US Army Corps
of Engineers®
Los Angeles District

Little Colorado River
Feasibility Study Report

APPENDIX I
Environmental

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BIOLOGICAL RESOURCES
SPECIES LIST

Special status species listed for Navajo County, Arizona.

Common Name	Scientific Name	Federal (USFWS Status[a])	State of Arizona Status (AZDGF[b])
Amphibians			
Chiricahua Leopard Frog	*Lithobates chiricahuensis*	T	SGCN, Tier 1A
Birds			
California Condor	*Gymnogyps californianus*	E	SGCN, Tier 1A
Mexican Spotted Owl	*Strix occidentalis lucida*	T	SGCN, Tier 1A
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E	SGCN, Tier 1A
Yellow-Billed Cuckoo	*Coccyzus americanus*	T	SGCN, Tier 1A
Fish			
Apache Trout	*Oncorhynchus apache*	T	SGCN, Tier 1A
Gila Trout	*Oncorhynchus gilae*	T	SGCN, Tier 1A
Little Colorado Spinedace	*Lepidomeda vittata*	T	SGCN, Tier 1A
Roundtail Chub	*Gila robusta*	C	SGCN, Tier 1B
Flannelmouth Sucker	*Catostomus latipinnis*	SC	SGCN, Tier 1A
Bluehead Sucker	*Catostomus discobolus*	SC	SGCN, Tier 1A
Zuni Bluehead Sucker	*Catostomus discobolus yarrowi*	E	SGCN, Tier 1A*
Flowering Plants			
Navajo Sedge	*Carex specuicola*	T	HS
Peebles Navajo cactus	*Pediocactus peeblesianus var. peeblesianus*	E	HS
Welsh's Milkweed	*Asclepias welshii*	T	HS
Mammals			
Black-foot Ferret	*Mustela nigripes*	EXPN	SGCN, Tier 1A
Gray Wolf	*Canis lupus*	EXPN	SGCN, Tier 1A
Mexican Gray Wolf	*Canis lupus baileyi*	PE	SGCN, Tier 1A
New Mexico Meadow Jumping Mouse	*Zapus hudsonius luteus*	PE	SGCN, Tier 1B
Reptiles			
Northern Mexican Gartersnake	*Thamnophis eques megalops*	PT	SGCN, Tier 1B

[a] **Endangered Species Act (ESA)** (as prepared by U.S. Fish and Wildlife Services) **status:** Only Endangered and Threatened species are protected by the ESA.

E= Endangered: any species that is in danger of extinction throughout all or a significant portion of its range.

T= Threatened: any species that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.

P= Proposed for listing in the indentified category listed above.

C= Candidate: taxa for which the Services has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.

SC= Species of Concern: taxa for which information now in the possession of the Service indicates that proposing to list as endangered or threatened is possible appropriate, but for which sufficient data on biological vulnerability and threat are not currently available to support proposed rules.

EXPN=Experimental Nonessential population. Species proposed for official listing as experimental and Non-essential.

[b] **State of Arizona status:**

SGCN= Species of Greatest Conservation Need.

Tier 1A= Scored "1" for Vulnerability in at least one of the eight categories and matches at least one of the following: Federally listed as endangered or threatened under the Endangered Species Act (ESA); Candidate species under ESA; Is specifically covered under a signed conservation agreement (CCA) or a signed conservation agreement with assurances (CCAA); Recently removed from ESA and currently requires post-delisting monitoring; Closed season species (i.e., no take permitted) as identified in Arizona Game and Fish Commission Orders 40, 41, 42 or 43.

*=In preparation

Tier 1B= Scored "1" for Vulnerability in at least one of the eight categories, but match none of the above criteria.

HS= Highly Safeguarded: no collection allowed.

Source:
USFWS Information for Planning and Conservation (http://ecos.fws.gov/ipac)
ADGF State Wildlife Action Plan: 2012-2022, 2012

CULTURAL RESOURCES
COORDINATION AND LETTERS

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. James Garrison
State Historic Preservation Officer
Arizona State Parks
State Historic Preservation Office
1300 West Washington Street
Phoenix, Arizona 85007

Dear Mr. Garrison:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. This letter provides a brief project description and documents the area of potential effect (APE). By this letter the Corps requests your comments on the appropriateness of the APE.

The project will specifically involve rebuilding the easternmost 2000 feet of the RWDL to its abutment with the Winslow Levee and then rebuilding approximately 3,052 feet of the adjoining Winslow Levee between the RWDL and I-40. A total of 3,733 feet of new levee would be constructed along the northern side of I-40, connecting the currently discontiguous segments of the Winslow levee. And finally, 13,767 feet of Winslow Levee would be rebuilt along the western side of the LCR. The total length of new and reconstructed levee would be 22,552 feet or approximately 4.25 miles (see enclosure).

All but one 1500 foot section would follow the alignment of the existing levee and would overlap with the existing levee footprint. Within the 1500 foot stretch, the Winslow levee would be set back from the river approximately 700 feet and the old levee would be removed. This would occur on the west bank of the Little Colorado River across from the *Homolovi* State Park Ancestral Hopi Villages The setback would restore 12 acres of floodplain connectivity, reduce surface water elevation, and would provide additional flood protection downstream.

Typical levee sections would consist of a trapezoidal compacted earth fill levee designed to convey the 1% ACE flood. An additional three feet of levee height would be included to

increase the assurance that the levee could convey this flood. Maximum levee height for the project would be 15.8 feet. The levee would be faced with 2H:1V (Horizontal: Vertical) basaltic riprap, 2H:1V grouted stone or 1H:1V soil cement on the river side; scour protection installed to an average depth of 15 feet below grade on the river side; a 2H:1V slope on the land side overlain with four inches of gravel mulch to prevent erosion; a 16 feet wide access road along the crest of the levee; a 10 feet wide, eight feet deep trench drain having 2:1 side slopes at the toe of the levee on the land side and a 15 feet wide maintenance road landward of the trench drain. The typical levee section footprint would be approximately 150 feet in width including the maintenance road and trench drain.

In addition to levee construction, the project also includes saltcedar removal and river channelization to increase conveyance of floodwater under the BNSF Railroad Bridge. Saltcedar would be removed from a 94.4-acre area in the vicinity of the BNSF Railroad and State Highway 87 bridges using mechanized equipment. Removed saltcedar would be disposed of in an upland location outside of the floodplain. Following saltcedar removal, the river would be channelized for a length of 2,500 feet by excavating 299,836 cubic yards of material to increase the river to its current thalweg depth. Most of this work would be accomplished using scrapers, resulting in temporary discharge of fill material. Excavated material would either be recycled for levee construction, or disposed of in an upland area behind the levee. The total channelization area would be 26.1 acres, and the average depth of excavation would range from 6 to 8 feet. The bottom of the newly excavated channel would remain earth-lined. As part of the channelization work, 36,640 cubic yards of soil cement and 26,055 cubic yards of riprap would be installed to create a low flow channel terrace and side slopes.

Based on the current project description, the Corps had defined the APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, over 800 acres of land are being evaluated for borrow and disposal areas (see enclosure); however, actual ground disturbance will likely not exceed 200 acres. It is expected that approximately 70% of the levee material will be reused in the reconstructed levees. The final borrow and disposal areas will not be selected until the next design phase. The Corps is enclosing a map of the full areas currently under consideration for your information; however, only the selected areas will be surveyed as part of the APE.

The Corps is proposing to complete a class III pedestrian inventory of the 142 acre levee construction corridor, the 12 acre setback area, and the 94.5 acre salt cedar removal area. The Corps will complete a visual inspection of the river cut bank. The Corps plans to postpone completing a cultural resource inventory on the borrow and disposal areas until the next phase of the study when the exact locations and limits have been identified. The survey for those areas will be completed as an addendum to the current survey.

The Corps is concurrently notifying the Fort Mojave Indian Tribe, the Havasupai Tribe, the Hopi Tribe, the Navajo Nation, and the Pueblo of Zuni about this project and soliciting any knowledge and concerns about the project area. If you are aware of any issues or if you know of other affected tribes or interested parties, please let us know.

Please indicate if you concur with our APE and proposed identification efforts at your earliest convenience or within 30 days. If you have any questions, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil.

Sincerely,

for Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Timothy Williams, Chair
Fort Mojave Tribal Council
500 Merriman Avenue
Needles, California 92363

Dear Mr. Williams:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. The Corps would like to request your assistance in identifying any issues or concerns the Tribe might have and seek information to identify properties that may be affected by the project which may be of religious or cultural significance to the Tribe (see 36 CFR 800.4(a)(4)).

The project will specifically involve rebuilding the easternmost 2000 feet of the RWDL to its abutment with the Winslow Levee and then rebuilding approximately 3,052 feet of the adjoining Winslow Levee between the RWDL and I-40. A total of 3,733 feet of new levee would be constructed along the northern side of I-40, connecting the currently discontiguous segments of the Winslow levee. And finally, 13,767 feet of Winslow Levee would be rebuilt along the western side of the LCR. The total length of new and reconstructed levee would be 22,552 feet or approximately 4.25 miles (see enclosure).

All but one 1500 foot section would follow the alignment of the existing levee and would overlap with the existing levee footprint. Within the 1500 foot stretch, the Winslow levee would be set back from the river approximately 700 feet and the old levee would be removed. This would occur on the west bank of the Little Colorado River across from the *Homolovi* State Park Ancestral Hopi Villages The setback would restore 12 acres of floodplain connectivity, reduce surface water elevation, and would provide additional flood protection downstream.

Typical levee sections would consist of a trapezoidal compacted earth fill levee designed to convey the 1% ACE flood. An additional three feet of levee height would be included to increase the assurance that the levee could convey this flood. Maximum levee height for the

project would be 15.8 feet. The levee would be faced with 2H:1V (Horizontal: Vertical) basaltic riprap, 2H:1V grouted stone or 1H:1V soil cement on the river side; scour protection installed to an average depth of 15 feet below grade on the river side; a 2H:1V slope on the land side overlain with four inches of gravel mulch to prevent erosion; a 16 feet wide access road along the crest of the levee; a 10 feet wide, eight feet deep trench drain having 2:1 side slopes at the toe of the levee on the land side and a 15 feet wide maintenance road landward of the trench drain. The typical levee section footprint would be approximately 150 feet in width including the maintenance road and trench drain.

In addition to levee construction, the project also includes saltcedar removal and river channelization to increase conveyance of floodwater under the BNSF Railroad Bridge. Saltcedar would be removed from a 94.4-acre area in the vicinity of the BNSF Railroad and State Highway 87 bridges using mechanized equipment. Removed saltcedar would be disposed of in an upland location outside of the floodplain. Following saltcedar removal, the river would be channelized for a length of 2,500 feet by excavating 299,836 cubic yards of material to increase the river to its current thalweg depth. Most of this work would be accomplished using scrapers, resulting in temporary discharge of fill material. Excavated material would either be recycled for levee construction, or disposed of in an upland area behind the levee. The total channelization area would be 26.1 acres, and the average depth of excavation would range from 6 to 8 feet. The bottom of the newly excavated channel would remain earth-lined. As part of the channelization work, 36,640 cubic yards of soil cement and 26,055 cubic yards of riprap would be installed to create a low flow channel terrace and side slopes.

Based on the current project description, the Corps had defined the APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, over 800 acres of land are being evaluated for borrow and disposal areas (see enclosure); however, actual ground disturbance will likely not exceed 200 acres. It is expected that approximately 70% of the levee material will be reused in the reconstructed levees. The final borrow and disposal areas will not be selected until the next design phase. The Corps is enclosing a map of the full areas currently under consideration for your information; however, only the selected areas will be surveyed as part of the APE.

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The Corps is concurrently notifying the State Historic Preservation Office and other Affected Tribes in the area. If you are aware of any issues or if you know of other interested parties please let us know.

The Corps would appreciate any comments you may have on the project at your earliest convenience or within 30 days. If you have any questions, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil.

Sincerely,

Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Shan Lewis, Vice-Chair
Fort Mojave Tribal Council
500 Merriman Avenue
Needles, California 92363

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Sincerely,

For Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Don Watahomgie, Chairperson
Havasupai Tribal Council
P.O. Box 10
Supai, Arizona 86435

Dear Mr. Watahomgie:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. The Corps would like to request your assistance in identifying any issues or concerns the Tribe might have and seek information to identify properties that may be affected by the project which may be of religious or cultural significance to the Tribe (see 36 CFR 800.4(a)(4)).

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Sincerely,

for Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

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LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Matthew Putesoy, Sr., Vice-Chair
Havasupai Tribal Council
P.O. Box 10
Supai, Arizona 86435

Dear Mr. Putesoy:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. The Corps would like to request your assistance in identifying any issues or concerns the Tribe might have and seek information to identify properties that may be affected by the project which may be of religious or cultural significance to the Tribe (see 36 CFR 800.4(a)(4)).

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In addition to levee construction, the project also includes saltcedar removal and river channelization to increase conveyance of floodwater under the BNSF Railroad Bridge. Saltcedar would be removed from a 94.4-acre area in the vicinity of the BNSF Railroad and State Highway 87 bridges using mechanized equipment. Removed saltcedar would be disposed of in an upland location outside of the floodplain. Following saltcedar removal, the river would be channelized for a length of 2,500 feet by excavating 299,836 cubic yards of material to increase the river to its current thalweg depth. Most of this work would be accomplished using scrapers, resulting in temporary discharge of fill material. Excavated material would either be recycled for levee construction, or disposed of in an upland area behind the levee. The total channelization area would be 26.1 acres, and the average depth of excavation would range from 6 to 8 feet. The bottom of the newly excavated channel would remain earth-lined. As part of the channelization work, 36,640 cubic yards of soil cement and 26,055 cubic yards of riprap would be installed to create a low flow channel terrace and side slopes.

Based on the current project description, the Corps had defined the APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, over 800 acres of land are being evaluated for borrow and disposal areas (see enclosure); however, actual ground disturbance will likely not exceed 200 acres. It is expected that approximately 70% of the levee material will be reused in the reconstructed levees. The final borrow and disposal areas will not be selected until the next design phase. The Corps is enclosing a map of the full areas currently under consideration for your information; however, only the selected areas will be surveyed as part of the APE.

The Corps is proposing to complete a class III pedestrian inventory of the 142 acre levee construction corridor, the 12 acre setback area, and the 94.5 acre salt cedar removal area. The Corps will complete a visual inspection of the river cut bank. The Corps plans to postpone completing a cultural resource inventory on the borrow and disposal areas until the next phase of the study when the exact locations and limits have been identified. The survey for those areas will be completed as an addendum to the current survey.

The Corps is concurrently notifying the State Historic Preservation Office and other Affected Tribes in the area. If you are aware of any issues or if you know of other interested parties please let us know.

The Corps would appreciate any comments you may have on the project at your earliest convenience or within 30 days. If you have any questions, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil.

Sincerely,

For Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Leigh Kuwanwisiwma, Director
Hopi Cultural Preservation Office
P.O. Box 123
Kykotsmovi, Arizona 86039

Dear Mr. Kuwanwisiwma:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. The Corps would like to request your assistance in identifying any issues or concerns the Tribe might have and seek information to identify properties that may be affected by the project which may be of religious or cultural significance to the Tribe (see 36 CFR 800.4(a)(4)).

The project will specifically involve rebuilding the easternmost 2000 feet of the RWDL to its abutment with the Winslow Levee and then rebuilding approximately 3,052 feet of the adjoining Winslow Levee between the RWDL and I-40. A total of 3,733 feet of new levee would be constructed along the northern side of I-40, connecting the currently discontiguous segments of the Winslow levee. And finally, 13,767 feet of Winslow Levee would be rebuilt along the western side of the LCR. The total length of new and reconstructed levee would be 22,552 feet or approximately 4.25 miles (see enclosure).

All but one 1500 foot section would follow the alignment of the existing levee and would overlap with the existing levee footprint. Within the 1500 foot stretch, the Winslow levee would be set back from the river approximately 700 feet and the old levee would be removed. This would occur on the west bank of the Little Colorado River across from the *Homolovi* State Park Ancestral Hopi Villages The setback would restore 12 acres of floodplain connectivity, reduce surface water elevation, and would provide additional flood protection downstream.

Typical levee sections would consist of a trapezoidal compacted earth fill levee designed to convey the 1% ACE flood. An additional three feet of levee height would be included to increase the assurance that the levee could convey this flood. Maximum levee height for the project would be 15.8 feet. The levee would be faced with 2H:1V (Horizontal: Vertical) basaltic riprap, 2H:1V grouted stone or 1H:1V soil cement on the river side; scour protection installed to an average depth of 15 feet below grade on the river side; a 2H:1V slope on the land side overlain with four inches of gravel mulch to prevent erosion; a 16 feet wide access road along the crest of the levee; a 10 feet wide, eight feet deep trench drain having 2:1 side slopes at the toe of the levee on the land side and a 15 feet wide maintenance road landward of the

trench drain. The typical levee section footprint would be approximately 150 feet in width including the maintenance road and trench drain.

In addition to levee construction, the project also includes saltcedar removal and river channelization to increase conveyance of floodwater under the BNSF Railroad Bridge. Saltcedar would be removed from a 94.4-acre area in the vicinity of the BNSF Railroad and State Highway 87 bridges using mechanized equipment. Removed saltcedar would be disposed of in an upland location outside of the floodplain. Following saltcedar removal, the river would be channelized for a length of 2,500 feet by excavating 299,836 cubic yards of material to increase the river to its current thalweg depth. Most of this work would be accomplished using scrapers, resulting in temporary discharge of fill material. Excavated material would either be recycled for levee construction, or disposed of in an upland area behind the levee. The total channelization area would be 26.1 acres, and the average depth of excavation would range from 6 to 8 feet. The bottom of the newly excavated channel would remain earth-lined. As part of the channelization work, 36,640 cubic yards of soil cement and 26,055 cubic yards of riprap would be installed to create a low flow channel terrace and side slopes.

Based on the current project description, the Corps had defined the APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, over 800 acres of land are being evaluated for borrow and disposal areas (see enclosure); however, actual ground disturbance will likely not exceed 200 acres. It is expected that approximately 70% of the levee material will be reused in the reconstructed levees. The final borrow and disposal areas will not be selected until the next design phase. The Corps is enclosing a map of the full areas currently under consideration for your information; however, only the selected areas will be surveyed as part of the APE.

The Corps is proposing to complete a class III pedestrian inventory of the 142 acre levee construction corridor, the 12 acre setback area, and the 94.5 acre salt cedar removal area. The Corps will complete a visual inspection of the river cut bank. The Corps plans to postpone completing a cultural resource inventory on the borrow and disposal areas until the next phase of the study when the exact locations and limits have been identified. The survey for those areas will be completed as an addendum to the current survey.

The Corps is concurrently notifying the State Historic Preservation Office and other Affected Tribes in the area. If you are aware of any issues or if you know of other interested parties please let us know.

The Corps would appreciate any comments you may have on the project at your earliest convenience or within 30 days. If you have any questions, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil.

Sincerely,

for Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Ron Maldanado, Acting THPO
Historic Preservation Department
Tribal Historic Preservation Officer
Navajo Nation Historic Preservation Office
P.O. Box 4950
Window Rock, Arizona 86039

Dear Mr. Maldanado:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. The Corps would like to request your assistance in identifying any issues or concerns the Tribe might have and seek information to identify properties that may be affected by the project which may be of religious or cultural significance to the Tribe (see 36 CFR 800.4(a)(4)).

The project will specifically involve rebuilding the easternmost 2000 feet of the RWDL to its abutment with the Winslow Levee and then rebuilding approximately 3,052 feet of the adjoining Winslow Levee between the RWDL and I-40. A total of 3,733 feet of new levee would be constructed along the northern side of I-40, connecting the currently discontiguous segments of the Winslow levee. And finally, 13,767 feet of Winslow Levee would be rebuilt along the western side of the LCR. The total length of new and reconstructed levee would be 22,552 feet or approximately 4.25 miles (see enclosure).

All but one 1500 foot section would follow the alignment of the existing levee and would overlap with the existing levee footprint. Within the 1500 foot stretch, the Winslow levee would be set back from the river approximately 700 feet and the old levee would be removed. This would occur on the west bank of the Little Colorado River across from the *Homolovi* State Park Ancestral Hopi Villages The setback would restore 12 acres of floodplain connectivity, reduce surface water elevation, and would provide additional flood protection downstream.

Typical levee sections would consist of a trapezoidal compacted earth fill levee designed to convey the 1% ACE flood. An additional three feet of levee height would be included to increase the assurance that the levee could convey this flood. Maximum levee height for the project would be 15.8 feet. The levee would be faced with 2H:1V (Horizontal: Vertical) basaltic riprap, 2H:1V grouted stone or 1H:1V soil cement on the river side; scour protection installed to an average depth of 15 feet below grade on the river side; a 2H:1V slope on the land side overlain with four inches of gravel mulch to prevent erosion; a 16

side slopes at the toe of the levee on the land side and a 15 feet wide maintenance road landward of the trench drain. The typical levee section footprint would be approximately 150 feet in width including the maintenance road and trench drain.

In addition to levee construction, the project also includes saltcedar removal and river channelization to increase conveyance of floodwater under the BNSF Railroad Bridge. Saltcedar would be removed from a 94.4-acre area in the vicinity of the BNSF Railroad and State Highway 87 bridges using mechanized equipment. Removed saltcedar would be disposed of in an upland location outside of the floodplain. Following saltcedar removal, the river would be channelized for a length of 2,500 feet by excavating 299,836 cubic yards of material to increase the river to its current thalweg depth. Most of this work would be accomplished using scrapers, resulting in temporary discharge of fill material. Excavated material would either be recycled for levee construction, or disposed of in an upland area behind the levee. The total channelization area would be 26.1 acres, and the average depth of excavation would range from 6 to 8 feet. The bottom of the newly excavated channel would remain earth-lined. As part of the channelization work, 36,640 cubic yards of soil cement and 26,055 cubic yards of riprap would be installed to create a low flow channel terrace and side slopes.

Based on the current project description, the Corps had defined the APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, over 800 acres of land are being evaluated for borrow and disposal areas (see enclosure); however, actual ground disturbance will likely not exceed 200 acres. It is expected that approximately 70% of the levee material will be reused in the reconstructed levees. The final borrow and disposal areas will not be selected until the next design phase. The Corps is enclosing a map of the full areas currently under consideration for your information; however, only the selected areas will be surveyed as part of the APE.

The Corps is proposing to complete a class III pedestrian inventory of the 142 acre levee construction corridor, the 12 acre setback area, and the 94.5 acre salt cedar removal area. The Corps will complete a visual inspection of the river cut bank. The Corps plans to postpone completing a cultural resource inventory on the borrow and disposal areas until the next phase of the study when the exact locations and limits have been identified. The survey for those areas will be completed as an addendum to the current survey.

The Corps is concurrently notifying the State Historic Preservation Office and other Affected Tribes in the area. If you are aware of any issues or if you know of other interested parties please let us know.

The Corps would appreciate any comments you may have on the project at your earliest convenience or within 30 days. If you have any questions, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil.

Sincerely,

For Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

May 7, 2015

Office of the Chief
Planning Division

Mr. Kurt Dongoske
Tribal Historic Preservation Officer
Zuni Cultural Resources Enterprise
P.O. Box 1149
Zuni, New Mexico 87327

Dear Mr. Dongoske:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in cooperation with the Navajo County Flood Control District as the non-Federal sponsor are proposing to construct a flood risk management project to protect the community of Winslow Arizona. The project involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The project is located east of Winslow Arizona along the Little Colorado River (LCR). In accordance with 36 C.F.R. § 800.4(a)(1), the Corps has reviewed the undertaking and determined that it is the type of undertaking that has the potential to affect historic properties. The Corps would like to request your assistance in identifying any issues or concerns the Tribe might have and seek information to identify properties that may be affected by the project which may be of religious or cultural significance to the Tribe (see 36 CFR 800.4(a)(4)).

The project will specifically involve rebuilding the easternmost 2000 feet of the RWDL to its abutment with the Winslow Levee and then rebuilding approximately 3,052 feet of the adjoining Winslow Levee between the RWDL and I-40. A total of 3,733 feet of new levee would be constructed along the northern side of I-40, connecting the currently discontiguous segments of the Winslow levee. And finally, 13,767 feet of Winslow Levee would be rebuilt along the western side of the LCR. The total length of new and reconstructed levee would be 22,552 feet or approximately 4.25 miles (see enclosure).

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trench drain. The typical levee section footprint would be approximately 150 feet in width including the maintenance road and trench drain.

