drill Rig (1)	Caisson Drilling	1	0.089	0.089	87	0	87
	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
	Cocnrete Mixer Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	0.8 CY Backhoe Loader (1)	n/a	1	-	-	-	0	-
	24 TN Truck End Dump (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (8)	n/a	8	-	-	-	18	-
Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)	n/a	1	-	-	-	0	-
and Wingwalls	2.5" Dia. Concrete Vibrator (1)	n/a	1	-	-	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	-	-	-	0	-
	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Construction Vibration - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Concrete Turnout Structure	Concrete Pump Boom Truck Mounted (1)						
Concrete rumout structure	2.5" Dia. Concrete Vibrator (1)						
	Concrete Mixer Truck (2)						
	Pickup Truck Conventional (7)						
36-Inch RCP							
36-Inch RCP	25 TN Truck Mounted Hydraulic Crane (1)						
	Flatbed Truck (1)						
Total	Pickup Truck Conventional (4)						
Trashrack	Flatbed Truck (1)						
	Pickup Truck Conventional (2)						
Screw Gate	Flatbed Truck (1)						
	Pickup Truck Conventional (2)						
Outlet Fish Screen	Flatbed Truck (1)						
	Pickup Truck Conventional (2)						
Concrete Emergency Spillway	Concrete Pump Boom Truck Mounted (1)						
	2.5" Dia. Concrete Vibrator (1)						
	Concrete Mixer Truck (2)						
	Pickup Truck Conventional (7)						
Concrete Connection Vault	40 TN Truck Mounted Hydraulic Crane (1)						
	Haul Truck Oversize Transport (1)						
	Pickup Truck Conventional (3)						
08 - Roads, Railroads, and Bridges							
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)						
	Extended Boom Pallet Loader (1)						
	Pickup Truck Conventional (1)						
Bridge Concrete Piles	40 TN Truck Mounted Hydraulic Crane (1)						
	100 FT Auger Track Mounted Drill Rig (1)						
	Concrete Pump Boom Truck Mounted (1)						
	Cocnrete Mixer Truck (3)						
	0.8 CY Backhoe Loader (1)						
	24 TN Truck End Dump (2)						
	Pickup Truck Conventional (8)						
Bridge Concrete Abutments	Concrete Pump Boom Truck Mounted (1)						
and Wingwalls	2.5" Dia. Concrete Vibrator (1)						
	Concrete Mixer Truck (2)						
	Pickup Truck Conventional (7)						
Bridge Span Installation	90 TN Truck Mounted Hydraulic Crane (1)						
	Flatbed Truck (2)						
	Pickup Truck Conventional (5)						
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Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Considerations. March 10.

Table <u>LM</u> -72. Construction Vibration Level at the Receptor												E	stima	ted Du	ıratior	ı, Wee	k											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	1.14	0.15	0.86	n/a	n/a	0.84	0.3	0.17	0.3	0.91	0.86	0.15	0.08	0.08	0.23	0.23	0.38	1.38	0.15	0.15	n/a	0.84	0.23	n/a	n/a	n/a	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PPV at the Receptor (in/sec)	0.14	0.02	0.11	n/a	n/a	0.10	0.04	0.02	0.04	0.11	0.11	0.02	0.01	0.01	0.03	0.03	0.05	0.17	0.02	0.02	n/a	0.10	0.03	n/a	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	n/a	n/a	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	no	no	n/a	n/a	n/a	n/a	n/a
Human Annoyance	=																											
Total Lv @ 25'	110	92	107	n/a	n/a	107	98	93	98	108	107	92	86	86	96	96	100	111	92	92	n/a	107	96	n/a	n/a	n/a	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)			510																								510	
Distance Divergence (dBA)	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3
Lv at the Receptor (VdB)	70	53	68	n/a	n/a	68	59	53	59	68	68	53	47	47	56	56	61	72	53	53	n/a	68	56	n/a	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	n/a	n/a	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	no	no	n/a	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

8000

Construction Vibration - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (Alternative 4)

Table LM-73. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -73. Construction Vibration	on and Ground-Borne Vibration	1			Г			Ţ
Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
09 - Channels and Canals					•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	15	0.076	1.14	86	24	110
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	_	-	16	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	_	-	12	-
	12' Blade Grader (1)	n/a	1	-	_	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-
11 - Levees and Flood walls					•			
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Berm/ Levee Fill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	_	-	0	-
	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
15 - Floodway Control and Diversion Stru		<u> </u>						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	12	0.076	0.912	86	22	108
	Extended Boom Pallet Loader (1)	n/a	1 1	-	_	_	0	_
	Pickup Truck Conventional (1)	n/a	1 1	_	_	_	0	_
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
<u> </u>	Pickup Truck Conventional (6)	n/a	6	-	_	_	16	-
					Į		-	

Table <u>⊾M</u> -73. Construction Vibration	on and Ground-Borne Vibration													Estim	ated I	Ourati	on, We	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations	·																				•			•					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
. ,	Pickup Truck Conventional (2)																												
09 - Channels and Canals														_										<u> </u>					
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																	+											
oleaning and enabling	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	16 CY 3 Axle Dump Truck (1)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	+										+		+															+
Lxcavation/Grading (Dry Conditions)	21 CY Scrapers (4)																												
	12' Blade Grader (1)							ŀ																					
								ŀ																					
	4000 Gal Water Truck (1)																												
Dinger Class 2	Pickup Truck Conventional (7)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																			-									
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												
	Pickup Truck Conventional (4)																												
11 - Levees and Flood walls						T				_		_				_		_		_				1					_
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (3)																												
Berm/ Levee Fill	300 HP Dozer (1)																												
	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
15 - Floodway Control and Diversion Str																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Construction Site Dewatering	Flatbed Truck (1)																												
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)																												
	Pickup Truck Conventional (6)	1																											

Construction Vibration - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (Alternative 4)

Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	_	I -	_	0	_
Condition one Dewatering (Fumping)	Pickup Truck Conventional (3)	n/a	3	_	_	_	10	_
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	_	_	_	0	_
Executation (vvet containent)	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	_	6	_
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	0.070	0.004	_	17	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
onest ne wan	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1 1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	- 0.011	- 0.011	-	16	-
Culvert Head Wall	2.5" Dia. Concrete Vibrator (1)	n/a	1	_	_	_	0	_
Carvert rioda vvan	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	0.070	0.102	-	16	-
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
Tredat Box curvert to to to to	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (4)	n/a	4	0.070	0.102	_	12	-
Water Control Structure	2.5" Dia. Concrete Vibrator (1)	n/a	1 1	_	_		0	_
Water Control Structure	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	0.070	0.132	- 00	16	92
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	-	0	_
Initiatable Obernieyer Gates	Haul Truck Oversize Transport (1)	Loaded Trucks		0.076	0.076	86	0	86
	Pickup Truck Conventional (4)	n/a	4	0.070	0.070		12	00
19 - Buildings, Grounds, and Utilities	Fickup Truck Conventional (4)	II/a	1 4	_	-	_	12	_
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
Mobilization and Demobilization	Extended Boom Pallet Loader (1)	n/a	10	0.076	0.76	00	0	100
	Pickup Truck Conventional (1)	n/a		_	-	_	0	_
	Temp. Mobile Office Building (1)	n/a		_	-	_	0	_
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1 1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a		0.009	0.009	07	0	67
Construction	Motor Grader (1)	n/a		_	-	_	0	-
	Compactor (1)	n/a		_	_	_	٥	l -
	4000 Gal Water Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a		0.076	0.076	00	0	00
	Pickup Truck Conventional (7)	n/a	'7	_	-	_	17	-
	Concrete Pump Boom Truck Mounted (1)	n/a	1 1	_	-	_	0	-
	2.5" Dia. Concrete Vibrator (1)			_	-	-	0	-
	· ,	n/a		-	-	-	0	-
	Extended Boom Pallet Loader (1) Concrete Mixer Truck (1)	n/a		0.070	0.070	-	ľ	-
Congrete Duet Denk	()	Loaded Trucks	1 1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a		-	-	-		-
	2.5" Dia. Concrete Vibrator (1)	n/a		0.070	- 0.450	-	0	-
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
OO Demonstration Francisco	Pickup Truck Conventional (7)	n/a	7	-	-	_	17	-
20 -Permanent Operating Equipment	Total A Truck (A partition of a miles of a	II and ad Trucks		0.070	0.000		40	00
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1 1	-	-	-	0	-
Davis Flactical O.M. decision F.	Pickup Truck Conventional (1)	n/a	1 1	-	-	-	0	-
Power, Electrical, & Mechanical Equipmen	* *	n/a	1	-	-	-	0	-
O constitution For the state of	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

	,									 				
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)													
	Pickup Truck Conventional (3)													
Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	i												
	300 HP Dozer (2)	i												
	3.5 CY Front End Loader, Wheel (2)	i												
	16 CY 3 Axle Dump Truck (9)	i												
	Pickup Truck Conventional (7)													
Sheet Pile Wall	Flatbed Truck (1)													
	75 TN Crane Crawler Pile Hammer (1)	i												
	Pickup Truck Conventional (6)													
Culvert Head Wall	2.5" Dia. Concrete Vibrator (1)													
	Concrete Mixer Truck (2)	i												
	Pickup Truck Conventional (6)	i												
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)													
	Flatbed Truck (2)	.												
	Pickup Truck Conventional (4)													
Water Control Structure	2.5" Dia. Concrete Vibrator (1)													
	Concrete Mixer Truck (2)	.												
	Pickup Truck Conventional (6)	i												
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)													
•	Haul Truck Oversize Transport (1)	i												
	Pickup Truck Conventional (4)	i												
19 - Buildings, Grounds, and Utilities										<u> </u>		<u>'</u>		
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
	Extended Boom Pallet Loader (1)													
	Pickup Truck Conventional (1)													
	Temp. Mobile Office Building (1)													
CMU Building and Earthwork Pad	165 HP Dozer (1)													
Construction	Scraper (1)													
	Motor Grader (1)													
	Compactor (1)													
	4000 Gal Water Truck (1)													
	10 TN Smooth Roller (1)													
	Pickup Truck Conventional (7)													
	Concrete Pump Boom Truck Mounted (1)													
	2.5" Dia. Concrete Vibrator (1)													
	Extended Boom Pallet Loader (1)													
	Concrete Mixer Truck (1)													
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)													
Control Duoi Builli	2.5" Dia. Concrete Vibrator (1)	.												
	Concrete Mixer Truck (2)	.												
	Pickup Truck Conventional (7)	.												
20 -Permanent Operating Equipment	1 Iskap Track Conventional (1)													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)													
Modifization and Demodifization	Extended Boom Pallet Loader (1)	.												
	Pickup Truck Conventional (1)	.												
Power, Electrical, & Mechanical Equipment	Extended Boom Pallet Loader (1)	\longrightarrow	+ +		+ +		-	- 						
ir ower, Ειθοιποαί, α iviechamicai Εquipment 	1 1	.												
Communication Equipment	Pickup Truck Conventional (3) Pickup Truck Conventional (3)	\longrightarrow	+ +		+ +							+		
	Habitat Pestoration & Fish Passage Project													

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Construction Vibration - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (A

Table <u>LM</u> -74. Construction Vibration Level at the Receptor												E	stimat	ted Du	uratio	n, Wee	ek											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	2.2	0.39	0.7	0.57	1.64	1.43	3.62	2.72	2	2.86	2.72	0.46	1.29	0.15	0.08	0.3	0.08	0.91	n/a	n/a	n/a	0.68	0.23	n/a	n/a	n/a	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)				180									180								180	180	180	180	180	180	180	180
PPV at the Receptor (in/sec)	0.11	0.02	0.04	0.03	0.08	0.07	0.19	0.14	0.10	0.15	0.14	0.02	0.07	0.01	0.00	0.02	0.00	0.05	n/a	n/a	n/a	0.04	0.01	n/a	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a	n/a	no	no	n/a	n/a	n/a	n/a	n/a
Human Annoyance	_																											
Total Lv @ 25'	115	100	105	103	113	111	120	117	114	117	117	102	111	92	86	98	86	108	n/a	n/a	n/a	105	96	n/a	n/a	n/a	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970	970
Distance Divergence (dBA)	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7
Lv at the Receptor (VdB)	68	53	58	56	65	64	72	69	67	70	69	54	63	44	38	50	38	60	n/a	n/a	n/a	57	48	n/a	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a	n/a	no	no	n/a	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

Source: Google Earth

72 VdB

Receptors:

Nearest residential receptor (ft)

2600

Table LM-75. Construction Vibration and Ground-Borne Vibration

Table <u>LM</u> -75. Construction Vibration	n and Ground-Borne vibration	1	_	011		0:		
Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
02 - Relocations								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (5)	Loaded Trucks	5	0.076	0.38	86	14	100
Temporary Electrical Power	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
09 - Channels and Canals								
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	15	0.076	1.14	86	24	110
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	Trailer Mounted Brush Chipper (1)	n/a	1	-	-	-	0	-
	Chainsaw (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
	Temp. Mobile Office Building (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)	large Bulldozer	1	0.089	0.089	87	0	87
	21 CY Scrapers (4)	n/a	4	-	-	-	12	-
	12' Blade Grader (1)	n/a	1	-	-	-	0	-
	4000 GAL Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)	n/a	2	-	-	-	6	-
	300 HP Dozer Crawler (1)	large Bulldozer	1	0.089	0.089	87	0	87
	Pickup Truck Conventional (5)	n/a	5	-	-	-	14	-
	16 CY 3 Axle Dump Trucks (23)	Loaded Trucks	23	0.076	1.748	86	27	113
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)	n/a	1	-	-	-	0	-
_	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-
11 - Levees and Flood walls		•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	4	0.076	0.304	86	12	98
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Berm/ Levee Fill	300 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
15 - Floodway Control and Diversion Struc	ctures	•						
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	12	0.076	0.912	86	22	108
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Construction Site Dewatering	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	-	-	-	16	-
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	_	10	_

Construction Vibration - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (A

Table <u>LM</u> -75. Construction Vibration	n and Ground-Borne Vibration												E	Estima	ated D	uratio	n, We	ek											
Phase	Equipment Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
02 - Relocations																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (2)																												
Levee O&M Road Regrading (6" AB)	12' Blade Grader (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (1)																												
	16 CY 3 Axle Dump Truck (5)																												
Temporary Electrical Power	Flatbed Truck (1)																												
. ,	Pickup Truck Conventional (2)																												
09 - Channels and Canals													_					<u> </u>							<u> </u>				
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (1)																												
Clearing and Grubbing	1.5 CY Front End Loader Crawler (1)																												
	Trailer Mounted Brush Chipper (1)																												
	Chainsaw (1)																												
	4000 Gal Water Truck (1)																												
	Pickup Truck Conventional (6)																												
	Temp. Mobile Office Building (1)																												
Excavation/Grading (Dry Conditions)	300 HP Dozer (1)																												
	21 CY Scrapers (4)																												
	12' Blade Grader (1)																												
	4000 GAL Water Truck (1)																												
	Pickup Truck Conventional (7)																												
Riprap - Class 2	2.5 CY Hydraulic Excavators (2)																												
	300 HP Dozer Crawler (1)																												
	Pickup Truck Conventional (5)																												
	16 CY 3 Axle Dump Trucks (23)																												
Erosion Control Seeding	0.8 CY Front End Loader, Wheel (1)																												
	Pickup Truck Conventional (4)																												
11 - Levees and Flood walls																													
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
	Pickup Truck Conventional (3)	<u> </u>																											
Berm/ Levee Fill	300 HP Dozer (1)																												
	4000 Gal Water Truck (1)																												
	10 TN Smooth Roller (1)																												
	Pickup Truck Conventional (3)																												
15 - Floodway Control and Diversion Struc							•	1										ı											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)																												
	Extended Boom Pallet Loader (1)																												
Overtee the Oile Burning	Pickup Truck Conventional (1)	<u> </u>											+		1														
Construction Site Dewatering	Flatbed Truck (1)																											ļ	
(Temporary Cofferdam)	75 TN Crane Crawler Pile Hammer (1)																											ļ	
0	Pickup Truck Conventional (6)	<u> </u>																											
Construction Site Dewatering (Pumping)	6" Dia. Pump Engine Drive (1) Pickup Truck Conventional (3)																												

Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	300 HP Dozer (2)	Large Bulldozer	2	0.089	0.178	87	6	93
	3.5 CY Front End Loader, Wheel (2)	n/a	2	-	-	-	6	-
	16 CY 3 Axle Dump Truck (9)	Loaded Trucks	9	0.076	0.684	86	19	105
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
Sheet Pile Wall	Flatbed Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	75 TN Crane Crawler Pile Hammer (1)	Pile Driver (impact)	1	0.644	0.644	104	0	104
	Pickup Truck Conventional (6)	n/a	6	_	-	_	16	- 1
Culvert Head Wall	2.5" Dia. Concrete Vibrator (1)	n/a	1	_	_	_	0	
	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	-	-	_	16	-
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)	n/a	1	_	_	_	0	_
Troduct Box Guivert To No No	Flatbed Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (4)	n/a	4	-		_	12	52
Water Control Structure	2.5" Dia. Concrete Vibrator (1)	n/a	1		_	_	0	_
Water Control Structure	Concrete Mixer Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (6)	n/a	6	1			16	92
Inflatable Obermover Cates	90 TN Truck Mounted Hydraulic Crane (1)		1	-	-	-		- -
Inflatable Obermeyer Gates		n/a		- 0.70	- 0.70	-	0	- 00
	Haul Truck Oversize Transport (1)	Loaded Trucks		0.076	0.076	86	0	86
10 D 11 D 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Pickup Truck Conventional (4)	n/a	4	-	-	-	12	-
19 - Buildings, Grounds, and Utilities		I	T 10		<u> </u>			100
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	10	0.076	0.76	86	20	106
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
CMU Building and Earthwork Pad	165 HP Dozer (1)	Large Bulldozer	1	0.089	0.089	87	0	87
Construction	Scraper (1)	n/a	1	-	-	-	0	-
	Motor Grader (1)	n/a	1	-	-	-	0	-
	Compactor (1)	n/a	1	-	-	-	0	-
	4000 Gal Water Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	10 TN Smooth Roller (1)	n/a	1	-	-	-	0	- 1
	Pickup Truck Conventional (7)	n/a	7	-	-	-	17	-
	Concrete Pump Boom Truck Mounted (1)	n/a	1	_	-	-	0	-
	2.5" Dia. Concrete Vibrator (1)	n/a	1 1	_	_	_	0	-
	Extended Boom Pallet Loader (1)	n/a	1	_	_	_	0	_
	Concrete Mixer Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)	n/a	1		-	-	0	
Concrete Buct Bunk	2.5" Dia. Concrete Vibrator (1)	n/a	'				0	
	` '	Loaded Trucks		0.076	0.150	- 06		-
	Concrete Mixer Truck (2)		7	0.076	0.152	86	6	92
OO Damas and On and in a Familian and	Pickup Truck Conventional (7)	n/a	/	-	-	_	17	-
20 -Permanent Operating Equipment	In the Late of the Control of the Co	II I I	1 0	0.070	0.000	1 00	40	00
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)	Loaded Trucks	3	0.076	0.228	86	10	96
	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Power, Electrical, & Mechanical Equipment	Extended Boom Pallet Loader (1)	n/a	1	-	-	-	0	-
	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-
Communication Equipment	Pickup Truck Conventional (3)	n/a	3	-	-	-	10	-

Ten Percent Design: Draft Technical Memorandum Constructability and Construction Considerations. March 10.

