



**ENVIRONMENTAL ASSESSMENT
404(b)(1) EVALUATION
STATEMENT OF FINDINGS
FINDINGS OF NO SIGNIFICANT IMPACT
PUBLIC INTEREST REVIEW**

PERMIT APPLICATION NUMBER:

SPL-2009-00560-SDM

PROJECT NAME:

Phoenix Sky Harbor International Airport
Runway Safety Area Improvements to Runway 25L

APPLICANT:

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Reviewed & Approved by:

Sallie McGuire

Sallie McGuire
Chief, Arizona Regulatory Branch

22 DEC 2009

Date

This document constitutes my Environmental Assessment, Statement of Findings, Findings of No Significant Impact, review and compliance determination according to the 404(b)(1) guidelines, and Public Interest Review for the proposed work (applicant's preferred alternative) described in the attached public notice.

The US Army Corps of Engineers (Corps) has assumed the role of lead federal agency for this action, with the Federal Aviation Administration (FAA) being a cooperating agency. Additional National Environmental Policy Act (NEPA) documentation will be prepared by the applicant and submitted to the FAA as a supplement to this Environmental Assessment and 404(b)(1) Evaluation.

I. Proposed action

The project is located at the southern edge of Phoenix Sky Harbor International Airport (PHX) along the Salt River between approximately Interstate 10 (I-10) and State Route (SR) 143 within the City of Phoenix, Maricopa County, Arizona. The Public Land Survey System description for the permit area is Township 1 North, Range 3 East, portions of Sections 13, 14, 23, and 24; and Township 1 North, Range 4 East, portions of Sections 17 and 18 (Gila and Salt River Baseline and Meridian) (Appendix, Figures 1, 2, and 3). The project would occur entirely on property owned by the City of Phoenix. Coordinates for the project area are Latitude 33.42933 N and Longitude -112.00405 W. Adjacent lands are privately owned and owned by the Arizona Department of Transportation.

The City of Phoenix Aviation Department is proposing to improve the Runway Safety Area (RSA) and Runway Object Free Area (ROFA) for Runway 25L at PHX. The FAA describes a RSA as “A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.” Runway 25L is the southern-most runway at PHX; the eastern end of the runway abuts the northern bank of the Salt River. The purpose of the ROFA is to enhance the safety of aircraft operation. According to FAA Advisory Circular (AC) 150/5300-13 of the Airport Design Standards, “Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the [Object Free Area] OFA.” Figure 4 in the Appendix illustrates existing conditions in the project area. The proposed improvements (preferred alternative) consist of the following:

- Extending the existing north embankment into the Salt River by placing fill material into the river to provide the RSA.
- Excavating native material from the Salt River channel adjacent to the new embankment.
- Cutting a 4-foot-wide by 10-foot notch in the existing grade control structure at the downstream end of the channel excavation area.
- Laterally extending the toe of the existing gabion apron along the south river bank.
- Realigning the existing airside service road and landside service road on the north bank of the Salt River to the perimeter of the new embankment.
- Constructing a new river access ramp at the eastern end of the new embankment to replace the existing river access ramp obliterated by the new embankment.

- Relocating the existing chain-link perimeter fence to the perimeter of the new embankment by installing new security perimeter fencing.
- Relocating the localizer antennae and localizer shelter.
- Extending two outfall pipes on the north bank to accommodate the new embankment width and installing new outfall structures at the ends of the extended pipes.
- Constructing an outfall ditch to channelize drainage from the two extended outfall pipes to the low-flow channel downstream of the RSA.
- Realigning and extending the landside river access/Aircraft Rescue and Firefighting (ARFF) road to parallel the outfall ditch.
- Utilizing a primitive dirt road across the Salt River channel as a haul route for fill material and for general construction access.
- Installing temporary culverts and fill material along the access road as necessary to maintain flow and access.

Per FAA's 2006 RSA Determination, the dimensions of the RSA for Runway 25L are currently 690 feet long by 500 feet wide. This is 310 feet short of the 1,000 feet for adequate grading and clearance as is required under FAA Airport Design AC 150/5300-13. The project would provide the standard RSA dimensions, 1,000 feet long by 500 feet wide, and also provide an additional 440 feet that meets FAA grading and drainage design standards for RSAs and is free of objects except those set by function. Thus, the project would provide a standard RSA as defined by FAA's design criteria as well as 440 feet of additional RSA to relocate objects currently within the Runway 25L RSA and ROFA.

Construction of the proposed project would be scheduled to begin in April 2010, pending all required approvals and permits.

A. Changes to the proposed action since circulation of the public notice

No changes have occurred since the circulation of the public notice.

1. Why a new public notice was not necessary

The current project is the same project described in the August 14, 2009, public notice.

B. Specific activity that requires a Department of the Army permit

The project includes activities that would occur above and below the plane of the ordinary high water mark. All project activities occurring below the plane of the ordinary high water mark require a Clean Water Act Section 404 permit (33 U.S.C. Section 1344). The scope of work within waters of the US includes:

- Constructing a RSA and river access ramp on the south end of Runway 25L.
- Excavating the Salt River channel floor.
- Constructing an outfall ditch.
- Extending the landside river access/ARFF road to parallel the outfall ditch.

- Extending existing gabion aprons at the south bank.
- Utilizing the river bottom for temporary construction access.

Project activities would cause permanent and temporary impacts to waters of the US including 54.45 acres of permanent impacts and 38.86 acres of temporary impacts (Table 1). Of the 54.45 acres of permanent impacts, 15.87 acres of the Salt River would be filled and would result in a permanent loss of waters of the US. The remaining 38.58 acres of permanent impact would constitute a permanent change to the condition of the Salt River, but would not be considered a permanent loss of the functions and values of that portion of the waters of the US.

Table 1. Summary of impact to waters of the US.			
Activity	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Total Impacts (Acres)
RSA and Access Ramp	15.87	0.35	16.35
Outfall Ditch and Landside River Access/ARFF road	4.77	9.02	13.72
Channel Excavation	32.61	26.56	59.11
Gabion Extensions	1.20	2.93	4.13
Totals	54.45	38.86	93.31

Impacts would include the discharge of materials into waters of the US. Activities resulting in discharge of dredge or fill materials include work involved with the construction of the RSA and river access ramp, drainage structures, outfall ditch and landside river access/ARFF road, gabion apron extensions, and temporary construction access requirements (Table 2).

Table 2. Materials discharged into waters of the US for each structure and activity.		
Structure/Activity	Material	Amount*
RSA and Access Ramp	Earthen Fill from Aviation Soil Stockpile	367,000 CY
	Earthen Fill from Channel Excavation	130,000 CY
	Earthen Backfill at Bank-Toe	57,000 CY
	Cement Stabilized Alluvium (cement and river rock mix)	32,000 CY
Drainage Structures	Reinforced Concrete Pipe	3,000,000 LBS
	Headwalls and Wingwalls (concrete)	40 CY
	Riprap (river rock)	500 CY
Outfall Ditch and Landside River Access/ARFF Road	Earthen Fill	15,000 CY
Gabion Apron Extensions	Riprap (river rock)	3,000 CY
	Wire (galvanized steel)	30,000 LBS
	Earthen Backfill	3,000 CY
Temporary Access	Earthen Fill	1,000 CY
	Temporary Steel Culverts	69,000 LBS
*Definitions: CY = Cubic Yards and LBS = Pounds		

The project would involve constructing a 16.50-acre embankment with sloping cement stabilized alluvium (CSA) bank protection. Clean fill material from the Aviation Soil Stockpile (located behind the south bank of the river) would be discharged along the north bank of the river to construct the embankment, along with material excavated from the Salt River channel adjacent to the new embankment. Excavation of the river channel is necessary in order to offset the loss of river hydraulic capacity created by encroachment of the new embankment into the river channel, and would also serve the secondary functions of reducing pooling in the area that attracts birds, which are a hazard to aircraft operations, and cleaning debris from the riverbed. A 4-foot-wide by 10-foot-long notch would be excavated along the grade control structure at the downstream end of the channel excavation area and would also alleviate pooling in the area. Material would be excavated from the Aviation Soil Stockpile and the Salt River with conventional heavy equipment such as crawler excavators, hydraulic excavators, and backhoes. Once material is excavated, it would be hauled approximately 1.5 miles and discharged into the RSA footprint. Boulders and large rocks from the excavated area would likely be temporarily stockpiled for potential use as riprap at drainage outfalls. Vibratory compactors would periodically compact the fill material in the RSA footprint for stabilization purposes. An access ramp would also be graded at the eastern end of the new embankment from the top of the RSA to the river bank toe-of-slope.

Additional clean fill from the Aviation Soil Stockpile would be mixed with cement and water to form the CSA, which would then be discharged on the RSA embankment slope as an 8-foot-thick layer of bank protection. River materials would be excavated at the new embankment toe-of-slope in order to extend the CSA bank protection below the channel bottom to protect the embankment from undercutting during flood events. This material would be temporarily side cast along the length of the new embankment, and once the below grade CSA has cured, the material would be backfilled and compacted in its original location.

Wire-tied gabion baskets would be discharged to laterally extend the toe of existing gabion aprons along 3,100 linear feet of the south river bank to protect against erosion. The gabion apron extensions on the south bank would be approximately 12 feet wide and would be constructed using native river rock, along with heavy wire mesh “boxes” and tie wire. Native material adjacent to the existing gabions would be excavated with a backhoe and temporarily side cast along the length of the gabions, then would be backfilled over the apron extensions once they are installed.

Prior to constructing the RSA, two reinforced concrete outfall pipes on the north bank would be extended to accommodate the new width of the RSA embankment. The 40th Street outfall pipe would be extended 1,750 linear feet, and two precast concrete manholes with steel covers would be installed along the newly extended portion of the pipe to allow for access to the drainage structure. An additional pipe located on the downstream end of the RSA would be extended 24 linear feet. The river materials within the footprint of the pipe extensions would be graded to provide a smooth surface for the pipe foundation. The pipes would likely be installed in sections with cranes lowering segments of pipe to the graded foundation. Two precast concrete headwalls would be installed at the new outfall of each of the pipes. The headwalls would also likely be lowered to the project site by a crane. Upon construction of the RSA, large boulders and rocks

temporarily stockpiled would be hauled to the outfall structures via a loader, and riprap would be placed at the base of the new outfall structures for increased erosion protection. Fill material would be discharged in a linear segment along the north bank toe-of-slope, and the linear form of fill material would be compacted. A 4,100 foot-long, 4-foot-wide outfall grader ditch would be excavated from the compacted fill material with a backhoe, and the side castings from the ditch would be compacted on the shoulder. Stormwater from the extended outfall structures would empty into the new outfall ditch, which would direct the water to the low-flow channel downstream of the RSA. The landside river access/ARFF road would be extended to parallel the entire length of the outfall ditch for maintenance and ARFF purposes.

Primary access to the permit area would occur via 40th Street south of the river. Construction equipment would enter the river via an existing primitive dirt road that crosses the riverbed. Portions of the primitive dirt road cross low areas in the riverbed where water flows intermittently and occasionally pools. Temporary culverts would be installed at various locations along the primitive dirt road to maintain flow during construction. Approximately 920 linear feet of temporary culverts would be installed along the primitive dirt road, and earthen fill material would be discharged over the temporary culverts to create temporary access without disrupting flow. Once construction is complete, the temporary culverts and fill material used for access purposes would be removed and re-contoured to preconstruction conditions.

Project activities occurring above the plane of the ordinary high water mark include the realignment of the airside service road and landside service road, installation of new fencing, and localizer antennae relocation though these activities may require temporary construction access within waters of the US for constructability purposes. The airside service road and landside service road are two parallel roads separated by a chain-link fence and occur along the top of the north bank of the Salt River. The existing 20-foot-wide paved airside service road and adjacent 20-foot-wide unpaved landside service road would be realigned near the perimeter of the RSA. The new airside service road alignment would be graded, and asphaltic concrete would be used to pave the new section of the roadway. The new landside service road would be graded and would not be paved. A total of 2,615 linear feet of 8-foot-high chain-link fence would be installed between the airside service road and the landside service road on the perimeter of the RSA. An auger would drill approximately 350 fence post holes along the top of the bank of the RSA, and concrete would be required to anchor the fence posts. The localizer antennae and shelter would be relocated within the fenced area, concrete would be used to form the foundation of the localizer structures, and cranes would be used to raise the antennae.

C. Purpose and Need

1. Applicant's Stated Purpose and Need

The identification of the purpose and need is the primary foundation for the identification of reasonable alternatives and the evaluation of environmental consequences. The project purpose and need is based on three primary objectives as described below.

Compliance with Federal Law

The proposed action is needed in order to comply with Public Law 109-115. This Law states, "...not later than December 31, 2015, the owner or operator of an airport certificated under 49 U.S.C. Section 44706 shall improve the airport's runway safety areas to comply with the FAA design standards required by 14 CFR Part 139". PHX must be certificated by the FAA and comply with the certification and operation requirements identified in 14 CFR Part 139. To comply with Part 139, certificate holders are directed to FAA AC to determine the configuration and maintenance of RSAs. FAA Airport Design AC 150/5300-13 provides design standards and dimensions for RSAs.

The dimensions of RSAs are based on the Airport Reference Code (ARC). The ARC is used by the FAA to relate airport design criteria to aircraft characteristics including wingspan, tail height and approach speed. The ARC for PHX is D-V, which includes aircraft with approach speeds between 141 and 166 knots, wingspans between 171 and 214 feet and tail heights from 60 to 66 feet. A typical D-V type aircraft is the Boeing 747.

For D-V aircraft, the RSA is 500 feet wide centered on the runway centerline and extends 1,000 feet beyond the end of the runway. FAA design standards require that the RSA "be cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations."

Runway 25L has an existing RSA that is 690 feet long by 500 feet wide, which is 310 feet short of the required 1,000 feet for adequate grading and clearance requirements. Although the ground extends beyond the existing 690 feet of RSA, the localizer antenna is located approximately 690 feet from the Runway 25L threshold on the extended Runway centerline and is the closest object to the runway threshold. The localizer antenna is not considered frangible (i.e., able to easily break near ground level) at the current height and is considered the current effective limit of the RSA. The airside service road, landside service road, airport perimeter fence and the bank and bed of the Salt River are located within the southeast portion of the RSA, which also violates RSA grading requirements. Thus, an additional 440 feet beyond the required 1,000 feet of RSA is needed to provide an area to relocate these structures and facilities. Therefore, the proposed action is needed in order to comply with Federal law by addressing the existing Runway 25L RSA deficiencies.

Enhance Safety

FAA airport design standards included in FAA AC 150/5300-13 also identify object clearing requirements for the ROFA. The purpose of the ROFA is to enhance the safety of aircraft operation.

The size of the ROFA is also related to the ARC. The standard ROFA for a D-V ARC is 800 feet wide (400 feet from runway centerline) and extends 1,000 feet beyond the end of the runway. The existing perimeter fence, localizer equipment shelter, and service road are located within the ROFA beyond Runway 25L. Therefore, the proposed action is needed to enhance safety by removing these fixed objects from the Runway 25L ROFA.