In addition to levee construction, the project also includes saltcedar removal and river channelization to increase conveyance of floodwater under the BNSF Railroad Bridge. Saltcedar would be removed from a 94.4-acre area in the vicinity of the BNSF Railroad and State Highway 87 bridges using mechanized equipment. Removed saltcedar would be disposed of in an upland location outside of the floodplain. Following saltcedar removal, the river would be channelized for a length of 2,500 feet by excavating 299,836 cubic yards of material to increase the river to its current thalweg depth. Most of this work would be accomplished using scrapers, resulting in temporary discharge of fill material. Excavated material would either be recycled for levee construction, or disposed of in an upland area behind the levee. The total channelization area would be 26.1 acres, and the average depth of excavation would range from 6 to 8 feet. The bottom of the newly excavated channel would remain earth-lined. As part of the channelization work, 36,640 cubic yards of soil cement and 26,055 cubic yards of riprap would be installed to create a low flow channel terrace and side slopes.

Based on the current project description, the Corps had defined the APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, over 800 acres of land are being evaluated for borrow and disposal areas (see enclosure); however, actual ground disturbance will likely not exceed 200 acres. It is expected that approximately 70% of the levee material will be reused in the reconstructed levees. The final borrow and disposal areas will not be selected until the next design phase. The Corps is enclosing a map of the full areas currently under consideration for your information; however, only the selected areas will be surveyed as part of the APE.

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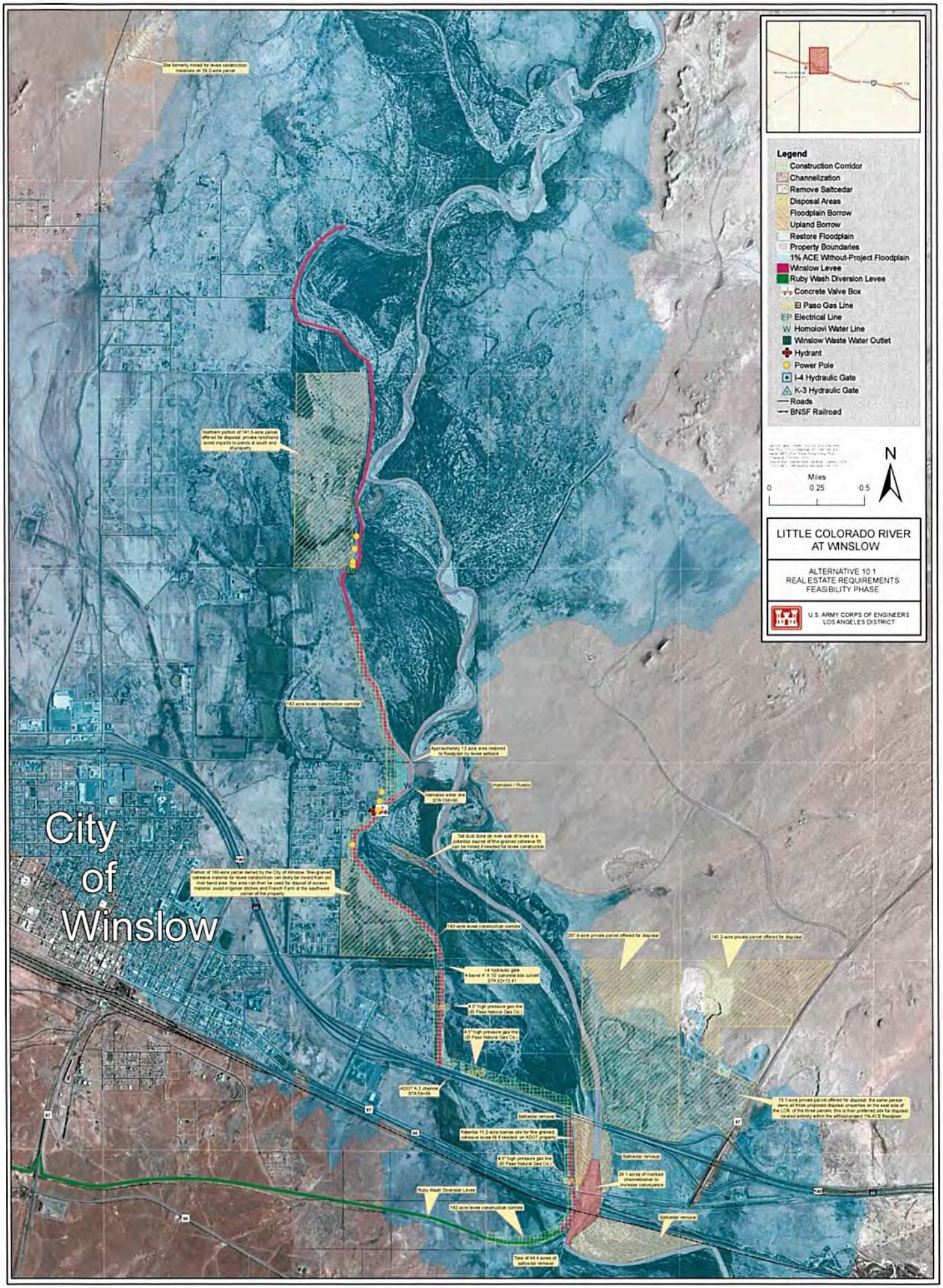
The Corps is concurrently notifying the State Historic Preservation Office and other Affected Tribes in the area. If you are aware of any issues or if you know of other interested parties please let us know.

The Corps would appreciate any comments you may have on the project at your earliest convenience or within 30 days. If you have any questions, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil.

Sincerely,

for Eduardo T. De Mesa
Acting Chief, Planning Division

Enclosure


Legend
Construction Corridor
Channelization
Remove Saltcedar
Disposal Areas
Floodplain Borrow
Upland Borrow
Restore Floodplain
Property Boundaries
1% ACE Without-Project Floodplain
Winslow Levee
Ruby Wash Diversion Levee
Concrete Valve Box
El Paso Gas Line
Electrical Line
Homolovi Water Line
Winslow Waste Water Outlet
Hydrant
Power Pole
I-4 Hydraulic Gate
K-3 Hydraulic Gate
Roads
BNSF Railroad
Miles
0
0.25
0.5
N
LITTLE COLORADO RIVER AT WINSLOW
ALTERNATIVE 10.1
REAL ESTATE REQUIREMENTS
FEASIBILITY PHASE
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT
City of Winslow

THE HOPI TRIBE

Herman G. Honanie
CHAIRMAN

Alfred Lomahquahu Jr.
VICE-CHAIRMAN

RECEIVED
JUN 01 2015

May 18, 2015

Eduardo T. De Mesa, Acting Chief, Planning Division
Attention: Danielle Storey, Archaeologist
Department of the Army, Los Angeles District, U.S. Army Corps of Engineers
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017

Dear Mr. De Mesa,

This letter is in response to your correspondence dated May 7, 2015, regarding the United States Army Corps of Engineers and Navajo County Flood Control District proposing to construct a flood risk management project to protect Winslow, Arizona.

The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in the Southwest. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites and we consider the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. Homolovi State Park and the Little Colorado River are Traditional Cultural Properties of the Hopi Tribe. Therefore, we appreciate the Corps' solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office understands the proposal is located along the Little Colorado River involving 4.25 miles of new and reconstructed levees and has the potential to effect historic properties. The project area is described as the 142 acre levee construction corridor, 12 acre setback area across from Homolovi State Park, 94.5 acre salt cedar removal and channeling area, and 200 of 800 acres being evaluated for associated barrow and disposal areas, access roads and staging areas. We also understand the Corp intends to survey only these areas for cultural resources.

We consider this area of potential effect to be insufficient and hereby request that Corps enter into consultations with the Hopi Tribe to assess the effects of the project on the east side of the Little Colorado River including Homolovi I Pueblo. There is currently a meander in the River between Homolovi I and the proposed 1500 foot set back stretch of the Winslow levee on the west bank of the Little Colorado River. This proposal will alter the River's water flow and therefore, we are concerned that Homolovi I may be adversely affected.

P.O. Box 123 KYKOTSMOVI, AZ 86039 (928) 734-3000

And therefore we hereby request the Corps conduct a consultation meeting with the Hopi Tribe for which we will also invite out partners in the management of Homolovi State Park including representatives of the State Historic Preservation Office and University of Arizona.

To schedule a meeting and if you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at tmorgart@hopi.nsn.us or 928-734-3619. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: Mark A. Gilfillan, COE, 400 Rood Avenue, Room 224, Grand Junction, Colorado 81501
Arizona State Historic Preservation Office
Advisory Council on Historic Preservation
Chuck Adams, Richard Lange, Arizona State Museum
Homolovi State Park

Arizona State Parks

Douglas A. Ducey
Governor

Sue Black
Executive Director

State Parks Board
R.J. Cardin, Chairman
Kay Daggett, Vice-Chairman
Mark Brnovich, Phoenix
Alan Everett, Sedona
Shawn Orme, Mayer
Orme Lewis, Jr., Phoenix
Lisa Atkins, State Land Commissioner

June 5, 2015

Mr. Eduardo T. De Mesa
Acting Chief, Planning Division
Department of the Army
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017

Re: East of Winslow, Navajo County; Winslow Levee and Ruby Wash Diversion Levee; Section 106 Consultation; U.S. Army Corps of Engineers (Corps); SHPO-2015-0498(125401)

Dear Mr. De Mesa:

Thank you for consulting with our office on the above-referenced project, which is a federal undertaking subject to review under 36 CFR 800, the regulations implementing Section 106 of the National Historic Preservation Act, as amended. It is our understanding that the undertaking, which will be completed in cooperation with Navajo County Flood Control District, involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee, channelizing a segment of the Little Colorado River, new levee construction, and vegetation removal within the active channel scour.

The Corps has defined the area of potential effects (APE) as the 142-acre levee construction corridor, the 12-acre setback area, the 94.5-acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. At this time, the Corps is proposing to complete a Class III survey of 248.5 acres encompassing the levee construction corridor, setback area and salt cedar removal area. Additional survey of the borrow areas, disposal areas, staging areas, and access roads, would be completed in a subsequent phase of the undertaking.

We believe that the APE needs to be better defined to assess potential impacts from this undertaking, including indirect and cumulative effects of the undertaking to historic properties (specifically, but not limited to, the Little Colorado River and Homolovi State Park). Therefore, please consult with the consulting parties pursuant to 36 CFR 800.4(a)(1-3) on your APE definition. Consultation on the APE definition is especially critical given that the Little Colorado River and Homolovi State Park are both Traditional Cultural Properties to the Hopi Tribe.

Also, given the phased nature of the undertaking, we recommend that a Programmatic Agreement (PA) be developed; consulting parties should include the White Mountain Apache Tribe, Arizona State Parks, and the Arizona State Museum, in addition to those

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AZStateParks.com AZStateParks

parties already identified by the Corps. Once the Agency has an agreed-upon APE, we recommend that you provide all consulting parties with your finding of effect (Adverse Effect) and circulate a draft outline of the PA to all the consulting parties for their input on the Section 106 consultation process that should be embodied in the agreement document.

We appreciate your cooperation in complying with historic preservation requirements for federal undertakings and look forward to working with you on this undertaking. Please don't hesitate to contact me by telephone, 602.542.7120, or via e-mail, mwalsh@azstateparks.gov, if you have any questions. Thank you.

Sincerely,

Mary-Ellen Walsh

Mary-Ellen Walsh, M.A., RPA
Archaeological Compliance Specialist
Arizona State Historic Preservation Office

cc:
Leigh J. Kuwanwisiwma, Director, Hopi Cultural Preservation Office
Chuck Adams and Richard Lange, Arizona State Museum
Paula Pflepsen, Archaeologist, Arizona State Parks

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

March 31, 2016

Planning Division

Mr. Leigh Kuwanwisiwma
Director
Hopi Cultural Preservation Office
P.O. Box 123
Kykotsmovi, Arizona 86039

Dear Mr. Kuwanwisiwma:

The U.S. Army Corps of Engineers, Los Angeles District (Corps), in cooperation with the Navajo County Flood Control District as the non-Federal sponsor, has proposed to construct a flood risk management project to protect the community of Winslow Arizona. The tentatively selected plan involves modifying portions of the Winslow Levee and Ruby Wash Diversion Levee (RWDL), channelizing a segment of the river below the Burlington Northern Santa Fe (BNSF) railroad bridge, new levee construction and vegetation removal within the active channel scour. The Corps contacted you about this project on May 7, 2015 and requested your assistance in identifying any issues or concerns the Hopi Tribe might have. On May 18th, the Corps received your letter outlining the Hopi Tribe's disagreement with the Corps' area of potential effect (APE) determination, citing concerns that the proposed project may result in adverse effects to Homol'ovi I. By your letter you also requested that the Corps formally consult with the Hopi Tribe. In response to your letter, the Corps has expanded their APE to include Homol'ovi I, on the east side of the river, and has performed additional hydraulic modeling to assess potential impacts to the site. This letter defines the Corps' expanded APE, provides hydraulic information, and seeks your comments.

The Corps originally defined the project APE as the 142 acre levee construction corridor, the 12 acre setback area, the 94.5 acre salt cedar removal area, and all associated borrow and disposal areas, access roads, and staging areas. The Corps has expanded the APE to include the aforementioned areas but also the east side of the river directly across from the proposed setback area (see enclosed map). This includes the full extent of the Homol'ovi I Pueblo complex. Please note that the entire east side of the River was not incorporated into the APE. The proposed project would raise the height of the existing levee without shifting its alignment for most of the project length and consequently would not alter the River's course or water surface profile through most of the project area. The Corps has amended the APE to include the area across from the setback segment in order to ascertain what changes, if any, may occur if the project was constructed.

In order to determine if and how the proposed project would affect Homol'ovi I, the Corps modeled the baseline conditions of the 1% Annual Chance Exceedance (ACE) flood event, also known as the 100 year flood. The term "baseline condition" refers to the Little Colorado River

(LCR) floodplain as it exists today, in the absence of federal action to reduce the flood risk to Winslow and vicinity. The Corps then modeled the proposed project under the same event and compared the results to the baseline. The hydraulic analysis was conducted using Hydrologic Engineering Center River Analysis System (HEC-RAS) computer software.

The water surface elevation at Homol'ovi I slightly decreased with the project compared to the baseline condition as a result of the setback levee across from the site. The water surface elevation decreased by approximately 0.2 feet (4852.4 feet for the baseline condition and 4852.2 feet for the proposed project) near Homol'ovi I. The average flow velocity in the reach near the Homol'ovi I Pueblo slightly decreased 0.5 feet per second (ft/s) from 4.2 ft/s from the baseline condition to 3.7 ft/s for the proposed project due to the modified conveyance and the setback levee. The decrease in average flow velocity in the reach by Homol'ovi I is minimal and would not result in an increase in flooding at Homol'ovi I. The Corps had prepared the attached memo that provides additional details about the analysis.

The Corps is concurrently notifying the Arizona State Historic Preservation Office and other Affected Tribes in the area of our expanded APE and of our additional analysis. In your letter, you requested that the Corps conduct a consultation meeting with the Hopi Tribe and your partners in managing Homol'ovi State Park. In coordination with Terry Morgart of your staff, we delayed scheduling this meeting until the Corps had completed hydraulic modeling so as to better inform the discussion. At this time, the Corps would like to offer to conduct a meeting with you and your partners to discuss the results of the modeling effort and discuss any other concerns that you may have about the project. We will coordinate further with your staff to identify potential dates, locations and agenda items.

If you have any questions or if you would like to schedule the meeting, please contact Danielle Storey, Archaeologist via phone at (213) 452-3855 or via email at Danielle.L.Storey@usace.army.mil

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

Legend

1:30,000

- Original Area of Potential Effects
- Expanded Area of Potental Effects
- Homol'ovi I

N
W E
S

THE HOPI TRIBE

Herman G. Honanie
CHAIRMAN

Alfred Lomahquahu Jr.
VICE-CHAIRMAN

April 15, 2016

Eduardo T. De Mesa, Acting Chief, Planning Division
Attention: Danielle Storey, Archaeologist
Department of the Army, Los Angeles District, U.S. Army Corps of Engineers
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017

Dear Mr. De Mesa,

Thank you for your correspondence dated March 31, 2016, regarding the United States Army Corps of Engineers and Navajo County Flood Control District proposing to construct a flood risk management project to protect Winslow, Arizona.

The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in the Southwest. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites and we consider the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. Homolovi State Park and the Little Colorado River are Traditional Cultural Properties of the Hopi Tribe. Therefore, we appreciate the Corps' continuing solicitation of our input and your efforts to address our concerns.

In a letter dated May 18, 2015, the Hopi Cultural Preservation Office responded to your correspondence dated May 7, 2015, and stated we understand the proposal is located along the Little Colorado River involving 4.25 miles of new and reconstructed levees and has the potential to effect historic properties. The project area is described as the 142 acre levee construction corridor, 12 acre setback area across from Homolovi State Park, 94.5 acre salt cedar removal and channeling area, and 200 of 800 acres being evaluated for associated barrow and disposal areas, access roads and staging areas. We also stated we understood the Corp intends to survey only these areas for cultural resources.

We appreciate that in response to our letter the Corps has expanded the area of potential effect to include Homolovi I on the east side of the Little Colorado River and performed additional hydraulic modeling to assess the potential impacts to the site. We have reviewed the enclosed Memorandum entitled Little Colorado River at Winslow Feasibility Study – Hydraulic Analysis at Homolovi I Pueblo and understand the analysis shows that the proposed project will not increase flooding at the Homolovi I Pueblo compared to the existing condition.

We also appreciate your offer to conduct a consultation meeting to discuss the results of the modeling effort with us and our partners in the management of Homolovi State Park including representatives of the State Historic Preservation Office and University of Arizona. We will contact our partners and you to schedule the meeting. If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at tmorgart@hopi.nsn.us or 928-734-3619. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: Arizona State Historic Preservation Office
Advisory Council on Historic Preservation
Chuck Adams, Richard Lange, Arizona State Museum
Homolovi State Park

AIR QUALITY CALCULATIONS

Environmental Appendix – Air Quality

This section contains the air quality calculations and assumptions used to support the conclusions contained in Section 5.7 of the Integrated Feasibility Report and Environmental Impact Statement, as follows:

1. Construction Air Quality Calculation Spreadsheets
2. On-road Air Quality Calculations (EMFAC2007)
3. Annual Emissions Calculations

Alternative 7 entails non-structural measures. Alternative 7 would not require use of most of the construction equipment for structural levee work or the use of vehicles to unload or load disposal or borrow materials, and would only need a few vehicles for non-structural measures work. Therefore, Alternative 7 air quality emission estimated calculation has been determined to be negligible and not included in the Construction Air Quality Calculations Spreadsheets.

Construction Air Quality Calculation Spreadsheets

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 1.1

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																			
	To be developed by Environmental Resources Branch																			
09	**CHANNELS AND CANALS**																			
	Construction of Berm:																			
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	6.9215	27.8680	51.8970	0.0802	2.0475	7,975.7689	0.6245	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	3.4608	13.9340	25.9485	0.0401	1.0238	3,987.8845	0.3123	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	6.9215	27.8680	51.8970	0.0802	2.0475	7,975.7689	0.6245	Using rubbber tire dozer calcs
	Water Diversion and Control																			
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	6.0172	26.2464	44.2892	0.0922	1.7158	8,618.2435	0.5429	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	6.0172	26.2464	44.2892	0.0922	1.7158	8,618.2435	0.5429	
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	65.4534	542.4734	411.6373	1.1626	20.1496	100,198.2749	5.9058	
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	26.8777	83.4076	203.7855	0.3262	8.1471	28,990.9630	2.4251	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	36.1991	146.5675	266.5097	0.4108	10.6376	41,849.8521	3.2662	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	18.3287	74.2114	134.9416	0.2080	5.3861	21,189.7985	1.6538	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	115.4313	441.0906	664.4840	2.1269	22.4058	208,069.6639	10.4152	
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	0.2931	2.0496	1.6170	0.0053	0.0736	478.3181	0.0264	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1.1543	4.4109	6.6448	0.0213	0.2241	2,080.6966	0.1042	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	0.8470	3.2024	6.3091	0.0098	0.2521	956.3369	0.0764	
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	14.8813	59.9162	111.5785	0.1724	4.4022	17,147.9032	1.3427	
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	138.4307	557.3602	1,037.9398	1.6039	40.9509	159,515.3784	12.4904	
	Excavation W/in Channel																			
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	10.1857	71.2247	56.1895	0.1828	2.5571	16,621.5556	0.9190	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	66.8058	255.2812	384.5701	1.2309	12.9674	120,420.3180	6.0278	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	2,119.3179	8,098.4231	12,199.9254	39.0497	411.3704	3,820,159.0287	191.2226	
	Soil Cement																			
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	158.4294	605.3968	912.0042	2.9192	30.7520	285,575.6137	14.2948	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	27.5595	161.2714	173.7375	0.4394	8.5971	39,751.5792	2.4867	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	77.5012	293.0191	577.2822	0.8973	23.0712	87,504.8266	6.9928	
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	9.9559	38.0441	57.3117	0.1834	1.9325	17,946.0085	0.8983	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282																See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	554.9358	2,120.5430	3,194.5066	10.2250	107.7158	1,000,294.9091	50.0710	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	271.4660	1,026.3674	2,022.0649	3.1428	80.8122	306,505.9772	24.4939	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	93.9428	656.9068	518.2373	1.6863	23.5840	153,300.9658	8.4763	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	74.8878	491.8699	486.2970	0.9866	29.7824	85,945.4947	6.7570	
		Wacker		1282								2	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	184.9786	706.8477	1,064.8355	3.4083	35.9053	333,431.6364	16.6903	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	96.5336	564.8905	608.5561	1.5392	30.1134	139,239.1379	8.7101	
	Riprap	Assume 40 miles from quarry. 52568 tons																		
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	45.6404	172.4688	524.5216	0.7822	12.8772	77,797.6612	4.1181	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	75.7518	289.4657	436.0676	1.3958	14.7038	136,545.7169	6.8350	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	62.9093	241.0018	316.4578	1.2044	11.5029	122,711.0837	5.6762	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	72.1445	275.6816	415.3025	1.3293	14.0036	130,043.5399	6.5095	
11	**LEVEES AND FLOODWALLS**																			
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	11.3975	35.3691	86.4154	0.1383	3.4548	12,293.6362	1.0284	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	15.3503	62.1520	113.0136	0.1742	4.5109	17,746.4563	1.3850	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	7.1996	27.2204	53.6273	0.0834	2.1432	8,128.8637	0.6496	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	7.1996	27.2204	53.6273	0.0834	2.1432	8,128.8637	0.6496	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	7.7897	31.5398	57.3502	0.0884	2.2891	9,005.6644	0.7029	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	2.5602	14.9815	16.1396	0.0408	0.7986	3,692.7696	0.2310	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	48.6254	185.8094	279.9139	0.8960	9.4384	87,649.3459	4.3874	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	4.2528	13.1974	32.2445	0.0516	1.2891	4,587.1777	0.3837	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	5.7277	23.1911	42.1693	0.0650	1.6832	6,621.8120	0.5168	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	2.9784	12.0593	21.9280	0.0338	0.8752	3,443.3423	0.2687	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	0.9789	5.7282	6.1710	0.0156	0.3054	1,411.9413	0.0883	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	36.5051	139.4949	210.1430	0.6726	7.0858	65,802.0312	3.2938	
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	28.4087	88.1587	215.3936	0.3448	8.6112	30,642.3470	2.5633	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	38.2611	154.9162	281.6906	0.4342	11.2435	44,233.7044	3.4522	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	19.2451	77.9219	141.6887	0.2184	5.6554	22,249.2884	1.7365	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	6.3251	37.0131	39.8742	0.1009	1.9731	9,123.3133	0.5707	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	121.4914	464.2478	699.3694	2.2386	23.5821	218,993.3212	10.9620	
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	290.8622	1,095.6150	2,058.9929	4.2892	75.9951	426,582.5120	26.2440	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	54.4970	205.2786	385.7808	0.8036	14.2387	79,926.1351	4.9172	
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	23.4464	88.3176	165.9755	0.3458	6.1260	34,386.8256	2.1155	
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	79.9187	294.6097	536.0670	1.5493	18.3786	137,690.5972	7.2109	
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	79.9187	294.6097	536.0670	1.5493	18.3786	137,690.5972	7.2109	
	Relocation of Existing RipRap*																			
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	106.8860	409.4735	537.6768	2.0464	19.5441	208,491.9746	9.6441	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	13.1168	91.7210	72.3592	0.2355	3.2929	21,404.7370	1.1835	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	103.0224	393.6733	593.0519	1.8982	19.9972	185,702.1750	9.2955	
	Relocation of Sandstone*																			
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	24.2051	92.7283	121.7609	0.4634	4.4259	47,214.5503	2.1840	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	2.9311	20.4963	16.1697	0.0526	0.7359	4,783.1815	0.2645	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	23.2305	88.7695	133.7274	0.4280	4.5092	41,874.0199	2.0961	
	Concrete V-Ditch - Landside*																			
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	2.4182	16.9095	13.3400	0.0434	0.6071	3,946.1247	0.2182	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	3.1684	11.9348	22.4291	0.0467	0.8278	4,646.8683	0.2859	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	-	-	-	-	-	-	-	
												1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	691.6690	2,605.3677	4,896.2762	10.1996	180.7160	1,014,411.3547	62.4082	
	Trench Drain																			
	Excavation																			
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	102.9646	645.7335	652.2224	1.6756	31.3906	148,672.1609	9.2903	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	86.7001	684.7610	597.0578	1.3628	31.9889	121,123.5505	7.8228	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	161.6038	617.5268	930.2775	2.9776	31.3681	291,297.5294	14.5812	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	223.6101	845.4322	1,665.6010	2.5888	66.5660	252,472.9422	20.1760	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	76.1846	291.1198	438.5594	1.4037	14.7878	137,325.9782	6.8740	
	Rebuilding of Levee																			
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780																See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	1,651.6651	6,244.6693	12,302.7347	19.1218	491.6809	1,864,856.9593	149.0271	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	45.5636	299.2656	295.8749	0.6003	18.1203	52,291.3306	4.1111	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	92.6690	309.3540	677.1220	1.4580	24.5935	129,582.6534	8.3614	
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	794.7442	3,036.9087	4,574.9720	14.6436	154.2639	1,432,559.6358	71.7085	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	77.8550	289.9891	519.1568	1.5388	17.8248	136,760.5722	7.0247	Use CAT 962H Loader?
	4" Gravel Mulch Slope	Rock transported 40 miles one way																		
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	9.4447	47.3368	60.9510	0.1132	3.4005	10,261.5891	0.8522	
	Grouted Rip Rap																			
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	9.4986	35.3799	63.3394	0.1877	2.1747	16,685.3857	0.8570	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	257.4117	983.6320	1,481.7992	4.7430	49.9649	463,995.3504	23.2258	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	46.8037	234.5800	302.0459	0.5611	16.8512	50,851.8749	4.2230	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	11.8733	44.2249	79.1742	0.2347	2.7184	20,856.7321	1.0713	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	322.6304	1,232.8482	1,857.2326	5.9447	62.6242	581,554.7105	29.1104	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	58.6621	294.0140	378.5732	0.7033	21.1207	63,735.8701	5.2930	
	Soil Cement																			
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400																
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	2.4529	9.3732	14.1203	0.0452	0.4761	4,421.4804	0.2213	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414																See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	179.2070	684.7931	1,031.6113	3.3020	34.7850	323,028.1532	16.1696	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	87.6653	331.4478	652.9913	1.0149	26.0969	98,980.8694	7.9099	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	30.3372	212.1368	167.3559	0.5446	7.6161	49,505.9281	2.7373	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	24.1837	158.8410	157.0413	0.3186	9.6177	27,754.6293	2.1821	
		Wacker		414								2	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	59.7357	228.2644	343.8704	1.1007	11.5950	107,676.0511	5.3899	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	31.1739	182.4217	196.5228	0.4971	9.7246	44,964.9010	2.8128	
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	4.0386	32.0408	24.7382	0.0614	1.3340	5,452.5463	0.3644	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	3.4061	26.9013	23.4558	0.0535	1.2567	4,758.4252	0.3073	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	6.3487	24.2600	36.5466	0.1170	1.2323	11,443.8315	0.5728	
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	4.6898	32.7941	25.8714	0.0842	1.1774	7,653.0903	0.4232	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	20.2780	76.3827	143.5463	0.2990	5.2981	29,739.9573	1.8296	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	18.4690	70.5745	106.3174	0.3403	3.5849	33,291.1462	1.6664	
	RCB Box Culverts & Gates for Interior Drainage*																			

