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President, PATCO

November 21, 2017

Re: 2017 DRPA Bridge Operations Management Audit

Attached you will find a final copy of the Bridge Operations Management Audit prepared by The Azimuth Group, Incorporated. This audit was conducted as part of the Authority's continued effort to perform independent assessments of the Authority's management and operations in alignment with our commitment to our interstate compact.

In an effort to address the audit results, the Office of the Inspector General will work with COO Robert Hicks and Bridge Operations' management (and other Authority management) to develop an implementation plan for agreed upon recommendations, and ensure appropriate follow-up measures are in place to assess and communicate the execution of management's commitments.

Sincerely,



John T. Hanson



Final Report

Bridge Operations Management Audit

Submitted to

**The Delaware River Port
Authority**

November 14, 2017



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BRIDGE OPERATIONS MANAGEMENT AUDIT

FINAL REPORT



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November 14, 2017

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EXECUTIVE SUMMARY

The Delaware River Port Authority of Pennsylvania and New Jersey (“DRPA”) engaged The Azimuth Group, Inc. (“AGI” or “Azimuth”) along with our subject matter expert team from the Kercher Group, Inc., the Matrix Consulting Group, and Cherry Consultants of the Carolinas, to plan and perform a management audit of its Bridge Operations Department. This Executive Summary provides an overview of the Final Report, including the following:

- Study Objectives, Scope and Approach.
- Bridge Operations Profile.
- DRPA Citizen Advisory Committee Input.
- Internal Support Services Satisfaction.
- Findings and Recommendations.

Audit Objectives, Scope and Approach

Section I of the audit report provides the background of the project and describes its objectives and approach.

Under its governing documents, the DRPA is a bi-state public transportation agency created by a compact agreement between the Commonwealth of Pennsylvania and the State of New Jersey, with the consent of the United States Congress with powers and responsibilities including but not limited to:

- Ownership and operation of four toll bridges connecting New Jersey and Pennsylvania across the Delaware River including the Benjamin Franklin Bridge, Walt Whitman Bridge, Commodore Barry Bridge and the Betsy Ross Bridge.
- Operation of the Port Authority Transit Corporation’s (PATCO), providing high-speed commuter rail service connecting center city Philadelphia and the New Jersey suburbs.

Article XII of the DRPA Compact specifically requires the periodic completion of an independent management audit, as follows:

“Not less than once every five years, the Commission shall cause a management audit of its operational effectiveness and efficiency to be conducted by an independent consulting firm selected by the Commission.”

In August of 2010, the DRPA Board of Commissioners adopted Resolution DRPA-10-040 – one of several “reform resolutions” intended to strengthen public accountability and transparency – to create an Audit Committee whose duties include overseeing an independent management audit of the Authority every two years. To ensure that the biennial management audits are conducted in accordance with the Compact

and Resolution DRPA-10-040, the Audit Committee identified four discrete divisions of the Authority, which are to be audited on a rotating basis as follows:

- DRPA Administrative and Support Functions.
- Public Safety.
- Bridge Operations.
- PATCO.

In furtherance of this mandate, the DRPA, through its Office of the Inspector General, competitively selected and engaged AGI to conduct a management audit of the Bridge Operations unit and to recommend improvements to enhance its overall effectiveness and efficiency.

Audit Objectives

The specific objectives established for the 2017 Bridge Operations Management Audit included the following:

- Provide an independent, objective and comprehensive review and assessment of:
 - The organizational structure, duties, and responsibilities of all management staff of the Bridge Operations Division.
 - The effectiveness of business strategies
 - The effectiveness of existing business and operating policies and procedures.
- Identify best management practices that should be considered to address identified management, organizational, operational and/or staffing issues and opportunities.
- Provide independent professional recommendations to the Authority based on the findings and conclusions of the management audit.

Audit Scope

The scope of the Bridge Operations management audit is comprehensive and includes all Bridge Operations departments and functions and key shared support functions, as follows:

- Bridge Operations administration and management.
- Construction & Maintenance.
- Toll Collection.
- Fleet Management.
- Shared support services provided by DRPA - for the limited purpose of assessing their impact the effectiveness and efficiency of Bridge Operations - including:
 - Finance
 - Purchasing
 - Contract Administration
 - Human Resources
 - Information Services
 - General Counsel
 - Benefits Administration

- Engineering
- Public Safety.

The following aspects of Bridge Operations' organization, management and operations are addressed:

- **Organizational Effectiveness**

- Development of long and short-range plans to assure the continued effective and efficient performance of DRPA functions.
- Organizational structure balance, career paths, reporting relationships, staffing levels and skill sets.
- Bridge Operations asset management.
- Customer service/customer relations.
- Consideration of apprenticeship programs for union represented trades personnel; succession planning; potential for establishing assistant foremen positions and the administration of temporary upgrades.

- **Operational Efficiency**

- Utilization of in-house personnel and staff to accomplish facility maintenance and physical improvements.
- Appropriateness of outsourcing annual and/or procurement related vendor service contracts and any staffing and equipment impact due to outsourcing.
- Obsolescence of tolling technology and equipment.
- Traffic control/management of traffic flow.
- Construction and maintenance management.
- Maintenance and repair of roadway surfaces.
- Fleet operations, maintenance and management processes.
- Maintenance of property, grounds and occupied buildings.
- Space utilization and storage, including vehicles/equipment and on-site material and commodity inventory.
- The "Back to NJ No Funds" toll collection issue at the Walt Whitman Bridge and similar "Did Not Use Bridge" toll collection issue at Betsy Ross, Ben Franklin, and Commodore Barry Bridges.

- **Safety and Compliance Program Effectiveness**

- Safety and security programs, including DRPA Police and Homeland Security.
- Compliance with federal, state and local statutes and regulation.
- Implementation of Biennial Inspection recommendations.
- Asset management as related to MAP-21 and GASB standards.

- **General Administration**

- Effectiveness of the Authority's internal control structure including the control environment, information and communication system, risk assessment and monitoring processes.

- Technology applications (including the adoption of a new ERP system) particularly for asset management, asset life expectancies, and labor productivity data.
- Integrity of the Authority's budgeting, management, and reporting systems.
- Revenue collection within Toll Operations and Revenue Operations.
- Allocation of bridges' operating and capital budgets.
- Efficiency of operating procedures and communication between the various shared services; e.g., Public Safety, Purchasing, Contract Administration, Information Services, Legal, Engineering, Human Resource Services, Engineering, Public Safety, et al.

Audit Standards, Methodology and Approach

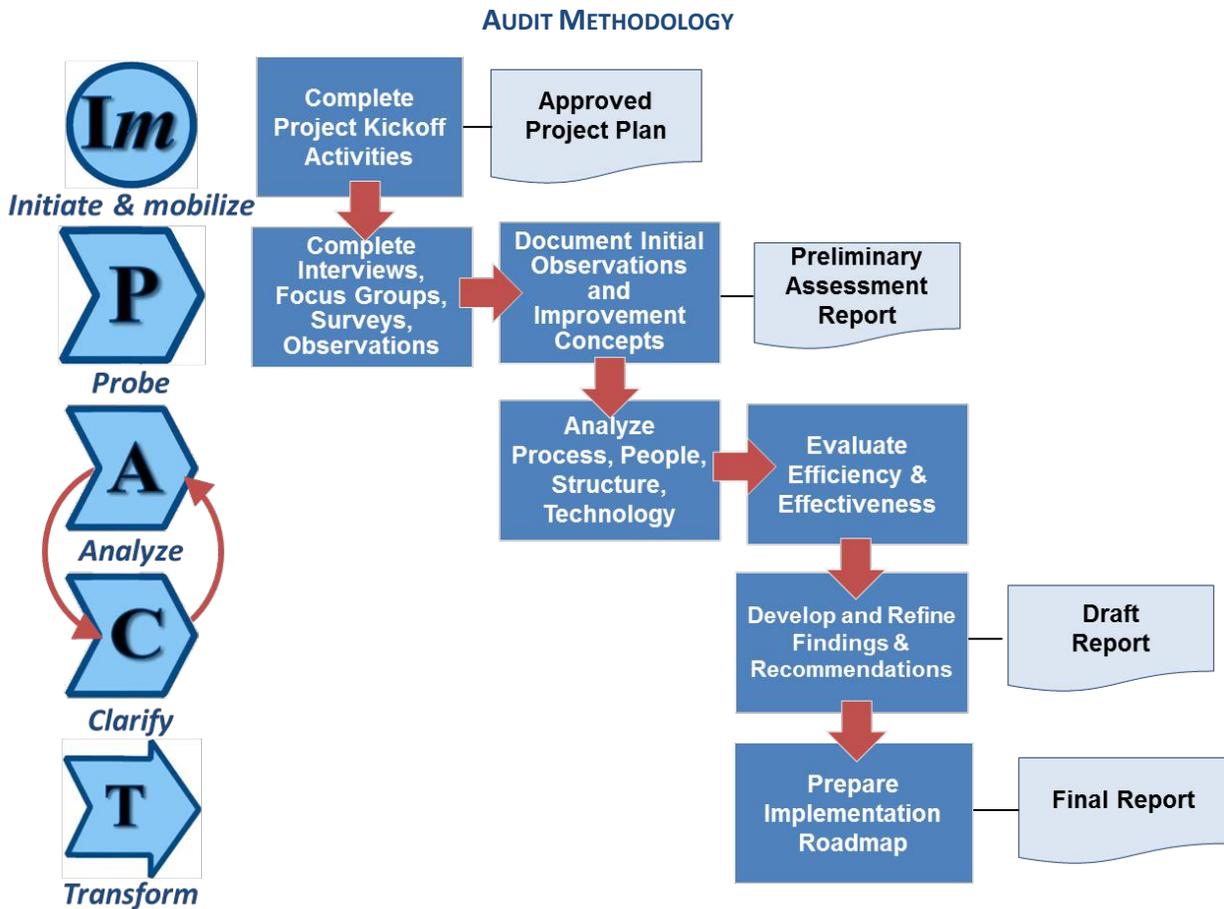
Management and performance audits provide objective analysis and recommendations to management and decision makers to facilitate the improvement of operations, support executive decision-making and improve accountability. The Azimuth Group's approach to the performance of the Bridge Operations Management Audit aligns with Generally Accepted Government Auditing Standards ("GAGAS") issued by the Comptroller General of the United States. The general standards state that the auditor must:

- Perform the work in accordance with basic *ethical principles*.
- Maintain *independence* in both fact and appearance.
- Use *professional judgment* in the planning, conduct, and reporting of audit results.
- Possess the *professional competence* needed to address the audit objectives.
- Provide adequate *quality control*.

Management and performance audits should provide reasonable assurance that the auditor has planned and performed the audit to obtain sufficient, appropriate evidence to provide a sound basis for our findings and conclusions based on the established audit objectives. To that end, Azimuth's **ImPACT** methodology provides a logical, sequential structure for the achievement of the audit objectives.

The five stages of the methodology, as illustrated at the top of the following page, are as follows:

- **Stage 1 – Initiate and mobilize.** This stage of the methodology encompassed those tasks necessary to solidify mutual understanding of the audit scope, objectives, deliverables, and timing as well to ensure that appropriate DRPA and consultant resources were available and well-coordinated.
- **Stage 2 – Probe.** This was the primary data collection stage of the audit and it here that the audit team developed an understanding of the current state of Bridge Operations functions as well as the internal administrative and support services provided by other units of DRPA. Using interviews, focus groups, surveys, direct observation, document review and other data



gathering and research techniques, the audit team compiled, organized and synthesized the bulk of the information needed to develop audit conclusions and findings in subsequent stages of the methodology.

- **Stage 3 – Analyze.** At this stage of the audit, the AGI team critically evaluated the data gathered and reviewed previously to reach conclusions, document specific findings and develop preliminary recommendations for discussion and factual validation.
- **Stage 4 – Clarify.** This stage of the methodology included the primary report writing and review tasks of the audit process. While maintaining independence and objectivity, the **IMPACT** approach included built-in feedback loops to ensure that the factual basis of findings and recommendations was sound and that both the AGI team and the client understood the ramifications of the recommended offered to address improvement opportunities identified.
- **Stage 5 – Transform.** Upon delivery and acceptance of the final audit report, the audit’s center of gravity will shift away from AGI and towards DRPA and Bridge Operations leadership and staff. The AGI team can be available to provide both on-site and remote support of DRPA’s follow-through and implementation of the study’s recommendations. Implementation support services are at the discretion of DRPA management and will be separately contracted if and when required.

Within the **ImPACT** framework, the audit team applied a variety of information gathering and analytical techniques including extensive data collection and document review, management interviews, employee focus groups, direct observations and a variety of specific analyses as necessary and appropriate. Accordingly, we believe that the evidence obtained through the course of our work provides a reasonable basis for our findings and recommendations based on the audit objectives defined by the Authority.

Bridge Operations Profile

An early step in the audit included the development and validation of a summary organizational profile. The organizational profile, which can be found in Appendix C to this document, is purely descriptive in nature – not evaluative - and is provided to document our overall understanding of the current structure, responsibilities, strategies, goals, and operations of the division.

Strategic Plan

The DRPA Department of Strategic Initiatives is leading a comprehensive strategic planning process for the Authority and representatives from all DRPA business units, including Bridge Operations, are assigned to the strategic planning effort. A draft “Roadmap to Strategic Success” for the period 2017-2021 has recently been published and includes:

- Statements of vision, mission, and values.
- Identification of the top strategic priorities objectives of the Authority, which include:
 - Infrastructure, facilities & equipment stewardship
 - User and beneficiary satisfaction
 - Organizational strength and capacity
 - Efficiencies and process improvements
 - Prudent deployment of resources.
- Specific strategic goals and supporting initiatives assigned to the various operating components of the Authority.

Going forward, Bridge Operations will be further developing operating objectives and performance metrics that directly contribute to the accomplishment of the strategic priorities of the Authority.

Bridge Operations Overview

Bridge Operations is organized and managed as five distinct business units. These include the Betsy Ross Bridge, the Benjamin Franklin Bridge, the Walt Whitman Bridge, the Commodore Barry Bridge and the Fleet Management unit.

The two northernmost bridges, the Benjamin Franklin and Betsy Ross, are managed by a single Bridge Director. Similarly, the two southernmost bridges, the Walt Whitman and Commodore Barry, are led by a single Bridge Director. Each bridge has its own Construction & Maintenance Manager, reporting to their respective Bridge Directors while two Toll Collection Managers are assigned to the northern and southern bridges, respectively, reporting to the responsible Director.

The two “inner bridges” – Ben Franklin and Walt Whitman – carry the largest traffic loads directly to and from highly urbanized sections of the City of Philadelphia. The two “outer bridges” – Betsy Ross and Commodore Barry – carry significantly less traffic and, in the case of the Commodore Barry Bridge, serve a less urban portion of the service area.

The Fleet Management unit provides vehicle and equipment maintenance to the four bridges as well as to the DRPA administrative units, DRPA Police, and the Port Authority Transit Corporation.

Financial Data

Bridge Operations is a substantial, \$326 million annual enterprise and accounts for a significant portion of the DRPA’s human and financial resources and requirements. An overview of the operating costs and revenues derived from bridge operations in 2016 (unaudited figures) is shown in the table below:

Bridge	Toll Revenue	Other Operating Revenue	Operating Expenses	Net Operating Income
Ben Franklin	\$ 101,033,079	\$ 6,633,128	(\$ 14,101,128)	\$..93,564,760
Walt Whitman	\$ 123,340,617	\$ 41,258	(\$ 16,503,552)	\$ 106,878,322
Commodore Barry	\$..55,289,867	\$ 194	(\$ 7,394,778)	\$..47,895,283
Betsy Ross	\$.. 40,114,159	\$ 241	(\$ 7,590,836)	\$..32,523,564
TOTAL	\$ 319,777,722	\$ 6,674,821	(\$ 45,590,614)	\$ 280,861,928

Bridge Operations unaudited capital project expenditures for FY 2016 totaled just over \$62 million as shown below:

Ben Franklin Bridge	Walt Whitman Bridge	Commodore Barry Bridge	Betsy Ross Bridge	Multi or All Bridges	Total Capital Projects
\$ 8,527,816	\$ 33,255,749	\$ 9,472,679	\$ 8,742,377	\$ 2,078,002	\$ 62,076,623

Revenues generated by the toll bridges are used to offset the Port Authority Transit Corporation’s operating losses each year. For fiscal year 2017, that loss is projected to approach \$28 million.

Tolls are collected via cash, electronic and – on a limited basis – credit cards. The current toll schedule as published on the DRPA website is shown in the table below.

Vehicle Classification	Toll
Passenger vehicles, including motorcycles & small trucks 7,000 lbs. and less gross vehicle weight (Class 1 & 2)	\$5.00
Trucks, mobile homes and recreation vehicles- gross vehicle weight 7,001 lbs. and upper axle	\$7.50
2 axles	\$15.00
3 axles	\$22.50
4 axles	\$30.00
5 axles	\$37.50
6 axles	\$45.00
Buses - per axle	\$3.75
2-axle	\$7.50
3-axle	\$11.25
Extra axles for autos (each)	\$3.75
Extra axles for trucks (each)	\$7.50

The current toll lane collection capability, by bridge, is shown in the table below:

TOLL LANE COLLECTION CAPABILITY

Bridge	Total Lanes	Cash Only	E-ZPass Only	Mixed Mode*	Non-Functional
Betsy Ross Bridge	12	6	3	1	2
Walt Whitman Bridge	14	7	2	5	0
Ben Franklin Bridge	13	0	1	12	0
Commodore Barry Bridge	8	4	2	1	1
Totals	47	17	8	19	3

*DRPA does not currently use mixed mode collection capability

Supporting Technologies

The table below summarizes the most significant systems employed by Bridge Operations:

Technology	Function Served
ERP Enterprise Resource Planning	An advanced integrated software package supporting the core administrative activities of the entire DRPA enterprise including accounting, financial reporting, purchasing, human resources, payroll and work order management.

Technology	Function Served
TransCore	Hardware for license plate pictures and hardware and software for all cash collection accounting and reporting activities. This is also the company, which provides the treadles, which are axle counting devices embedded in all the cash lanes. Also control cash registers, lane cameras and lane controllers. TransCore is often referred to as the DRPA lane integrator.
Vector	Software for license plate pictures
SATS	Analytical software used by revenue audit in auditing cash collections
ACL	Internal audit software used to document certain audit activities
DVAS	Digital video software for lane traffic
Genetec	Digital video software used for bridge traffic monitoring, toll collector video monitoring and recording and video monitoring of security areas.
Conduent	3 rd party, which provides all E-ZPass related services
Tri-M	Bridge traffic control, building automation, lane and roadway lighting, and traffic control signage control.
Microsoft Office	Desktop productivity applications for such functions as word processing, spreadsheets, and presentation graphics.

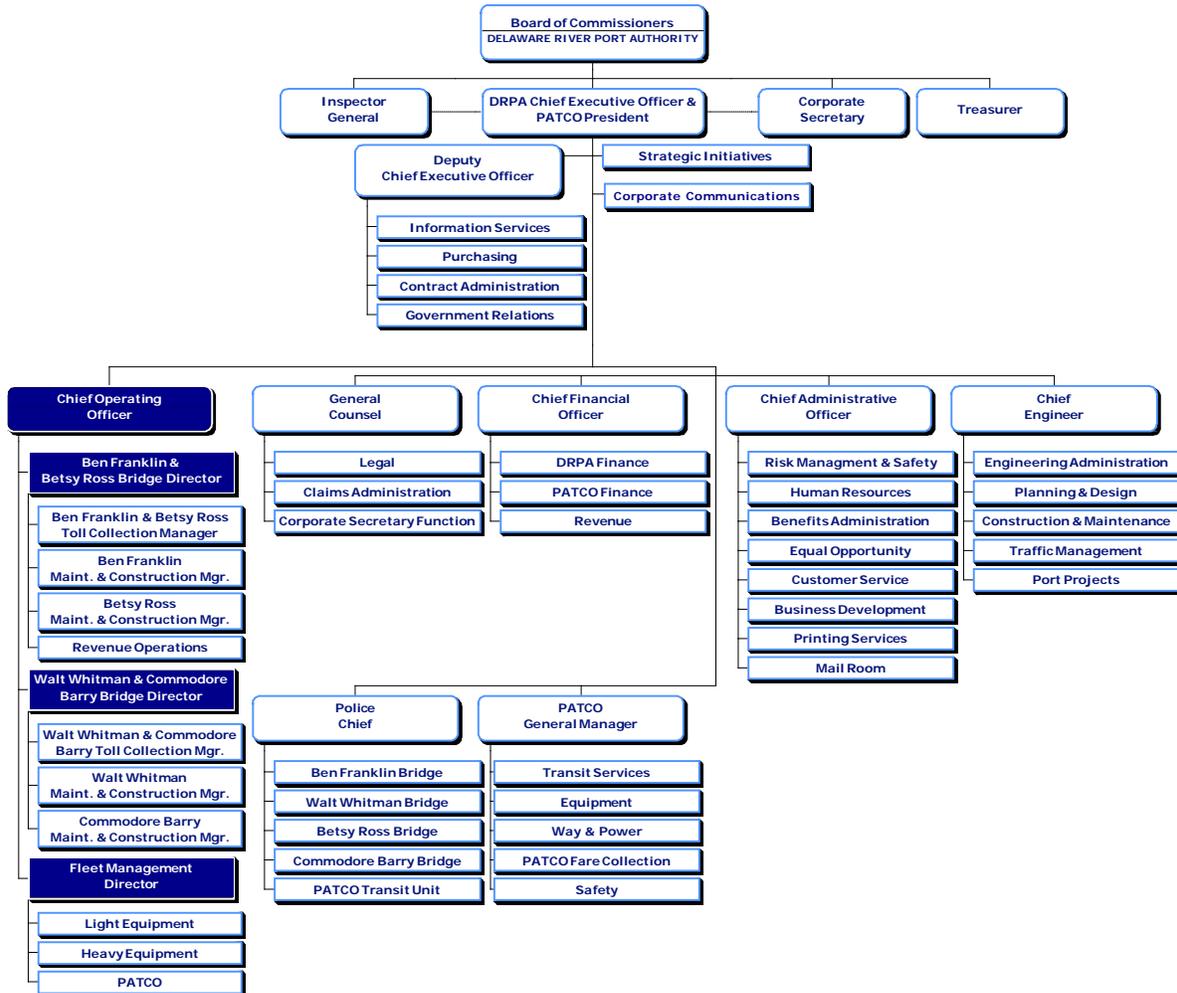
Staffing and Organization Structure

Based on staffing schedules provided by DRPA, authorized employee headcount for Bridge Operations and Fleet Management have remained stable in recent years.

- Total authorized Bridge Operations headcount for the current fiscal year is 269, including 248 for the maintenance and operation of the four toll bridges and 21 allocated to fleet services.
- Of the 269 authorized positions, approximately 196 are represented by the International Union of Operating Engineers (IUOE), accounting for 73% of the Bridge Operations workforce.
- Full-time Toll Collectors are not assigned to work weekends or holidays. Those periods are covered by temporary Toll Collectors hired through a contracted staffing agency. Temporary Toll Collectors may also be used to cover staffing shortages primarily due to sick and injured (over 14 days) during the week on an as-needed basis.

The overall organizational structure of Bridge Operations within the context of the DRPA organization is shown on the following page.

DRPA / Bridge Operations Organizational Structure



As illustrated in the organization chart above, Bridge Operations is led by the Authority’s Chief Operating Officer (COO), reporting directly to the Chief Executive Officer. As a member of the senior executive team of the DRPA, the COO has significant interaction with members of the Board of Commissioners, provides staff support and advice to the Operations Committee of the Board and interfaces with other governmental entities, peer tolling and transportation organizations, local government officials and other key stakeholders.

DRPA Citizen’s Advisory Committee Input

DRPA Board Resolution 10-093 established a Citizen’s Advisory Committee (CAC) of not more than 20 members, with membership equally divided among residents of New Jersey and Pennsylvania. The role of the CAC is to provide an independent customer perspective to the Board on topics of current concern. On April 12, 2017, the AGI project manager and the Acting Inspector General attended the CAC meeting to invite their comments and suggestions on improvements to Bridge Operations services. The results of that meeting are described in Appendix D.

Using the “plus/delta” focus group technique, CAC members were asked to describe those aspects of Operations that they felt were the most positive aspects of the Bridge Operations services and activities (“pluses”) and then to list those aspects of Bridge Operations and its services they felt could benefit from positive change (“deltas”). They were then asked to list and rank order specific suggestions for improvement.

CAC members identified a relatively small number of “pluses”:

- The availability of discounts for frequent users and senior citizens.
- The ability to adjust the number of lanes to account for peak demand capacity needs.
- The attractiveness and community pride associated with the iconic Ben Franklin Bridge.
- The lack of disruption of traffic flow due to shipping traffic on the river (i.e. no bascule or drawbridges.)
- The efficiency of the staff’s snow removal efforts.

They had numerous suggestions for improvements, generally addressing:

- Minimization of traffic congestion.
- Improvement of the amount of information made available to the commuting public through expanded and enhanced signage and/or technology applications.
- Provision of multiple alternative forms of toll payment including cash, E-ZPass, credit card and smartphones.
- Expanding pedestrian access on the Ben Franklin Bridge.

The top improvement suggestions, as ranked by the CAC members, included:

Using the “plus/delta” focus group technique, CAC members were asked to describe those aspects of Operations that they felt were the most positive aspects of the Bridge Operations services and activities (“pluses”) and then to list those aspects of Operations and its services they felt could benefit from positive change (“deltas”). They were then asked to list and rank order specific suggestions for improvement.

The top improvement suggestions, as ranked by the CAC members, included:

1. Treat personal passenger vehicles with high gross vehicle weight as cars and not commercial vehicles.
2. Provide an “express” E-ZPass lane – one that does not include a gate – to reduce congestion (tie).
2. Provide signage of E-ZPass lane status well in advance of the toll gates to allow drivers to get in the proper lanes (tie).
2. Open pedestrian access on the Ben Franklin Bridge to 24 x 7 availability (tie).
3. Improve access to major highways from both the Ben Franklin and Walt Whitman bridges.