Improve Security

From a security standpoint it is preferable to have all airport facilities located within the perimeter fence. A portion of the existing Runway 25L approach lighting system is on stilted metal posts with concrete bases located in the Salt River outside the airport perimeter fence. Therefore, the proposed action is needed to improve security by locating the approach lighting system within the airport perimeter fence.

In summary, the purpose of the proposed action is to:

- Comply with Federal law by providing a standard RSA or equivalent for Runway 25L.
- Enhance safety by providing a ROFA that is clear of fixed objects for Runway 25L.
- Improve security by including the Runway 25L approach lighting system within the airport perimeter fence.

Incidental Construction Not Related to the Purpose and Need

As discussed above, the purpose of the project is to comply with federal law, enhance safety, and improve security. However, the construction of the 40th Street outfall grader ditch and extension of the landside river access/ARFF road are not necessarily required to meet the purpose and need of the project. These items are considered incidental construction work required to preserve the existing river channel conditions generated under a separate Section 404 permit.

The City of Phoenix Aviation Department is currently permitted under a separate Individual Section 404 permit (Corps File No. 2000-00669-SDM; Bird Hazard Mitigation Project) to eliminate wildlife habitat in the Salt River near PHX to reduce the potential for bird-strikes with aircraft as part of PHX Wildlife Management Plan required by FAA. The permitted area occurs within the Salt River channel from State Route (SR) 143 to 1,100 feet west of Interstate 10 (I-10), and the proposed RSA project occurs within this area as well. Permitted activities for the bird hazard mitigation project include the construction and maintenance of low-flow channels including lateral channels extending from outfall structures to the low-flow channel to eliminate standing water in the permit area. The permit authorizes re-grading and reconstructing channels in the event that they become damaged from large magnitude flows, and the continuous removal of all vegetation (including wetland vegetation) occurring within the Salt River channel in the permit area. Compensatory mitigation was completed for this project to mitigate for permanent loss to waters of the US created from the construction and maintenance of channels and the destruction of vegetation. The City of Phoenix has requested an update and modification to the activities authorized under the above file number. This request is pending under Corps File No. SPL-2009-00596-AP).

The construction of the RSA would impact the 40th Street outfall structure, and thus require an extension of the outfall pipe to maintain flow. The 40th Street outfall pipe could not be extended laterally across the river channel, as it would interfere with the purpose of the bird hazard mitigation project to reduce avian/aircraft collisions. A lateral extension of the 40th Street outfall pipe would cause water pooling at the base of the RSA and potentially attract avian wildlife to the end of the runway increasing the risk of avian/aircraft collisions.

An alternate design of the 40th Street outfall pipe extension was developed to avoid impacting the purpose of the bird hazard mitigation project. In order to maintain water flowing through the channels near the RSA, flows from the 40th Street outfall pipe need to be rerouted to the 32nd Street outfall. To effectively maintain flows to the 32nd Street outfall, the 40th Street outfall pipe would be extended and empty into an outfall grader ditch to the 32nd Street outfall, and the extension of the landside river access/ARFF road would be constructed for maintenance purposes of the new grader ditch. Thus, the construction of the new outfall grader ditch and landside river access/ARFF road would maintain drainage from the 40th Street outfall without causing pooling near the RSA, and the proposed action would not interfere with the purpose of the bird hazard mitigation project. Because the bird hazard mitigation project authorizes the continual re-grading and reconstruction of channels within the permit area, the maintenance of the new outfall grader ditch would be authorized under the current bird hazard mitigation project's Individual Section 404 permit.

2. Corps' Determination of Overall Project Purpose (404(b)(1) Alternatives Analysis)

The overall purpose of the project is to 1) comply with federal law, 2) enhance safety, and 3) improve security.

3. Corps' Determination of Basic Project Purpose (Water Dependency Test)

The basic project purpose, as defined by the Corps, is to provide a compliant runway safety area for Runway 25L. This basic purpose is not water-dependent. Therefore, the alternatives analysis must demonstrate that it is not practicable to avoid permanent impacts to waters of the US during project construction.

D. Scope of Analysis under National Environmental Policy Act (NEPA)

The Corps' NEPA implementation procedures for the regulatory program are stated in Appendix B of 33 CFR, Section 325.7(b) which states that "for those regulated activities that comprise merely a link in a transportation or utility transmission project, the scope of analysis should address the Federal action, i.e., the specific activity requiring a Department of Army permit and any other portion of the project that is within the control or responsibility of the Corps of Engineers (or other Federal agencies)." The scope of analysis for the proposed project is 99.31 acres of the Salt River that are proposed to be impacted temporarily or permanently by the proposed activities.

E. Alternatives (33 CFR 320.4(b)(4), 40 CFR 230.10)

1. No action

Under the No Action Alternative, no activities requiring authorization from the Corps under Section 404 of the Clean Water Act would occur. The RSA and associated improvements would not be constructed under the No Action Alternative. Consideration of the No Action Alternative is required by NEPA per CEQ Regulations. This alternative serves as a basis of comparison

with other alternatives considered for detailed analysis. The Airport would remain as is. Thus, the No Action Alternative would not meet the Purpose and Need and fails to comply with FAA Airport Design AC 150/5300-13 requiring that all airports have standard RSAs before December 31, 2015. The No Action Alternative would limit the use of Runway 25L due to the failure to meet this circular. Regardless, the No Action Alternative was retained for detailed environmental analysis as required by CEQ Regulations.

2. Sequenced search for less environmentally damaging alternatives

a. Other Sites

Both off-site and on-site alternatives were considered. Off-site alternatives include the use of other modes of transportation or other airports. Off-site alternatives would not provide a standard RSA or equivalent for Runway 25L, would not provide a ROFA that is clear of fixed objects (except those fixed by function) for Runway 25L, and would not relocate the Runway 25L perimeter fence to encompass the approach lighting system. Therefore, off-site alternatives would not meet any aspect of the Purpose and Need and were eliminated from further consideration.

b. Other project designs

The 404(b)(1) Guidelines require that, for non-water-dependent projects such as this project, the applicant must demonstrate that no practicable alternatives are available. An analysis of all potential on-site alternatives was completed to determine the most practicable alternative.

On-site alternatives were identified based on the acceptable methods to address deficient RSAs. According to FAA Order 5200.8, *Runway Safety Area Program*, the alternatives to be considered for obtaining or improving RSAs are:

- Construct a traditional RSA graded area surrounding the runway.
- Relocate, shift, or realign the runway.
- Reduce the runway length where the existing runway length exceeds that which is required for the design aircraft.
- Establish declared distances.
- Install an Engineered Material Arresting System (EMAS).

Construct a Traditional RSA

Among the alternatives that should be considered, the FAA recommends the construction of a traditional RSA. For Runway 25L, this alternative would require placement of fill materials into the Salt River essentially extending the RSA such that the grading requirements are met for the full length of the standard RSA. Since it is feasible to place fill materials in the Salt River, this alternative was carried forward for further consideration. This alternative would impact waters of the US.

Relocate, Shift or Realign the Runway

Alternatives to relocate, shift or realign Runway 25L in order to provide full standard RSAs at both ends of the runway were considered. In order to relocate Runway 25L to any other area on the Airport property and maintain the capacity provided by the current location, the available area would need to accommodate a 7,800-foot-long runway with a full RSA (i.e. 9,800 feet total length) and 4,300 feet minimum separation from Runway 8/26L (the nearest runway) per FAA runway separation requirements. Review of the airport layout revealed that relocating Runway 25L is not feasible due to existing constraints that limit the alignment of Runway 25L to its current location.

Minimum runway separation requirements combined with FAA ROFA requirements do not allow Runway 25L to be shifted to the north. Shifting Runway 25L to the south would result in impacts to existing airport development and greater impacts to the Salt River. The location of 24th Street restricts shifting of Runway 25L to the west. Finally, realigning Runway 25L was not possible because the runway is intended to function as a parallel runway. Therefore, this alternative was deemed unfeasible and was eliminated from further consideration. If this alternative were feasible, it could impact waters of the US, depending on the relocation, shift or realignment location.

Reduce the Runway Length

Another acceptable alternative identified by the FAA to address a deficient RSA is to reduce the runway length. This method is feasible when the existing runway length exceeds that which is required. Therefore, it was necessary to determine if the length of Runway 25L exceeds the required runway length for the aircraft it serves.

The 1993 Final Environmental Impact Statement (FEIS) for Sky Harbor International Airport Master Plan Update Improvements documented both the need for construction of Runway 25L and the necessary length of that runway. The 1993 FEIS stated “The proposed new runway is recommended to be initially built to a length of 7,800 feet. This length is sufficient to accommodate the landing of all of the airport’s current aircraft types on a wet runway.” The 1993 FEIS also stated, “Constructing the [new] runway to lengths shorter than 7,800 feet are not long enough to readily accommodate air carrier arrival or departure aircraft at PHX.” Therefore, reducing the runway length of Runway 25L was determined to not be a feasible alternative to address the deficient RSA. This alternative would not impact waters of the US.

Establish Declared Distances

Declared distances are the length of runway available for aircraft operations based on their performance characteristics. Ideally, the entire runway is available for landing and departing aircraft. However, when an airport is constrained and it is not viable to provide RSAs or ROFAs that meet FAA criteria, declared distances may be used.

For instance, one of the declared distances defined by the FAA is the Landing Distance Available (LDA). The LDA is the length of runway available for landing. The full runway length is only available for landing if the standard RSA and ROFA are provided beyond each end of the

runway. When the RSA and ROFA do not meet FAA standards, the length of the runway available for landing is reduced to provide a standard RSA and ROFA. The runway is then marked and lighted to show the portion of runway that is not available for landing. This reduced length is also published to inform pilots of the use of declared distances for operations on a specific runway.

The feasibility of the declared distance alternative at PHX was considered by comparing the LDA for Runway 25L to the landing length required by the aircraft for which Runway 25L was designed. The first step was to calculate the LDA for Runway 25L. The LDA was determined by subtracting the length of deficient RSA from the physical runway length. The full standard RSA is essentially provided on the 7R end, however only approximately 470 feet of a full width RSA is provided on the 25L end. Since the standard RSA for this runway would extend 1,000 feet beyond the threshold of Runway 25L, the existing RSA is deficient by approximately 530 feet (1,000 – 470). Therefore, the LDA for aircraft landing on Runway 7R is 7,270 feet (7,800 – 530).

The next step in determining the feasibility of this option was to compare the LDA to the landing length needed for the aircraft that 25L was intended to serve. As previously discussed, the 1993 EIS indicated that 7,800 feet was the minimum length needed “...to readily accommodate air carrier arrival or departure aircraft at PHX.” Additionally, according to the manufacturer of the critical design aircraft, the landing runway length required for wet conditions and at the maximum landing weight would be approximately 7,800 feet.

Therefore, since the LDA for departures on Runway 7R is less than the 7,800 feet needed, this alternative was determined to be unfeasible and eliminated from further consideration. It should be noted that the previous discussion on the Reduce the Runway Length Alternative indicated that reducing runway length is not a viable option for PHX, providing additional reasoning for eliminating the use of declared distances from further consideration. This alternative would not impact waters of the US.

Install EMAS

Engineered Material Arresting Systems (EMAS) is a bed of crushable, lightweight concrete blocks installed in a non-standard RSA. When an aircraft travels across the EMAS, it crushes the concrete blocks and, thus, decelerates. FAA Order 5200.8, *Runway Safety Area Program*, states that EMAS shall be considered when determining the feasible alternatives to develop a standard RSA. According to FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*, “A standard EMAS installation provides a level of safety that is generally equivalent to a full RSA constructed to the standards of FAA AC 150/5300-13 for overruns. It also provides an acceptable level of safety for undershoots.”

As part of the FAA’s 2005 RSA Evaluation and Analysis for PHX, the FAA indicated that the City of Phoenix needed to conduct the cost to benefit analysis to install an EMAS in an equivalent of 1,000 foot of RSA length. The FAA requested that the City of Phoenix conduct a

study to evaluate the practicability and feasibility of constructing EMAS for the RSA of the Runway 25L.

To determine whether EMAS was a feasible alternative, it was necessary to verify that sufficient space would be available for an appropriately sized EMAS arrestor bed. A preliminary estimate of the EMAS arrestor bed size and location was requested from an EMAS manufacturer. Based on the type of aircraft that operate at PHX, it was estimated that the EMAS arrestor bed would be placed 180 feet from the Runway 25L threshold and would be 420 feet long and 170 feet wide. Therefore, this alternative was determined to be feasible and was carried forward for further consideration. This alternative would not impact waters of the US.

F. Evaluation of Feasible Alternatives

As determined above, the two feasible alternatives include constructing a traditional RSA and installing EMAS. These two alternatives were evaluated to determine whether they would meet all elements of the Purpose and Need. Thus, the alternatives to construct a traditional RSA and to install EMAS were examined in regard to their ability to address the following:

- Comply with federal law by providing a standard RSA or equivalent for Runway 25L.
- Enhance safety by providing a ROFA that is clear of fixed objects (except those fixed by function) for Runway 25L.
- Improve security by including the Runway 25L approach lighting system within the airport perimeter fence.

Construct a Traditional RSA

To construct a traditional RSA it would be necessary to place fill in the Salt River. The fill could be extended into the River such that the fill provided would be sufficient to relocate objects currently in the Runway 25L RSA and ROFA. By extending the fill beyond that needed for the RSA, the localizer antenna and shelter could be relocated to locations outside of the RSA and ROFA; the airside service road and landside service road could be relocated outside of the RSA; and the perimeter fence could be relocated such that it is outside both the RSA and the ROFA, and encompasses the approach lighting system. Therefore, this alternative should be considered in detail because it would meet all elements of the Purpose and Need.

The traditional RSA alternative would be constructed by extending the existing north embankment into the Salt River. Preliminary engineering indicated that two methods were available to support the extended embankment: sloped bank protection and vertical bank protection. Therefore, two sub-alternatives were developed. The following sections provide additional information regarding the sloped bank and vertical bank alternatives.

Alternative A - Sloped Bank Alternative

Compacted fill would be placed in the Salt River to extend the existing north embankment. A sloped bank would extend at approximately a 2:1 slope from the top of the extended north embankment to the existing grade in the Salt River. CSA would be placed on the face of the embankment to protect against erosion. The preliminary engineering estimate of cost for this

alternative is \$9.3 million (estimated in 2008); maintenance cost for this alternative would be minimal.

Alternative B - Vertical Bank Alternative

As with the Sloped Bank Alternative, compacted fill would be placed in the Salt River to extend the existing embankment. However, instead of constructing a sloped bank to meet the grade in the Salt River, a vertical bank or retaining wall structure would be constructed. The preliminary engineering estimate of cost for this alternative is \$21.5 million (estimated in 2008) not including maintenance costs, which would be more than for the sloped bank alternative.

Install EMAS

The Install EMAS alternative did not meet all the elements of the Purpose and Need. While this alternative provided an equivalent RSA for Runway 25L, it did not provide a ROFA free of fixed objects nor did it allow for the relocation of the perimeter fence to encompass the approach lighting system. Therefore, this alternative was not retained for a more detailed analysis.