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1.4369	6.2678	10.5765	0.0220	0.4098	2,058.0880	0.1297	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	150.8894	607.5226	1,131.3544	1.7482	44.6365	173,871.7625	13.6145	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	18.9019	72.2286	108.8092	0.3483	3.6689	34,071.4075	1.7055	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	11.7650	51.3176	86.5954	0.1804	3.3548	16,850.5956	1.0615	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		Total (lbs)											12,242.2324	49,071.6528	78,475.2690	196.9057	2,926.8353	############	1,104.5969	
		Total (tons)											6.1211	24.5358	39.2376	0.0985	1.4634	9,564.3942	0.5523	
		Total (tons/year)											0.7651	3.0670	4.9047	0.0123	0.1829	1,195.5493	0.0690	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014;update 5/20/2015
Alternative 3.1

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																			
	To be developed by Environmental Resources Branch																			
09	**CHANNELS AND CANALS**																			
	Construction of Berm:																			
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	6.9215	27.8680	51.8970	0.0802	2.0475	7,975.7689	0.6245	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	3.4608	13.9340	25.9485	0.0401	1.0238	3,987.8845	0.3123	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	6.9215	27.8680	51.8970	0.0802	2.0475	7,975.7689	0.6245	Using rubbber tire dozer calcs
	Water Diversion and Control																			
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	6.0172	26.2464	44.2892	0.0922	1.7158	8,618.2435	0.5429	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	6.0172	26.2464	44.2892	0.0922	1.7158	8,618.2435	0.5429	
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	65.4534	542.4734	411.6373	1.1626	20.1496	100,198.2749	5.9058	
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	26.8777	83.4076	203.7855	0.3262	8.1471	28,990.9630	2.4251	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	36.1991	146.5675	266.5097	0.4108	10.6376	41,849.8521	3.2662	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	18.3287	74.2114	134.9416	0.2080	5.3861	21,189.7985	1.6538	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	115.4313	441.0906	664.4840	2.1269	22.4058	208,069.6639	10.4152	
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	0.2931	2.0496	1.6170	0.0053	0.0736	478.3181	0.0264	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1.1543	4.4109	6.6448	0.0213	0.2241	2,080.6966	0.1042	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	0.8470	3.2024	6.3091	0.0098	0.2521	956.3369	0.0764	
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	14.8813	59.9162	111.5785	0.1724	4.4022	17,147.9032	1.3427	
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	138.4307	557.3602	1,037.9398	1.6039	40.9509	159,515.3784	12.4904	
	Excavation W/in Channel																			
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	10.1857	71.2247	56.1895	0.1828	2.5571	16,621.5556	0.9190	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	66.8058	255.2812	384.5701	1.2309	12.9674	120,420.3180	6.0278	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	2,119.3179	8,098.4231	12,199.9254	39.0497	411.3704	3,820,159.0287	191.2226	
	Soil Cement																			
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	158.4294	605.3968	912.0042	2.9192	30.7520	285,575.6137	14.2948	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	27.5595	161.2714	173.7375	0.4394	8.5971	39,751.5792	2.4867	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	77.5012	293.0191	577.2822	0.8973	23.0712	87,504.8266	6.9928	
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	9.9559	38.0441	57.3117	0.1834	1.9325	17,946.0085	0.8983	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282																See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	554.9358	2,120.5430	3,194.5066	10.2250	107.7158	1,000,294.9091	50.0710	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	271.4660	1,026.3674	2,022.0649	3.1428	80.8122	306,505.9772	24.4939	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	93.9428	656.9068	518.2373	1.6863	23.5840	153,300.9658	8.4763	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	74.8878	491.8699	486.2970	0.9866	29.7824	85,945.4947	6.7570	
		Wacker		1282								2	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	184.9786	706.8477	1,064.8355	3.4083	35.9053	333,431.6364	16.6903	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	96.5336	564.8905	608.5561	1.5392	30.1134	139,239.1379	8.7101	
	Riprap	Assume 40 miles from quarry. 52568 tons																		
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	45.6404	172.4688	524.5216	0.7822	12.8772	77,797.6612	4.1181	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	75.7518	289.4657	436.0676	1.3958	14.7038	136,545.7169	6.8350	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	62.9093	241.0018	316.4578	1.2044	11.5029	122,711.0837	5.6762	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	72.1445	275.6816	415.3025	1.3293	14.0036	130,043.5399	6.5095	
11	**LEVEES AND FLOODWALLS**																			
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	11.3975	35.3691	86.4154	0.1383	3.4548	12,293.6362	1.0284	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	15.3503	62.1520	113.0136	0.1742	4.5109	17,746.4563	1.3850	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	7.1996	27.2204	53.6273	0.0834	2.1432	8,128.8637	0.6496	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	7.1996	27.2204	53.6273	0.0834	2.1432	8,128.8637	0.6496	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	7.7897	31.5398	57.3502	0.0884	2.2891	9,005.6644	0.7029	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	2.5602	14.9815	16.1396	0.0408	0.7986	3,692.7696	0.2310	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	48.6254	185.8094	279.9139	0.8960	9.4384	87,649.3459	4.3874	
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Setback Only	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		45	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	7.6550	23.7553	58.0402	0.0929	2.3204	8,256.9199	0.6907	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		45	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	10.3099	41.7439	75.9047	0.1170	3.0297	11,919.2617	0.9302	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		23	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	4.8703	18.4138	36.2773	0.0564	1.4498	5,498.9372	0.4394	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		23	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	4.8703	18.4138	36.2773	0.0564	1.4498	5,498.9372	0.4394	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		23	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	5.2695	21.3358	38.7957	0.0598	1.5485	6,092.0671	0.4755	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		23								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		23	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1.7319	10.1345	10.9179	0.0276	0.5403	2,498.0501	0.1563	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		227	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	32.7536	125.1595	188.5473	0.6035	6.3576	59,039.7671	2.9553	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	4.2528	13.1974	32.2445	0.0516	1.2891	4,587.1777	0.3837	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	5.7277	23.1911	42.1693	0.0650	1.6832	6,621.8120	0.5168	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	2.9784	12.0593	21.9280	0.0338	0.8752	3,443.3423	0.2687	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	0.9789	5.7282	6.1710	0.0156	0.3054	1,411.9413	0.0883	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	36.5051	139.4949	210.1430	0.6726	7.0858	65,802.0312	3.2938	
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	28.4087	88.1587	215.3936	0.3448	8.6112	30,642.3470	2.5633	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	38.2611	154.9162	281.6906	0.4342	11.2435	44,233.7044	3.4522	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	19.2451	77.9219	141.6887	0.2184	5.6554	22,249.2884	1.7365	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	6.3251	37.0131	39.8742	0.1009	1.9731	9,123.3133	0.5707	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	121.4914	464.2478	699.3694	2.2386	23.5821	218,993.3212	10.9620	
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	290.8622	1,095.6150	2,058.9929	4.2892	75.9951	426,582.5120	26.2440	
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	54.4970	205.2786	385.7808	0.8036	14.2387	79,926.1351	4.9172	
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	23.4464	88.3176	165.9755	0.3458	6.1260	34,386.8256	2.1155	
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	79.9187	294.6097	536.0670	1.5493	18.3786	137,690.5972	7.2109	
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	79.9187	294.6097	536.0670	1.5493	18.3786	137,690.5972	7.2109	
	Relocation of Existing RipRap*																			
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	106.8860	409.4735	537.6768	2.0464	19.5441	208,491.9746	9.6441	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	13.1168	91.7210	72.3592	0.2355	3.2929	21,404.7370	1.1835	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	103.0224	393.6733	593.0519	1.8982	19.9972	185,702.1750	9.2955	
	Relocation of Sandstone*																			
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	24.2051	92.7283	121.7609	0.4634	4.4259	47,214.5503	2.1840	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	2.9311	20.4963	16.1697	0.0526	0.7359	4,783.1815	0.2645	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	23.2305	88.7695	133.7274	0.4280	4.5092	41,874.0199	2.0961	
	Concrete V-Ditch - Landside*																			
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	2.4182	16.9095	13.3400	0.0434	0.6071	3,946.1247	0.2182	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	3.1684	11.9348	22.4291	0.0467	0.8278	4,646.8683	0.2859	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	-	-	-	-	-	-	-	
	Demolition of Existing Levee (350 BCY/HR)	HYDRAULIC EXCAVATOR, CRAWLER, 160,000 LB (72,575 KG), 4.50 CY (3.4 M3) BUCKET, 34.8' (10.6 M) MAX DIGGING DEPTH		1622	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	118.8574	831.1255	655.6793	2.1335	29.8387	193,958.0082	10.7243	
		CRANE, HYDRAULIC, SELF-PROPELLED, ROUGH TERRAIN, 15 TON (14 MT), 49' (14.9 M) BOOM, 4X4		1622	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	145.6700	635.3980	1,072.1964	2.2332	41.5385	208,638.6719	13.1436	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		1622	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	513.9199	1,935.8252	3,638.0028	7.5785	134.2746	753,722.0418	46.3702	
		TRUCK, HIGHWAY, CONVENTIONAL, 10,000 LB (4,536 KG) GVW, 4X2, 2 AXLE, 1 TON (0.9 MT) - PICKUP		1622	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	234.0369	894.3112	1,347.2412	4.3123	45.4277	421,861.2435	21.1168	
		TRUCK, WATER, OFF-HIGHWAY, 6,000 GAL (22,712 L), W/330 HP (246 KW) TRACTOR)		1622	0.1488	0.5446	0.7481	0.0027	0.0273	272	0.0134	1	241.3865	883.3626	1,213.3892	4.3357	44.3173	441,725.5873	21.7799	
												1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	691.6690	2,605.3677	4,896.2762	10.1996	180.7160	1,014,411.3547	62.4082	
	Trench Drain																			
	Excavation																			
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	102.9646	645.7335	652.2224	1.6756	31.3906	148,672.1609	9.2903	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	86.7001	684.7610	597.0578	1.3628	31.9889	121,123.5505	7.8228	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	161.6038	617.5268	930.2775	2.9776	31.3681	291,297.5294	14.5812	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	223.6101	845.4322	1,665.6010	2.5888	66.5660	252,472.9422	20.1760	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	76.1846	291.1198	438.5594	1.4037	14.7878	137,325.9782	6.8740	
	Rebuilding of Levee																			
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780																See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	1,651.6651	6,244.6693	12,302.7347	19.1218	491.6809	1,864,856.9593	149.0271	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	45.5636	299.2656	295.8749	0.6003	18.1203	52,291.3306	4.1111	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	92.6690	309.3540	677.1220	1.4580	24.5935	129,582.6534	8.3614	
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	794.7442	3,036.9087	4,574.9720	14.6436	154.2639	1,432,559.6358	71.7085	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	77.8550	289.9891	519.1568	1.5388	17.8248	136,760.5722	7.0247	Use CAT 962H Loader?
	4" Gravel Mulch Slope	Rock transported 40 miles one way																		
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	9.4447	47.3368	60.9510	0.1132	3.4005	10,261.5891	0.8522	
	Grouted Rip Rap																			
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	9.4986	35.3799	63.3394	0.1877	2.1747	16,685.3857	0.8570	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	257.4117	983.6320	1,481.7992	4.7430	49.9649	463,995.3504	23.2258	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	46.8037	234.5800	302.0459	0.5611	16.8512	50,851.8749	4.2230	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	11.8733	44.2249	79.1742	0.2347	2.7184	20,856.7321	1.0713	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	322.6304	1,232.8482	1,857.2326	5.9447	62.6242	581,554.7105	29.1104	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	58.6621	294.0140	378.5732	0.7033	21.1207	63,735.8701	5.2930	
	Soil Cement																			
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400																
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	2.4529	9.3732	14.1203	0.0452	0.4761	4,421.4804	0.2213	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414																See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	179.2070	684.7931	1,031.6113	3.3020	34.7850	323,028.1532	16.1696	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	87.6653	331.4478	652.9913	1.0149	26.0969	98,980.8694	7.9099	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	30.3372	212.1368	167.3559	0.5446	7.6161	49,505.9281	2.7373	

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		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	24.1837	158.8410	157.0413	0.3186	9.6177	27,754.6293	2.1821	
		Wacker		414								2	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	59.7357	228.2644	343.8704	1.1007	11.5950	107,676.0511	5.3899	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	31.1739	182.4217	196.5228	0.4971	9.7246	44,964.9010	2.8128	
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	4.0386	32.0408	24.7382	0.0614	1.3340	5,452.5463	0.3644	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	3.4061	26.9013	23.4558	0.0535	1.2567	4,758.4252	0.3073	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	6.3487	24.2600	36.5466	0.1170	1.2323	11,443.8315	0.5728	
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	4.6898	32.7941	25.8714	0.0842	1.1774	7,653.0903	0.4232	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	20.2780	76.3827	143.5463	0.2990	5.2981	29,739.9573	1.8296	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	18.4690	70.5745	106.3174	0.3403	3.5849	33,291.1462	1.6664	
	RCB Box Culverts & Gates for Interior Drainage*																			
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1.4369	6.2678	10.5765	0.0220	0.4098	2,058.0880	0.1297	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	Demolition of Existing Levee (350 BCY/HR)	HYDRAULIC EXCAVATOR, CRAWLER, 160,000 LB (72,575 KG), 4.50 CY (3.4 M3) BUCKET, 34.8' (10.6 M) MAX DIGGING DEPTH		1235	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	129.6023	649.5658	836.3826	1.5538	46.6620	140,811.8061	11.6938	
		CRANE, HYDRAULIC, SELF-PROPELLED, ROUGH TERRAIN, 15 TON (14 MT), 49' (14.9 M) BOOM, 4X4		1235	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	110.9140	483.7956	816.3764	1.7004	31.6276	158,858.6681	10.0076	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		1235	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	391.3015	1,473.9483	2,769.9959	5.7703	102.2374	573,888.2378	35.3065	
		TRUCK, HIGHWAY, CONVENTIONAL, 10,000 LB (4,536 KG) GVW, 4X2, 2 AXLE, 1 TON (0.9 MT) - PICKUP		1235	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	178.1970	680.9336	1,025.7971	3.2834	34.5889	321,207.5436	16.0784	
		TRUCK, WATER, OFF-HIGHWAY, 6,000 GAL (22,712 L), W/330 HP (246 KW) TRACTOR)		1235	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	178.1970	680.9336	1,025.7971	3.2834	34.5889	321,207.5436	16.0784	
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	150.8894	607.5226	1,131.3544	1.7482	44.6365	173,871.7625	13.6145	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	18.9019	72.2286	108.8092	0.3483	3.6689	34,071.4075	1.7055	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	11.7650	51.3176	86.5954	0.1804	3.3548	16,850.5956	1.0615	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		Total (lbs)											14,551.7753	#########	93,320.8874	######	3,488.6332	############	#######	
		Total (tons)											7.2759	29.2399	46.6604	0.1171	1.7443	11,381.7359	0.6565	
		Total (tons/year)											0.9095	3.6550	5.8326	0.0146	0.2180	1,422.7170	0.0821	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 8

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																			
	To be developed by Environmental Resources Branch																			
09	**CHANNELS AND CANALS**																			
	Construction of Berm:																			
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	6.9215	27.8680	51.8970	0.0802	2.0475	7,975.7689	0.6245	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	3.4608	13.9340	25.9485	0.0401	1.0238	3,987.8845	0.3123	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	6.9215	27.8680	51.8970	0.0802	2.0475	7,975.7689	0.6245	Using rubbber tire dozer calcs
	Water Diversion and Control																			
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	6.0172	26.2464	44.2892	0.0922	1.7158	8,618.2435	0.5429	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	6.0172	26.2464	44.2892	0.0922	1.7158	8,618.2435	0.5429	
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	65.4534	542.4734	411.6373	1.1626	20.1496	100,198.2749	5.9058	
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	26.8777	83.4076	203.7855	0.3262	8.1471	28,990.9630	2.4251	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	36.1991	146.5675	266.5097	0.4108	10.6376	41,849.8521	3.2662	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	18.3287	74.2114	134.9416	0.2080	5.3861	21,189.7985	1.6538	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	16.9402	64.0479	126.1819	0.1961	5.0429	19,126.7380	1.5285	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	115.4313	441.0906	664.4840	2.1269	22.4058	208,069.6639	10.4152	
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	0.2931	2.0496	1.6170	0.0053	0.0736	478.3181	0.0264	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1.1543	4.4109	6.6448	0.0213	0.2241	2,080.6966	0.1042	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	0.8470	3.2024	6.3091	0.0098	0.2521	956.3369	0.0764	
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	14.8813	59.9162	111.5785	0.1724	4.4022	17,147.9032	1.3427	
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	138.4307	557.3602	1,037.9398	1.6039	40.9509	159,515.3784	12.4904	
	Excavation W/in Channel																			
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	10.1857	71.2247	56.1895	0.1828	2.5571	16,621.5556	0.9190	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	66.8058	255.2812	384.5701	1.2309	12.9674	120,420.3180	6.0278	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	2,119.3179	8,098.4231	12,199.9254	39.0497	411.3704	3,820,159.0287	191.2226	
	Soil Cement																			
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	158.4294	605.3968	912.0042	2.9192	30.7520	285,575.6137	14.2948	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	27.5595	161.2714	173.7375	0.4394	8.5971	39,751.5792	2.4867	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	77.5012	293.0191	577.2822	0.8973	23.0712	87,504.8266	6.9928	
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	9.9559	38.0441	57.3117	0.1834	1.9325	17,946.0085	0.8983	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282																See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	554.9358	2,120.5430	3,194.5066	10.2250	107.7158	1,000,294.9091	50.0710	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	271.4660	1,026.3674	2,022.0649	3.1428	80.8122	306,505.9772	24.4939	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	93.9428	656.9068	518.2373	1.6863	23.5840	153,300.9658	8.4763	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	74.8878	491.8699	486.2970	0.9866	29.7824	85,945.4947	6.7570	
		Wacker		1282								2	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	184.9786	706.8477	1,064.8355	3.4083	35.9053	333,431.6364	16.6903	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	96.5336	564.8905	608.5561	1.5392	30.1134	139,239.1379	8.7101	
	Riprap	Assume 40 miles from quarry. 52568 tons																		
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	45.6404	172.4688	524.5216	0.7822	12.8772	77,797.6612	4.1181	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	75.7518	289.4657	436.0676	1.3958	14.7038	136,545.7169	6.8350	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	62.9093	241.0018	316.4578	1.2044	11.5029	122,711.0837	5.6762	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	72.1445	275.6816	415.3025	1.3293	14.0036	130,043.5399	6.5095	
11	**LEVEES AND FLOODWALLS**																			
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	11.3975	35.3691	86.4154	0.1383	3.4548	12,293.6362	1.0284	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	15.3503	62.1520	113.0136	0.1742	4.5109	17,746.4563	1.3850	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	7.1996	27.2204	53.6273	0.0834	2.1432	8,128.8637	0.6496	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	7.1996	27.2204	53.6273	0.0834	2.1432	8,128.8637	0.6496	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	7.7897	31.5398	57.3502	0.0884	2.2891	9,005.6644	0.7029	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	2.5602	14.9815	16.1396	0.0408	0.7986	3,692.7696	0.2310	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	48.6254	185.8094	279.9139	0.8960	9.4384	87,649.3459	4.3874	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	4.2528	13.1974	32.2445	0.0516	1.2891	4,587.1777	0.3837	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	5.7277	23.1911	42.1693	0.0650	1.6832	6,621.8120	0.5168	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	2.9784	12.0593	21.9280	0.0338	0.8752	3,443.3423	0.2687	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	0.9789	5.7282	6.1710	0.0156	0.3054	1,411.9413	0.0883	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	36.5051	139.4949	210.1430	0.6726	7.0858	65,802.0312	3.2938	
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	28.4087	88.1587	215.3936	0.3448	8.6112	30,642.3470	2.5633	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	38.2611	154.9162	281.6906	0.4342	11.2435	44,233.7044	3.4522	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	19.2451	77.9219	141.6887	0.2184	5.6554	22,249.2884	1.7365	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	6.3251	37.0131	39.8742	0.1009	1.9731	9,123.3133	0.5707	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	121.4914	464.2478	699.3694	2.2386	23.5821	218,993.3212	10.9620	
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	290.8622	1,095.6150	2,058.9929	4.2892	75.9951	426,582.5120	26.2440	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	54.4970	205.2786	385.7808	0.8036	14.2387	79,926.1351	4.9172	
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	23.4464	88.3176	165.9755	0.3458	6.1260	34,386.8256	2.1155	
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	79.9187	294.6097	536.0670	1.5493	18.3786	137,690.5972	7.2109	
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	79.9187	294.6097	536.0670	1.5493	18.3786	137,690.5972	7.2109	
	Relocation of Existing RipRap*																			
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	106.8860	409.4735	537.6768	2.0464	19.5441	208,491.9746	9.6441	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	13.1168	91.7210	72.3592	0.2355	3.2929	21,404.7370	1.1835	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	103.0224	393.6733	593.0519	1.8982	19.9972	185,702.1750	9.2955	
	Relocation of Sandstone*																			
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	24.2051	92.7283	121.7609	0.4634	4.4259	47,214.5503	2.1840	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	2.9311	20.4963	16.1697	0.0526	0.7359	4,783.1815	0.2645	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	23.2305	88.7695	133.7274	0.4280	4.5092	41,874.0199	2.0961	
	Concrete V-Ditch - Landside*																			
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	2.4182	16.9095	13.3400	0.0434	0.6071	3,946.1247	0.2182	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	3.1684	11.9348	22.4291	0.0467	0.8278	4,646.8683	0.2859	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	-	-	-	-	-	-	-	
												1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	691.6690	2,605.3677	4,896.2762	10.1996	180.7160	1,014,411.3547	62.4082	
	Trench Drain																			
	Excavation																			
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	102.9646	645.7335	652.2224	1.6756	31.3906	148,672.1609	9.2903	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	86.7001	684.7610	597.0578	1.3628	31.9889	121,123.5505	7.8228	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	161.6038	617.5268	930.2775	2.9776	31.3681	291,297.5294	14.5812	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	223.6101	845.4322	1,665.6010	2.5888	66.5660	252,472.9422	20.1760	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	76.1846	291.1198	438.5594	1.4037	14.7878	137,325.9782	6.8740	
	Rebuilding of Levee																			
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780																See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	1,651.6651	6,244.6693	12,302.7347	19.1218	491.6809	1,864,856.9593	149.0271	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	149.2811	619.1836	1,047.8839	2.0959	42.1707	204,738.4393	13.4694	
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	45.5636	299.2656	295.8749	0.6003	18.1203	52,291.3306	4.1111	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	92.6690	309.3540	677.1220	1.4580	24.5935	129,582.6534	8.3614	
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	794.7442	3,036.9087	4,574.9720	14.6436	154.2639	1,432,559.6358	71.7085	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	77.8550	289.9891	519.1568	1.5388	17.8248	136,760.5722	7.0247	Use CAT 962H Loader?
	4" Gravel Mulch Slope	Rock transported 40 miles one way																		
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	9.4447	47.3368	60.9510	0.1132	3.4005	10,261.5891	0.8522	
	Grouted Rip Rap																			
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	9.4986	35.3799	63.3394	0.1877	2.1747	16,685.3857	0.8570	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	257.4117	983.6320	1,481.7992	4.7430	49.9649	463,995.3504	23.2258	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	46.8037	234.5800	302.0459	0.5611	16.8512	50,851.8749	4.2230	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	11.8733	44.2249	79.1742	0.2347	2.7184	20,856.7321	1.0713	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	322.6304	1,232.8482	1,857.2326	5.9447	62.6242	581,554.7105	29.1104	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	58.6621	294.0140	378.5732	0.7033	21.1207	63,735.8701	5.2930	
	Soil Cement																			
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400																
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	2.4529	9.3732	14.1203	0.0452	0.4761	4,421.4804	0.2213	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414																See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	179.2070	684.7931	1,031.6113	3.3020	34.7850	323,028.1532	16.1696	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	87.6653	331.4478	652.9913	1.0149	26.0969	98,980.8694	7.9099	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	30.3372	212.1368	167.3559	0.5446	7.6161	49,505.9281	2.7373	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	24.1837	158.8410	157.0413	0.3186	9.6177	27,754.6293	2.1821	
		Wacker		414								2	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	59.7357	228.2644	343.8704	1.1007	11.5950	107,676.0511	5.3899	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	31.1739	182.4217	196.5228	0.4971	9.7246	44,964.9010	2.8128	
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	4.0386	32.0408	24.7382	0.0614	1.3340	5,452.5463	0.3644	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	3.4061	26.9013	23.4558	0.0535	1.2567	4,758.4252	0.3073	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	6.3487	24.2600	36.5466	0.1170	1.2323	11,443.8315	0.5728	
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	4.6898	32.7941	25.8714	0.0842	1.1774	7,653.0903	0.4232	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	20.2780	76.3827	143.5463	0.2990	5.2981	29,739.9573	1.8296	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	18.4690	70.5745	106.3174	0.3403	3.5849	33,291.1462	1.6664	
	RCB Box Culverts & Gates for Interior Drainage*																			