Construction Vibration - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (A

Excavation (Wet Conditions)	4.5 CY Hydraulic Excavator (1)					T T		1			
Excavation (vvet Conditions)	300 HP Dozer (2)										
	3.5 CY Front End Loader, Wheel (2)										
	16 CY 3 Axle Dump Truck (9)										
	Pickup Truck Conventional (7)										
Sheet Pile Wall	Flatbed Truck (1)										
	75 TN Crane Crawler Pile Hammer (1)										
	Pickup Truck Conventional (6)										
Culvert Head Wall	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (6)										
Precast Box Culvert 10'x8'x30'	90 TN Truck Mounted Hydraulic Crane (1)										
	Flatbed Truck (2)										
	Pickup Truck Conventional (4)										
Water Control Structure	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (6)										
Inflatable Obermeyer Gates	90 TN Truck Mounted Hydraulic Crane (1)										
,	Haul Truck Oversize Transport (1)										
	Pickup Truck Conventional (4)										
19 - Buildings, Grounds, and Utilities											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										
CMU Building and Earthwork Pad	165 HP Dozer (1)										
Construction	Scraper (1)		i								
	Motor Grader (1)		i								
	Compactor (1)		i								
	4000 Gal Water Truck (1)		i								
	10 TN Smooth Roller (1)		ŀ								
	Pickup Truck Conventional (7)		·								
	Concrete Pump Boom Truck Mounted (1)										
	2.5" Dia. Concrete Vibrator (1)										
	Extended Boom Pallet Loader (1)										
	Concrete Mixer Truck (1)										
Concrete Duct Bank	Concrete Pump Boom Truck Mounted (1)										
	2.5" Dia. Concrete Vibrator (1)										
	Concrete Mixer Truck (2)										
	Pickup Truck Conventional (7)										
20 -Permanent Operating Equipment											
Mobilization and Demobilization	Flatbed Truck (1 per piece of equipment)										
	Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (1)										
Power, Electrical, & Mechanical Equipn	nent Extended Boom Pallet Loader (1)										
	Pickup Truck Conventional (3)										
Communication Equipment	Pickup Truck Conventional (3)										
	onid Habitat Restoration & Fish Passage Project	 		 	 	 			-	 	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Considerations. March 10.

⁻ Ten Percent Design: Draft Technical Memorandum Constructability and Construction

Table <u>LM</u> -76. Construction Vibration Level at the Receptor												E	stima	ted Du	ıratio	ı, Wee	k											
Building Damage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Total PPV @ 25'	2.2	0.39	0.7	0.56	1.64	1.43	3.79	2.89	2.17	2.86	2.72	2.15	2.15	2.15	2.08	2.31	2.08	2.91	2	0.3	1.14	0.68	0.23	n/a	n/a	n/a	n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)			180			180	180		180		180										180		180	180	180	180	180	180
PPV at the Receptor (in/sec)	0.11	0.02	0.04	0.03	0.08	0.07	0.20	0.15	0.11	0.15	0.14	0.11	0.11	0.11	0.11	0.12	0.11	0.15	0.10	0.02	0.06	0.04	0.01	n/a	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	n/a	n/a	n/a	n/a	n/a
Human Annoyance	_																											
Total Lv @ 25'													115										96				n/a	n/a
Distance from the Center of Construction Activity to a Receptor (ft)													800															
Distance Divergence (dBA)	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2
Lv at the Receptor (VdB)	70	55	60	58	67	66	75	72	70	72	72	70	70	70	70	70	70	72	69	53	64	60	50	n/a	n/a	n/a	n/a	n/a
Impact to Receptor	no	no	no	no	no	no	YES	YES	no	YES	no	no	no	no	no	no	no	YES	no	no	no	no	no	n/a	n/a	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft) 800

Table <u>LM</u>-77. Vibration Source Levels for Construction Equipment

	PPV at 25 ft	Approximate
Equipment	(in/sec)	Lv [†] at 25 ft
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.17	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall) - in soil	0.008	66
Hydromill (slurry wall) - in rock	0.017	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Federal Transit Administration. 2006. Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May. Note:

Values for pile drivers are based on the typical vibration source levels.

† RMS velocity in decibels (VdB) re 1 micro-inch/second

Table <u>LM</u>-78. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

	·						Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road			,					•
O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
·	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Headworks Structure			•					
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
, , , , , , , , , , , , , , , , , , ,	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings		•						
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74

Appendix M Noise and Vibration Calculations

Operational Noise - Equipment Alternative 1 - East Alignment

Headworks Structure Operating Equipment	l .							
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

February 14.

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table LM-78. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

			l														HW
			0&	- 1												l!	Ор
Phase	Equipment Description	Tot	Roa	ad	Ма	in Cha	annel a	and Int	take S	helf	<u> </u>	leadw	orks S	tructui	re	Bldg	Eq
O&M Road																	
O&M Road Regrading	12' Blade Grader (1)																
Main Channel and Intake Shelf																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Channel Inspection	Pickup Truck Conventional (1)																
Headworks Structure							•	•		•					•		
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																
Buildings					<u> </u>												
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (2)																

Appendix M Noise and Vibration Calculations

Operational Noise - Equipment Alternative 1 - East Alignment

Headworks Structure Operating Equipment									
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)								
Test Operate Gates	Pickup Truck Conventional (1)								

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Table <u>LM</u>-79. 8-Hour Operation & Maintenance Noise Level at the Receptor

	O&M															HW Op
Tot	1		Ma	in Cha	annel a	and Int	ake Sh	nelf		н	leadwo	orks St	tructur	e	Bldg	Eq
0' 90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76	76
t) 330	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
16.4	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
0.27	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
73	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62	62
70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60	60
s CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA	CA
t) 110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
() 83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72	72
() 79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68	68
s CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA
f A A A	ft) 330 A) 16.4 A) 0.27 A) 73 A) 70 es CA ft) 110 A) 6.8 A) 0.09 A) 83	ft) 330 250 A) 16.4 14.0 A) 0.27 0.21 A) 73 67 A) 70 64 es CA CA ft) 110 80 A) 6.8 4.1 A) 0.09 0.07 A) 83 77 A) 79 73	Tot Road 50' 90 81 88 ft) 330 250 250 A) 16.4 14.0 14.0 A) 0.27 0.21 0.21 A) 73 67 73 A) 70 64 70 es CA CA ft) 110 80 80 A) 6.8 4.1 4.1 A) 0.09 0.07 0.07 A) 83 77 83 A) 79 73 80	Tot Road Ma 50' 90 81 88 78 ft) 330 250 250 250 A) 16.4 14.0 14.0 14.0 A) 0.27 0.21 0.21 0.21 A) 73 67 73 64 A) 70 64 70 61 es CA CA CA CA ft) 110 80 80 80 A) 6.8 4.1 4.1 4.1 A) 0.09 0.07 0.07 A) 83 77 83 74 A) 79 73 80 70	Tot Road Main Charles	Tot Road Main Channel at 80 60' 90 81 88 78 81 81 ft) 330 250 250 250 250 250 A) 16.4 14.0 14.0 14.0 14.0 14.0 A) 0.27 0.21 0.21 0.21 0.21 0.21 0.21 A) 70 64 70 61 64 64 es CA CA CA CA CA ft) 110 80 80 80 80 A) 6.8 4.1 4.1 4.1 4.1 A) 0.09 0.07 0.07 0.07 0.07 0.07 A) 79 73 80 70 73 73	Tot Road Main Channel and Intented 60' 90 81 88 78 81 81 78 ft) 330 250 250 250 250 250 250 250 A) 16.4 14.0 12.0 16.0 16.0 16.0	Tot Road Main Channel and Intake Street 50' 90 81 88 78 81 81 78 78 ft) 330 250 260 26 26	Tot Road	Tot Road Main Channel and Intake Shelf 10 90 81 88 78 81 81 78 78 81 71	Tot Road	Tot Road	Tot Road	Tot Road	Tot Road	Tot Road Main Channel and Intake Shelf Headworks Structure Bldg

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Pacantors

Nearest residential receptor (ft)

7500

Operational Noise - Equipment Alternative 2 - Center Alignment

Table LM-80. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

		İ				l	Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor		Leq(h) @ 50'	Equipment		50'
O&M Road			•		-	-		
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Headworks Structure								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings								
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipment								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 2 - Center Alignment

Table LM-80. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

Table EM-00. 0-11001 Operation & I	Maintenance Noise Level at 50 Feet (ub	<u> </u>																
			l															HW
			0&	M														Op
Phase	Equipment Description	Tot	Roa	ad		Ма	in Ch	annel a	and In	take S	helf	I	Headw	orks S	tructu	re	Bldg	Eq
O&M Road																		
Levee O&M Road Regrading	12' Blade Grader (1)																	
Main Channel and Intake Shelf					·													
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Vegetation Removal	56 HP Tractor Rotary Mower (1)																	
	16 CY 3 Axle Dump Truck (1)							İ										
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																	
	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																	
	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	

	Ta == av(1) 1 11 = 1 (1)								
Channel Repairs	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								1
Channel Inspection	Pickup Truck Conventional (1)								
Headworks Structure									
Debris Removal	1.5 CY Front End Loader Crawler (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)								
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)								
Buildings									
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (2)								1
Headworks Structure Operating Equipment									
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)								
Test Operate Gates	Pickup Truck Conventional (1)								

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 2 - Center Alignment

Table <u>LM</u>-81. 8-Hour Operation & Maintenance Noise Level at the Receptor

-																	HW
		О&М															Op
	Tot	Road		Ma	ain Cha	annel a	and Int	ake Sh	nelf		н	leadwo	orks S	tructui	e	Bldg	
Total O&M Leq(h) @	50' 90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76	76
Residential Receptor																	
Distance from the Center of O&M Activity to a Receptor	(ft) 330	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence (dE	A) 16.4	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation (dE	A) 0.27	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor (dE	A) 73	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62	62
CNEL (O&M Noise + Existing) (dB	A) 70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60	60
Impact to Residential Us	es CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																	
Distance from the Center of O&M Activity to a Receptor	` /	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence (dE	A) 6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation (dE	A) 0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor (dE	A) 83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72	72
CNEL (O&M Noise + Existing) (dB	A) 79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68	68
Impact to Agricultural Us	es CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft)
Source: Google Earth

4200

M-170

Table LM-82. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

		, 	T	I	I		Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor		Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road	•	_						
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
·	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Headworks Structure				•	•	•		<u> </u>
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
·	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings				•	•	•		,
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
- ` - ` /	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipme	nt							
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
			-			•		-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

— Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 3 - West Alignment

Table LM-82. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

			O&M												HW
Phase	Equipment Description	Tot	Road	lain Ch	nannel a	and Int	ako Si	nolf	١,	leadw	nrke Si	ructu	ro	Bldg	Op Eq
O&M Road	Equipment Becompaign	100	Intodu	iuiii Oi	iaiiiici (and m	unc o	icii	<u>'</u>	icuaw	JING O	uctui		Diag	4
Levee O&M Road Regrading	12' Blade Grader (1)														
Main Channel and Intake Shelf	12 Blace Gracer (1)														
Debris Removal	1.5 CY Front End Loader Crawler (1)														
Double Homevar	16 CY 3 Axle Dump Truck (1)														l
	Pickup Truck Conventional (1)														l
Vegetation Removal	56 HP Tractor Rotary Mower (1)														
	16 CY 3 Axle Dump Truck (1)														l
	Pickup Truck Conventional (1)														l
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)														
(16 CY 3 Axle Dump Truck (3)														l
	Pickup Truck Conventional (2)														l
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)														
1 , ,	16 CY 3 Axle Dump Truck (2)														l
	Pickup Truck Conventional (1)														l
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)														
. , , ,	16 CY 3 Axle Dump Truck (2)														l
	Pickup Truck Conventional (1)														l
Channel Repairs	0.75 CY Hydraulic Excavator (1)														
·	16 CY 3 Axle Dump Truck (3)														l
	Pickup Truck Conventional (2)														l
Channel Inspection	Pickup Truck Conventional (1)														
Headworks Structure			_						_						
Debris Removal	1.5 CY Front End Loader Crawler (1)														
	16 CY 3 Axle Dump Truck (1)														l
	Pickup Truck Conventional (1)														l
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)														
,	16 CY 3 Axle Dump Truck (3)														l
	Pickup Truck Conventional (2)														l
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)														
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)														
Buildings					·			•							
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)														
· · · · · · · · · · · · · · · · · · ·	Pickup Truck Conventional (2)														I
Headworks Structure Operating Equipment	nt														
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)														
Test Operate Gates	Pickup Truck Conventional (1)														
	id Habitat Dagtaration & Fieb Daggara Drain	-		 _											

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance. February 14.

Table <u>LM</u>-83. 8-Hour Operation & Maintenance Noise Level at the Receptor

																	HW
		O&M															Op
	Tot	Road		Ma	in Cha	nnel a	and Int	ake Sh	nelf		Н	leadwo	orks St	tructur	re	Bldg	Eq
Total O&M Leq(h) @ 50	90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76	76
Residential Receptor																	
Distance from the Center of O&M Activity to a Receptor (ft	330	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence (dBA	16.4	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation (dBA	0.27	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor (dBA)	73	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62	62
CNEL (O&M Noise + Existing) (dBA	70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60	60
Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																	
Distance from the Center of O&M Activity to a Receptor (ft	110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence (dBA	6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation (dBA		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor (dBA)	83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72	72
CNEL (O&M Noise + Existing) (dBA	79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68	68
Impact to Agricultural Uses	CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level (dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

700

Receptors:

Nearest residential receptor (ft)

Source: Google Earth

Operational Noise - Equipment Alternative 4 - West Alignment

Table LM-84. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

	lamtenance Noise Level at 50 Feet (u			I	1	1	Add to Single	Total
Phase	Equipment Description	RCNM Equipment Types	Usage Factor		Equipment Leq(h) @ 50'	Number of Equipment	Source Level	Leq(h) @
O&M Road								
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf		<u> </u>						
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Headworks Structure								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings								
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipment								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 4 - West Alignment

Table LM-84. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

																	HW
Phase	Equipment Description	Tot	O&I Roa	- 1	N	ain Cl	nannel	and Int	ake S	helf	١,	leadw	orks S	tructur	re	Bldg	Op Eq
O&M Road			•	_													
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel and Intake Shelf	· ·						_	<u>'</u>									
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)															1	
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)						i										
	Pickup Truck Conventional (1)															1	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
, ,	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)															1	
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)															1	
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)															1	
	Pickup Truck Conventional (1)																

16 CY 3 Axle Dump Truck (3)																
Pickup Truck Conventional (2)																
Pickup Truck Conventional (1)																
1.5 CY Front End Loader Crawler (1)																
16 CY 3 Axle Dump Truck (1)																
Pickup Truck Conventional (1)																
0.75 CY Hydraulic Excavator (1)																
16 CY 3 Axle Dump Truck (3)																
Pickup Truck Conventional (2)																
Pickup Truck Conventional (2)																
Pickup Truck Conventional (2)																
16 CY 3 Axle Dump Truck (1)																
Pickup Truck Conventional (2)																
Pickup Truck Conventional (2)																
Pickup Truck Conventional (1)																
	Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)	16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (1) 1.5 CY Front End Loader Crawler (1) 16 CY 3 Axle Dump Truck (1) Pickup Truck Conventional (1) 0.75 CY Hydraulic Excavator (1) 16 CY 3 Axle Dump Truck (3) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2) Pickup Truck Conventional (2)

