Repair Aircraft Parking Apron at Naval Station Norfolk
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<td>6. AUTHOR(S)</td>
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<td>Department of Defense Office of Inspector General, 400 Army Navy Drive, Arlington, VA, 22202-4704</td>
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<td>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</td>
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<td>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</td>
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<td>12. DISTRIBUTION/AVAILABILITY STATEMENT</td>
<td>13. SUPPLEMENTARY NOTES</td>
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<td>Approved for public release; distribution unlimited</td>
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Department of Defense Inspector General
400 Army Navy Drive (Room 801)
Arlington, VA 22202-4704
MEMORANDUM FOR NAVAL INSPECTOR GENERAL
COMMANDING OFFICER, NAVAL FACILITIES ENGINEERING COMMAND, MID-ATLANTIC

SUBJECT: Repair Aircraft Parking Apron at Naval Station Norfolk
(Briefing No. D-2010-RAM-003)

We are providing this report for your information and use. We conducted this audit pursuant to Public Law 111-5, "American Recovery and Reinvestment Act of 2009," February 17, 2009. We considered management comments on a draft of this report when preparing the final report.

The comments provided by the Assistant Secretary of the Navy (Financial Management and Comptroller), on behalf of Naval Facilities Engineering Command, Mid-Atlantic, were responsive to Recommendations A and C. Although the Assistant Secretary's comments were partially responsive for Recommendation B, actions taken fully met the intent of the recommendation. The Assistant Secretary's comments conformed to DOD Directive 7650.3; therefore, additional comments are not required.

We appreciate the courtesies extended to the staff. Please direct questions to Mr. Timothy Wimette at (703) 604-8876 (DSN 664-8876).

Daniel R. Blair, CPA
Principal Assistant Inspector General for Auditing
Repair Aircraft Parking Apron at Naval Station Norfolk
(Recovery Act Project No. RM 173-05)

(Project No. D2009-D000LH-0321.000)
Results in Brief: Repair Aircraft Parking Apron at Naval Station Norfolk

What We Did
We evaluated DOD’s implementation of plans for the American Recovery and Reinvestment Act of 2009 (Recovery Act). Specifically, we determined whether the Repair Aircraft Parking Apron project was adequately planned to ensure the appropriate use of Recovery Act funds.

What We Found
Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic officials adequately justified and supported repair and reconstruction for some sections of the aircraft parking apron, taxiways, and heliport apron, totaling about $18.7 million in costs. However, other sections of the Repair Aircraft Parking Apron project, valued at about $24.9 million, were not properly planned/scoped to ensure appropriate use of Recovery Act funds. Some sections of the project were not properly scoped because NAVFAC Mid-Atlantic planners included out-year reconstruction requirements for the South Mat Apron (SMA) section 1 and the southern section of SMA 2 of the aircraft parking apron; did not conduct an economic analysis for the addition of a taxiway; included a section of the aircraft parking apron no longer needing repair; and did not complete the economic analysis for the project. As a result, DOD did not have reasonable assurance that Recovery Act funds were used appropriately. In addition, the Department of the Navy could make approximately $24.9 million in Recovery Act funds available for other projects.

What We Recommend
We recommend that the Commander, NAVFAC Mid-Atlantic reduce the scope of the Repair Aircraft Parking Apron project and revise the current DD Form 1391 to reflect the revision, complete a detailed economic analysis, and develop a plan to use the $24.9 million in potential savings for other projects.

Management Comments and Our Response
The Assistant Secretary of the Navy (Financial Management and Comptroller), on behalf of NAVFAC Mid-Atlantic, was responsive to all but one recommendation. Although the Assistant Secretary's comments were partially responsive on one recommendation, actions taken fully met the intent of the recommendation. Therefore, additional comments are not required.
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## Acronyms

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<tr>
<td>CIM</td>
<td>Chevron Industrial Membrane</td>
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<td>FOD</td>
<td>Foreign Object Debris</td>
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<td>HPA</td>
<td>Heliport Apron</td>
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<td>IG</td>
<td>Inspector General</td>
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<td>NAVFAC</td>
<td>Naval Facilities Engineering Command</td>
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<td>OA</td>
<td>Overrun Area</td>
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<td>PC</td>
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<td>RLA</td>
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<td>SF</td>
<td>Square Feet</td>
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<td>SMA</td>
<td>South Mat Apron</td>
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<td>USACE</td>
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Background

  - Preserve and create jobs, promote economic recovery, and assist those most impacted by the recession;
  - Provide investments needed to increase economic efficiency by spurring technological advances in science and health; and
  - Invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits, and stabilize State and local government budgets in order to minimize and avoid reductions in essential services and counterproductive State and local tax increases.