Although the EMAS alternative does not meet the purpose and need for the Proposed Action and will not be carried forward for detailed environmental review, in order to comply with FAA's request for consideration of EMAS as a solution, coordination was undertaken with ESCO, an Engineered Arresting Systems Corporation. ESCO is the most prominent EMAS provider in the US. Based on the aircraft types that utilize Runway 25L, ESCO recommended that the EMAS system be 420 feet long by 170 feet wide with a direct cost of \$6.6 million (estimated in 2008), not including site preparation. Assuming site preparation amounts to approximately \$1.4 million (estimated in 2008), without consideration of maintenance and replacement costs after accidental overruns/overshoots, the EMAS alternative would cost approximately \$8 million dollars (estimated in 2008). Due to the extreme heat of the Phoenix climate, it was estimated that the entire EMAS system would need to be replaced every 10 years. The maintenance cost associated with the EMAS system would include a setback preparation areas equalling to 600 feet long by 200 feet wide (120,000 square feet). The estimated annual cost is \$0.33 per square foot totalling to \$39,600 each year. For the length of arrestor bed required for Runway 25L, FAA Order 5200.9 (*Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*) indicates that the maximum feasible cost could be approximately \$20 million.

G. Analysis of Alternatives Recommended for Further Consideration

The two feasible action alternatives (Alternative A – Sloped Bank, and Alternative B – Vertical Bank) were analyzed to determine the most practicable alternative that is least damaging to the aquatic environment. A practicable alternative as defined by the Corps is an alternative that is capable of being implemented after taking into consideration the cost, available technology, and logistics in light of the overall project purpose. Both the Sloped Bank alternative and Vertical Bank alternative would include the following work:

- Extending the current north embankment into the Salt River by placing fill material into the river to provide a standard RSA.

- Realigning the existing airside service road and landside service road on the north bank of the Salt River to the perimeter of the new embankment.
- Constructing a new river access ramp at the eastern end of the new embankment to replace the existing river access ramp obliterated by the new embankment.
- Relocating the existing chain-link perimeter fence to the perimeter of the new embankment by installing new fencing or recycling the existing fencing.
- Relocating the localizer antenna and localizer shelter.
- Extending two outfall pipes on the north bank to accommodate the new embankment width and installing new outfall structures at the ends of the extended pipes.
- Constructing an outfall ditch to channelize drainage from the two extended outfall pipes to the low-flow channel downstream of the RSA.
- Extending the landside river access/ARFF road to parallel the outfall ditch.
- Utilizing a primitive dirt road across the Salt River channel as a haul route for fill material and for general construction access
- Installing temporary culverts and fill material along the access road as necessary to maintain access.

The primary difference between the two action alternatives is that the southern edge of the new embankment for Alternative A would be sloped with 2:1 slopes and protected with CSA, whereas the southern edge of the new embankment for Alternative B would consist of a vertical concrete retaining wall. Table 3 summarizes the estimated impacts to waters of the US and approximate costs for each of the alternatives. The differences between the alternatives are described in more detail below.

Alternative	Approximate Cost	Permanent Impacts to Waters of the US (Acres)	Temporary Impacts to Waters of the US (Acres)	Total Impacts to Waters of the US (Acres)
No Action	\$0	0.00	0.00	0.00
Alternative A – Sloped Bank	\$9,263,000	54.45	38.86	93.31
Alternative B – Vertical Bank	\$21,483,000	19.41	14.79	34.20

Alternative A – Sloped Bank Alternative

The Sloped Bank alternative meets the project purpose and need. Under this alternative, a 16.50-acre embankment with sloping CSA bank protection would be constructed (Appendix, Figure 5). Other work specific to this alternative includes:

- Excavating native material from approximately 32.61 acres of the Salt River channel adjacent to the new embankment.
- Cutting a 4-foot-wide by 10-foot notch in the existing grade control structure at the downstream end of the channel excavation area.

- Laterally extending the toe of existing gabion apron along 3,100 linear feet of the south river bank.

Clean fill material from the Aviation Soil Stockpile (located on the south bank) would be discharged along the north bank of the river to construct the embankment, along with native material excavated from the Salt River channel adjacent to the new embankment. Excavation of the river channel is necessary for this alternative in order to offset the loss of river hydraulic capacity created by encroachment of the new embankment into the river channel, and would also serve the secondary functions of reducing pooling in the area that attracts birds and cleaning debris from the riverbed. The notch cut in the existing grade control structure at the downstream end of the channel excavation area would also alleviate pooling in the area. Due to an increase in channel velocity expected to result from implementation of this alternative, the toe of existing gabion apron on the south bank must be extended to protect the south bank from undercutting during flood events.

Material would be excavated from the Aviation Soil Stockpile and the Salt River with conventional heavy equipment such as crawler excavators, hydraulic excavators, and backhoes. Once material is excavated it would be hauled and discharged into the RSA footprint. Boulders and large rocks from the excavated area would likely be temporarily stockpiled for potential use as riprap at drainage outfalls. Vibratory compactors would periodically compact the fill material in the RSA footprint for stabilization purposes.

Additional clean fill from the Aviation Soil Stockpile would be mixed with cement and water to form the CSA, which would then be discharged on the RSA embankment slope as an 8-foot-thick layer of bank protection. River material would be excavated at the new embankment toe-of-slope in order to extend the CSA bank protection below the channel bottom to protect the embankment from undercutting during flood events. This material would be temporarily side cast along the length of the new embankment, and once the below grade CSA has cured, the material would be backfilled and compacted in its original location.

The gabion apron extensions on the south bank would be approximately 12 feet wide and would be constructed using native river rock, along with heavy wire mesh “boxes” and tie wire. Native material adjacent to the existing gabions would be excavated with a backhoe and temporarily side cast along the length of the gabions, then backfilled over the apron extensions once they are installed.

Alternative A – Sloped Bank approximate cost: \$9,263,000

Permanent impacts to waters of the US: 54.45 acres

Temporary impacts to waters of the US: 38.86 acres

Total impacts to waters of the US: 93.31 acres

Alternative B – Vertical Bank Alternative

The Vertical Bank Alternative meets the project purpose and need. Under this alternative, a 12.35-acre embankment with a vertical concrete retaining wall would be constructed (Appendix,

Figure 6). Because the embankment footprint for this alternative is smaller than that of the Sloped Bank Alternative, impacts to river hydraulic capacity resulting from the Vertical Bank Alternative are not substantial enough to require channel excavation (other than that necessary for construction of the retaining wall). In addition, no grade control structure notching or south bank gabion apron extension is required for the Vertical Bank Alternative.

Clean fill material from the Aviation Soil Stockpile would be discharged along the north bank of the river to construct the new embankment under the Vertical Bank Alternative. Native river material would be excavated at the base of the retaining wall to construct piers, footings, and gabion aprons below the existing grade. The excavated material would be backfilled over the footings. To construct the retaining wall, reinforced steel would be installed to form the retaining wall frame. A crane would lower and secure the steel frame in place. The steel frame would be temporarily encased, and concrete would be discharged over the enclosed steel frame.

Alternative B approximate cost: \$21,483,000
Permanent impacts to waters of the US: 19.41 acres
Temporary impacts to waters of the US: 14.79 acres
Total impacts to waters of the US: 34.20 acres

The only feasible alternatives meeting the project purpose and need are the Sloped Bank Alternative and Vertical Bank Alternative. Because the Sloped Bank Alternative requires a sloping bank, channel excavation, and extension of gabion aprons along the south bank of the river, the Sloped Bank Alternative would result in greater impacts to waters of the US than the Vertical Bank Alternative, primarily due to the channel excavation area. However, the Vertical Bank Alternative would cost approximately \$12,220,000 more than the Sloped Bank Alternative. Therefore, the Sloped Bank Alternative is the more practicable alternative, and is the proposed action.

II. NEPA Environmental Factors and Public Interest Factors Considered

A. Changes to the physical/chemical characteristics of the aquatic environment

1. Substrate

The substrate in the Salt River channel through the permit area is derived from soils that are stratified mixed alluvium characterized by sandy, mixed, hyperthermic Torrifluvents that are deep, excessively well-drained, are formed within the stratified stream alluvium, and are typically found in the floodplain (Hendricks 1985 and NRCS 2009). The average channel elevation of the Salt River is approximately 1,100 feet above mean sea level. The substrate, or top surface of the soil, consists mainly of sand and clay mixed with river cobbles and small to intermediate sized round and angular boulders ranging from 6 inches to 2 feet in diameter. In scour holes and other areas subject to more frequent inundation such as the 40th Street outfall, the substrate consists of alluvial mud and sand over river cobble. The substrate in the low-flow channel consists mainly of sand with small rounded and oblong river cobbles and pebbles, and is free of large boulders and debris due to periodic maintenance efforts. The cross-section of the Salt River channel surface is relatively convex with some irregularities due to the presence of

various scour holes and the low-flow channel. The subsurface below the permit area is stratified with 115 to 175 feet of heterogeneous alluvial sediments overlying several hundred feet of sedimentary bedrock that appears to correlate with the Tertiary Tempe Beds and Tertiary Camelshead Formation. The alluvial layers are gradual and not well defined, though the bedrock layer is distinct (MACTEC Engineering 2009).

The proposed action would involve excavating approximately 130,000 cubic yards of native material to a depth of 5 to 10 feet over approximately 32.61 acres of the channel floor to maintain river hydraulic capacity through the permit area. The excavation activities would not expose the bedrock lying below the surface. However, the post-construction substrate within the excavation footprint would be comprised of newly exposed subsurface alluvial materials of various shapes and sizes. Given that the stratified layers in the channel are gradual, the newly exposed substrate would not substantially differ from the current channel morphology though the channel would be relatively flatter without scour holes present, and the cross-section of the channel would be angular at the RSA (see Design Plans - River Bank Protection Options, Options A and B in the Appendix). No compaction activities would occur in the channel excavation area. Thus, the project is not anticipated to change the infiltration patterns, and the surface and subsurface soils would continue to be characterized as excessively well-drained with the exception of the impervious surface of the RSA.

Although the channel excavation would assist with the maintenance of river hydraulics, the construction of the RSA coupled with the channel excavation would still increase the velocity and depth of waters flowing through the permit area during substantial flow events due to storms or upstream dam releases. The average Water Surface Elevation (WSE) would rise approximately 0.46 feet and the average velocity would rise 0.47 feet per second (fps) during a 100-year flood event (Pacific Advanced Civil Engineering 2009). The increase in velocity and depth of water during 100-year flood events could increase the amount and size of sediment carried through and deposited in the permit area, though maintenance removal of larger sediments deposited from large storms would maintain normal flows downstream. The proposed action would not substantially modify the substrate of the watercourses in the project area.

2. Currents, Circulation or Drainage Patterns

The Salt River in the permit area is ephemeral due to upstream dams and groundwater pumping and only experiences bank to bank flows during substantial precipitation events or upstream dam releases. However, some surface water is typically present in channels that were constructed to reduce standing water in the area, including the low-flow channel and two pipe outfall channels. The low-flow channel near the south bank of the river conveys low volume flows typically from the Tempe Town Lake bypass located approximately 2.75 miles upstream of the permit area. The Tempe Town Lake bypass pumps water out of the Salt River at the east (upstream) end of the lake. The water is piped around the lake and is discharged downstream of the lake, and this water occasionally flows into the permit area particularly from March to June and from September to November in an effort to control Tempe Town Lake water quality for recreational purposes (Nancy Ryan, City of Tempe, Personal Communication 2009). The water pumped around the lake typically occurs from runoff from surrounding stormwater drainage structures, and more

consistently, the effluent discharge of the City of Mesa’s Northwest Wastewater Treatment Plant (NWWRP) located approximately 1.60 miles upstream of the east Tempe Town Lake dam. The two pipe outfall channels in the Salt River through the permit area convey runoff discharged into the river from outfall pipes on the north bank to the low-flow channel near the south bank. Occasional pooling also occurs from these water sources collecting in scour holes. A hydraulics analysis of the 100-year flood event for the Salt River through the permit area revealed the average WSE is 1,115.97 feet above mean sea level with an average velocity of 11.83 fps.

The construction of the RSA would create a minor change in the localized drainage pattern associated with the 40th Street outfall pipe. The 40th Street outfall pipe would be extended to the southwest and would no longer discharge water into the Salt River directly south of the 40th Street outfall. Instead, stormwater from the 40th Street outfall pipe would be redirected to a new grader ditch located along the north river bank toe-of-slope and would discharge into the low-flow channel near the 32nd Street outfall pipe where the grade would allow gravity discharge with no pooling. Because the downstream low-flow channel would continue to receive inputs from the upstream portion of the low-flow channel (storm events, dam releases, and the Tempe Town Lake bypass flows) and the 40th Street outfall via the new grader ditch, no substantial changes in current and circulation would occur to the overall low-flow channel.

Overall, the project would not substantially modify the drainage pattern of the Salt River through the permit area, and flows would continue to drain from the northeast to the southwest within the boundaries of the main channel. However, some minor changes would occur to water current and circulation patterns during 100-year storm events. During the 100-year storm event, the average WSE would rise approximately 0.46 feet to approximately 1,116.43 feet above mean sea level, and the average velocity would rise 0.47 fps (Pacific Advanced Civil Engineering 2009). However, the change in current and circulation patterns is relatively minor, and the project would not adversely affect the drainage, current, and circulation patterns of the Salt River.

3. Suspended Particulates; Turbidity

No quantitative suspended particulate or turbidity data was available for the Salt River within the permit area. However, data for turbidity and total suspended solids was available for effluence from NWWRP (Table 4).

Table 4. Northwest Wastewater Reclamation Plant average turbidity and suspended particulate data for 2008.		
Range	Turbidity (NTU)	Total Suspended Solids (mg/L)
Minimum	0.14	0.00
Maximum	1.19	5.50
Average	0.28	1.29
<i>Source: NWWRP 2008. NWWRP effluent water quality raw data.</i>		

The effluent from NWWRP generally makes up the majority of water being routed through the Tempe Town Lake bypass pipe and contributes to flows in the permit area. Although the above

referenced data occurs upstream of the permit area, the data can be used as baseline data for water quality parameters through the permit area because the water passes through to the permit area. However, the bypass flows also contain water from other sources such as stormwater outfalls, storm events, and upstream dam releases.

During dry or normal conditions, water is relatively clear with few suspended particulates which correlate to storm events. However, during storm flows, flow is highly turbid due to suspended particulates, as is normal for desert watercourses. Generally, during periods of low-flows from slow dam releases, the Tempe Town Lake bypass, outfall storm structures, and minor storm events, water in the permit area is relatively clear.