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 4 - West Alignment

Table <u>LM</u>-85. 8-Hour Operation & Maintenance Noise Level at the Receptor

																	HW
	l _	O&M	I													l !	Ор
	Tot	Road		Ma	ain Cha	annel a	and Int	ake Sh	nelf		H	leadwo	orks S	tructur	re	Bldg	Eq
Total O&M Leq(h) @ 5	0' 90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76	76
Residential Receptor																	
Distance from the Center of O&M Activity to a Receptor (t) 700	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence (dB	A) 22.9	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation (dB	4) 0.58	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor (dB	A) 67	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62	62
CNEL (O&M Noise + Existing) (dB	A) 64	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60	60
Impact to Residential Use	es CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																	
Distance from the Center of O&M Activity to a Receptor (t) 110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence (dB.	4) 6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation (dB	A) 0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor (dB	,	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72	72
CNEL (O&M Noise + Existing) (dB	A) 79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68	68
Impact to Agricultural Use	es CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft)
Source: Google Earth

700

Table LM-86. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

Phase	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Leq(h) @ 50'
O&M Road	<u> </u>							
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf		•						
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
, , ,	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
. , , ,	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
, , , , , , , , , , , , , , , , , , , ,	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
·	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Headworks Structure	· · · · · · · · · · · · · · · · · · ·	· '						
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
(16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings						_	-	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipmen		1. 101.00	1 .0,0			_		<u> </u>
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
·	d Habitat Pastoration & Fish Passage Proj	<u> </u>	1 .0 ,0		· · ·			L ''

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 5 - Multipe Gates/Center Alignment

Table LM-86. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

																HW
Phase	Equipment Description	Tot	O&M Road	Main	Channe	l and In	taka Si	half		Ι.	leadwo	arka Si	tructuu	.	Bldg	Or Ec
O&M Road	Equipment Description	100	INOAU	Walli	Cilailie	and in	lake Si	ICII		<u> </u>	ieauw	JI KS GI	uctui	-	Diag	
Levee O&M Road Regrading	12' Blade Grader (1)					_	Τ									
Main Channel and Intake Shelf	12 Blade Grader (1)															
Debris Removal	1.5 CY Front End Loader Crawler (1)						T	I	I	1	I			1		
Deblis Reliiovai	16 CY 3 Axle Dump Truck (1)															l
	Pickup Truck Conventional (1)															l
Vacatation Domaval	56 HP Tractor Rotary Mower (1)															
Vegetation Removal																l
	16 CY 3 Axle Dump Truck (1)															l
O. P	Pickup Truck Conventional (1)															
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)															1
	16 CY 3 Axle Dump Truck (3)															l
	Pickup Truck Conventional (2)															<u> </u>
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)															l
	16 CY 3 Axle Dump Truck (2)															l
	Pickup Truck Conventional (1)															
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)															
	16 CY 3 Axle Dump Truck (2)															1
	Pickup Truck Conventional (1)															
Channel Repairs	0.75 CY Hydraulic Excavator (1)															1
	16 CY 3 Axle Dump Truck (3)															l
	Pickup Truck Conventional (2)															
Channel Inspection	Pickup Truck Conventional (1)															
Headworks Structure																
Debris Removal	1.5 CY Front End Loader Crawler (1)															
	16 CY 3 Axle Dump Truck (1)															1
	Pickup Truck Conventional (1)															1
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)															
,	16 CY 3 Axle Dump Truck (3)															
	Pickup Truck Conventional (2)															l
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)															
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)			\top												
Buildings	, , , , , , , , , , , , , , , , , , , ,															
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)					T										
1. I	Pickup Truck Conventional (2)															i
Headworks Structure Operating Equipment																
Mechanical Hydraulic Equipment Upkeep																
Test Operate Gates	Pickup Truck Conventional (1)					+										
	id Habitat Bastavatian & Fish Bassava Brain						1	1								الكام

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table <u>LM</u>-87. 8-Hour Operation & Maintenance Noise Level at the Receptor

	· · · · · · · · · · · · · · · · · · ·		_														$\overline{}$	
			O&M															HW Op
		Tot	Road		Ma	in Cha	annel a	and Int	ake Sh	nelf		Н	leadwo	orks S	tructui	e	Bldg	Eq
	Total O&M Leq(h) @ 50'	90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76	76
Residential Receptor																		
	Distance from the Center of O&M Activity to a Receptor (ft)	330	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	25
	Distance Divergence (dBA)	16.4	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
	Atmospheric Attenuation (dBA)	0.27	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	1-Hour O&M Noise Level at the Receptor (dBA)	73	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62	62
	CNEL (O&M Noise + Existing) (dBA)	70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60	60
	Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																		
	Distance from the Center of O&M Activity to a Receptor (ft)	110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	8
	Distance Divergence (dBA)	6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	Atmospheric Attenuation (dBA)	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	1-Hour O&M Noise Level at the Receptor (dBA)	83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72	72
	CNEL (O&M Noise + Existing) (dBA)	79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68	68
	Impact to Agricultural Uses	CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

(dBA)

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft)
Source: Google Earth

3800

Final Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project EIS/EIR

Operational Noise - Equipment Alternative 6 - West Alignment

Table LM-88. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

							Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road		-	•					•
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Headworks Structure		•						
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings		•						
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipment								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 6 - West Alignment

Table LM-88. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

Table Em-00. 0-11001 Operation &	waintenance Noise Level at 30 i eet (ul	<u>'^</u>															
																	HW
			O&N	'													Op
Phase	Equipment Description	Tot	Road	t	M	ain Ch	annel a	and Int	ake SI	nelf	H	leadw	orks S	tructur	е	Bldg	Eq
O&M Road				-							-						
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel and Intake Shelf																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)						i										
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																

	Ta == av(1) 1 11 = 1 (1)								
Channel Repairs	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								1
Channel Inspection	Pickup Truck Conventional (1)								
Headworks Structure									
Debris Removal	1.5 CY Front End Loader Crawler (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)								
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)								
Buildings									
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (2)								1
Headworks Structure Operating Equipment									
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)								
Test Operate Gates	Pickup Truck Conventional (1)								

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Alternative 6 - West Alignment

Table <u>LM</u>-89. 8-Hour Operation & Maintenance Noise Level at the Receptor

-																	HW
		O&M															Op
	Tot	Road		Ma	in Cha	annel a	and Int	ake Sh	elf		Н	eadwo	orks S	tructur	е	Bldg	Eq
Total O&M Leq(h) @ 5)' 90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76	76
Residential Receptor																	
Distance from the Center of O&M Activity to a Receptor (330	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence (dB/) 16.4	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation (dBA	0.27	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor (dB/) 73	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62	62
CNEL (O&M Noise + Existing) (dB/) 70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60	60
Impact to Residential Use	s CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																	
Distance from the Center of O&M Activity to a Receptor (110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence (dB/	6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation (dB/	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor (dB/) 83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72	72
CNEL (O&M Noise + Existing) (dBA) 79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68	68
Impact to Agricultural Use	s CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft)

700

(dBA)

Source: Google Earth

Table LM-90. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

		ĺ					Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road								
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

- Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
February 14.

Operational Noise - Equipment Downstream (Alternatives 1-4, 6)

Table LM-90. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

Table Lin vo. o Hour Operation &	Maintenance Noise Level at 50 Feet (di							
			О&М					
Phase	Equipment Description	Tot	Road		Main C	hanne	el .	
O&M Road								
Levee O&M Road Regrading	12' Blade Grader (1)							
Main Channel	•							
Debris Removal	1.5 CY Front End Loader Crawler (1)							
	16 CY 3 Axle Dump Truck (1)							
	Pickup Truck Conventional (1)							
Vegetation Removal	56 HP Tractor Rotary Mower (1)							
	16 CY 3 Axle Dump Truck (1)							
	Pickup Truck Conventional (1)							
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)							
	16 CY 3 Axle Dump Truck (3)							
	Pickup Truck Conventional (2)							
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)							
	16 CY 3 Axle Dump Truck (2)							
	Pickup Truck Conventional (1)							
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)							
	16 CY 3 Axle Dump Truck (2)							
	Pickup Truck Conventional (1)							
Channel Repairs	0.75 CY Hydraulic Excavator (1)							
	16 CY 3 Axle Dump Truck (3)							
	Pickup Truck Conventional (2)							
Channel Inspection	Pickup Truck Conventional (1)							

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table LM-91. 8-Hour Operation & Maintenance Noise Level at the Receptor

	por a										
			О&М	l .							
		Tot	Road				Main C	hanne	1		
	Total O&M Leq(h) @ 50'	88	81	88	78	81	81	78	78	81	71
Residential Receptor											
	Distance from the Center of O&M Activity to a Receptor (ft)	270	250	250	250	250	250	250	250	250	250
	Distance Divergence (dBA)	14.6	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
	Atmospheric Attenuation (dBA)	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	1-Hour O&M Noise Level at the Receptor (dBA)	74	67	73	64	67	67	64	64	67	57
	CNEL (O&M Noise + Existing) (dBA)	70	64	70	61	64	64	62	62	64	58
	Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA
Agricultural Receptor											
	Distance from the Center of O&M Activity to a Receptor (ft)	90	80	80	80	80	80	80	80	80	80
	Distance Divergence (dBA)	5.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	Atmospheric Attenuation (dBA)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	1-Hour O&M Noise Level at the Receptor (dBA)	83	77	83	74	77	77	74	74	77	67
	CNEL (O&M Noise + Existing) (dBA)	80	73	80	70	73	73	70	70	73	64
	Impact to Agricultural Uses	CA	NA	CA	NA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels
Land Use Type Normal Suburban Residential

Background Noise

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft) Source: Google Earth

7000

Operational Noise - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

Table LM-92. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

Table Em-32. 0-Hour Operation & I	maintenance Noise Level at 30 i eet (ui	DA)		1		1		т
							Add to Single	Total
			Usage		Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road								
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Headworks Structure								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipment	l .							
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
February 14.

Operational Noise - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

Table <u>LM</u>-92. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

		Í												T	HW
Phase	Favinasant Bassarintian	_{T-4}	O&M		01		4-1 01	16		١			4	_	Op
Phase	Equipment Description	101	Road	wain	Channe	el and In	take Si	пент			leadwo	orks 5	tructur	<u> </u>	Eq
O&M Road	LOUDING CONTRACTOR		ı						T						
Levee O&M Road Regrading	12' Blade Grader (1)														
Main Channel and Intake Shelf															
Debris Removal	1.5 CY Front End Loader Crawler (1)														
	16 CY 3 Axle Dump Truck (1)														
	Pickup Truck Conventional (1)														
Vegetation Removal	56 HP Tractor Rotary Mower (1)														
-	16 CY 3 Axle Dump Truck (1)														
	Pickup Truck Conventional (1)														
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)														
	16 CY 3 Axle Dump Truck (3)														
	Pickup Truck Conventional (2)														
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)														
	16 CY 3 Axle Dump Truck (2)														
	Pickup Truck Conventional (1)														
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)														
	16 CY 3 Axle Dump Truck (2)														
	Pickup Truck Conventional (1)														
Channel Repairs	0.75 CY Hydraulic Excavator (1)														
	16 CY 3 Axle Dump Truck (3)														
	Pickup Truck Conventional (2)														
Channel Inspection	Pickup Truck Conventional (1)														

Headworks Structure									
Debris Removal	1.5 CY Front End Loader Crawler (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)								
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)								
Headworks Structure Operating Equipmen	t								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)								
Test Operate Gates	Pickup Truck Conventional (1)								

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Operational Noise - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

Table <u>LM</u>-93. 8-Hour Operation & Maintenance Noise Level at the Receptor

																HW
		O&M														Op
	Tot	Road		Ма	in Cha	annel a	and Int	ake Sh	nelf		Н	leadw	orks S	tructui	re	Eq
Total O&M Leq(h) @ 5	0' 90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76
Residential Receptor																
Distance from the Center of O&M Activity to a Receptor (t) 320	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence (dB.	A) 16.1	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation (dB	(4) 0.26	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor (dB.	(4) 74	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62
CNEL (O&M Noise + Existing) (dB.	A) 70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60
Impact to Residential Use	s CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA
Agricultural Receptor																
Distance from the Center of O&M Activity to a Receptor (t) 110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence (dB.	4) 6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation (dB.	A) 0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor (dB.	A) 83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72
CNEL (O&M Noise + Existing) (dB.	A) 79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68
Impact to Agricultural Use	s CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 1800

Source: Google Earth

Table LM-94. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

							Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road	•							
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
•	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Operational Noise - Equipment Supplemental Fish Passage East (Alternatives 3, 4, and 6)

Headworks Structure								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Headworks Structure Operating Equipment								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Table LM-94. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

	,	ĺ								l					HW
			O&M												Op
Phase	Equipment Description	Tot	Road	Main	Chan	nnel a	nd Int	ake Sl	nelf	H	leadwo	orks S	tructu	re	Eq
O&M Road		·	-							-					
Levee O&M Road Regrading	12' Blade Grader (1)														
Main Channel and Intake Shelf															
Debris Removal	1.5 CY Front End Loader Crawler (1)														
	16 CY 3 Axle Dump Truck (1)														
	Pickup Truck Conventional (1)														
Vegetation Removal	56 HP Tractor Rotary Mower (1)														
	16 CY 3 Axle Dump Truck (1)														
	Pickup Truck Conventional (1)														
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)														
	16 CY 3 Axle Dump Truck (3)														
	Pickup Truck Conventional (2)														
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)														
	16 CY 3 Axle Dump Truck (2)														
	Pickup Truck Conventional (1)														
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)														
	16 CY 3 Axle Dump Truck (2)														
	Pickup Truck Conventional (1)														
Channel Repairs	0.75 CY Hydraulic Excavator (1)														
	16 CY 3 Axle Dump Truck (3)														
	Pickup Truck Conventional (2)														
Channel Inspection	Pickup Truck Conventional (1)														

Operational Noise - Equipment Supplemental Fish Passage East (Alternatives 3, 4, and 6)

Headworks Structure									
Debris Removal	1.5 CY Front End Loader Crawler (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)								
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)								
Headworks Structure Operating Equipment									
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)								
Test Operate Gates	Pickup Truck Conventional (1)								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Table <u>LM</u>-95. 8-Hour Operation & Maintenance Noise Level at the Receptor

																	HW
			O&M														Op
		Tot	Road		Ma	in Cha	annel a	and Int	ake Sh	nelf		H	leadw	orks S	tructui	re	Eq
	Total O&M Leq(h) @ 50'	90	81	88	78	81	81	78	78	81	71	84	78	81	74	74	76
Residential Receptor																	
Distance from the Cen	ter of O&M Activity to a Receptor (ft)	320	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
	Distance Divergence (dBA)	16.1	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
	Atmospheric Attenuation (dBA)	0.26	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&f	M Noise Level at the Receptor (dBA)	74	67	73	64	67	67	64	64	67	57	70	64	67	60	60	62
	CNEL (O&M Noise + Existing) (dBA)	70	64	70	61	64	64	62	62	64	58	66	61	64	59	59	60
	Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	NA	NA	CA
Agricultural Receptor																	
Distance from the Cen	ter of O&M Activity to a Receptor (ft)	110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
	Distance Divergence (dBA)	6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	Atmospheric Attenuation (dBA)	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&I	M Noise Level at the Receptor (dBA)	83	77	83	74	77	77	74	74	77	67	80	74	77	70	70	72
	CNEL (O&M Noise + Existing) (dBA)	79	73	80	70	73	73	70	70	73	64	76	70	73	66	66	68
	Impact to Agricultural Uses	CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft) 8600

Source: Google Earth

Operational Noise - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Table <u>LM</u>-96. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

·							Add to Single	Total
			Usage	Equipment	Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor		Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road			•			-		
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Agricultural Channel and Intake								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Clearing and Grubbing	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Bridge	<u> </u>							
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Bridge Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Bridge Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74

Bridge Inspection Pickup Truck Conventional (2) Fource: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

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Table LM-96. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

Table Lin Gold Hour operation	Wilding indice itolog Egyer at 00 i eet (al	- · ·							
Phase	Equipment Description	Tot	O&M Road	Agricult	ıral Ch	annel a	and Int	ake	Bridge
O&M Road		•							-
Levee O&M Road Regrading	12' Blade Grader (1)								
Agricultural Channel and Intake									
Debris Removal	1.5 CY Front End Loader Crawler (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Vegetation Removal	56 HP Tractor Rotary Mower (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Clearing and Grubbing	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								
Channel Repairs	0.75 CY Hydraulic Excavator (1)								
	16 CY 3 Axle Dump Truck (3)								
	Pickup Truck Conventional (2)								
Channel Inspection	Pickup Truck Conventional (1)								
Bridge									
Debris Removal	1.5 CY Front End Loader Crawler (1)								
	16 CY 3 Axle Dump Truck (1)								
	Pickup Truck Conventional (1)								
Bridge Upkeep	Pickup Truck Conventional (2)								
Bridge Inspection	Pickup Truck Conventional (2)								

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Noise - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Table <u>LM</u>-97. 8-Hour Operation & Maintenance Noise Level at the Receptor

		Tot	O&M Road	Agı	ricultu	ral Cha	annel a	and Int	ake	Bridge
	Total O&M Leq(h) @ 50'	88	81	87	78	81	81	81	71	80
Residential Receptor										
	Distance from the Center of O&M Activity to a Receptor (ft)	270	220	220	220	220	220	220	220	220
	Distance Divergence (dBA)	14.6	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
	Atmospheric Attenuation (dBA)	0.22	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
	1-Hour O&M Noise Level at the Receptor (dBA)	73	68	73	65	68	68	68	58	67
	CNEL (O&M Noise + Existing) (dBA)	70	65	70	62	65	65	65	58	64
	Impact to Residential Uses	CA	CA	CA	CA	CA	CA	CA	NA	CA
Agricultural Receptor										
	Distance from the Center of O&M Activity to a Receptor (ft)	90	70	70	70	70	70	70	70	70
	Distance Divergence (dBA)	5.1	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	Atmospheric Attenuation (dBA)	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	1-Hour O&M Noise Level at the Receptor (dBA)	83	78	84	75	78	78	78	68	77
	CNEL (O&M Noise + Existing) (dBA)	79	74	80	71	74	74	74	65	74
	Impact to Agricultural Uses	CA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

Nighttime 45

Receptors:

Nearest residential receptor (ft)

8000

Source: Google Earth

Table LM-98. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

							Add to Single	Total
			Usage		Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road		•	•					
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Berm/Levee								
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Water Control Structure & Culvert			-			-		
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Buildings								
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Water Control Structure Operating Equipr								
Mechanical Hydraulic Equipment Upkeep		Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance. February 14.