- The Office of the Under Secretary of Defense (Comptroller) states that the American Recovery and Reinvestment Act of 2009 (Recovery Act) requires DOD IG to conduct vigorous oversight of its execution by DOD.
The overall objective is to evaluate DOD’s implementation of plans for the Recovery Act. To meet our objective, we assessed the planning and funding for the Recovery Act project to ensure accountability and transparency. Specifically, we determined whether the Repair Aircraft Parking Apron project was adequately planned to ensure the appropriate use of Recovery Act funds.
Criteria

Scope

- Appropriation: Department of the Navy — approximately $1.9 billion for Navy and Marine Corps Projects [Operations & Maintenance (O&M) and Military Construction]

- Project Summary: Naval Station Norfolk — Project No. RM 173-05, Repair of Aircraft Parking Apron (Facilities, Sustainment, Restoration, and Modernization) — $43.6M (O&M, Navy). The requirements included:
  - reconstruct South Mat Apron sections 1, 2, 3, and 4; totaling 1,164,583 square feet (SF) — estimated cost of $33.7 million;
  - reconstruct Seaplane Taxiway 3; 18,432 SF — estimated cost of $533,000;
  - mill, overlay, and seal of Red Label Aprons (RLA) 1 and 2; 503,121 SF — estimated cost of $1.1 million;
  - add taxiway at north end of RLA 1 and RLA 2; 19,405 SF — estimated cost of $521,000;
  - miscellaneous pavement reconstruction for Heliport Apron (HPA) sections 1-1, 1-2, and 2-1 and Overrun Area (OA) section 9R-1A; 23,500 SF — estimated cost of $680,000; and
  - miscellaneous storm sewer reconstruction for HPA sections 1-1, 1-2, and 2-2, and OA section 9R-1A; 1,600 linear feet — estimated cost of $410,000.

Note: Included in the total project cost of $43.6M, but not in the requirements above, are contingency, overhead, and build-design totaling about $6.5 million.

- Documents/records reviewed:
  - Economic Analysis
  - Cost Estimates
  - DD Forms 1391 (Requirements)
  - 2003 and 2007 Airfield Pavement Condition Surveys
Methodology

- We conducted this performance audit from July 2009 through February 2010. We generally complied with generally accepted government auditing standards. However, due to the unique requirements of the Recovery Act, along with time limitations for executing the respective audit, we did not fully comply with some planning and reporting standards. In our opinion, not following some aspects of these standards had no effect on our conclusions.

- Before selecting DOD Recovery Act projects for audit, the Quantitative Methods and Analysis Division (QMAD) of the DOD IG analyzed all DOD agency-funded projects, locations, and contracting oversight organizations to assess the risk of waste, fraud, and abuse associated with each. They selected most audit projects and locations using a modified Delphi technique, which allowed them to quantify the risk based on expert auditor judgment and other quantitatively developed risk indicators. Initially, 83 projects with the highest risk rankings were selected. Auditors chose some additional projects at the selected locations. QMAD used information collected from all projects to update and improve the risk assessment model.

- QMAD used additional predictive analytic techniques for two other special cases: (1) projects performed jointly with State National Guard units in the 50 States and (2) public works projects funded directly through the U.S. Army Corps of Engineers (USACE). They factored in workload volume, proposed costs, geographic districts, and USACE districts and regions in evaluating the relative risk of problems with oversight and completion.

- QMAD did not use classical statistical sampling techniques that would permit generalizing results to the total population because there were too many potential variables with unknown parameters at the beginning of this analysis. The predictive analytic techniques employed provided a basis for logical coverage not only for Recovery Act dollars being expended, but also for types of projects and types of locations across the Military Services, Defense agencies, State National Guard units, and public works projects managed by USACE.
Methodology (continued)

- We interviewed personnel from Commander, Navy Installations Command; NAVFAC Headquarters; NAVFAC Atlantic; NAVFAC Mid-Atlantic; and Naval Station Norfolk.