4. Concentrate the E-ZPass lanes to be adjacent to one another, rather than intermixed with cash lanes (tie).
4. Improve the catwalk on the north side of the Ben Franklin Bridge (tie).
4. Limit traffic lane closures when there is no construction/maintenance work underway. Turn off the “red X” signage (3).
4. Improve both informational signage and technology to push information on lane closures, traffic conditions, alternative routing to customers (tie).
5. Streamline the sign-up process for senior citizen E-ZPass accounts and provide for multi-year account validity (tie).
5. Accept multiple alternative forms of payment - cash, credit, smartphone, etc. - in all lanes (tie).
5. Develop an E-ZPass toll account application for smartphones (tie).
5. Improve traffic signal synchronization between the Ben Franklin Bridge and the City of Philadelphia (tie).

Internal Support Services Satisfaction Survey

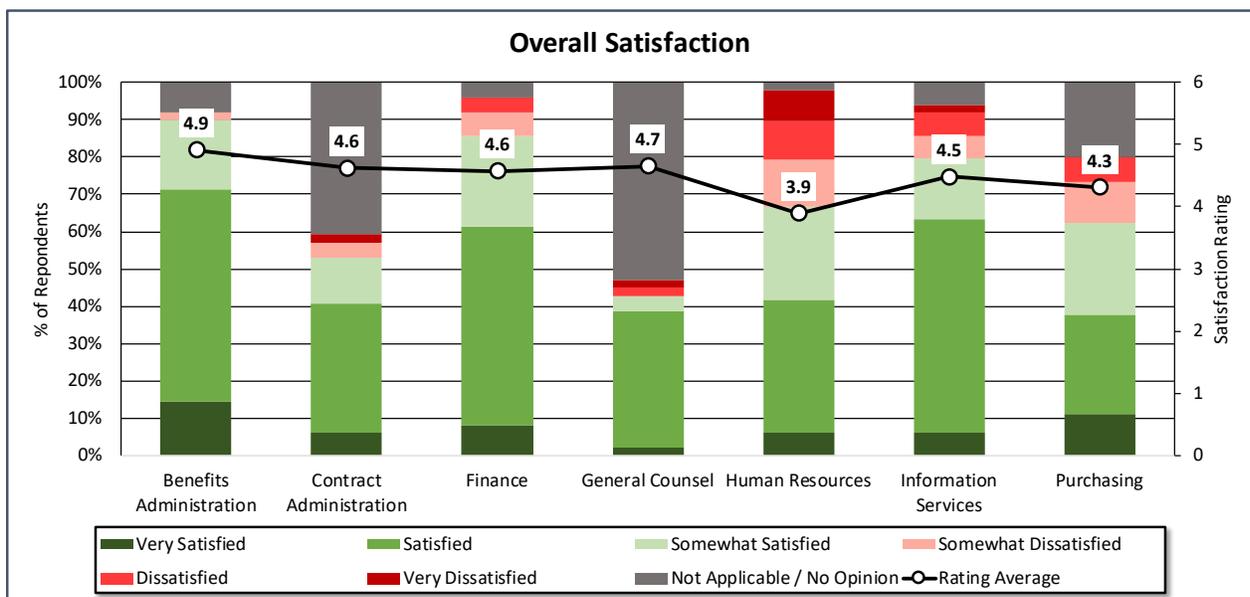
Appendix E presents and describes results of an online survey administered to Bridge Operations managers, supervisors and administrative support staff to evaluate their level of satisfaction with the shared administrative support services provided to their business units by the parent DRPA organization. The specific service providers included within the scope of the support services satisfaction survey included:

- Finance.
- Purchasing.
- Human Resources.
- Contract Administration.
- Information Systems.
- General Counsel.
- Benefits Administration.

The Internal Support Satisfaction Survey was distributed to 71 Bridge Operations managers, supervisors and administrative support staff members. Of those employees, 54 returned a survey, for a 75% return rate and 49 completed the survey for an effective response rate of 69%. For each of the shared support functions included in the satisfaction survey, the respondent results and a selected sample of narrative comments can be found in Appendix E. For each survey item, a series of statements descriptive of the range of services provided by the service provider afforded respondents an opportunity to indicate their level of satisfaction with the services on a six point scale:

- 0 - Not Applicable.
- 1 - Very Dissatisfied.
- 2 - Dissatisfied.
- 3 - Somewhat Dissatisfied.
- 4 - Somewhat Satisfied.
- 5 - Satisfied.
- 6 - Very Satisfied.

At the conclusion of the survey, participants were asked to consider the entirety of their responses and provide an “overall” satisfaction rating for each internal service department. Overall satisfaction ratings are graphically depicted in the following chart and summarized below.



- **Benefits Administration** received the highest average rating score with a satisfaction rating of 4.9 or “**Satisfied.**”
- **Contract Administration** received an average satisfaction score of 4.6 or “**Satisfied.**”
- **Finance** (accounting, payroll, budget, etc.) received an average satisfaction rating of 4.6 or “**Satisfied.**”
- **General Counsel** received an average satisfaction rating of 4.7 or “**Satisfied.**”
- **Human Resources** (recruitment, selection, compensation, training, etc.), scored an average satisfaction rating with 3.9 or “**Somewhat Satisfied.**”
- **Information Services** received an average satisfaction rating of 4.5 or just at the threshold of the “**Satisfied**” level.
- **Purchasing** scored an average satisfaction rating of 4.3 or “**Somewhat Satisfied.**”

While satisfaction ratings were positive overall, there are areas that can benefit from improvement noted in several areas critical to the functional efficiency and effectiveness of Bridge Operations.

These opportunities for improvement include:

- Collaboration between HR and Bridge Operations management to streamline the process of recruiting and selecting qualified employees.
- Reforming certain aspects of the DRPAs purchasing process and rules, especially related to raising the current purchasing authority thresholds established by current Board policy.
- Improving the quality of software applications training to end-users when new or upgraded systems are deployed and placed into production.

Findings and Recommendations

Section II presents the findings and recommendations that are the primary deliverable product of the management audit. The recommendations are intended to address the improvement opportunities developed over the course of the management audit and are offered as constructive suggestions for the improvement of the Bridge Operations organization, operations and service delivery over the long term. Findings and recommendations are organized by topical areas to cover the elements of the audit scope, as follows:

Audit findings and recommendations are organized by topical areas to include the elements of the audit scope, as follows:

- Organizational Effectiveness.
- Operational Efficiency.
- Safety and Compliance.
- General Administration.

The following table lists each of the findings and recommendations included in the Final Report, by topical area of the audit scope. More detailed discussion of these findings and recommendations can be reviewed in the main body of this report.

FINDINGS	RECOMMENDATIONS
<p><i>Organizational Effectiveness</i> Findings and recommendations related to long and short-range planning, organizational structure and staffing and asset management efforts are addressed in this section of the audit report.</p>	
<p>The DRPA bridges are highly visible public landmarks and a source of pride for residents of the greater Philadelphia area.</p>	<p>No associated recommendation.</p>

FINDINGS	RECOMMENDATIONS
Bridge Operations is actively engaged with the ongoing DRPA-wide strategic planning initiative.	Fully integrate Bridge Operations planning and goal setting under the DRPA strategic umbrella.
Bridge Operations lacks a set of robust key performance indicators.	Develop Bridge Operations-specific objectives, initiatives and key performance indicators (KPIs) to support each of the five strategic focus areas included in the DRPA strategic plan.
The current organizational structure of Bridge Operations is both effective and efficient.	No associated recommendation.
DRPA lacks the systematically collected and recorded workforce production data needed to make accurate assessments of Bridge Operations staffing needs.	Use the Authority’s Enterprise Resource Planning system to substantiate staffing needs.
	Eliminate the practice of assigning Coordinators to oversee contractors.
Bridge Operations is likely over-spending on building maintenance and repair.	Consider outsourcing building maintenance functions.
Bridge Operations asset management programs and practices are evolving and maturing.	Develop and deploy a comprehensive Asset Management Plan appropriate for the Authority.
DRPA relies on manual processes for determining infrastructure needs and development of short and long-term work plans.	Develop appropriate asset management business processes and data that support Authority goals and facilitate reporting to State and Federal agencies.
	Acquire and implement Bridge and Pavement Management Software for decision support.
	Develop a GIS-based inventory of pavement assets along with processes for collecting condition and performance data.
Coordination and collaboration between DRPA Engineering and Bridge Operations is excellent.	Leverage the close relationship with Engineering to strengthen asset management, capital planning and maintenance program effectiveness.
Opportunities to further enhance the Bridge Operations customer experience exist.	Survey customers on their interest in being able to use credit cards and mobile payments on the eventual availability of fully automated toll collection.
	Negotiate a merchant services arrangement with the DRPA bank, to provide fast, low-cost credit card processing.

FINDINGS	RECOMMENDATIONS
	Consider expanding the E-ZPass discount to Pennsylvania E-ZPass holders and evaluate expanding the discount to encourage more E-ZPass use.
No apprenticeship programs are presently available to facilitate the growth of unskilled and semi-skilled workers into the skilled-trades and higher-level roles.	Establish a formalized trades apprenticeship program.
Bridge Operations leaders are interested in the creation of a new position of Assistant Foreman.	Defer creation of an Assistant Foreman position.
Bridge Operations personnel may be temporarily upgraded to fill higher-level vacancies on an acting basis while the recruitment of a permanent employee progresses.	Consider revisions to temporary upgrade practices to increase organizational effectiveness and lessen the impact of vacant position vacuums.
<p>Operational Efficiency The findings and recommendations included in this section addresses a range of scope items focused on a variety of operational and managerial aspects of Bridge Operations including construction and maintenance management practices, staff and contractor utilization, tolling technology and processes and bridge traffic management.</p>	
Multiple management practices impair Bridge Operations focus on needed preventive maintenance activities.	Commit to a consistent focus on preventive maintenance.
Preventive maintenance activities have not been standardized across bridges.	Standardize preventive maintenance activities across each of the four bridges.
Opportunities to outsource certain routine maintenance activities exist.	Develop and implement an analytical approach to the insourcing and outsourcing decision.
Predictive maintenance methods have not been applied in the development of the facilities maintenance program.	Incorporate predictive elements into the development of ongoing maintenance programs once the PM program is mature and stable.
Bridge Maintenance schedules at the inner bridges are suboptimal.	Consider alternative shift schedules to ensure that work activities are maximized in maintaining bridges.
Construction and Maintenance managers have recently completed a valuable step in their ability to project labor requirements.	Refine and enhance the Bridge Operations staffing requirements and scheduling model.
The “Back to New Jersey” practice is neither effective nor efficient.	Eliminate the practice of providing Police escorts to return non-paying drivers on the Walt Whitman Bridge to New Jersey.

FINDINGS	RECOMMENDATIONS
	<p>Pursue necessary legislative authority to enforce toll violators, including the denial of vehicle registrations and/or drivers license renewal in both New Jersey and Pennsylvania.</p> <p>Implement multi-mode toll lanes, including credit cards and, in the future, other alternative payment modes (i.e., smartphones) in all lanes.</p> <p>Consider improvements to signage, including Dynamic Message Boards to better inform drivers of available toll lanes and to support diversion of traffic unable to pay tolls.</p>
<p>DRPA’s existing tolling technology is rapidly approaching obsolescence.</p>	<p>Acquire modern tolling software to enable the DRPA to transition to mixed-mode toll collections and to enable all electronic tolling as customer and DRPA needs demand it.</p>
<p>DRPA has not conducted formal studies to evaluate the mobility implications from a transition to open road tolling.</p>	<p>Conduct a traffic engineering study focused on modeling of traffic queues at various traffic volumes and times for each bridge with and without the presence of toll booths.</p>
<p>Tolling industry trends are moving increasingly towards all electronic collection methods.</p>	<p>Begin research and planning for an eventual migration to all electronic tolling.</p>
<p>The efficiency of Toll Collections staff scheduling can be improved.</p>	<p>Define requirements and deploy an electronic staffing system.</p>
<p>Fleet operations could be improved by adopting accepted fleet management best practices in several areas.</p>	<p>Develop written standard operating procedures for common fleet repairs.</p> <p>Ensure that automated systems supporting fleet management incorporate best practice data capture and reporting features.</p> <p>Prepare, update and communicate a day-by-day schedule of vehicles and equipment for scheduled preventive maintenance by shop location.</p> <p>Consider establishing an internal service fund business model for Fleet Management.</p> <p>Address ceiling height constraints at the Walt Whitman shop facility.</p> <p>Recapture available shop space.</p>

FINDINGS	RECOMMENDATIONS
	Improve inventory controls and eliminate informal inventories.
Fleet personnel require ongoing, industry-specific training and education support.	Encourage/require fleet maintenance personnel and supervisors to pursue fleet certification and credentials.
	Provide incentives for fleet technicians to earn and maintain ASE or similar technical certifications.
<p>Safety and Compliance Findings and recommendations addressing the organization’s safety and security practices, compliance with applicable regulatory requirements and the effectiveness of asset management and related programs are included in this section.</p>	
Efforts to ensure employee awareness of security threats to Bridge Operations infrastructure can be strengthened.	Develop a formal process for Homeland Security threat identification, reporting, mitigation and implementation of protective measures to thwart or mitigate against an attack.
Safety and Risk Management activities are highly responsive and supportive of Bridge Operations’ needs.	Continue the Safety Specialists emphasis on conducting onsite training activities and performance of periodic inspections of Bridge Operations facilities.
DRPA complies with the requirements of the National Bridge Inspection Standard.	Provide effective quality control and oversight of consultant-performed bridge inspections and associated reporting of data to FHWA via the states of New Jersey and Pennsylvania.
DRPA is responsive in addressing bridge maintenance and repair needs identified through biennial inspections.	Ensure that biennial inspections continue to address near-term maintenance needs and support the DRPA Strategic Plan.
	Track and report routine and capital maintenance work through a systematic process from inception through completion.
DRPA is not subject to the condition-based performance reporting requirements of Federal MAP-21 and FAST Act legislation.	Develop effective asset management systems and reporting processes aligned to the standards established under MAP-21 and the FAST Act in consultation and collaboration with the New Jersey and Pennsylvania Departments of Transportation.
	Use bridge and pavement management technology for decision support and performance reporting.

FINDINGS	RECOMMENDATIONS
	Proactively engage staff responsible for the Asset Management program areas within the Pennsylvania and New Jersey DOT's as well as the respective FHWA Division Offices in those states.
DRPA complies with GASB-34 reporting requirements.	No associated recommendation.
<p>General Administration Opportunities to improve and strengthen the business practices and processes supporting the day-to-day administration and management oversight of Bridge Operations services and functions are described in the following findings and recommendations.</p>	
Bridge Operations staff lack complete information to support management decision-making.	Provide Bridge Operations management with the training and technical capabilities required to enable sophisticated data analytics and reporting.
User adoption and acceptance of the new Enterprise Resource Planning software system has been slow.	Systematically identify, evaluate and address the sources of user acceptance challenges.
No strategic technology plan for Bridge Operations presently exists.	Contract for the completion of a comprehensive technology strategic plan for Bridge Operations
Revenue assurance practices can be improved.	Form a multi-disciplined team to comprehensively evaluate the sources and value of revenue losses, establish a regular reporting protocol and devise a plan for leakage reduction.
Revenue Audit processes are thorough and conscientiously conducted, though inadequately documented.	Prepare and review regular exception reports to assure the accuracy and integrity of the Authority's revenue accounts.
	Supplement and strengthen Revenue Audit procedures documentation.
Toll collection safes are not consistently secured.	Require all safes maintained at the bridges to be locked at all times they are not in use.
Current budget management and reporting practices are ineffective.	Seek relief from the 2% limitation on year-over-year operating expenditure growth.
	Train / re-train Bridge Operations managers on the usage of the financial system reporting tools to enable effective monitoring and management of both operating and capital budgets.

FINDINGS	RECOMMENDATIONS
Talent acquisition efforts are hampered by an overly complex recruitment and selection process.	Initiate a Lean Six Sigma (LSS) process improvement project to identify and recommend improvements to the current talent acquisition process.
No formal succession planning program exists.	Develop a standardized succession planning process and provide managerial training.
Formalized and structured training programs for newly hired employee are unavailable beyond the initial employee orientation.	Develop a standardized new-hire training protocol for all Bridge Operations personnel.
DRPA purchasing authority limits and required processes significantly impact Bridge Operations.	Continue to pursue the ongoing purchasing Lean Six Sigma analysis and implement procedural changes to improve documentation standards and compliance, and increase timeliness and efficiency.
	Seek increased spending authority to reduce volume of procurements requiring Board approval.
	Establish service level agreements and performance standards for completing each procurement step, identify the responsible group/person, and provide performance reporting by step and responsible party.
	Expand procurement reporting to identify the timeliness of each process step and track when procurement requests are returned to sender.
	Expand the on-call pool of equipment rental vendors.
	Seek increased P-card limits (or pursue alternate supplier arrangements such as the “blanket orders” recommendation below) to avoid having users circumvent Authority policies.
	Establish blanket contracts with suppliers that are based on established pricing basis (e.g., discount off list) to reduce P-card purchase volumes.
	Establish blanket contracts with suppliers that are based on established pricing basis (e.g., discount off list) to reduce P-card purchase volumes.

FINDINGS	RECOMMENDATIONS
	Consider contracting for additional purchasing support. Ensure all materials inventories are recorded, monitored and managed, to include exploring the expansion of the stockroom services provided at the Walt Whitman facility to the Ben Franklin facility.
Bridge Operations incurs significant overtime expense.	Implement effective controls on overtime expenditures

Implementation Plan

A specific plan for the implementation of the audit recommendations is included in Section III of the audit report. For each recommendation, the implementation plan:

- Restates the recommendation.
- Recommends a priority level (High, Med, Low).
- Suggests a timeframe for completion, by fiscal year, with the implementation of some recommendations spanning multiple fiscal periods.
- Assigns key accountable personnel, including both primary and supporting accountabilities.
- Provides implementation notes to assist DRPA going forward.

Management Response

Section IV of the Final Report incorporates the response of Authority management to the audit recommendations. The response document indicates whether or not the Authority agrees with the audit team’s recommendations and provides clarifying comments supporting management’s position as appropriate.

Acknowledgements

The Bridge Operations Management Audit was conducted as a collaboration between the independent audit team and many members of the DRPA management team. Specific thanks and acknowledgment are due to several individuals including:

- DRPA Chief Executive Officer and PATCO President John Hanson, who clearly articulated his support and his expectations for the management audit.
- Chief Operating Officer Robert Hicks and his management team including Bridge Directors Val Bradford and Larry Walton, Fleet Director Steve Reiners and the many Managers, Foremen,

Supervisors and rank-and-file bridge operations personnel who gave freely of their time, experience and expertise to ensure the audit team’s understanding of the complex challenges and opportunities to improve services to the toll-paying public.

- Key senior DRPA executives who provided valuable review, comment and constructive criticism of our work: Deputy CEO Maria Wing, Chief Operating Officer Toni Brown, Chief Financial Officer James White, General Counsel Raymond Santarelli, Chief Engineer Michael Venuto, Police Chief Jack Stief and Strategic Initiatives Director Christina Maroney.
- Acting Inspector General David Aubrey and his Assistant, Yvette Martelli who together ensured that the audit stayed on schedule and on-task and ably coordinated onsite logistics and scheduling for the audit team.

I. AUDIT OBJECTIVES, SCOPE & APPROACH

This document is the Final Report on the Bridge Operations Management Audit performed for the Delaware River Port Authority (“DRPA” or “Authority”) by The Azimuth Group, Inc. (“AGI”) under the direction and supervision of the DRPA Office of the Inspector General (“OIG”). The report includes an overview of the background and purpose of the management audit, presents specific audit findings and recommendations and outlines a plan for the implementation of those recommendations. Various appendices further document the audit process and support the findings and recommendations.

Background

The DRPA has an established history of undertaking independent management audits to help management assure the continuing efficiency, effectiveness, and responsiveness of the services delivered by the Authority to the citizens of the greater Philadelphia region.

DRPA is a bi-state public transportation authority created with the consent of Congress by compact legislation between the Commonwealth of Pennsylvania and the State of New Jersey and plays a critical transportation role in the greater Philadelphia area:

- DRPA owns and operates four toll bridges connecting New Jersey and Pennsylvania across the Delaware River including the Benjamin Franklin Bridge, Walt Whitman Bridge, Commodore Barry Bridge and the Betsy Ross Bridge.
- In addition to the management of the four toll bridges, DRPA’s wholly-owned subsidiary, the Port Authority Transit Corporation, provides high-speed commuter rail service connecting center city Philadelphia and the New Jersey suburbs.

The Authority is governed by a 16-member Board of Commissioners, with eight members appointed by the Governor of New Jersey and ratified by the New Jersey Senate and six members named by the Governor of Pennsylvania. The Auditor General and the State Treasurer of Pennsylvania serve as ex-officio commissioners for Pennsylvania.

The Chief Executive Officer of DRPA manages the daily operations of the Authority under the policy guidance of the Board of Commissioners and is accountable for the effective implementation of the Board’s directives consistent with the Authority’s governing documents.

DRPA’s governing documents require that each component part of the Authority participate in an independent management audit on a periodic/cyclical basis. Article XII of the DRPA Compact specifically requires the periodic performance of a management audit, as follows:

“Not less than once every five years, the Commission shall cause a management audit of its operational effectiveness and efficiency to be conducted by an independent consulting firm selected by the Commission.”

In August of 2010, the DRPA Board of Commissioners adopted Resolution DRPA-10-040 – one of several “reform resolutions” intended to strengthen public accountability and transparency – to create an Audit Committee whose duties include overseeing an independent management audit of the Authority every two years. To ensure that the biennial management audits are conducted in accordance with the Compact and Resolution DRPA-10-040, the Audit Committee identified four discrete divisions of the Authority, which are to be audited on a rotating basis as follows:

- Public Safety (including the Department of Emergency Management and Homeland Security).
- The Port Authority Transit Corporation.
- Bridge Operations.
- DRPA Administrative and Support Functions (including all other departments and activities not specifically listed above).

In furtherance of this mandate, the DRPA, through its Office of the Inspector General, competitively selected and engaged the services of The Azimuth Group, Inc. - along with its subject matter expert teaming partners The Kercher Group, Matrix Consulting Group and Cherry Consultants of the Carolinas - to plan and perform an independent management and performance audit of its Bridge Operations Division and to recommend improvements to enhance its overall effectiveness and efficiency.

Audit Objectives

The request for proposals issued by the DRPA defined the overall purpose, objectives, scope, and deliverables for the Bridge Operations Management Audit.

The specific objectives of the 2017 Bridge Operations Management Audit include the following:

- Provide an independent, objective and comprehensive review and assessment of:
 - The organizational structure, duties, and responsibilities of all management staff of the Bridge Operations Division.
 - The effectiveness of business strategies
 - The effectiveness of existing business and operating policies and procedures.
- Identify best management practices that should be considered to address identified management, organizational, operational and/or staffing issues and opportunities.
- Provide independent professional recommendations to the Authority based on the findings and conclusions of the management audit.

Audit Scope

The management audit was conducted under the direction of the DRPA's Office of the Inspector General. The scope of the audit was comprehensive and included all Bridge Operations departments and functions and key shared internal administrative support functions, as follows:

- Bridge Operations administration and management.
- Construction & Maintenance.
- Toll Collection.
- Fleet Management.
- Shared support services provided by DRPA - for the limited purpose of assessing their impact the effectiveness and efficiency of Bridge Operations - including:
 - Finance
 - Purchasing
 - Contract Administration
 - Human Resources
 - Information Services
 - General Counsel
 - Benefits Administration
 - Engineering
 - Public Safety.

The following aspects of Bridge Operations' organization, management and operations were addressed:

- **Organizational Effectiveness**
 - Development of long and short-range plans to assure the continued effective and efficient performance of DRPA functions.
 - Organizational structure balance, career paths, reporting relationships, staffing levels and skill sets.
 - Bridge Operations asset management.
 - Customer service/customer relations.
 - Consideration of apprenticeship programs for union represented trades personnel; succession planning; evaluation of establishing assistant foremen positions, and the administration of temporary upgrades.
- **Operational Efficiency**
 - Utilization of in-house personnel and staff to accomplish facility maintenance and physical improvements.
 - Appropriateness of outsourcing annual and/or procurement related vendor service contracts and any staffing and equipment impact due to outsourcing.
 - Obsolescence of tolling technology and equipment.

- Traffic control/management of traffic flow.
- Construction and maintenance management.
- Maintenance and repair of roadway surfaces.
- Fleet operations, maintenance and management processes.
- Maintenance of property, grounds and occupied buildings.
- Space utilization and storage, including vehicles/equipment and on-site material and commodity inventory.
- The “Back to NJ No Funds” toll collection issue at the Walt Whitman Bridge and similar “Did Not Use Bridge” toll collection issue at Betsy Ross, Ben Franklin, and Commodore Barry Bridges.
- **Safety and Compliance Program Effectiveness**
 - Safety and security programs, including DRPA Police and Homeland Security.
 - Compliance with federal, state and local statutes and regulation.
 - Implementation of Biennial Inspection recommendations.
 - Asset management as related to MAP-21 and GASB standards.
- **General Administration**
 - Effectiveness of the Authority’s internal control structure including the control environment, information and communication system, risk assessment and monitoring processes.
 - Technology applications (including the adoption of a new ERP system) particularly for asset management, asset life expectancies, and labor productivity data.
 - Integrity of the Authority’s budgeting, management, and reporting systems.
 - Revenue collection within Toll Operations and Revenue Operations.
 - Allocation of bridges’ operating and capital budgets.
 - Efficiency of operating procedures and communication between the various shared services; e.g., Public Safety, Purchasing, Contract Administration, Information Services, Legal, Engineering, Human Resource Services, Engineering, Public Safety, et al.