During construction, the project would likely cause a temporary increase in sedimentation and turbidity due to unstable sediments entering water flows. During large storm events, the construction site would be stabilized and equipment would be removed outside of the ordinary high water mark until flow has subsided. Water quality protection measures would be implemented during construction to reduce any construction-related impacts to water quality. For example, construction activities not typically identified as day-to-day airport operations at PHX require the Arizona Pollutant Discharge Elimination System (AZPDES) General Permit for Discharge from Construction Activities (permit number AZG-2008-001). Any construction work that occurs on PHX property requires the implementation of a project-specific Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs) to ensure the construction activities would not affect water quality. Thus, the contractor would be required to implement project-specific measures to reduce impacts to water quality.

The construction of the RSA would cause a narrowing of the banks increasing the WSE and velocity of flows for the 100-year storm event through the permit area. This could cause a slight change in sedimentation and turbidity during substantial storm events. However, these changes are minor and are not expected to substantially increase sedimentation and turbidity through the permit area.

The Arizona Department of Environmental Quality (ADEQ) water quality certification pursuant to the federal Clean Water Act Section 401 (33 U.S.C. Section 1341) for this project was issued on September 19, 2009. The Corps agrees with the certification requirements and, to ensure that the project meets water quality standards for suspended particulates, would include ADEQ's water quality certification conditions as special conditions of the Corps permit.

4. Water Quality (Temperature, Salinity Patterns and Other Parameters)

No quantitative surface water quality data is available for the immediate permit area. However, some water quality data was available for the NWWRP located upstream of Tempe Town Lake (Table 5).

Table 5. Northwest Wastewater Reclamation Plant average water quality data for 2008.			
Range	pH	Dissolved Oxygen (mg/L)	Sodium (mg/L)

Minimum	6.43	37.40	174.00
Maximum	7.80	47.30	215.00
Average	7.30	42.35	194.50
<i>Source: NWWRP 2008. NWWRP effluent water quality raw data.</i>			

As previously discussed, water flowing through the permit area is primarily dependent on the inputs from the outfall pipes and occasional releases of the Tempe Town Lake bypass pipe and or/dam. Because the current flows through the permit area include water from the NWWRP through the Tempe Town Lake bypass, these data can still be used to infer the potential water quality conditions in the project area during periods of flow.

PHX operates under the Multi-Sector General Permit for Industrial Activities under the current National Pollutant Discharge Elimination System (NPDES) permit dated October 30, 2000. This permit requires PHX to implement a SWPPP and BMPs to ensure water quality is protected by preventing contaminants from day-to-day airport operations from entering the stormwater drainage system. PHX conducts routine monitoring and maintenance of stormwater structures to ensure that substances from daily operations do not enter the stormwater drainage system. Furthermore, PHX has a fuel spill plan which details a specific action plan to prevent contaminants associated with emergency fuel spills from entering the stormwater drainage system. Thus, stormwater runoff entering the Salt River via outfall pipes has been subjected to water quality protection measures prior to entering the permit area.

The project would not create point or non-point source pollutants that would generate more than a temporary and minimal impact on water quality. The project is not anticipated to substantially change pH levels, total dissolved oxygen content, and sodium levels. In addition, the project would comply with the conditions of the Section 401 (33 U.S.C. Section 1341) water quality certification from ADEQ, which are designed to prevent impacts to water quality. Therefore, the project would not adversely impact water quality.

5. Flood Control Functions

The project occurs within Zone AE of the 100-year floodplain (FIRM Map Numbers FM0413C2145H and FM04013C2165H). In the 1990s, the Salt River was channelized through the permit area to increase flood control protection in the cities of Phoenix, Tempe, and Mesa. The river channel was designed to contain a 250,000 cubic feet per second (cfs) event with an additional three feet of freeboard. The 100-year flood event in the Salt River through the permit area is 169,000 cubic feet per second (cfs) (Pacific Advanced Civil Engineering 2009). The 100-year flood event was re-evaluated and lowered to 169,000 cfs after the upstream Roosevelt Dam was raised in 1996 to provide more flood control and water storage capacity.

As previously discussed, during a 100-year flood event, the average WSE would rise approximately 0.46 feet to approximately 1,116.43 feet above mean sea level, and the average velocity would rise 0.47 fps (Pacific Advanced Civil Engineering 2009). However, the channel

excavation would allow for adequate freeboard without overtopping the channelized banks of the river. Thus, flood control functions are not anticipated to be impacted by this project.

The project would result in minor impacts to floodplains and would raise the 100-year WSE. Coordination with the City of Phoenix floodplain administrator is currently underway to evaluate impacts to the floodplain, and the floodplain administrator has determined that the project is adequately self-mitigating, i.e. through channel excavation, gabion apron extensions on the south side of the river bank, and CSA armoring on the north side of the river bank. A conditional letter of map revision (CLOMR) application was submitted to the Federal Emergency Management Agency (FEMA) on March 26, 2009, and a Letter of Map Revision (LOMR) application will be submitted to FEMA upon completion of the project.

6. Storm, Wave and Erosion Buffers

There are no existing storm, wave or erosion buffers within the Salt River. Thus, the project would not impact storm, wave, or erosion buffers.

7. Erosion and Accretion Patterns

Water flow through the permit area is typically low energy flow and is dependent on inputs from the outfall pipes and occasional slow releases of the Tempe Town Lake bypass. Thus, erosion and sediment transport in the permit area is generally slow and minor. Major transportation of sediments occurs during substantial storm events or large releases from the Tempe Town Lake bypass and/or dam. During storm events, sediments erode from the channel creating a number of large scour holes. There are no areas within the project location where sediments substantially accumulate. The project could increase scour at the toe-of-slope of the north and south banks. However, the north embankment would have CSA bank protection below grade to reduce the likelihood of any undercutting of the structure. The gabion apron extensions would protect the south embankment toe-of-slope from being undercut from erosion. No substantial changes to erosion and accretion patterns are anticipated within the permit area or downstream.

8. Aquifer Recharge

The permit area is located in the West Salt River Valley Groundwater Sub-basin. As previously discussed, the subsurface below the permit area is stratified with over 100 feet of heterogeneous alluvial sediments overlying sedimentary bedrock. The alluvium in the permit area has been described as three distinct hydro-stratigraphic units starting with the upper layer (ground surface) downward:

- Unit F1 is an unconfined, highly permeable aquifer from the surface to approximately 60 feet below grade
- Unit F2 is a semi-confined aquitard with low permeability occurring roughly 60 to 90 feet below the surface
- Unit F3 is a semi-confined aquitard with medium permeability occurring approximately 90 feet below the surface to the bedrock

The alluvial layers are gradual and not well defined, though the bedrock layer is distinct. Unit F2 does not occur as a continuous layer through the permit area. Where Unit F2 is not present, both Units F1 and F3 are one unconfined alluvial aquifer. The Salt River is the predominant hydrologic feature influencing aquifer recharge in the permit area with rapid recharge occurring after major precipitation events or dam releases. A series of groundwater monitoring wells in the permit area are evaluated biannually by ADEQ. These wells revealed that the depths to groundwater in the permit area fluctuate over time and correspond to recharge during times of high river flow (MACTEC Engineering 2009).

A total of 15.87 acres of new impervious surface would be constructed within the Salt River due to the construction of the RSA likely causing a localized lower infiltration rate in the vicinity of the RSA. However, the channel excavation would allow for the required river hydraulics. Thus, the project activities would not substantially impede water flows or infiltration allowing aquifer recharge to continue to occur. Therefore, the project is unlikely to have any measurable effect on local aquifer recharge.

9. Baseflow

The portion of stream flow that occurs due to groundwater inputs is considered baseflow. Through the permit area, the groundwater flows to the west during dry river conditions, and typically flows to the southwest during flow events. Historically, groundwater levels have fluctuated from 25 to 70 feet below the surface through the permit area (MACTEC Engineering). There is no evidence of baseflow occurring in the the permit area. Given the historical data depicting the shallowest depth to groundwater during storm events occurring at approximately 25 feet below ground surface, baseflow is unlikely to occur even after substantial storm events (i.e. when the aquifer is rapidly recharged). Although the project would involve channel excavation to a depth of 5 to 10 feet below current elevation, it is not anticipated that the excavation activities would cause the release of groundwater or a new baseflow site into the Salt River. Thus, it is not anticipated that the project would result in any effects to baseflow.

10. Mixing Zone, in light of the depth of water at the disposal site; current velocity, direction and variability at the disposal site; degree of turbulence; water column stratification; discharge vessel speed and direction; rate of discharge; dredged material characteristics; number of discharges per unit of time; and any other relevant factors affecting rates and patterns of mixing

The Salt River in the permit area is ephemeral with a minimal amount of surface water present. The project would be constructed during dry conditions. It is not anticipated that the project would generate a mixing zone, or a place where waste and a limited volume of water mix.

B. Anticipated Changes to the Biological Characteristics of the Aquatic Environment

1. Special Aquatic Sites (wetlands, mudflats, coral reefs, pool and riffle areas, vegetated shallows, sanctuaries and refuges, as defined in 40 CFR 230.40-45)

The only special aquatic sites in the permit area are potential wetlands. Though a formal wetland delineation was not completed for this project, small patches of vegetation comprised of wetland species such as cattail and umbrella sedge occur within the permit area surrounding the two stormwater outfall structures. The City of Phoenix Aviation Department is currently permitted under Section 404 (33 U.S.C. Section 1344) of the Clean Water Act (Corps File No. 2000-00669-SDM) to eliminate wildlife habitat in the Salt River near PHX to reduce the potential for bird-strikes with aircraft as part of a PHX Wildlife Management Plan required by FAA. Permitted activities include continuous removal of vegetation (including wetland vegetation) and making minor alterations to the river channel to eliminate standing water. Therefore, for the purposes of evaluating impacts to special aquatic sites, wetlands would be considered absent, and the RSA improvement project would not impact wetlands.

2. Habitat for Fish and Other Aquatic Organisms

Because the Salt River in the permit area is ephemeral, habitat for fish and other aquatic organisms is present only when water is present. Most fish occurring in the permit area have been flushed downstream from Tempe Town Lake. Fish species known to occur in Tempe Town Lake are mostly non-native to Arizona, and some were originally stocked by Arizona Game and Fish Department for sport-fishing. Other fish potentially present in the permit area include species flushed downstream from other water bodies along the mainstem of the Salt River and tributaries further upstream. The mainstem of the Salt River throughout Arizona is currently known to contain 5 native fish species and 28 non-native species (Turner and List 2007). The 5 native species could potentially occur in the permit area, though likely in much smaller proportion to non-native species. As the water recedes after dam releases and precipitation events, most of the fish stranded in the permit area die, though some smaller species or individuals may persist in refugia such as the low-flow channel, stormwater outfalls, or pools in scour holes. Other aquatic organisms occurring in the Salt River may include non-native crayfish and bullfrogs, Couch's spadefoot toad, Woodhouse's toad, and various aquatic macro-invertebrates such as water boatman, water striders, giant waterbugs, and larvae of terrestrial insects such as dragonflies.

The new embankment would convert approximately 16.50 acres of the Salt River channel to dry land. However, except for a small pool of water at the 40th Street outfall, the area where the new embankment would be constructed is typically dry land unless bank to bank flows are present. The 32.61-acre channel excavation area would still be natural ground surface after construction is complete, though the channel excavation combined with the grade control structure notching and 40th Street outfall ditch would reduce pooling in the permit area, which would reduce refugia available for aquatic organisms. Overall, the project would result in a minor reduction of habitat for fish and other aquatic organisms, mostly in the form of refugia sites.

3. Wildlife Habitat (breeding, cover, food, travel, general)

When the Salt River is dry, habitat for wildlife in the permit area is generally poor quality that does not support a diverse assemblage of wildlife species, though the presence of surface water during or after flows attracts species that would not otherwise use the river when it is dry.

Bird species present in the permit area, depending on the presence of water, include species typical of urban environments (sparrows, grackles, doves), waterfowl, shore birds, larger wading birds, marshbirds, raptors, and passerine species. Mammals known to occur in the permit area include coyote and black-tailed jackrabbit. Beavers are known to occur further upstream and downstream of the project site, but would generally only occur within the permit area when sufficient surface water is present. Reptiles and amphibians that may occur in the area include ornate tree lizard, whiptail lizard, American bullfrog, Couch's spadefoot toad and Woodhouse's toad.

The new embankment would convert approximately 16.50 acres of the Salt River channel to airport use incompatible with wildlife habitat. The 32.61-acre channel excavation area would still be natural ground surface capable of supporting vegetation and wildlife after construction is complete, though the channel excavation combined with the grade control structure notching and 40th Street outfall ditch would reduce pooling in the permit area, which would reduce the attractiveness of the permit area to birds that feed on fish and other aquatic organisms. Temporary disturbance areas would revert to usable wildlife habitat post-construction, and the project would not impact the Salt River's capability to function as a wildlife travel corridor. Overall, the project would result in a minor reduction of wildlife habitat. As previously discussed, wildlife habitat in the permit area is subject to removal under the PHX Wildlife Management Plan.

4. Endangered/Threatened Species and Critical Habitat--Endangered Species Act

a. Listed Species and Designated Critical Habitat within Permit Area

The US Fish and Wildlife Service (USFWS) list of federally threatened, endangered, proposed, candidate, and conservation agreement species potentially occurring in Maricopa County, Arizona was reviewed and several site visits were conducted to determine species potentially occurring in the permit area. Three federally listed threatened or endangered species were identified as potentially occurring in the permit area based on recent occurrence records in the area and/or the presence of potential habitat in the project vicinity; bald eagle, California brown pelican, and Yuma clapper rail. No designated critical habitat is located within or near the permit area.

Bald eagles are known to occasionally forage along the Salt River in the Phoenix metro area, and have been regularly documented foraging and roosting in the permit area when surface water is present. Until recently, no bald eagle nesting attempts have been documented in the Phoenix metro area. However, an active bald eagle nest was discovered in January 2009 near the Salt River approximately 6 miles upstream of the permit area (K. Jacobson, AGFD, personal communication 2009). The nesting pair has been reported using the Salt River from Tempe Town Lake to east of State Route Loop 101 for foraging.

Brown pelicans are known to be occasional visitors to the Salt River in the Phoenix metro area, and have been regularly documented foraging and roosting in the permit area when surface water is present. Although nesting behavior has been documented along the Salt River (USFWS 2007), no known successful nesting attempts have been documented in Arizona and it is unlikely that pelicans would nest in the permit area.

No Yuma clapper rails are known to occur in the permit area. Clapper rail surveys conducted along the Salt River near the permit area include surveys along the “Tempe Drain” in 2000 (City of Phoenix 2000), and 2005 and 2006 (J. Dockens, personal communication 2009). No clapper rails were detected. The Tempe Drain is located approximately 2,000 feet southwest of the western project limit. Surveys have also been conducted along the Salt River approximately 5 miles east of the permit area near the SR 101L and SR 202L traffic interchange in 2003 and 2006–2008 with no detections (Burger 2008). In 2008, the nearest known survey site where clapper rails were detected was the Gila/Salt rivers between 91st Avenue and 107th Avenue, approximately 14 miles west of the permit area (Burger 2008).