- We reviewed DD Form 1391 requirements, justifications, Airfield Pavement Condition Surveys, funding documents, and cost documentation supporting the March 2009 DD Form 1391.

- We toured parking aprons, taxiways, runways, and the heliport apron at Naval Station Norfolk.

- We reviewed information provided by NAVFAC Mid-Atlantic personnel after we outbriefed our tentative finding, conclusions, and recommendations. Specifically, we reviewed the:
  - November 17, 2009, DD Form 1391; and
  - NAVFAC Solicitation No. N40085-09-R-5067.
Finding

Condition: NAVFAC Mid-Atlantic officials adequately justified and supported repair and reconstruction for some sections of the aircraft parking apron, taxiways, and heliport apron, totaling about $18.7 million in costs. However, other sections of the Repair Aircraft Parking Apron project, valued at about $24.9 million*, were not properly planned/scoped to ensure appropriate use of Recovery Act funds.

Causes: This condition occurred because planners:

- included out-year reconstruction requirements for South Mat Apron (SMA) section 1 (83,952 SF) and southern section of SMA 2 (1,100 ft [about 627,872 SF]) — estimated cost of $20.5 million;
- did not conduct an economic analysis for the addition of a taxiway and used cement concrete unit costs instead of asphalt concrete unit costs — estimated cost of $521,000;
- included a section of the aircraft parking apron no longer needing repair — compass calibration pad-1B (7,202 SF) — estimated cost of $208,000; and
- did not complete the economic analysis for the project.

Effect: DOD did not have reasonable assurance that Recovery Act funds were used appropriately for the entire project. In addition, by revising the scope of the Repair Aircraft Parking Apron project, the Department of the Navy could make approximately $24.9 million in Recovery Act funds available for other projects. (Funds Put To Better Use)

* Costs include contingency, overhead, and build-design, totaling about $3.6 million.
Discussion of Audit Results

Airfield Pavement Condition Survey

In February 2007, NAVFAC Atlantic completed the Pavement Condition (PC) Survey on the condition of the airfield pavement at Naval Station Norfolk (Chambers Field, Naval Air Station Oceana Air Detachment Norfolk). The purpose was to provide pavement maintenance and repair recommendations for runway and airfield pavements (taxiways and parking aprons) based on pavement condition index (PCI) values. PC Surveys are performed every 3 to 4 years. According to the PC Survey, repair projects should be considered for pavements with pavement condition indexes at or below the specified values or where foreign object debris (FOD)* is in the immediate or foreseeable future. The PC Survey also states that most of the apron pavement and some of the taxiway pavement were rated as being in good to satisfactory condition. According to NAVFAC Mid-Atlantic personnel, the requirements for the Repair Aircraft Parking Apron project were based on results from the PC Survey.

Note: The PC Survey states that where jet aircraft routinely operate, maintenance and preventive maintenance should be considered on aprons with a PCI value above 60.

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* Any object located in an inappropriate location in the airport environment that has the capacity to injure airport personnel and damage aircraft.
**South Mat Apron**

We conclude that portions of SMA sections 2 (northern 400 feet [about 228,317 SF]), 3, and 4 (totaling about 224,442 SF) at an estimated cost of $13.1 million, were adequately justified. However, requirements for reconstruction of SMA sections 1 (83,952 SF) and 2 (southern 1,100 ft [about 627,872 SF]) in FY 2010 were not adequately justified. According to the PC Survey, reconstruction of these two sections, estimated at a cost of $20.5 million, is recommended in FY 2015. Also, the PC Survey states:

- SMA section 1 does not see routine traffic and is recommended to be included in the “reconstruct” of the southern portion of SMA section 2 in FY 2015. The PC Survey concluded that only routine maintenance* was needed to control FOD for section 1 until FY 2015. In addition, the NAVFAC Atlantic technical expert for airfield paving (technical expert), stated that although SMA section 1 needed some isolated repairs, it did not need wholesale repairs. The technical expert concluded that SMA section 1 is in good condition and that routine maintenance is sufficient for now.