Operational Noise - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (A

Table <u>LM</u>-98. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

	aintenance Noise Level at 50 i eet (di	Ť															
		_	08					_			_	Wat			tructur		
Phase	Equipment Description	Tot	Ro	ad		N	Main C	hannel			Berm		(Culver	<u>t </u>	Bldg	Op Eq
O&M Road					1			I I								-	
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																I
	16 CY 3 Axle Dump Truck (1)																I
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																l
	16 CY 3 Axle Dump Truck (1)																ı
	Pickup Truck Conventional (1)																Į
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																I
	16 CY 3 Axle Dump Truck (3)																ı
	Pickup Truck Conventional (2)																1
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																I
	Pickup Truck Conventional (1)																I
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																I
	Pickup Truck Conventional (1)																I
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																I
	Pickup Truck Conventional (2)																I
Channel Inspection	Pickup Truck Conventional (1)																
Berm/Levee	·								<u> </u>								
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)																
·	16 CY 3 Axle Dump Truck (3)																I
	Pickup Truck Conventional (2)																I
Water Control Structure & Culvert																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																I
	Pickup Truck Conventional (1)																I
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
(1111 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	16 CY 3 Axle Dump Truck (3)																l
	Pickup Truck Conventional (2)																I
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																
Buildings																	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (2)																l
Water Control Structure Operating Equipm	nent																
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)																
Test Operate Gates	Pickup Truck Conventional (1)																
			_														

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance. February 14.

Table <u>LM</u>-99. 8-Hour Operation & Maintenance Noise Level at the Receptor

			O&M										Wat	ter Coı	ntrol S	tructu	re &		
		Tot	Road				Main C	hanne	el			Berm		(Culver	t		Bldg	Op Eq
Total O&M Leq(h)	@ 50'	91	81	88	78	81	81	78	78	81	71	81	84	78	81	74	74	76	76
Residential Receptor			-																•
Distance from the Center of O&M Activity to a Recept	tor (ft)	350	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence	(dBA)	16.9	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation	(dBA)	0.29	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor	(dBA)	73	67	73	64	67	67	64	64	67	57	67	70	64	67	60	60	62	62
CNEL (O&M Noise + Existing)	(dBA)	70	64	70	61	64	64	62	62	64	58	64	66	61	64	59	59	60	60
Impact to Residential	Uses	CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																			
Distance from the Center of O&M Activity to a Recept	tor (ft)	110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence	(dBA)	6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation	(dBA)	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor	(dBA)	84	77	83	74	77	77	74	74	77	67	77	80	74	77	70	70	72	72
CNEL (O&M Noise + Existing)	(dBA)	80	73	80	70	73	73	70	70	73	64	73	76	70	73	66	66	68	68
Impact to Agricultural	Uses	CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level (dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75 Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55 Nighttime 45

Receptors:

Nearest residential receptor (ft) 2600

Source: Google Earth

Operational Noise - Equipment

Southern Water Control Structure and Sturgeon Bypass Channel (Alternative 4)

Table LM-100. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dBA)

							Add to Single	Total
			Usage		Equipment	Number of	Source Level	Leq(h) @
Phase	Equipment Description	RCNM Equipment Types	Factor	Lmax @ 50'	Leq(h) @ 50'	Equipment	(dBA)	50'
O&M Road								
Levee O&M Road Regrading	12' Blade Grader (1)	Grader	40%	85	81	1	0	81
Main Channel								
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Vegetation Removal	56 HP Tractor Rotary Mower (1)	Tractor	40%	84	80	1	0	80
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	Crane	16%	81	73	1	0	73
	16 CY 3 Axle Dump Truck (2)	Dump Truck	40%	76	72	2	3	75
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Channel Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Channel Inspection	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Berm/Levee		<u> </u>						
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
·	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Water Control Structure & Culvert				<u> </u>				
Debris Removal	1.5 CY Front End Loader Crawler (1)	Front End Loader	40%	79	75	1	0	75
	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	Excavator	40%	81	77	1	0	77
,	16 CY 3 Axle Dump Truck (3)	Dump Truck	40%	76	72	3	5	77
	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Gates and Concrete Structure Inspection	•	Pickup Truck	40%	75	71	2	3	74
Buildings		1						
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Dump Truck	40%	76	72	1	0	72
()	Pickup Truck Conventional (2)	Pickup Truck	40%	75	71	2	3	74
Water Control Structure Operating Equip	. ,							
Mechanical Hydraulic Equipment Upkeep		Pickup Truck	40%	75	71	2	3	74
Test Operate Gates	Pickup Truck Conventional (1)	Pickup Truck	40%	75	71	1	0	71
·	nid Habitat Restoration & Fish Passage Proj		1		· ·			

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

February 14.

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table LM-100. 8-Hour Operation & Maintenance Noise Level at 50 Feet (dB/

			0	&М							Wa	ter Co	ntrol S	tructu	re &		Op
Phase	Equipment Description	Tot	Ro	oad		Main C	hanne	el	 	Berm		-	Culver	t		Bldg	Eq
O&M Road			_														
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																1
	Pickup Truck Conventional (1)																1
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)																1
	Pickup Truck Conventional (1)																1
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																1
	Pickup Truck Conventional (2)																1
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
, , , , ,	16 CY 3 Axle Dump Truck (2)																1
	Pickup Truck Conventional (1)																1
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																1
	Pickup Truck Conventional (1)																1
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
'	16 CY 3 Axle Dump Truck (3)																1
	Pickup Truck Conventional (2)																1
Channel Inspection	Pickup Truck Conventional (1)																
Berm/Levee	, ,																
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)		г		Т												
	16 CY 3 Axle Dump Truck (3)																1
	Pickup Truck Conventional (2)																1
Water Control Structure & Culvert																	
Debris Removal	1.5 CY Front End Loader Crawler (1)		П		Т												
2 0 0 1 0 1 0 1 0 1 0 1	16 CY 3 Axle Dump Truck (1)																1
	Pickup Truck Conventional (1)																1
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
Codiment Removal (Wet Conditions)	16 CY 3 Axle Dump Truck (3)																1
	Pickup Truck Conventional (2)																1
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)				+												
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)				+												
Buildings	Trickep fractional (2)																
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																
Equipment building (Major Repair)	Pickup Truck Conventional (2)																ı
Water Control Structure Operating Equipme																	
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)																
Test Operate Gates	Pickup Truck Conventional (1)				+												
Tost Operate Gates	I lokup Truck Conventional (1)																

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Operational Noise - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (A

Table LM-101. 8-Hour Operation & Maintenance Noise Level at the Recepto

- ·	_											_						
	Tot	O&M Road			ı	Main C	hanne	el			Berm	Wat	ter Cor	ntrol S Culver		re &	Bldg	Op Eq
Total O&M Leq(h) @ 50)' 91	81	88	78	81	81	78	78	81	71	81	84	78	81	74	74	76	76
Residential Receptor																		
Distance from the Center of O&M Activity to a Receptor (f	350	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Distance Divergence (dBA) 16.9	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Atmospheric Attenuation (dBA	0.29	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
1-Hour O&M Noise Level at the Receptor (dBA) 73	67	73	64	67	67	64	64	67	57	67	70	64	67	60	60	62	62
CNEL (O&M Noise + Existing) (dBA) 70	64	70	61	64	64	62	62	64	58	64	66	61	64	59	59	60	60
Impact to Residential Use	s CA	CA	CA	CA	CA	CA	CA	CA	CA	NA	CA	CA	CA	CA	NA	NA	CA	CA
Agricultural Receptor																		
Distance from the Center of O&M Activity to a Receptor (f	110	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Distance Divergence (dBA	6.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Atmospheric Attenuation (dBA	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1-Hour O&M Noise Level at the Receptor (dBA) 84	77	83	74	77	77	74	74	77	67	77	80	74	77	70	70	72	72
CNEL (O&M Noise + Existing) (dBA	.) 80	73	80	70	73	73	70	70	73	64	73	76	70	73	66	66	68	68
Impact to Agricultural Use	s CA	NA	CA	NA	NA	NA	NA	NA	NA	NA	NA	CA	NA	NA	NA	NA	NA	NA

^{*}Distances are the minimum distances that can still achieve noise levels within

Conditionally Acceptable limits, except when there is a closer receptor.

Significance Level

(dBA)

Residential

Normally Acceptable 60

Conditionally Acceptable 70

Agricultural

Normally Acceptable 75

Conditionally Acceptable 80

Existing Noise Levels

Land Use Type Normal Suburban Residential

Background Noise (dBA)

Daytime 55

800

Nighttime 45

Receptors:

Nearest residential receptor (ft)

Source: Google Earth

Equivalency 2015 AADT Factor for Substantial without O&M **Peak Daily Peak Daily Heavy-Duty** Equivalent Total with Noise Level **Noise Increase** Above Roadway Traffic Truck Trips Worker Trips | Average Speed Vehicles Vehicles **Project** Increase Ratio Increase (dBA) (dBA) Threshold? Segment Type Sacramento/Yolo County Line to CR 8,438 64,838 Interstate I-5 56,400 801 112 55 10.4 1.1 12 No 117 Interstate I-5 CR 117 to CR 102 56,200 801 112 55 10.4 8,438 64,638 1.2 12 No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-103. Alt 1 Peak Hourly O&M Traffic - Equivalent Noise Levels

			Peak Hourly	Peak Hour	Peak Hour		Equivalency Factor for Heavy-Duty	Equivalent	Total with		Noise Level	Substantial Noise Increase	Above
Type	Roadway	Segment	Volume	Truck Trips	Worker Trips	Average Speed	Vehicles	Vehicles	Project	Increase Ratio	Increase (dBA)	(dBA)	Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		801	56	55	10.4	8,382	14,022	2.5	4	12	No
Interstate	I-5	CR 117 to CR 102	5,620	801	56	55	10.4	8,382	14,002	2.5	4	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table LM-104. Alt 2 Daily O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	2015 AADT without O&M Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		802	112	55	10.4	8,456	64,856	1.1	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	802	112	55	10.4	8,456	64,656	1.2	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-105. Alt 2 Peak Hourly O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		802	56	55	10.4	8,400	14,040	2.5	4	12	No
Interstate	I-5	CR 117 to CR 102	5,620	802	56	55	10.4	8,400	14,020	2.5	4	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-106. Alt 3 Daily O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	2015 AADT without O&M Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio	Noise Level Increase (dBA)	Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117	56,400	840	114	55	10.4	8,848	65,248	1.2	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	840	114	55	10.4	8,848	65,048	1.2	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-107. Alt 3 Peak Hourly O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		840	57	55	10.4	8,791	14,431	2.6	4	12	No
Interstate	I-5	CR 117 to CR 102	5,620	840	57	55	10.4	8,791	14,411	2.6	4	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-108. Alt 4 Daily O&M Traffic - Equivalent Noise Levels

			2015 AADT without O&M	Peak Daily	Peak Daily		Equivalency Factor for Heavy-Duty	Equivalent	Total with		Noise Level	Substantial Noise Increase	Above
Type	Roadway	Segment	Traffic	Truck Trips	Worker Trips	Average Speed	Vehicles	Vehicles	Project	Increase Ratio	Increase (dBA)	(dBA)	Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		1,719	178	55	10.4	18,058	74,458	1.3	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	1,719	178	55	10.4	18,058	74,258	1.3	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-109. Alt 4 Peak Hourly O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio	Noise Level Increase (dBA)	Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117	5,640	1,719	89	55	10.4	17,969	23,609	4.2	6	12	No
Interstate	I-5	CR 117 to CR 102	5,620	1,719	89	55	10.4	17,969	23,589	4.2	6	12	No

ssume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Туре	Roadway	Segment	2015 AADT without O&M Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio	Noise Level Increase (dBA)	Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117	56,400	784	114	55	10.4	8,271	64,671	1.1	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	784	114	55	10.4	8,271	64,471	1.1	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-111. Alt 5 Peak Hourly O&M Traffic - Equivalent Noise Levels

			Peak Hourly	Peak Hour	Peak Hour		Equivalency Factor for Heavy-Duty	Equivalent	Total with		Noise Level	Substantial Noise Increase	Above
Type	Roadway	Segment	Volume	Truck Trips	Worker Trips	Average Speed	Vehicles	Vehicles	Project	Increase Ratio	Increase (dBA)	(dBA)	Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117	5,640	784	57	55	10.4	8,214	13,854	2.5	4	12	No
Interstate	I-5	CR 117 to CR 102	5,620	784	57	55	10.4	8,214	13,834	2.5	4	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

Table <u>LM</u>-112. Alt 6 Daily O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	2015 AADT without O&M Traffic	Peak Daily Truck Trips	Peak Daily Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio		Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		1,247	138	55	10.4	13,105	69,505	1.2	1	12	No
Interstate	I-5	CR 117 to CR 102	56,200	1,247	138	55	10.4	13,105	69,305	1.2	1	12	No

Source:

Caltrans. 2015 AADT Volumes.

Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Table LM-113. Alt 6 Peak Hourly O&M Traffic - Equivalent Noise Levels

Туре	Roadway	Segment	Peak Hourly Volume	Peak Hour Truck Trips	Peak Hour Worker Trips	Average Speed	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total with Project	Increase Ratio	Noise Level Increase (dBA)	Substantial Noise Increase (dBA)	Above Threshold?
Interstate	I-5	Sacramento/Yolo County Line to CR 117		1,247	69	55	10.4	13,036	18,676	3.3	5	12	No
Interstate	I-5	CR 117 to CR 102	5,620	1,247	69	55	10.4	13,036	18,656	3.3	5	12	No

Assume

10% of daily traffic occurs during peak hour.

Assume half of worker trips and all truck trips occur during a peak hour.

<u>Traffic Calculations</u> <u>Maximum Daily Trips</u>

Table M-114. Alternative 1 Maximum Daily Trips by Component

	<u>Haul</u>		
Alternative 1	<u>Trucks</u>	Employees	Haul Routes
Channel E	<u>394</u>	<u>20</u>	East Alternative Route
<u>Downstream</u>	<u>31</u>	<u>6</u>	East Alternative Route
Fish Passage West	<u>288</u>	<u>20</u>	West Alternative Route
Ag Crossing 1	<u>8</u>	<u>20</u>	East Alternative Route
<u>Maximum</u>	<u>394</u>	<u>20</u>	
East Alternative Route	<u>394</u>	<u>20</u>	
West Alternative Route	<u>288</u>		

Table M-115. Alternative 2 Maximum Daily Trips by Component

Alternative 2	<u>Maximum</u>	Employees	Haul Routes
Channel C	<u>394</u>	<u>20</u>	Trucks could use either West or East Route per Ch. 17
<u>Downstream</u>	<u>31</u>	<u>6</u>	East Alternative Route
Fish Passage West	<u>288</u>	<u>20</u>	West Alternative Route
Ag Crossing 1	<u>8</u>	<u>20</u>	East Alternative Route
<u>Maximum</u>	<u>394</u>	<u>20</u>	
East Alternative Route	<u>394</u>	<u>20</u>	
West Alternative Route	<u>394</u>	<u>20</u>	

Table M-116. Alternative 3 Maximum Daily Trips by Component

Alternative 3	<u>Maximum</u>	Employees	Haul Routes
Channel W	<u>394</u>	<u>20</u>	West Alternative Route
<u>Downstream</u>	<u>31</u>	<u>6</u>	East Alternative Route
Fish Passage E	<u>326</u>	<u>20</u>	East Alternative Route
Ag Crossing 1	<u>8</u>	<u>20</u>	East Alternative Route
<u>Maximum</u>	<u>394</u>	<u>20</u>	
East Alternative Route	<u>326</u>	20	
West Alternative Route	<u>394</u>	<u>20</u>	

Table M-117. Alternative 4 Maximum Daily Trips by Component

Alternative 4	<u>Maximum</u>	Employees	Haul Routes
Channel W	<u>394</u>	<u>20</u>	West Alternative Route
<u>Downstream</u>	<u>31</u>	<u>6</u>	East Alternative Route
Fish Passage E	<u>326</u>	<u>20</u>	East Alternative Route
Ag Crossing 1	<u>8</u>	<u>20</u>	East Alternative Route
<u>Northern</u>	<u>388</u>	<u>20</u>	East Alternative Route
<u>Southern</u>	<u>399</u>	<u>20</u>	West Alternative Route
<u>Maximum</u>	<u>399</u>	<u>20</u>	
East Alternative Route	<u>388</u>	<u>20</u>	
West Alternative Route	<u>399</u>	<u>20</u>	

Table M-118. Alternative 5 Maximum Daily Trips by Component

Alternative 5	<u>Maximum</u>	Employees	Haul Routes
Channel C	<u>394</u>	<u>20</u>	Trucks could use either West or East Route per Ch. 17
Fish Passage W	<u>288</u>	<u>20</u>	West Alternative Route
Ag Crossing 1	<u>8</u>	<u>20</u>	East Alternative Route
Tule Canal	<u>360</u>	<u>20</u>	West Alternative Route
<u>Maximum</u>	<u>394</u>	<u>20</u>	
East Alternative Route	<u>394</u>	<u>20</u>	
West Alternative Route	394	<u>20</u>	