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1.4369	6.2678	10.5765	0.0220	0.4098	2,058.0880	0.1297	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	150.8894	607.5226	1,131.3544	1.7482	44.6365	173,871.7625	13.6145	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	18.9019	72.2286	108.8092	0.3483	3.6689	34,071.4075	1.7055	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	11.7650	51.3176	86.5954	0.1804	3.3548	16,850.5956	1.0615	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		Total (lbs)											12,242.2324	#########	78,475.2690	######	2,926.8353	#############	#######	
		Total (tons)											6.1211	24.5358	39.2376	0.0985	1.4634	9,564.3942	0.5523	
		Total (tons/year)											0.7651	3.0670	4.9047	0.0123	0.1829	1,195.5493	0.0690	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 9

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		23								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		23	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1.7319	10.1345	10.9179	0.0276	0.5403	2,498.0501	0.1563	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		227	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	32.7536	125.1595	188.5473	0.6035	6.3576	59,039.7671	2.9553	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	4.2528	13.1974	32.2445	0.0516	1.2891	4,587.1777	0.3837	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	5.7277	23.1911	42.1693	0.0650	1.6832	6,621.8120	0.5168	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	2.7528	10.4078	20.5046	0.0319	0.8195	3,108.0949	0.2484	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	2.9784	12.0593	21.9280	0.0338	0.8752	3,443.3423	0.2687	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	0.9789	5.7282	6.1710	0.0156	0.3054	1,411.9413	0.0883	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	36.5051	139.4949	210.1430	0.6726	7.0858	65,802.0312	3.2938	
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	28.4087	88.1587	215.3936	0.3448	8.6112	30,642.3470	2.5633	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	38.2611	154.9162	281.6906	0.4342	11.2435	44,233.7044	3.4522	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	17.7872	67.2503	132.4910	0.2059	5.2950	20,083.0749	1.6049	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	19.2451	77.9219	141.6887	0.2184	5.6554	22,249.2884	1.7365	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	6.3251	37.0131	39.8742	0.1009	1.9731	9,123.3133	0.5707	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	121.4914	464.2478	699.3694	2.2386	23.5821	218,993.3212	10.9620	
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	4.0386	32.0408	24.7382	0.0614	1.3340	5,452.5463	0.3644	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	3.4061	26.9013	23.4558	0.0535	1.2567	4,758.4252	0.3073	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	6.3487	24.2600	36.5466	0.1170	1.2323	11,443.8315	0.5728	
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	4.6898	32.7941	25.8714	0.0842	1.1774	7,653.0903	0.4232	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	20.2780	76.3827	143.5463	0.2990	5.2981	29,739.9573	1.8296	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	18.4690	70.5745	106.3174	0.3403	3.5849	33,291.1462	1.6664	
	RCB Box Culverts & Gates for Interior Drainage*																			
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1.4369	6.2678	10.5765	0.0220	0.4098	2,058.0880	0.1297	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way																		
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	0.7185	3.1339	5.2883	0.0110	0.2049	1,029.0440	0.0648	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	0.3671	2.9128	2.2489	0.0056	0.1213	495.6860	0.0331	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	0.3096	2.4456	2.1323	0.0049	0.1142	432.5841	0.0279	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	0.5772	2.2055	3.3224	0.0106	0.1120	1,040.3483	0.0521	
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	150.8894	607.5226	1,131.3544	1.7482	44.6365	173,871.7625	13.6145	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	18.9019	72.2286	108.8092	0.3483	3.6689	34,071.4075	1.7055	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	11.7650	51.3176	86.5954	0.1804	3.3548	16,850.5956	1.0615	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	346.2938	1,323.2718	1,993.4519	6.3807	67.2174	624,208.9916	31.2455	
		Total (lbs)											1,283.8200	5,013.8449	7,950.9321	21.4887	284.7623	2,100,668.4614	115.8370	
		Total (tons)											0.6419	2.5069	3.9755	0.0107	0.1424	1,050.3342	0.0579	
		Total (tons/year)											0.1605	0.6267	0.9939	0.0027	0.0356	262.5836	0.0145	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																				
	To be developed by Environmental Resources Branch																				
09	**CHANNELS AND CANALS**																				
	Construction of Berm:																				
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	2.1803	8.7784	16.3476	0.0253	0.6450	2,512.3672	0.1967	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
													0								
	Water Diversion and Control												0								
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
													0								
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	1	41.2356	341.7583	259.3315	0.7324	12.6942	63,124.9132	3.7206	
													0								
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	16.9330	52.5468	128.3849	0.2055	5.1327	18,264.3067	1.5278	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	22.8055	92.3375	167.9011	0.2588	6.7017	26,365.4068	2.0577	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	11.5471	46.7532	85.0132	0.1310	3.3932	13,349.5731	1.0419	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	72.7217	277.8871	418.6249	1.3399	14.1156	131,083.8882	6.5616	
													0								
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	0.1847	1.2913	1.0187	0.0033	0.0464	301.3404	0.0167	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	0.7272	2.7789	4.1862	0.0134	0.1412	1,310.8389	0.0656	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	0.5336	2.0175	3.9747	0.0062	0.1589	602.4922	0.0481	
													0								
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	9.3752	37.7472	70.2945	0.1086	2.7734	10,803.1790	0.8459	
													0								
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	87.2113	351.1369	653.9021	1.0104	25.7991	100,494.6884	7.8689	
													0								
	Excavation W/in Channel												0								
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	6.4170	44.8716	35.3994	0.1152	1.6110	10,471.5800	0.5790	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	42.0877	160.8271	242.2792	0.7755	8.1694	75,864.8003	3.7975	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	10	1,335.1703	5,102.0066	7,685.9530	24.6013	259.1633	2,406,700.1881	120.4703	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	99.8105	381.4000	574.5627	1.8391	19.3737	179,912.6366	9.0057	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	17.3625	101.6010	109.4547	0.2768	5.4162	25,043.4949	1.5666	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	48.8258	184.6020	363.6878	0.5653	14.5348	55,128.0407	4.4055	
													0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	6.2722	23.9678	36.1064	0.1156	1.2175	11,305.9854	0.5659	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282									0								See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	349.6095	1,335.9421	2,012.5392	6.4418	67.8610	630,185.7927	31.5447	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	171.0236	646.6115	1,273.9009	1.9800	50.9117	193,098.7656	15.4312	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	59.1839	413.8513	326.4895	1.0624	14.8579	96,579.6084	5.3401	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	47.1793	309.8780	306.3671	0.6215	18.7629	54,145.6616	4.2569	
		Wacker		1282								2	1	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	116.5365	445.3140	670.8464	2.1473	22.6203	210,061.9309	10.5149	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	60.8162	355.8810	383.3903	0.9697	18.9715	87,720.6569	5.4873	
													0								
	Riprap	Assume 40 miles from quarry. 52568 tons											0								
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	1	28.7535	108.6554	330.4486	0.4928	8.1126	49,012.5265	2.5944	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.7236	182.3634	274.7226	0.8793	9.2634	86,023.8017	4.3060	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	39.6329	151.8311	199.3684	0.7588	7.2469	77,307.9827	3.5760	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	45.4511	173.6794	261.6406	0.8375	8.8223	81,927.4302	4.1010	
													0								
11	**LEVEES AND FLOODWALLS**												0								
													0								
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	7.1804	22.2825	54.4417	0.0871	2.1765	7,744.9908	0.6479	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	9.6707	39.1558	71.1986	0.1097	2.8418	11,180.2674	0.8726	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	4.9075	19.8701	36.1306	0.0557	1.4421	5,673.5686	0.4428	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	1.6129	9.4383	10.1679	0.0257	0.5031	2,326.4449	0.1455	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	30.6340	117.0599	176.3457	0.5644	5.9462	55,219.0879	2.7641	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	2.6793	8.3144	20.3141	0.0325	0.8121	2,889.9219	0.2417	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	3.6085	14.6104	26.5666	0.0409	1.0604	4,171.7416	0.3256	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	1.8764	7.5974	13.8146	0.0213	0.5514	2,169.3056	0.1693	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	0.6167	3.6088	3.8877	0.0098	0.1924	889.5230	0.0556	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	22.9982	87.8818	132.3901	0.4238	4.4641	41,455.2797	2.0751	
													0								
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	17.8975	55.5400	135.6980	0.2172	5.4250	19,304.6786	1.6149	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	24.1045	97.5972	177.4651	0.2735	7.0834	27,867.2338	2.1749	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	12.1244	49.0908	89.2639	0.1376	3.5629	14,017.0517	1.0940	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	3.9848	23.3183	25.1207	0.0635	1.2431	5,747.6873	0.3595	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	76.5396	292.4761	440.6027	1.4103	14.8567	137,965.7924	6.9060	
													0								
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	183.2432	690.2375	1,297.1655	2.7022	47.8769	268,746.9825	16.5337	

Winslow - Feasibility Study
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5/28/2014; update 5/20/2015
Alternative 10

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
													0								
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	34.3331	129.3255	243.0419	0.5063	8.9704	50,353.4651	3.0978	
													0								
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	14.7712	55.6401	104.5645	0.2178	3.8594	21,663.7001	1.3328	
													0								
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Relocation of Existing RipRap*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	67.3382	257.9683	338.7364	1.2892	12.3128	131,349.9440	6.0758	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	8.2636	57.7842	45.5863	0.1483	2.0745	13,484.9843	0.7456	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	64.9041	248.0142	373.6227	1.1959	12.5982	116,992.3703	5.8562	
													0								
	Relocation of Sandstone*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	15.2492	58.4188	76.7094	0.2920	2.7883	29,745.1667	1.3759	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.8466	12.9127	10.1869	0.0331	0.4636	3,013.4043	0.1666	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	14.6352	55.9248	84.2483	0.2697	2.8408	26,380.6325	1.3205	
													0								
	Concrete V-Ditch - Landside*												0								
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.5235	10.6530	8.4042	0.0273	0.3825	2,486.0586	0.1375	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	1.9961	7.5189	14.1303	0.0294	0.5215	2,927.5270	0.1801	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	1	-	-	-	-	-	-	-	
													0								
												1	1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	435.7514	1,641.3817	3,084.6540	6.4258	113.8511	639,079.1534	39.3172	
													0								
	Trench Drain												0								
	Excavation												0								
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	1	64.8677	406.8121	410.9001	1.0556	19.7761	93,663.4614	5.8529	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	54.6211	431.3995	376.1464	0.8586	20.1530	76,307.8368	4.9284	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	101.8104	389.0419	586.0748	1.8759	19.7619	183,517.4435	9.1862	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	140.8743	532.6223	1,049.3286	1.6309	41.9366	159,057.9536	12.7109	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.9963	183.4055	276.2924	0.8844	9.3163	86,515.3662	4.3306	
													0								
	Rebuilding of Levee												0								
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780									0								See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	6	1,040.5490	3,934.1417	7,750.7229	12.0467	309.7590	1,174,859.8844	93.8871	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
													0								
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	28.7051	188.5373	186.4012	0.3782	11.4158	32,943.5383	2.5900	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	1	58.3815	194.8930	426.5868	0.9186	15.4939	81,637.0716	5.2677	
													0								
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	4	500.6889	1,913.2525	2,882.2324	9.2255	97.1862	902,512.5705	45.1763	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	49.0486	182.6931	327.0688	0.9694	11.2296	86,159.1605	4.4256	Use CAT 962H Loader?
													0								
	4" Gravel Mulch Slope	Rock transported 40 miles one way											0								
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	5.9502	29.8222	38.3991	0.0713	2.1423	6,464.8011	0.5369	
													0								
	Grouted Rip Rap												0								
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	5.9841	22.2894	39.9038	0.1183	1.3701	10,511.7930	0.5399	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	162.1694	619.6882	933.5335	2.9881	31.4779	292,317.0708	14.6323	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	29.4864	147.7854	190.2889	0.3535	10.6163	32,036.6812	2.6605	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	7.4802	27.8617	49.8798	0.1478	1.7126	13,139.7412	0.6749	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	203.2571	776.6944	1,170.0566	3.7451	39.4532	366,379.4676	18.3396	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	36.9571	185.2288	238.5011	0.4431	13.3060	40,153.5982	3.3346	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400									0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	1.5453	5.9051	8.8958	0.0285	0.3000	2,785.5326	0.1394	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414									0								See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	112.9004	431.4197	649.9151	2.0803	21.9145	203,507.7365	10.1868	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	55.2291	208.8121	411.3845	0.6394	16.4411	62,357.9477	4.9832	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	19.1124	133.6462	105.4342	0.3431	4.7981	31,188.7347	1.7245	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	15.2358	100.0698	98.9360	0.2007	6.0592	17,485.4165	1.3747	
		Wacker		414								2	1	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	37.6335	143.8066	216.6384	0.6934	7.3048	67,835.9122	3.3956	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	19.6395	114.9257	123.8094	0.3131	6.1265	28,327.8876	1.7720	
													0								
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	2.5443	20.1857	15.5850	0.0387	0.8405	3,435.1042	0.2296	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	2.1458	16.9478	14.7772	0.0337	0.7917	2,997.8079	0.1936	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	3.9997	15.2838	23.0244	0.0737	0.7764	7,209.6139	0.3609	
													0								
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	2.9546	20.6603	16.2990	0.0530	0.7417	4,821.4469	0.2666	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	12.7751	48.1211	90.4342	0.1884	3.3378	18,736.1731	1.1527	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	11.6355	44.4619	66.9800	0.2144	2.2585	20,973.4221	1.0498	
													0								
	RCB Box Culverts & Gates for Interior Drainage*												0								

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 10

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.9053	3.9487	6.6632	0.0139	0.2581	1,296.5954	0.0817	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
													0								
													0								
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	1	95.0603	382.7393	712.7532	1.1014	28.1210	109,539.2104	8.5771	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	11.9082	45.5040	68.5498	0.2194	2.3114	21,464.9867	1.0745	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	7.4119	32.3301	54.5551	0.1136	2.1135	10,615.8752	0.6688	
													0								
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		Total (lbs)												7,712.6064	#########	49,439.4195	######	1,843.9062	############	695.8961	
		Total (tons)												3.8563	15.4576	24.7197	0.0620	0.9220	6,025.5684	0.3479	
		Total (tons/year)												0.6427	2.5763	4.1200	0.0103	0.1537	1,004.2614	0.0580	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 10.1

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																				
	To be developed by Environmental Resources Branch																				
09	**CHANNELS AND CANALS**																				
	Construction of Berm:																				
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	2.1803	8.7784	16.3476	0.0253	0.6450	2,512.3672	0.1967	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
													0								
	Water Diversion and Control												0								
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
													0								
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	1	41.2356	341.7583	259.3315	0.7324	12.6942	63,124.9132	3.7206	
													0								
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	16.9330	52.5468	128.3849	0.2055	5.1327	18,264.3067	1.5278	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	22.8055	92.3375	167.9011	0.2588	6.7017	26,365.4068	2.0577	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	11.5471	46.7532	85.0132	0.1310	3.3932	13,349.5731	1.0419	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	72.7217	277.8871	418.6249	1.3399	14.1156	131,083.8882	6.5616	
													0								
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	0.1847	1.2913	1.0187	0.0033	0.0464	301.3404	0.0167	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	0.7272	2.7789	4.1862	0.0134	0.1412	1,310.8389	0.0656	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	0.5336	2.0175	3.9747	0.0062	0.1589	602.4922	0.0481	
													0								
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	9.3752	37.7472	70.2945	0.1086	2.7734	10,803.1790	0.8459	
													0								
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	87.2113	351.1369	653.9021	1.0104	25.7991	100,494.6884	7.8689	
													0								
	Excavation W/in Channel												0								
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	6.4170	44.8716	35.3994	0.1152	1.6110	10,471.5800	0.5790	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	42.0877	160.8271	242.2792	0.7755	8.1694	75,864.8003	3.7975	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	10	1,335.1703	5,102.0066	7,685.9530	24.6013	259.1633	2,406,700.1881	120.4703	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	99.8105	381.4000	574.5627	1.8391	19.3737	179,912.6366	9.0057	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	17.3625	101.6010	109.4547	0.2768	5.4162	25,043.4949	1.5666	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	48.8258	184.6020	363.6878	0.5653	14.5348	55,128.0407	4.4055	
													0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	6.2722	23.9678	36.1064	0.1156	1.2175	11,305.9854	0.5659	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282									0								See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	349.6095	1,335.9421	2,012.5392	6.4418	67.8610	630,185.7927	31.5447	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	171.0236	646.6115	1,273.9009	1.9800	50.9117	193,098.7656	15.4312	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	59.1839	413.8513	326.4895	1.0624	14.8579	96,579.6084	5.3401	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	47.1793	309.8780	306.3671	0.6215	18.7629	54,145.6616	4.2569	
		Wacker		1282								2	1	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	116.5365	445.3140	670.8464	2.1473	22.6203	210,061.9309	10.5149	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	60.8162	355.8810	383.3903	0.9697	18.9715	87,720.6569	5.4873	
													0								
	Riprap	Assume 40 miles from quarry. 52568 tons											0								
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	1	28.7535	108.6554	330.4486	0.4928	8.1126	49,012.5265	2.5944	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.7236	182.3634	274.7226	0.8793	9.2634	86,023.8017	4.3060	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	39.6329	151.8311	199.3684	0.7588	7.2469	77,307.9827	3.5760	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	45.4511	173.6794	261.6406	0.8375	8.8223	81,927.4302	4.1010	
													0								
11	**LEVEES AND FLOODWALLS**												0								
													0								
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	7.1804	22.2825	54.4417	0.0871	2.1765	7,744.9908	0.6479	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	9.6707	39.1558	71.1986	0.1097	2.8418	11,180.2674	0.8726	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	4.9075	19.8701	36.1306	0.0557	1.4421	5,673.5686	0.4428	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	1.6129	9.4383	10.1679	0.0257	0.5031	2,326.4449	0.1455	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	30.6340	117.0599	176.3457	0.5644	5.9462	55,219.0879	2.7641	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	2.6793	8.3144	20.3141	0.0325	0.8121	2,889.9219	0.2417	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	3.6085	14.6104	26.5666	0.0409	1.0604	4,171.7416	0.3256	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	1.8764	7.5974	13.8146	0.0213	0.5514	2,169.3056	0.1693	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	0.6167	3.6088	3.8877	0.0098	0.1924	889.5230	0.0556	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	22.9982	87.8818	132.3901	0.4238	4.4641	41,455.2797	2.0751	
													0								
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	17.8975	55.5400	135.6980	0.2172	5.4250	19,304.6786	1.6149	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	24.1045	97.5972	177.4651	0.2735	7.0834	27,867.2338	2.1749	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	12.1244	49.0908	89.2639	0.1376	3.5629	14,017.0517	1.0940	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	3.9848	23.3183	25.1207	0.0635	1.2431	5,747.6873	0.3595	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	76.5396	292.4761	440.6027	1.4103	14.8567	137,965.7924	6.9060	
													0								
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	183.2432	690.2375	1,297.1655	2.7022	47.8769	268,746.9825	16.5337	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
													0								
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	34.3331	129.3255	243.0419	0.5063	8.9704	50,353.4651	3.0978	
													0								
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	14.7712	55.6401	104.5645	0.2178	3.8594	21,663.7001	1.3328	
													0								
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Relocation of Existing RipRap*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	67.3382	257.9683	338.7364	1.2892	12.3128	131,349.9440	6.0758	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	8.2636	57.7842	45.5863	0.1483	2.0745	13,484.9843	0.7456	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	64.9041	248.0142	373.6227	1.1959	12.5982	116,992.3703	5.8562	
													0								
	Relocation of Sandstone*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	15.2492	58.4188	76.7094	0.2920	2.7883	29,745.1667	1.3759	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.8466	12.9127	10.1869	0.0331	0.4636	3,013.4043	0.1666	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	14.6352	55.9248	84.2483	0.2697	2.8408	26,380.6325	1.3205	
													0								
	Concrete V-Ditch - Landside*												0								
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.5235	10.6530	8.4042	0.0273	0.3825	2,486.0586	0.1375	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	1.9961	7.5189	14.1303	0.0294	0.5215	2,927.5270	0.1801	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	1	-	-	-	-	-	-	-	
													0								
												1	1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	435.7514	1,641.3817	3,084.6540	6.4258	113.8511	639,079.1534	39.3172	
													0								
	Trench Drain												0								
	Excavation												0								
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	1	64.8677	406.8121	410.9001	1.0556	19.7761	93,663.4614	5.8529	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	54.6211	431.3995	376.1464	0.8586	20.1530	76,307.8368	4.9284	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	101.8104	389.0419	586.0748	1.8759	19.7619	183,517.4435	9.1862	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	140.8743	532.6223	1,049.3286	1.6309	41.9366	159,057.9536	12.7109	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.9963	183.4055	276.2924	0.8844	9.3163	86,515.3662	4.3306	
													0								
	Rebuilding of Levee												0								
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780									0								See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	6	1,040.5490	3,934.1417	7,750.7229	12.0467	309.7590	1,174,859.8844	93.8871	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
													0								
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	28.7051	188.5373	186.4012	0.3782	11.4158	32,943.5383	2.5900	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	1	58.3815	194.8930	426.5868	0.9186	15.4939	81,637.0716	5.2677	
													0								
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	4	500.6889	1,913.2525	2,882.2324	9.2255	97.1862	902,512.5705	45.1763	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	49.0486	182.6931	327.0688	0.9694	11.2296	86,159.1605	4.4256	Use CAT 962H Loader?
													0								
	4" Gravel Mulch Slope	Rock transported 40 miles one way											0								
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	5.9502	29.8222	38.3991	0.0713	2.1423	6,464.8011	0.5369	
													0								
	Grouted Rip Rap												0								
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	5.9841	22.2894	39.9038	0.1183	1.3701	10,511.7930	0.5399	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	162.1694	619.6882	933.5335	2.9881	31.4779	292,317.0708	14.6323	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	29.4864	147.7854	190.2889	0.3535	10.6163	32,036.6812	2.6605	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	7.4802	27.8617	49.8798	0.1478	1.7126	13,139.7412	0.6749	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	203.2571	776.6944	1,170.0566	3.7451	39.4532	366,379.4676	18.3396	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	36.9571	185.2288	238.5011	0.4431	13.3060	40,153.5982	3.3346	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400									0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	1.5453	5.9051	8.8958	0.0285	0.3000	2,785.5326	0.1394	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414									0								See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	112.9004	431.4197	649.9151	2.0803	21.9145	203,507.7365	10.1868	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	55.2291	208.8121	411.3845	0.6394	16.4411	62,357.9477	4.9832	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	19.1124	133.6462	105.4342	0.3431	4.7981	31,188.7347	1.7245	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	15.2358	100.0698	98.9360	0.2007	6.0592	17,485.4165	1.3747	
		Wacker		414								2	1	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	37.6335	143.8066	216.6384	0.6934	7.3048	67,835.9122	3.3956	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	19.6395	114.9257	123.8094	0.3131	6.1265	28,327.8876	1.7720	
													0								
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	2.5443	20.1857	15.5850	0.0387	0.8405	3,435.1042	0.2296	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	2.1458	16.9478	14.7772	0.0337	0.7917	2,997.8079	0.1936	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	3.9997	15.2838	23.0244	0.0737	0.7764	7,209.6139	0.3609	
													0								
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	2.9546	20.6603	16.2990	0.0530	0.7417	4,821.4469	0.2666	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	12.7751	48.1211	90.4342	0.1884	3.3378	18,736.1731	1.1527	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	11.6355	44.4619	66.9800	0.2144	2.2585	20,973.4221	1.0498	
													0								
	RCB Box Culverts & Gates for Interior Drainage*												0								