No suitable Yuma clapper rail habitat occurs within or immediately adjacent to the construction footprint. Patches of wetland vegetation within the construction footprint and immediately adjacent are too small and of insufficient height and density for clapper rail use. The Tempe Drain, located approximately 2,000 feet southwest of the western project limit, does support potential clapper rail habitat due to the presence of cattail that is of sufficient height and density. However, the Tempe Drain is unlikely to be used by clapper rails due to the configuration of the cattail patches and the substrate type (two narrow linear strips growing from rip-rap along either side of the drain), as well as its location relative to the normal eastern range limit of clapper rails (Gila/Salt rivers near 107th Avenue). Vegetation previously present at the outlet of Tempe Drain in the Salt River has since been removed as part of the unrelated PHX Wildlife Management Plan, and is also subject to continuous removal under the plan.

b. Proposed Species and Proposed Critical Habitat within Permit Area

No species proposed for listing or proposed critical habitat is present in the permit area. This project would not impact any proposed species or proposed critical habitat.

c. Compliance with Section 7 of Endangered Species Act (ESA)

A biological evaluation (BE) was completed for this project on March 27, 2009. The Corps, as lead federal agency for the project, determined that the project “may affect, but is not likely to adversely affect” the bald eagle and California brown pelican, but that the project would not affect any other ESA-protected species. Through Informal Section 7 consultation (50 CFR Section 402.13), the USFWS concurred in a September 15, 2009 letter that the project “is not likely to adversely affect” the bald eagle or California brown pelican.

Previous consultations with the USFWS have been conducted for other projects in the permit area. FAA has conducted consultation with USFWS pursuant to Section 7 of the ESA (50 CFR

Section 402.14) for hazing/harassment of brown pelicans near PHX to reduce the potential for bird strikes (USFWS 2007).

In addition, internal consultation with the USFWS has been conducted prior to the issuance of two non-ESA permits. The City of Phoenix Aviation Department currently holds a federal USFWS permit for take of depredating eagles under the Bald and Golden Eagle Protection Act, and has applied to renew that permit. Activities conducted under the permit are described in the PHX Wildlife Hazard Management plan and include non-lethal hazing/harassing of bald eagles within the fenced boundaries of PHX and within 10,000 feet of runways. The City of Phoenix Aviation Department currently holds a migratory bird depredation permit under the Migratory Bird Treaty Act. Activities conducted under the permit are described in the PHX Wildlife Hazard Management plan and include non-lethal hazing/harassing of brown pelicans within the fenced boundaries of PHX and within 10,000 feet of runways.

5. Biological availability of possible contaminants in dredged or fill material, considering hydrography in relation to known or anticipated sources of contaminants; results of previous testing of material from the vicinity of the project; known significant sources of persistent pesticides from land runoff or percolation; spill records for petroleum products or designated (Section 311 of the CWA) hazardous substances; other public records of significant introduction of contaminants from industries, municipalities or other sources

Sites and facilities with known, suspected, or with the potential to contain hazardous substances and/or environmental contamination were identified through a site visit, a review of publicly-available documents, and the assistance of the environmental staff of the City of Phoenix Aviation Department. State and federal databases were searched to determine the presence, or former presence on any hazardous waste generating activities on or within 0.25-mile of the permit area. Historical records were also reviewed to determine if there were previous activities that may have released hazardous materials on or near the permit area. The search provided results on any properties that have had a release of a hazardous substance, as well as any properties with underground storage tanks (USTs) or leaking USTs (LUSTs). Several other environmental investigations have been performed on portions of the permit area and surrounding areas. These studies were used to confirm the database search results and identify any concerns not evident from the site visit. Sites identified within 0.25-mile of the permit area are summarized in Table 6 on page 27. This information is presented by site name, location, and a brief characterization of the site. The listing of these sites in a publicly-available database does not necessarily indicate the presence of contamination. Several sites identified in the database search and review of previous documents indicate facilities located within, adjacent to, or in close proximity to, the permit area that are known or have the potential to involve hazardous materials, environmental contamination, and/or other regulated substances. These areas are discussed below:

Estes Landfill

The Estes Landfill was privately owned and operated from 1953 until 1973 when it was permanently closed. The unregulated landfill was reported to have accepted industrial,

commercial, residential and liquid wastes. Groundwater contamination in the area was confirmed through sampling. The current contaminants of concern in the soil include arsenic, lead and thallium. The contaminants of concern in the groundwater include vinyl chloride, cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), benzene, bis(2-ethylhexyl) phthalate, arsenic, barium, chromium, lead, and manganese. The City of Phoenix acquired the landfill in 1982 to complete a river channelization project adjacent to the landfill. Approximately 30 acres of refuse in the riverbed were excavated and moved to the top of the landfill. The landfill materials were screened before and during excavation for possible hazardous materials, and several cubic yards of material were removed and disposed of at an appropriate hazardous materials disposal facility. Currently, the site is being monitored for groundwater contamination and no further remediation activities are being performed.

161st Air National Guard

In 1951 a new National Guard Base at Phoenix Sky Harbor International Airport was constructed on the south side of the airport between the south runway and the Salt River Channel. This facility has been used for a variety of aircraft operations, most recently aircraft refueling. Previous releases of fuels leaking from a fuel storage system (IRP Site Number 6) has created soil and groundwater contamination. Contaminants of concern include: benzene, toluene, ethylbenzene and xylenes (BTEX). Remediation of the groundwater contamination was performed between 2001 and 2007. Currently, no further remediation activities are occurring or are planned.

City of Phoenix Vacant Land Parcel (Earthfill Project)

Phase I and Phase II Environmental Site Assessments were conducted in 1990 for a City of Phoenix-owned property adjacent to the 161st Air National Guard facility (Sergent, Hauskins, and Beckwith 1990a and 1990b). These reports documented that construction/demolition debris had been disposed of in the area between the Air National Guard facility and the north bank of the Salt River. Backhoe trench testing of the area documented that transite (asbestos concrete) pipe, an asbestos containing material (ACM), was present in addition to other debris. In 1991, the City removed all construction/demolition debris by excavation and backfilled the entire area with engineered fill material. In addition, groundwater monitoring wells were installed and results indicated no impact to groundwater beneath the site.

New Fire Training Facility at Sky Harbor International Airport

The City of Phoenix operated a fire training facility adjacent to the south runway at the Sky Harbor International Airport in 1989 and 1990. The facility consisted of a concrete basin in which jet fuel was ignited and fire fighting operations were conducted to extinguish the flames. Soil sampling was conducted as part of the closure of this facility and no contamination was found. This site was successfully closed in 1994.

Groundwater Monitoring Wells

ADEQ replied to a scoping letter for this study on October 24, 2008. This letter indicated that there are numerous groundwater monitoring wells located throughout the airport property and on

adjacent parcels. These wells are used to test groundwater for the presence and concentrations of pollutants from nearby hazardous materials sites including the Estes Landfill and the 161st Air National Guard site.

Table 6. Hazardous materials sites within 0.25-mile of the permit area.		
Site Name	Address	Concern
Arizona Air National Guard – 161 st Air Refueling	2001 S. 32 nd St.	Soil and Groundwater Contamination
Estes Landfill	40 th St. and the Salt River	Soil and Groundwater Contamination
Bradley John S. and Sons	Not provided	None. No contamination known.
40 th St. Landfill	40 th St. and Magnolia	None. Landfill has been closed and is outside of permit area.
Beall Trailers of Arizona	2711 S. 40 th St.	None. LUST case has been closed and the site is outside of permit area.
Wayne Oxygen Co	2615 S. 40 th St.	None. All cases have been closed and the site is outside of permit area.
US Airweld	2615 S. 40 th St.	None. All cases have been closed and the site is outside of permit area.
Eagle Transportation	2606 S. 40 th St.	None. No contamination known.
Metron Chamber Performance Services	3925 E. Watkins St.	None. UST has been closed and the site is outside of permit area.
The Heil Company	2441 S. 40 th St.	None. No contamination known.
TESCO Truck Equipment	2441 S. 40 th St.	None. UST has been closed and the site is outside of permit area.

Table 6. Hazardous materials sites within 0.25-mile of the permit area (continued).		
Site Name	Address	Concern
WMI - Sky Harbor Regional SWTS	2425 S. 40 th St.	None. UST has been closed and the site is outside of permit area.
Waste Management Inc. Asset Recovery Group	2604 S. 38 th St.	None. No contamination known.
Pro Innovative Inc.	3836 E. Watkins St.	None. No contamination known.
Sumika Electronic Materials Inc.	3832 E. Watkins St.	None. No contamination known.
Biotech Research Labs Inc.	3809 E. Watkins St.	None. No contamination known.
Rohm and Haas	3804 E. Watkins St.	None. No contamination known.
Laboratory Corporation of America	3930 E. Watkins St.	None. No contamination known.
Minute Man Tank Lines	4030 E. Magnolia St.	None. LUST/UST case has been closed and the site is outside of permit area.
Courier Graphics Corp	2621 S. 37 th St.	None. No contamination known.

Source: Environmental Data Report, February 2009.

Soil and groundwater contamination does occur on sites adjacent to the permit area. Fill material to be used for extending the embankment on the north bank of the Salt River would come from an existing stockpile of material (the Aviation Soil Stockpile) located east and adjacent to the Estes Landfill. This material has been tested for the presence of contaminants and the levels were below the soil remediation levels (SRL) for residential areas as defined by ADEQ. No disturbance to the soil or groundwater on the Estes Landfill site, the 161st Air National Guard, or the Fire Training Facility would occur under either alternative. Groundwater monitoring wells that would be impacted by construction would be abandoned and relocated or modified as necessary. Coordination with ADEQ during the design phase would identify any conflicts with these wells. If contaminated soils or groundwater are encountered during construction, appropriate steps would be taken to determine and address any safety concerns, and to properly handle any onsite contamination. Workers would be instructed to immediately report any illegal solid or hazardous waste encountered to the construction supervisor. The City of Phoenix would coordinate with the ADEQ and/or Environmental Protection Agency (EPA) to determine the proper treatment or disposal of any contaminated materials encountered during construction.

6. General Environmental Concerns

C. Changes to the Human Use Characteristics of the Aquatic Environment

1. Existing and Potential Water Supplies; Water Conservation

This reach of the Salt River does not currently supply any municipal or private water system. If this reach were to be used as a water supply in the future, the construction of the RSA and resultant changes in the river topography would not preclude extraction or siphoning of water at this location during upstream dam releases, or from the low-flow channel. This action would not have a permanent impact on water quality in this reach, and would not affect the suitability of this water supply for municipal or private use. Water conservation efforts in the Salt Watershed are primarily focused on efforts to maintain water supplies in the aquifer and Salt River Project/Bureau of Reclamation reservoir system through sustainable levels of consumption and recharge. The project would not affect water supplies in these systems, or change consumption rates. Therefore, the project would not precipitate a greater need for conservation or negatively affect any on-going conservation practices.

2. Commercial or Recreational Fisheries

There is no commercial fishing activity in the permit area or vicinity that would be potentially affected by the project. This reach of the Salt is not publicly accessible, and no recreation or sport fishing is allowed. The pre- and post-construction conveyance of flows would not be affected by the project and those areas of the watershed up and downstream where recreational fishing is permitted would not experience changes that diminish their recreational fishing value.

3. Other Water Related Recreation

This reach of the Salt River provides no water-related recreation opportunities such as boating or swimming because it is not a publicly accessible area, and water flows, when present, are typically too rapid and/or shallow to accommodate these activities.

4. Aesthetics of the Aquatic Ecosystem

Along the PHX property, the Salt River has been extensively channelized and has the appearance of a flat-bottomed floodway with steeply sloped concrete or riprapped sides. Vegetation is also removed to prevent the formation of habitat for birds to reduce the probability of aircraft-bird strikes. Although the project would result in changes to the river topography and the local cross section, the general appearance of the river would not change as a result of the Action.

5. Parks, National and Historic Monuments, National Seashores, Wild and Scenic Rivers, Wilderness Areas, Research Sites, etc.

This project would take place along a reach of the Salt River that is not within or adjacent to any park, National or Historic Monument, National Seashore, Wilderness Area, or research site. Furthermore, this reach of Salt River is not designated Wild, Scenic, or Recreational under the Wild & Scenic Rivers Act.

6. Traffic/Transportation Patterns

The project would take place on PHX property and within the river channel; there would be no direct involvement with the surrounding public street system or freeways. Haul routes to transport material between the aviation soil stockpile and the construction site would not utilize public roads. Thus, construction would occur without interruption to the local street system and freeways. Aircraft operations at PHX would continue uninterrupted during construction. Aircraft would be permitted to take-off and land from Runway 25L while construction is taking place. Once complete, the project would result in no changes to the airport or aircraft operations.

7. Energy Consumption or Generation

Changes to the topography and local cross section of this reach of the Salt River would not affect energy consuming activities that take place in the area such as airport or aircraft operations. Although energy would be expended in the construction of this action, this would be a temporary condition that would cease when construction is complete. The Salt River is used for the generation of electricity at four dam sites located upstream of the permit area, the nearest is located approximately 30 miles upstream. The project would not temporarily or permanently affect operations at any of the dams and would not affect the generation of energy at these facilities.

8. Navigation

Watercraft do not use this reach of the Salt River; therefore, the project would not affect navigation.

9. Safety

A purpose of this project is to enhance safety by providing a RSA and ROFA for aircraft landing and departing Runway 25L. Safety during construction would be maintained by access control through signage and fences that would prevent the public from entering the construction site. The project would comply with all applicable FAA construction safety rules.

10. Air Quality

This section describes the existing air quality conditions within the permit area, and relevant provisions of the State Implementation Plans (SIP) of Arizona (ADEQ 2009). The EPA has established National Ambient Air Quality Standards (NAAQS) for ambient (outdoor) concentrations of the following criteria pollutants: Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Ozone (ground-level O₃), Sulfur Dioxide (SO₂), Lead (Pb), and particulate matter with a diameter of 10 microns or less (PM₁₀ and PM_{2.5}) (US EPA 2009).

Primary standards set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 7 on page 31 provides a basic description of each pollutant and typical sources. States must identify geographic areas that do not meet the NAAQS for each criteria pollutant. These areas are then identified as non-attainment areas for the applicable criteria pollutant(s). States must develop a SIP for non-attainment areas that includes a variety of emission control measures that the state deems necessary to produce attainment of the applicable standard(s) in the future. If a SIP already exists, it must be revised if an area is designated non-attainment for a criteria pollutant, or if the severity of non-attainment changes. An area previously designated non-attainment pursuant to the Clean Air Act (CAA) Amendments of 1990 (42 U.S.C. Section 7401 et seq.), and subsequently re-designated as attainment, is termed a *maintenance area*. A maintenance area must have a maintenance plan in a revision to the SIP to ensure attainment of the air quality standards is maintained.