Table M-119. Alternative 6 Maximum Daily Trips by Component

Alternative 6	<u>Maximum</u>	Employees	Haul Routes
Channel W	<u>788</u>	<u>40</u>	West Alternative Route
<u>Downstream</u>	<u>31</u>	<u>6</u>	East Alternative Route
Fish Passage E	<u>326</u>	<u>20</u>	East Alternative Route
Ag Crossing 1	<u>8</u>	<u>20</u>	East Alternative Route
<u>Maximum</u>	<u>788</u>	<u>40</u>	
East Alternative Route	<u>326</u>	<u>20</u>	
West Alternative Route	<u>788</u>	<u>40</u>	

Maintenance Schedule

Table M-120. Alternative 1 - Main Channel and Headworks Operations and Maintenance

									Estimated Duration, Week							Week	[
Item#	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	<u>Weeks</u>	1	<u>2</u> <u>3</u>	4	<u>5</u>	<u>6</u>	<u>7 8</u>	9	<u>10</u>	11 1	2 13	14	<u>15</u>	<u>16</u> 1	Z <u>Assumptions/Notes</u>
O&M Roa		1	2 200	1	2 200	2	1		_								_				No select of the reading out removed every Europe
	O&M Road Regrading		<u>3,200</u>	<u></u>	<u>3,200</u>	<u> </u>															Needed after sediment removal every 5 years.
_	ental Permits and Mitigation																				
_	Permits and mitigation		<u>=</u>	_	<u> </u>	_															Every year
_	nnel and Intake Shelf																				
_	<u>Debris Removal</u> Vegetation Removal	1 1	<u>2</u> 1	<u>1</u> 1	<u>2</u> 1	<u>15</u> 30 60	<u>3</u> 6														Estimated \$500 per acre every year Estimated \$300 per acre every year
<u>5</u>	Sediment Removal (Wet conditions)	1	<u>320</u>	<u>10</u>	3,200	<u>60</u>	<u>12</u>														Estimated removal every 5 years
	Rock Replacement (Minor Repair)	<u>1</u>	<u>64</u>	<u>1</u>	64 64 320	<u>2</u>	<u>1</u>														Assumed 0.25% of initially placed quantity every year
<u>7</u>	Rock Replacement (Major Repair)	1	<u>64</u>	<u>1</u>	<u>64</u>	<u>14</u>	<u>3</u>														Assumed 2.5% of initially placed quantity every 10 years
<u>8</u>	Channel Repairs	<u>1</u>	<u>320</u>	<u>1</u>	320	<u>6</u>	<u>2</u>														Assumed 1% of initially placed volume every 5 years
<u>9</u>	Channel Inspection	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>1</u>														Four times per year
Headworl	cs Structure																				
<u>10</u>	Debris Removal	<u>1</u>	<u>80</u>	<u>1</u>	80	<u>3</u>	<u>1</u>														Assumed 7 logs (30 ft long, 3' diameter)/opening, every year
<u>11</u>	Sediment Removal (Wet conditions)	<u>1</u>	<u>320</u>	<u>10</u>	3,200	<u>3</u>	<u>1</u>														Assumed 5% of channel sediment volume, every 5 years
<u>12</u>	Hinged Bottom Gates Upkeep	<u>2</u>		<u>1</u>	_	<u>5</u>	1														Assumed 1% of initial gate cost, every 5 years
<u>13</u>	Gates and Concrete Structure Inspection	<u>2</u>		<u>1</u>	_	<u>3</u>	1														Assumed inspection needed every 5 years
Buildings							_														
14	Equipment Building (Major Repair)	<u>1</u>																			Assumed 2.5% of initial cost every 10 years
Headworl	ks Structure Operating Equipment																				
<u>15</u>	Mechanical Hydraulic Equipment Upkeep	<u>2</u>	_	<u>1</u>	_	<u>5</u>	<u>1</u>														Assumed same as for gates upkeep every 5 years
<u>16</u>	Test Operate Gates	<u>1</u>	_	<u>1</u>	_	<u>1</u>	<u>1</u>														\$1,000 per test once a year

Table M-121. Alternative 2 - Main Channel and Headworks Operations and Maintenance

													<u>E</u> :	stim	ated	Du	ratio	1, W	<u>eek</u>					\Box
Item #	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	Weeks	1	2	3	3 4	1 5	5 6	6 7	7 8	3	9 10	11	12	13	14	15	16	17
O&M Roa	<u></u>							_																
1	Levee O&M Road Regrading	<u>1</u>	<u>3,200</u>	<u>1</u>	3,200	<u>8</u>	<u>2</u>																	
Environm	nental Permits and Mitigation																							
_	Permits and mitigation		<u>-</u>	_	Ξ	Ξ																		
Main Cha	nnel and Intake Shelf																							
<u>3</u>	<u>Debris Removal</u>	1	2	1	2	<u>29</u>	<u>6</u>																	
<u>4</u>	Vegetation Removal	1	<u> 1</u>	1	1	29 57 60	<u>12</u> <u>12</u>																	
<u>5</u>	Sediment Removal (Wet conditions)	1	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>60</u>	<u>12</u>																	
<u>6</u>	Rock Replacement (Minor Repair)	1	<u>64</u> <u>64</u>	<u>1</u>	<u>64</u>	<u>3</u>	<u>1</u>																	
<u>7</u>	Rock Replacement (Major Repair)	1	<u>64</u>	<u>1</u>	<u>64</u> 320	<u>30</u> <u>15</u>	<u>6</u>																	
<u>8</u>	Channel Repairs	<u>1</u>	<u>320</u>	1	<u>320</u>	<u>15</u>	<u>3</u>																	
<u>9</u>	Channel Inspection	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>1</u>																	
	ks Structure																							
10 11 12 13	Debris Removal	1	<u>80</u>	<u>1</u>	<u>80</u>	<u>3</u>	<u>1</u>																	
<u>11</u>	Sediment Removal (Wet conditions)	1	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>3</u>	<u>1</u>																	
<u>12</u>	Hinged Bottom Gates Upkeep	2	-	1	_	<u>5</u>	<u>1</u>																	
<u>13</u>	Gates and Concrete Structure Inspection	<u>2</u>	_	<u>1</u>	_	<u>3</u>	<u>1</u>																	
Buildings																								
<u>14</u>	Equipment Building (Major Repair)	<u>1</u>					<u>0</u>																	
Headwor	ks Structure Operating Equipment																							
<u>15</u> <u>16</u>	Mechanical Hydraulic Equipment Upkeep	2	 -	<u>1</u>	_	<u>5</u>	<u>1</u>																	
<u>16</u>	Test Operate Gates	<u>1</u>	_	<u>1</u>	_	<u>1</u>	<u>1</u>																	

Table M-122. Alternative 3 - Main Channel and Headworks Operations and Maintenance

												<u> </u>	Esti	mate	d D	urati	on, \	Neek	<u>(</u>				
ltem#	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	Weeks	1	2	3	4	5	6	7	8	9 1	0 1	11 1	2 1	13 14	4 1	5 1	6 1
O&M Roa	<u></u>																						
1	Levee O&M Road Regrading	<u>1</u>	3,200	<u>1</u>	3,200	<u>10</u>	<u>2</u>																
Environm	ental Permits and Mitigation																						
2	Permits and mitigation		=	=	<u>-</u>	_																	
Main Cha	nnel and Intake Shelf																						
<u>3</u>	<u>Debris Removal</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>35</u>	<u>7</u>																
<u>4</u>	Vegetation Removal	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>35</u>																	
<u>5</u>	Sediment Removal (Wet conditions)	<u>1</u>	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>60</u>	<u>12</u>																
<u>6</u>	Rock Replacement (Minor Repair)	<u>1</u>	<u>64</u> <u>64</u>	1	<u>64</u> <u>64</u>	<u>5</u>	<u>1</u>																
<u>7</u>	Rock Replacement (Major Repair)	<u>1</u>	<u>64</u>	<u>1</u>	<u>64</u>	<u>40</u>	<u>8</u>																
<u>8</u>	Channel Repairs	<u>1</u>	<u>620</u>	<u>1</u>	<u>320</u>	<u>24</u>	<u>5</u>																
<u>9</u>	Channel Inspection	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>1</u>																
Headworl	ks Structure																						
<u>10</u>	Debris Removal	<u>1</u>	<u>80</u>	1	80	<u>3</u>	<u>1</u>																
<u>11</u>	Sediment Removal (Wet conditions)	<u>1</u>	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>3</u>	<u>1</u>																
12 13	Hinged Bottom Gates Upkeep	<u>2</u>	_	<u>1</u>	_	<u>5</u>	<u>1</u>																
<u>13</u>	Gates and Concrete Structure Inspection	<u>2</u>	_	<u>1</u>	_	<u>3</u>	<u>1</u>																
Buildings																							
<u>14</u>	Equipment Building (Major Repair)	<u>1</u>					<u>0</u>																
Headworl	ks Structure Operating Equipment																						
<u>15</u>	Mechanical Hydraulic Equipment Upkeep	2	_	<u>1</u>	_	<u>5</u>	<u>1</u>																
<u>16</u>	Test Operate Gates	<u>1</u>	_	<u>1</u>	_	<u>1</u>	1																

Table M-123. Alternative 4 - Main Channel and Headworks Operations and Maintenance

													Es	tima	ted l	Dura	ition	, We	<u>ek</u>					
ltem #	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	Weeks	<u>1</u>	2	3	4	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	9	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	14	<u>15</u>	<u>16</u>	<u>17</u>
O&M Roa	<u>nd</u>																							
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	<u>3,200</u>	<u>1</u>	<u>3,200</u>	<u>10</u>	<u>2</u>																	
Environn	nental Permits and Mitigation																							
<u>2</u>	Permits and mitigation		=	<u>-</u>	=	=																		
Main Cha	innel and Intake Shelf																							
<u>3</u>	Debris Removal	<u> 1</u>	<u>2</u>	<u>1</u>	<u>2</u>	3 <u>5</u> 3 <u>5</u> 30	<u>7</u>																	
<u>4</u>	<u>Vegetation Removal</u>	<u> 1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>35</u>	<u>7</u>																	
5 6 7 8	Sediment Removal (Wet conditions)	<u>1</u>	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>30</u>	<u>6</u>																	
<u>6</u>	Rock Replacement (Minor Repair)	1	<u>64</u> <u>64</u>	1	<u>64</u> <u>64</u> <u>320</u>	<u>5</u>	<u>1</u>																	
<u>7</u>	Rock Replacement (Major Repair)	1	<u>64</u>	1	<u>64</u>	<u>40</u> <u>24</u>	<u>8</u>																	- 1
<u>8</u>	Channel Repairs	<u>1</u>	<u>320</u>	1	<u>320</u>	<u>24</u>	<u>5</u>																	
<u>9</u>	Channel Inspection	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>1</u>																	
	ks Structure																							
10 11 12 13	Debris Removal	1	<u>80</u> 320	1	<u>80</u>	<u>3</u>	<u>1</u>																	
<u>11</u>	Sediment Removal (Wet conditions)	1	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>2</u>	<u>1</u>																	- 1
<u>12</u>	Hinged Bottom Gates Upkeep	<u>2</u>	_	1	_	<u>5</u>	<u>1</u>																	- 1
	Gates and Concrete Structure Inspection	<u>2</u>	=	<u>1</u>	_	<u>3</u>	<u>1</u>																	
Buildings																								
<u>14</u>	Equipment Building (Major Repair)	<u>1</u>					<u>0</u>																	
Headwor	ks Structure Operating Equipment																							
<u>15</u> <u>16</u>	Mechanical Hydraulic Equipment Upkeep	2		1		<u>5</u>	1																	
<u>16</u>	Test Operate Gates	<u>1</u>	_	<u>1</u>	_	<u>1</u>	<u>1</u>																	

Table M-124. Alternative 5 - Main Channel and Headworks Operations and Maintenance

	124. Atternative o - Main Gharmer and															Estima	ated D	urati	on, W	eek							
Item#	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	Weeks	1	2 3	4	5	6 7	8	9 10	11	12	13 14	4 15	16	17 1	8 <u>19</u>	20 2	1 22	23	24 2	<u>5</u> <u>26</u>	
O&M Roa	<u></u>																										
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	3,200	<u>1</u>	3,200	<u>48</u>	<u>10</u>																				
Environm	ental Permits and Mitigation																										
<u>2</u>	Permits and mitigation		<u>-</u>	_	_	_																					
	nnel and Intake Shelf																										
4 5 6 7 8 9 Headwork	Debris Removal Vegetation Removal Sediment Removal (Wet conditions) Rock Replacement (Minor Repair) Rock Replacement (Major Repair) Channel Repairs Channel Inspection Structure	1 1 1 1 1 1 1	2 1 320 64 64 320 1	4 8 10 1 1 2 1	8 8 3,200 64 640 1	56 56 30 5 40 60 4	12 12 6 1 8 12 1																				
11 12	Debris Removal Sediment Removal (Wet conditions) Hinged Bottom Gates Upkeep Gates and Concrete Structure Inspection	1 1 2 2	80 320 -	1 10 1 1	80 3,200 -	19 2 5 3	<u>4</u> 1 1 1																				
Buildings								<u> </u>																			
14	Equipment Building (Major Repair)	<u>1</u>					<u>0</u>																				
Headwork	s Structure Operating Equipment																										
<u>15</u>	Mechanical Hydraulic Equipment Upkeep	2	_	1	_	<u>5</u>	<u>1</u>																				
16	Test Operate Gates	1	L	<u>1</u>	_	<u>1</u>	<u>1</u>																				

Table M-125. Alternative 6 - Main Channel and Headworks Operations and Maintenance

					_								Es	stima	ated	Dura	ation	ı, We	ek					
Item #	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	<u>Weeks</u>	1	2	3	4	5	6	7	8	9 1	10 1	11 1	2 1:	3 14	4 <u>15</u>	16	17	18
O&M Roa	<u></u>																							
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	<u>3,200</u>	<u>1</u>	<u>3,200</u>	<u>10</u>	<u>2</u>																	
	ental Permits and Mitigation																							
	Permits and mitigation		П	-	Ξ	_																		
Main Cha	nnel and Intake Shelf																							
<u>3</u>	Debris Removal	<u> 1</u>	<u>2</u>	<u>1</u>	2	<u>48</u>	10 10 12 3 9 11 1																	ı
<u>4</u>	Vegetation Removal	1	<u>1</u>	<u>2</u>	2	<u>48</u> <u>60</u>	<u>10</u>																	ı
<u>5</u>	Sediment Removal (Wet conditions)	<u> 1</u>	320 64 64 320	<u>20</u>	<u>6,400</u>	<u>60</u>	<u>12</u>																	ı
<u>6</u>	Rock Replacement (Minor Repair)	<u>1</u>	<u>64</u>	<u>1</u>	<u>64</u>	<u>13</u> <u>43</u> <u>51</u>	<u>3</u>															!		1
<u>7</u>	Rock Replacement (Major Repair)	<u>1</u>	<u>64</u>	<u>3</u>	<u>192</u>	<u>43</u>	<u>9</u>															!		1
<u>8</u>	Channel Repairs	<u>1</u>	<u>320</u>	<u>1</u>	<u>320</u>	<u>51</u>	<u>11</u>															'		ı
<u>9</u>	<u>Channel Inspection</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>1</u>																	
	s Structure																							
10 11 12 13	<u>Debris Removal</u>	<u>1</u>	<u>80</u>	<u>1</u>	<u>80</u>	<u>3</u>	<u>1</u>													4		!		1
<u>11</u>	Sediment Removal (Wet conditions)	<u>1</u>	<u>320</u>	<u>10</u>	<u>3,200</u>	<u>6</u>	<u>2</u>														4	!		1
<u>12</u>	Hinged Bottom Gates Upkeep	<u>2</u>	=	<u>1</u>	_	<u>5</u>	<u>1</u>													Æ		!		1
	Gates and Concrete Structure Inspection	<u>2</u>	_	<u>1</u>	_	<u>3</u>	<u>1</u>													4				
Buildings																								
<u>14</u>	Equipment Building (Major Repair)	<u>1</u>					<u>0</u>																	
	s Structure Operating Equipment																							
<u>15</u>	Mechanical Hydraulic Equipment Upkeep	2	_	1	_	<u>5</u>	1					T												
<u>16</u>	Test Operate Gates	<u>1</u>	_	<u>1</u>	_	1	1															'		

Table M-126. Downstream Reach, Operations and Maintenance

											<u>Est</u>	timated	Durat	ion, We	<u>ek</u>					
ltem #	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	<u>Weeks</u>	1	2 3	4 5	<u>6</u>	7 8	9 10	11 1	2 <u>13 1</u>	<u>4</u> <u>15</u>	<u>16 1</u>	7 <u>18</u>	Assumptions/Notes	
O&M Roa	<u>d</u>																			
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	<u>3200</u>	<u>1</u>	<u>3200</u>	<u>4</u>	<u>1</u>												Needed after sediment removal every 5 years.	
Environm	ental Permits and Mitigation																			
<u>2</u>	Permits and mitigation		=	<u>-</u>	_	_													Every year	
Main Cha	nnel and Intake Shelf																			
- 4 5 6 7	Debris Removal Vegetation Removal Sediment Removal (Wet conditions) Rock Replacement (Minor Repair) Rock Replacement (Major Repair) Channel Repairs Channel Inspection	1 1 1 1 1 1 1	2 1 320 64 64 320 1	<u>1</u> 3	2 2 320 64 192 320 1	7 7 0 2 5 3 4	2 2 0 1 1 1 1												Estimated \$500 per acre every year Estimated \$300 per acre every year Refer to the main channel volumes for each alternative Assumed 0.25% of initially placed quantity every year Assumed 2.5% of initially placed quantity every 10 years Assumed 1% of initially placed volume every 5 years \$1,500 per inspection twice a year	