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.9053	3.9487	6.6632	0.0139	0.2581	1,296.5954	0.0817	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
													0								
													0								
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	1	95.0603	382.7393	712.7532	1.1014	28.1210	109,539.2104	8.5771	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	11.9082	45.5040	68.5498	0.2194	2.3114	21,464.9867	1.0745	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	7.4119	32.3301	54.5551	0.1136	2.1135	10,615.8752	0.6688	
													0								
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		Total (lbs)												7,712.6064	#########	49,439.4195	######	1,843.9062	############	695.8961	
		Total (tons)												3.8563	15.4576	24.7197	0.0620	0.9220	6,025.5684	0.3479	
		Total (tons/year)												0.6427	2.5763	4.1200	0.0103	0.1537	1,004.2614	0.0580	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 10.2

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																				
	To be developed by Environmental Resources Branch																				
09	**CHANNELS AND CANALS**																				
	Construction of Berm:																				
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	2.1803	8.7784	16.3476	0.0253	0.6450	2,512.3672	0.1967	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
													0								
	Water Diversion and Control												0								
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
													0								
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	1	41.2356	341.7583	259.3315	0.7324	12.6942	63,124.9132	3.7206	
													0								
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	16.9330	52.5468	128.3849	0.2055	5.1327	18,264.3067	1.5278	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	22.8055	92.3375	167.9011	0.2588	6.7017	26,365.4068	2.0577	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	11.5471	46.7532	85.0132	0.1310	3.3932	13,349.5731	1.0419	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	72.7217	277.8871	418.6249	1.3399	14.1156	131,083.8882	6.5616	
													0								
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	0.1847	1.2913	1.0187	0.0033	0.0464	301.3404	0.0167	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	0.7272	2.7789	4.1862	0.0134	0.1412	1,310.8389	0.0656	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	0.5336	2.0175	3.9747	0.0062	0.1589	602.4922	0.0481	
													0								
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	9.3752	37.7472	70.2945	0.1086	2.7734	10,803.1790	0.8459	
													0								
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	87.2113	351.1369	653.9021	1.0104	25.7991	100,494.6884	7.8689	
													0								
	Excavation W/in Channel												0								
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	6.4170	44.8716	35.3994	0.1152	1.6110	10,471.5800	0.5790	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	42.0877	160.8271	242.2792	0.7755	8.1694	75,864.8003	3.7975	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	10	1,335.1703	5,102.0066	7,685.9530	24.6013	259.1633	2,406,700.1881	120.4703	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	99.8105	381.4000	574.5627	1.8391	19.3737	179,912.6366	9.0057	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	17.3625	101.6010	109.4547	0.2768	5.4162	25,043.4949	1.5666	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	48.8258	184.6020	363.6878	0.5653	14.5348	55,128.0407	4.4055	
													0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	6.2722	23.9678	36.1064	0.1156	1.2175	11,305.9854	0.5659	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282									0								See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	349.6095	1,335.9421	2,012.5392	6.4418	67.8610	630,185.7927	31.5447	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	171.0236	646.6115	1,273.9009	1.9800	50.9117	193,098.7656	15.4312	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	59.1839	413.8513	326.4895	1.0624	14.8579	96,579.6084	5.3401	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	47.1793	309.8780	306.3671	0.6215	18.7629	54,145.6616	4.2569	
		Wacker		1282								2	1	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	116.5365	445.3140	670.8464	2.1473	22.6203	210,061.9309	10.5149	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	60.8162	355.8810	383.3903	0.9697	18.9715	87,720.6569	5.4873	
													0								
	Riprap	Assume 40 miles from quarry. 52568 tons											0								
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	1	28.7535	108.6554	330.4486	0.4928	8.1126	49,012.5265	2.5944	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.7236	182.3634	274.7226	0.8793	9.2634	86,023.8017	4.3060	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	39.6329	151.8311	199.3684	0.7588	7.2469	77,307.9827	3.5760	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	45.4511	173.6794	261.6406	0.8375	8.8223	81,927.4302	4.1010	
													0								
11	**LEVEES AND FLOODWALLS**												0								
													0								
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	7.1804	22.2825	54.4417	0.0871	2.1765	7,744.9908	0.6479	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	9.6707	39.1558	71.1986	0.1097	2.8418	11,180.2674	0.8726	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	4.9075	19.8701	36.1306	0.0557	1.4421	5,673.5686	0.4428	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	1.6129	9.4383	10.1679	0.0257	0.5031	2,326.4449	0.1455	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	30.6340	117.0599	176.3457	0.5644	5.9462	55,219.0879	2.7641	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	2.6793	8.3144	20.3141	0.0325	0.8121	2,889.9219	0.2417	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	3.6085	14.6104	26.5666	0.0409	1.0604	4,171.7416	0.3256	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	1.8764	7.5974	13.8146	0.0213	0.5514	2,169.3056	0.1693	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	0.6167	3.6088	3.8877	0.0098	0.1924	889.5230	0.0556	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	22.9982	87.8818	132.3901	0.4238	4.4641	41,455.2797	2.0751	
													0								
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	17.8975	55.5400	135.6980	0.2172	5.4250	19,304.6786	1.6149	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	24.1045	97.5972	177.4651	0.2735	7.0834	27,867.2338	2.1749	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	12.1244	49.0908	89.2639	0.1376	3.5629	14,017.0517	1.0940	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	3.9848	23.3183	25.1207	0.0635	1.2431	5,747.6873	0.3595	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	76.5396	292.4761	440.6027	1.4103	14.8567	137,965.7924	6.9060	
													0								
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	183.2432	690.2375	1,297.1655	2.7022	47.8769	268,746.9825	16.5337	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
													0								
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	34.3331	129.3255	243.0419	0.5063	8.9704	50,353.4651	3.0978	
													0								
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	14.7712	55.6401	104.5645	0.2178	3.8594	21,663.7001	1.3328	
													0								
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Relocation of Existing RipRap*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	67.3382	257.9683	338.7364	1.2892	12.3128	131,349.9440	6.0758	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	8.2636	57.7842	45.5863	0.1483	2.0745	13,484.9843	0.7456	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	64.9041	248.0142	373.6227	1.1959	12.5982	116,992.3703	5.8562	
													0								
	Relocation of Sandstone*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	15.2492	58.4188	76.7094	0.2920	2.7883	29,745.1667	1.3759	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.8466	12.9127	10.1869	0.0331	0.4636	3,013.4043	0.1666	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	14.6352	55.9248	84.2483	0.2697	2.8408	26,380.6325	1.3205	
													0								
	Concrete V-Ditch - Landside*												0								
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.5235	10.6530	8.4042	0.0273	0.3825	2,486.0586	0.1375	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	1.9961	7.5189	14.1303	0.0294	0.5215	2,927.5270	0.1801	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	1	-	-	-	-	-	-	-	
													0								
												1	1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	435.7514	1,641.3817	3,084.6540	6.4258	113.8511	639,079.1534	39.3172	
													0								
	Trench Drain												0								
	Excavation												0								
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	1	64.8677	406.8121	410.9001	1.0556	19.7761	93,663.4614	5.8529	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	54.6211	431.3995	376.1464	0.8586	20.1530	76,307.8368	4.9284	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	101.8104	389.0419	586.0748	1.8759	19.7619	183,517.4435	9.1862	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	140.8743	532.6223	1,049.3286	1.6309	41.9366	159,057.9536	12.7109	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.9963	183.4055	276.2924	0.8844	9.3163	86,515.3662	4.3306	
													0								
	Rebuilding of Levee												0								
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780									0								See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	6	1,040.5490	3,934.1417	7,750.7229	12.0467	309.7590	1,174,859.8844	93.8871	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
													0								
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	28.7051	188.5373	186.4012	0.3782	11.4158	32,943.5383	2.5900	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	1	58.3815	194.8930	426.5868	0.9186	15.4939	81,637.0716	5.2677	
													0								
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	4	500.6889	1,913.2525	2,882.2324	9.2255	97.1862	902,512.5705	45.1763	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	49.0486	182.6931	327.0688	0.9694	11.2296	86,159.1605	4.4256	Use CAT 962H Loader?
													0								
	4" Gravel Mulch Slope	Rock transported 40 miles one way											0								
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	5.9502	29.8222	38.3991	0.0713	2.1423	6,464.8011	0.5369	
													0								
	Grouted Rip Rap												0								
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	5.9841	22.2894	39.9038	0.1183	1.3701	10,511.7930	0.5399	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	162.1694	619.6882	933.5335	2.9881	31.4779	292,317.0708	14.6323	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	29.4864	147.7854	190.2889	0.3535	10.6163	32,036.6812	2.6605	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	7.4802	27.8617	49.8798	0.1478	1.7126	13,139.7412	0.6749	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	203.2571	776.6944	1,170.0566	3.7451	39.4532	366,379.4676	18.3396	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	36.9571	185.2288	238.5011	0.4431	13.3060	40,153.5982	3.3346	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400									0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	1.5453	5.9051	8.8958	0.0285	0.3000	2,785.5326	0.1394	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414									0								See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	112.9004	431.4197	649.9151	2.0803	21.9145	203,507.7365	10.1868	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	55.2291	208.8121	411.3845	0.6394	16.4411	62,357.9477	4.9832	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	19.1124	133.6462	105.4342	0.3431	4.7981	31,188.7347	1.7245	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	15.2358	100.0698	98.9360	0.2007	6.0592	17,485.4165	1.3747	
		Wacker		414								2	1	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	37.6335	143.8066	216.6384	0.6934	7.3048	67,835.9122	3.3956	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	19.6395	114.9257	123.8094	0.3131	6.1265	28,327.8876	1.7720	
													0								
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	2.5443	20.1857	15.5850	0.0387	0.8405	3,435.1042	0.2296	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	2.1458	16.9478	14.7772	0.0337	0.7917	2,997.8079	0.1936	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	3.9997	15.2838	23.0244	0.0737	0.7764	7,209.6139	0.3609	
													0								
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	2.9546	20.6603	16.2990	0.0530	0.7417	4,821.4469	0.2666	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	12.7751	48.1211	90.4342	0.1884	3.3378	18,736.1731	1.1527	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	11.6355	44.4619	66.9800	0.2144	2.2585	20,973.4221	1.0498	
													0								
	RCB Box Culverts & Gates for Interior Drainage*												0								

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Alternative 10.2

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.9053	3.9487	6.6632	0.0139	0.2581	1,296.5954	0.0817	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
													0								
													0								
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	1	95.0603	382.7393	712.7532	1.1014	28.1210	109,539.2104	8.5771	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	11.9082	45.5040	68.5498	0.2194	2.3114	21,464.9867	1.0745	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	7.4119	32.3301	54.5551	0.1136	2.1135	10,615.8752	0.6688	
													0								
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		Total (lbs)												7,712.6064	#########	49,439.4195	######	1,843.9062	############	695.8961	
		Total (tons)												3.8563	15.4576	24.7197	0.0620	0.9220	6,025.5684	0.3479	
		Total (tons/year)												0.6427	2.5763	4.1200	0.0103	0.1537	1,004.2614	0.0580	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 10.3

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																				
	To be developed by Environmental Resources Branch																				
09	**CHANNELS AND CANALS**																				
	Construction of Berm:																				
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	2.1803	8.7784	16.3476	0.0253	0.6450	2,512.3672	0.1967	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
													0								
	Water Diversion and Control												0								
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
													0								
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	1	41.2356	341.7583	259.3315	0.7324	12.6942	63,124.9132	3.7206	
													0								
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	16.9330	52.5468	128.3849	0.2055	5.1327	18,264.3067	1.5278	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	22.8055	92.3375	167.9011	0.2588	6.7017	26,365.4068	2.0577	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	11.5471	46.7532	85.0132	0.1310	3.3932	13,349.5731	1.0419	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	72.7217	277.8871	418.6249	1.3399	14.1156	131,083.8882	6.5616	
													0								
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	0.1847	1.2913	1.0187	0.0033	0.0464	301.3404	0.0167	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	0.7272	2.7789	4.1862	0.0134	0.1412	1,310.8389	0.0656	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	0.5336	2.0175	3.9747	0.0062	0.1589	602.4922	0.0481	
													0								
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	9.3752	37.7472	70.2945	0.1086	2.7734	10,803.1790	0.8459	
													0								
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	87.2113	351.1369	653.9021	1.0104	25.7991	100,494.6884	7.8689	
													0								
	Excavation W/in Channel												0								
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	6.4170	44.8716	35.3994	0.1152	1.6110	10,471.5800	0.5790	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	42.0877	160.8271	242.2792	0.7755	8.1694	75,864.8003	3.7975	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	10	1,335.1703	5,102.0066	7,685.9530	24.6013	259.1633	2,406,700.1881	120.4703	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	99.8105	381.4000	574.5627	1.8391	19.3737	179,912.6366	9.0057	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	17.3625	101.6010	109.4547	0.2768	5.4162	25,043.4949	1.5666	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	48.8258	184.6020	363.6878	0.5653	14.5348	55,128.0407	4.4055	
													0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	6.2722	23.9678	36.1064	0.1156	1.2175	11,305.9854	0.5659	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282									0								See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	349.6095	1,335.9421	2,012.5392	6.4418	67.8610	630,185.7927	31.5447	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	171.0236	646.6115	1,273.9009	1.9800	50.9117	193,098.7656	15.4312	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	59.1839	413.8513	326.4895	1.0624	14.8579	96,579.6084	5.3401	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	47.1793	309.8780	306.3671	0.6215	18.7629	54,145.6616	4.2569	
		Wacker		1282								2	1	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	116.5365	445.3140	670.8464	2.1473	22.6203	210,061.9309	10.5149	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	60.8162	355.8810	383.3903	0.9697	18.9715	87,720.6569	5.4873	
													0								
	Riprap	Assume 40 miles from quarry. 52568 tons											0								
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	1	28.7535	108.6554	330.4486	0.4928	8.1126	49,012.5265	2.5944	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.7236	182.3634	274.7226	0.8793	9.2634	86,023.8017	4.3060	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	39.6329	151.8311	199.3684	0.7588	7.2469	77,307.9827	3.5760	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	45.4511	173.6794	261.6406	0.8375	8.8223	81,927.4302	4.1010	
													0								
11	**LEVEES AND FLOODWALLS**												0								
													0								
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	7.1804	22.2825	54.4417	0.0871	2.1765	7,744.9908	0.6479	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	9.6707	39.1558	71.1986	0.1097	2.8418	11,180.2674	0.8726	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	4.9075	19.8701	36.1306	0.0557	1.4421	5,673.5686	0.4428	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	1.6129	9.4383	10.1679	0.0257	0.5031	2,326.4449	0.1455	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	30.6340	117.0599	176.3457	0.5644	5.9462	55,219.0879	2.7641	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	2.6793	8.3144	20.3141	0.0325	0.8121	2,889.9219	0.2417	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	3.6085	14.6104	26.5666	0.0409	1.0604	4,171.7416	0.3256	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	1.8764	7.5974	13.8146	0.0213	0.5514	2,169.3056	0.1693	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	0.6167	3.6088	3.8877	0.0098	0.1924	889.5230	0.0556	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	22.9982	87.8818	132.3901	0.4238	4.4641	41,455.2797	2.0751	
													0								
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	17.8975	55.5400	135.6980	0.2172	5.4250	19,304.6786	1.6149	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	24.1045	97.5972	177.4651	0.2735	7.0834	27,867.2338	2.1749	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	12.1244	49.0908	89.2639	0.1376	3.5629	14,017.0517	1.0940	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	3.9848	23.3183	25.1207	0.0635	1.2431	5,747.6873	0.3595	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	76.5396	292.4761	440.6027	1.4103	14.8567	137,965.7924	6.9060	
													0								
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	183.2432	690.2375	1,297.1655	2.7022	47.8769	268,746.9825	16.5337	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
													0								
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	34.3331	129.3255	243.0419	0.5063	8.9704	50,353.4651	3.0978	
													0								
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	14.7712	55.6401	104.5645	0.2178	3.8594	21,663.7001	1.3328	
													0								
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Relocation of Existing RipRap*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	67.3382	257.9683	338.7364	1.2892	12.3128	131,349.9440	6.0758	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	8.2636	57.7842	45.5863	0.1483	2.0745	13,484.9843	0.7456	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	64.9041	248.0142	373.6227	1.1959	12.5982	116,992.3703	5.8562	
													0								
	Relocation of Sandstone*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	15.2492	58.4188	76.7094	0.2920	2.7883	29,745.1667	1.3759	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.8466	12.9127	10.1869	0.0331	0.4636	3,013.4043	0.1666	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	14.6352	55.9248	84.2483	0.2697	2.8408	26,380.6325	1.3205	
													0								
	Concrete V-Ditch - Landside*												0								
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.5235	10.6530	8.4042	0.0273	0.3825	2,486.0586	0.1375	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	1.9961	7.5189	14.1303	0.0294	0.5215	2,927.5270	0.1801	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	1	-	-	-	-	-	-	-	
													0								
												1	1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	435.7514	1,641.3817	3,084.6540	6.4258	113.8511	639,079.1534	39.3172	
													0								
	Trench Drain												0								
	Excavation												0								
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	1	64.8677	406.8121	410.9001	1.0556	19.7761	93,663.4614	5.8529	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	54.6211	431.3995	376.1464	0.8586	20.1530	76,307.8368	4.9284	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	101.8104	389.0419	586.0748	1.8759	19.7619	183,517.4435	9.1862	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	140.8743	532.6223	1,049.3286	1.6309	41.9366	159,057.9536	12.7109	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.9963	183.4055	276.2924	0.8844	9.3163	86,515.3662	4.3306	
													0								
	Rebuilding of Levee												0								
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780									0								See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	6	1,040.5490	3,934.1417	7,750.7229	12.0467	309.7590	1,174,859.8844	93.8871	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
													0								
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	28.7051	188.5373	186.4012	0.3782	11.4158	32,943.5383	2.5900	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	1	58.3815	194.8930	426.5868	0.9186	15.4939	81,637.0716	5.2677	
													0								
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	4	500.6889	1,913.2525	2,882.2324	9.2255	97.1862	902,512.5705	45.1763	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	49.0486	182.6931	327.0688	0.9694	11.2296	86,159.1605	4.4256	Use CAT 962H Loader?
													0								
	4" Gravel Mulch Slope	Rock transported 40 miles one way											0								
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	5.9502	29.8222	38.3991	0.0713	2.1423	6,464.8011	0.5369	
													0								
	Grouted Rip Rap												0								
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	5.9841	22.2894	39.9038	0.1183	1.3701	10,511.7930	0.5399	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	162.1694	619.6882	933.5335	2.9881	31.4779	292,317.0708	14.6323	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	29.4864	147.7854	190.2889	0.3535	10.6163	32,036.6812	2.6605	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	7.4802	27.8617	49.8798	0.1478	1.7126	13,139.7412	0.6749	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	203.2571	776.6944	1,170.0566	3.7451	39.4532	366,379.4676	18.3396	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	36.9571	185.2288	238.5011	0.4431	13.3060	40,153.5982	3.3346	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400									0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	1.5453	5.9051	8.8958	0.0285	0.3000	2,785.5326	0.1394	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414									0								See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	112.9004	431.4197	649.9151	2.0803	21.9145	203,507.7365	10.1868	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	55.2291	208.8121	411.3845	0.6394	16.4411	62,357.9477	4.9832	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	19.1124	133.6462	105.4342	0.3431	4.7981	31,188.7347	1.7245	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	15.2358	100.0698	98.9360	0.2007	6.0592	17,485.4165	1.3747	
		Wacker		414								2	1	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	37.6335	143.8066	216.6384	0.6934	7.3048	67,835.9122	3.3956	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	19.6395	114.9257	123.8094	0.3131	6.1265	28,327.8876	1.7720	
													0								
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	2.5443	20.1857	15.5850	0.0387	0.8405	3,435.1042	0.2296	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	2.1458	16.9478	14.7772	0.0337	0.7917	2,997.8079	0.1936	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	3.9997	15.2838	23.0244	0.0737	0.7764	7,209.6139	0.3609	
													0								
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	2.9546	20.6603	16.2990	0.0530	0.7417	4,821.4469	0.2666	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	12.7751	48.1211	90.4342	0.1884	3.3378	18,736.1731	1.1527	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	11.6355	44.4619	66.9800	0.2144	2.2585	20,973.4221	1.0498	
													0								
	RCB Box Culverts & Gates for Interior Drainage*												0								

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.9053	3.9487	6.6632	0.0139	0.2581	1,296.5954	0.0817	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
													0								
													0								
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	1	95.0603	382.7393	712.7532	1.1014	28.1210	109,539.2104	8.5771	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	11.9082	45.5040	68.5498	0.2194	2.3114	21,464.9867	1.0745	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	7.4119	32.3301	54.5551	0.1136	2.1135	10,615.8752	0.6688	
													0								
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		Total (lbs)												7,712.6064	#########	49,439.4195	######	1,843.9062	############	695.8961	
		Total (tons)												3.8563	15.4576	24.7197	0.0620	0.9220	6,025.5684	0.3479	
		Total (tons/year)												0.6427	2.5763	4.1200	0.0103	0.1537	1,004.2614	0.0580	

Winslow - Feasibility Study
Impacts to Air Quality
5/28/2014; update 5/20/2015
Alternative 10.4

CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
06	**FISH & WILDLIFE FACILITIES**																				
	To be developed by Environmental Resources Branch																				
09	**CHANNELS AND CANALS**																				
	Construction of Berm:																				
	Installation of Berm	D10 Dozers	441-600	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
	Excavate and Sort with D10 Dozer	D10 Dozers	441-602	10	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	2.1803	8.7784	16.3476	0.0253	0.6450	2,512.3672	0.1967	Using rubbber tire dozer calcs
	Demolition of Berm	D10 Dozers	441-601	20	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	4.3606	17.5568	32.6951	0.0505	1.2900	5,024.7344	0.3934	Using rubbber tire dozer calcs
													0								
	Water Diversion and Control												0								
	Installation of 36" CMP to Bypass Water Thru Construction Site	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
	Removal of 36" CMP	CRANE, HYDRAULIC, SELF-PROPELLED, YARD, 9 TON (8 MT), 44' (13.4 M) BOOM, 4X4		67	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	3.7908	16.5352	27.9022	0.0581	1.0810	5,429.4934	0.3420	
													0								
	Dewatering	LOADER/BACKHOE, WHEEL, 0.80 CY (0.6 M3) FRONT END BUCKET, 9.8' (3.0 M) DEPTH OF HOE, 24" (0.61 M) DIPPER, 4X4		1500	0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039	1	1	41.2356	341.7583	259.3315	0.7324	12.6942	63,124.9132	3.7206	
													0								
	Salt Cedar Removal	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP	181-250	158	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	16.9330	52.5468	128.3849	0.2055	5.1327	18,264.3067	1.5278	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		158	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	22.8055	92.3375	167.9011	0.2588	6.7017	26,365.4068	2.0577	Using 500hp dozer
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	Using loader data
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		80	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	11.5471	46.7532	85.0132	0.1310	3.3932	13,349.5731	1.0419	Using 500hp dozer
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		80								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		80	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	10.6723	40.3502	79.4946	0.1236	3.1770	12,049.8450	0.9629	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		800	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	72.7217	277.8871	418.6249	1.3399	14.1156	131,083.8882	6.5616	
													0								
	Demo of Abandoned Bridge Pier	1 hydr excavator, crawler, 3.13 CY		4	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	0.1847	1.2913	1.0187	0.0033	0.0464	301.3404	0.0167	
		2 trucks, dump, 12 CY (On Highway)		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	0.7272	2.7789	4.1862	0.0134	0.1412	1,310.8389	0.0656	
		Push with 1 D10 dozers (130 bcy/hr per dozer)		4	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	0.5336	2.0175	3.9747	0.0062	0.1589	602.4922	0.0481	
													0								
	Build Access Road With D10 Dozer	D10 Dozers	441-601	43	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	9.3752	37.7472	70.2945	0.1086	2.7734	10,803.1790	0.8459	
													0								
	Access Road Maintenance with D10 dozer (Thru out construction)	D10 Dozers	441-601	400	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	1	1	87.2113	351.1369	653.9021	1.0104	25.7991	100,494.6884	7.8689	
													0								
	Excavation W/in Channel												0								
	Excavation W/in Channel - Material to be Trans within Channel Only	1 hydr excavator, crawler, 3.70 CY		139	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	6.4170	44.8716	35.3994	0.1152	1.6110	10,471.5800	0.5790	
		Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip @ 20 MPH (4.2 cycles/hour), 26 C.Y., off highway haulers		463	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	42.0877	160.8271	242.2792	0.7755	8.1694	75,864.8003	3.7975	
	Excavation W/in Channel w/ Transport to Northern Disposal Site	16 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	16	10	1,335.1703	5,102.0066	7,685.9530	24.6013	259.1633	2,406,700.1881	120.4703	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		366								1	1	-	-	-	-	-	-	-	
		D400 artcltd trk		366	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	99.8105	381.4000	574.5627	1.8391	19.3737	179,912.6366	9.0057	
		Loader		366	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	17.3625	101.6010	109.4547	0.2768	5.4162	25,043.4949	1.5666	
		Dozer		366	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	48.8258	184.6020	363.6878	0.5653	14.5348	55,128.0407	4.4055	
													0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		69	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	6.2722	23.9678	36.1064	0.1156	1.2175	11,305.9854	0.5659	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		1282									0								See subsequent rows for breakdown
		Trucks		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	349.6095	1,335.9421	2,012.5392	6.4418	67.8610	630,185.7927	31.5447	
		Dozer		1282	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	171.0236	646.6115	1,273.9009	1.9800	50.9117	193,098.7656	15.4312	
		Excavator		1282	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	59.1839	413.8513	326.4895	1.0624	14.8579	96,579.6084	5.3401	
		Roller		1282	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	47.1793	309.8780	306.3671	0.6215	18.7629	54,145.6616	4.2569	
		Wacker		1282								2	1	-	-	-	-	-	-	-	
		Truck		1282	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	116.5365	445.3140	670.8464	2.1473	22.6203	210,061.9309	10.5149	
		Loader		1282	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	60.8162	355.8810	383.3903	0.9697	18.9715	87,720.6569	5.4873	
													0								
	Riprap	Assume 40 miles from quarry. 52568 tons											0								
	Reload	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		131	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314	1	1	28.7535	108.6554	330.4486	0.4928	8.1126	49,012.5265	2.5944	1000 HP Loader
	Hauling	Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		525	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.7236	182.3634	274.7226	0.8793	9.2634	86,023.8017	4.3060	
	Place and Shape	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		525	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	39.6329	151.8311	199.3684	0.7588	7.2469	77,307.9827	3.5760	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
												1	1	-	-	-	-	-	-	-	
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		500	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	45.4511	173.6794	261.6406	0.8375	8.8223	81,927.4302	4.1010	
													0								
11	**LEVEES AND FLOODWALLS**												0								
													0								
	Clear & Grub - Exclusively for Work Area (Landside - 50' wide corridor)/Existing Alignment	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		67	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	7.1804	22.2825	54.4417	0.0871	2.1765	7,744.9908	0.6479	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		67	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	9.6707	39.1558	71.1986	0.1097	2.8418	11,180.2674	0.8726	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		34	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	4.5357	17.1488	33.7852	0.0525	1.3502	5,121.1841	0.4093	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		34	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	4.9075	19.8701	36.1306	0.0557	1.4421	5,673.5686	0.4428	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		34								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		34	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	1.6129	9.4383	10.1679	0.0257	0.5031	2,326.4449	0.1455	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		337	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	30.6340	117.0599	176.3457	0.5644	5.9462	55,219.0879	2.7641	
	Clear & Grub (Riverside - Tamarisk - 20 foot Corridor)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		25	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	2.6793	8.3144	20.3141	0.0325	0.8121	2,889.9219	0.2417	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		25	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	3.6085	14.6104	26.5666	0.0409	1.0604	4,171.7416	0.3256	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		13	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	1.7342	6.5569	12.9179	0.0201	0.5163	1,958.0998	0.1565	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		13	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	1.8764	7.5974	13.8146	0.0213	0.5514	2,169.3056	0.1693	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		13								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		13	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	0.6167	3.6088	3.8877	0.0098	0.1924	889.5230	0.0556	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		253	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	22.9982	87.8818	132.3901	0.4238	4.4641	41,455.2797	2.0751	
													0								
	Clearing & Grubbing (Northernmost Disposal Site - 100 Acres)	D7 DOZER, 181-250 HP (135-186KW), POWERSHIFT, LGP		167	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153	1	1	17.8975	55.5400	135.6980	0.2172	5.4250	19,304.6786	1.6149	
		LAND CLEARING EQUIPMENT, V-TREE CUTTER (ADD 251-300 HP D8 DOZER)		167	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	24.1045	97.5972	177.4651	0.2735	7.0834	27,867.2338	2.1749	
		988 LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		LOGGING FORK, 92" TINES FOR CAT 988 FE LOADER		84	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	11.2059	42.3677	83.4693	0.1297	3.3359	12,652.3372	1.0111	
		D8 DOZER, 305 HP, POWERSHIFT, W/ 15.3 CY		84	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207	1	1	12.1244	49.0908	89.2639	0.1376	3.5629	14,017.0517	1.0940	
		BRUSH CHIPPER, 15-17" CAPACITY, DISC TYPE, TRAILER MTD		84								1	1	-	-	-	-	-	-	-	
		LOADER, FRONT END, WHEEL, 9.00 CY BUCKET, ARTICULATED, 4X4		84	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	3.9848	23.3183	25.1207	0.0635	1.2431	5,747.6873	0.3595	
		TRUCK TRAILER, END DUMP, 20 CY (15 M3), 24 TON (21.8 MT) (ADD TOWING TRUCK)		842	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	76.5396	292.4761	440.6027	1.4103	14.8567	137,965.7924	6.9060	
													0								
	D10 Dozer at Tempory Disposal Site to Shape/Move Material	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		918	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	183.2432	690.2375	1,297.1655	2.7022	47.8769	268,746.9825	16.5337	

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
													0								
	Build acces road with D10 dozer (Landside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		172	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	34.3331	129.3255	243.0419	0.5063	8.9704	50,353.4651	3.0978	
													0								
	Build acces road with D10 dozer (Riverside)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		74	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	14.7712	55.6401	104.5645	0.2178	3.8594	21,663.7001	1.3328	
													0								
	Access Road Grading and Maintenance (Landside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Access Road Grading and Maintenance (Riverside)	GRADER, MOTOR, ARTICULATED, 215 HP (160 KW), 12' (3.6 M) BLADE WIDTH		800	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090	1	1	50.3488	185.6041	337.7222	0.9760	11.5785	86,745.0763	4.5429	
													0								
	Relocation of Existing RipRap*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		892	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	67.3382	257.9683	338.7364	1.2892	12.3128	131,349.9440	6.0758	PC600LC-7 Hydraulic Excavator: net 385 HP - using 500hp
	Load and Haul	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)		179	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	8.2636	57.7842	45.5863	0.1483	2.0745	13,484.9843	0.7456	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		714	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	64.9041	248.0142	373.6227	1.1959	12.5982	116,992.3703	5.8562	
													0								
	Relocation of Sandstone*												0								
	Remove Existing Riprap - hyd excvtr (assume 50 ton/hr)	Komatsu PC600LC-7 Hydraulic Excavator (4.25 CY) w/ Operator		202	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108	1	1	15.2492	58.4188	76.7094	0.2920	2.7883	29,745.1667	1.3759	
	Load and Haul	Load trucks: CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		40	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.8466	12.9127	10.1869	0.0331	0.4636	3,013.4043	0.1666	
		Haul with 4 ea: D250 Articulated Off-Hwy Trucks and drivers		161	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	14.6352	55.9248	84.2483	0.2697	2.8408	26,380.6325	1.3205	
													0								
	Concrete V-Ditch - Landside*												0								
	Excavation	HYDRAULIC EXCAVATOR, CRAWLER, 24,000 LB (10,886 KG), 0.50 CY (0.4 M3) BUCKET, 16.5' (5 M) MAX DIGGING DEPTH		33	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	1.5235	10.6530	8.4042	0.0273	0.3825	2,486.0586	0.1375	
	Push with (1) D10 dozers (130 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		10	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	1.9961	7.5189	14.1303	0.0294	0.5215	2,927.5270	0.1801	
	Concrete - Landside	CONCRETE VIBRATOR, 2.5" (63.5 MM) DIA, W/7.5 HP (5.6 KW) GENERATOR		4								1	1	-	-	-	-	-	-	-	
													0								
												1	1	-	-	-	-	-	-	-	
	Push with (2) D10 dozers (260 bcy/hr per dozer)	TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		2183	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	435.7514	1,641.3817	3,084.6540	6.4258	113.8511	639,079.1534	39.3172	
													0								
	Trench Drain												0								
	Excavation												0								
	Material Costs - Sand and Gravel	Assume Matarials transported 40 miles one way.										1	1	-	-	-	-	-	-	-	
	Placement - Sand & Gravel	CAT 135H Grader (12' blade) w/ Operator		1120	0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083	1	1	64.8677	406.8121	410.9001	1.0556	19.7761	93,663.4614	5.8529	
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		1120	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	54.6211	431.3995	376.1464	0.8586	20.1530	76,307.8368	4.9284	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		1120	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	101.8104	389.0419	586.0748	1.8759	19.7619	183,517.4435	9.1862	
	Backfill - Native Material	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating		1056	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	140.8743	532.6223	1,049.3286	1.6309	41.9366	159,057.9536	12.7109	
		TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW		528	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	47.9963	183.4055	276.2924	0.8844	9.3163	86,515.3662	4.3306	
													0								
	Rebuilding of Levee												0								
	Loading, Hauling, & Dumping (4300 LF Assumed) - Fleet of 10 Scrappers	10 scrapers, 1 D11 dzr. Frmn, grade chckr and operators. 1 water 6000 gal tank/scaper. An additional scraper on standby.		780									0								See subsequent rows for breakdown
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		D11 Dozer		780	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	10	6	1,040.5490	3,934.1417	7,750.7229	12.0467	309.7590	1,174,859.8844	93.8871	
		Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
		Standby Scraper		780	0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173	1	1	94.0471	390.0857	660.1669	1.3204	26.5676	128,985.2168	8.4857	
													0								
	Water & Compaction	ROLLER, VIBRATORY, TOWED, SINGLE DRUM, SHEEPSFOOT, 25.5 TON (23.1 MT), 72" (1.8 M) WIDE, SHEEPSFOOT (ADD TOWING UNIT)		780	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	28.7051	188.5373	186.4012	0.3782	11.4158	32,943.5383	2.5900	
		TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE		780	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107	1	1	58.3815	194.8930	426.5868	0.9186	15.4939	81,637.0716	5.2677	
													0								
	Loading & Hauling of Existing Levee (Offset Portions Only)	6 Off Highway Trucks + 1 Loader		918	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	6	4	500.6889	1,913.2525	2,882.2324	9.2255	97.1862	902,512.5705	45.1763	
		Loader		918	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	49.0486	182.6931	327.0688	0.9694	11.2296	86,159.1605	4.4256	Use CAT 962H Loader?
													0								
	4" Gravel Mulch Slope	Rock transported 40 miles one way											0								
		1 hydr excavator, crawler, 3.13 CY		90	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	5.9502	29.8222	38.3991	0.0713	2.1423	6,464.8011	0.5369	
													0								
	Grouted Rip Rap												0								
	From Stockpile	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		112	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	5.9841	22.2894	39.9038	0.1183	1.3701	10,511.7930	0.5399	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		446	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	162.1694	619.6882	933.5335	2.9881	31.4779	292,317.0708	14.6323	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		446	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	29.4864	147.7854	190.2889	0.3535	10.6163	32,036.6812	2.6605	
	Purchased	CAT 962H Loader (4.00 CY) w/ Operator (250 cy/hr)		140	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077	1	1	7.4802	27.8617	49.8798	0.1478	1.7126	13,139.7412	0.6749	Listed as gross 230hp, use 250
		4 TRUCK, OFF-HIGHWAY, ARTICULATED FRAME, 25 TON (22.7 MT), 16-19 CY (12.2-14.5 M3), REAR DUMP		559	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	4	3	203.2571	776.6944	1,170.0566	3.7451	39.4532	366,379.4676	18.3396	
		HYDRAULIC EXCAVATOR, CRAWLER, 140,000 LB (63,503 KG), 3.50 CY (2.7 M3)		559	0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095	1	1	36.9571	185.2288	238.5011	0.4431	13.3060	40,153.5982	3.3346	
													0								
	Soil Cement												0								
	Soil from Borrow Site	Assumed production 300 cy/hr w/ 3 D400 artcltd trks, 962 ldr and a D10.		400									0								
	Load/Haul Unsatisfactory rock/soil	Hauling, excavated or borrow material, loose cubic yards, 2 mile round trip, 3.3 loads/hour,		17	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	1.5453	5.9051	8.8958	0.0285	0.3000	2,785.5326	0.1394	
	Soil Cement Hauling and placement	Hauling 1 mile round-trip. Crew: 5 off-hwy trucks, 1 hyd exc, 1 dzr, 1 roller, 2 wackers, 1 wtr trk and 1 ldr. . 3 laborers with darbys erasing dozer tracks, 2 labs with wackers at the edges, 1 grade checker, 4 eq oprtrs		414									0								See subsequent rows for breakdown
		Trucks		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	3	2	112.9004	431.4197	649.9151	2.0803	21.9145	203,507.7365	10.1868	
		Dozer		414	0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191	1	1	55.2291	208.8121	411.3845	0.6394	16.4411	62,357.9477	4.9832	
		Excavator		414	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	19.1124	133.6462	105.4342	0.3431	4.7981	31,188.7347	1.7245	
		Roller		414	0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053	1	1	15.2358	100.0698	98.9360	0.2007	6.0592	17,485.4165	1.3747	
		Wacker		414								2	1	-	-	-	-	-	-	-	
		Truck		414	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	37.6335	143.8066	216.6384	0.6934	7.3048	67,835.9122	3.3956	
		Loader		414	0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068	1	1	19.6395	114.9257	123.8094	0.3131	6.1265	28,327.8876	1.7720	
													0								
	Aggregate Base Course (4" Layer)	Material transported 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		44	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	2.5443	20.1857	15.5850	0.0387	0.8405	3,435.1042	0.2296	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		44	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	2.1458	16.9478	14.7772	0.0337	0.7917	2,997.8079	0.1936	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		44	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	3.9997	15.2838	23.0244	0.0737	0.7764	7,209.6139	0.3609	
													0								
	Demolition of Existing RCB Box Culverts	HYDRAULIC EXCAVATOR ATTACHMENT, CONCRETE BREAKER, 2,000 FT-LB (2712 N-m), W/4.25" (108mm) DIA. POINT (ADD HYDRAULIC EXCAVATOR)		64	0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066	1	1	2.9546	20.6603	16.2990	0.0530	0.7417	4,821.4469	0.2666	
		TRACTOR, CRAWLER (DOZER), 441-600 HP (329-447 KW), POWERSHIFT, W/UNIVERSAL BLADE		64	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286	1	1	12.7751	48.1211	90.4342	0.1884	3.3378	18,736.1731	1.1527	
		2 trkdvrhv + 2 trucks, dump, 12 CY		64	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	2	1	11.6355	44.4619	66.9800	0.2144	2.2585	20,973.4221	1.0498	
													0								
	RCB Box Culverts & Gates for Interior Drainage*												0								

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CWBS	CONSTRUCTION FEATURE	EQUIPMENT TYPE	HP	HRS	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4	Count	Ratio	lb Tot ROG	lb Tot CO	lb Tot NOX	lb Tot SOX	lb Tot PM	lb Tot CO2	lb Tot CH4	COMMENTS
	3 RCB @ Sta 59+68 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		16	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.9053	3.9487	6.6632	0.0139	0.2581	1,296.5954	0.0817	This product will ship in (18 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way											0								
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	4 RCB @ Sta 92+13.41 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (30 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
	3 RCB @ Sta 200+00 *	CRANE, MECHANICAL, LATTICE BOOM, TRUCK MOUNTED, 125 TON (113 MT), 240' (73.2 M) BOOM		8	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	0.4526	1.9744	3.3316	0.0069	0.1291	648.2977	0.0408	This product will ship in (72 qty) truckloads from Phoenix, AZ
		Aggregate base course delivered from quarry 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		Crane pad aggregate base course delivered 40 miles one way		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
		CAT 135H Grader (12' blade) w/ Operator		4	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083	1	1	0.2313	1.8351	1.4168	0.0035	0.0764	312.2822	0.0209	Listed as net 155hp, use 175
		Bomag BW190AD-4 Steel Drum Roller, Vibratory, Self-Propelled (12 TON) w/ Operator		4	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070	1	1	0.1951	1.5407	1.3434	0.0031	0.0720	272.5280	0.0176	Listed on website as 134hp; use 175
		3,000 gal Water Truck with driver		4	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	0.3636	1.3894	2.0931	0.0067	0.0706	655.4194	0.0328	
													0								
													0								
	Disposal of Waste Materials (Existing Levee Only - BCY)	Push with (2) D10 dozers (260 bcy/hr per dozer)		218	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312	2	1	95.0603	382.7393	712.7532	1.1014	28.1210	109,539.2104	8.5771	
		1 laborer + 1 flatbed truck, 20,000-25,000 GVW		131	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	11.9082	45.5040	68.5498	0.2194	2.3114	21,464.9867	1.0745	
		3 laborers + 1 crane, hydr, trk mtd, 14 ton		131	0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081	1	1	7.4119	32.3301	54.5551	0.1136	2.1135	10,615.8752	0.6688	
													0								
	Dust Control	TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		TRUCK, HIGHWAY, 45,000 LB (20,412 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)		2400	0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130	1	1	218.1651	833.6612	1,255.8747	4.0198	42.3469	393,251.6647	19.6847	
		Total (lbs)												7,712.6064	#########	49,439.4195	######	1,843.9062	############	695.8961	
		Total (tons)												3.8563	15.4576	24.7197	0.0620	0.9220	6,025.5684	0.3479	
		Total (tons/year)												0.6427	2.5763	4.1200	0.0103	0.1537	1,004.2614	0.0580	

On-road Air Quality Calculations (EMFAC2007)

Highest (Most Conservative) EMFAC2007 (version 2.3)
Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)

Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:

Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

The following emission factors were compiled by running the California Air Resources Board's EMFAC2007 (version 2.3) Burden Model and extracting the **Heavy-Heavy-Duty Diesel Truck (HHDT)** Emission Factors.

These emission factors can be used to calculate on-road mobile source emissions for the vehicle/emission categories listed in the tables below, by use of the following equation:

Emissions (pounds per day) = N x TL x EF

where N = number of trips, TL = trip length (miles/day), and EF = emission factor (pounds per mile)

The **HHDT-DSL** vehicle/emission category accounts for all emissions from heavy-heavy-duty diesel trucks, including start, running and idling exhaust. In addition, ROG emission factors account for diurnal, hot soak, running and resting emissions, and the PM10 & PM2.5 emission factors account for tire and brake wear.

The **HHDT-DSL, Exh** vehicle/emission category includes only the exhaust portion of PM10 & PM2.5 emissions from heavy-heavy-duty diesel trucks.