- SMA section 2 should receive routine maintenance until FY 2011, when reconstruction of the northern section (400 feet [about 228,317 SF]) is recommended. In addition, the PC Survey concluded that the addition of SMA section 6** allows reconstruction of SMA section 2 (southern 1,100 feet [about 627,872 SF]) to be deferred until FY 2015.

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* Includes crack sealing, small-scale repairs, such as joint sealing and cleaning, grass removal, and rubber removal.
**Not included in this project for repair or reconstruction.
South Mat Apron (continued)

In addition to the PC Survey not adequately supporting SMA section 1 and SMA 2 (southern 1,100 feet), DD Form 1391 does not adequately support the reconstruction of these sections. The “Impact If Not Provided” section of DD Form 1391 states that “routine maintenance, if further deferred, will result in the requirement for major repair and replacement of pavements. There will be an increasing probability of FOD to aircraft engines.” In summary, this impact statement shown in the March 2009 and May 2008 DD Forms 1391 highlights the requirement for routine maintenance and not reconstruction.

The May 2008 DD Form 1391 for repair of the aircraft parking apron seemed to coincide with the recommendations in the PC Survey. Specifically, DD Form 1391 showed joint sealing, patching, and repairing of the same sections totaling $5.7 million. When Recovery Act funds became available for the same May 2008 project — just 9.5 months later — estimated project costs increased by about 660 percent: from $5.7 million to $43.6 million.
Addition of Taxiway to Red Label Apron 1 and 2

The addition of a taxiway (19,405 SF), at an estimated cost of $521,000, to make effective use of other aircraft apron sections for parking aircraft, should be included in the economic analysis to substantiate its costs and benefits.

If the economic analysis supports the taxiway addition, asphalt concrete costs estimated at $18/SF versus cement concrete costs estimated at $26.83/SF should be used because taxiways are generally constructed with asphalt, according to planners in the NAVFAC Mid-Atlantic Public Works Department (PWD). This change will result in about $172,000 that can be applied towards other Recovery Act requirements.*

Reconstruction of Seaplane Taxiway

Requirements to reconstruct seaplane taxiway section 3 (18,432 SF), at an estimated cost of $533,000, included a section that no longer needed repair. The section no longer needing repair, the “compass calibration pad-1B” (7,202 SF), with an estimated cost of $208,000, results in funds that can be applied towards other Recovery Act requirements.

* Potential monetary benefits were calculated based on the reduced cost associated with Red Label Apron sections 1 and 2.
Economic Analysis

The economic analysis used to support the justification for repair and reconstruction of the aircraft parking apron was incomplete. Three of the six key steps were not assessed in determining the most efficient and effective use of resources. These three steps were formulate assumptions, determine cost and benefits, and compare costs and benefits/rank alternatives.

The NAVFAC Economic Analysis Handbook states that the economic analysis is a systematic approach to identify, analyze, and compare costs and benefits of alternative courses of action to achieve a given set of objectives. A six-step approach is used — define the objective, generate alternatives, formulate assumptions, determine costs and benefits, compare costs and benefits and rank alternatives, and perform sensitivity analysis.
Potential Foreign Object Debris Hazards

NAVFAC and Naval Station Norfolk officials discussed concerns and risks associated with FOD* and its impact on the mission at Naval Station Norfolk. Discussions were meant to supplement the lack of information in DD Form 1391 and the PC Survey and to justify reconstruction of SMA section 1 and SMA 2 (southern 1,100 feet) in FY 2010 rather than FY 2015. Officials stated that FOD poses an operational risk to both aircraft (engine damage) and personnel (safety) working on the parking apron; however, as mentioned on page 14, DD Form 1391 did not detail operational risks impacting Naval Station Norfolk missions if the project was not approved. As we toured the aircraft parking apron, NAVFAC officials pointed out more “potential” FOD hazards than actual FOD impacting current operations.

PWD officials stated that the approval chain for DD Form 1391 understood FOD operational risks, so they did not detail FOD-related matters. They also stated that DD Form 1391 is a technical document and agreed that they need to better articulate and document impact on the warfighter mission if specific projects are not approved. Officials stated that for future DD Forms 1391, they plan to highlight impacts to the warfighter mission for all proposed projects.