Audit Standards, Methodology and Approach

Management and performance audits provide objective analysis and recommendations to management and decision makers in order to facilitate the improvement of operations, support executive decision-making and improve accountability. The Azimuth Group’s approach to the performance of the Bridge Operations Management Audit aligns with Generally Accepted Government Auditing Standards (“GAGAS”) issued by the Comptroller General of the United States. The general standards require that the auditor must:

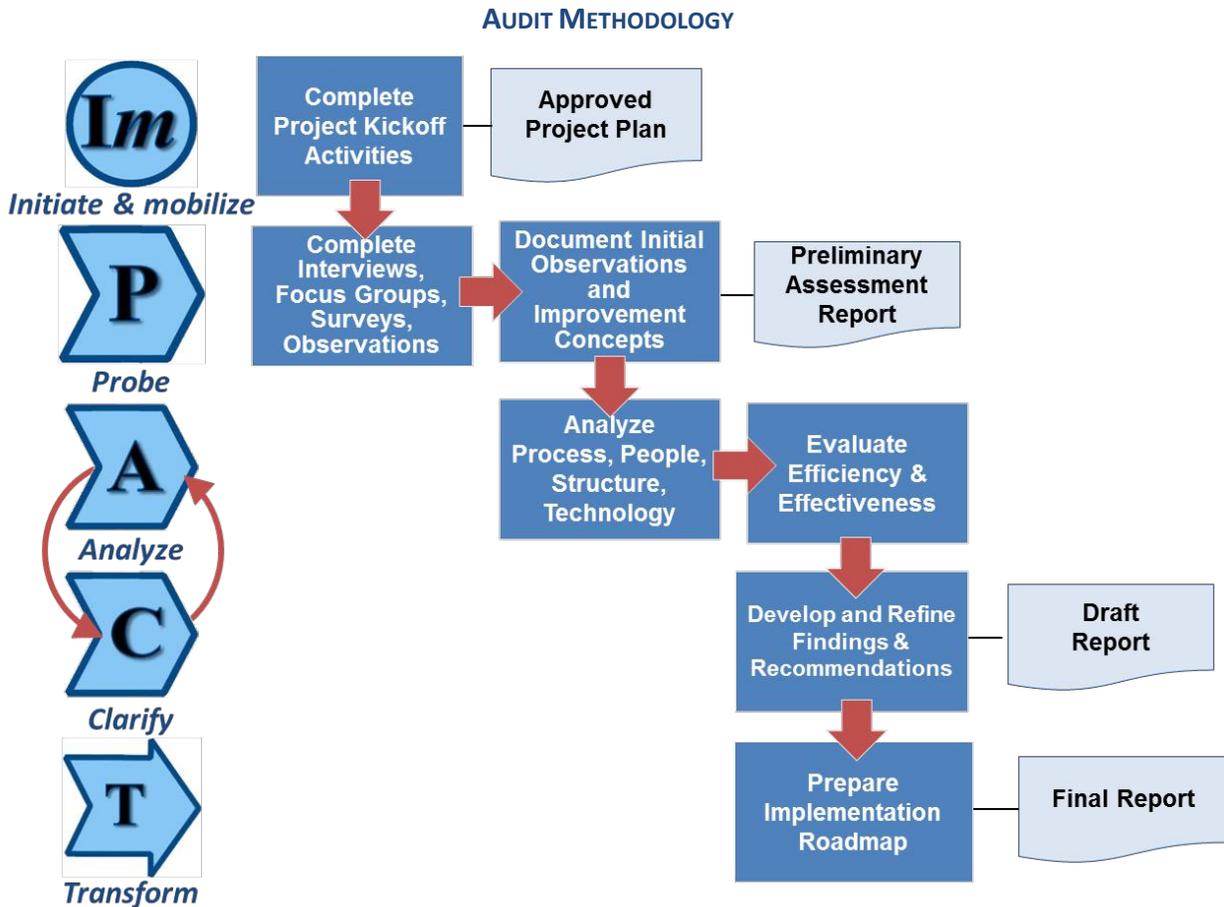
- Perform the work in accordance with basic **ethical principles**.
- Maintain **independence** in both fact and appearance.

- Use **professional judgment** in the planning, conduct, and reporting of audit results.
- Possess the **professional competence** needed to address the audit objectives.
- Provide adequate **quality control**.

Management and performance audits should provide reasonable assurance that the auditor has planned and performed the audit to obtain sufficient, appropriate evidence to provide a sufficient basis for our findings and conclusions based on the established audit objectives. To that end, Azimuth’s **ImPACT** methodology provides a logical, sequential structure for the achievement of the audit objectives.

The five stages of the methodology, as illustrated at the top of the following page, are as follows:

- **Stage 1 – Initiate and mobilize.** This stage of the methodology encompassed those tasks necessary to solidify mutual understanding of the audit scope, objectives, deliverables, and timing as well to ensure that appropriate DRPA and consultant resources were available and well-coordinated.
- **Stage 2 – Probe.** This was the primary data collection stage of the audit, and it here that the audit team developed an understanding of the current state of the DRPA Bridge Operations functions as well as the internal administrative and support services provided by other units of DRPA. Using interviews, focus groups, surveys, direct observation, document review and other data gathering and research techniques, the audit team compiled, organized and synthesized the bulk of the information needed to develop audit conclusions and findings in subsequent stages of the methodology.
- **Stage 3 – Analyze.** At this stage of the audit, the AGI team critically evaluated the data gathered and reviewed previously to reach conclusions, document specific findings and develop preliminary recommendations for discussion and factual validation.
- **Stage 4 – Clarify.** This stage of the methodology included the primary report writing and review tasks of the audit process. While maintaining independence and objectivity, the **ImPACT** approach included built-in feedback loops to ensure that the factual basis of findings and recommendations was sound and that both the AGI team and the client understood the ramifications of the recommended offered to address improvement opportunities identified.
- **Stage 5 – Transform.** Upon delivery and acceptance of the final audit report, the audit’s center of gravity will shift away from AGI and towards DRPA and Bridge Operations leadership and staff. The AGI team can be available to provide both on-site and remote support of DRPA’s follow-through and implementation of the study’s recommendations. Implementation support services are at the discretion of DRPA management and will be separately contracted if and when required.



Within the **ImPACT** framework, the audit team applied a variety of information gathering and analytical techniques including extensive data collection and document review, management interviews, employee focus groups, direct observations and a variety of specific analyses as necessary and appropriate. Accordingly, we believe that the evidence obtained through the course of our work provides a reasonable basis for our findings and recommendations based on the audit objectives defined by the Authority.

Throughout the course of the engagement, the audit team had extensive contact and interaction with members of the management and staff of Bridge Operations and other supporting DRPA departments. The information and access required for the completion of the management audit were readily made available, employees actively participated in interviews, focus groups, site visits and other tasks. No request for additional information was declined.

Tasks Completed

A detailed project task plan has guided the work of the management audit team. To date, completed tasks include:

- Task 1.1 – Complete preliminary audit planning.
- Task 1.2 – Formally initiate the audit.

- Task 1.3 – Prepare an updated audit work plan.
- Task 1.4 – Finalize the audit plan.
- Task 1.5 – Mobilize the audit team.
- Task 1.6 – Conduct initial project briefings and interviews.
- Task 2.1 – Prepare for audit fieldwork.
- Task 2.2 – Discover and document the “as-is” organizational structures, processes, performance objectives and results.
 - Appendix A includes a list of the documents collected and reviewed by the audit team.
 - Appendix B lists interview and focus-group participants.
 - Appendix C includes a summary profile of the Bridge Operations organization structure, staffing and other information.
 - Appendix D summarizes the results and input received from the DRPA Citizen’s Advisory Committee.
- Task 2.3 – Assess internal service satisfaction levels.
 - Appendix E contains the findings and results of the internal support services satisfaction survey.
- Task 2.4 – Prepare, review and revise a Preliminary Assessment Report.
- Task 3.1 – Evaluate the efficiency, effectiveness, responsiveness and compliance of DRPA Operations in light of the Authority’s stewardship mission.
- Task 3.2 – Prepare and review a Preliminary Draft Report of Audit Findings and Recommendations.
- Task 4.1 – Complete additional data collection and analysis as required.
- Task 4.2 – Collect and incorporate management responses to findings and recommendations.
- Task 4.3 – Prepare and Present a Final Draft Report of Audit Finding and Recommendations to the DRPA Audit Committee.
- Task 4.4 – Prepare and deliver the Final Audit Report incorporating any feedback received from the DRPA Audit Committee, along with a formal response from DRPA management.

Organization of the Audit Report

Auditing standards require auditors to issue reports that effectively communicate the results of the completed audit. The form of the report should be appropriate for its intended use, should effectively communicate results to the appropriate officials of the audited entity, make results understandable to the intended audience – including the general public – and should facilitate follow-up to determine whether recommendations have been adopted.

Auditors must provide in the report a description of the audit objectives and scope and should describe the methodology applied to accomplish the objectives. Findings must be based on evidence sufficient to assist management in understanding the basis of the recommendations provided.

This Final Report on the Bridge Operations Management Audit is organized as follows:

Executive Summary

- I. Objectives, Scope and Approach
- II. Findings & Recommendations
- III. Implementation Plan
- IV. Management Response

Appendix A – List of Source Documents

Appendix B – List of Interview Participants

Appendix C – Organizational Profile

Appendix D – Citizen’s Advisory Committee Input

Appendix E – Internal Support Services Survey Results

Appendix F – Sample Transportation Asset Management Plan Contents

Appendix G – Sample Outsourcing Scoring Methodology

Appendix H – Fleet Classification Codes

II. FINDINGS & RECOMMENDATIONS

This section of the Final Report presents the specific findings and recommendations that are the primary deliverable product of the Bridge Operations management audit. The recommendations are intended to address the improvement opportunities developed over the course of the audit engagement and are offered as constructive suggestions for the improvement of Bridge Operations organization, operations and service delivery over the long term.

Generally accepted auditing standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on the audit objectives. As documented in this report and the appendices, we believe that the evidence obtained provides a reasonable basis for our findings and recommendations for improvement.

Audit findings and recommendations are organized by topical areas to cover the elements of the audit scope, as follows:

- Organizational Effectiveness.
- Operational Efficiency.
- Safety and Compliance.
- General Administration.

Organizational Effectiveness

Findings and recommendations related to long and short-range planning, organizational structure and staffing and asset management efforts are addressed in this section.

FINDING DRPA bridges are highly visible public landmarks and a source of pride for residents of the greater Philadelphia area.

The bridges are also the “signature” assets of the Authority and, along with the PATCO rail line, serve a vital public purpose and are central to the economic viability of the region. It is the overall assessment of the audit team that the Bridge Operations leadership team and staff, supported by the balance of the DRPA organization, excel at maintaining and operating these iconic structures. Independent biennial assessments of the condition of the bridges demonstrate that they have consistently been maintained in serviceable condition. To the extent that this audit report suggests a range of opportunities to improve and enhance the services of the Bridge Operations Division, this should not detract in any way from the fine work performed every day and are offered in the spirit of continuous improvement for the public good.

FINDING Bridge Operations is actively engaged with the ongoing DRPA-wide strategic planning initiative.

Under the leadership and direction of the Board and the CEO, DRPA is involved in the development of a comprehensive strategic plan for the entire enterprise. Members of Bridge Operations senior leadership are participating in this effort, which is being managed by the Strategic Initiatives Department with the facilitative support of an independent consulting organization.

The current focus of the planning effort is on the creation of a high-level organizational plan to include the development of refined mission and vision statements and establishment of top-level goals and objectives. DRPA's primary objective is to be "World Class Stewards" of the public's assets and five overarching strategic objectives have been agreed to for the organization as a whole.

RECOMMENDATION

ORG 1 Fully integrate Bridge Operations planning and goal setting under the DRPA strategic umbrella.

This is the current practice and should be continued. Bridge Operations is one of the most visible – if not THE most visible – of the DRPA's services and the revenue stream produced by toll bridge users underwrites all other elements of the Authority's operational and support activities. Bridge Operations is represented in the strategic planning process and is working to ensure alignment of its goals, objectives initiatives and performance metrics with the strategic priorities of the Authority at large.

FINDING Bridge Operations lacks a set of robust key performance indicators.

Comprehensive, formally structured performance management has not yet been adopted and integrated into Bridge Operations business processes. However, the development of such a management process is recognized as a critical need across the DRPA and is among the next steps in the ongoing strategic planning process.

At the direction of the Chief Operating Officer, the Bridge Operations management team is now moving toward development of a set of key performance indicators with an initial focus on measures of productivity and accountability.

RECOMMENDATION

ORG 2 Develop Bridge Operations-specific objectives, initiatives and key performance indicators (KPIs) to support each of the five strategic focus areas included in the DRPA strategic plan.

Objectives and initiatives should be measurable and reflect the core mission of the Authority. Once the Authority-level metrics are established, operations-oriented metrics should be cascaded to lower levels of the organization such that each functional area can establish related / linked indicators. Performance targets should be both attainable and aspirational with appropriate timelines established for achieving results. Emphasis should be on outcomes vs. outputs. All the above-listed aspects of integrating Bridge Operations into the Authority’s comprehensive planning effort are presently in process.

FINDING The current organizational structure of Bridge Operations is both effective and efficient.

Organizational lines of authority, responsibility, communication, and accountability are clearly established and well understood throughout the Bridge Operations organization.

- Two Bridge Directors oversee the two northern and two southern bridges, respectively, each with one high volume bridge and one lower-volume bridge, effectively balancing both resources and management oversight.
- Similarly, two Toll Managers divide the responsibility for management of toll collections at the northern and southern bridges, respectively.
- Each bridge has dedicated Construction & Maintenance Managers, each overseeing a diverse set of skilled and semi-skilled trades workers.
- Fleet Management is organized into separate units for heavy and light vehicle maintenance. A DRPA “Fleet Management Center of Excellence” is being established with Bridge Operations assuming responsibility for the maintenance and management of the PATCO vehicle fleet.
- Construction and maintenance crews are organized by trade, including both skilled and semi-skilled trades workers, with skills sets necessary for the accomplishment of needed work.
- Spans of control range from very narrow (1 – Fleet Management Director) to moderately broad (15 –Toll Managers). While the spans of control of the Toll Managers appear to be broad, they are functional. The addition of separate Toll Managers at the two lower-volume+ “outer bridges” could improve the span of control over the Plaza Supervisors at the “inner bridges,” but would result in inefficiently narrow spans for the outer bridges.

FINDING DRPA lacks the systematically collected and recorded workforce production data needed to make accurate assessments of Bridge Operations staffing needs.

The current status of DRPA’s utilization of the new ERP software is such that adequate data could not be readily produced for the audit team to make informed evaluations of DRPA workforce staffing needs. Lacking regularly compiled, reliable and accurate data from the Authority’s automated information systems, the audit team reviewed and evaluated information prepared by DRPA bridge management personnel. This data was developed in support of an initiative driven by the DRPA COO to gain some understanding of workload demand and labor supply. This information consisted of DRPA-provided “Annual Labor Man Hour” spreadsheets that provide estimated time to each task performed at the four bridges.

The provided spreadsheets identified crew sizes, estimated annual task volumes, and average hours required per task to derive the total labor time, in hours, to complete the identified workload. These spreadsheets include time estimates for preventive maintenance tasks, corrective maintenance, biennial work tasks, and for capital projects that are performed using internal crews.

The audit team noted the following limitations of these spreadsheets:

- Basic tasks at the bridges differ between bridges. For example, the WWB Maintenance crews project 16 hours in “Monthly inspections of the building roofs,” but the BFB does not list this task. Furthermore, this “monthly” task is projected to be performed at the WWB only twice during the year, however. The BFB listing does include tasks for building preventive maintenance, though, for each of the principal buildings.
- BFB Maintenance crews project 525 hours for pothole patching and pavement repair. The BRB has a similar task estimated, as does the CBBB. The WWB does not list the task for Maintenance crews,
- The frequencies of routine tasks also appear to be very different from bridge to bridge. For example, at BFB, HVAC Techs perform drain and trap maintenance once weekly. At WWB, it is performed quarterly. Similarly, at the WWB, a single HVAC Tech checks building automation systems and consumes 500 hours annually. At BFB, a 2-person crew performs this task once per week.
- Even crew sizes used appear to be different for similar tasks. For example, chiller system maintenance at BFB requires a 3-person crew while the WWB uses a 2-person crew.

The above examples are just some of the variances noted in the bridge labor requirement estimates.

The noted lack of consistency in foundational aspects of the labor estimation exercise, such as crew sizes, frequencies of performance and times per task, suggests the problematic nature of attempting to rely on this information to make sound decisions on staffing levels and the appropriate mix of skill sets. Importantly, the noted lack of systematically collected data suggests that until improved data is available, such an exercise will lack the reliability needed to make objective, data-driven management decisions confidently.

Regardless of noted concerns with the “Annual Labor Man Hour” spreadsheets, the audit team acknowledges the DRPA Bridge Management team’s assertion that current staffing levels produce labor hour capacity that is significantly below the total estimated labor requirements associated with its four major program categories:

1. Preventive maintenance/routine maintenance/corrective repairs including building/facility maintenance tasks.
2. Biennial repairs.
3. Internally-performed capital projects.
4. Project coordinator for major Engineering capital projects.

However, the audit team further notes that using the same DRPA Bridge Management estimates, however problematic that data may be, the existing bridge operations staffing is likely much closer to being sufficient to perform the core preventive and routine maintenance, capital repairs, and biennial repairs activities. As the analysis in the table below illustrates, if current staff were to be relieved of responsibility for the construction of capital projects, project coordination duties and building maintenance activities through outsourcing or other means, current staffing capacity, as estimated by the Bridge Operations staff, is much closer to being adequate to meet basic maintenance requirements.

ANNUAL LABOR HOURS ANALYSIS

BFB and BRB	Projected Labor Hours				
	Maintenance	Highway	HVAC	Electrical	Cumulative
Total Labor Supply (current staffing)	30,932	35,816	8,140	19,536	94,424
PM Repairs and Biennial Repairs	27,316	35,030	6,088	18,024	86,457
In-house Capital Projects and Project Coordination	14,271	2,224	1,948	5,420	23,863
Building / Facilities Maintenance	4,596	812	7,892	3,106	16,406
Total Labor Demand	46,183	38,066	15,928	26,550	126,726
Overall Workforce Capacity (% of demand)	67%	94%	51%	74%	75%
Workforce Capacity w/o Capital Projects, Project Coordination and Building Maintenance (% of demand)	113%	102%	134%	108%	109%
WWB and CBB	Maintenance	Highway	HVAC	Electrical	Cumulative
Total Labor Supply (current staffing)	35,816	42,328	6,512	17,908	102,564
PM Repairs and Biennial Repairs	44,886	47,561	5,376	22,156	119,979
In-house Capital Projects and Project Coordination	7,550	4,745	3,942	12,836	29,073
Building / Facilities Maintenance	800	750	6,568	3,432	11,550
Total Labor Demand	53,236	53,056	15,886	38,424	160,602
Overall Workforce Capacity (% of demand)	69%	82%	62%	52%	64%
Workforce Capacity w/o Capital Projects, Project Coordination and Building Maintenance (% of demand)	84%	92%	2128%	108%	85%
Totals - All bridges	Maintenance	Highway	HVAC	Electrical	Cumulative
Total Labor Supply (current staffing)	66,748	78,144	14,652	37,444	196,988
PM Repairs and Biennial Repairs	72,202	82,591	11,464	40,180	206,436
In-house Capital Projects and Project Coordination	21,821	6,969	5,890	18,256	52,936
Building / Facilities Maintenance	5,396	1,562	14,460	6,538	27,956
Total Projected Labor Demand	99,419	91,122	31,814	64,974	287,328
Overall Workforce Capacity (% of demand)	69%	82%	62%	52%	69%
Workforce Capacity w/o Capital Projects, Project Coordination and Building Maintenance (% of demand)	84%	92%	2128%	108%	95%

The above analysis only serves to underscore the vital need for reliable work order management and workforce analytics tools.

Concerning the overall issues of staffing adequacy and the potential for outsourcing certain functions, the audit team offers the following comments:

- Best practice for making outsourcing decisions typically is based on the following factors:
 - To save money (when vendors can perform the desired service at lower cost);
 - To obtain needed skills/expertise;
 - To match supply (internal personnel) with demand (maintenance and repair backlog);
 - To focus internal resources, and
 - To gain control of difficult to manage functions.
- Within the context of the identified outsourcing guidelines, organizations typically attempt to maintain internal staffing at levels that ensure adequate work exists year around (“staff for the valleys, outsource to meet demand peaks”).
- Contracting (outsourcing) tends to be optimized when a given work activity can be clearly defined and measured, and sufficient volume exists to allow for efficiencies of scale. Conversely, the use of internal forces tends to be more effective in handling smaller(er) projects and particularly those that have a number of potential unknowns that can drive the need for change-orders or other cost/scope negotiations with using vendors.
- Difficulties related to capturing detailed information on work accomplished and the associated labor and material costs of its internally performed maintenance and repair operations complicate efforts to reliably evaluate outsourcing decisions in terms of cost effectiveness.

RECOMMENDATIONS

ORG 3 Use the Authority’s Enterprise Resource Planning system to substantiate staffing needs.

The audit team recommends the following prioritized steps in achieving this ability:

- Develop an inventory of commonly-performed tasks that are performed at all bridges, and within each discipline (e.g., Electrical, HVAC, etc.) at the bridges. The objective should be to define these tasks and to assign activity codes to these that are common across each bridge environment such that a minimum of 80% of all work may be specifically assigned to one of these activity codes. Some tasks may be infrequently performed or not well defined, however, and these should be charged to a Miscellaneous category.
- Define standard crew sizes for each task.
- Define targeted service levels/cost standards for each task, along with the number of hours, or a range of hours, typical for each task.

- Develop GPS-based inventories of infrastructure assets to tie work activities to specific locations or assets.

Once these items have been defined and populated within the ERP system, Bridge Operations should use the technology to accumulate the labor hours and other costs expended in each task.

The Construction and Maintenance Division's goal should be to build its staffing needs around the preventive and routine tasks, which are the foundation of a well-designed maintenance program. As capital projects and biennial report items are identified, and internal staff have both the capabilities and capacities to perform them, these tasks may be assigned based on the availability of appropriate resources. Where assignment of such tasks to internal staff might negatively impact the Division's ability to keep up with routine and preventive maintenance tasks, additional contract resources should be brought to bear. In a subsequent recommendation in this document (OPS 3), the audit team provides guidance in instituting a disciplined approach to the insourcing and outsourcing decision, and this or some other structured analytical approach should be employed to make decisions such as this to determine when, and whether, to assign work to internal crews.

ORG 4 Eliminate the practice of assigning Coordinators to oversee contractors.

The DRPA should avoid diverting its workforce away from needed maintenance activities to oversee the work of contractors. To the extent that such Coordinator work involves (or should involve) any level of project management or oversight, the recommended solution would be to contract for Construction and Engineering Inspection support, working under the management oversight of DRPA Engineering, to serve in this role. There may be occasions when Bridge Operations personnel are necessary to allow contractors to gain access to secure facilities, but the work of supervising the work of contract personnel should be accomplished by either contract personnel or DRPA staff working under Engineering's direction.

FINDING Bridge Operations is likely over-spending on building maintenance and repair.

The Construction and Maintenance Division recently engaged in an exercise to estimate the labor expended in various categories of maintenance. Two of these, "Building Repair and Modification," and "Building Preventive Maintenance" were designed to capture all facilities-related efforts. In analyzing the labor expenditures estimated for these efforts, DRPA appears to be devoting far more resources than are generally necessary for the maintenance and repair of these facilities.

- The International Facility Management Association (IFMA) published a 2005 report on the average maintainable space for which trades workers such as Electricians, HVAC Technicians, Plumbers, Helpers, etc., are responsible. Its 650 respondents averaged between 45,000 and 50,000 square feet per FTE assigned to building maintenance and repair.

- Summarizing the estimated labor allocated to building repair and modification and building preventive maintenance, the four bridges indicate that they are each over-allocating resources for these functions.
- At the Walt Whitman Bridge, staff estimate that 6,026 labor hours are expended in building repair and modification, and building preventive maintenance. If the average full-time equivalent staff member is available for 1,628 hours per year (as estimated by the DRPA in its labor analysis model), this equates to 3.7 FTE. Total maintainable building space (excluding unheated storage buildings and salt sheds) equates to 56,187 square feet which, applying IFMA standards, would require about 1.1 FTE.
- At the Ben Franklin Bridge, staff estimated that they expend 11,048 labor hours annually on building maintenance-related functions, which equates to about 6.8 FTE. With building space covering 47,613 square feet, this would equate to the need for approximately one FTE for building maintenance.
- At the Betsy Ross Bridge, staff estimated that they expend 5,358 labor hours on building maintenance-related functions, which equates to about 3.3 FTE. With building space covering 36,034 square feet, this equates to the need for about 0.7 FTE for building maintenance.
- At the Commodore Barry Bridge, staff estimated that they expend 5,524 labor hours annually on building maintenance-related functions, which equates to about 3.4 FTE. With building space covering 25,789 square feet, this equates to the need for about 0.5 FTE.
- Each of the four bridges use contractors for some building repair, and these expenditures equate to some level of additional staffing for the building maintenance functions for which the four bridges noted have estimated a relatively large amount of labor expended for the functions.

RECOMMENDATION

ORG 5 Consider outsourcing building maintenance functions.

The audit team has noted elsewhere in this report that the labor hour estimates made in good faith by the responsible staff at the four bridges are inconsistent with each other and are may not be representative of actual levels of effort. The recommendation of the audit team, which is re-expressed here, is that the Construction and Maintenance Division should develop the necessary business process for planning and executing maintenance activities and then use the ERP system to accumulate and analyze actual expenditures in pre-defined labor categories.

Bridge Maintenance estimates of labor hours required for building maintenance and repair are well above IFMA standards for this function. The audit team echoes perception. Outsourcing the building maintenance and repair functions would allow DRPA to focus its available resources on its core maintenance activities, which are bridge preventive maintenance and repairs.