Table 7. National Ambient Air Quality Standards (NAAQS).			
Pollutant	Averaging Time	NAAQS	Description and Typical Sources
Carbon monoxide (CO)	1 hour	35 ppm (40 mg/m ³)	CO is a colorless, odorless, tasteless gas; can temporarily accumulate into localized “hot-spots” in calm weather conditions and in the wintertime. CO usually dissipates quickly, posing no wide-spread threat to human health or the environment. Under elevated ambient concentrations, CO can cause headache and nausea in humans. Mobile sources (i.e. motor vehicles), indoor heating and open burning are among the pre-dominant anthropogenic (i.e. man-made) sources of CO.
	8-hour	9.0 ppm (10 mg/m ³)	
Ozone (O ₃)	8-hour	0.075 ppm (147 µg/m ³)	O ₃ is a secondary pollutant, formed from daytime reactions of NO _x and VOC rather than being directly emitted by natural or man-made sources. In elevated concentrations, O ₃ is a strong oxidant with deleterious effects on both human health and the natural environment. The CAAQS for O ₃ was lowered recently and the averaging period changed from one to eight hours.
Nitrogen dioxide (NO ₂)	Annual	0.053 ppm (100 µg/m ³)	NO ₂ , nitric oxide (NO), and the nitrate radical (NO ₃) are collectively called oxides of nitrogen (NO _x) and NO ₂ is the compound commonly measured with air quality monitors. NO _x is generally emitted in the form of NO, which is oxidized to NO ₂ . The principal man-made source of NO _x is fuel combustion in motor vehicles and power plants. In elevated concentrations, NO ₂ causes adverse health effects and reactions of NO _x with other atmospheric chemicals can lead to the formation of O ₃ and acidic precipitation.
Sulfur dioxide (SO ₂)	3-hour	0.5 ppm (1300 µg/m ³)	For man-made sources, SO ₂ is emitted primarily by the combustion of sulfur-containing fuels and sulfuric acid manufacturing. SO ₂ can lead to the formation of acidic precipitation and in elevated concentrations impair human lung functions and plant growth.
	24-hour	0.14 ppm (365 µg/m ³)	
	Annual	0.03 ppm (80 µg/m ³)	
Respirable Particulate Matter (PM ₁₀)	24-hour	150 µg/m ³	PM comprises of very small particles of dirt, dust, soot or liquid droplets called aerosols. The regulatory standards for PM are segregated by sizes (i.e., respirable or PM ₁₀ and fine or PM _{2.5}). PM is formed from both natural and man-made sources including wind erosion over exposed soils (i.e., fugitive dust), the burning of fossil fuels and incineration of solid wastes, and as an exhaust product from the internal combustion engine. Of growing concern are the effects of PM on visibility and the potential impairment to human health in the form of diesel emissions.
Fine Particulate Matter (PM _{2.5})	24-hour	35 µg/m ³	
	Annual	15 µg/m ³	
Lead (Pb)	Calendar Quarter	0.15 µg/m ³	Lead is a “heavy metal” most commonly associated with emissions from industrial sources including waste oil and solid waste incineration, iron and steel production, lead smelting, and battery and lead alkyl manufacturing. The lead content of motor vehicle fuel, which was a major source of atmospheric lead in the past, has significantly declined with the widespread use of unleaded fuel.

The current attainment/non-attainment designations for Maricopa County are summarized in Table 8. As shown, Maricopa County is currently designated as “attainment” for NO₂, SO₂, PM_{2.5} and lead; classified as “maintenance” for CO, and “non-attainment” for PM₁₀. For O₃, Maricopa County is designated as a “non-attainment area” under Subpart 1 (the lowest

classification). Maricopa’s current SIP still references the previous standard for 8-hour Ozone and indicates that attainment status will be reached by June 15, 2009 (US EPA 2009).

Pollutant	Attainment Status
CO	Maintenance
NO ₂	Attainment
O ₃	Non-attainment (Subpart 1)
SO ₂	Attainment
PM ₁₀	Non-attainment (Serious)
PM _{2.5}	Attainment
Lead	Attainment

Source: US EPA 2009. website: <http://www.epa.gov/air/oaqps/greenbk/index.html>

The FAA document, Air Quality Procedures for Civilian Airports and Air Force Bases (Air Quality Handbook) (Addendum 2004) provides guidance on how to assess potential air quality impacts. The project would not cause a change in the level of aircraft activity at PHX, nor cause changes to the runway or taxiway use. Because there would be no impact to these factors, there is no significant impact in Air Quality. When a project entails extensive grading such as this project, fugitive dust may be an issue. Fugitive dust pollution from excavated areas and construction equipment emissions can result in temporary impacts to ambient air quality. In terms of fugitive dust, BMP methods would minimize air quality impacts by treating excavated areas with water and covering graded area. It is noted that construction activities would need to take the necessary steps to comply with the fugitive dust rules in place as part of the Maricopa County air quality regulatory program. The appropriate dust permits would be acquired before construction begins. As previously discussed, PHX is located in an area designated as serious non-attainment for PM₁₀, maintenance for CO, and subpart 1 for Ozone. Construction emissions for the project was quantified and compared to the associated General Conformity threshold rates (also referred to as de minimis levels), shown in Table 9.

Pollutant	Tons/Year
Ozone (VOC’s or NO _x): Other ozone Non-attainment areas outside an ozone transport region	100
Carbon monoxide: All Maintenance Areas	100
PM ₁₀ : Serious Non-attainment areas	70

Source: USDOJ, Clean Air Act, 40 CFR Part 51 [Amended], Subpart W, Section 51.853.

Emissions were quantified by using EPA AP-42 non-road emission factors (EPA 1991). A construction schedule was prepared and yearly hours of operation for non-road equipment and mileage for on-road equipment were estimated. The EPA AP-42 emission factors were then applied to the estimated total equipment hours/ mileage for each piece of equipment that would be used to construct the project. As shown in Table 10, the emissions for construction of the project would be well below the associated General Conformity emission thresholds. Refer to the

air quality data in the Appendix for more detailed information regarding estimation of construction emissions.

Table 10. Construction emissions for the proposed action.						
	Emissions (tons)					
	CO	NO_x	VOC	PM₁₀	PM_{2.5}	SO_x
Construction Activity	6.88	13.92	1.59	1.48	1.33	1.27
Truck Emissions	1.72	7.51	0.52	0.23	0.19	0.05
Total	8.60	21.43	2.12	1.71	1.52	1.31
General Conformity Threshold	100	100	100	70	N/A	N/A
Exceeds Threshold?	No	No	No	No	N/A	N/A
<i>Source: HNTB Analysis 2009.</i>						

Additionally, as shown in Table 11, the total of construction emissions from the project would not represent 10% of total regional emissions for PM₁₀ and as a result are not considered regionally significant. It should be noted that Maricopa County includes ammonia (NH₃) within their inventory. Ammonia is associated with PM_{2.5}. Since PM₁₀ is the pollutant of concern for this study, ammonia was not inventoried as part of this analysis. However, since PM_{2.5} is a subset of PM₁₀ and both sizes of particulate matter are less than significant regionally, it can be qualitatively inferred that construction of the project would not be regionally significant for ammonia.

Table 11. Percent of Maricopa County regional emissions.				
	Emissions (tons)			
	NO_x	PM₁₀	PM_{2.5}	SO_x
Maricopa County Regional Emissions¹	16,016.62	1,354.26	1,311.26	287.07
Sloped Bank Alternative	21.43	1.71	1.52	1.31
Percent of Regional Total	0.13%	0.12%	0.11%	0.45%
<i>Sources: HNTB Analysis 2009; MCESD, Maricopa County Periodic Emission Inventories 2005. ¹ Includes all construction-related emissions in Maricopa County.</i>				

Therefore, construction of the project would not exceed General Conformity threshold levels (i.e. be de minimis) and thus be presumed to conform to the SIP. Additionally, the project would not result in regionally significant emissions. Thus, a conformity determination is not required and no further analysis for air quality is necessary.

11. Noise

The Federal Interagency Committee on Noise (FICON) has established guidelines to address the compatibility of various land uses within an aircraft operation's induced noise environment. These guidelines provide a means to describe the potential effect of the project alternatives on land areas within the vicinity of PHX. The FAA has informally adopted the FICON guidelines

regarding land use compatibility with various levels of aircraft noise. FAA noise compatibility guidelines are included in 14 CFR Part 150, *Airport Noise Planning, Land Use Compatibility Guidelines*. Per 14 CFR Part 150, noise exposure levels of less than 65 Day /Night Sound Level (DNL) are compatible with residential and other noise-sensitive land uses. FAA Order 1050.1E establishes that a change of 1.5 DNL or more at or above 65 DNL at noise-sensitive land uses due to the proposed action alternative(s), as compared to the no action alternative, is considered a significant impact.

The compatibility of existing and planned land uses with aircraft operations is usually determined based on the extent of noise impacts around an airport. PHX sits on approximately 3,400 acres within the City of Phoenix limits. The April 2008 Land Use Map included in the City's General Plan indicates that the airport is bordered immediately to the north and west by industrial zoned land. To the south of the airport the land is zoned for commerce or business. Immediately to the east the airport is located within a floodplain and to the south east is floodplain as well as land zoned as parks and open space. Beyond the parks and open space, the land is zoned for commerce or business.

Because the project would not change aircraft traffic patterns or activity levels, there would be no difference in aviation noise contours after construction is completed when compared to the existing condition. Therefore, the project would have no permanent impact on the noise environment.

Temporary changes to the noise environment are anticipated during construction. Grading and scraping operations are among the noisiest construction activities expected during project construction, with equipment generating noise levels of approximately 96 dBA within 50 feet of their operations. However, distance would rapidly attenuate these noise levels. There are no residential properties within a mile of the construction area. Land use types near the construction site include industrial/commercial lands located on the south bank of the Salt River, which are not considered noise sensitive. Table 12 shows the maximum noise level by the equipment types that would be used in construction of the Proposed Action, as well as the resulting noise at various distances from the construction zones. It should be noted that no adjustment to calculated noise levels has been made to account for the fact that much of the grading activities would be undertaken at elevations below the embankment thereby reducing the noise levels for construction activities conducted in the Salt River.

From the noise levels provided in Table 12, maximum noise levels generated by any of the construction equipment considered would be below 50 dBA beyond 3,000 feet from the construction site (50 dBA is often compared to the sound of light traffic at 100 feet). Noise sensitive land uses such as residential use are located more than a mile from the construction site; therefore, there would be minimal impact from the temporary construction noise associated with the project.

Equipment Type	Maximum Noise (at 50 feet)	Noise (dBA) at Receiver by Distance (feet)								
		1000	1500	2000	2500	3000	3500	4000	4500	5000
Compacter/Roller	88	51.9	45.4	40.7	37.0	34.0	31.9	30.0	28.2	26.5
Front Loader	97	60.9	54.4	49.7	46.0	43.0	40.9	39.0	37.2	35.5
Backhoe	93	56.9	50.4	45.7	42.0	39.0	36.9	35.0	33.2	31.5
Tractor	97	60.9	54.4	49.7	46.0	43.0	40.9	39.0	37.2	35.5
Scraper/Grader	96	59.9	53.4	48.7	45.0	42.0	39.9	38.0	36.2	34.5
Paver	92	55.9	49.4	44.7	41.0	38.0	35.9	34.0	32.2	30.5
Truck	97	60.9	54.4	49.7	46.0	43.0	40.9	39.0	37.2	35.5
Concrete Mixer	90	53.9	47.4	42.7	39.0	36.0	33.9	32.0	30.2	28.5
Concrete Pump	85	48.9	42.4	37.7	34.0	31.0	28.9	27.0	25.2	23.5
Pump	80	43.9	37.4	32.7	29.0	26.0	23.9	22.0	20.2	18.5
Generator	83	46.9	40.4	35.7	32.0	29.0	26.9	25.0	23.2	21.5
Compressor	88	51.9	45.4	40.7	37.0	34.0	31.9	30.0	28.2	26.5
Jackhammer/Drill	99	62.9	56.4	51.7	48.0	45.0	42.9	41.0	39.2	37.5
Pile Drivers @ Peak	105	68.9	62.4	57.7	54.0	51.0	48.9	47.0	45.2	43.5
Vibrator	82	45.9	39.4	34.7	31.0	28.0	25.9	24.0	22.2	20.5
Saw	96	59.9	53.4	48.7	45.0	42.0	39.9	38.0	36.2	34.5
Maximum		68.9	62.4	57.7	54.0	51.0	48.9	47.0	45.2	43.5

Sources: HNTB analysis using: Average Temperature = 72.6 degrees F. Average Humidity = 41%, Average Atmospheric Pressure = 29.99 in=Hg, Equipment noise levels: Handbook of Noise Control, Cyril Harris, 1979, Ground Attenuation: Ground to Ground Lateral Attenuation, INM 6.0 Technical Manual, page 55, Atmospheric Absorption: Absorption of Sound in Air versus Humidity and Temperature, Cyril Harris, 1966, and <http://www.csgnetwork.com/atmossndabsorbcalc.html>.

12. Historic Properties

Since the entire area of potential effects (APE) lies within the historic Salt River bed; scouring from Salt River flow and floodwaters would have removed any archaeological remains in the APE. Some portions of the APE are on fill deposits used to create developable land for the airport. Any buildings or other structures surrounding the construction area post-date 1982 and, therefore, are too recent to be considered eligible for the National Register of Historic Places (NRHP). As a result, there is no potential that intact historic properties are present in the APE. Based on this, the Corps has determined the project does not have the potential to affect historic properties. The State Historic Preservation Office concurred with this finding August 31, 2009.

13. Land Use Classification

According to the City of Phoenix General Plan (updated March 5, 2009), land categories in the permit area include public/quasi public (PHX), open space (the Salt River), and industrial (the aviation soil stockpile). Land use activity classifications for these categories include transportation/aviation, flood control, and material storage. The project would not result in changes to these land uses.

14. Economics

PHX is an important economic resource for the Phoenix metropolitan area and the State of Arizona. PHX has been described as the economic engine of Arizona as it contributes more than \$33 billion annually to the state's economy and employs more than 33,000 people (City of Phoenix 2008). Improvements to the safety facilities at the airport are an important aspect of maintaining this economic resource and ensuring its long-term viability. The construction of the RSA would further these goals and contribute to the regional and statewide economic livelihood.

The project is confined to City of Phoenix-owned property that is occupied by PHX, the Salt River channel, and the aviation soil stockpile area. There are no businesses in these areas that would be affected by the construction of the RSA, and construction activities would not indirectly affect business through potential construction-related impacts such as interruptions to local traffic patterns. Once complete, the RSA would not affect business or commerce in the area.

As previously discussed, during a 100-year flood event, the average WSE would rise approximately 0.46 feet to approximately 1,116.43 feet above mean sea level, and the average velocity would rise 0.47 fps (Pacific Advanced Civil Engineering 2009). However, the channel excavation would allow for adequate freeboard without overtopping the channelized levee banks of the river. Thus, effects from flooding are not anticipated to occur to the surrounding landowners.

15. Prime and Unique Farmland (7 CFR 658)

There is no farmland or agricultural activities occurring in the permit area; therefore, the project would not affect prime or unique farmland.

16. Food and Fiber Production

No food or fiber production is occurring in the permit area; therefore, the project would not affect food or fiber production.