* Examples include rocks, broken pavement, and joint sealant debris. The intake suction from a jet engine is often powerful enough to suck up loose material lying on the runway, and the winds created by a helicopter or prop-driven aircraft’s rotors or by a jet blast can send such objects airborne, creating hazards to nearby personnel.
Potential Foreign Object Debris Hazards (continued)

PWD and Flight Operation officials stated that they conduct FOD Control Inspections and daily FOD walks; however, command does not measure or document the severity or criticality of FOD and its impact to the mission or operations. According to the technical expert, the 2007 PC Survey is primarily a tool used to report PCI values and does not expand on FOD hazards and the risks to Service personnel and aircraft. Therefore, the PC Survey does not fully support these hazards and risks.

During a tour of SMA sections 1 and 2, the technical expert showed us patchwork performed on the apron with Chevron Industrial Membrane (CIM)-1000 repair material (tar-like sealant), which is used to control FOD as well as seal joints (a 4-5 year fix). However, according to the technical expert, the poor application (spillage on concrete) of the CIM-1000 on SMA section 2 has contributed to the risk of FOD. The technical expert was not sure whether the CIM-1000 was applied by contractor or PWD personnel, but either way, the quality of work has resulted in some FOD risks on the apron. In addition to CIM-1000 causing FOD risks, the technical expert showed us some examples of poor concrete patchwork and sealing surface, which also have high FOD potential. PWD officials stated that although there is little chance of FOD impacting operations, operational risks are high when FOD is present on the apron (safety, engine damage). We understand the operational risk associated with FOD; however, it is difficult to conclude whether FOD is driving near-term (FY 2010) reconstruction for SMA section 2 because there are no studies, surveys, or other documents detailing the severity of FOD and its impact to mission at Naval Station Norfolk. Therefore, routine maintenance for SMA section 1 and the southern section of SMA 2 should mitigate risks of FOD.
Management Actions

We commend NAVFAC Mid-Atlantic for taking actions to address issues we identified during our audit. Specifically, NAVFAC Mid-Atlantic:

- amended the June 12, 2009, Solicitation No. N40085-09-R-5067, for the Repair Aircraft Parking Apron project. The amendment, effective November 4, 2009, removes reconstruction of SMA sections 1 and 2 from the initial scope of the proposed project and makes the respective sections options. The amendment clearly states that the Government is NOT obligated to exercise either option; however, the Government has the right to award either option to the contractor up to 120 days after contractor award.

- revised DD Form 1391 for the Repair Aircraft Parking Apron project (dated November 17, 2009). NAVFAC Atlantic and Mid-Atlantic officials provided additional information in the revised DD Form 1391 regarding pavement condition and FOD. In summary, the revised DD Form 1391 recommends routine maintenance for SMA section 1 until FY 2015, which is our recommended course of action, and reconstruction of SMA section 2, with which we do not agree.

Based on our conclusions to perform routine maintenance for SMA section 1, and NAVFAC Mid-Atlantic’s revision to DD Form 1391 recommending routine maintenance and not reconstruction for SMA section 1, coupled with our conclusions briefed to Command on November 5, 2009, responsible officials should not execute option 1 of Solicitation No. N40085-09-R-5067 for reconstruction of SMA section 1. Rather, NAVFAC Mid-Atlantic officials should amend the solicitation to reflect routine maintenance and NOT reconstruction.
Additionally, the “Cost Estimates” section of the revised DD Form 1391 does NOT reflect routine maintenance for SMA section 1 as recommended in the “Requirement” section. Rather, the cost estimates reflect reconstruction of SMA section 1. NAVFAC Mid-Atlantic officials should revise the respective DD Form 1391 to reflect routine maintenance for SMA section 1.

Although the revised DD Form 1391 provides more details and information regarding the need for reconstruction of SMA section 2, NAVFAC Mid-Atlantic officials did not provide studies, surveys, or other documents detailing the severity of FOD and its impact to mission. As a result, NAVFAC Mid-Atlantic officials should not execute option 2 of Solicitation No. N40085-09-R-5067 for reconstruction of SMA section 2 (southern 1,100 ft [about 627,872 SF]). However, we do agree that routine maintenance is required.
Conclusion