If the estimates of labor expended at the Betsy Ross, Ben Franklin, Walt Whitman and Commodore Barry bridges are reasonably accurate, the outsourcing of the building maintenance and repair functions could allow for the allocation of just over 17 full-time equivalent positions to bridge preventive maintenance and repair work. This recommendation is qualified with the caveat that the data upon which the analysis is based was developed by Bridge Operations leadership based largely on their experience and expert judgment and in the absence of hard data produced by reliable systems. Therefore, the audit team cannot vouch for the reliability of the estimated facility maintenance labor requirement. Even so, if Bridge Operations leadership is reasonably confident that the labor hours estimates are reasonable, they should seriously evaluate different outsourcing models for performing all or at least most of building maintenance and repair activities. Outsourcing options to be considered include on-call contracts, quantity based contracts for specific projects or complete privatization of facility maintenance.

FINDING Bridge Operations asset management programs and practices are evolving

There is a keen understanding that the four toll bridges owned and operated by DRPA are high value, perpetual assets which must be adequately maintained. DRPA and Bridge Operations leaders at the executive and managerial levels of the organization are acutely aware of the need to formalize and adopt a robust Asset Management approach and program for Bridge Operations. While no such plan or program exists today, the development of such a program is explicitly acknowledged as a key initiative within the draft DRPA 2017-2021 Strategic Plan.

At a tactical level, the Chief Operating Officer has communicated a strong expectation for staff to focus on asset management, initially for the bridges and subsequently for all assets. Bridge Operations staff have been asked to compile an asset management needs list for all facilities and efforts are underway to create a methodology for determining or improving resource allocation.

RECOMMENDATION

ORG 6 Develop and deploy a comprehensive Asset Management Plan appropriate for the Authority.

An Asset Management Plan would provide a sound investment strategy for optimizing available resources and maximizing asset performance over the long term.

While there currently is no regulatory mandate for DRPA in the areas of bridge and roadway maintenance, e.g., Federal MAP-21 or FAST Act requirements applicable to state Departments of Transportation, such plans and approaches are considered best practice.

Templates and example plans are available through the American Association of State Highway and Transportation Officials (AASHTO) or the Federal Highway Administration (FHWA) websites to serve as a

guide. An example Table of Contents from an Asset Management Plan is included for reference in Appendix F.

FINDING DRPA relies on manual processes for determining infrastructure needs and development of short and long-term work plans.

Capital Infrastructure needs are identified and programmed through a Five-Year Capital Plan. Biennial bridge inspections are currently the primary data source for identification of bridge needs and project selection. No formal process exists for collecting and analyzing pavement data to determine needs and treatment strategies other than periodic visual inspections.

The Authority's ability to project long-term infrastructure needs is hampered by the lack of access to robust, predictive analytics that are found in best practice asset management systems.

The determination of long-term bridge maintenance needs is based heavily on institutional knowledge, experience, and the expertise of the engineering team, who do not have access to a Bridge Management System (BMS). Further, the Authority relies upon its engineering consultants performing the biennial NBIS inspections to provide a recommended near-term program of work for each structure. The work plan developed from the biennial inspections, while extremely important, is a short-term, reactionary approach to bridge management.

With respect to pavement assets, DRPA has not developed any formal strategies or processes for evaluating the condition of its pavements or for determining appropriate treatments and timing for ensuring they are maintained in a state of good repair. In fact, DRPA does not even maintain an inventory of its pavement assets. The current pavement strategy is focused principally on reacting to and repairing pavement failures identified by Bridge Foremen or Bridge Construction and Maintenance Managers through periodic inspections. The Authority does not have a Pavement Management System.

Without bridge and pavement management systems (BMS, PMS), and associated condition evaluation processes (pavements) DRPA is very limited in its ability to access inventory data for analysis and performance modeling to optimize budgets and performance. These systems enable asset owners to determine short and long-term actions more effectively (projects, repairs, etc.) along with funding requirements for improving conditions, extending asset life, and achieving performance objectives.

RECOMMENDATIONS

ORG 7 Develop appropriate asset management business processes and performance measures that support Authority goals and facilitate reporting to State and Federal agencies.

The Federal Highway Administration’s guidance to the states for their development of compliant Transportation Asset Management Plans (TAMP) include standards that may be useful to DRPA in the development of its own asset management processes and practices. Among the pertinent aspects of that guidance were the following:

- A minimum 10-year financial planning horizon is required in the State TAMPs.
- Methodologies for assuring the state of good repair of assets over their expected life cycle must be addressed in the TAMP.
- A methodology for securing the required data from other National Highway System asset owners (this would include the DRPA) in a “collaborative and coordinated” fashion must be defined.
- Specific standards and requirements for the capabilities of the pavement management systems used by the states to prepare / support their TAMPs.

ORG 8 Acquire and implement Bridge and Pavement Management Software for decision support.

If it is not feasible or cost-effective to implement full-featured bridge and pavement management solutions to support best practice transportation asset management activities using the Authority’s current ERP software, evaluate “Commercial-Off- the- Shelf” systems appropriate for Authority needs. Software as Service (SaaS) / cloud-based models of software may offer good value to the DRPA and minimize up-front capital outlays.

ORG 9 Develop a GIS-based inventory of pavement assets along with processes for collecting condition and performance data.

Data collected should include the extent and severity of cracking as well as rutting and ride quality which is typically measured through automated equipment. In the short term, DRPA should explore available options for contracting with the New Jersey and Pennsylvania DOTs to collect this data when these agencies perform evaluations of their abutting roadways.

FINDING Coordination and collaboration between DRPA Engineering and Bridge Operations is excellent.

This appears to be especially true at the Bridge Director and Construction & Maintenance Manager levels through a series of recurring meetings. The assignment of a dedicated Engineer for each bridge has been well received by the Bridge Operations staff. Engagement and involvement of Engineering with Bridge Operations increased and improved in conjunction with the organizational transition from four Bridge Directors – one for each bridge – to two Directors.

RECOMMENDATION

ORG 10 Leverage the close relationship with Engineering to strengthen asset management, capital planning, and maintenance program effectiveness.

Engineering has the lead role and overall responsibility for the development of a robust asset management program for the entire DRPA enterprise. A Professional Engineer on the Engineering staff is dedicated to this project and is charged with the coordination of asset management program planning and execution in collaboration with both Bridge Operations and PATCO. At the same time, effective asset management is among the highest priorities of the Chief Operating Officer and is directly linked to the Authority's overall Stewardship mission. It is essential that the existing cooperative and mutually supportive relationships be continued, nurtured and strengthened.

FINDING Opportunities to further enhance the Bridge Operations customer experience exist.

Bridge Operations personnel are strongly customer oriented and sensitive to toll payers desire for safe, rapid, cost-effective movement across the Delaware River. Observations of toll collection operations and toll-collection focus group interviews reveal that Toll Collection personnel are customer-focused, helpful and engaging. Opportunities to provide an even better customer experience are evident:

- The DRPA only accepts cash or E-ZPass for routine toll payments. Credit cards are only used for large toll amounts paid by commercial vehicles and payment are accepted only through the Plaza Supervisor's office. This is inconvenient for both automotive and commercial customers and may risk revenue loss. The reluctance to accept credit cards for passenger car toll transactions reportedly stems from concerns regarding credit card fees - which effectively discount the net toll amount received - as well as a desire to encourage the use of E-ZPass or cash. Additional concerns include driver safety when crossing the toll plaza to get to the Supervisors office and the slowing of traffic throughput while taking time to process credit card transactions.

- The lack of a “mixed-mode” collection capability (serving both manual and E-ZPass) inconveniences customers, creates lane switching issues that can cause traffic back-ups or hazards. The issue combines customer service, safety, and potential lost revenue concerns.
- Approximately 60-70% of weekday traffic currently uses E-ZPass - with 55-60% on weekends - versus manually paying tolls. There is only limited pricing advantage for E-ZPass usage as an incentive to switch to this payment method, in the form of senior-citizen discounts and frequent user discounts. New Jersey E-ZPass users now receive a credit of \$18 the month following a month in which they made 18 bridge crossings. E-ZPass use also reduces revenue leakage and is more efficient.
- Similarly, because even the E-ZPass lanes require slowing for the toll gate, time savings for E-ZPass users - compared to cash or credit card payments - are nominal compared to facilities allowing gateless electronic tolling.

RECOMMENDATIONS

ORG 11 Survey customers on their interest in being able to use credit cards, mobile payment applications and the eventual availability of fully automated toll collection.

DRPA should calibrate its investments in these and other potential changes with a full understanding of the wants and needs of the toll-paying public.

ORG 12 Negotiate a merchant services arrangement with the DRPA bank, to provide fast, low-cost credit card processing.

DRPA currently accepts credit cards on a limited basis. This recommendation is predicated on the suggestion that credit cards be accepted in the lanes as a part of a multi-mode collection model. Re-negotiation of the credit card provider could be a part of the new toll collection software selection process described elsewhere in this audit report or could move forward independent of that project.

ORG 13 Consider expanding the E-ZPass frequent user credit to Pennsylvania E-ZPass holders and evaluate expanding the program to encourage more E-Z Pass use.

Tolling industry trends towards “open road tolling” and other forms of electronic toll collection, and the potential for reductions in the cost of collections, suggest that efforts to attract additional E-ZPass users will benefit the Authority and its customers in a number of ways. While extending the frequent user credit to the Pennsylvania customers could incrementally decrease revenues, the intent is to provide

additional incentives to Pennsylvania customers to adopt E-ZPass and, over the long term, create offsetting cost reduction potential by driving market penetration of electronic collection technologies.

FINDING No apprenticeship programs are presently available to facilitate the growth of unskilled and semi-skilled workers into the skilled-trades and higher-level roles.

Bridge Operations workers, especially those in the Highway Maintenance sections, see significant value in the creation of a program that will allow unskilled and semi-skilled workers to advance through a lifetime career with DRPA. PATCO has, with the close collaboration and support of Human Resource Services, developed and deployed such an apprenticeship program.

RECOMMENDATION

ORG 14 Establish a formalized trades apprenticeship program.

Working with Human Resource Services and in close communication with the IUOE union, DRPA should develop a program that will facilitate the long-term growth of workers through the trades. This program can be modeled along the same lines as the PATCO program. For example, the structure of the PATCO Electrical Maintainer apprenticeship program includes the following:

- Designed as an approximately 18-24-month training program. (This duration may change based on the specific trade.)
- Classroom instruction taught by Camden County College to support the on-the-job training (OJT) effort led by designated trades workers and supervisors with demonstrated knowledge of a particular area of expertise and a desire to assist with the training.
- Together, the classroom training and OJT will be instructive in the techniques and knowledge required to perform the work of the designated trade.
- The training program emphasized both the fundamental skill requirements for job success but also proper safety precautions.

Note that the apprenticeship program envisioned for Bridge Operations will include five separate position types and will therefore require a program design appropriately tailored for the job classification.

FINDING Bridge Operations leaders are interested in the creation of a new position of Assistant Foreman.

Some Bridge Operations leaders indicated that the Construction and Maintenance Division would benefit from the creation of an Assistant Foreman position title. Although the audit team recognizes

some benefits of this position, such as providing a clear line of succession to the Foreman position, and the ability of the Division to provide a step in the career ladder for qualified and exemplary employees, there are mitigating factors that also weigh against the creation of this position title, including the following:

- The Division should prioritize the accomplishment of a greater volume of preventive maintenance. Therefore, the Division's emphasis should be on positions that contribute work in the field rather than additional supervisory staff.
- The current spans of control of Foremen are reasonable and do not need to be reduced by creating an Assistant Foreman position for this purpose.

RECOMMENDATION

ORG 15 Defer creation of an Assistant Foreman position.

Although there may be certain benefits to the organization through the addition of the position of Assistant Foreman, these advantages are outweighed by the cost and the need to prioritize the accomplishment of preventive maintenance with any additional staff that may be added. Further, the current spans of control of the Divisions Foremen are reasonable.

FINDING Bridge Operations personnel may be temporarily upgraded to fill higher-level vacancies on an acting basis while the recruitment of a permanent employee progresses.

The lengthy hiring process can cause temporary upgrades to extend for a protracted period. Human Resource Services provides to the Board Chair a list of personnel serving in temporarily upgraded roles and a policy requiring periodic rotation of long-term temporary assignments is under consideration. However, some employees filling temporarily upgraded roles report feeling overworked/over-tasked due to assuming responsibilities for both their regularly assigned and temporary acting positions.

RECOMMENDATION

ORG 16 Consider revisions to temporary upgrade practices to increase organizational effectiveness and lessen the impact of vacant position vacuums.

These revisions could include:

- Modify the "Temporary Upgrade Policy" by delegating the authority for approval of such upgrades to the Chief Director levels, rather than CEO level.

- In key position upgrades, have personnel performing tasks/responsibilities for only acting position and not both the regularly assigned plus the acting role, thereby avoiding burn-out.

Human Resource Services is evaluating the implementation of a policy that would require the rotation of personnel assigned to acting positions as a way to provide more interested employees the opportunity to gain experience and also to avoid the creation of an assumption that the acting employee is advantaged in the ultimate selection decision. The COO has included within the performance plans for the Bridge Directors a requirement that rotation of temporary upgrades be recognized as an opportunity to cross-train personnel and thereby strengthen the organization's "bench strength."

Operational Efficiency

The findings and recommendations included in this section addresses a range of scope items focused on a variety of operational and managerial aspects of Bridge Operations including construction and maintenance management practices, staff and contractor utilization, tolling technology and processes and bridge traffic management.

FINDING Multiple management practices impair Bridge Operations focus on needed preventive maintenance activities.

Preventive maintenance refers to activities that are performed in order to avoid, or prevent, a known or predicted failure from occurring. Examples of preventive maintenance in DRPA Bridge Operations include:

- Filter changes.
- Drain and trap maintenance.
- Chiller system maintenance.
- Boiler and heating system maintenance.
- Building automation system checks and maintenance.
- Camera system inspections and maintenance.
- Cathodic protection system maintenance.
- Generator inspections and maintenance.
- Switchgear servicing.
- Bridge speed limit sign inspection and maintenance.

Closely related Routine Maintenance activities include cyclical tasks that are of a smaller, typically lesser-skilled nature that involve cleaning and general upkeep of buildings, equipment, machinery, or systems. These activities are performed in order to restore an asset to its original state or to make the asset more aesthetically pleasing. Examples of routine maintenance in DRPA Bridge Operations include:

- Toll booth and bridge hose-downs and cleaning.
- Toll lane degreasing and power washing.
- Fueling movable maintenance platforms.

- Landscaping and grass-cutting.
- Roadway sweeping.
- Flushing tunnels, walks, and streets.
- Crack sealing.
- Clean pits.
- Tree trimming and leaf removal.
- Treadle replacement.
- Clean debris from bridge troughs.

Interviews and observations at the four bridges indicate that preventive maintenance (“PM”) is being accomplished at uneven rates among bridges. Although the audit team did not have access to precise data regarding the times spent in preventive maintenance activities and the time spent in reactive and emergency duties, anecdotally the time spent in PM at the Walt Whitman and Ben Franklin bridges was far less than that spent at the Commodore Barry and Betsy Ross bridges.

- Crews are failing to adhere to a schedule of PM at any of the four bridges. This is particularly true at Walt Whitman and Ben Franklin bridges, where preventive maintenance tasks are accomplished only as time permits.
- It is not clear that the focus of Bridge Operations is on PM. For example, during the course of the study, crews at the Ben Franklin Bridge were assigned to complete a renovation project in the maintenance office building rather than completing PM.
- Preventive maintenance events and schedules have not been entered into the ERP system.

Bridge Operations leadership report that while Construction and Maintenance Foremen do attempt to work to complete scheduled preventive maintenance, difficulties arise in sustaining these schedules due to staffing levels, workload, capital project demands and reactive maintenance response. They report that these challenges are more pronounced at the two inner bridges.

RECOMMENDATION

OPS 1 Commit to a consistent focus on preventive maintenance.

Consistent with the audit team’s review of the labor hours and workload data supplied by the Bridge Operations leadership team, the “highest and best” use of the Bridge Operations workforce seems most closely linked to performing preventive and routine maintenance. This analytical conclusion is buttressed by the audit team’s observations and discussions with Bridge Operations personnel, who consistently cited the need for more focus on these basic activities in support of bridge, roadway and facility infrastructure.

Accordingly, there are many reasons for instituting an effective preventive maintenance program. These include the following:

- Better conservation of assets and increased life expectancy of assets, thereby eliminating premature replacement of machinery and equipment.
- Reduced overtime costs and more economical use of maintenance workers, due to working on a scheduled basis instead of a crisis basis to repair breakdowns.
- Timely, routine repairs circumvent fewer large-scale repairs.
- Reduced cost of repairs by reducing secondary failures. When parts fail in service, they usually damage other parts.
- Identification of equipment with excessive maintenance costs, indicating the need for corrective maintenance, operator training, or replacement of obsolete equipment.
- Improved safety and quality conditions.

Bridge Operations should commit to being a preventive maintenance-focused organization. PM activities should account for a minimum of 30% of all labor hours expended by maintenance crews during the year, with the goal of reaching 50% in the longer-term and should end the practice of utilizing maintenance crews for non-core tasks such as building renovations.

FINDING Preventive maintenance activities have not been standardized across bridges.

Although most of the PM categories listed in the “PM-Repair Schedules” completed by personnel at the four bridges are consistent, the crew sizes and frequencies of completion are not.

Recognizing that there are unique features of bridge structures, buildings and building systems at each of the bridges, the functions of the PM program should be standardized at each location even if the time expended in their performance is not.

Some of the PM tasks are not sufficiently descriptive of the work performed and are not at a fine enough level of detail to enable a buildup of the hours required to perform them. For example, each of the bridges lists, “Chiller system maintenance,” however there are multiple tasks involved in accomplishing this important PM activity, and these should be programmed into the ERP system, along with the crew sizes, frequencies of performance and the standard hours associated with each.

RECOMMENDATION

OPS 2 Standardize preventive maintenance activities across each of the four bridges.

The Construction and Maintenance Division should establish a PM Committee to define the tasks that comprise the Division’s PM program. This ad hoc committee’s goal should be to establish a plan to ensure that each of the tasks associated with the preventive maintenance program is entered into the

ERP system, along with the standard crew sizes, frequencies of performance and the standard hours associated with each task.

FINDING *Opportunities to outsource certain routine maintenance activities exist.*

As has been noted in this report, the Construction and Maintenance Division, and Bridge Operations generally, is not currently capturing data at the level required to make definitive conclusions related to the cost-effectiveness of the tasks its crew perform. This inhibits the Division's ability to determine whether any particular task is performed more efficiently or cost-effectively than a private contractor. The audit team noted, however that the "Annual Labor Hours" spreadsheets completed by the four bridges each estimate relatively large expenditures of time for certain routine tasks that are typically easily privatized due to the large number of private competitors in the marketplace. These include the following:

- Roadway sweeping.
- Maintenance painting.
- Making of signs, banners, stickers.
- Grass cutting.
- Tree trimming.

The above is not intended to be a comprehensive listing of potential outsourcing candidates, but rather a listing of some of the activities for which the Construction and Maintenance Division is expending relatively large amounts of time, and for which private contractors are usually in abundance and available to perform.

- Interviews with bridge staff members indicate that they attempt to accomplish most of the work with internal crews.
- There is no clear set of criteria by which the Construction and Maintenance Division determines whether to utilize internal crews or to contract for a specific element of work.
- The use of internal crews for certain routine activities may not only be cost-ineffective but may not be maximizing the utility of these crews to perform more important preventive maintenance tasks.

RECOMMENDATION

OPS 3 Develop and implement an analytical approach to the insourcing and outsourcing decision.

The audit team has made the recommendation to enhance the utility of the ERP system and associated maintenance management business processes, and will not reiterate that recommendation here. However, accumulating and analyzing accurate data is an essential prerequisite to making informed

decisions related to the cost-effectiveness and efficiency of the work performed by internal crews. This provides the foundation for valid comparisons to the private sector for such routine and cyclical tasks as those noted in this section.

The Division should work to establish and utilize a standard set of criteria to decide to outsource work or to perform it with internal crews. The development of these criteria should be a collaborative effort among Bridge Directors and C&M Managers and should be standardized across the Division. To facilitate this effort, and to begin the discussion, a potential outsourcing scoring methodology that incorporates important factors to consider in this effort is included in Appendix G.

FINDING Predictive maintenance methods have not been applied in the development of the facilities maintenance program.

As noted above, the preventive maintenance program requires some refinement in the definition and standardization of tasks at a more granular level.

Although preventive maintenance is certainly necessary, it relies on scheduled cycles of maintenance, and the performance of routine tasks that may or may not be required given that mechanical systems, even the same type of system, display uneven rates of wear.

Reliability-centered maintenance (RCM) employs predictive testing and inspection to determine preventive maintenance requirements and frequency. RCM recognizes that equipment design and operation differ and that different equipment will experience varying probabilities of failure from different degradation mechanisms. It also structures a maintenance program recognizing that the organization does not have access to unlimited personnel and funding resources, and therefore it is an approach to evaluate a facility's equipment and resources to best mate the two, and, in theory, results in more facility reliability and cost-effectiveness.

Reliability-centered maintenance places great emphasis on improving equipment reliability, principally through the feedback of equipment condition data using primarily non-intrusive testing techniques, visual inspection, and performance information to assess machinery condition. For example, vibration analysis of a generator might be the basis for either accelerating or deferring a scheduled major overhaul, or infrared testing of a roof might indicate the need for small repairs now and avert a major repair project in the future.

RECOMMENDATION

OPS 4 Incorporate predictive elements into the development of ongoing maintenance programs once the PM program is mature and stable.

Bridge Operations should first ensure that it implements a standardized and comprehensive preventive maintenance program. Once this PM system matures, it should begin to incorporate a reliability-

centered maintenance program that utilizes predictive techniques. The use of predictive testing equipment should be applied on an ongoing basis to include the techniques enumerated below.

- Vibration analysis should be used to detect, identify, and isolate specific component degradation and its causes before serious damage or actual failure. Vibration monitoring helps to determine the condition of rotating equipment, a system's structural stability, and sources of airborne noise.
- Oil analysis should be used to determine the condition of a given oil, fuel, or grease sample by testing for viscosity; particle, fuel, and water contaminants; acidity/alkalinity (pH); breakdown of additives; and oxidation.
- Temperature monitoring devices should be used to detect temperature variances in machines, electrical systems, heat transfer surfaces, and structures and the relative magnitude of those temperature variances. Large changes in temperature often precede equipment failure. Infrared thermography, in particular, is a reliable technique for finding roof leaks and determining the thermal efficiency of heat exchangers, boilers, building envelopes, etc.

FINDING Bridge Maintenance schedules at the inner bridges are suboptimal.

The primary work shift for Bridge Operations is 7 AM-3:30 PM. However, traffic at the WWB and the BFB effectively limits the productive time available to work in certain bridge and roadway maintenance activities from 10-2 PM (4-hours).

Shifting whatever work that can be efficiently and safely performed during time periods outside of “rush hours” provides the potential for an increased amount of bridge and roadway work that can be performed within a standard 8-hour day. However, without increasing staffing levels, any increase in the work hours devoted to performing work activities that otherwise could not be performed because of traffic would come at the expense of having less capacity to perform other work (such as building maintenance/renovations).

Having Bridge Operations construction and maintenance personnel focus work to periods outside the daily traffic rush hours would avoid the need to pay workers overtime to work through lunch (a practice driven by the four-hour window of low-volume traffic at the WWB and BFB). This would reduce overtime costs.

RECOMMENDATION

OPS 5 Consider alternative shift schedules to ensure that work activities are maximized in maintaining bridges.

Bridge Operations management should identify the Walt Whitman Bridge and Ben Franklin Bridge work activities that are impacted by traffic and determine what work can be done safely and efficiently during nights/evenings with supplemental lighting.

Management should revise employee work schedules as supported by the suggested analysis (above) to place workers on a schedule not impacted by rush hour traffic.

Potential schedules include the following:

- 7 PM to 3 AM.
- A four-day work week consisting of 12 hour days with staggered coverage throughout the week.
- Use of “split-shifts”
 - Work from 10 AM - 2 PM, go home, then return to work from 7 - 11 PM
 - Work from 3 AM - 7 AM, go home, then return to work from 10 AM – 2 PM.

Establishment of weekend work schedules (Saturday and Sunday) could be considered as an alternative if the rush hour traffic patterns make this a viable option for increasing the amount of continuous work hours available. Whether Bridge Operations adopts one of the recommended shift schedules or another one of its own design, the overarching objective should be to maximize the window of opportunity to perform preventive maintenance on the bridges.

FINDING *Construction and Maintenance managers have recently completed a valuable step in their ability to project labor requirements.*

Each of the four bridges has developed projected labor requirements for the tasks for which they are responsible throughout the year. This exercise was directed by the Chief Operating Officer and was recently completed, although Bridge Operations management indicates that it continues to undergo refinement and iterative updates.

These labor projections are an initial attempt to define broad categories of work, standard crew sizes, frequencies of performance, and time expenditures required for each task. These projections stop short, however, of determining how many staff members are required to complete the tasks, and the timing of their performance. This limits the ability of the Division to identify time periods during which there are sufficient and insufficient numbers of staff to perform the required tasks.

As discussed earlier in this document, the audit team noted several inconsistencies in the labor hour projections and made recommendations to revise the spreadsheets to be more consistent between bridges. Nevertheless, in absence of comprehensive and accurate data from the ERP system, this

exercise is a valuable one and should result in the Construction and Maintenance Division's ability to construct a useful staffing model to project, and schedule, staffing needs over an extended period.

RECOMMENDATION

OPS 6 Refine and enhance the Bridge Operations staffing requirements and scheduling model.

The Division should begin identifying the time periods during which tasks will occur. Projections that, for example, building filter changes will require 224 hours throughout the year is not as valuable as programming this task into an automated schedule that identifies the actual timing of this event on a weekly basis along with all other tasks that are required of HVAC Technicians.