17. General Water Quality

Requirements for this project would include compliance with the specifications and practices outlined in the SWPPP, the terms and conditions of the CWA Section 404 (33 U.S.C. Section 1344) permit, and the conditions of the CWA Section 401 (33 U.S.C. Section 1341) Water Quality Certification. Construction would be controlled in accordance with these plans and permits, and no exceedences of the allowable standards for water quality are anticipated to result from construction or as a result of the completed project.

18. Mineral Needs

Sand and gravel aggregate from the aviation soil stockpile and material excavated from the river bottom adjacent to the RSA would be used to construct the RSA. The use and/or extraction of these materials would not affect other mineral resources on-site or elsewhere.

19. Consideration of Private Property

The project would take place on City of Phoenix-owned properties at PHX, within the Salt River channel and its banks, and at the aviation soil stockpile location and intervening haul roads. Construction would not directly involve any private property. Because the project would maintain the current flow capacity of the Salt River with minor changes in WSE and flow velocity, the project would not affect private property located upstream or downstream due to increases or changes to the elevation of floodwaters.

20. Conservation

Conservation efforts in the permit area are limited to maintaining the current land-use functions represented by PHX, the Salt River, and the aviation soil stockpile area. There are no areas in the permit area or immediately adjacent areas that have been identified as areas for the conservation of natural resources. Habitat restoration projects that are existing or planned in and along the Salt River are located up and downstream. These existing or planned conservation areas would not be affected by the project because construction of the RSA would not result in the additional loss of aquatic resource functions and values within the Salt River and corresponding watershed. Downstream impacts are not anticipated to occur because the project would not substantially or permanently impede flow or alter downstream water quality.

21. Other

No other general environmental concerns have been identified that would require consideration in this analysis.

D. Other Anticipated Changes to Non-jurisdictional Areas That Have Been Determined to be Within the Corps' NEPA Scope of Analysis

The aviation soil stockpile area and the haul roads that connect the aviation soil stockpile area to the RSA site and river are located outside the Corps' jurisdictional area. Changes to these areas would be limited to removing earthen material from the stockpile. Transporting the material would be done on existing haul roads and would not result in changes outside of the jurisdictional area.

E. Summary of Indirect and Cumulative Effects from the Proposed Permit Action

The growth of PHX is constrained by the surrounding freeway system, private lands, and lack of adjacent open space that could accommodate expansion of the facility. The construction of the RSA represents a small increase in the size of PHX relative to overall size of the facility. Furthermore, the construction of the RSA does not facilitate an increase of the airport's

operational capacity and would not increase the number of flights or passengers that the airport can handle. The project would not increase the likelihood of or create an opportunity for the further expansion of airport facilities. The project is not expected to result in growth-inducing impacts related to expansion of the PHX facilities, and would not indirectly result in future actions within Corps-jurisdictional areas of the Salt River or contribute to the overall environmental degradation that could result from future development.

Numerous past actions have occurred that involve renovation, safety improvements, and expansion of PHX facilities. The sum of these past actions have resulted in impacts to the aquatic resource functions and values of the Salt River. Although the current project would result in permanent loss to jurisdictional waters, the construction of the RSA would involve measures to protect water quality. The current project would not represent a continuation of historic trends that have individually or cumulatively resulted in impacts to the Salt River or environmental degradation of the watershed.

F. Other Cumulative Effects Not Related to the Proposed Permit Action

1. Occurred On-site Historically

Numerous changes to the reach of the Salt River along the PHX property have occurred in the past. Over time, flood control efforts including channelization and changes to the river topography, mining, waste disposal, and vegetation and bird habitat removal, have all affected the aquatic resource functions and values of the river.

2. Likely to Occur within the Foreseeable Future

The reach of the Salt River where the project is occurring, the adjacent PHX facilities, and the adjacent industrial/commercial lands are likely to continue to function in the future in the same way they function today with little or no change. Although some changes may occur at PHX to further enhance safety or flight operations, these changes are unlikely to bring about actions that would affect areas within the jurisdictional limits of the Salt River or affect water quality. Because this reach of the Salt River remains an important watercourse for the conveyance of floodwaters and stormwater runoff, it is unlikely that future actions would permit significant changes to river function, channel location, or channel topography. Up and downstream of the permit area, additional habitat restoration projects are planned that would offset some of the overall environmental degradation that has impacted the Salt River, and the trend towards natural restoration of the River is expected to continue.

3. Contextual Relationship Between the Proposed Action and (1) and (2) Above

The construction of the RSA is in keeping with the history of occasional expansion and safety improvements made to PHX. It is, however, not related to many of the past undertakings that have directly or indirectly affected the Salt River, such as irrigation diversion, constructing flood control measures, or dumping. Although the current project does represent a permanent loss of

waters of the US, it is unlike many of the past actions that have substantially affected the functioning of the watershed and harmed aquatic value and water quality.

Those actions that are likely to occur in the future are limited by the development constraints of the permit area and immediate vicinity. Current land uses are expected to persist for the foreseeable future with little or no change. The current project is therefore unlikely to be a part of a future trend of development or redevelopment that results in actions taking place within the jurisdictional limits of the Salt River. An exception would be the planned habitat restoration projects that would occur in the Salt River. The current project would not affect these restoration efforts, as the RSA would be constructed in a reach of the Salt River that is intentionally kept free of standing water and vegetation to make it less attractive for birds.

G. Mitigation Proposed by Applicant

1. Avoidance, Minimization, Compensation Sequence

Avoidance. The alternatives analysis for this project indicated that it would not be practicable to avoid waters of the US during project construction. After reviewing the alternatives analysis and independently evaluating opportunities for avoidance, the Corps has concurred that avoidance of waters of the US is not practicable for this project.

Minimization. Impacts would be limited to the minimum necessary to accomplish this project. To the extent practicable, impacts to waters of the US would be minimized. Erosion control measures would be taken to reduce impacts to water quality.

Compensatory Mitigation. The applicant proposes compensatory mitigation for permanent loss to waters of the US that constitutes an actual loss of aquatic resource functions and values. Project components resulting in permanent loss to waters of the US that would not result in an actual loss of aquatic functions and values include the channel excavation area, south bank gabion apron extensions, and the 40th Street outfall grader ditch and extension of the landside river access/ARFF road. Although the channel excavation will result in an elevation change of the river bed, the channel excavation area would not be converted to dry land and will still be natural ground surface that retains aquatic functions and values of the pre-construction condition. The south bank gabion apron extensions will be buried below the channel surface and backfilled with native material such that the surface disturbance area will still be natural ground surface that retains pre-construction condition aquatic functions and values. The 40th Street outfall grader ditch will support surface flow from the 40th Street outfall pipe, which will replace aquatic functions and values lost at the current 40th Street outfall to be obliterated by extension of the north embankment for the RSA. Furthermore, the current 40th Street outfall location was previously mitigated under the separate Bird Hazard Mitigation Project Section 404 permit (Corps File No. 2000-00669-SDM). The extension of the landside river access/ARFF road occurs in an area that is typically only inundated during bank to bank river flows and only supports sparse vegetation more typical of upland areas. Because the road will remain natural ground surface that will still be inundated when bank to bank flows are present, the road extension does not constitute an actual loss of aquatic functions and values.

The only project component that would convert waters of the US to uplands would be the new north embankment for the RSA itself, which would convert 15.87 acres of waters of the US to uplands. Aside from the 40th Street outfall, which typically supports a small pool of water lined with wetland vegetation, vegetation and habitat within the north embankment extension footprint is more comparable to upland areas, and the footprint is only inundated with water during bank to bank flows in the Salt River. In addition, the applicant previously mitigated for a portion of the new north embankment footprint under the separate Bird Hazard Mitigation Project Individual Section 404 permit. Approximately 0.69 acres of permanent loss to water of the US attributed to the Bird Hazard Mitigation Project (portions of devegetation area # 3 and the current 40th Street outfall ditch) overlap the current RSA north embankment footprint. This 0.69 acres was mitigated through in-lieu fees under the Bird Hazard Mitigation permit. Therefore, the applicant proposes compensatory mitigation for 15.18 acres of permanent loss to waters of the US within the RSA footprint that would be converted to uplands (15.87 acres – 0.69 acre) at a rate of \$5,000 per acre.

The applicant proposes off-site compensatory mitigation within the same watershed as the impact site. On-site mitigation is not practicable because the addition of any habitat that may attract birds would pose a potential bird-strike safety hazard for aircraft operations. In-lieu fees were considered but eliminated from further consideration because fees would likely be distributed to Arizona Game and Fish Department's Powers Butte Wildlife Area along the Gila River approximately 40 miles west of the project area, and the applicant would prefer that mitigation for the project be implemented along the Salt River within the City of Phoenix. The applicant also considered off-site compensatory mitigation by contributing funds to restoration of riparian habitat at the Arizona Audubon's Nina Mason Pulliam Rio Salado Audubon Center located along the Salt River approximately four miles west (downstream) of the project area. However, FAA opposed this proposal because the mitigation site would be located within 5 miles of PHX, which could pose a potential bird-strike safety hazard for aircraft operations at PHX. Through coordination with City of Phoenix Parks & Recreation Department, a site in need of restoration was identified at South Mountain Park/Preserve approximately 9 miles southwest of the project site. Because South Mountain Park/Preserve is already managed for preservation and low-impact outdoor recreation and will continue to be in the future, it is practicable to accomplish ecologically self-sustaining restoration of habitat at South Mountain Park/Preserve.

The applicant proposes to contribute \$80,000 towards restoration of a maximum of 15.18 acres of desert habitat at a site along an ephemeral wash within the City of Phoenix South Mountain Park/Preserve. The proposed mitigation site has been severely degraded due to a human-caused fire that occurred in 2001. Restoration would focus on re-establishing native Sonoran desert vegetation, including grasses, annuals, shrubs, and trees. South Mountain Park/Preserve provides a unique refuge for native desert vegetation and wildlife in the otherwise mostly developed southern Phoenix metropolitan area. The mitigation site currently provides limited value to wildlife due to a lack of vegetative cover. Re-establishing vegetation at the site would restore habitat for wildlife in the South Mountains, which may otherwise take decades to recover, and would also reduce erosion in the drainage basin. The applicant would be responsible for periodic monitoring of the re-established vegetation and reporting to the Corps to ensure the mitigation is

successful. The applicant believes that restoring up to 15.18 acres of native desert along an ephemeral wash at South Mountain Park/Preserve will adequately mitigate for the conversion of 15.18 acres of degraded Salt River bottom to uplands in order to construct the RSA.

2. Is Mitigation Used To Reduce Any Impact to Below Significance?

Mitigation is not used to reduce any impacts below significance within the meaning of NEPA. However, the implementation of the following mitigation measures would avoid or minimize potential impacts to environmental resources within the permit area.

- If construction or demolition debris consisting of transite pipe or other suspected asbestos containing materials (ACM) is encountered during construction, the construction supervisor would immediately contact the City of Phoenix Aviation Department Planning and Environmental Division (602.683.3786) to arrange for proper assessment, treatment, or disposal of those materials.
- If suspected hazardous waste or solid waste is encountered during construction, the construction supervisor will immediately contact the City of Phoenix Aviation Department Planning and Environmental Division (602.683.3786) to arrange for proper assessment, treatment, or disposal of those materials.
- The City of Phoenix Aviation Department Planning and Environmental Division will coordinate with the Arizona Department of Environmental Quality (602.771.4411) during final design to identify any groundwater monitoring well locations that require relocation or modification.
- The contractor shall instruct workers to immediately report any illegal solid or hazardous waste encountered to the construction supervisor.
- The contractor shall hire a qualified biologist to conduct a pre-construction survey of the permit area to locate any active migratory bird nests and implement measures to avoid disturbing any active nests found. If impacts to active nests cannot be avoided, a permitted wildlife rehabilitator shall be contacted to remove active nests, eggs, or nestlings prior to construction.
- The contractor shall submit a Notice of Intent to Clear Land of protected native plants form to the Arizona Department of Agriculture prior to construction.
- To prevent the introduction of invasive species seeds, all earth moving and hauling equipment shall be washed at the contractor's storage facility prior to entering the construction site.
- To prevent invasive species seeds from leaving the site, the contractor shall inspect all construction equipment and remove all attached plant/vegetation and soil/mud debris prior to leaving the construction site.

- The contractor shall submit the Arizona Pollutant Discharge Elimination System Notice of Intent and the Notice of Termination for construction activities to the Arizona Department of Environmental Quality, and prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) for the project.
- This project is located within a designated municipal separate storm sewer system. Therefore the contractor, in association with the City of Phoenix Aviation Department Planning and Environmental Division shall send a copy of the certificate authorizing permit coverage and a copy of the Notice of Termination acknowledgement letter to the City of Phoenix.
- The City of Phoenix Floodplain Manager will be provided an opportunity to review and comment on the design plans.

III. Findings

A. Status of Other Authorizations and Legal Requirements

1. Water Quality Certification

The applicant obtained a State Water Quality Certification pursuant to Section 401 and 404 of the Clean Water Act from ADEQ on September 19, 2009. The Corps would include this certification as a special condition of any permit issued to the applicant.

2. Compliance with Section 106 of National Historic Preservation Act

The Permit Area/Area of Potential Effect for the proposed project does not include any properties listed or eligible for listing on the National Register of Historic Places or the National Register of Natural Landmarks. Since no historic properties were found, no additional coordination is required by Section 106 of the National Historic Preservation Act. The Corps requested concurrence from the Arizona SHPO with the finding of no historic properties affected. SHPO provided concurrence dated August 31, 2009.

3. Compliance with the Endangered Species Act

The Corps, as lead federal agency for the project, determined that the project “may affect, but is not likely to adversely affect” the bald eagle and California brown pelican, but that the project would not affect any other ESA-protected species. Through Informal Section 7 consultation, the USFWS concurred in a September 15, 2009 letter that the project “is not likely to adversely affect” the bald eagle and California brown pelican.

4. Compliance with Section 176(c)(General Conformity Rule) of the Clean Air Act

The project has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit would not exceed de minimis levels of direct emissions of a criteria pollutant or its

precursors and are exempted by 40 CFR Section 93.153. Any later indirect emissions are generally not within the Corps continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons a conformity determination is not required for this permit.

5. Compliance with Executive Order 11988, Floodplains

The project would result in minor impacts to floodplains and would raise the 100-year WSE. Coordination with the City of Phoenix floodplain administrator is currently underway to evaluate impacts to the floodplain, and the floodplain administrator has determined that the project is adequately self-mitigating, i.e. through channel excavation, gabion apron extensions on the south side of the river bank, and CSA armoring on the north side of the river bank. A CLOMR application was submitted to the FEMA on March 26, 2009, and a Letter of Map Revision LOMR application would be submitted to FEMA upon completion of the project.

6. State and/or Local Authorizations

A Section 404 permit issued by the Corps does not grant any property rights or exclusive privileges. Also, it does not authorize any injury to the property or rights of others or authorize interference with any existing or proposed federal project. Furthermore, the applicant is still required to obtain any other applicable federal, state or local authorizations.