Scenario Year: **2007**

All model years in the range 1965 to 2007

HHDT-DSL (pounds/mile)	
CO	0.01446237
NOx	0.04718166
ROG	0.00372949
SOx	0.00003962
PM10	0.00230900
PM2.5	0.00204018
CO2	4.22184493

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00216752
PM2.5	0.00199491

Scenario Year: **2008**

All model years in the range 1965 to 2008

HHDT-DSL (pounds/mile)	
CO	0.01361368
NOx	0.04458017
ROG	0.00351579
SOx	0.00004136
PM10	0.00215635
PM2.5	0.00189990
CO2	4.21067145
CH4	0.00016269

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00201296
PM2.5	0.00185303

Scenario Year: **2009**

All model years in the range 1965 to 2009

HHDT-DSL (pounds/mile)	
CO	0.01282236
NOx	0.04184591
ROG	0.00329320
SOx	0.00004013
PM10	0.00199572
PM2.5	0.00175227
CO2	4.21080792
CH4	0.00015249

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00185393
PM2.5	0.00170680

Scenario Year: **2010**

All model years in the range 1966 to 2010

HHDT-DSL (pounds/mile)	
CO	0.01195456
NOx	0.03822102
ROG	0.00304157
SOx	0.00004131
PM10	0.00183062
PM2.5	0.00160083
CO2	4.21120578
CH4	0.00014201

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00168861
PM2.5	0.00155435

Highest (Most Conservative) EMFAC2007 (version 2.3)
Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)

Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:

Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

Scenario Year: **2011**

All model years in the range 1967 to 2011

HHDT-DSL (pounds/mile)	
CO	0.01112463
NOx	0.03455809
ROG	0.00279543
SOx	0.00003972
PM10	0.00166087
PM2.5	0.00144489
CO2	4.22045680
CH4	0.00012910

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00151936
PM2.5	0.00139772

Scenario Year: **2012**

All model years in the range 1968 to 2012

HHDT-DSL (pounds/mile)	
CO	0.01021519
NOx	0.03092379
ROG	0.00252764
SOx	0.00004042
PM10	0.00149566
PM2.5	0.00129354
CO2	4.21590774
CH4	0.00011651

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00135537
PM2.5	0.00124837

Scenario Year: **2013**

All model years in the range 1969 to 2013

HHDT-DSL (pounds/mile)	
CO	0.00931790
NOx	0.02742935
ROG	0.00226308
SOx	0.00004086
PM10	0.00133697
PM2.5	0.00114629
CO2	4.21518556
CH4	0.00010441

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00119623
PM2.5	0.00109863

Scenario Year: **2014**

All model years in the range 1970 to 2014

HHDT-DSL (pounds/mile)	
CO	0.00846435
NOx	0.02418049
ROG	0.00201594
SOx	0.00004092
PM10	0.00118458
PM2.5	0.00100582
CO2	4.21279345
CH4	0.00009261

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00104243
PM2.5	0.00096059

Scenario Year: **2015**

All model years in the range 1971 to 2015

HHDT-DSL (pounds/mile)	
CO	0.00766891
NOx	0.02122678
ROG	0.00178608
SOx	0.00004082
PM10	0.00104715
PM2.5	0.00087977
CO2	4.20902225
CH4	0.00008369

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00090631
PM2.5	0.00083282

Scenario Year: **2016**

All model years in the range 1972 to 2016

HHDT-DSL (pounds/mile)	
CO	0.00704604
NOx	0.01887374
ROG	0.00161035
SOx	0.00003952
PM10	0.00094448
PM2.5	0.00078443
CO2	4.21063031
CH4	0.00007508

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00080419
PM2.5	0.00073898

Highest (Most Conservative) EMFAC2007 (version 2.3)
Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)

Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:

Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

Scenario Year: **2017**

All model years in the range 1973 to 2017

HHDT-DSL (pounds/mile)	
CO	0.00650533
NOx	0.01690387
ROG	0.00145203
SOx	0.00004033
PM10	0.00084894
PM2.5	0.00069721
CO2	4.20820129
CH4	0.00006722

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00070873
PM2.5	0.00065111

Scenario Year: **2018**

All model years in the range 1974 to 2018

HHDT-DSL (pounds/mile)	
CO	0.00604721
NOx	0.01526414
ROG	0.00131697
SOx	0.00003934
PM10	0.00076808
PM2.5	0.00062383
CO2	4.20756838
CH4	0.00006182

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00062758
PM2.5	0.00057700

Scenario Year: **2019**

All model years in the range 1975 to 2019

HHDT-DSL (pounds/mile)	
CO	0.00565433
NOx	0.01389113
ROG	0.00120235
SOx	0.00004032
PM10	0.00070198
PM2.5	0.00056085
CO2	4.20637830
CH4	0.00005499

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00056085
PM2.5	0.00051320

Scenario Year: **2020**

All model years in the range 1976 to 2020

HHDT-DSL (pounds/mile)	
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00050364
PM2.5	0.00046227

Scenario Year: **2021**

All model years in the range 1977 to 2021

HHDT-DSL (pounds/mile)	
CO	0.00503726
NOx	0.01179977
ROG	0.00103095
SOx	0.00004033
PM10	0.00059437
PM2.5	0.00046287
CO2	4.21495573
CH4	0.00004734

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00045411
PM2.5	0.00041729

Scenario Year: **2022**

All model years in the range 1978 to 2022

HHDT-DSL (pounds/mile)	
CO	0.00478830
NOx	0.01098794
ROG	0.00096142
SOx	0.00004106
PM10	0.00055427
PM2.5	0.00042597
CO2	4.21520828
CH4	0.00004448

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00041399
PM2.5	0.00037807

Highest (Most Conservative) EMFAC2007 (version 2.3)
Emission Factors for On-Road Heavy-Heavy-Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)

Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

Vehicle Class:

Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

Scenario Year: **2023**

All model years in the range 1979 to 2023

HHDT-DSL (pounds/mile)	
CO	0.00457902
NOx	0.01031407
ROG	0.00090210
SOx	0.00004009
PM10	0.00052122
PM2.5	0.00039592
CO2	4.21483461
CH4	0.00004176

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00037922
PM2.5	0.00034915

Scenario Year: **2024**

All model years in the range 1980 to 2024

HHDT-DSL (pounds/mile)	
CO	0.00444444
NOx	0.00974372
ROG	0.00084009
SOx	0.00003930
PM10	0.00050766
PM2.5	0.00038320
CO2	4.19552935
CH4	0.00003930

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00036682
PM2.5	0.00033735

Scenario Year: **2025**

All model years in the range 1981 to 2025

HHDT-DSL (pounds/mile)	
CO	0.00431086
NOx	0.00932573
ROG	0.00080206
SOx	0.00004018
PM10	0.00048541
PM2.5	0.00036326
CO2	4.19512979
CH4	0.00003697

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00034397
PM2.5	0.00031664

Scenario Year: **2026**

All model years in the range 1982 to 2026

HHDT-DSL (pounds/mile)	
CO	0.00420297
NOx	0.00898990
ROG	0.00077178
SOx	0.00003946
PM10	0.00046717
PM2.5	0.00034564
CO2	4.19349747
CH4	0.00003630

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00032670
PM2.5	0.00029830

Approx. length of levee

ft	mile
37000	7.00757576

0.00110621
0.00000000

Emission Factor

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/mile/truck)	
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

(pounds/mile/truck)	
PM10	0.00050364
PM2.5	0.00046227

52 Trucks for 8 Years (184 working days/year from May - Oct)

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/mile)	
CO	407.39939923
NOx	975.74840903
ROG	84.67408940
SOx	3.02899182
PM10	49.42763918
PM2.5	38.96384927
CO2	321899.22115298
CH4	3.99276194

(pounds/mile)	
PM10	38.55080493
PM2.5	35.38413167

52 Trucks for 8 Years (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds)	
CO	2854.88215367
NOx	6837.63089661
ROG	593.36009615
SOx	21.22588962
PM10	346.36792605
PM2.5	273.04212555
CO2	2255733.17853415
CH4	27.97958177

(pounds)	
PM10	270.14768605
PM2.5	247.95698327

52 Trucks per Year (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/year)	
CO	356.86026921
NOx	854.70386208
ROG	74.17001202
SOx	2.65323620
PM10	43.29599076
PM2.5	34.13026569
CO2	281966.64731677
CH4	3.49744772

(pounds/year)	
PM10	33.76846076
PM2.5	30.99462291

Approx. length of levee

ft	mile
35500	6.72348485

Emission Factor

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/mile/truck)	
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

(pounds/mile/truck)	
PM10	0.00050364
PM2.5	0.00046227

52 Trucks for 8 Years (184 working days/year from May - Oct)

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/mile)	
CO	407.39939923
NOx	975.74840903
ROG	84.67408940
SOx	3.02899182
PM10	49.42763918
PM2.5	38.96384927
CO2	321899.22115298
CH4	3.99276194

(pounds/mile)	
PM10	38.55080493
PM2.5	35.38413167

52 Trucks for 8 Years (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds)	
CO	2739.14368798
NOx	6560.42964404
ROG	569.30495712
SOx	20.36538058
PM10	332.32598310
PM2.5	261.97285019
CO2	2164284.53616114
CH4	26.84527440

(pounds)	
PM10	259.19575283
PM2.5	237.90467314

52 Trucks per Year (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/year)	
CO	342.39296100
NOx	820.05370551
ROG	71.16311964
SOx	2.54567257
PM10	41.54074789
PM2.5	32.74660627
CO2	270535.56702014
CH4	3.35565930

(pounds/year)	
PM10	32.39946910
PM2.5	29.73808414

Approx. length of levee

ft	mile
37000	7.00757576

Emission Factor

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds/mile/truck)
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

	(pounds/mile/truck)
PM10	0.00050364
PM2.5	0.00046227

52 Trucks for 8 Years (184 working days/year from May - Oct)

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds/mile)
CO	407.39939923
NOx	975.74840903
ROG	84.67408940
SOx	3.02899182
PM10	49.42763918
PM2.5	38.96384927
CO2	321899.22115298
CH4	3.99276194

	(pounds/mile)
PM10	38.55080493
PM2.5	35.38413167

52 Trucks for 8 Years (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds)
CO	2854.88215367
NOx	6837.63089661
ROG	593.36009615
SOx	21.22588962
PM10	346.36792605
PM2.5	273.04212555
CO2	2255733.17853415
CH4	27.97958177

	(pounds)
PM10	270.14768605
PM2.5	247.95698327

52 Trucks per Year (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds/year)
CO	356.86026921
NOx	854.70386208
ROG	74.17001202
SOx	2.65323620
PM10	43.29599076
PM2.5	34.13026569
CO2	281966.64731677
CH4	3.49744772

	(pounds/year)
PM10	33.76846076
PM2.5	30.99462291

Approx. length of levee

ft	mile
2000	0.37878788

Emission Factor

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds/mile/truck)
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

	(pounds/mile/truck)
PM10	0.00050364
PM2.5	0.00046227

52 Trucks for 8 Years (184 working days/year from May - Oct)

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds/mile)
CO	203.69969961
NOx	487.87420451
ROG	42.33704470
SOx	1.51449591
PM10	24.71381959
PM2.5	19.48192463
CO2	160949.61057649
CH4	1.99638097

	(pounds/mile)
PM10	19.27540246
PM2.5	17.69206583

52 Trucks for 8 Years (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds)
CO	77.15897713
NOx	184.80083504
ROG	16.03675936
SOx	0.57367269
PM10	9.36129530
PM2.5	7.37951691
CO2	60965.76158200
CH4	0.75620491

	(pounds)
PM10	7.30128881
PM2.5	6.70154009

52 Trucks per Year (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

	(pounds/year)
CO	19.28974428
NOx	46.20020876
ROG	4.00918984
SOx	0.14341817
PM10	2.34032382
PM2.5	1.84487923
CO2	15241.44039550
CH4	0.18905123

	(pounds/year)
PM10	1.82532220
PM2.5	1.67538502

Approx. length of levee

ft	mile
23000	4.35606061

Emission Factor

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/mile/truck)	
CO	0.00532242
NOx	0.01274755
ROG	0.00110621
SOx	0.00003957
PM10	0.00064574
PM2.5	0.00050904
CO2	4.20541416
CH4	0.00005216

(pounds/mile/truck)	
PM10	0.00050364
PM2.5	0.00046227

52 Trucks for 8 Years (184 working days/year from May - Oct)

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/mile)	
CO	305.54954942
NOx	731.81130677
ROG	63.50556705
SOx	2.27174386
PM10	37.07072938
PM2.5	29.22288695
CO2	241424.41586474
CH4	2.99457145

(pounds/mile)	
PM10	28.91310370
PM2.5	26.53809875

52 Trucks for 8 Years (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds)	
CO	1330.99235543
NOx	3187.81440450
ROG	276.63409888
SOx	9.89585394
PM10	161.48234390
PM2.5	127.29666664
CO2	1051659.38728957
CH4	13.04453474

(pounds)	
PM10	125.94723201
PM2.5	115.60156652

52 Trucks per Year (184 working days/year from May - Oct) * Length of Levee

Scenario Year: **2020**

All model years in the range 1976 to 2020

(pounds/year)	
CO	221.83205924
NOx	531.30240075
ROG	46.10568315
SOx	1.64930899
PM10	26.91372398
PM2.5	21.21611111
CO2	175276.56454826
CH4	2.17408912

(pounds/year)	
PM10	20.99120534
PM2.5	19.26692775

Annual Emissions Calculations

Annual Emission Calculations

Chemical Thresholds	Alt 1.1		Alt 3.1		Alt 8		Alt 9		Alt 10	
	Off-Road	On-Road	Off-Road	On-Road	Off-Road	On-Road	Off-Road	On-Road	Off-Road	On-Road
ROG	0.765	0.037	0.909	0.036	0.765	0.037	0.160	0.002	0.643	0.023
		0.802		0.945		0.802		0.162		0.666
CO	3.067	0.178	3.655	0.171	3.067	0.178	0.627	0.010	2.576	0.111
		3.245		3.826		3.245		0.636		2.687
NOX	4.905	0.427	5.833	0.410	4.905	0.427	0.994	0.023	4.120	0.266
		5.332		6.243		5.332		1.017		4.386
SOX	0.012	0.001	0.015	0.001	0.012	0.001	0.003	0.000	0.010	0.001
		0.014		0.016		0.014		0.003		0.011
PM	0.183		0.218		0.183		0.036		0.154	
		0.183		0.218		0.183		0.036		0.154
CO2	1,195.549	140.983	1,422.717	135.268	1,195.549	140.983	262.584	7.621	1,004.261	87.638
		1,336.533		1,557.985		1,336.533		270.204		1,091.900
CH4	0.069	0.002	0.082	0.002	0.069	0.002	0.014	0.000	0.058	0.001
		0.071		0.084		0.071		0.015		0.059

PUBLIC INVOLVEMENT
SUPPORTING INFORMATION

Notice of Intent

No Federal Action Alternative; (2) Proposed Projects; (3) Reduced Aquatic Impacts Alternative; (4) Previously Proposed Project; and (5) No Build Alternative. The Draft EIR/EIS will also consider any other reasonable alternative(s) identified during the scoping or the preparation of the document.

3. *Scoping Process:* Pursuant to CEQA and NEPA, the City and USACE must include a ''scoping'' process for the Draft EIR/EIS. Scoping primarily involves determining the scope of issues to be addressed in the Draft EIR/EIS and identifying the anticipated significant issues for in-depth analysis. The scoping process includes public participation to integrate public needs and concerns regarding the proposed action into the process.

a. *Public Involvement Program:* Vehicles for public comment on the proposed action will include: a public hearing to be conducted jointly by the City and USACE, the preparation of the Draft EIR/EIS, and receipt of public comment in response to the Draft EIR/EIS. In addition, affected Federal, state and local agencies, affected Native American tribes, and other interested private organizations and parties are encouraged to participate in the program.

b. *Significant Issues to be Analyzed in Depth in the Draft EIR/EIS:* The following significant environmental issues have already been identified and will be analyzed in depth in the Draft EIR/EIS: (1) Aesthetics; (2) Agriculture; (3) Air Quality; (4) Biological Resources; (5) Cultural Resources; (6) Geology/Soils; (7) Hazards/Hazardous Materials; (8) Hydrology/Water Quality; (9) Land Use/Planning; (10) Noise; (11) Population and Housing; (12) Public Services; (13) Recreation; (14) Traffic and Circulation; and (15) Utilities/Service Systems.

c. *Environmental Review/Consultation Requirements:*

- National Environmental Policy Act.
- Section 404 of the Clean Water Act.
- Endangered Species Act.
- Clean Air Act.
- National Historic Preservation Act.
- California Environmental Quality Act.
- Section 401 of the Clean Water Act.

4. *Scoping Meeting:* The City and the USACE will hold a scoping meeting at the Fairfield City Council Chambers, 1000 Webster Street, Fairfield, CA 94533–4883, to provide information on the project and receive oral comments on the scope of the document on March 16, 2009, at 7 p.m. Mail comments within 30 days of publication to: Mr. Bryan Matsumoto, U.S. Army Corps of Engineers, 1455 Market Street, CESPN–R–N, San Francisco, CA 94103–1398, or; Mr. David Feinstein, Senior Planner, Department of Community Development, City of Fairfield, 1000 Webster Street, Fairfield, California 94533–4883.

5. *Availability of Draft EIR/EIS:* The Draft EIR/EIS is expected to be available for public review August 2009.

(Authority: 40 CFR part 1501.7)

Dated: February 13, 2009.

Laurence M. Farrell,

Lieutenant Colonel, U.S. Army, Commanding.

[FR Doc. E9–4201 Filed 2–26–09; 8:45 am]

BILLING CODE 3720–58–P

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement for the Little Colorado River at Winslow, a Feasibility Study of a Portion of the Little Colorado River From Chevelon Canyon to the North End of the Winslow Levee, in and Near Winslow, Navajo County, AZ

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DOD.

ACTION: Notice of intent.

SUMMARY: Analyses of foreseeable environmental impacts from potential actions along the Little Colorado River in the vicinity of the City of Winslow, Navajo County, AZ, will commence. No explicit plans have been advanced as yet, so contents of the Draft Environmental Impact Statement (DEIS) remain to be determined during the public scoping process. The Little Colorado River at Winslow Study area encompasses the floodplain of the Little Colorado River (LCR) from Chevelon Canyon downstream (northwest) to the north end of the existing Winslow Levee, a distance of about 18 river miles. The study area includes the majority of the City of Winslow, including the Ruby Wash Diversion Levee and the Ruby Wash Levee.

The purposes of this Feasibility Study are to develop and evaluate potential non-structural and engineered solutions to address flooding issues within the City of Winslow, and to investigate potential opportunities for ecosystem restoration along the LCR and its tributaries in the vicinity of Winslow. There is also an opportunity to provide much-needed recreational opportunities concurrent with flood risk management and ecosystem restoration. If there are measures and alternatives or plans that could be implemented within the U.S. Army Corps of Engineers, (USACE) missions, Navajo County has indicated their interest to support and provide necessary cost-sharing and other requirements for the project. Navajo County has identified within this length of the river needs associated with loss of native riparian habitat and the presence of significant cultural resources. Those needs will guide the formulation of plans for this segment of the Little Colorado River. The USACE and Navajo County, AZ, will cooperate in conducting this Feasibility Study.

ADDRESSES: District Engineer, U.S. Army Corps of Engineers, Los Angeles District, ATTN: CESPL–PD–RP, P.O. Box 532711, Los Angeles, CA 90053–2325.

FOR FURTHER INFORMATION CONTACT: Mr. Michael J. Fink, Environmental Manager, telephone (602) 640–2001, ext. 232, or Mr. Mike Ternak, Project Manager, telephone (602) 640–2004, ext. 272. The cooperating entity, Navajo County, requests inquiries be directed to Mr. Homero Vela, telephone (928) 524–4000, for any additional information.

SUPPLEMENTARY INFORMATION:

1. *Authorization.* This study has been conducted under the authority provided by the Flood Control Act of 1937. This authority amends the Flood Control Act of 1936 to permit the Secretary of the Army, through the Chief of Engineers, to conduct preliminary examinations and surveys for flood control at the Little Colorado River upstream from the boundary of the Navajo Indian Reservation. Further authority is provided under House Committee on Public Works Resolution (Docket 2425) May 17, 1994 which states:

> * * * The Secretary of Army is hereby requested to review reports of the Chief of Engineers on the State of Arizona * * * in the interest of flood damage reduction, environmental protection and restoration, and related purposes.

2. *Background.* The Little Colorado River (LCR) Watershed encompasses an area of approximately 27,051 square miles in northeastern Arizona and northwestern New Mexico. The drainage basin of the LCR is about 245 miles long and 158 miles wide at the widest point. The mainstem of the LCR is entirely in Arizona, has a channel length of 356 miles, and total elevation drop of about 6,300 feet from its headwaters in the White Mountains to its confluence with the Colorado River. The LCR flows in generally a northwest direction and receives runoff from 18 sub-watershed basins and contributing drainage areas with hundreds of miles of small tributary streams. The

tributaries of Ruby Wash, Clear Creek, Cottonwood Wash and Salt Creek join the LCR within the study area. The LCR joins the Colorado River in the Grand Canyon on the northwest edge of the basin. The City of Winslow is located in the west-central part of the LCR Watershed in western Navajo County, AZ.

The LCR was once a broad and flat bottomland environment, conveying shallow perennial flows along a braided, meandering channel. As a result, numerous backwater sloughs and marshes offered appropriate biotic conditions and habitat for a diversity of riparian species. Today the LCR is a deep, narrow, incised channel which experiences only intermittent to ephemeral flows. This entrenchment has disconnected large parts of the floodplain from the river. During flooding, channel migration results from sedimentation deposition and scour. This erosion has contributed to habitat degradation and threatened cultural resources throughout the Watershed. Riparian vegetation has been largely replaced by the non-native salt cedar, which forms almost pure in-channel stands. Changes in vegetation types, channel morphology and sediment transport are believed to be contributing to the flooding problems being experienced by the Winslow community.

In response to recurrent flooding problems along the LCR, Navajo County requested assistance from the Arizona Department of Water Resources (ADWR) to build the Winslow Levee in 1979. The 7.2 mile Winslow Levee was constructed along the west side of the LCR between 1986 and 1989 for the purpose of providing 100-year flood protection to the city. This levee has failed twice in recent years. The levee was overtopped in 1993, resulting in washout of a 400-foot levee section, and damage to an additional 3,000 feet of levee. The resulting flooding inundated 204 parcels and 140 structures. Permanent levee repairs were completed in 1994. However, problems with the levee continue as evidenced by a second levee failure in 2003. This was a piping failure, believed to have been caused by desiccation cracks, root channels, rodent burrows, a structural flaw, and other factors.

Recent studies indicate that the levee now only provides a 55-year level of protection. The Federal Emergency Management Agency (FEMA) has completed decertification of the levee for 100-year protection, returning approximately 2,700 individual parcels and 1,500 structures to the regulated floodplain. Owners of developed properties in this area will now be required to obtain flood insurance from the National Flood Insurance Program. The Navajo County Public Works Department is attempting to rehabilitate the levee along the 7.2 mile reach east of Winslow. Navajo County is seeking assistance from the USACE to resolve recurrent flooding problems in the Winslow community.

The potential environmental impacts to be evaluated by this DEIS will include: (1) Non-structural solutions to address flooding issues; (2) engineered solutions to address flooding issues; (3) opportunities for ecosystem restoration, especially as necessary to support the primary purpose of flood risk management; (4) mitigation of impacts to cultural resources, and; (5) designs for recreational features which would be most compatible with the natural resources of the region.

Prehistoric and historic cultural resources are abundant along the 18 mile reach of the Little Colorado River Feasibility Study area. Sensitive natural habitats for federally listed species in the general vicinity of the confluence of Chevelon Creek with the Little Colorado River have previously been identified by the U.S. Fish and Wildlife Service (USFWS), and the Arizona Game and Fish Department (AZGFD).

3. *Proposed Action*. No plan of action has yet been identified.

4. *Alternatives*. a—No Action: No plans would be implemented to reduce flood risk to the Winslow area.

b—Proposed Alternative Plans: None have been formulated to date.

5. *Public Involvement*. Public involvement, an essential part of the EIS process, is integral to assessing the environmental consequences of the proposed action and improving the quality of the environmental decision making. The public includes affected and interested Federal, State, and local agencies, Indian tribes, concerned citizens, stakeholders, and other interested parties. Public participation in the EIS process will be strongly encouraged, both formally and informally, to enhance the probability of a more technically accurate, economically feasible, and socially and politically acceptable EIS. Public involvement will include but is not limited to: Information dissemination; identification of problems, needs and opportunities; idea generation; public education; problem solving; providing feedback on proposals; evaluation of alternatives; conflict resolution by consensus; public and scoping notices and meetings; public, stakeholder and advisory groups consultation and meetings; and making the EIS and supporting information readily available in conveniently located places, such as libraries and on the Internet.

Participation of all interested Federal, State, and County resource agencies, as well as Native American peoples, groups with environmental interests, and all interested individuals is encouraged. Public involvement will be most beneficial and worthwhile in identifying pertinent environmental issues, offering useful information such as published or unpublished data, direct personal experience or knowledge which inform decision making, assistance in defining the scope of plans which ought to be considered, and recommending suitable mitigation measures warranted by such plans. Those wishing to contribute information, ideas, alternatives for actions, and so forth can furnish these contributions in writing to the points of contacts indicated above, or by attending public scoping meetings. Notice of public scoping meetings will be published in the local and regional newspapers.

When plans have been devised and alternatives formulated to embody those plans, potential environmental and social impacts will be evaluated in the DEIS. These analyses will emphasize at least fifteen categories of resources: Land use, impromptu historic landfills created by dumping trash over the banks, hazardous wastes, physical environment, hydrology, groundwater, biological, archaeological, historical, geological, air quality, noise, transportation, socioeconomics, and safety.

6. *Scoping Process*. Scoping, an early and open process for identifying the scope of significant issues related to the proposed action to be addressed in the EIS, will be used to: (a) Identify the affected public and agency concerns; (b) facilitate an efficient EIS preparation process; (c) define the issues and alternatives that will be examined in detail in the EIS; and (d) save time in the overall process by helping to ensure that the Draft EIS adequately addresses relevant issues. An initial public scoping meeting will be held on Tuesday, March 24, 2009, in Winslow, AZ. Announcements through local and regional media, as well as a scoping meeting public notice announcing the location, date and time of the scoping meeting will be mailed to all interested parties during February 2009. Interested parties are encouraged to express their views throughout the entire study process. Comments will be welcomed at the public scoping meeting. In addition, written comments will also be accepted during the scoping comment period

which will extend 30 days from the date of the scoping meeting public notice.