The Division also accumulates information on the amounts of time off due to sick leave, vacation, workers compensation, short-term disability and long-term disability. However, these categories are reported in the aggregate and are not projected out by week or by month. The projection of known time off, such as for vacation, workers compensation, STD and LTD, reduces the staff time available during specific periods and should be programmed into a schedule for the year that shows weekly tasks, labor hours required, and labor hours unavailable due to the known time off. Multiple interviews with Construction and Maintenance staff indicated that there are multiple absences on most work days, and projecting the days on which critical staff members are unavailable for work is a crucial element of scheduling work.

The product of this exercise should be an annual schedule that reflects known tasks and known time off for employees. This will allow the Division to identify the periods during which critical efforts are to be accomplished, and to identify the time periods during which it is unlikely that sufficient staff will be available to perform the work, resulting in either the planned deferral of work, or the supplementing of internal crews with contracted labor.

FINDING *The "Back to New Jersey" practice is neither effective nor efficient.*

At the DRPA bridges other than the Walt Whitman (WWB), drivers that lack an E-ZPass or cash can be turned away from the toll plaza and directed to locate an automated teller machine to obtain the cash needed. However, the location of the WWB toll facilities means that drivers cross the bridge before they are required to pay the toll. For those drivers that cross the WWB without sufficient cash or an E-ZPass, the current practice is to have these drivers pull over and await a police escort back to New Jersey and off the bridge. However, the wait for an available Police escort can be quite long and drivers sometimes leave the scene without paying the toll. Occasionally no escort arrives at all.

The logistics of escorting a vehicle back to NJ from the WWB is complicated and difficult to navigate. Without DRPA law enforcement escort, it can be difficult to enter the correct traffic lanes; also, without police enforcement, there are no means for DRPA to ensure that the driver returned to New Jersey.

DRPA therefore faces suboptimal choices between lost toll revenue versus the inefficient use of DRPA law enforcement associated with the return to New Jersey policy. An underlying consideration of the return to New Jersey policy is the lack of enabling legislation in New Jersey to enforce toll payment and fines by withholding vehicle registration renewal for violators. (Pennsylvania has the necessary legislation).

RECOMMENDATIONS

OPS 7 Eliminate the practice of providing Police escorts to return non-paying drivers on the Walt Whitman Bridge to New Jersey.

Implement multi-mode toll lanes, including credit cards and, in the future, other alternative electronic payment modes (i.e. smartphones) in all lanes. Longer-term, as customer demand warrants, move to fully automated cashless toll collection.

OPS 8 Pursue necessary legislative authority to enforce toll violators, including the denial of vehicle registrations and/or driver license renewal in both New Jersey and Pennsylvania.

DRPA staff indicate that efforts are currently underway with the New Jersey Legislature on a bill to allow withholding of registration for failure to pay fines.

OPS 9 Implement multi-mode toll lanes, including credit and debit cards, smartphone apps and, in the future, other alternative payment modes in all lanes.

Longer-term, as customer demand warrants, move to fully automated cashless toll collection.

OPS 10 Consider improvements to signage, including Dynamic Message Boards to better inform drivers of available toll lanes and to support diversion of traffic unable to pay tolls.

Enhanced signage should help mitigate driver confusion, incrementally reduce congestion and improve safety.

FINDING DRPA's existing tolling technology is rapidly approaching obsolescence.

The core technology systems supporting toll collections is 25 or more years old and is limited in its ability to support the changing requirements of the Authority. For example:

- Lack of flexible and highly integrated tolling software and hardware limits the toll collection options and the revenue audit processes supporting mixed-mode lanes.
- The existing toll collection infrastructure does not currently include cameras for imaging vehicle license tags for collection of unpaid tolls in the manual lanes.
- Software maintenance and support costs are high. The current TransCore maintenance agreement totals approximately \$871,000 per year, plus the cost of replacement parts directly purchased and inventoried by the DRPA.

DRPA is currently in the process of implementing the TransCore Infinity system as an upgrade to the current Vehicle Enforcement System (VES) in all 28 E-ZPass lanes, at a cost of just under \$927,000. This modernized system, once live, will improve the Authority's ability to identify toll violators through the imaging of license tags. Additionally, TransCore has provided an unsolicited proposal to fully upgrade the current toll collection system to the latest digital product for "rough order of magnitude" cost estimate of \$8.95 million.

Considering these needs and opportunities, the Chief Operating Officer recently led a delegation of DRPA staff members involved in tolling operations to the Port Authority of New York and New Jersey as a part of his continuing effort to identify best practices in toll collection technology, business processes, and practices.

RECOMMENDATION

OPS 11 Acquire modern tolling software to enable the DRPA to transition to mixed-mode toll collections and to enable all electronic tolling as customer and DRPA needs demand it.

Initiate planning and requirements analysis for the upgrade or replacement of tolling software and hardware to support all mixed-mode lanes and an eventual transition to fully automated cashless toll collection. This decision needs to be budgeted with a supporting timeline. The decision and the implementation should be driven by the toll collection teams based on customer needs and consumer demand. Business and technical requirements should be gathered and documented through a collaborative and inclusive internal process involving all key stakeholders and should also consider and the needs, benefits, and costs of integrations to other components of the tolling system as well as to the enterprise financial management, accounting and reporting systems.

FINDING DRPA has not conducted formal studies to evaluate the mobility implications from a transition to open road tolling

Agency staff cited concerns with traffic back-ups onto the bridges if open-road tolling was put in place, i.e., there is a view that the toll booths serve to regulate traffic flow into Philadelphia and minimize delay and congestion on the bridges when entering Philadelphia. The concern is primarily centered around the Walt Whitman and Ben Franklin bridges which have considerably higher traffic volumes than the outer bridges. However, staff is not aware of any formal Traffic Engineering Studies that have been conducted to model traffic flow and queuing effect at peak hours in a scenario where toll booths were eliminated. Bridge Operations leadership reported that there were traffic studies related to speed and congestion impacts of E-ZPass implementation. Interviewed officials also indicate that DRPA explored cashless electronic tolling and elimination of toll booths on the Betsy Ross Bridge at one time, but determined that it would be impractical due to the relatively low traffic volume on that bridge. However, Bridge Operations leadership indicate an openness to a future migration to all electronic tolling on a bridge-by-bridge basis in those instances where the benefits justify the costs.

RECOMMENDATION

OPS 12 Conduct a traffic engineering study focused on modeling of traffic queues at various traffic volumes and times for each bridge with and without the presence of toll booths.

This data can be used to support informed decision making as the feasibility of transitioning to open road tolling is evaluated for each bridge through other studies.

FINDING Tolling industry trends are moving increasingly towards all electronic collection methods.

The International Bridge, Tunnel and Turnpike Association (IBTTA) published its 2016 National Toll Technology Survey, titled “*Toll Technology Transforms Mobility for Customers.*” Based on data supplied by the 36 toll agencies participating in the survey, the report illustrates an upswing in the usage of electronic tolling technologies. Examples include:

- The number of ETC (electronic toll collection) accounts grew from 19.9 million in 2010 to 32.7 million in 2015.
- The number of ETC transponders grew from 30.6 million to 50 million over the same five-year period.
- The percentage of tolls collected in cash dropped from 29% in 2010 to 18% in 2015.

- During the 2010-2015 period covered by the survey, participating agencies saw a 76% increase of revenues collected via cashless transactions – both transponders and video tolling technology – for more than \$11 billion in revenue.
- All toll roads in the State of Colorado are now fully cashless, all toll facilities except one in the State of Washington are all electronic tolling based, and there are numerous examples of individual AET agencies across the United States.
- The report concludes: “As more tolling innovations make their way through the technology pipeline, and as the industry works toward achieving interoperability nationwide, drivers are looking at a user-financed future enhanced by technology that results in greater convenience and safety on America’s highways.”

Bridge Operations officials indicate that DRPA has explored cashless electronic tolling and elimination of toll booths on the Betsy Ross Bridge but determined that it was not justified due to relatively low traffic volume on that bridge. However, Bridge Operations leadership is open to a future migration to electronic tolling on a bridge-by-bridge basis in those instances where the benefits justify the costs.

By installing mixed-mode capabilities in all lanes, the migration to electronic tolling could be managed in response to customer requirements and in a way to minimize job loss over a period of years. The hardware and software investment costs could be significantly offset by salary savings. A part of the transition may involve the maintenance of some limited number of manual lanes and revisiting the use of contract employees on weekends, to provide more flexibility and less disruption and job loss for full-time employees.

RECOMMENDATION

OPS 13 Begin research and planning for an eventual migration to all electronic tolling.

DRPA staff indicate that the Authority is reluctant to move toward fully all electronic tolling or “open road tolling” due to concerns with the regulation of speed on the bridges – especially the Ben Franklin and Walt Whitman bridges – and due to likely resistance from employees and labor organizations representing them who are concerned about the prospect of job losses. Nevertheless, as an increasing number of consumers become comfortable with new toll collection methods, and as DRPA considers the opportunities to effectively and efficiently manage toll collection costs, planning for an electronic future is only prudent. The timing of the decision to make the move to an all-electronic system, or the development of a hybrid form of electronic and manual collection as a transitional step, is a policy matter for the Board of Commissioners and will require a balancing of customer needs, employee concerns, and fiscal responsibility.

FINDING The efficiency of Toll Collections staff scheduling can be improved.

Staffing for toll collections is all done manually, with Plaza Supervisors and Toll Managers expending significant time and effort on the staffing process using Excel spreadsheets. This process can be improved by converting to an electronic staffing system, which notifies staff of openings and enables bidding for schedules, considering factors such as needs, skills, tenure, and timeliness of employee response. Such a system can also better enable sharing of employees among bridges.

RECOMMENDATION

OPS 14 Define requirements and deploy an electronic staffing system.

There may be an opportunity to “piggy-back” a similar scheduling software initiative in the DRPA Police Department. Alternatively, the Authority’s enterprise software system may be able to support this business need. Both of these options should be explored, along with the evaluation of other commercially available solutions. However, if the Authority anticipates that a conversion to all electronic tolling will occur within a relatively short timeframe, there may be diminishing value for making an investment in such technology for Toll Collections alone.

FINDING Fleet operations could be improved by adopting accepted fleet management best practices in several areas.

Fleet maintenance and operations are organized within a central fleet department serving both Bridge Operations and, soon, PATCO. The current organizational structure and shop logistics were recommended in the 2010 management audit performed by TransTech Management and are consistent with best practice.

The DRPA fleet is smaller and younger today when compared to the 2010 audit.

- 416 total fleet units in 2017 versus 519 in 2010.
- 40 fewer fleet units that are on-road, tagged vehicles in 2017.
- 22 units of the 40-unit reduction were from the Public Safety fleet.
- The average age of the on-road fleet is 6.8 years in 2017 versus 7.4 in 2010.

Interviews and observations of the current Fleet organization and operation include the following:

- Heavy duty fleet support is focused at the Walt Whitman while light-duty fleet maintenance is focused at the Benjamin Franklin. PATCO fleet support will be located at PATCO’s Lindenwold facility. Outer bridges perform routine preventive maintenance and minor repairs.
- Management-to-technician levels are somewhat higher than normal (roughly 1-to-4) but generally acceptable within the logistics of the fleet operations.

- Fleet technician staffing is somewhat above what would be anticipated with a fleet of this size and composition. However, the available fleet data and data capture practices do not support a detailed analysis of staffing and technician productivity.
- Fleet personnel are currently using the ERP system to create fleet work orders and to track mechanic time. Fleet staff may not, however, be fully aware or taking full advantage of the ERP system's range of fleet management capabilities.
- Equipment repairs lack standard operating procedures, reducing the ability to compare technician productivity.
- Outsourcing practices are appropriate, primarily focused on specialty repairs such a body and glass work, exhaust system repairs and major component rebuilding (engines, transmissions, cylinder heads, etc.).
- Equipment maintenance and repair scheduling and coordination need better coordination with operations personnel.
- Heavy duty shops at Walt Whitman Bridge have ceiling heights too low to lift many large vehicles/equipment units.
- Some usable shop space at both the Ben Franklin and Walt Whitman shop facilities is absorbed by outdated and/or inoperable shop equipment.
- Both the Ben Franklin and Walt Whitman shops maintain small part rooms that are not inventoried and are (effectively) unmanaged but contain items of little cumulative value.

RECOMMENDATIONS

OPS 15 Develop written standard operating procedures for common fleet repairs.

To measure technician productivity, task expectations need to be standardized. Standard operating procedures (SOPs) allow employees to understand what steps are expected to be performed as part of a given repair. This supports both repair uniformity and performance benchmarking. In turn, this allows management to identify performance expectations both in terms of repair completeness and timeliness.

Private sector light-duty vehicle shops typically combine repair SOPs (often derived from manufacturer service manuals) with industry standard estimates of vehicle-specific repair times (typically, from industry resources such as "Mitchell's Motor Manual" or similar) to bill customers on a flat rate basis.

In the public sector, it is rare to see flat rate used as the basis for billing repairs. Instead, the more typical public-sector use of flat rate hours is to compare employee productivity against flat rate standards, with the flat rate standard identified on the work order, providing the technician a performance target for that task. When combined with the appropriate SOPs, the amount of work to be performed and the performance expectation are known up front. In turn, with the appropriate quality

control measures, employee performance can be measured against flat rate standards to provide a basis for performance rewards or other incentives.

Flat rate time estimates typically are not available for heavy-duty vehicles. In such cases, the performance expectations usually are based of fleet's average time for similar repairs on similar vehicles. These points reinforce the need to have and use a robust vehicle classification code system and standard repair codes to support such performance reporting.

OPS 16 Ensure that automated systems supporting Fleet Management incorporate best practice data capture and reporting features.

Current fleet personnel report that they are unaware or unable to complete several important business functions within the new system:

- Parts inventory management.
- Automated preventive maintenance scheduling.
- Integration with fuel management systems.
- Integrated access to the available AVL/GPS (fleet usage) data.
- Use of industry standard equipment classification codes (See Appendix H for additional details).
- Use fleet repair classification codes.
- Capture of vehicle odometer/hour meter readings.

To the extent that fleet personnel are not sufficiently trained to use the current technology, additional training is warranted. To the extent that the capabilities of the fleet management application have yet to be fully deployed, ensure that Fleet personnel understand the deployment plan and timeline.

OPS 17 Prepare, update and communicate a day-by-day schedule of vehicles and equipment for scheduled preventive maintenance (PM) by shop location.

The equipment PM schedule should be communicated to the appropriate Bridge Operations managers and foremen each week by email (ideally, automatically generated from within the fleet application) or via some calendar scheduling application. Bridge personnel should be responsible for making the vehicle available at the time, date and location scheduled.

Fleet personnel should be responsible for having substitute (spare or rental vehicles) to cover the anticipated downtime. A related recommendation in the "General Administration" section of this report includes expanding the availability and access to rental equipment.

As unscheduled repairs are performed, any equipment identified within the communicated PM schedule should have that service also performed. Updates to the PM schedule will need to reflect PM services performed incidental to repairs.

OPS 18 Consider establishing an internal service fund business model for Fleet Management.

Widely accepted fleet management best practice is for this function to operate as a separate cost center within the organization. That cost center “owns” all fleet assets and recovers its costs through equipment rental charges to the operating units along with surcharges on goods and services provided (e.g., markup on fuel dispensed, parts issued, etc.). This business model is commonly referred to as an “enterprise fund” or “internal service fund” approach and more accurately accounts for the costs of fleet equipment and maintenance within the operating units using the equipment. This practice can provide greater accountability, allow for the planned accumulation of fleet replacement funds and support more accurate benchmarking internal costs or services against those available commercially.

Note, too, that the recent assumption of responsibility for PATCO fleet management by Bridge Operations’ fleet unit, along with the existing responsibility for maintenance of general administrative vehicles used by other DRPA units, has effectively established Fleet Management as the centralized fleet support element for the entire DRPA enterprise.

Within the context of the fleet support needs described previously, it would be difficult for the DRPA to operate the fleet unit as internal enterprise in the near term. However, as a long-range goal, the DRPA may wish to consider operating fleet services under such a cost recovery basis once DRPA business practices and support system have matured. In the interim, the Authority should establish a separate cost-center within the DRPA’s chart of accounts to separately track and account for Fleet Management costs as a stand-alone business unit within Bridge Operations.

OPS 19 Address ceiling height constraints at the Walt Whitman shop facility.

Potential options for addressing the shop ceiling height issues include one or more of the following approaches:

- Build a new roof over the existing shop and tear out the existing roof.
- Revamp the onsite equipment storage building to use as a shop (and move equipment storage to the existing shop).
- Perform more maintenance at the outer bridges with the existing shop facilities (a somewhat suboptimal but viable option).
- Build a new shop at the WWB and repurpose the existing shop.
- Pursue the budgeted Fleet Management Building at BFB and realign fleet repairs accordingly.

OPS 20 Recapture available shop space.

Floor space is a precious commodity in any shop. Old, obsolete and unused equipment should be disposed of as appropriate to both gain floor room and to reduce safety hazards.

OPS 21 Improve inventory controls and eliminate informal inventories.

As indicated, the relative value of the items maintained in equipment shop inventories at the Ben Franklin and Walt Whitman shop facilities is nominal. While lax inventory controls should be discouraged, the cost of addressing such concerns must be considered against the incremental benefit received. The capabilities of the Authority's enterprise software system could be leveraged to strengthen inventory controls as necessary and appropriate cost-effectively.

Concerning the Walt Whitman facility, the Purchasing Department maintains a stockroom operation that seems well-managed, with inventory support systems and personnel trained in stockroom operations. A potential solution to this issue would be to assign the Walt Whitman shop parts inventory to this group, which could issue this inventory from the stockroom facilities.

With respect to the Ben Franklin shop, no analogous stockroom solution was noted. However, given the amount of bridge and facilities maintenance operations observed, there may be a need to consider a joint (vehicle shop and bridge/facilities) stock room operation, potentially to be managed by Purchasing personnel (given the support systems and personnel familiarity with such operations).

Finally, both shops could consider eliminating the storerooms altogether and relying on an as-needed or just-in-time parts delivery. This is the dominant vehicle/equipment parts procurement practice for these facilities so the practical impact of eliminating these storerooms is likely to be nominal.

FINDING Fleet personnel require ongoing, industry-specific training and education support.

At the DRPA, fleet management personnel generally are knowledgeable and experienced. However, their background and training typically have provided limited exposure to fleet best practices.

At the shop floor level, increasing equipment technical complexity drives the need to provide technicians on-going training opportunities and incentives to keep these skills current. Without such ongoing commitments of time and resources, fleet operations can become inefficient.

RECOMMENDATIONS

OPS 22 Encourage/require Fleet Management personnel and supervisors to pursue fleet certification and credentials.

Delivering a best practice fleet management operation requires educated and trained personnel. Such personnel must be willing devote the effort needed to acquire the core skills, knowledge and capabilities to successfully manage a fleet or shop operation while committing to a lifelong effort to stay abreast of new developments and emerging technologies. Sustaining this knowledge over time typically involves the active participation in fleet organizations that can provide the continuous education efforts needed to deliver a best practice fleet operation. (This recommendation is repeated from the 2010 TransTech management audit report.)

OPS 23 Provide incentives for fleet technicians to earn and maintain ASE or similar technical certifications.

Many DRPA technicians indicate that they have held industry technical certifications (such as ASE or similar). Such certifications represent an objective measure of technician training levels. Acquiring and maintaining these certifications requires that the technician commit to the effort needed to learn or refresh the knowledge required to earn or retain such certifications. However, a lack of incentives to acquire or retain these certifications increases the risk that the technical capacity of fleet technicians may fall behind the support demands of the equipment. Potential incentives include additional pay for achieving and sustaining various certification levels (e.g., one-time bonus or increased hourly pay) to providing additional time-off, special recognition within the organization, to other incentives such as designated parking spaces, etc. DRPA should also encourage fleet managers and supervisors to participate in fleet management organizations and associations. (This recommendation is repeated from the 2010 TransTech management audit report.)

Safety & Compliance Program Effectiveness

Findings and recommendations addressing the organization's safety and security practices, compliance with applicable regulatory requirements and the effectiveness of asset management and related programs are included in this section.

FINDING Efforts to ensure employee awareness of security threats to Bridge Operations infrastructure can be strengthened.

DRPA's Police Chief is the Authority's lead in Homeland Security risk matters and serves as the Authority's representative with external stakeholder agencies and resources and DRPA Police Officers serve as the first line of defense for any security risks posed to Bridge Operations. Security surveillance

systems exist throughout the facilities and are monitored by personnel working at the Police Department dispatch center. DRPA also participates in training activities and drills sponsored by other local area stakeholders. However, the only formal training or awareness that occurs with Bridge Operations personnel takes place during the New Hire Orientation and that training provides little more than an overview to remind employees to report suspicious activities.

RECOMMENDATION

SC 1 Develop a formal process for Homeland Security threat identification, reporting, mitigation and implementation of protective measures to thwart or mitigate against an attack.

Elements of such a process would include:

- Provide training (via tabletop drills and instruction) to Bridge Operations personnel to ensure that they are aware of their roles and responsibilities when emergency conditions arise.
- Specify and practice the recommended actions to take to ensure personal safety and to avoid additional risks; conduct personnel accountability; identify the source of the incident (internal/external); understand who to and how to report all incidents.
- Reinforce the importance of threat awareness by adopting the U.S. Homeland Security Advisory System and communicate changes to the current threat condition code to all employees and security stakeholders.

FINDING Safety and Risk Management activities are highly responsive and supportive of Bridge Operations' needs.

A reorganization of the DRPA and PATCO safety programs is presently in process. This reorganization allows Risk Management to focus on comprehensively managing all risks to the organization while Safety will be proactively engaged to support the entire DRPA enterprise through a newly-created Safety Center of Excellence organized in PATCO.

Safety personnel appear highly skilled, knowledgeable staff members with a proactive approach to developing a safety culture and raising employees' awareness of safe work practices within the organization. The staff has been afforded professional development and educational opportunities (train-the-trainer certifications) to improve the organization's safety program.

RECOMMENDATION

SC 2 Continue the Safety Specialists emphasis on conducting onsite training activities and performance of periodic inspections of Bridge Operations facilities.

Frequent on-site presence at the Bridge Operations facilities promotes awareness of the importance of safety and fosters the development of productive, personal working relationships between the Safety staff and Bridge Operations managers, supervisors and staff.

FINDING DRPA complies with the requirements of the National Bridge Inspection Standard.

Bridge inspection reports were reviewed from the most recent inspection cycles (2016) for the Barry, Whitman, Franklin, and Ross bridges. NBI ratings for deck, superstructure, and substructure were typically 6-7 or satisfactory to good across the bridges. The only exception was the Franklin substructure which received a 5 rating which is considered to be fair.

- Given the range of ages for the four bridges, the NBI ratings are reflective of an effective maintenance and rehabilitation strategy
- None of the inventoried bridges are categorized as Structurally Deficient (SD)
- The Sufficiency Ratings of the four main bridges has not changed significantly over the past two inspection cycles
- The Barry, Franklin, and Whitman bridges are designated as Functionally Obsolete due to roadway geometry (width, capacity, etc.)

All publicly owned bridges 20' or greater in length are required by law to be inspected every two years to stay in compliance with the National Bridge Inspection Standard (NBIS). Further, bridge owners are required to annually report inspection information to the Federal Highway Administration (FHWA) as part of the National Bridge Inspection Standard (NBIS) requirements. The DOT in each state has the responsibility for compiling this information within its respective jurisdiction and submitting an aggregated report to FHWA. The FHWA periodically reviews state programs for compliance.

DRPA contracts with qualified engineering firms to perform bridge inspections and these firms provide the inspection data directly to the New Jersey and Pennsylvania DOT's on their behalf. The biennial inspection program also includes the completion of more in-depth inspections on a four-year cycle - every other biennial inspection - due to the age and complexity of the DRPA structures.

The Authority is beginning the transition to element level inspection, consistent with AASHTO element level inspection guidance. This element level inspection data will ultimately provide the DRPA with greater detail on actual in-situ bridge conditions concerning the severity and extent of deterioration.

From its review of bridge inspection information made available by DRPA staff, the audit team considers the DRPA to comply with the National Bridge Inspection Standard (NBIS) requirements

RECOMMENDATION

SC 3 Provide effective quality control and oversight of consultant-performed bridge inspections and associated reporting of data to FHWA via the states of New Jersey and Pennsylvania.

As noted previously, the respective State Departments of Transportation are accountable to FHWA for ensuring that all publicly owned bridges are inspected biennially, and bridge condition information reported annually in accordance with the National Bridge Inspection Standard. Therefore, DRPA must ensure that this information is submitted by their consultants in an accurate and timely fashion to the state DOT's for inclusion in their reporting to FHWA.

FINDING DRPA is responsive in addressing bridge maintenance and repair needs identified through biennial inspections

DRPA selects and oversees the work of engineering consultants performing biennial inspections of its bridges as required by the National Bridge Inspection Standard. These inspections are also required under the Authority's bond indentures.

The results and repair recommendations from these biennial inspections serve as the primary planning documents used for developing the Bridge Operations capital and maintenance programs. The Authority is responsive in programming and delivering needed repairs as evidenced by the satisfactory condition ratings reported through the bridge inspection process. DRPA Engineering staff also provide programming recommendations on major, longer-term bridge maintenance, preservation, and rehabilitation actions based on their review of biennial inspection data, historical experience, and periodic field reviews with Bridge Operations staff.

The lack of available software tools capable of long-term performance modeling and analysis tends to focus DRPA's bridge strategy on short-term, reactive actions identified through the biennial inspections.

RECOMMENDATIONS

SC 4 Ensure that biennial inspections continue to address near-term maintenance needs and support the DRPA Strategic Plan.

These inspections are required by both the Federal Highway Administration and the Authority's bond covenants. This recommendation is a continuation of current practice and necessitates significant coordination and collaboration between DRPA Engineering, Bridge Operations, and Strategic Initiatives.

SC 5 Track and report routine and capital maintenance work through a systematic process from inception through completion.

This would apply to all maintenance projects, including both capital projects in the five-year capital budget and maintenance projects included in the annual maintenance workplans developed internally by Bridge Operations.

FINDING DRPA is not subject to the condition-based performance reporting requirements of Federal MAP-21 and FAST Act legislation.