B. Corps Public Notice and Comment Process

The permit application was complete on June 29, 2009. A public notice describing the project was issued on August 14 2009, and sent to all interested parties (mailing list), including appropriate state and Federal agencies. All comments received on this action have been reviewed and are summarized below.

1. Summary of Comments Received

a. Federal Agencies

FEMA responded with a letter dated August 18, 2009. This letter cited floodplain regulations and urged the City of Phoenix to review the current Flood Insurance Rate Maps and comply with floodplain regulations.

EPA responded to the public notice with a letter dated September 14, 2009. While the EPA acknowledges the appropriateness of mitigating for only the portion of the project that would convert waters of the U.S. to uplands, they disagree that the proposed mitigation is adequate and suggest that a functional analysis be performed to justify a deviation from the standard 1:1 mitigation ratio by acreage. EPA also acknowledges the City maintains the River channel to reduce bird habitat.

b. State and Local Agencies

No state or local agencies responded to the public notice.

c. Other Organizations and Individuals

No other organizations or individuals responded to the public notice.

d. Requests for Public Hearings

No requests for public hearings were received.

2. Evaluation

I have reviewed and evaluated, in light of the overall public interest, the documents and factors concerning this permit application as well as the stated views of other interested agencies and the concerned public. In doing so, I have considered the possible consequences of this proposed work in accordance with regulations published in 33 CFR Sections 320 through 330 and 40 CFR 230. The following paragraphs include our evaluation of comments received and of how the project complies with the above cited regulations.

a. Consideration of Comments

FEMA letter dated August 18, 2009

This letter urged the City to review the current Flood Insurance Rate Maps (FIRMs) and comply with floodplain regulations. The City of Phoenix responded to FEMA on December 18, 2009 with a letter detailing their compliance with floodplain regulations including filing a Conditional Letter of Map Revision package with FEMA on March 27, 2009. We believe this response to be sufficient.

EPA Letter Dated September 14, 2009

While the EPA acknowledges the appropriateness of mitigating for only the portion of the project that would convert waters of the U.S. to uplands, they disagree that the proposed mitigation is adequate and suggest that a functional analysis be performed to justify a deviation from the standard 1:1 mitigation ratio by acreage. EPA also acknowledges the City maintains the River channel to reduce bird habitat.

The City of Phoenix considered performing a functional assessment of the impacted and mitigation areas. Because there is so little vegetation of value in the impacted area, The City believed that a functional assessment would justify a mitigation ratio substantially lower than the standard 1:1. However, the decision was made to put the funds that would have been required for the functional assessment towards the mitigation itself: a benefit to both the environment and the schedule. The total proposed funds for mitigation have increased from \$50,000 to \$80,000.

The revised mitigation proposal describes performing mitigation at the standard 1:1 mitigation acreage ratio, at a rate of \$5,000 per acre. This \$5,000 per acre figure is based on the Bird Hazard Mitigation Permit (SPL-2000-00669-SDM), which required 1:1 mitigation for high-value habitat (i.e. wetlands) and 1:1/2 mitigation for medium-value habitat. If the area impacted were part of the Bird Hazard Mitigation Permit impacted area, it would not have qualified for a 1:1 mitigation ratio. Because the \$5,000 per acre rate was accepted by the Corps in a previous 404 permit in the immediate vicinity and the currently proposed impacted area is of lower habitat value than the areas impacted in that previous permit, we believe it is more than appropriate to use this \$5,000 per acre rate.

As a separate issue, the proposed mitigation site was changed from the Rio Salado area to the South Mountain area. This change was made at the request of the FAA, who required that the mitigation site be more than five miles from the airport runways.

The revised mitigation proposal of restoring a South Mountain fire-damaged area at a mitigation acreage rate of 1:1 is fully responsive to the EPA's concerns.

b. Evaluation of Compliance with 404(b)(1) guidelines (restrictions on discharge, 40 CFR 230.10). A check in a block denoted by an asterisk indicates that the project does not comply with the guidelines.

Yes	No	
-----	-----	1) Alternatives Test
	x	a) Based on the discussion in II B, are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the United States" or at other locations within these waters?
	NA	b) Based on II B, if the project is in a special aquatic site and is not water-dependent, has the applicant clearly demonstrated that there are no practicable alternative sites available?
		2. Special Restrictions. Would the discharge:
	x	a) violate state water quality standards?
	x	b) violate toxic effluent standards (under Section 307 of the Act)?
	x	c) jeopardize endangered or threatened species or their critical habitat?
	x	d) violate standards set by the Department of Commerce to protect marine sanctuaries?
		e) Evaluation of the information in II C and D above indicates that the proposed discharge material meets testing exclusion criteria for the following reason(s). <input checked="" type="checkbox"/> based on the above information, the material is not a carrier of contaminants <input type="checkbox"/> the levels of contamination are substantially similar at the extraction and disposal sites and the discharge is not likely to result in degradation of the disposal site and pollutants would not be transported to less contaminated areas <input type="checkbox"/> acceptable constraints are available and would be implemented to reduce contamination to acceptable levels within the disposal site and prevent contaminants from being transported beyond the boundaries of the disposal site
	x	3) Other restrictions. Would the discharge contribute to significant degradation of "waters of the US" through adverse impacts to:
	x	a) human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?
	x	b) life states of aquatic life and other wildlife?
	x	c) diversity, productivity and stability of the aquatic ecosystem, such as the loss of fish or wildlife habitat, or loss of the capacity of wetland to assimilate nutrients, purify water or reduce wave energy?
	x	d) recreational, aesthetic and economic values?
x		4) Actions to minimize potential adverse impacts (mitigation). Would all appropriate and practicable steps (40 CFR 23.70-77) be taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem? (Proposed Special conditions follow table.)

Proposed Special Conditions:

- a. The permittee shall comply with all requirements and conditions in the letter of water quality certification that the Arizona Department of Environmental Quality signed on September 17, 2009. This certification demonstrates that the permittee has complied with Section 401(a) of the Clean Water Act. A copy of the letter is enclosed.
- b. The Permittee shall mitigate for permanent impacts to 15.87 acres of waters of the U. S., through restoration of 15 acres of desert habitat, including ephemeral waters of the U.S. as described in the final mitigation plan: "Compensatory Mitigation Proposal for Impacts to Waters of the U.S. for Phoenix Sky Harbor International Airport Runway Safety Area Improvements to Runway 25L" (dated November 30, 2009, and prepared by AZTEC). The Permittee shall fully implement this final mitigation plan by December 31, 2010.
- c. Your responsibility to complete the required compensatory mitigation as set forth in Special Condition b. will not be considered fulfilled until you have demonstrated compensatory mitigation project success and have received written verification of that success from the U.S. Army Corps of Engineers Regulatory Division.
- d. Cultural Resources: Pursuant to 36 C.F.R. section 800.13, in the event of any discoveries during construction of either human remains, archeological deposits, or any other type of historic property, the Permittee shall notify the Corps' Archeology Staff within 24 hours (Steve Dibble at 213-452-3849 or John Killeen at 213-452-3861). The Permittee shall immediately suspend all work in any area(s) where potential cultural resources are discovered. The Permittee shall not resume construction in the area surrounding the potential cultural resources until the Corps Regulatory Division re-authorizes project construction, per 36 C.F.R. section 800.13.

c. Public Interest Review, General Criteria (33 CFR 320.4(a))

1) The relative extent of the public and private need for the proposed structure or work

This project is proposed by a public agency; therefore, it is designed to address a need that is public, not private. The public need is for reliable and safe aircraft operations through the permit area.

2) Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure of work

There are no known unresolved conflicts as to resource use. Alternative designs have been determined to be not practicable, not less environmentally damaging, and/or unable to meet the purpose and need for the project. The preferred alternative, with all included mitigation, is considered to be the least environmentally damaging practicable alternative (LEDPA).

3) The extent and permanence of the beneficial and/or detrimental effects which the proposed structures or work is likely to have on the public and private uses to which the area is suited

A total of 54.45 acres of waters of the US would be permanently lost. This loss would have no effect on the public or private uses of land in the area.

3. Determinations

a. Finding of No Significant Impact (FONSI) (33 CFR 325)

Having reviewed the information provided by the applicant, all interested parties and our assessment of environmental impacts contained in part II B of this document, I find that this permit action would not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement would not be required.

b. 404(b)(1) Compliance/Noncompliance Review (40 CFR 230.12)

The discharge complies with the guidelines. The proposed action is the least environmentally damaging practicable alternative (LEDPA).

All of the appropriate and practicable conditions listed in III.B.2.b.4 to minimize pollution or adverse effects to the affected ecosystem have been included as part of the proposed action or were required by special conditions of the permit. This revised and/or conditioned project is the LEDPA.

The discharge fails to comply with the requirements of these guidelines because:

There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem and that alternative does not have other significant adverse environmental consequences.

The proposed discharge would result in significant degradation of the aquatic ecosystem under 40 CFR 230.10(b) or (c).

The discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem, namely

There is not sufficient information to make a reasonable judgment as to whether the proposed discharge would comply with the guidelines.

c. Public Interest Determination

I find that issuance of a Department of the Army permit (with special conditions), as prescribed by regulations published in 33 CFR Sections 320 to 330, and 40 CFR Part 230, is not contrary to the public interest.

4. Agency and Public Involvement

As part of the environmental review process, the City of Phoenix Aviation Department sent scoping letters to agencies and the public, and conducted both agency and public scoping meetings. Applicable agencies and the surrounding property owners were sent a scoping package on September 17, 2008, which requested comments regarding the Proposed Action and invited the agencies and public to attend the scoping meeting on October 7, 2008.

The scoping package included a description of the Proposed Action, provided a brief summary of the project background and need for the action, the project alternatives, the affected environment, the environmental consequences to be analyzed, and included a map depicting the permit area. Additionally, agencies reviewing areas of particular environmental concern were provided with an outline of the relevant guidelines and a proposed methodology.

Seven written responses and one phone response from agencies were received during the scoping period. No comments were received from private landowners in the area. Table 13 summarizes the comments received during the scoping period.

Agency	Comment
USFWS, Region 2	No comments received.
EPA, Region 9	No comments received.
Corps	No comments received.
FAA, Technical Operations, Phoenix, Arizona	The project would be positive because the lighting system in the river requires 4-wheel drive and the use of fall-gear when working on them. The relocation of the localizer will enable maintenance efforts without closing the Foxtrot taxiway (Taxiway 'F'). Currently (2008) they have to close the taxiway in order to gain access to the localizer. Glide slopes are barely passing inspections and have reflection issues because of the location of the fence. The localizer shelter will be relocated and this will also increase accessibility.
Arizona Air National Guard	No comments received.
ADEQ, Air Quality Division	No comments received.

<p>ADEQ, Water Quality Division</p>	<p>If the project results in more than one acre of disturbance, an AZPDES permit with a SWPPP will be required and should be addressed in the EA. If the project requires a Section 404 permit, a state-issued Section 401 certification will be required. The Corps will insert the conditions of the 401 certification in the Section 404 permit to ensure the project does not affect water quality. ADEQ's records do not show any drinking water wells used by a public water system in the project area.</p> <p>A number of hazardous material sites are located in the project area. ADEQ does not believe any of the hazardous materials site will be impacted by the project.</p> <p>Groundwater monitoring wells occur in the area, and the project has potential to affect these wells. Wells should be protected or abandoned and re-drilled as necessary.</p> <p>Three facilities at the Motorola 52nd Street National Priority List site could be impacted by the project. A soil vapor extraction system occurs underground in the area and the City of Phoenix should coordinate with ADEQ Waste Programs Division to ensure construction does not damage or interfere with this system.</p> <p>Construction documents should include provisions that if any solid waste or hazardous materials are encountered, the owner or developer will coordinate with state and federal regulators to determine the appropriate actions.</p> <p>Construction operations should include waste reduction through use of recycled materials as well as proper handling, recycling and disposal of construction debris and solid and hazardous waste. Onsite workers should be instructed to properly dispose of waste and report any illegal disposal of hazardous waste. ADEQ would like to review the EA documentation.</p>
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Table 13. (continued) Summary of the agency and public comments on the proposed action.

Agency	Comment
Arizona Game and Fish Department	The director of the AGFD retired and has been replaced. Future scoping lists should be updated to reflect the new contact.
Arizona Department of Transportation	The letter has been forwarded to the ADOT Aeronautics Division for their review. ADOT reserves the right to review development plans to assess impacts to the state highway system.
Arizona Department of Transportation, Aeronautics Division	No comments received.
Arizona State Parks, State Historic Preservation Office	The State Historic Preservation Office looks forward to consulting with the FAA for cultural resources.
Rio Salado Habitat Restoration Area	No comments received.
Salt River Project	No comments received.
Maricopa County, Air Quality Director	If the EA reveals air quality impacts that require a permit from Maricopa County, please be prepared to apply for and acquire such a permit prior to any further project action. This suggestion

	is consistent with the main objective cited in your letter, which is maintenance of the National Ambient Air Quality Standards and adherence with the State Implementation Plan.
Flood Control District of Maricopa County (FCDMC)	No comments received.
City of Mesa, Planning Department	No comments received.
City of Scottsdale, Planning and Development Services	No comments received.
City of Tempe, Planning Division	No comments received.
City of Phoenix, Parks and Recreation Department	No comments received.
City of Phoenix, Office of Environmental Programs	No comments received.
City of Phoenix, Planning Department	No comments received.
City of Phoenix, Street Transportation Department	No comments received.
Councilman Michael Johnson	No comments received.
Salt River Pima-Maricopa Indian Community	No comments received.
Gila River Indian Community	No comments received.
NAGPRA Coordinator of the Salt River-Maricopa Indian Community	No comments received.
Fort McDowell Yavapai Nation	No comments received.
Ak-Chin Indian Community	The tribe does not have any questions or comments on the project and will defer to any comments from the Salt River Pima-Maricopa Indian Community.
Yavapai-Prescott Indian Tribe	No comments received.
Tohono O'odham Nation	No comments received.
The Hopi Tribe	The tribe supports the identification and avoidance of cultural resources in the project area. If prehistoric cultural resources are identified, the tribe requests additional cultural consultation and review of the cultural resources survey report and treatment plan.
Adjacent landowners	No comments received.

A public scoping meeting and an agency scoping meeting were both held on October 7, 2008, in an effort to solicit feedback about the proposed action and answer any questions or address any concerns from agencies or the public in attendance. Notice of the public meeting was given in the Arizona Business Gazette on September 25, 2008, and in the Arizona Republic on October 1, 3, and 4, 2008. The agency meeting began with a slideshow presentation which explained the NEPA process, identified the proposed action, listed potential alternatives, described the affected environment, and identified resource categories likely to be affected by the Proposed Action. The slideshow presentation was followed by a comment and question period. Agencies and jurisdictions represented at the agency scoping meeting included the FAA and the City of Phoenix, Office of Environmental Programs. The public meeting consisted of exhibits depicting project information staffed with personnel from the project team. The community had an opportunity to review the exhibits and ask questions. There was also a comment table available where visitors were encouraged to submit any concerns. One person attended the public scoping meeting. No written comments from the public were received.

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6. Personal Communications

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