Table M-127. Supplemental Fish Passage East, Operations and Maintenance

												Estim	iated l	Durati	on, We	<u>eek</u>					
Item #		Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration. Days	<u>Weeks</u>	1	2 3	4	<u>5</u> <u>9</u>	<u> </u>	<u>8</u>	9 10	11 1	12 13	<u>14</u>	<u>15 1</u>	6 17	7 <u>18</u>	<u>Assumptions/Notes</u>
1	Levee O&M Road Regrading	1	3200	1	3200	1	1					Т Т					Т			Т	Needed after sediment removal every 5 years.
 Environm	nental Permits and Mitigation		3200	<u>_</u>	3200																iveeded after sediment removal every 3 years.
	Permits and mitigation		<u> </u>	-		_						Т					Т			Т	Every year
	nnel and Intake Shelf			_	_	_															<u> </u>
3 4 5 6	Debris Removal Vegetation Removal Sediment Removal (Wet conditions) Rock Replacement (Minor Repair) Rock Replacement (Major Repair) Channel Repairs Channel Inspection	1 1 1 1 1 1 1	2 1 320 64 64 320 1	1 10 10 1 1 1	2 1 3,200 64 64 320 1	1 1 1 1 1 1 4	1 1 1 1 1 1														Estimated \$500 per acre every year Estimated \$300 per acre every year Estimated channel 100% filled within 5 years; Removal every 5 years Assumed 0.25% of initially placed quantity every year Assumed 2.5% of initially placed quantity every 10 years Assumed 1% of initially placed volume every 5 years Four times per year
	ks Structure																				
<u>12</u>	Debris Removal Sediment Removal (Wet conditions) Hinged Bottom Gates Upkeep Gates and Concrete Structure Inspection	1 1 2 2	<u>80</u> <u>320</u> -	1 10 1 1	<u>80</u> <u>3,200</u> - -	1 1 5 3	1 1 1 1														Assumed 7 logs (30 ft long, 3' diameter)/opening, every year Assumed 5% of channel sediment volume, every 5 years Assumed 1% of initial gate cost, every 5 years Assumed inspection needed every 5 years
	ks Structure Operating Equipment																				
<u>14</u> 15	Mechanical Hydraulic Equipment Upkeep Test Operate Gates	<u>2</u> 1	-	1 1	- -	<u>5</u> 1	<u>1</u> 1														Assumed same as for gates upkeep every 5 years \$1,000 per test once a year

Table M-128. Supplemental Fish Passage West, Operations and Maintenance

												Esti	imate	d Dur	ation,	, Wee	<u>k</u>					
Item #	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	Weeks	1	2 3	4	5	6 7	7 8	9	10 1	1 12	13 1	14 1	15 10	6 17	18	Assumptions/Notes
O&M Roa	<u>.</u> I <u>d</u>	•		•																		
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	3,200	<u>1</u>	3,200	<u>1</u>	<u>1</u>															Needed after sediment removal every 5 years.
Environm	nental Permits and Mitigation																					
<u>2</u>	Permits and mitigation		=	-	=	_																Every year
Main Cha	nnel and Intake Shelf																					
3 4 5 6 7 8 9	Debris Removal Vegetation Removal Sediment Removal (Wet conditions) Rock Replacement (Minor Repair) Rock Replacement (Major Repair) Channel Repairs Channel Inspection	1 1 1 1 1 1 1	2 1 320 64 64 320 1	<u>1</u> 1	2 1 3,200 64 64 320 1	1 1 1 1 1 1 4	1 1 1 1 1 1 1															Estimated \$500 per acre every year Estimated \$300 per acre every year Estimated channel 100% filled within 5 years; Removal every 5 years Assumed 0.25% of initially placed quantity every year Assumed 2.5% of initially placed quantity every 10 years Assumed 1% of initially placed volume every 5 years Four times per year
	ks Structure	1 1	90	1 1	I 001	41	4						1 1							1	1	A
10 11 12 13	Debris Removal Sediment Removal (Wet conditions) Hinged Bottom Gates Upkeep Gates and Concrete Structure Inspection	1 1 2 2	80 320 -		3,200 - -	1 1 5 3	1 1 1 1															Assumed 7 logs (30 ft long, 3' diameter)/opening, every year Assumed 5% of channel sediment volume, every 5 years Assumed 1% of initial gate cost, every 5 years Assumed inspection needed every 5 years
Headwor	ks Structure Operating Equipment																					
<u>14</u> 15	Mechanical Hydraulic Equipment Upkeep Test Operate Gates	<u>2</u> 1	_	<u>1</u> 1	_	<u>5</u> 1	<u>1</u> 1															Assumed same as for gates upkeep every 5 years \$1,000 per test once a year

Table M-129. Agricultural Crossing 1, Operations and Maintenance

											<u>Esti</u>	mated	Duration	n, Week					
<u>ltem #</u>		Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	<u>Weeks</u>	1 2	<u>3</u>	<u>4</u> <u>5</u>	<u>6</u> 7	<u> 8</u>	9 10	11 12	<u>13 14</u>	<u>15</u>	<u>16 1</u>	7 <u>18</u>	Assumptions/Notes
O&M Roa	<u>d</u>																		
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	<u>3,200</u>	1	<u>3,200</u>	<u>1</u>	<u>1</u>												Needed after sediment removal every 5 years.
Environm	ental Permits and Mitigation																		
<u>2</u>	Permits and mitigation		=	=	=	-													Every year
Agricultu	al Channel and Intake																		
4 5 6 <u>7</u>	Debris Removal Vegetation Removal Pipe Flush Channel Repairs Channel Inspection	1 1 1 1 1	2 1 320 320 1		2 1 3,200 320 1		1 1 1 1 1												Estimated \$500 per acre every year Estimated \$950 per acre every year Estimated pipe flushing is needed every year Assumed 1% of initially placed volume every 5 years Four times per year
Rail Car E	<u>ridge</u>																		
<u>9</u>	Debris Removal Rail Car Bridge Upkeep Rail Car Bridge Inspection	1 2 2	<u>80</u> -	1 1 1	<u>80</u> -	1 5 3	1 1 1												Assumed 7 logs (30 ft long, 3' diameter)/opening, every year Assumed 2.5% of initial bridge cost, every year Assumed inspection needed every year

Table M-130. Northern Water Control Structure, Operations and Maintenance

										<u>E</u>	stimate	d Durati	on, Week			
Item #	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	<u>Weeks</u>	1 2	<u>3</u> <u>4</u>	<u>5 6</u>	<u>7</u> <u>8</u>	<u>9 10</u>	11 12 1	3 <u>14 15</u>	16 <u>17</u>	18 Assumptions/Notes
O&M Roa																
<u>1</u>	Levee O&M Road Regrading	<u>1</u>	<u>3,200</u>	<u>1</u>	<u>3,200</u>	<u>33</u>	<u>7</u>									Needed after sediment removal every 5 years.
	ental Permits and Mitigation															
	Permits and mitigation		<u>-</u>	_	=	_										Every year
Main Cha	nnel and Intake Shelf															
6 7 8 9	Debris Removal Vegetation Removal Sediment Removal (Wet conditions) Rock Replacement (Minor Repair) Rock Replacement (Major Repair) Channel Repairs Channel Inspection	1 1 1 1 1 1	2 1 320 64 64 320	1 10 1 1 1 1 1	2 1 3,200 64 64 320 1	9 17 5 2 13 2 4	2 4 1 1 3 1 1									Estimated \$500 per acre every year Estimated \$300 per acre every year Estimated removal every 5 years Assumed 0.25% of initially placed quantity every year Assumed 2.5% of initially placed quantity every 10 years Assumed 1% of initially placed volume every 5 years Four times per year
Berm/Lev		1 4	200	41	200	<u>al</u>										IA 1407 C 18 H
	Berm/Levee Repairs	<u> </u>	<u>320</u>		<u>320</u>	의	<u>1</u>									Assumed 1% of initially excavated volume every 5 years
<u>11</u>	ntrol Structure and Culvert Debris Removal Sediment Removal (Wet conditions) Inflatable Gates Upkeep Gates and Concrete Structure Inspection	1 1 2 2	<u>80</u> <u>320</u> -	1 10 1 1	<u>80</u> 3,200 -	1 1 5 3	1 1 1 1									Assumed 7 logs (30 ft long, 3' diameter)/opening, every year Assumed 5% of channel sediment volume, every 5 years Assumed 1% of initial gate cost, every 5 years Assumed inspection needed every 5 years
Buildings																· · · · · · · · · · · · · · · · · · ·
<u>15</u>	Equipment Building (Major Repair)	<u>1</u>														Assumed 2.5% of initial cost every 10 years
Water Co	ntrol Structure Operating Equipment															
<u>16</u> <u>17</u>	Mechanical Hydraulic Equipment Upkeep Test Operate Gates	<u>2</u> <u>1</u>	- 	<u>1</u> 1	-	<u>5</u> <u>1</u>	<u>1</u> 1									Assumed same as gates upkeep every 5 years \$1,000 per test once a year

Table M-131. Southern Water Control Structure, Operations and Maintenance

Tubio III	131. Southern Water Control Structure	o, oporatio	mo una man	itoriarioo									Estima	ated D	uratio	n. Wee	ek						
Item#	WBS Description	Quantity	Crew Daily Output	Number of Crews	Total Daily Output	Estimated Duration, Days	<u>Weeks</u>	1 2	3	4 5	<u>6</u>	<u>8</u>					_	<u>17</u>	<u>18</u> <u>1</u>	19 20	21 22	2 23	Assumptions/Notes
O&M Roa	<u>u</u> Levee O&M Road Regrading	1	3,200	1	3,200	29	6		1 1			Т		Т		Т						Т	Needed after sediment removal every 5 years.
<u>∸</u> Environm	ental Permits and Mitigation	<u> </u>	0,200	<u> </u>	0,200																		receded after sediment removal every 5 years.
	Permits and mitigation		- 1	- 1	- 1	- T						Т		Т		Т		Т				Т	Every year
	nnel and Intake Shelf		=		-	-																	<u> </u>
3 4 5 6	Debris Removal Vegetation Removal Sediment Removal (Wet conditions) Rock Replacement (Minor Repair) Rock Replacement (Major Repair) Channel Repairs Channel Inspection	1 1 1 1 1 1 1	2 1 320 64 64 320 1	1 10 1 1 1 1	2 1 3,200 64 64 320 1	22 43 8 6 56 4 4	5 9 2 2 12 1 1																Estimated \$500 per acre every year Estimated \$300 per acre every year Estimated removal every 5 years Assumed 0.25% of initially placed quantity every year Assumed 2.5% of initially placed quantity every 10 years Assumed 1% of initially placed volume every 5 years Four times per year
Berm/Lev		1 41	220	41	220	cl	0																A
	Berm/Levee Repairs		<u>320</u>		<u>320</u>	밀	<u> </u>				\Box											\perp	Assumed 1% of initially excavated volume every 5 years
<u>11</u>	Debris Removal Sediment Removal (Wet conditions) Inflatable Gates Upkeep Gates and Concrete Structure Inspection	1 1 2 2	80 320 -	1 10 1 1	8 <u>0</u> 3,200 - -	1 1 5 3	1 1 1 1																Assumed 7 logs (30 ft long, 3' diameter)/opening, every year Assumed 5% of channel sediment volume, every 5 years Assumed 1% of initial gate cost, every 5 years Assumed inspection needed every 5 years
Buildings						•						· ·	'								'	•	
<u>15</u>	Equipment Building (Major Repair)	<u>1</u>																					Assumed 2.5% of initial cost every 10 years
Water Co	ntrol Structure Operating Equipment																						
<u>16</u> <u>17</u>	Mechanical Hydraulic Equipment Upkeep Test Operate Gates	<u>2</u> 1	<u> </u>	1 1	- -	5 1	1 1																Assumed same as gates upkeep every 5 years \$1,000 per test once a year

Operational Vibration - Equipment Alternative 1 - East Alignment

Table LM-132. Operation & Maintenance Vibration and Ground-Borne Vibration

				Single Equipment		Single Equipment	Add to Single	
			Number of	PPV at 25 ft	Total PPV at	Lv at 25 ft	Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
O&M Road	Training and the				ı	1		1
O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-
Main Channel and Intake Shelf	Transaction of the control of the co				ı	T	-	
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
, , ,	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1 1	_	_	-	0	_
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	_	_	-	0	_
(majer r topum)	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1 1	-	-	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	_	_	_	0	-
onamer repairs	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	0.220	00	6	30
Channel Inspection	Pickup Truck Conventional (1)	n/a	1			-	0	-
	Pickup Truck Conventional (1)	пла	<u>'</u>	-	_		U	-
Headworks Structure	1.5 CY Front End Loader Crawler (1)		1 4		Τ	1	0	1
Debris Removal	. ,	n/a .	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Buildings								
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Headworks Structure Operating Equipment	t	<u> </u>						
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Table <u>LM</u>-132. Operation & Maintenance Vibration and Ground-Borne Vibra

																	l HW
			0&1	и													Op
Phase	Equipment Description	Tot	Roa	d	Main	Chann	nel an	d Inta	ke Sh	elf	H	Headw	orks S	tructur	e	Bldg	
O&M Road				•													
O&M Road Regrading	12' Blade Grader (1)																
Main Channel and Intake Shelf																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Channel Inspection	Pickup Truck Conventional (1)																
Headworks Structure			-														
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																
Buildings																	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (2)																1
Headworks Structure Operating Equipmer	nt																
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)																
Test Operate Gates	Pickup Truck Conventional (1)																

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Operational Vibration - Equipment Alternative 1 - East Alignment

Table LM-133. Operation & Maintenance Vibration Level at the Receptor

																	HW
		O&M														1	Op
	Tot	Road		Ma	ain Cha	annel a	and Int	ake Sh	elf		Н	leadwo	orks St	ructur	е	Bldg	Eq
Building Damage		-	-								=						-
Total PPV @	25' 1.29	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to a Receptor	(ft) 90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/s	ec) 0.19	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact to Recep	tor no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a
Human Annoyance																	
Total Lv @	25' 111	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a Receptor	(ft) 490	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Distance Divergence (dl	38.8 (AS	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Receptor (V	(B) 72	n/a	72	50	50	60	56	56	60	n/a	62	50	60	n/a	n/a	50	n/a
Impact to Recep	tor no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

7500

Source: Google Earth

Table LM-134. Operation & Maintenance Vibration and Ground-Borne Vibration

Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	Single Equipment PPV at 25 ft (in/sec)	Total PPV at 25 ft (in/sec)	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
O&M Road	Equipment Description	Lookup Equipment Types	Lquipilient	(III/Sec)	23 it (iii/sec)	(Vab)	(VUB)	23 it (Vab)
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	_		- 1	0	_
Main Channel and Intake Shelf	1.2 2.000 0.000. (.)	1						
Debris Removal	1.5 CY Front End Loader Crawler (1)	ln/a	1	-	_	- 1	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	_
3	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	_	_	0	_
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
(:::::::::::::::::::::::::::::::::::::	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
. , ,	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
. , , ,	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
•	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Headworks Structure		-	•					
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	- 1	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Buildings		·						
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Headworks Structure Operating Equipmer	t							
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-

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⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Vibration - Equipment Alternative 2 - Center Alignment

Table <u>LM</u>-134. Operation & Maintenance Vibration and Ground-Borne Vibra

																	HW
			0&1	иΙ													Op
Phase	Equipment Description	Tot	Roa		Main	n Chai	nnel a	nd Int	ake Sl	nelf	H	Headw	orks S	tructur	e	Bldg	Eq
O&M Road											•						
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel and Intake Shelf																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																1
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)																1
İ	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																l
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																1
	Pickup Truck Conventional (1)																
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																1
	Pickup Truck Conventional (2)																
Channel Inspection	Pickup Truck Conventional (1)																
Headworks Structure															ı		
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
,	16 CY 3 Axle Dump Truck (3)																1
	Pickup Truck Conventional (2)																
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																
Gates and Concrete Structure Inspection																	
Buildings																	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																
,	Pickup Truck Conventional (2)																i
Headworks Structure Operating Equipme											 						
Mechanical Hydraulic Equipment Upkeer																	
Test Operate Gates	Pickup Truck Conventional (1)																
0	: / / / / / / / / / / / / / / / / / / /			_							 						-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

February 14.

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table <u>LM</u>-135. Operation & Maintenance Vibration Level at the Receptor

	Γ		O&M															HW Op
			Road		Ma	in Cha	annel a	nd Inta	ake Sh	elf		Н	leadwo	orks St	ructur	е	Bldg	
Building Damage		•																
Tota	I PPV @ 25'	1.29	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to a I	Receptor (ft)	90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Rece	ptor (in/sec)	0.19	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact	to Receptor	no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a
Human Annoyance																		
To	tal Lv @ 25'	111	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a I	Receptor (ft)	490	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Distance Diverg	gence (dBA)	38.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Rec	ceptor (VdB)	72	n/a	72	50	50	60	56	56	60	n/a	62	50	60	n/a	n/a	50	n/a
Impact	to Receptor	no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

4200

Source: Google Earth

Operational Vibration - Equipment Alternative 3 - West Alignment

Table LM-136. Operation & Maintenance Vibration and Ground-Borne Vibration

			Number of	Single Equipment PPV at 25 ft	Total PPV at	Single Equipment Lv at 25 ft	Add to Single Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
O&M Road	Trouble to Occidental	Lit	T 4		1		^	T
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-
Main Channel and Intake Shelf	145045 45 11 1 0 1 40	T /		Г	ı	<u> </u>	•	_
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	_	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	_	_	-	6	_
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	_	-	0	-
Headworks Structure	ristap rista contentional (1)							
Debris Removal	1.5 CY Front End Loader Crawler (1)	ln/a	1	_	_	_	0	_
Dobne Hemoval	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	_	_	_	0	_
Comment Nemoval (Wet Containone)	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	0.070	0.220	-	6	
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	<u> </u>		-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2		_	_	6	_
Buildings	Fickup Truck Conventional (2)	II/a		-	_	-	U	-
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
Legaliphient bulluling (Major Repair)	Pickup Truck Conventional (2)	n/a	2	0.076	0.076	-	6	00
Headwarks Structure Operating Facilities		Jil/a					0	
Headworks Structure Operating Equipmen		la ta	1 2	l l	ı			<u> </u>
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	1	-	-	-	6 0	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a		-		-	U	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

February 14.