The audit team, supported by informal conversations with FHWA Office of Asset Management, is of the opinion that the DRPA today is not required to develop a Transportation Asset Management Plan (TAMP) to comply with requirements of the Federal MAP-21 and FAST Act legislation.

Because the highways and bridges owned and operated by DRPA are located on the National Highway System (NHS), the states of Pennsylvania and New Jersey are required to include those DRPA-owned assets in their respective statewide TAMPs and are required to coordinate and collaborate with DRPA and other such asset owners to provide condition-based performance information on pavements and bridges necessary for TAMP development and ongoing reporting. Should an asset owner (other than the state) fail to provide the information the states require for the development of their asset management plans and subsequent condition reporting, the omission of those assets must be documented and explained in the TAMP. As such, DRPA should anticipate being asked to provide bridge and pavement performance data by the states of New Jersey and Pennsylvania for inclusion in their respective reports to the Federal Highway Administration.

Biennial bridge inspection data already being supplied by DRPA to the New Jersey and Pennsylvania DOT's can be used by those agencies for reporting on bridge performance. However, DRPA does not currently collect pavement condition data on its roadways. The Authority should take appropriate steps to begin evaluating its pavement assets so that it can provide condition-based performance reporting in the format outlined by MAP-21 and FAST Act legislation and associated rules to the State DOTs when required.

RECOMMENDATIONS

SC 6 Develop effective asset management systems and reporting processes aligned to the standards established under MAP-21 and the FAST Act, in consultation with the New Jersey and Pennsylvania Departments of Transportation.

Although DRPA is not responsible for the reporting of asset condition data to either the Federal government or the responsible state Departments of Transportation under MAP-21 or the FAST Act, the audit team believes that the development of robust asset management systems and process, performance standards and metrics, and internal reporting practices consistent with emerging industry standards and best practice is in the interest of the Authority. This responsibility will principally fall to the Engineering Department, which has already assigned an Engineer to represent the DRPA to the State of New Jersey's Transportation Asset Management program. This effort will also require the active participation and involvement of Bridge Operations leadership and staff.

SC 7 Use bridge and pavement management technology for decision support and performance reporting.

These technologies are essential tools for the effective management of pavement and bridge assets. These capabilities may be provided through the existing ERP system or along with the acquisition of commercial application systems designed specifically for these functions.

SC 8 Proactively engage staff responsible for the Asset Management program areas within the Pennsylvania and New Jersey DOT's as well as the respective FHWA Division Offices in those states.

Working cooperatively with state DOT and federal peers will not only support DRPA's participation and cooperation with the respective DOTs as they develop their required asset management programs going forward but also provide valuable access to best practices that can benefit the Authority. Additionally, to the extent that DRPA's future plans include seeking additional FHWA grant funds, the engagement and cooperation with these agencies will support DRPA's ability to meet potential future reporting requirements that may attach to such funding.

FINDING DRPA complies with GASB-34 reporting requirements.

Based on a review of the DRPA's 2015 Annual Report, the DRPA is compliant with the Governmental Accounting Standards Board (GASB) Statement 34 reporting requirements with respect to reporting the value of its infrastructure assets. Specifically, DRPA follows a standard asset depreciation method, as described in the notes to the annual financial report as follows: "Assets ... generally have an original cost of five thousand dollars or more and a useful life of three years. Depreciation and amortization are provided using the straight-line method over the estimated useful lives of the related assets ..."

General Administration

Opportunities to improve and strengthen the business practices and processes supporting the day-to-day administration and management oversight of Bridge Operations services and functions are described in the following findings and recommendations.

FINDING Bridge Operations staff lack complete information to support management decision-making.

This challenge is not unique to the DRPA. A 2015 benchmarking study conducted by the KPMG accounting firm (“*An Evolution in Tolling, KPMG Toll Benchmarking Survey*”, Stephen Beatty, KPMG International) found that “many toll operators actually collect a significant amount of data on their users (particularly those that use ETC) but few use their data for more than simply tracking and billing customers.” The kinds of customer data that toll operators use to assess their operations include measure of toll transactions/traffic volume, costs and revenue, violations, complaints and general operational data.

While DRPA aspires to become a much more data-driven organization than it is today, staff report that they are either unable or insufficiently trained to use current enterprise systems to their full capability. Staff continue to rely on Excel documents to support much of their analytical and reporting work. This can mean that there is a time lag in the production of needed reports and a need to manually consolidate and massage data for use in effective and timely management decision making. This includes daily and periodic operational data as well as basic organizational and budget data.

RECOMMENDATION

GA 1 Provide Bridge Operations management with the training and technical capabilities required to enable sophisticated data analytics and reporting.

This reporting includes operational data, such as tolling transactions by type, lost revenue, lane closures, lane backups (delays), and cash shortages, HR data, such as staffing schedule, lost time, and overtime use, and budget expenditure data with period-to-period comparisons and variances. To the extent that the reported inability to compile and produce timely and useful management reporting and data analytics is attributable to training gaps or shortfalls, the Authority should provide the necessary refresher and ongoing training. To the extent that the difficulties in effectively leveraging system capabilities are attributable to technical issues such as system configuration or the availability of specific functionality, the Authority should devise an approach and plan to reduce or remediate the technical barriers.

FINDING User adoption and acceptance of the new Enterprise Resource Planning software system has been slow.

Enterprise Resource Planning software systems are intended to allow the integrated management of core “back-office” business processes such as accounting, financial reporting, purchasing, human resources management, payroll and similar functions. DRPA selected and implemented such software with the goal of significantly improving the Authority’s ability to do data-driven analysis, planning, budgeting and reporting and to put more sophisticated technologies in the hands of line managers, supervisors and employees. Like most large and complex organizations adopting and deploying new technologies, the transition from familiar legacy software systems and paper-based business processes has not been easy for Bridge Operations. Over the short to midterm following “go-live,” disruptions to ongoing operations, employee confusion and management frustration are common.

Bridge Operations is no exception to this well-known pattern and the change-management challenges of large-scale technology implementation. Examples of “friction” described to the audit team include:

- Users report that they are unable to produce reports to facilitate the analysis of work types (e.g., electrical, HVAC, road repairs, etc.), and that they cannot capture and report on data for relevant sub-categories of work (e.g., within Electrical major category: electrical panels, decorative lighting, motor repair, etc.).
- Workforce analytics are lacking across all of Bridge Operations. One of the key business imperatives the ERP system is intended to address is equipping managers with usable data to proactively manage workforce activity.
- Excel spreadsheets are extensively used in managing the bridges. There are some spreadsheets for timekeeping and employee data, still being maintained, traffic counts and revenue reports are maintained in spreadsheets as are some maintenance related data. Much of this data should ultimately reside in the ERP system; however, some managers either do not trust the new system or are not sufficiently trained and knowledgeable about system’s capabilities and functionality. The practice of maintaining duplicate or “shadow” data in offline spreadsheets represents a duplication of effort and could result in conflicting data.

Typically, slow user adoption and acceptance of organizational, process and technology change can be attributed to a combination of three causes:

- Lack of understanding or ***the unknowing*** – These are the employees who do not understand the need for the change and, importantly, do not know how the change might benefit them in their work. The remedy for the unknowing is consistent, repetitive and transparent communication of the answers to their questions and concerns. The WIIFM – “What’s In It For Me?” – phenomenon.
- Lack of training or ***the unable*** – For these employees, they are frustrated and anxious because they do not know enough to feel that they are doing their jobs as effectively, as efficiently, as easily as they once did. The remedy for the unable is focused, hands-on training to build their competence and their confidence in their ability use the new tools and processes.

- Lack of commitment or *the unwilling* – These employees need a clear sense of why and how they must change their behaviors and must have no doubt about their performance expectations. Remedies included robust performance management, positive recognition for success and, if necessary, career counseling and discipline.

With a proper understanding of the sources of user concern and with patient and focused attention to addressing those concerns over the long-term, benefits realization can be achieved and senior DRPA leadership is currently actively engaged in just such an undertaking.

RECOMMENDATION

GA 2 Systematically identify, evaluate and address the sources of user acceptance challenges.

Moving forward, DRPA and Bridge Operations leadership need to develop a clear understanding of the existing and potential barriers to effective user adoption and then implement those intervention strategies necessary to overcome them. This process is presently underway.

FINDING *No strategic technology plan for Bridge Operations presently exists.*

There are a variety of business technology needs identified throughout this audit report that are unlikely to be adequately addressed through the new ERP system alone. These include, for example, upgraded tolling systems and related technologies, pavement management and bridge management systems. No long-term information technology strategy for Bridge Operations is evident nor has a future-state technology architecture to support the integration of multiple systems and capabilities been defined. Developing an IT strategy and architecture which directly supports the Authority's business strategy, goals and priorities is essential.

GA 3 Contract for the completion of a comprehensive technology strategic plan for Bridge Operations.

Working with DRPA Information Services, develop a comprehensive long-range technology strategy – including the definition of a robust technology architecture and integration plan - for Bridge Operations. An effective IT strategy is typically two-thirds about the business needs and processes and only one-third about hardware and software. An IT strategy is often developed using outside assistance. The strategy development process should closely involve the business process owners and end-users, and the resulting plan should be updated regularly. While an examination of the larger technology needs of the Authority was outside of the scope of this audit, it may be that the completion of an enterprise-wide technology plan would be both appropriate and cost-effective. We understand that DRPA has been

researching the potential for engaging a consultant to complete a technology assessment for the Authority.

FINDING Revenue assurance practices can be improved.

The previously-referenced KPMG toll benchmarking study noted that fully one-third of its survey respondents identified revenue leakage as being among the most significant toll collection problems they face, along with collection technology challenges, political/legislative challenges and the cost of toll collection activities. Solutions cited for the reduction of revenue leakage include improved interoperability of electronic collection systems to better identify out-of-jurisdiction vehicles and migration to improved technology.

Today, DRPA lacks a holistic perspective on revenue leakage in terms of type, dollar value, and steps to reduce the losses. While all agree that there is some leakage of revenue occurring, no authoritative estimate of the aggregate amount of such leakage, or how materially significant such leakage might be, or which sources are most significant, is available.

Some of the known sources of revenue leakage are:

- Back to New Jersey (BTNJ) on the WWB.
- Did not use bridge (DNUB) on the BFB, CBB, and BRB.
- Violators who go through E-ZPass lanes with defective transponders.
- E-ZPass owners whose accounts are not replenished.
- Improperly classified E-ZPass transponders (switching tags).
- Violators who have E-ZPass transponders, but go through a cash lane and have no cash.
- Violators who go through manual lanes without paying, but the license information is not collected.
- Habitual violators who work the system.
- One-off “outside lane” transactions, which are generally large amounts and not reviewed or audited by the Revenue Audit unit.
- Trucking companies who game the system on truck size and weight.
- Rental cars.
- Abuse of senior citizen E-ZPass discount, with transponder used by one not qualified for the discount.
- Violators who are billed, but do not pay the toll, including the administrative fees and penalties.
- Improperly classified E-ZPass transponder vehicles, such as tag holders switching tags across different vehicle classes.

The Chief Financial Officer is focused on getting a better understanding of the magnitude of the revenue loss that the DRPA experiences and Police Department has recently initiated a program for the aggressive criminal pursuit of chronic toll violators.

RECOMMENDATION

GA 4 Form a multi-disciplined team to comprehensively evaluate the sources and value of revenue losses, establish a regular reporting protocol and devise a plan for leakage reduction.

Assuring that the DRPA collects all revenues to which it is entitled is a priority business requirement and part of the Authority's regular management discipline. The proposed evaluation team should be empowered with the responsibility, accountability, and authority to make improvements. Team members should include members from Toll Collections, Budget, Revenue Audit and DRPA Police. This team should report to the COO, who will work with them to get results.

FINDING Revenue Audit processes are thorough and conscientiously conducted, though inadequately documented.

A review of prior comprehensive annual financial reports shows no indication of material weaknesses in the Authority's internal control systems regarding Revenue Audit nor any other aspect of the organization. Standardized forms support the audit processes for cash and E-ZPass collections. These forms are diligently used and appear to be reviewed where needed. However, audit processes are not specifically documented in writing.

Additionally, the Revenue Audit Manager reports that she reviews and approves the total monthly credit or debits that impact DRPA revenues, after the third-party Customer Service Center (CSC) has credited or debited the questioned accounts as appropriate. E-ZPass account adjustments may be triggered by an account owner's complaint of inaccurate charges or if the toll collection system flags an apparent misclassification of a vehicle type, resulting in the possible application of an incorrect toll. The latter of these adjustment types is referred to as "delayed transaction adjustment." In the case of both adjustments the Revenue Audit staff must provide approval before adjustments are applied. In the case of delayed transaction adjustments, a secondary review of certain auditors' recommended adjustments is conducted by a more senior auditor. Following this due-diligence process, the CSC is directed to make appropriate adjusting entries to E-ZPass owner accounts. No member of the Revenue Audit staff has access to the CSC system to make such adjustments that may be warranted. However, at this point there is no procedure in place for exception reporting and Revenue Audit management review of the credits and other adjustments meeting pre-determined dollar thresholds or other potential risk factors. The lack of such exception review creates a potential control weakness that could assist in detecting and correcting inaccurate adjustments.

RECOMMENDATIONS

GA 5 Prepare and review regular exception reports to assure the accuracy and integrity of the Authority's revenue accounts.

A sensitivity analysis of the history of account adjustments should be performed to identify and assess any patterns or trends that might suggest potential control weaknesses or risks to the Authority. Based on the analysis, the Authority can then create a set of screening parameters to design an exception report and review process that will assist Revenue audit in spotting potentially inaccurate account adjustments and implement and guidelines and procedures to ensure proper management approval of agreed adjustments. This exception reporting and review process should include an independent review of flagged adjustments by a staff member not involved in the adjustment approval process and not authorized system access to make account changes in the revenue accounting system, such as the Revenue Accounting Manager. This process should also provide for a review of adjustments on a spot or random basis by the Office of the Inspector General. The steps in the adjustment approval process should be documented in a written procedure by Revenue Audit staff, and the Office of Inspector General should review the underlying documentation for account adjustments, from time to time, to ensure the agreed review and approval steps are followed.

Examples of the kinds of risk factors or parameters to be considered include:

- Individual adjustments over a pre-determined dollar threshold, either positive or negative.
- Accounts with aggregate adjustments within a specified timeframe over or above an established threshold.
- Adjustments to accounts with a history of frequent or repetitive number of adjustments within a specified timeframe.
- Other risk indicators as may be determined through a review of the patterns and trends of historical adjustment activity.

The Revenue Audit Manager and the Office of the Inspector General should collaborate on the development of and documentation of this exception reporting protocol and associated procedures.

GA 6 Supplement and strengthen Revenue Audit procedures documentation.

This documentation could be as simple as a purpose statement and list of steps for each key form, report and procedure.

FINDING Toll collection safes are not consistently secured.

Audit team members observed that the safes used to secure cash for toll collector cash drawers and for daily cash receipts are sometimes left opened. Best internal control practices suggest that all safes

should be locked unless being used by authorized persons. Mitigating controls include procedures to control cash, safes are located in spaces behind secure doors along with the various staff that may also have access to that room. Additionally, there are cameras in the safes and police officers are usually close by. However, these controls do not substitute for a securely locked safe.

RECOMMENDATION

GA 7 Require all safes maintained at the bridges to be locked at all times they are not in use.

While locking the safes may be inconvenient at times, this discipline is important to maintain.

FINDING Current budget management and reporting practices are ineffective.

Bridge Operations internal budgeting and planning processes appear to be primarily incremental in nature. DRPA is subject to a 2% annual growth cap imposed by the State of New Jersey that allows for very limited flexibility and, due at least in part to this constraint, the planning and budgeting activities are of a “subsistence” nature, focused on the margins and maintenance of existing services.

Bridge Operations managers no longer receive regular monthly budget status reports of expenditures to date. Previously, such reports were prepared and distributed by DRPA Finance but are now considered a self-service process, with managers able to directly inquire online for current budget status information and to run needed financial reports. Absent adequate or sufficiently detailed training in self-service report preparation and production, this is not yet reliably happening. Interviews with members of Bridge Operations management indicate that some feel that they are now “flying blind” with respect to their budgets and the current status of those budgets.

RECOMMENDATIONS

GA 8 Seek relief from the 2% limitation on year-over-year operating expenditure growth.

This seemingly arbitrary constraint limits the Authority’s ability to manage its resources dynamically and to allocate resources to expand or enhance service levels to the toll-paying public. Because the DRPA’s service operations are user-funded, revenues derived from increases in bridge traffic should be available for reinvestment in infrastructure maintenance, technology enhancements and other critical needs. Failure to do so risks a compounded cost burden on future toll payers. Finally, due to the veto power afforded to both Governors, the states have sufficient authority to control excessive spending.

GA 9 Train / re-train Bridge Operations managers on the usage of the financial system reporting tools to enable effective monitoring and management of both operating and capital budgets.

Managers require timely access to accurate information regarding the financial status of their organizations if they are to be held accountable for financial results. Finance should provide the necessary reporting support until such time as the manager’s training can be updated.

FINDING Talent acquisition efforts are hampered by an overly complex recruitment and selection process.

HRS has established a target range for the time to completion of recruitments at 80-95 days. The audit team examined data for five Bridge Operations vacancies occurring during the first six months of 2017.

Recruitment Timeline Analysis for Bridge Operations - 2017

Recruitment Process Steps	C&M Mechanic	Days between Dates	Electrical Foreman	Days between Dates	Highway Foreman Reposting	Days between Dates	Maintenance Technician	Days between Dates	Plaza Supervisor	Days between Dates
Vacancy Form	04/20/17		02/21/17		02/08/17		12/06/16		03/31/17	
Vacancy Memo	05/18/17	28	02/24/17	3	03/27/17		02/08/17	64	04/24/17	24
Date Posted	05/18/17	-	02/27/17	3	03/27/17	-	02/08/17	-	05/01/17	7
Date Posting Closed	06/01/17	14	03/10/17	11	04/07/17	11	02/14/17	6	05/12/17	11
Min Qual Spreadsheet	06/08/17	7	03/29/17	19	04/17/17	10	03/20/17	34	05/18/17	6
Testing	06/23/17						05/09/17			
Interviews	06/23/17	15	04/28/17	30	05/08/17	21	05/12/17	3	06/09/17	22
Written Assessment			06/01/17	34	06/05/17	28	05/30/17	18		
Sent to CEO		-	06/02/17	1	06/08/17	3	05/31/17	1		-
CEO Selection		-					06/05/17	5		-
Total # of Days		64		101		73		131		70

As shown in the chart above, that analysis showed:

- Only one of the five Bridge Operations selection processes had been completed at the time of our analysis, with a total elapsed time from submission of the vacancy notice to the CEO’s hiring decision of 131 days, or 19 weeks.
- Two of the unfilled positions were awaiting CEO approval with 101 elapsed days (14 weeks) and 73 elapsed days (10 weeks), respectively, to reach the final stage of the recruitment and selection process.
- Two unfilled positions are awaiting the completion of the post-interview assessment write-ups, at 70 and 64 days duration respectively.
- For two of the positions, the most significant source of delay was in the completion of the written assessment reports, at 28 and 34 days respectively.

- For two of the open positions, the most significant source of delay was in the approval of the vacancy for Vacancy Memo, at 29 and 64 days respectively.

While it is difficult to generalize from this small sample, the data indicates that the recruitments will be completed moderately beyond the target timeline but for reasons largely outside of the control of HRS. Ensuring that the talent acquisition process works with maximum effectiveness is the joint responsibility of the hiring officials, Human Resource Services and other participants in the hiring decision process.

Human Resources Services recruitment professionals are working diligently to recruit and hire qualified applicants throughout the DRPA service area. However, current requirements (and Board-level expectations) for CEO-level direct involvement in the hiring and promotion process at all levels of the organization are inconsistent with best practices in recruitment and selection.

The audit team therefore believes that there are opportunities to streamline and accelerate the hiring process, at least for the majority of open positions. For example:

- The CEO could delegate authority for final hiring and promotion decisions for positions through the first level of supervision to the “Chief” level of the organization.
- Involvement of the Board Chair and Vice Chair can be limited to hiring and promotion decisions at the Director level and above, based upon the recommendation of the CEO.
- Manager-level and Director roles could be approved at the CEO level, based on the recommendation of the Chief or other directly reporting official.

RECOMMENDATION

GA 10 Initiate a Lean Six Sigma (LSS) process improvement project to identify and recommend improvements to the current talent acquisition process.

The recommended process would mirror in approach and intent the current LSS project in Purchasing. The goal of the project would be to accelerate the recruitment and selection process while assuring compliance with appropriate diversity, compliance and policy requirements. Changes to existing practice to consider may include, but are not necessarily limited to:

- Adoption of more aggressive performance targets and establishment of formal service level agreements and performance metrics for the recruitment process, clearly defining the roles, responsibilities and accountability mechanisms for all participants in the end-to-end process.
- Decentralization of new hire approval process is necessary to ensure adequate staffing levels for positions which have been previously approved, budgeted and funded. Specifically, reduce the degree of involvement required at the CEO level of the organization to both authorize the posting of vacancies and to confirm selection of the recommended application.

- Delegation of authority to lower organizational levels, commensurate with the level of the position to be filled, supported by strong guidelines and standards for the race, gender and geographic diversity of the workforce.
- Elimination of redundant approval steps where possible.
- Initiation of the recruiting process at the point the impending vacancy is identified, without waiting for the actual vacancy to occur. Establish a goal to have a position filled before the vacancy date, whereby a transition period exists between the incumbent and new hire.
- Improvement of the recruitment of skilled trades through outreach to local community colleges and high schools and aggressive recruitment of mid-career professionals from the industry with significant experience in the trades.
- Completion of skills testing earlier in the recruitment process, specifically on or about the same time that Selection Panel is being formed. Applicants that can not exhibit skills or do not successfully pass the test are not included in the Selection Panel interviews, thereby eliminating time spent on ineligible applicants.
- Offering skills tests on a quarterly basis - preferably on a non-work day - for any party (internal or external) interested in future employment with DRPA.
- Employment of an outside contracted agency or individual to conduct skills assessment and written tests rather than encountering delays awaiting involvement by DRPA management representatives.

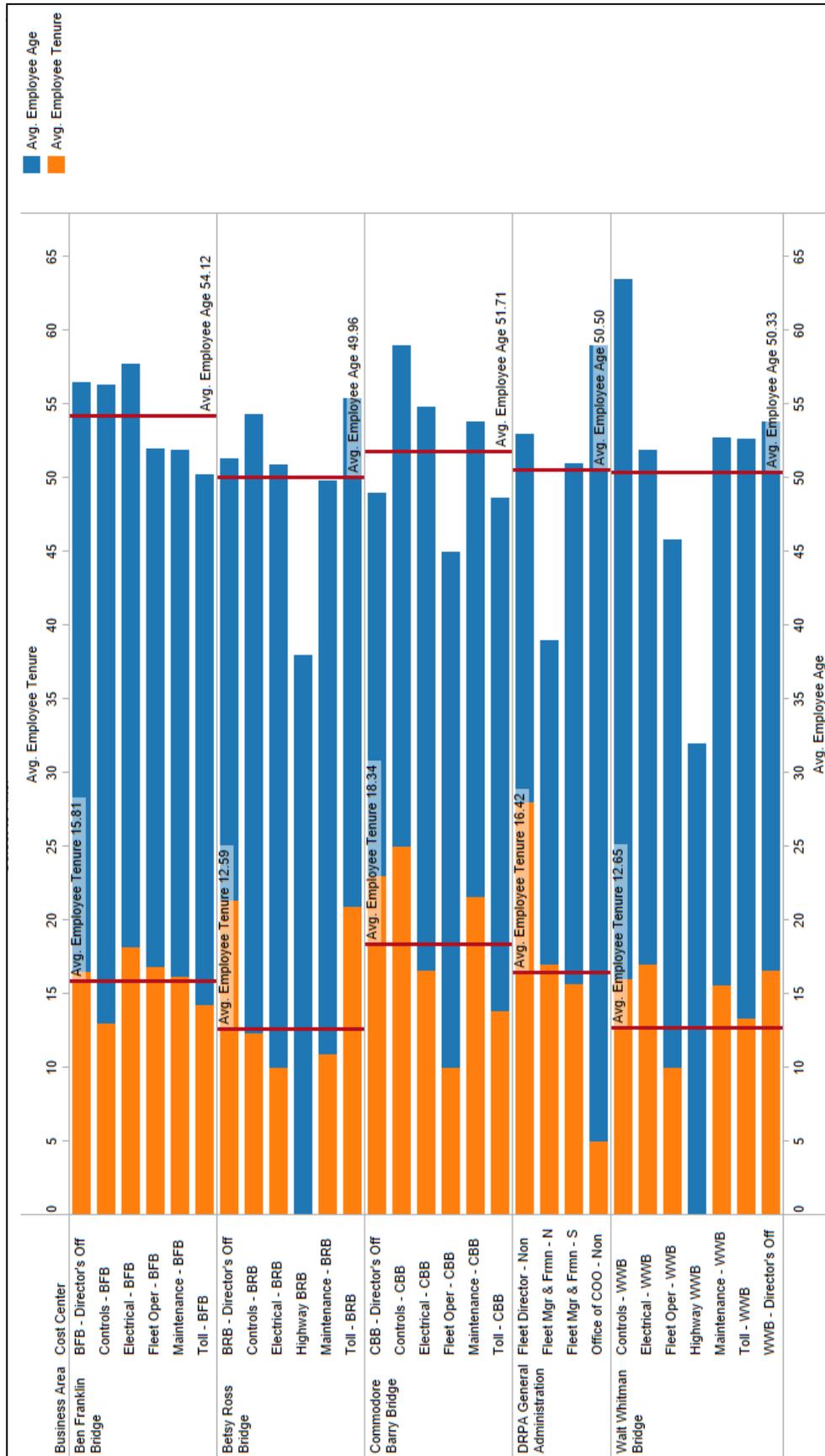
FINDING No formal succession planning program exists.