Although NAVFAC Mid-Atlantic officials adequately justified and supported repair and reconstruction for other sections of the aircraft parking apron, taxiways, and heliport apron totaling about $18.7 million in costs, they need to adequately plan the repair and reconstruction of SMA sections 1 and 2 for the aircraft parking apron to ensure the appropriate use of Recovery Act funds. Responsible officials need to reduce the scope (SMA section 1 and southern section of SMA 2) of the aircraft parking apron repair efforts, and the Department of the Navy should use the $24.9 million in potential savings as a result of the reduction in scope, for other relevant and justified Recovery Act projects. This action should be taken in accordance with Under Secretary of Defense (Comptroller)/Chief Financial Officer memorandum, “Project Cost Variations During Execution of American Recovery and Reinvestment Act Expenditure Plans for Infrastructure Investments,” May 7, 2009.
We recommend that the Commander, Naval Facilities Engineering Command Mid-Atlantic:

A. Reduce the scope of the Repair Aircraft Parking Apron project (Recovery Act Project No. RM 173-05) by about 719,026 square feet (totaling about $20.7 million in costs) and revise the current DD Form 1391 to reflect the revision. Specifically:

1. Delete the requirements for reconstruction of:
   a. South Mat Apron sections 1 (83,952 square feet) and 2 (southern 1,100 feet [627,872 square feet]) totaling about $20.5 million in costs.
   b. The “compass calibration pad-1B” (7,202 square feet) totaling about $208,000 in costs.

2. Include routine maintenance and repair requirements for South Mat Apron sections 1 (83,952 square feet) and 2 (southern 1,100 feet [627,872 square feet]).

3. Amend Solicitation No. N40085-09-R-5067 to include routine maintenance and repair requirements for South Mat Apron sections 1 (83,952 square feet) and 2 (southern 1,100 ft [627,872 square feet]).
Recommendations,
Management Comments, and
Our Response
(continued)

B. Using the six-step approach, complete a detailed economic analysis to determine the most efficient and effective use of resources needed to support the justification for the repair and reconstruction of the aircraft parking apron. As part of the economic analysis, determine whether the addition of the taxiway is needed and:

1. If justified, reduce the scope of the project and revise DD Form 1391 by $172,000.
2. If not justified, reduce the scope of the project and revise DD Form 1391 by $521,000.

Recommendations, Management Comments, and Our Response
(continued)

Assistant Secretary of the Navy (Financial Management and Comptroller)

The Assistant Secretary of the Navy (Financial Management and Comptroller), on behalf of Naval Facilities Engineering Command, Mid-Atlantic, agreed. The Assistant Secretary stated that the Department of the Navy has taken actions to reduce the scope of the project in accordance with our recommendations. The Assistant Secretary also stated none of the options in Recommendations A and B were included in the final contract. Additionally, the associated funds have been realigned for other Recovery Act projects.

Our Response

The Assistant Secretary of the Navy (Financial Management and Comptroller) comments were responsive for Recommendations A and C. However, comments for Recommendation B were partially responsive. Although the comments were partially responsive, actions taken fully met the intent of the recommendations. Therefore, no additional comments are required.
MEMORANDUM FOR DEPARTMENT OF DEFENSE INSPECTOR GENERAL

SUBJECT: DoDIG Draft Report (Project No. D 2009-D0001H-0321.000); Repair of Aircraft Parking Apron at Naval Station Norfolk

The DoDIG Draft Report (Project No. D 2009-D0001H-0321.000); Repair of Aircraft Parking Apron at Naval Station Norfolk, contained the following recommendations:

a. Reduce the scope of the Repair of Aircraft Parking Apron project (Recovery Act Project No. RM 173-05) by 719,026 square feet (totaling $20.7 million in cost) and revise the current form 1391 to reflect the revision.

b. Using the six-step approach, complete a detailed economic analysis to determine the most efficient and effective use of resources needed to support the justification for the repair and reconstruction of the aircraft parking apron. As part of the economic analysis, determine whether the addition of the taxiway is needed.

c. Develop a plan to use the $24.9 million in potential savings for other Recovery Act projects.

The Department of the Navy concurs with the above recommendations and has taken the following actions: Project No. RM 173-05 was reduced in scope in accordance with the recommendations prior to award. None of the options challenged in recommendations (a) and (b) were included in the final contract. The associated funds have been identified for realignment to other ARRA projects.

Gladys J. Commons
Assistant Secretary of the Navy (Financial Management and Comptroller) Comments