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table <u>LM</u>-136. Operation & Maintenance Vibration and Ground-Borne Vibra

																		HW
			O&M															Op
Phase	Equipment Description	Tot	Road	<u> </u>	Ma	in Ch	annel a	and Int	take S	helf		<u> </u>	leadw	orks S	tructui	e	Bldg	Eq
O&M Road							1											
Levee O&M Road Regrading	12' Blade Grader (1)																	
Main Channel and Intake Shelf			_	_														
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Vegetation Removal	56 HP Tractor Rotary Mower (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																	
	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																	
, , , ,	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Channel Repairs	0.75 CY Hydraulic Excavator (1)																	
•	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Channel Inspection	Pickup Truck Conventional (1)																	
Headworks Structure	, , , , , , , , , , , , , , , , , , , ,																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
(16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																	
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																	
Buildings																		
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																	
4. F = 2	Pickup Truck Conventional (2)																	l
Headworks Structure Operating Equipmen																		
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)									T								
Test Operate Gates	Pickup Truck Conventional (1)																	
							1		1		1	1	1					

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Operational Vibration - Equipment Alternative 3 - West Alignment

Table LM-137. Operation & Maintenance Vibration Level at the Receptor

																	HW
	Tot	O&M Road		Ма	iin Cha	annel a	and Int	ake Sh	elf		н	eadwo	orks St	ructur	e	Bldg	Op Eq
Building Damage	•																
Total PPV @ 2	5' 1.29	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to a Receptor (t) 90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/se	0.19	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact to Recept	or no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a
Human Annoyance																	
Total Lv @ 2	5' 111	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a Receptor (t) 700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
Distance Divergence (dB	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
Lv at the Receptor (Vd	3) 67	n/a	64	43	43	52	49	49	52	n/a	55	43	52	n/a	n/a	43	n/a
Impact to Recept	or no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

700

Source: Google Earth

Table LM-138. Operation & Maintenance Vibration and Ground-Borne Vibration

				Single		Single		
			Number of	Equipment PPV at 25 ft	Total PPV at	Equipment Lv at 25 ft	Add to Single Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
O&M Road	<u> </u>			, ,		,	, ,	
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-
Main Channel and Intake Shelf		•						
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Headworks Structure		-	-	-				
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Buildings		·						
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-		-	6	-
Headworks Structure Operating Equipment	t							
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
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Operational Vibration - Equipment Alternative 4 - West Alignment

Table LM-138. Operation & Maintenance Vibration and Ground-Borne Vibra

																	HW
Phase	Equipment Description	Tot	O&N Road		N	lain Ch	annol a	nd Int	aka Sh	oolf		loadw	orks St	ructur	•	Bldg	Op Ec
O&M Road	Lquipment Description	100	Inca	41	.,,	iaiii Cii	aiiiiei a	iiiu iiiu	ake Si	ICII	<u>'</u>	leauw	UIKS O	liuctui	<u> </u>	Diag	
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel and Intake Shelf	12 Blace Grader (1)																
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
,	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
,	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Channel Inspection	Pickup Truck Conventional (1)																
Headworks Structure			-			·											
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																
Buildings																	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																1
	Pickup Truck Conventional (2)																
Headworks Structure Operating Equipme																	
Mechanical Hydraulic Equipment Upkeeր																	
Test Operate Gates	Pickup Truck Conventional (1)																
	mid Habitat Dagtaration & Fish Daggara Drain	4					·	·			 						_

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Table LM-139. Operation & Maintenance Vibration Level at the Receptor

		08	м														WH aO
	T	ot Ro		Ma	ain Cha	annel a	nd Inta	ake Sh	elf		H	leadwo	orks St	ructur	е	Bldg	- 1
Building Damage																	
Tota	I PPV @ 25' 1.	29 n/	a 0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to a	Receptor (ft) 9	90 70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Rece	ptor (in/sec) 0.	.19 n/	a 0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact	to Receptor n	no n/	a no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a
Human Annoyance	_																
To	tal Lv @ 25' 1	11 n/	a 108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a	Receptor (ft) 70	00 70	0 700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
Distance Diver	gence (dBA) 43	3.4 43	.4 43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
Lv at the Re-	ceptor (VdB) 6	67 n/	a 64	43	43	52	49	49	52	n/a	55	43	52	n/a	n/a	43	n/a
Impact	to Receptor n	no n/	a no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)
Source: Google Earth 700

Operational Vibration - Equipment Alternative 5 - Multipe Gates/Center Alignment

Table LM-140. Operation & Maintenance Vibration and Ground-Borne Vibration

Phase	Equipment Decembring	Lookun Fruirmont Trace	Number of	Single Equipment PPV at 25 ft	Total PPV at	Single Equipment Lv at 25 ft (VdB)	Add to Single Source Level (VdB)	Total Lv at 25 ft (VdB)
O&M Road	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VUB)	(VUB)	25 II (VUB)
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	_	Ι .	_	0	Ι -
Main Channel and Intake Shelf	12 Blade Gladel (1)	i i i i	· ·				<u> </u>	
Debris Removal	1.5 CY Front End Loader Crawler (1)	ln/a	1	_	I -		0	I -
202.10 1 101.110 1 2.	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1 1	-	-	-	0	_
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	_	_	-	0	_
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	_	_	-	0	_
(16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	_	-	6	_
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	_	-	-	0	-
, , , , , , , , , , , , , , , , , , ,	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	_	-	0	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
, , , ,	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
·	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Headworks Structure					•			
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Buildings								
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Headworks Structure Operating Equipmen								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

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Table <u>LM</u>-140. Operation & Maintenance Vibration and Ground-Borne Vibra

																		11104/
			O&N	,														HW Op
Phase	Equipment Description	Tot	Roa		М	ain Ch	annel a	and Int	ake S	helf		_F	leadw	orks S	tructui	re	Bldg	
O&M Road				_								•						
Levee O&M Road Regrading	12' Blade Grader (1)																	
Main Channel and Intake Shelf											•							
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Vegetation Removal	56 HP Tractor Rotary Mower (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																	
	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																	
	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Channel Repairs	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Channel Inspection	Pickup Truck Conventional (1)																	
Headworks Structure																		
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																	
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																	
Buildings																		
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (2)																	1
Headworks Structure Operating Equipme	ent																	
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)																	
Test Operate Gates	Pickup Truck Conventional (1)																	
0 1/00 00/5 1/1 0 0 1				_	_	_	_	-	_	_		_		_	_	_		

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
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Operational Vibration - Equipment Alternative 5 - Multipe Gates/Center Alignment

Table LM-141. Operation & Maintenance Vibration Level at the Receptor

																	HW
	Tot	O&M Road	Main Channel and Intake Shelf Headworks S								orks St	ructur	e	Bldg	Op Eq		
Building Damage																	
Total PPV @ 2	5' 1.29	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to a Receptor (t) 90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/se	0.19	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact to Recept	or no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a
Human Annoyance	_																
Total Lv @ 2	5' 111	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a Receptor (t) 490	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Distance Divergence (dB	38.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Receptor (Vd	3) 72	n/a	72	50	50	60	56	56	60	n/a	62	50	60	n/a	n/a	50	n/a
Impact to Recept	or no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

3800

Source: Google Earth

Table LM-142. Operation & Maintenance Vibration and Ground-Borne Vibration

	ance vibration and Ground-Borne vi		Number of	Single Equipment PPV at 25 ft	Total PPV at	Single Equipment Lv at 25 ft	Add to Single Source Level	Total Lv at
Phase O&M Road	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	Π	T	 	0	I
Main Channel and Intake Shelf	12 Blade Gladel (1)	Jil/a		_	_	-	0	_
Debris Removal	1.5 CY Front End Loader Crawler (1)	ln/a	1	_	I _	_ 1	0	_
Deblis Removal	16 CY 3 Axle Dump Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1 1	0.070	0.070	-	0	_
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	_	_	_	0	
vegetation removal	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1 1	- 0.070	0.070	- 00	0	00
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1			-	0	
Gedinient Nemovai (Wet Conditions)	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	0.070	0.220	-	6	_
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	_	_	_	0	
Trock replacement (Millor repail)	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	0.070	0.132	-	0	- 52
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	_	_	_	0	_
Trock replacement (Major repair)	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	- 0.070	0.102	-	0	
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	_	_	_	0	
Charlie Repairs	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	0.070	0.220	-	6	_
Channel Inspection	Pickup Truck Conventional (1)	n/a	1		-	-	0	
Headworks Structure	I lekup Truck Conventional (1)	III/a	<u> </u>	-			<u> </u>	_
Debris Removal	1.5 CY Front End Loader Crawler (1)	ln/a	1	_	_	_	0	_
Deblis Nellioval	16 CY 3 Axle Dump Truck (1)	Loaded Trucks		0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1 1	- 0.070	0.070	-	0	_
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1 1	_	_	_	0	
Comment (VVCt Conditions)	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	0.070	0.220	-	6	50
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	_	_	_	6	_
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2				6	
Buildings	The track contentional (2)	1.24					<u> </u>	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
qa.p.nont bananig (Major Nopan)	Pickup Truck Conventional (2)	n/a	2		3.570		6	-
Headworks Structure Operating Equipmen		1					<u> </u>	
Mechanical Hydraulic Equipment Upkeep		ln/a	2			_	6	
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1		_	_	0	
•	id Habitat Dantaration & Fish Danage Proj		l '	l .	I .			

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Operational Vibration - Equipment Alternative 6 - West Alignment

Table <u>LM</u>-142. Operation & Maintenance Vibration and Ground-Borne Vibra

			O&N		Main Channel and Intake Shelf						Headworks Structure						HW Op	
Phase O&M Road	Equipment Description	lot	Road	1	Ма	in Cha	annel a	ind Int	ake S	helf			leadw	orks S	tructur	'e	Bldg	Eq
Levee O&M Road Regrading	12' Blade Grader (1)				1		T T			T	Т		1		Г			
Main Channel and Intake Shelf	12 Blade Grader (1)																	
	4.5.0V Front Find London Crowdon (4)						1	l		1		1	1					
Debris Removal	1.5 CY Front End Loader Crawler (1)																	1
	16 CY 3 Axle Dump Truck (1)																	1
Maria Cara Barara d	Pickup Truck Conventional (1)																	
Vegetation Removal	56 HP Tractor Rotary Mower (1)																	1
	16 CY 3 Axle Dump Truck (1)																	1
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	1
	16 CY 3 Axle Dump Truck (3)																	1
	Pickup Truck Conventional (2)																	
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																	1
	16 CY 3 Axle Dump Truck (2)																	1
	Pickup Truck Conventional (1)																	
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																	1
	16 CY 3 Axle Dump Truck (2)																	1
	Pickup Truck Conventional (1)																	1
Channel Repairs	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	1
	Pickup Truck Conventional (2)																	1
Channel Inspection	Pickup Truck Conventional (1)																	
Headworks Structure												•						
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	1
	Pickup Truck Conventional (1)																	1
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
(16 CY 3 Axle Dump Truck (3)																	1
	Pickup Truck Conventional (2)																	1
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																	
Gates and Concrete Structure Inspection																		
Buildings	T Indicap Track Conventional (2)																	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)			T														
_qaipinoni bananig (Major Nopan)	Pickup Truck Conventional (2)																	I
Headworks Structure Operating Equipme																		
Mechanical Hydraulic Equipment Upkee																		
Test Operate Gates	Pickup Truck Conventional (2) Pickup Truck Conventional (1)			+ +						-								
•	Pickup Truck Conventional (1)																	

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Table LM-143. Operation & Maintenance Vibration Level at the Receptor

																	HW
	Tot	O&M Road	Main Channel and Intake Shelf							н	eadwo	e.	Bldg	Op Eq			
Building Damage																	
Т	otal PPV @ 25' 1.29	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to	a Receptor (ft) 90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the R	eceptor (in/sec) 0.19	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Imp	act to Receptor no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a
Human Annoyance	_																
	Total Lv @ 25' 111	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to	a Receptor (ft) 700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
Distance Di	vergence (dBA) 43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
Lv at the	Receptor (VdB) 67	n/a	64	43	43	52	49	49	52	n/a	55	43	52	n/a	n/a	43	n/a
Imp	act to Receptor no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)
Source: Google Earth

700

Final Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project EIS/EIR

Operational Vibration - Equipment Downstream (Alternatives 1-4, 6)

Table <u>LM</u>-144. Operation & Maintenance Vibration and Ground-Borne Vibration

				Single Equipment		Single Equipment	Add to Single						
			Number of		Total PPV at		Source Level	Total Lv at		о&м			
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)		(VdB)	25 ft (VdB)	Tot	Road	Mair	n Channel	
O&M Road	•												
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-					
Main Channel													
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-					
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86					
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-					
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-					
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86					
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-					
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-					
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96					
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-					
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-					
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92					
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-					
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-					
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92					
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-					
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-					
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96					
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-					
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-					

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

February 14.

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table LM-145. Operation & Maintenance Vibration Level at the Receptor

	Tot	O&M Road			Main C	hannel			
Building Damage									1
Total PPV @ 25'	0.912	n/a	0.912	0.076	0.076	0.228	0.152	0.23	n/a
Distance from the Center of O&M Activity to a Receptor (ft)	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/sec)	0.19	n/a	0.19	0.02	0.02	0.05	0.03	0.05	n/a
Impact to Receptor	no	n/a	no	no	no	no	no	no	n/a
Human Annoyance									
Total Lv @ 25'	108	n/a	108	86	86	96	92	96	n/a
Distance from the Center of O&M Activity to a Receptor (ft)	390	390	390	390	390	390	390	390	390
Distance Divergence (dBA)	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Receptor (VdB)	72	n/a	72	50	50	60	56	60	n/a
Impact to Receptor	no	n/a	no	no	no	no	no	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft) 7000

Source: Google Earth

Final Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project EIS/EIR

Operational Vibration - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

Table LM-146. Operation & Maintenance Vibration and Ground-Borne Vibration

				Single Equipment		Single Equipment	Add to Single	
			Number of	PPV at 25 ft	Total PPV at	Lv at 25 ft	Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
O&M Road		1		,		,		
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-
Main Channel and Intake Shelf								•
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Headworks Structure								
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Headworks Structure Operating Equipment								
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	ı	_	-	0	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table <u>LM</u>-146. Operation & Maintenance Vibration and Ground-Borne Vibra

				 										HW
			O&M											Op
Phase	Equipment Description	Tot	Road	Main C	hannel	and Int	ake Sl	nelf	Н	leadw	orks S	tructu	·e	Eq
O&M Road														
Levee O&M Road Regrading	12' Blade Grader (1)													
Main Channel and Intake Shelf														
Debris Removal	1.5 CY Front End Loader Crawler (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (1)													
Vegetation Removal	56 HP Tractor Rotary Mower (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (1)													
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)													
·	16 CY 3 Axle Dump Truck (3)													
	Pickup Truck Conventional (2)													
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)													
, , , ,	16 CY 3 Axle Dump Truck (2)													
	Pickup Truck Conventional (1)													
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)													
, , , , ,	16 CY 3 Axle Dump Truck (2)													
	Pickup Truck Conventional (1)													
Channel Repairs	0.75 CY Hydraulic Excavator (1)													
•	16 CY 3 Axle Dump Truck (3)													
	Pickup Truck Conventional (2)													
Channel Inspection	Pickup Truck Conventional (1)													
Headworks Structure														
Debris Removal	1.5 CY Front End Loader Crawler (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (1)													
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)					+								
(** 50 55.11.51.51)	16 CY 3 Axle Dump Truck (3)													
	Pickup Truck Conventional (2)													
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)													<u> </u>
Gates and Concrete Structure Inspection						+								
Headworks Structure Operating Equipme	1													
Mechanical Hydraulic Equipment Upkeep														
Test Operate Gates	Pickup Truck Conventional (1)					+								
•	aid Hebitat Besteration & Fish Bessers Brain							1						

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.
 February 14.

Operational Vibration - Equipment Supplemental Fish Passage West (Alternatives 1, 2, and 5)

Table <u>LM</u>-147. Operation & Maintenance Vibration Level at the Receptor

																HW
		O&M														Op
	Tot	Tot Road Main Channel and Intake Shelf 1.22 n/a 0.91 0.08 0.08 0.23 0.15 0.15 0.23 90 70 70 70 70 70 70 70 0.18 n/a 0.19 0.02 0.02 0.05 0.03 0.03 0.08					elf		Н	leadwo	orks St	ructur	e	Eq		
Building Damage	-		n/a 0.91 0.08 0.08 0.23 0.15 0.15 0.70 70 70 70 70 70 70 70 70													
Total PPV @	25' 1.22									n/a	0.3	0.08	0.23	n/a	n/a	n/a
Distance from the Center of O&M Activity to a Receptor	(ft) 90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/s	ec) 0.18	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	n/a
Impact to Rece	tor no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	n/a
Human Annoyance																
Total Lv @	25' 110	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	n/a
Distance from the Center of O&M Activity to a Receptor	(ft) 470	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Distance Divergence (d	38.2	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Receptor (V	IB) 72	n/a	72	50	50	60	56	56	60	n/a	62	50	60	n/a	n/a	n/a
Impact to Rece	tor no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft) 1800

Source: Google Earth

Table LM-148. Operation & Maintenance Vibration and Ground-Borne Vibration

			Number of	Single Equipment PPV at 25 ft	Total PPV at	Single Equipment Lv at 25 ft	Add to Single Source Level	Total Lv at
Phase	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)
O&M Road								
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-
Main Channel and Intake Shelf								
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Headworks Structure								
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Headworks Structure Operating Equipment	t				•			
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance. February 14.