Human Resources provides data to help Operations identify succession issues, but a standardized succession planning process or discipline is not currently available, either at the Authority level or within Bridge Operations. Turnover has historically been low and most supervisory and management positions, historically, have been filled through internal promotions. Even so, there is little to no structure or guidance for helping employees prepare and position themselves for advancement.

The graphic on the following page, developed using data extracted from the DRPA payroll database, illustrates the average age and DRPA tenure of employees in Bridge Operations.

- Average employee tenure with the DRPA for employees at the Ben Franklin Bridge is just under 16 years, with an average employee age of 54 years.
- Average tenure at the Betsy Ross Bridge is just under 13 years at the Besty Ross Bridge, with an average age of 50 years.
- At the Commodore Barry Bridge, average employee tenure with the DRPA is just over 18 years at an average age of almost 52 years.
- Walt Whitman Bridge personnel average about 12 ½ years of DRPA tenure and show an average age of 50 years.

Bridge Operations Employee Tenure and Age by Business Unit and Cost Center



Overall, Bridge Operations is staffed with experienced, senior personnel. Estimating an average retirement age of 65 years old, this analysis identified total of 58 Bridge Operations staff members who are currently of retirement age or within five years of that age (employees with a current age of 60 or greater years). Of those, 15 are Plaza Supervisors.

RECOMMENDATION

GA 11 Develop a standardized succession planning process and provide managerial training.

Human Resource Services should be tasked with the expansion of their current succession forecasting efforts to include the design of a robust succession planning process and supporting policies. This program would establish the standard for the Authority as a whole, with the responsibility and accountability for the execution of the program delegated to operating managers in the various DRPA Departments and Divisions. HRS should develop (or purchase) training curricula, deliver (or contract for delivery) managerial training and assume responsibility for the overall management and direction of the succession planning process. The audit team understands that development of a sound and comprehensive approach to succession planning is a current priority of both the CEO and CAO.

FINDING Formalized and structured training programs for newly hired employee are unavailable beyond the initial employee orientation.

Each New Hire completes a three-day orientation upon receipt of a job offer. Orientations are conducted bi-monthly with target dates for the entire calendar year. The course content provides an overview of employee benefits; corporate policies, procedures, and programs. A New Hire then reports to his/her assigned work site to commence work assignments, that includes additional technical training and instruction. Safety awareness and workplace safety topics are conveyed in training sessions (facilitated by Safety Specialists). New Hires and internal promotions to supervisory positions complete a six-day Professional Development program that focuses on leadership and management skills topics (facilitated by HRS). This program is offered several times annually, and some newly-promoted supervisors may wait for extended time periods to complete the course, based on the availability of the next course offering.

Mandatory training courses (such as Bloodborne Pathogens; Substance Abuse Awareness; First Aid; and technical subjects, such as welding) are scheduled throughout the year by Directors via formal presentations or the HRS Online Intranet system. Newly hired Toll Collectors also receive a 2-hour review of the Authority's Toll Collection Manual.

Subsequent to the formal orientation process, orientation and training for new employees transitioning into Bridge Operations is left primarily to the Foremen directing each crew. While the formal New Hire

orientation process is thorough and professional, the quality and completeness of the initial and ongoing training provided on specific work requirements, skills, practices and procedures is uneven and ad-hoc, based primarily on the interest and skill of the assigned Foreman.

Newly-hired Toll Collectors are assigned to complete a 7-day set of one-on-one training sessions with an experienced Toll Collector in the toll booth and processing active transactions.

RECOMMENDATION

GA 12 Develop a standardized new-hire training protocol for all Bridge Operations personnel.

Designate a highly skilled and motivated supervisor to assume a role as the “Bridge Operations Training and Development Specialist” whose specific duties include, but are not limited to, development and/or refinement of SOPs; oversight / coordination of the Selection Panels for all job vacancies; skills testing of job applicants, to expedite the selection process; liaison to HRS in development of technical training programs and curriculums; and focal person for investigating viable apprenticeship programs and partnerships with technical colleges, community colleges, equipment manufacturers, etc.

Individual Foremen have the responsibility not only to identify but to document (by job position) those specific tasks and responsibilities that are to be performed by newly hired employees in their respective work units and crews. Develop standard operating procedures that are applicable to all facilities, in addition to detailed processes and procedures for a specific work site.

C&M Managers and Foremen should be jointly fulfilling an instructor role and ensuring that, with assistance from HRS training and development staff, that new employees obtain required training to address both skills enhancement and remedial training needs. Foremen are naturally the on-the-job trainers since they have the best opportunities to observe and instruct new hires on adherence to SOPs. However, assurances that there is consistency in the training and development at the various facilities rests with Managers and other members of Bridge Operations senior management.

FINDING DRPA purchasing authority limits and required processes significantly impact Bridge Operations.

DRPA is currently undergoing a detailed Lean Six Sigma project to identify, evaluate and recommend improvements to the Authority’s purchasing processes, policies, and practices.

- Purchasing transactions over \$25,000 require DRPA Board approval. This low threshold significantly increases the volume of purchases that go before the Board and the lead time for Board agenda preparation increases potential purchase approval timelines.
- A significant volume of purchasing requests lack some information that is needed for the request to be actionable, requiring the request to be returned to the originator.

- Procurement maintains an intranet site (“e.net”) with procurement manuals and training information.
- Procurement uses established New Jersey and Pennsylvania contracts whenever possible, including equipment rental contracts. However, Bridge Operations and Fleet Management personnel indicate a desire for expanded equipment rental provider options.
- Bridge Operations personnel have and use purchasing cards (P-cards) to make routine, low-value purchases.
 - P-card purchasing transaction limits depend on position.
 - Limits on total purchasing amount per month.
 - P-cards are not intended to be used to circumvent procurement rules.
 - Users sometimes split purchases across multiple P-cards to avoid limits and allow work to proceed.
- The described purchasing issues have encouraged Bridge Operations personnel to create informal, undocumented and unmanaged material supplies and work practices reflect workarounds to process constraints.

RECOMMENDATIONS

GA 13 Continue to pursue the ongoing purchasing Lean Six Sigma analysis and implement procedural changes to improve documentation standards and compliance, and increase timeliness and efficiency.

Lean Six Sigma is a methodology that focuses achieving process improvement through the elimination of waste (unnecessary steps or redundant process) and reducing errors. Such an initiative is consistent with the other recommendations identified below and supports these efforts.

GA 14 Seek increased spending authority to reduce volume of procurements requiring Board approval.

The audit team acknowledges that several previous management reports have recommended an increase in spending authority without action. However, we reiterate the need to reduce the volume of procurement requiring board approval. Conversely, the unintended consequence of this policy is to encourage the use of workarounds that may not result in the optimal use of Authority resources.

GA 15 Establish service level agreements and performance standards for completing each procurement step, identify the responsible group/person, and provide performance reporting by step and responsible party.

Processing procurement requests is a multi-step effort that involve multiple handoffs between various parties. To improve performance, each party needs to understand and commit to meeting its performance expectation, and to being tracked and reported on against that standard. If these standards prove unsupportable in any area, the process needs to be examined for improvement and the appropriate steps taken to adjust the project, provide additional training or resources, or the performance standard needs to be adjusted. Such an approach is consistent with the ongoing Lean Six Sigma purchasing initiative.

GA 16 Expand procurement reporting to identify the timeliness of each process step and track when procurement requests are returned to sender.

Procurement cannot be expected to process a procurement request unless it contains the necessary information to make it actionable. The procurement reporting process needs to include tracking when such requisitions are being returned to the originator, so the performance reporting accurately reflects the source of the delay.

GA 17 Expand the on-call pool of equipment rental vendors.

While the DRPA already uses rental equipment contracts available from the states of New Jersey and Pennsylvania, Bridge Operations personnel suggest that expanding that rental equipment vendor pool would be desirable in terms of providing response alternatives to unforeseen needs.

GA 18 Seek increased P-card limits (or pursue alternate supplier arrangements such as the “blanket orders” recommendation below) to avoid having users circumvent Authority policies.

Interviews indicate that some P-cards purchases are being split across multiple transactions to avoid existing P-card transaction limits. While this practice is contrary to P-card rules, it is reflective of the frustration of the workforce with the length of the procurement process.

By increasing P-card limits, the total number of P-card transactions should be reduced while the practice of circumventing P-card rules by splitting transaction should be reduced. More to the point, DRPA has a robust process for tracking and managing P-card transactions and P-card purchasing is significantly less costly than traditional procurement processes. The Office of the Inspector General completed an audit

of the Authority's Purchasing card program in early 2017 and provided a series of recommendations to strengthen the program.

GA 19 Establish blanket contracts with suppliers that are based on established pricing basis (e.g., discount off list) to reduce P-card purchase volumes.

DRPA already has and uses some volume of contract-based pricing with some vendors. In some cases, DRPA personnel issue a purchase order number and the vendor bills DRPA. In other cases, a P-card is used to pay for that item. In either case, because pricing has already been established through a competitive process, DRPA personnel generally do not have to solicit competitive bids, streamlining the procurement process. This recommendation simply encourages DRPA to expand the number of such blanket contracts available for use by DRPA personnel.

GA 20 Establish more multi-year contracts to reduce procurement transaction volumes.

Another way to reduce the volume of procurement transactions being processed over a given period is simply to increase the period covered by contracts. This recommendation simply encourages DRPA to expand the use of such contracts to reduce the overall number of procurements necessary.

GA 21 Consider contracting for additional purchasing support.

To the extent that the described procurement reporting effort identifies areas where personnel resources are the critical bottleneck, this recommendation encourages DRPA to consider using part-time or contractual resources to provide assistance. Potential, skilled resources available could be retired DRPA personnel among others.

GA 22 Ensure all materials inventories are recorded, monitored and managed, to include exploring the expansion of the stockroom services provided at the Walt Whitman facility to the Ben Franklin facility.

As described previously, the Purchasing Department maintains a stockroom operation at the Walt Whitman facility. This group has manifested a core competency in this function, which provided the basis for recommending the reassignment assign the Walt Whitman equipment shop parts inventory to this group, relocating this inventory to their existing operation.

With respect to the Ben Franklin shop, no analogous stockroom solution was noted. However, given the amount of bridge and facilities maintenance operations observed, there may be a need to consider a joint (vehicle shop and bridge/facilities) stockroom operation, potentially to be managed by Purchasing personnel (given the support systems and personnel familiarity with such operations). Inventories should be managed within the Authority's enterprise systems.

FINDING Bridge Operations incurs significant overtime expense.

Overtime is an important and necessary tool for management to ensure the Authority's ability to meet its service objectives and to cost-effectively maintain vital public assets. It is, however, a **management tool** to be applied judiciously and with due regard to the Authority's stewardship mission. Overtime should not be considered an employee benefit but, rather, an equitable arrangement to compensate employees for extraordinary work requirements and to comply with applicable legal and contractual obligations.

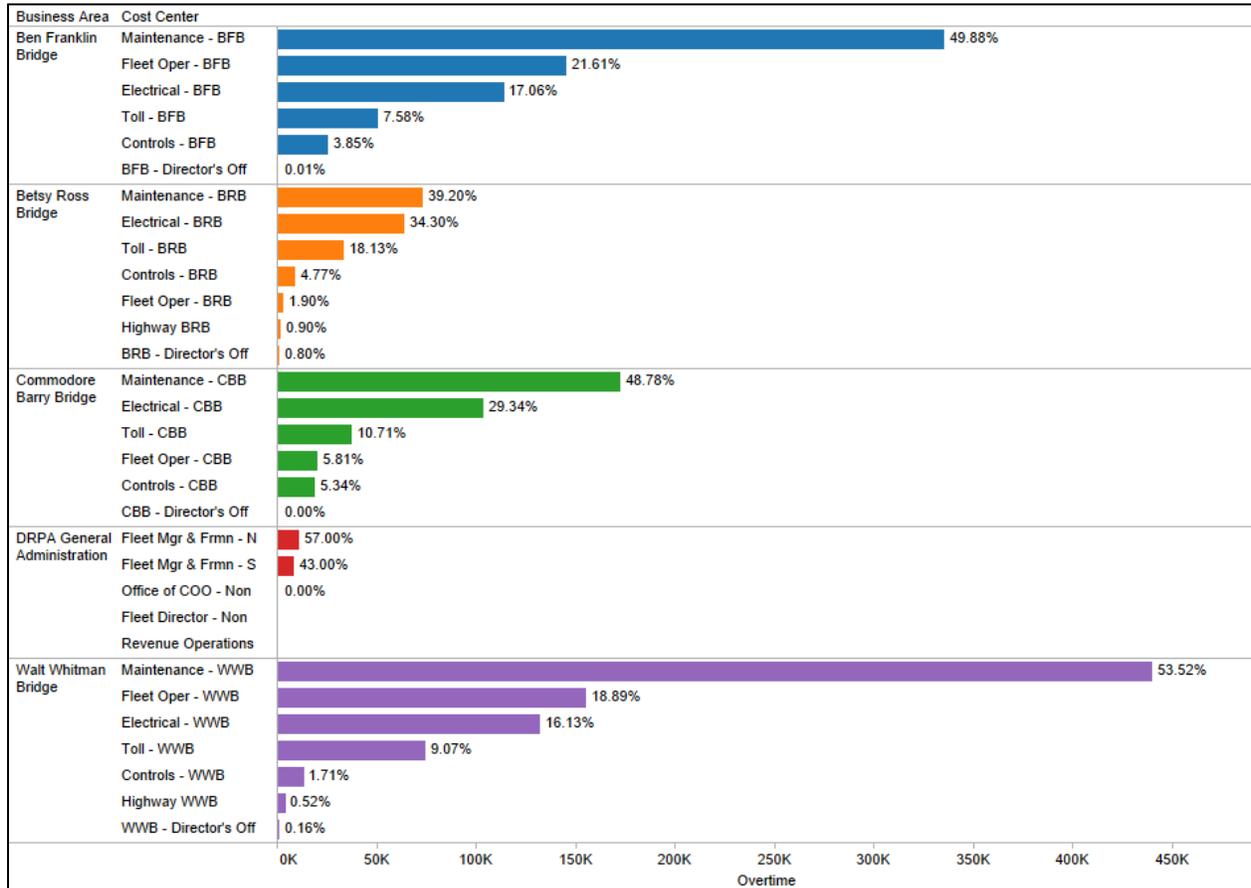
Based on an analysis of Bridge Operations overtime expenditure data for the 12-month period June 23, 2016 to June 23, 2017, the audit team notes:

- A total of \$2,056,463.42 was paid to a total of 244 of Bridge Operations personnel, for an average overtime payout per recipient of \$8,428.13.
- The range of overtime payments spans a high of \$31,460.84 to \$1.37.
- By bridge/business function, the total overtime expense for the period under review totaled:
 - \$667,208.13 at the WWB, paid to 71 individuals for an average of \$9,397.30
 - \$527,468.92 at the BFB, paid to 65 individuals for an average of \$8,114.91
 - \$344,262.98 in Fleet Management, paid to 20 individuals for an average of \$17,213.15
 - 333,391.90 at the CBB, paid to 42 individuals for an average of \$7,937.90
 - \$184,131.49 at the BRB, paid to 44 individuals for an average of \$4,184.81
- As a percentage of base earnings, overtime payments range from a high of 41% to a low of less than 1%, with a Bridge Operations average of 13% of all Bridge Operations overtime recipients.

The chart on the following page illustrates the distribution of overtime expenses for the period in question by Business Area and Cost Center. This graphic shows that the great bulk of the overtime expense is accounted for in the general "Maintenance" cost centers of the bridges, with 53.52% of the overtime expense at the Walt Whitman Bridge, 49.88% at the Ben Franklin, 48.78% at the Commodore Barry and 39.20% at the Betsy Ross. Not unexpectedly, at the two larger bridges that house the bulk of the fleet maintenance personnel, Fleet Management overtime is a significant contributor to the overall overtime costs allocated to the bridge.

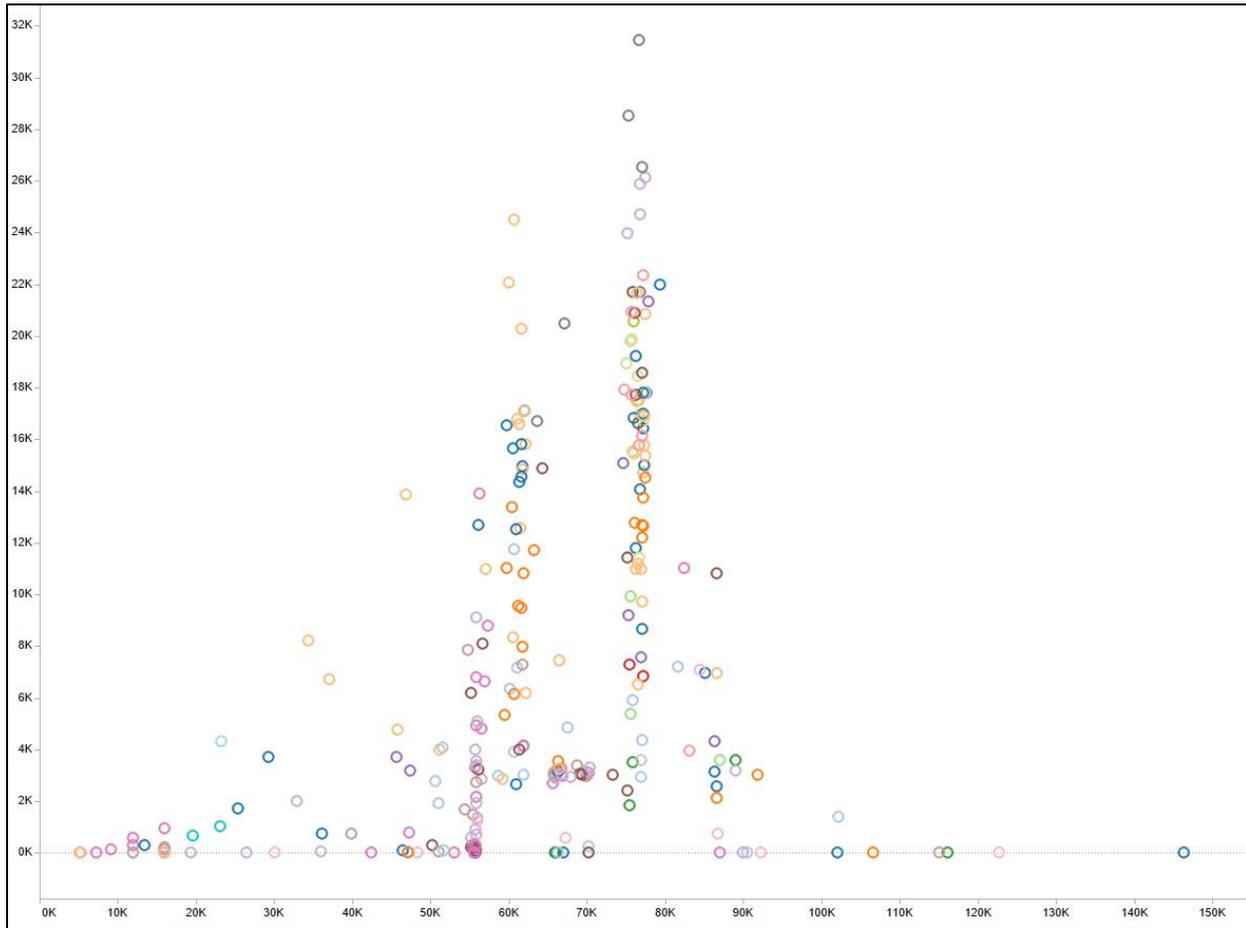
A further exploration of this data revealed that the results of a January 2017 restructuring of the business units within Bridge Operations are not fully reflected in the analysis. Specifically, salary and overtime costs for Highway personnel, including the Construction & Maintenance Mechanics and their Foremen, are included within the "Maintenance" business units on the respective bridges for the 12-

Overtime by Business Area and Cost Center



month period of the analysis between June 23, 2016 to June 23, 2017. The exceptions which identify “Highway” overtime data at the Walt Whitman Bridge and the Betsy Ross Bridge are explained by the addition of 2017 new hires after the Highway business unit restructuring. Therefore, the “Maintenance” overtime costs are significantly overstated, and the “Highway” overtime costs are significantly understated in the graphics. This is important because the “Highway” workers are those most subject to extreme weather response and emergency call-backs and are thus less predictable and manageable than other units from an overtime perspective. However, the anomalies in the depiction of the overtime salary and overtime expenses at the cost center level appear to be solely related to errors in the allocation of data and not the integrity of the underlying data itself. Finally, the scatter plot on the next page shows the relationship between overtime and base earnings. Each point on the chart represents an individual employee. Overtime earnings are plotted on the vertical axis and base earning on the horizontal axis. This reveals that the largest number of overtime recipients over the 12 months examined have base earnings in the \$70,000 to \$80,000 range and overtime payments ranging from \$0 to \$31,461. A second significant grouping of overtime earnings can be seen with employees earning between \$50,000 and \$60,000 in base pay.

Overtime vs Base Earnings



RECOMMENDATION

GA 23 Implement effective controls on overtime expenditures.

First, senior Bridge Operations managers should seek to reverse the culture of overtime entitlement by reinforcing with lower level managers and supervisors that the conscientious control of overtime costs is a part of their job. Overtime should be authorized only when necessary to assure the continued safe and continuous operation of the bridges. Managers should plan work assignments with a view towards overtime avoidance where practical.

Several of the recommendations in this audit report should help to alleviate overtime pressures. These include:

- Elimination of the Project Coordinator role.
- Considering alternative work schedules to avoid peak traffic lane closures on the high volume bridges (which can have the effect of building a maintenance project backlog necessitating overtime to catch up).

- Outsourcing building maintenance and, potentially, other non-core functions to allow more resources to be dedicated to core preventive and routine maintenance activities.
- Ensure that Managers and Foremen have complete visibility to their overtime budgets and costs incurred and set performance targets for overtime management.
- Accelerate recruitment timelines to limit gaps in the availability of workers.

Other organizations have found alternative techniques useful both in controlling overtime and in mitigating the potential negative consequences of over-tiring workers:

- Perform a detailed audit of the sources and causes of overtime and implement policies to control root causes identified.
- Institute an annual cap on overtime hours.
- Institute a pay period cap on overtime assignments.
- Develop a pool of qualified contract or part-time workers to meet either scheduled or unanticipated peaks in workload.
- Improve absence management policies and practices.

If these and other interventions do not sufficiently reduce the need for overtime, hire additional staff to replace overtime hours with straight time hours.

III. IMPLEMENTATION PLAN

A specific plan for the implementation of the audit recommendations is included in this section of the audit report. For each recommendation, the implementation plan:

- Restates the recommendation.
- Recommends a priority level (High, Med, Low).
- Suggests a timeframe for completion, by fiscal year, with the implementation of some recommendations spanning multiple fiscal periods.
- Assigns key accountable personnel, including both primary and supporting accountabilities. The primary accountable executive is shown in **bold text**, with supporting individuals indicated by *italics text*.
- Provides implementation notes to assist DRPA going forward.