7. *Interagency Coordination and Cooperation*. The USACE and the USFWS have formally committed to work together to conserve, protect, and restore fish and wildlife resources while ensuring environmental sustainability of our Nation's water resources under the January 22, 2003, Partnership Agreement for Water Resources and Fish and Wildlife. The USFWS will provide a Fish and Wildlife Coordination Act Report. Coordination will be maintained with the USFWS regarding threatened and endangered species under their jurisdictional responsibilities. The Arizona Game and Fish Department (AZGFD) will be consulted concerning potential impacts to sensitive species and habitats. Coordination will be maintained with the Advisory Counsel on Historic Preservation and the State Historic Preservation Officer (SHPO). Coordination will be maintained with the U.S. Environmental Protection Agency (USEPA) concerning compliance with Executive Order 12898, ''Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations.''

8. *Availability of the EIS*. It is anticipated that the DEIS will be available for public review during the spring of 2011. The DEIS or a Notice of Availability (NOA) will be provided during the 45-day review period to affected Federal, State and local agencies, Indian Tribes, and other interested parties.

Dated: February 25, 2009.

Thomas H. Magness,

Colonel, U.S. Army, District Engineer.

[FR Doc. E9–4200 Filed 2–26–09; 8:45 am]

BILLING CODE 3720–58–P

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement for the Southwest Coastal Louisiana Feasibility Study

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The Corps of Engineers (Corps) intends to prepare an Environmental Impact Statement (EIS) for the Southwest Coastal Louisiana Feasibility Study for Calcasieu, Cameron and Vermilion Parishes, Louisiana. The Corps will evaluate a full suite of structural, nonstructural and coastal restoration measures to achieve hurricane protection and storm damage risk reduction within Calcasieu, Cameron and Vermilion Parishes in Louisiana. Southwestern Louisiana has been affected by several named storms in the past 50 years. The study area, which is characterized by low, flat terrain, is highly susceptible to flooding from tidal surges associated with hurricanes and tropical storms due to its close proximity to the Gulf of Mexico. Hurricanes that caused damage include Audrey (1957), Arlene (1959), Debra (1978), Chris (1982), Danny (1985), Juan (1985), Bonnie (1986), Allison (1989), Chantal (1989), Francis (1998), Hermine (1998), Allison (2001), Bertha (2002), Lili (2002), Rita (2005), Gustav (2008) and Ike (2008). As the ground elevation subsides relative to the levels of the Gulf of Mexico, the depth of potential flooding in the future will increase along with an increase in damages to the human and natural environments. Wetlands in the study area are affected by relative sea level rise, subsidence, tides and storm surge created by tropical storms and hurricanes, saltwater intrusion and ponding and reduced organic production. These conditions would continue at an increased rate as the mass of coastal land decreases.

DATES: See **SUPPLEMENTARY INFORMATION** section for scoping meeting dates.

FOR FURTHER INFORMATION CONTACT: Questions concerning the Draft Environmental Impact Statement (DEIS) should be addressed to Ms. Sandra Stiles at U.S. Army Corps of Engineers, CEMVNPM–RS, P.O. Box 60267, New Orleans, LA 70160–0267, phone (504) 862–1583, fax number (504) 862–2088 or by e-mail at *sandra.e.stiles@usace.army.mil*.

SUPPLEMENTARY INFORMATION:

1. *Authority:* Committee on Transportation and Infrastructure, U.S. House of Representatives, Resolution Docket 2747, Southwest Coastal Louisiana, LA authorized the Secretary of the Army in accordance with section 110 of the River and Harbor Act of 1962, to survey the coast of Louisiana in Cameron, Calcasieu and Vermilion Parishes with particular reference to the advisability of providing hurricane protection and storm damage reduction and related purposes to include the feasibility of constructing an armored 12 foot levee along the Gulf Intracoastal Waterway.

2. *Proposed Action*. The Corps will develop hurricane protection, storm damage risk reduction and coastal restoration measures for Calcasieu, Cameron and Vermilion Parishes to include: (1) Levee alignments to provide hurricane protection and reduce damages from storm surge; (2) restoring natural ecosystem features, such as Cheniers, to reduce damages from storm surge; (3) measures protecting, restoring or increasing wetlands to prevent saltwater intrusion or reduce storm surge; (4) measures reducing risk of storm damage to communities by preventing or reducing wetland losses in areas affected by navigation, oil and gas and other manmade channels; (5) creation of barrier islands to serve as the first line of defense against storms and reduce storm surge; (6) nonstructural measures such as raising structures in-place, relocating structures, buyouts, flood proofing and policy development.

3. *Alternatives*. Hurricane protection and surge reduction measures being considered include multi-parish levee alignments, ring levees, ridges, and breakwaters to provide multiple lines of defense. Coastal restoration measures being considered include restoration of Cheniers, creation of barrier islands, large-scale marsh creation and restoration, salinity control, hydrologic restoration, and restoration of natural features to prevent/reduce storm surge. Non-structural measures include raising structures in-place, property buyouts, relocations of residents and communities, flood-proofing and hardening of infrastructure. Once hurricane protection, storm surge risk reduction and coastal restoration measures are identified, alternative plans will be developed through various combinations of measures that best meet the study goals and objectives and are determined to be cost-effective, environmentally acceptable and technically feasible.

3. *Public Involvement*. Stakeholder and public involvement for this proposed action is integral to the project. Interested parties, concerned citizens, and other State and Federal agencies, private and not for profit or non-governmental organizations are strongly encouraged to participate in the development of the proposed action. Stakeholder and public meetings would be held throughout project development. Meeting announcements would be made as information becomes available.

4. *Public Scoping Meeting*. Scoping is the process utilized for determining the range of alternatives and significant issues to be addressed in the EIS. For this study, a letter will be mailed to all parties believed to have an interest in the analysis. The letter will notify interested parties of public scoping meetings that will be held in the local

Newspaper Notice of Public Scoping Meeting

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Little Colorado River at Winslow, AZ- Feasibility Study ***PUBLIC MEETING*****- Tuesday, March 24, 2009**
First Baptist Church Meeting Hall- 411 N. Warren Winslow, AZ 86047
***Open House- 5:00 p.m.- 6:00 p.m. *Public Meeting- 6:00- 8:00pm.**

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VOL. 8
#10

YOUR HOMETOWN NEWS SOURCE

Thursday, March 19, 2009

AGENDA – NOTICE OF SPECIAL MEETING & WORK SESSION OF THE WINSLOW CITY COUNCIL – MONDAY, MARCH 23, 2009 – 6 P.M.

COUNCIL CONSIDERATION AND POSSIBLE ACTION
Discussion and Possible Action Regarding City Engineering Services

ADJOURNMENT

AGENDA - NOTICE OF REGULAR MEETING AND POSSIBLE EXECUTIVE SESSION OF THE WINSLOW CITY COUNCIL – MONDAY, MARCH 23, 2009 – 7 P.M.

COUNCILMEMBERS' BUSINESS

STATUS REPORTS & POSSIBLE ACTION
Verbal Status Report on Current City Activities by City Manager Including FYI Report, Verbal Report on Intoxicated Street People by Police Chief, Verbal Report on Procurement Process by City Attorney
Presentation to Contractors
Monthly Financial Report by Finance Director
Presentation of City's Audit Report by Senior Accountant for Year Ending June 2008

CALL TO THE PUBLIC

CONSENT CALENDAR
Check Register
Minutes – City Council Special Meeting & Work Session – March 10, 2009; City Council Regular Meeting – March 10, 2009
Award Bid and Approve Payment for Street Maintenance Phase I Project

COUNCIL CONSIDERATION AND POSSIBLE ACTION
Approve the Transfer of Winslow Crossing Apartments from CDG Winsbw, LLC to the Community Housing Corporation, Authorize the Board Chairman to Sign the Necessary Documents and Approve Addition of a New Position, Tax Credit Occupancy Specialist to the Authorized Position List
Approve Additional Services Agreement with Woodson Engineering to Continue Recertification Process for the Ruby Wash Diversion Levee, Authorize the City Manager to Sign and Approve Payment
Approve Variance of City Code Provision 13.04.010 Regarding Mandatory Connection to City Water System for the Benefit of Monastery Hotels, LLC, dba La Posada Hotel
Appoint Member to Planning & Zoning Commission
Approve Technical Assistance Contract with NACOG for Administration of CDBG Contacts for Non-Profit Recipients, Authorize the City Manager to Sign and Approve Payment
Approve the Passage of Ordinance No. 1089 Authorizing the Friends of the Library to Store, in the Old City Jail, Books and Other Materials, all for the Benefit of the Winslow Public Library, and Approve the Storage Agreement Attached to the Ordinance and Made a Part Thereof
Approve the Passage of Ordinance No. 1091 Authorizing the City to Accept a Quit Claim Deed Back from Pasqual Arreola Torrez and Virginia Nakai Benally of the Property Known as the Old Prairie Moon, and to Dismiss the Current Action Pending in the Navajo County Superior Court, and Authorizing Pasqual Arreola Torrez and Virginia Nakai Bennally to Remove any Personal Property and/or Building Materials in Said Structure within Sixty Days from March 2, 2009, and Authorize the City Manager to Execute the Quit Claim Deed and the Agreement to Dismiss the Navajo County Superior Court Case on Behalf of the City of Winslow
Future Agenda Items (Regular Council Agenda and/or Work Session Agenda)

TRIBUNE NEWS WEDNESDAY MARCH 11, 2009 PAGE 2 HOLBROOK AZ

munities."

Every year the NBPA selects one local charitable group from the host city or state, and presents it with a donation. Poley says she is pleased the NBPA learned about the work of The Hopi Foundation and chose to honor them.

who were also honored for their off-court achievements. Each NBA player received the Community Contribution All-Star Award.

In addition to the donation, members of The Hopi Foundation and special guests from the Hopi community attended the

Public Meeting Scheduled Regarding Winslow Levee

The Navajo County Flood Control District and the U.S. Army Corps of Engineers are cooperating on a feasibility study involving the Little Colorado River from Chevelon Creek to the northern end of the Winslow Levee. The study will investigate various alternatives for providing cost effective flood risk management to the Winslow community.

On Tuesday, March 24, an open house and public scoping meeting will be held to receive public comment on the problems and opportunities for managing the flood risk to the community. This meeting will also serve as the scoping meeting for preparation of an environmental impact statement. The open house will be held from 5 to 6 p.m., followed by the public meeting from 6 to 8 p.m. at the First Baptist Church Meeting Hall, located at 411 N. Warren Ave. in Winslow.

Individuals with disabilities who require accommodations for effective participation and communication in the meeting may call Navajo County Flood Control at (928) 524-4114 to make appropriate arrangements.

Stimulus Funds To Open Clinic

North Country HealthCare will receive $1.3 million as one of three community health centers in Arizona to receive funding from the federal stimulus package to establish new access points for care. The funds will allow North Country to open a new clinic in Show Low.

North Country had its origins as the Flagstaff Free Clinic in 1991, and became a federally qualified health center in 1996. Since then it has grown to include 10 clinic locations across Northern Arizona, including Winslow and Holbrook.

Child Find Set At IWES

Do you have concerns regarding your three to four-year-old child in the areas of motor skills, concepts, language, speech, self-help, hearing, vision or socialization? The Holbrook School District will be holding Child Find preschool screenings and evaluations on Tuesday, March 17, at Indian Wells Elementary School. For an appointment, call Catrina Garner at (928) 654-3160.

Senior Center Menu Schedule

The menus at the Holbrook Senior Citizens Center for March 16-20 follow. Menus are subject to change without notice.

Monday, March 16: Taco salad, oatmeal muffin and applesauce.

Tuesday, March 17: Corned beef brisket, potatoes, cabbage and carrots, bread and cherry crisp.

Wednesday, March 18: Swiss steak, rice, three-bean salad, cooked spinach and Waldorf salad.

Thursday, March 19: Roast chicken, mashed potatoes, Brussels sprouts, bread and fruit cocktail.

Friday, March 20: Vegetable lasagna, black bean salad, steamed carrots, oranges and pistachio pudding.

New Life Benefit Planned March 14

New Life Pregnancy Centers will be holding a benefit concert and dessert auction at 6:30 p.m. on Saturday, March 14, at Valley View Baptist Church in Snowflake.

The artists will be Josh Hanna, and Dan and Sandy Allen. Josh is from Tucson and sang at the Purity Ball held last October. Sandy and Dan are from Snowflake. During intermission there will be a dessert auction.

Child care will be provided. All proceeds go to help New Life Pregnancy Centers in Holbrook, St. Johns, Snowflake and Winslow. For more information, please call (928) 536-4760.

Child Find Set In Joseph City

Do you have concerns regarding your three to four-year-old child in the areas of motor skills, concepts, language, speech, self-help, hearing, vision or socialization? The Joseph City School District will be holding Child Find preschool screenings and evaluations on Friday, April 3, at Joseph City Elementary School. For an appointment, call Rhona Solomon at (928) 288-3329.

March 11: Holbrook Chamber of Commerce meeting, 12 noon, Bubba's Big Pig Barbecue.

March 11: Navajo County Fair Board meeting, 7 p.m., fair office at the county fairgrounds, 404 E. Hopi Drive in Holbrook.

March 11: Taylor Town Council meeting, 7 p.m., town hall, 425 W. Paper Mill Road.

March 12: Winslow Chamber of Commerce Board of Directors meeting, 5:30 p.m., chamber office, 101 E. Second St.

March 12: Snowflake School District Governing Board meeting, 7 p.m., 682 School Bus Lane.

March 17: St. Patrick's Day.

March 17: Navajo County Community College District Governing Board study session, 9:30 a.m., regular meeting, 11 a.m., Tiponi Community Center on the Painted Desert Campus of Northland Pioneer College in Holbrook.

March 17: Holbrook City Council meeting, 7 p.m., city hall, 465 First Ave.

March 17: Snowflake Town Council meeting, 7 p.m., town hall, 81 W. First South St.

March 18: Winslow School District Governing Board meeting, 7 p.m., district board conference room, 800 Apache Ave.

March 20: First day of spring.

March 23-27: Spring break for Holbrook, Winslow, Joseph City and Snowflake school districts.

March 24: Navajo County Board of Supervisors meeting, 9 a.m., county governmental center in Holbrook.

March 24: Holbrook City Council meeting, 7 p.m., city hall, 465 First Ave.

March 24: Winslow City Council meeting, 7 p.m., city council chambers, 115 E. Second St.

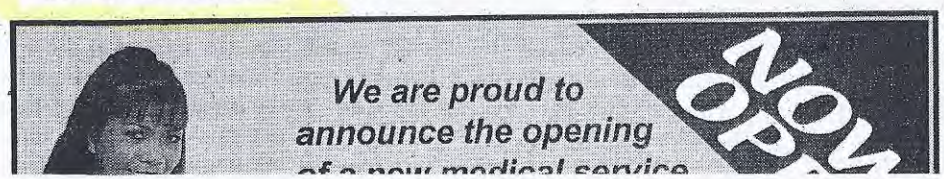
March 25: Winslow Historic Preservation Commission meeting, 4 p.m., city hall conference room, 21 Williamson Ave.

March 25: Taylor Town Council meeting, 7 p.m., town hall, 425 W. Paper Mill Road.

March 26: Winslow Arts Council, 5 p.m., city hall conference room, 21 Williamson Ave.

Easter Egg Hunt Donations Sought

Organizers hope to get an early start on Holbrook's annual Easter Egg Hunt. If you would like to donate or have any ideas, please contact Paula Kelley at (928) 241-0405 or Sandra Martinez at 241-1168.



s To Purchase rossings Apts.

xpenditures such as roof- ir conditioning and other items.

'he project was funded arily by low-income ing tax credits, which ided roughly $4,431,199 equity for the project, ever, for the project to ompleted two additional is of credit were provided Key Bank and the Arizona artment of Housing. The nces of those loans are ap- imately $730,000 owed Key Bank and $490,000 he Arizona Department Housing. The Key Bank is 90 percent guaranteed nst default by the United es Department of Agricul- (USDA), which leaves a l recourse liability of only 0,000 for the project.

The Winslow Crossings rtments are estimated to alued at nearly six million dollars and have replacement reserves of over $200,000. The city will take control of the property under the Winslow Municipal Housing Corporation for the token fee of $10 and credit the Cardon Development Group with the value of the gift.

Mayor Robin Boyd said during the meeting in which the agreement was ratified that he knew people who wanted to move into the Winslow Crossings Apartments but made too much money to qualify for the program. He said that the project is seen as a real asset to the community and expressed the desire for similar developments that were not part of a low-income project. He explained that he sees this project as providing some of the best housing units in the area.

ason To Be Grateful l In Navajo County

* Approved the renewal of ercover plates for the sher- s office.

* Authorized naming sting roads in the Heber- ergaard area 'Havenwood cle' and 'Morning Run art.'

* Approved renewing a ntract for the Navajo Coun- Employee Benefit Trust llness program.

* Approved an agreement h Ironside Engineering for urvey of the Ninth Place perty in an amount not to eed $7,500.

* Authorized an agreement h B.J. Tatro Consulting to vide facilitation services the health district in the ount of $7,500.

* Approved a professional vices contract for econo- st services with Barnes and sociates for an amount not exceed $5,000 including vel expenses.

* Approved the official canvas of the March 10 primary elections.

* Upheld the Navajo County Assessor's decision regarding the review of notice claim for property located at 500 Columbia Road in Holbrook belonging to Partition Systems Incorporated of South Carolina (PSiSC).

* Approved a resolution adding the Canyon Vista Estates subdivision roads in Shumway into the Navajo County roads maintenance system.

* Awarded a contract to Hatch Construction for work and improvement on streets in the North Whistle Stop Loop Improvement District in an amount not to exceed $76,347.50.

* Approved an amendment to a memorandum of agreement between Fort Defiance Agency Division of

Winslow Corps Meeting Moves Levee Repair One Step Forward

By Sam Conner

The U.S. Army Corps of Engineers held a meeting concerning the Winslow Levee in Winslow on Tuesday.

The meeting was attended by many representatives of the Corps as well as Navajo County Supervisors, Winslow City Council members and personnel from the various entities. Members of the Winslow Levee Advisory Committee were also in attendance as were a geologist from the U.S. Geological Survey, a representative of a museum in Tucson and other interested parties.

The history of the Little Colorado River flooding, when the river has flooded Winslow in the past and why and when the levee was decertified by the Federal Emergency Management Agency (FEMA) were addressed. Much of the discussion revolved around repair of the levee and efforts to get it recertified. According to discussions at the meeting, the levee can be repaired but it will not happen soon.

The meeting was intended as a public hearing for a proposed feasibility study which, according to material distributed, may take four to five years to complete. The feasibility study is the second step in the planning process, after a reconnaissance study. The next step is authorization of the project by Congress.

If authorization is received, the designing and planning process is expected to take two or three years. Once those processes have been completed the construction of the project can begin. When the project is finally complete, operation and maintenance will become the responsibility of Navajo County.

The Winslow meeting consisted of a presentation by Navajo County Public Works representative Homero Vela who is in charge of such projects in the county. Members of the Army Corps of Engineers such as Kim Gavigan, Chief

changing channel of the meandering Little Colorado River.

Individuals were also allowed to submit comments in writing as well. In private discussions, the necessity of flood insurance was a major issue but was only briefly addressed in the meeting.

The Winslow Levee is 7.2 miles long and owned by the Navajo County Flood Control District. It is an engineered structure and has experienced two flooding instances in the recent past. First was an overtopping failure in 1993. This flooded 204 parcels and damaged 140 structures. The second flood was a piping failure at the end of 2003.

FEMA decertified the Winslow levee on Sept. 26, 2008. The causes listed included that it does not meet FEMA levee requirements and does not have the capacity to contain a 100-year flood. The levee is said to be able to contain a 50-year flood. The decertification increased the flood plain area dramatically.

Navajo County and the Army Corps of Engineers plan to bring the levee up to standard so that it can contain a 100-year flood and be recertified. This would greatly benefit Winslow citizens now in the flood plain, but is not a process that will be completed quickly.

Navajo County Supervisor Jesse Thompson spoke at the end of the meeting and introduced members of the Winslow Levee Committee among other active persons in those working to alleviate the levee problems. He also noted that the Corps of Engineers, the county and others working on the project should be aware of the flooding damage the river can do at Bird Springs and other areas on the reservation north of Winslow. He noted that the Little Colorado River flooding affects a lot more than just Winslow and that a comprehensive plan is needed.

Utility Audit Tabled Until Meters Can Be Evaluated

Continued From Page 1

the audit, the total cost would be $16,000 to $27,000. Stuart remarked that she would like to see the work that is not needed removed from the proposal and only pay for the work that is needed. Pilgrim replied that in that case, the company would not provide an opinion on the audit because they had not reviewed the billing procedures. Stuart countered that the auditor already indicated in their proposal that they would not issue an opinion because the items listed for the job do not constitute a complete audit.

"We don't need the things we already know. Take them out," she said.

The council had requested information on completing a utility audit while considering whether utility rates should be raised. At that time,

system.

Pilgrim told the council that city staff has developed a form that will allow them to check every water meter in the city for accuracy. Over the next two or three months, city staff will check every meter and complete a form for each meter. The forms will then be compared against billing records to make sure billing is accurate.

"We can inspect them and get the information we need and evaluate it internally," Pilgrim said.

Councilman Wade Carlisle noted that he also wanted an evaluation of the city's collection efforts, noting that with the recent revelation that some customers were not being charged for water usage, he wants to be sure the city is collecting for all water used:

The council unanimously

Public Involvement Meeting
Statement from Arizona State Museum

Statement for Winslow Levee Meeting, March 24, 2009
Winslow AZ
Read by representative of the Arizona State Museum

The Homol'ovi Research Program was founded by a legislative decision package to the Arizona State Museum, University of Arizona, in the mid-1980s. Since 1984, research has been conducted under the direction of Dr. E. Charles Adams and Richard C. Lange. The research has focused on the formation and history of the Homol'ovi Settlement Cluster – a group of seven ancestral Hopi villages established along the middle Little Colorado River in the 13th and 14th centuries.

The archaeological work has focused on learning about the individual histories of the villages, including when and how they came together, how they were related to each other, and how they were related to other communities in the region. We have also worked extensively with the descendent communities at Hopi in determining individual and collective relationships to all of the Homol'ovi villages. As a result, we know that more than a dozen of the modern Hopi clans once lived at Homol'ovi and all of the villages are considered sacred, as ancestral homes where Hopi ancestors are still buried.

The archaeological work has involved excavation as well as extensive surface survey in the area, locating over 400 other archaeological sites in the twenty square-mile area around Homol'ovi Ruins State Park. The archaeological work has also contributed to the management of these resources in the park—evaluating the extent of damage caused by vandalism and natural processes, and providing interpretive materials for the park, including actual structures, signage, maps, objects, and written summaries of our knowledge about the history of this area. Many of these resources and two of the major pueblos – Homol'ovi I and Homol'ovi III –are within the modern floodplain of the Little Colorado River and subject to damage from flooding. The numbers for the villages were assigned in 1896 by Smithsonian archaeologist, Jesse Walter Fewkes, and have nothing to do with the age or importance of the ruins.

Homol'ovi I and Homol'ovi II are some of the largest villages in the northern Southwest. Homol'ovi I was occupied for about a century and consists of around 1100 rooms. It is the most massive example of two-story, form-molded, adobe-brick architecture in North America. Hundreds of rooms around a large southern courtyard (or plaza) were built in this manner. These bricks are particularly vulnerable to the river waters and were severely damaged by floods in 1993 and 1995. Homol'ovi II was occupied for less than 50 years, but quickly became the largest of the villages at over 1200 rooms. With the arrival of Homol'ovi II, we see the complete reorganization of the settlements in the middle Little Colorado River, with new architectural features and village layouts, new rock art, the appearance of shrines and fieldhouses, and new kinds of pottery – all reflecting a political and religious reorganization of these communities and increased control over ownership of the landscape.

Homol'ovi II is well-protected from flooding because it is on a mesa-top. However, the other Homol'ovi pueblos, and particularly Homol'ovi I, are in danger of being destroyed or severely impacted by continued modifications of the floodplain. Arizona State Museum has monitored the condition of all of the pueblos in the floodplain since 1984 and we know that when the river cannot spreadout naturally in its floodplain, it will be forced to move in new directions, Thus, recent levees have restricted the flow of the river and are causing it to cut back against the east side of the floodplain, an area that had been minimally impacted in previous centuries and where Homol'ovi I is located. As a result, the river-side of the pueblo and one of its primary cemetery areas is being eroded by flooding of the river. These ancient communities are tremendously important resources, as evidence of the history of this area, and to the Hopi people as ancestral homes and places where their ancestors still reside. We ask that as plans are developed to protect the modern community along the west side of the floodplain, that these plans also consider the ancient communities on the east side and farther downriver, including Homol'ovi III and Creswell Pueblo. A document detailing these concerns has been submitted to the Army Corps of Engineers and several copies are available from me.