Operational Vibration - Equipment Supplemental Fish Passage East (Alternatives 3, 4, and 6)

Table LM-148. Operation & Maintenance Vibration and Ground-Borne Vibra

Phase	Equipment Description	Tot	O&M Road		Main C	hannel	and In	take Sh	elf	Head	lworks	Structu	re	HW Op Eq
O&M Road														
Levee O&M Road Regrading	12' Blade Grader (1)													
Main Channel and Intake Shelf			_	•						 				
Debris Removal	1.5 CY Front End Loader Crawler (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (1)													
Vegetation Removal	56 HP Tractor Rotary Mower (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (1)													
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)													
	16 CY 3 Axle Dump Truck (3)													
	Pickup Truck Conventional (2)													
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)													
	16 CY 3 Axle Dump Truck (2)													
	Pickup Truck Conventional (1)													
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)													
	16 CY 3 Axle Dump Truck (2)													
	Pickup Truck Conventional (1)													
Channel Repairs	0.75 CY Hydraulic Excavator (1)													
	16 CY 3 Axle Dump Truck (3)													
	Pickup Truck Conventional (2)													
Channel Inspection	Pickup Truck Conventional (1)													
Headworks Structure	•													
Debris Removal	1.5 CY Front End Loader Crawler (1)													
	16 CY 3 Axle Dump Truck (1)													
	Pickup Truck Conventional (1)													
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)													
	16 CY 3 Axle Dump Truck (3)													
	Pickup Truck Conventional (2)													
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)													
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)													
Headworks Structure Operating Equipmen														
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)													
Test Operate Gates	Pickup Truck Conventional (1)													
0 //00 00/5 // 0 0 /		_			_					 			-	_

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table <u>LM</u>-149. Operation & Maintenance Vibration Level at the Receptor

																	HW
			O&M													ľ	Op
		Tot	Road		Ma	in Cha	annel a	nd Int	ake Sh	elf		Н	eadwo	orks S	tructur	e.	Eq
Building Damage	•		n/a 0.91 0.08 0.08 0.23 0.15 0.15 0.2														
	Total PPV @ 25'	1.22	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.3	80.0	0.23	n/a	n/a	n/a
Distance fro	m the Center of O&M Activity to a Receptor (ft)	90	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	PPV at the Receptor (in/sec)	0.18	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.06	0.02	0.05	n/a	n/a	n/a
	Impact to Receptor	no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	n/a
Human Annoyance																	
	Total Lv @ 25'	110	n/a	108	86	86	96	92	92	96	n/a	98	86	96	n/a	n/a	n/a
Distance fro	m the Center of O&M Activity to a Receptor (ft)	470	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
	Distance Divergence (dBA)	38.2	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
	Lv at the Receptor (VdB)	72	n/a	72	50	50	60	56	56	60	n/a	62	50	60	n/a	n/a	n/a
	Impact to Receptor	no	n/a	no	no	no	no	no	no	no	n/a	no	no	no	n/a	n/a	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

8600

Source: Google Earth

Operational Vibration - Equipment Agricultural Crossing 1 (Alternatives 1-6)

Table <u>LM</u>-150. Operation & Maintenance Vibration and Ground-Borne Vibration

			Number of	Single Equipment PPV at 25 ft	Total PPV at	Single Equipment	Add to Single	Total Lv at	O 8 M		Duida
Phase	Equipment Description	Lookup Equipment Types	Number of Equipment	(in/sec)	25 ft (in/sec)	Lv at 25 ft (VdB)	Source Level (VdB)	25 ft (VdB)	 O&M Road	Agricultural Channel and Intake	Bridg e
O&M Road		, , , , , , , , , , , , , , , , , , , ,		·	Ì	· ·	, ,	•			
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0	-			
Agricultural Channel and Intake											
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-			
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86			
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-			
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-			
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86			
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-			
Clearing and Grubbing	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-			
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96			
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-			
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-			
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96			
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-			
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-			
Bridge											
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-			
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86			
	Pickup Truck Conventional (1)	n/a	1	-	-		0	-			
Bridge Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-			
Bridge Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-			

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table <u>LM</u>-151. Operation & Maintenance Vibration Level at the Receptor

								Bridg
	Tot	O&M Road		Agricult	ural Channel a	ind Intake		е
Building Damage								
Total PPV @ 25'	0.684	n/a	0.608	0.076	0.076	0.228	0.228	0.08
Distance from the Center of O&M Activity to a Receptor (ft)	60	60	60	60	60	60	60	60
PPV at the Receptor (in/sec)	0.18	n/a	0.16	0.02	0.02	0.06	0.06	0.02
Impact to Receptor	no	n/a	no	no	no	no	no	no
Human Annoyance								
Total Lv @ 25'	105	n/a	104	86	86	96	96	86
Distance from the Center of O&M Activity to a Receptor (ft)	320	300	300	300	300	300	300	300
Distance Divergence (dBA)	33.2	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Lv at the Receptor (VdB)	72	n/a	72	54	54	63	63	54
Impact to Receptor	no	n/a	no	no	no	no	no	no

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)
Source: Google Earth

8000

Operational Vibration - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (Alternative 4)

Table LM-152. Operation & Maintenance Vibration and Ground-Borne Vibration

				Single		Single			
			N	Equipment	Total PPV at	Equipment	Add to Single	T-4-114	
Dhasa	Favrings and December	Laskum Fauriamant Tunas	Number of	PPV at 25 ft		Lv at 25 ft	Source Level	Total Lv at	
Phase O&M Road	Equipment Description	Lookup Equipment Types	Equipment	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)	
	101 Dlade Crader (1)	In/a	1		T	T	0	T	
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	-	-	-	0		-
Main Channel	4.5.0V Front Find London Crowdon (4)	In/a	1 1		Т	<u> </u>	0	Т	
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1 1	- 0.70	0.070	-	0	-	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86	2.00E+04
N	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-	-
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92	3.99E+04
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92	3.99E+04
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	_	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-	-
'	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
	Pickup Truck Conventional (2)	n/a	2	_	_	_	6	_	_
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	_	_	0	-	-
Berm/Levee	p 1010p 111011 content (1)								
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	_	_	_	0	Τ -	-
Berry Levee Repaire	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
	Pickup Truck Conventional (2)	n/a	2	0.070	0.220	_	6	_	0.552.04
Water Control Structure & Culvert	Tickup Truck Conventional (2)	IIIa		_			0		-
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1				0	Т -	
Deblis Keliloval	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (1)	n/a		0.076	0.070	00	0	00	2.002+04
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	<u> </u>	_
Sediment Removal (Wet Conditions)	. ,	l .			1		_	1	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
History I Button College Hallow	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-	-
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	-	-	6		-
Buildings	140 OV 0 A 1 D T (1)	D. J. L. T. J.	1 4	0.070	0.070	00		1 00	0.005.01
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (2)	n/a	2	-	<u>-</u>	-	6	-	-
Water Control Structure Operating Equipm									
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-	-
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table LM-152. Operation & Maintenance Vibration and Ground-Borne Vibra

Table Lin 102. Operation a maintena	ince Vibration and Ground-Borne Vil		1	т —						ı	Г					l	T
				_							<u></u>				•		
Dhasa	Favrings at Description		0&			Ma: (N			D	wa	ter Co			re &	Dista	0- 5-
Phase	Equipment Description	10	ot Roa	al		Main (nanne	ei		Berm			Culver	τ		Blag	Op Ec
O&M Road	Large to a second						1	_	l	ı	ı			ı	ı		
Levee O&M Road Regrading	12' Blade Grader (1)																
Main Channel									ı					ı	ı		
Debris Removal	1.5 CY Front End Loader Crawler (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Vegetation Removal	56 HP Tractor Rotary Mower (1)																
	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																
	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																
. , , ,	16 CY 3 Axle Dump Truck (2)																
	Pickup Truck Conventional (1)																
Channel Repairs	0.75 CY Hydraulic Excavator (1)																
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Channel Inspection	Pickup Truck Conventional (1)																
Berm/Levee	indep man comonación (1)																
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)					I	Т										
	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Water Control Structure & Culvert	i lokap Track Comonacial (2)																
Debris Removal	1.5 CY Front End Loader Crawler (1)																
Boblie Homeval	16 CY 3 Axle Dump Truck (1)																
	Pickup Truck Conventional (1)																
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)					+		1									
ocalment (temoval (vvet ochalilons)	16 CY 3 Axle Dump Truck (3)																
	Pickup Truck Conventional (2)																
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																
Buildings	I lokup Huck Conventional (2)																
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																
Lydipinent building (Major Repair)																	1
Water Central Structure Occupies Families	Pickup Truck Conventional (2)																
Water Control Structure Operating Equipm																	
Mechanical Hydraulic Equipment Upkeep	Pickup Truck Conventional (2)					-											
Test Operate Gates	Pickup Truck Conventional (1)																

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

– Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Vibration - Equipment Northern Water Control Structure and Sturgeon Bypass Channel (A

Table <u>LM</u>-153. Operation & Maintenance Vibration Level at the Receptor

		0&1	1									Wat	ter Co	ntrol S	tructu	re &		
	T	ot Roa	d			Main C	hanne	el			Berm		(Culver	t		Bldg	Op Eq
Building Damage	_																	
Total PPV @	25' 1.	52 n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.228	0.3	0.08	0.23	n/a	n/a	0.076	n/a
Distance from the Center of O&M Activity to a Receptor	(ft) 10	00 70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/s	ec) 0.	19 n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.05	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact to Recep	otor n	o n/a	no	no	no	no	no	no	no	n/a	no	no	no	no	n/a	n/a	no	n/a
Human Annoyance																		
Total Lv @	25' 1°	12 n/a	108	86	86	96	92	92	96	n/a	96	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a Receptor	(ft) 54	10 390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Distance Divergence (di	3A) 40	0.0 35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Receptor (Ve	dB) 7	2 n/a	72	50	50	60	56	56	60	n/a	60	62	50	60	n/a	n/a	50	n/a
Impact to Recep	otor n	o n/a	no	no	no	no	no	no	no	n/a	no	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Significance Level

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

2600

Source: Google Earth

Table LM-154. Operation & Maintenance Vibration and Ground-Borne Vibration

				Single Equipment		Single Equipment	Add to Single		
			Number of	PPV at 25 ft	Total PPV at	Lv at 25 ft	Source Level	Total Lv at	
Phase	Equipment Description	Lookup Equipment Types	1	(in/sec)	25 ft (in/sec)	(VdB)	(VdB)	25 ft (VdB)	
O&M Road	Equipment Becomption	Zookap Zdaipinoni Typoo	Equipment	(111/000)	20 11 (111/000)	(Vab)	(vab)	2011 (143)	
Levee O&M Road Regrading	12' Blade Grader (1)	n/a	1	_		_	0	T -	
Main Channel	12 Blace Grader (1)	11110					Ů		
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-	
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1 1	0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (1)	n/a		- 0.070	- 0.070	_	0	_	
Vegetation Removal	56 HP Tractor Rotary Mower (1)	n/a	1	_	_	_	0	_	-
vegetation removal	16 CY 3 Axle Dump Truck (1)	Loaded Trucks		0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (1)	n/a		0.070	0.070	- 00	Ö	00	2.002104
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	 	
Sediment Removal (Wet Conditions)	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
			2	0.076	0.220	00		90	5.99⊑+04
Dools Donlocoment (Miner Deneir)	Pickup Truck Conventional (2)	n/a	-	-	-	-	6	-	- -
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)	n/a	1	- 0.070	0.450	-	0	-	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92	3.99E+04
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)	n/a – .	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (2)	Loaded Trucks	2	0.076	0.152	86	6	92	3.99E+04
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Channel Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-	-
Channel Inspection	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Berm/Levee									
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	-	-
Water Control Structure & Culvert									
Debris Removal	1.5 CY Front End Loader Crawler (1)	n/a	1	-	-	-	0	-	-
	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (1)	n/a	1	-	-	-	0	-	-
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)	n/a	1	-	-	-	0	-	-
,	16 CY 3 Axle Dump Truck (3)	Loaded Trucks	3	0.076	0.228	86	10	96	5.99E+04
	Pickup Truck Conventional (2)	n/a	2	_	_	-	6	_	- '
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)	n/a	2	-	-	_	6	-	-
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)	n/a	2	-	_	_	6	_	_
Buildings							·	<u> </u>	
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)	Loaded Trucks	1	0.076	0.076	86	0	86	2.00E+04
	Pickup Truck Conventional (2)	n/a	2	-	-	-	6	_	
Water Control Structure Operating Equipm		1~							
Mechanical Hydraulic Equipment Upkeep		n/a	2		T -		6	T -	
Test Operate Gates	Pickup Truck Conventional (1)	n/a	1	_	 _	_	0	 -	
	d Labitat Bastaration & Fish Bassara Brain		_ '	<u> </u>	I -	I	1 0		

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Operational Vibration - Equipment Southern Water Control Structure and Sturgeon Bypass Channel (A

Table LM-154. Operation & Maintenance Vibration and Ground-Borne Vibra

Phase	Equipment Description		Tot I	O&M Road		Main (Main Channel			Berm	Water Control Structure & Culvert					Bldg	Op I Eq	
O&M Road																	1 3	
Levee O&M Road Regrading	12' Blade Grader (1)	_			T	T												
Main Channel	()																	
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Vegetation Removal	56 HP Tractor Rotary Mower (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
,	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Rock Replacement (Minor Repair)	17 TN Crane Crawler (1)																	
	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Rock Replacement (Major Repair)	17 TN Crane Crawler (1)																	
, , , , , , , , , , , , , , , , , , ,	16 CY 3 Axle Dump Truck (2)																	
	Pickup Truck Conventional (1)																	
Channel Repairs	0.75 CY Hydraulic Excavator (1)																	
•	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Channel Inspection	Pickup Truck Conventional (1)																	
Berm/Levee						<u>'</u>												
Berm/ Levee Repairs	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Water Control Structure & Culvert					 	<u>'</u>										<u> </u>	<u> </u>	
Debris Removal	1.5 CY Front End Loader Crawler (1)																	
	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (1)																	
Sediment Removal (Wet Conditions)	0.75 CY Hydraulic Excavator (1)																	
	16 CY 3 Axle Dump Truck (3)																	
	Pickup Truck Conventional (2)																	
Hinged Bottom Gates Upkeep	Pickup Truck Conventional (2)																	
Gates and Concrete Structure Inspection	Pickup Truck Conventional (2)																	
Buildings																		
Equipment Building (Major Repair)	16 CY 3 Axle Dump Truck (1)																	
	Pickup Truck Conventional (2)																	l
Water Control Structure Operating Equipm	nent																	
Mechanical Hydraulic Equipment Upkeep																		
Test Operate Gates	Pickup Truck Conventional (1)				 	_	1	_							1	1	1	

Source: HDR. 2017. Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project

⁻ Ten Percent Design: Draft Technical Memorandum Operations and Maintenance.

Table LM-155. Operation & Maintenance Vibration Level at the Receptor

	т		O&M Road	Main Channel						Berm	Water Control Structure & Culvert					Bldg	Op Eq		
Building Damage																			
Total PPV @	25' 1.	.52	n/a	0.91	0.08	0.08	0.23	0.15	0.15	0.23	n/a	0.228	0.3	0.08	0.23	n/a	n/a	0.08	n/a
Distance from the Center of O&M Activity to a Receptor	or (ft) 1	00	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PPV at the Receptor (in/	/sec) 0.	.19	n/a	0.19	0.02	0.02	0.05	0.03	0.03	0.05	n/a	0.05	0.06	0.02	0.05	n/a	n/a	0.02	n/a
Impact to Rece	eptor n	10	n/a	no	no	no	no	no	no	no	n/a	no	no	no	no	n/a	n/a	no	n/a
Human Annoyance																			
Total Lv @	25' 1	12	n/a	108	86	86	96	92	92	96	n/a	96	98	86	96	n/a	n/a	86	n/a
Distance from the Center of O&M Activity to a Receptor	or (ft) 5	40	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Distance Divergence (o	dBA) 40	0.0	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Lv at the Receptor (VdB) 7	72	n/a	72	50	50	60	56	56	60	n/a	60	62	50	60	n/a	n/a	50	n/a
Impact to Rece	eptor n	10	n/a	no	no	no	no	no	no	no	n/a	no	no	no	no	n/a	n/a	no	n/a

^{*}Distances are the minimum distances that can still achieve vibration levels within the significance thresholds, except when there is a closer receptor.

Non-engineered timber & masonry building

0.2 in/sec

Human annoyance

72 VdB

Receptors:

Nearest residential receptor (ft)

Source: Google Earth

800

Table <u>LM</u>-156. Vibration Source Levels for Construction Equipment

	PPV at 25 ft	Approximate
Equipment	(in/sec)	Lv [†] at 25 ft
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.17	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall) - in soil	0.008	66
Hydromill (slurry wall) - in rock	0.017	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Federal Transit Administration. 2006. Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May.

Values for pile drivers are based on the typical vibration source levels.

[†] RMS velocity in decibels (VdB) re 1 micro-inch/second