IMPLEMENTATION PLAN

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
Organizational Effectiveness							
ORG 1	Fully integrate Bridge Operations planning and goal setting under the DRPA strategic umbrella.	High	●	●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Bridge Directors</i> • <i>Strategic Initiatives Director</i> 	<ul style="list-style-type: none"> • This recommendation will be implemented working with and through the Director of Strategic Initiatives. • This is part of a continuous, ongoing part of strategic management discipline.
ORG 2	Develop Bridge Operations-specific objectives, initiatives and key performance indicators (KPIs) to support each of the five strategic focus areas included in the DRPA strategic plan.	High	●	●		<ul style="list-style-type: none"> • Chief Operating Officer • <i>Bridge Directors</i> • <i>Bridge Operations Managers and Foremen</i> 	<ul style="list-style-type: none"> • Although the strategic planning process is well underway at the DRPA enterprise level, Bridge Operations objectives and performance metrics can be better defined and documented.
ORG 3	Use the Authority's Enterprise Resource Planning system to substantiate staffing needs.	High		●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Deputy CEO</i> • <i>Bridge Directors</i> • <i>Fleet Director</i> • <i>Bridge Operations Managers and Foremen</i> 	<ul style="list-style-type: none"> • The recommended timing assumes that the planned upgrade to the new ERP release will be a necessary first step. • The Deputy CEO will have significant executive oversight of the ERP upgrade project.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
ORG 4	Eliminate the practice of assigning Coordinators to oversee contractors.	Med	●			<ul style="list-style-type: none"> • Chief Operating Officer • <i>Chief Engineer</i> • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • The intent of this recommendation is three-fold: • Facilitate the reallocation of staff resources to preventive and routine maintenance work. • Reduce overtime expense. • Project Coordination should be the role of the Engineering Department.
ORG 5	Consider outsourcing building maintenance functions.	High		●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • Bridge Directors have estimated that tasks related to non-bridge building and facilities maintenance tasks consume significant staff resources to complete. These resources are better deployed to core preventive and routine maintenance tasks. • Implementation of this recommendation will involve additional costs to Bridge Operations for contracted services.
ORG 6	Develop and deploy a comprehensive Asset Management Plan appropriate for the Authority.	High	●	●		<ul style="list-style-type: none"> • Chief Engineer • <i>Chief Operating Officer</i> • <i>Bridge Directors</i> • <i>Construction & Maintenance Managers</i> • <i>Potential consulting support</i> 	<ul style="list-style-type: none"> • The creation of an Asset Management Plan for the DRPA Bridges is a key objective of the Authority and is foundational to a number of other audit recommendations. • The Engineering Department is currently leading the development of PATCO's Transit Asset Management Plan and the asset management plan for the bridges should be coordinated, to the extent practicable, with that effort.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
ORG 7	Develop appropriate asset management business processes and performance measures that support Authority goals and facilitate reporting to State and Federal agencies.	High	●	●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Bridge Directors</i> • <i>Construction & Maintenance Managers</i> • <i>Potential consulting support</i> 	<ul style="list-style-type: none"> • Once the Bridge Asset Management Plan is developed in close collaboration with Engineering, the responsibility for the development and execution of the necessary management and operational processes, practices and performance management will shift to Bridge Operations. • Accordingly, Bridge Operations personnel should be closely involved in both the development of the plan and the design of future business practices.
ORG 8	Acquire and implement Bridge and Pavement Management Software for decision support.	High		●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Deputy CEO</i> • <i>Bridge Directors</i> • <i>Construction & Maintenance Managers</i> • <i>Potential consulting support</i> 	<ul style="list-style-type: none"> • These technologies are essential asset management tools and Bridge Operations personnel responsible for the maintenance and operation of the bridges should be closely involved in the development of the functional requirements for such tools. • If the upgraded ERP system is capable of meeting those functional requirements, these capabilities can be delivered through that toolset. If not, commercial-off-the-shelf packaged applications should be identified, evaluated and implemented.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
ORG 9	Develop a GIS-based inventory of pavement assets along with processes for collecting condition and performance data.	High		●	●	<ul style="list-style-type: none"> Chief Operating Officer Deputy CEO Bridge Directors Construction & Maintenance Managers 	<ul style="list-style-type: none"> This should be a functional requirement for the future pavement and bridge management software applications, whether within the ERP's asset management module or in separate, dedicated and systems.
ORG 10	Leverage the close relationship with Engineering to strengthen asset management, capital planning and maintenance program effectiveness.	Med	●	●	●	<ul style="list-style-type: none"> Chief Operating Officer Bridge Operations staff Chief Engineer Engineering staff 	<ul style="list-style-type: none"> The "Med" priority attached to this recommendation recognizes that working relationships between Engineering and Bridge Operations are already strong. The recommendation acknowledges the importance of the existing collaborative relationship and the opportunity to strengthen it over time to the even greater benefit of the Authority.
ORG 11	Survey customers on their interest in being able to use credit cards, mobile payment applications and the eventual availability of fully automated toll collection.	Low	●			<ul style="list-style-type: none"> Chief Operating Officer Potential market research consultant 	<ul style="list-style-type: none"> Other audit recommendations suggest that the adoption of multiple alternative forms of payment have the potential of improving the toll-customer experience. Decisions regarding investments in the technologies and process changes required to implement these new and/or additional collection modes successfully should be based on a clear understanding of customer demand.
ORG 12	Negotiate a merchant services arrangement with the DRPA bank, to provide fast, low-cost credit card processing.	Med		●		<ul style="list-style-type: none"> Chief Financial Officer Contract Administrator Bridge Directors 	<ul style="list-style-type: none"> Leverage potential increases in credit card transaction volume to ensure best value.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
ORG 13	Consider expanding the E-ZPass frequent user credit to Pennsylvania E-ZPass holders and evaluate expanding the program to encourage more E-Z Pass use.	Med	●			<ul style="list-style-type: none"> Chief Financial Officer Chief Executive Officer Board of Commissioners 	<ul style="list-style-type: none"> The idea behind this recommendation is to provide balanced incentives to help improve market penetration of the E-ZPass technology and to drive more revenues through electronic collection means.
ORG 14	Establish a formalized trades apprenticeship program.	High	●			<ul style="list-style-type: none"> Human Resource Services Director Bridge Operations Directors C&M Managers and Foremen 	<ul style="list-style-type: none"> Implementation of this recommendation will help solidify a structured career path for unskilled, to semi-skilled to skilled trades jobs and should help to shorten the recruitment cycles to fill higher level maintenance and construction related jobs.
ORG 15	Defer creation of an Assistant Foreman position.	N/A				N/A	<ul style="list-style-type: none"> No action required.
ORG 16	Consider revisions to temporary upgrade practices to increase organizational effectiveness and lessen the impact of vacant position vacuums.	Med	●			<ul style="list-style-type: none"> Human Resource Services Director Chief Operating Officer Bridge Directors 	<ul style="list-style-type: none"> Both Human Resource Services and the Chief Operating Officer are currently working to implement revisions to the temporary upgrade policy.
Operational Efficiency							
OPS 1	Commit to a consistent focus on preventive maintenance.	High	●	●	●	<ul style="list-style-type: none"> Chief Operating Officer Bridge Directors C&M Managers C&M Foremen 	<ul style="list-style-type: none"> The primacy of preventive maintenance in assuring the effective life-cycle management of the bridge structures and pavements was a consistent theme in the audit team interviews with Bridge Operations personnel.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
OPS 2	Standardize preventive maintenance activities across each of the four bridges.	High	●			<ul style="list-style-type: none"> • Bridge Directors • <i>C&M Managers and Foremen</i> 	<ul style="list-style-type: none"> • The Bridge Directors, their Managers and Foremen should develop a standard listing of preventive maintenance activities and tasks that are universal across all bridges. • As necessary, any PM tasks unique to a given bridge should also be document. • Written procedures and standards for the completion of PM activities should also be developed and utilized.
OPS 3	Develop and implement an analytical approach to the insourcing and outsourcing decision.	High	●			<ul style="list-style-type: none"> • Chief Operating Officer • <i>Bridge Directors</i> • <i>Fleet Director</i> 	<ul style="list-style-type: none"> • Audit consultants have provided a sample outsourcing analysis methodology in Appendix G to this report. • Bridge Operations management should review and refine this methodology as appropriate for the Authority's use and then apply it to the assessment of its activities to identify candidates for outsourcing. • Additionally, the methodology can be applied to services presently provided by outsourced service providers to assess the potential value of bringing those services in-house.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
OPS 4	Incorporate predictive elements into the development of ongoing maintenance programs once the PM program is mature and stable.	Med		●	●	<ul style="list-style-type: none"> Bridge Directors C&M Managers Technology support 	<ul style="list-style-type: none"> As a part of the anticipated upgrade of the Authority's ERP software, the introduction and/or exploitation of predictive analysis and modeling features and functionality should be seriously considered. The current ERP provider offers both cloud-based and on-premise predictive analytics capabilities.
OPS 5	Consider alternative shift schedules to ensure that work activities are maximized in maintaining bridges.	Med	●			<ul style="list-style-type: none"> Chief Operating Officer Bridge Directors C&M Managers 	<ul style="list-style-type: none"> Time-shifting of maintenance activities to off-peak traffic hours will enable the more efficient use of maintenance staff time, enhance preventative maintenance of bridge and pavement assets and support improved management of overtime costs.
OPS 6	Refine and enhance the Bridge Operations staffing requirements model.	High	●			<ul style="list-style-type: none"> Bridge Directors C&M Managers and Foremen 	<ul style="list-style-type: none"> The spreadsheet-based staffing requirements model developed by Bridge Operations leadership represents a worthwhile effort to objectively quantify and document staffing requirements. However, it is based primarily on experienced-based estimates and lacks standardization in maintenance activity classification and level of effort requirements. The capture of accurate workload volumes and level-of-effort data within the Authority's ERP system, once upgraded, is an essential step towards the development of consistent and valid projections of labor requirements.

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			FY 18	FY 19	Future		
OPS 7	Eliminate the practice of providing Police escort to return non-paying drivers on the Walt Whitman Bridge to New Jersey.	High	●			<ul style="list-style-type: none"> Chief Operating Officer Police Chief 	<ul style="list-style-type: none"> By providing a variety of payment options to the toll-paying public, the need for the return to New Jersey policy should be substantially reduced.
OPS 8	Pursue necessary legislative authority to enforce toll violators, including the denial of vehicle registrations and/or driver license renewal in both New Jersey and Pennsylvania.	High	●			<ul style="list-style-type: none"> Chief Executive Officer Chief Operating Officer General Counsel 	<ul style="list-style-type: none"> This effort is presently underway. Once achieved, this will be a powerful enforcement tool, enhancing the Authority's ability to recover revenues and fees from toll violators and thereby reducing the cost of revenue leakage.
OPS 9	Implement multi-mode toll lanes, including credit and debit cards, smartphone apps and, in the future, other alternative payment modes in all lanes.	High		●		<ul style="list-style-type: none"> Chief Operating Officer Bridge Directors Toll Collection Managers 	<ul style="list-style-type: none"> The benefits of such an approach include enhanced customer service, reduced revenue loss and future labor cost savings through the adoption of electronic payment methods. The current tolling technology will likely require upgrades to accomplish this objective and Bridge Operations management is currently researching options, alternatives and associated costs.
OPS 10	Consider improvements to signage, including Dynamic Message Boards to better inform drivers of available toll lanes and to support diversion of traffic unable to pay tolls.	High	●			<ul style="list-style-type: none"> Bridge Directors C&M Managers Toll Collection Managers 	<ul style="list-style-type: none"> This recommendation is designed to promote improved traffic flow through the toll plazas.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
OPS 11	Acquire modern tolling software to enable the DRPA to transition to mixed-mode toll collections and to enable all electronic tolling as customer and DRPA needs demand it.	Med		●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Bridge Directors</i> • <i>Toll Collection Managers</i> • <i>Information Services staff</i> • <i>Potential consulting support</i> 	<ul style="list-style-type: none"> • Bridge Operations management has received an unsolicited proposal from the current tolling software provider, along with high-level cost estimates. • Additionally, the Chief Operating Officer has undertaken an effort to understand emerging trends and best practices in toll collections and, more particularly, the effective application of technology to automate the collection process.
OPS 12	Conduct a traffic engineering study focused on modeling of traffic queues at various traffic volumes and times for each bridge with and without the presence of toll booths.	Med		●		<ul style="list-style-type: none"> • Chief Engineer • <i>Chief Operating Officer</i> • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • This is recommendation is offered to address the Authority's concerns that any future move towards cashless electronic toll collection and the elimination of toll booths would negatively impact safety on the bridges due to increased speeds. • The experience of other tolling authorities in the transition to all electronic collection should also be consulted.
OPS13	Begin research and planning for an eventual migration to all electronic tolling.	High	●	●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Deputy CEO</i> • <i>Bridge Directors</i> • <i>Toll Collection Managers</i> 	<ul style="list-style-type: none"> • The audit team's review of current tolling industry practices strongly suggests that the adoption of all-electronic, cashless collection methods is the emerging best practice. • Any future transition to such a toll collection model should be carefully planned and implemented in such a way as to minimize impacts on both the workforce and the toll-paying public.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
OPS 14	Define requirements and deploy an electronic staffing system.	Low	●			<ul style="list-style-type: none"> • Chief Operating Officer • <i>Deputy CEO</i> • <i>Bridge Directors</i> • <i>Toll Collection Managers</i> 	<ul style="list-style-type: none"> • Current staffing and scheduling for Toll Collections is a manual and spreadsheet based process. • Automated scheduling tools are available in the marketplace and should be explored. As noted in the report, the audit team understands that DRPA Police is exploring the implementation of scheduling software and this might represent an opportunity to “piggyback” that effort and achieve some economies of scale.
OPS 15	Develop written standard operating procedures for common fleet repairs.	High	●			<ul style="list-style-type: none"> • Fleet Director • <i>Fleet Manager</i> • <i>Fleet Foremen</i> 	<ul style="list-style-type: none"> • Written SOPs help to drive consistency and predictability of repair results, improve employee training and support cost-efficient operations.
OPS 16	Ensure that automated systems supporting fleet management incorporate best practice data capture and reporting features.	High		●		<ul style="list-style-type: none"> • Deputy CEO • <i>Chief Operating Officer</i> • <i>Fleet Director</i> 	<ul style="list-style-type: none"> • As a part of the anticipated ERP upgrade, ensure that the incumbent vendor can meet best-practice functional capabilities for the management of a diverse vehicle and equipment fleet. • Should the utilization of the existing ERP system to meet fleet maintenance needs be impractical or excessively expensive, consider the implementation and integration of commercial-off-the-shelf fleet management technology.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
OPS 17	Prepare, update and communicate a day-by-day schedule of vehicles and equipment for scheduled preventive maintenance	High	●			<ul style="list-style-type: none"> • Fleet Director • <i>Fleet Manager</i> • <i>Fleet Foremen</i> 	<ul style="list-style-type: none"> • The development, publication and observance of a planned preventive maintenance schedule for vehicles and equipment is considered a best practice.
OPS 18	Consider establishing an internal service fund business model for Fleet Management.	Low		●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Chief Financial Officer</i> 	<ul style="list-style-type: none"> • With the assumption of fleet management responsibility for much of the PATCO vehicle fleet, the Bridge Operations division will be providing enterprise-wide fleet services. • Establishment of an internal service fund and, potentially, a “lease-back” program for the Authority’s fleet assets, costs can be captured in the appropriate operating units and the accumulation of future replacement funds is facilitated.
OPS 19	Address ceiling height constraints at the Walt Whitman shop facility.	Med		●		<ul style="list-style-type: none"> • Fleet Director • <i>Chief Engineer</i> • <i>Potential engineering design consulting support</i> 	<ul style="list-style-type: none"> • The audit recommendation addresses a variety of ways that this requirement can be addressed. • Engaging a consulting engineer or architect with expertise in large-scale fleet management to review these – and potentially other – alternatives and make recommendations for a cost-effective solution may be in order.
OPS 20	Recapture available shop space.	Med		●		<ul style="list-style-type: none"> • Fleet Director • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • This can be accomplished through a concerted effort to permanently dispose of obsolete or otherwise unused or unneeded equipment to free up shop space.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
OPS 21	Improve inventory controls and eliminate informal inventories.	High		●		<ul style="list-style-type: none"> • Fleet Director • <i>DRPA Purchasing</i> 	<ul style="list-style-type: none"> • This recommendation suggests the establishment of a common stockroom for Bridge Operations as a whole, potentially staffed by assigned Purchasing staff. • The Authority's new ERP solution should be leveraged for inventory management and reporting purposes.
OPS 22	Encourage/require fleet maintenance personnel and supervisors to pursue fleet certification and credentials.	Med	●			<ul style="list-style-type: none"> • Fleet Director • <i>Human Resource Services Director</i> 	<ul style="list-style-type: none"> • Helps to promote and ensure that the skill sets of fleet personnel remain current with advancing automotive and equipment technology.
OPS 23	Provide incentives for fleet technicians to earn and maintain ASE or similar technical certifications.	Med	●			<ul style="list-style-type: none"> • Fleet Director • <i>Human Resource Services Director</i> 	<ul style="list-style-type: none"> • Additional incentives for the achievement of advanced, job-related technical certifications or credentials is common fleet maintenance industry practice.
Safety & Compliance							
SC 1	Develop a formal process for Homeland Security threat identification, reporting, mitigation and implementation of protective measures to thwart or mitigate against an attack.	Med	●			<ul style="list-style-type: none"> • Police Chief • <i>Chief Operating Officer</i> • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • Bridge Operations personnel should be serving as the Authority's "eyes and ears" on and around the bridges. • Specific training and periodic re-training in the warning signs of security threats to the structures improves the Authority's opportunity to mitigate or avoid the risk of property damage, injury or loss of life due to foreign or domestic terror attack.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
SC 2	Continue the Safety Specialists emphasis on conducting onsite training activities and performance of periodic inspections of Bridge Operations facilities.	Med	●			<ul style="list-style-type: none"> • Safety Center of Excellence • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • This is a continuation of current practice. • The transition to the DRPA Safety Center of Excellence supports and enables this recommendation.
SC 3	Provide effective quality control and oversight of consultant-performed bridge inspections and associated reporting of data to FHWA via the states of New Jersey and Pennsylvania.	High	●			<ul style="list-style-type: none"> • Chief Engineer • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • This is a continuation of current practice and represents an important area of cooperation and collaboration between Engineering and Bridge Operations. • Ensures continued compliance with the National Bridge Inspection program and provides significant input into the development of Bridge Operations operating and capital repair and maintenance programs.
SC 4	Ensure that biennial inspections continue to address near-term maintenance needs and support the DRPA Strategic Plan.	High	●	●	●	<ul style="list-style-type: none"> • Chief Engineer • <i>Chief Operating Officer</i> • <i>Bridge Directors</i> • <i>C&M Managers</i> • <i>Consulting engineers</i> 	<ul style="list-style-type: none"> • Similar to recommendation SC3. • SC3 addresses the need for continued focus on the required inspection process whereas this recommendation speaks to the effective utilization of the inspection results to extend asset life and to support the Authority's stewardship mission.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
SC 5	Track and report routine and capital maintenance work through a systematic process from inception through completion.	High		●	●	<ul style="list-style-type: none"> • Bridge Directors • <i>C&M Managers</i> 	<ul style="list-style-type: none"> • Supplying managers with accurate and current reports of maintenance project status enables effective priority-setting, project oversight, contractor or crew performance management and timely project completion. • The need for such tracking and reporting is included in the working draft of the DRPA Strategic Plan.
SC 6	Develop effective asset management systems and reporting processes aligned to the standards established under MAP 21 and the FAST Act, in consultation with the New Jersey and Pennsylvania Departments of Transportation.	High	●	●	●	<ul style="list-style-type: none"> • Chief Engineer • <i>Chief Operating Officer</i> • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • While DRPA is not subject to the MAP-21 or FAST Act transportation planning and condition reporting requirements, the standards and practices articulated by the relevant Federal and State government offices are based on industry norms and best practices. • While not specifically required to report asset condition information to the respective Departments of Transportation in Pennsylvania and New Jersey, DRPA should expect to be asked for such data and failure or inability to provide such data must be noted by the DOTs in their mandated Transportation Asset Management Plans. • Given that DRPA has determined that effective stewardship of the bridge and pavement assets are a part of its strategic purpose, alignment of its planning and reporting processes with those of the two states is not unreasonable.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
SC 7	Use bridge and pavement management technology for decision support and performance reporting.	High		●	●	<ul style="list-style-type: none"> • Chief Operating Officer • <i>Deputy CEO</i> • <i>Bridge Directors</i> 	<ul style="list-style-type: none"> • These tools are essential to effective management of the bridge and pavement management lifecycles. • If sufficiently robust bridge and pavement management functionality can be implemented and supported within the Authority's ERP system, that may be a viable option for meeting this need. If not, commercial software packages to meet this requirement are readily available and should be evaluated.
SC 8	Proactively engage staff responsible for the Asset Management program areas within the Pennsylvania and New Jersey DOT's as well as the respective FHWA Division Offices in those states.	High	●	●	●	<ul style="list-style-type: none"> • Chief Engineer • <i>Chief Operating Officer</i> 	<ul style="list-style-type: none"> • DRPA has designated a representative to the New Jersey DOT's asset management team and should consider a similar arrangement with Pennsylvania. • Involvement with the respective DOTs supports the building of professional relationships that can benefit the Authority in the future, exposes the Authority to the experience and learning of others and promotes awareness and understanding of potential future regulatory actions.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
General Administration							
GA 1	Provide Bridge Operations management with the training and technical capabilities required to enable sophisticated data analytics and reporting.	High	●	●	●	<ul style="list-style-type: none"> Chief Operating Officer Deputy CEO Potential consulting support 	<ul style="list-style-type: none"> As a part of the expected ERP upgrade, all staff expected to effectively use the various capabilities of the technology should be thoroughly trained. Certain, select “power users” of the financial and work order and asset management systems should be identified and trained in the production of routine and ad-hoc analytical reports and analyses necessary to support improved operational insight and data-driven management decision making.
GA 2	Systematically identify, evaluate and address the sources of user acceptance challenges.	High	●			<ul style="list-style-type: none"> Chief Operating Officer Deputy CEO Potential consulting support 	<ul style="list-style-type: none"> A software implementation that fully addresses all of the business. Technical and performance requirements specified for the system is a failure if users do not accept and use it to its potential. Comprehensive training, consistent communication and thoughtful change management and user readiness assessment are imperative.
GA 3	Contract for the completion of a comprehensive technology strategic plan for Bridge Operations.	Med		●		<ul style="list-style-type: none"> Chief Operating Officer Deputy CEO Technology planning consultant 	<ul style="list-style-type: none"> While this recommendation focuses specifically on the development of a technology strategy for Bridge Operations, it may be most useful to the Authority to conduct the analysis at the enterprise, rather than the operational, level.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
GA 4	Form a multi-disciplined team to comprehensively evaluate the sources and value of revenue losses, establish a regular reporting protocol and devise a plan for leakage reduction.	High	●			<ul style="list-style-type: none"> • Chief Operating Officer • <i>Revenue Audit Manager</i> • <i>Bridge Directors</i> • <i>Toll Collection Managers</i> • <i>DRPA Police</i> 	<ul style="list-style-type: none"> • Revenue leakage is a ubiquitous tolling industry challenge. • Tracking, reporting and addressing the causes of revenue leakage is a current priority of the Authority. • Leakage reduction strategies will most likely include a combination of technology enhancements, process improvements and enforcement emphasis. As such, the development of effective solutions will involve involvement by a cross-section of Authority personnel in each of these areas.
GA 5	Prepare and review regular exception reports to assure the accuracy and integrity of the Authority's revenue accounts.	Med	●			<ul style="list-style-type: none"> • Chief Financial Officer • <i>Revenue Audit Manager</i> • <i>Office of the Inspector General</i> 	<ul style="list-style-type: none"> • This is a straightforward and relatively minor improvement to internal controls through improved segregation of duties and targeted analysis of areas of potential concern.
GA 6	Supplement and strengthen Revenue Audit procedures documentation.	Med	●			<ul style="list-style-type: none"> • Chief Financial Officer • <i>Revenue Audit Manager</i> 	<ul style="list-style-type: none"> • Improved documentation of revenue audit forms, processes and procedures will help to ensure consistency and stability of revenue assurance practices over time.
GA 7	Require all safes maintained at the bridges to be locked at all times they are not in use.	High	●			<ul style="list-style-type: none"> • Bridge Directors • <i>Toll Collection Managers</i> • <i>Plaza Supervisors</i> 	<ul style="list-style-type: none"> • A simple, best practice-based improvement to current practice.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
GA 8	Seek relief from the 2% limitation on year-over-year operating expenditure growth.	High		●		<ul style="list-style-type: none"> • Chief Executive Officer • <i>Board of Commissioners</i> 	<ul style="list-style-type: none"> • This is primarily a policy question for resolution and action by the Chief Executive Officer as directed by the Board.
GA 9	Train/re-train Bridge Operations managers on the usage of the financial system reporting tools to enable effective monitoring and management of both operating and capital budgets.	High		●		<ul style="list-style-type: none"> • Deputy CEO • <i>Chief Operating Officer</i> • <i>Chief Financial Officer</i> 	<ul style="list-style-type: none"> • As with earlier recommendations on the training of operating managers and personnel on the effective utilization of the Authority's sophisticated software systems, Bridge Operations staff with responsibility for the management of human and other resources and for the production, distribution and analysis of financial and budget data require thorough initial and refresher training.
GA 10	Initiate a Lean Six Sigma (LSS) process improvement project to identify and recommend improvements to the current talent acquisition process.	High	●			<ul style="list-style-type: none"> • Chief Administrative Officer • <i>Human Resource Services Director</i> • <i>Strategic Initiatives Director</i> 	<ul style="list-style-type: none"> • Strategic Initiatives have this capability. • Significant improvement of talent acquisition (recruitment and selection) timelines will likely require changes to both policy and practice at the Board and CEO levels of the organization.
GA 11	Develop a standardized succession planning process and provide managerial training.	High	●	●		<ul style="list-style-type: none"> • Chief Administrative Officer • <i>Human Resource Services Director</i> • <i>Chief Operating Officer</i> 	<ul style="list-style-type: none"> • Based in part on the recommendations of past management audits citing the need for effective succession planning and management, the CEO has directed the development of a sound program for DRPA. • Design and deployment of the program should reside with the Human Resource Services Department, with execution of that design at the operational level of the organization.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
GA 12	Develop a standardized new-hire training protocol for all Bridge personnel.	High	●			<ul style="list-style-type: none"> • Bridge Directors • <i>Human Resource Services Director</i> 	<ul style="list-style-type: none"> • This initiative should be undertaken as a collaboration between Bridge Operations and Human Resource Services. • The Bridge Operations new-hire training would follow closely on the heels of the standard new employee orientation and should be tailored to the specific assignment of the new employee, focused on orientation to the specific facility to which the employee is assigned and the standard operating practices and safety precautions necessary for the crew with which the employee will work. • Foremen should have the lead role in the delivery of this training for their respective new hires.
GA 13	Continue to pursue the ongoing purchasing Lean Six Sigma analysis and implement procedural changes to improve documentation standards and compliance, and increase timeliness and efficiency.	High	●			<ul style="list-style-type: none"> • Deputy CEO • <i>Strategic Initiatives Director</i> 	<ul style="list-style-type: none"> • The audit report includes a series of best practice recommendations for the improvement of purchasing support to the Bridge Operations organization. • The current Lean Six Sigma process improvement analysis may well include similar recommendations to those following below.
GA 14	Seek increased spending authority to reduce volume of procurements requiring Board approval.	High	●			<ul style="list-style-type: none"> • Chief Executive Officer • <i>Board of Commissioners</i> 	<ul style="list-style-type: none"> • Increasing the spending authority of the CEO can accelerate the purchasing process by limiting the required approvals to those with the most significant financial impact to the Authority.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
GA 15	Establish service level agreements and performance standards for completing each procurement step, identify the responsible group/person, and provide performance reporting by step and responsible party.	High	●			<ul style="list-style-type: none"> Deputy CEO Procurement Director Strategic Initiatives Director 	<ul style="list-style-type: none"> This recommendation seeks to create improved transparency into the procurement process and the establishment of improved levels of predictability of the required timelines for various procurement types. It will be important that the established SLAs include the expectations of the requesting department that must be met to achieve the expected performance standards.
GA 16	Expand procurement reporting to identify the timeliness of each process step and track when procurement requests are returned to sender.	Med		●		<ul style="list-style-type: none"> Deputy CEO Procurement Director Strategic Initiatives Director 	<ul style="list-style-type: none"> The Authority's ERP should be leveraged to provide this kind of real-time tracking and reporting of individual procurement status. The capturing and reporting of data related to purchasing requisitions or requests returned to the originator serves as a valuable quality assurance tool and will help to reinforce the importance of process discipline to the successful and timely completion of procurements.
GA 17	Expand the on-call pool of equipment rental vendors.	Med	●			<ul style="list-style-type: none"> Fleet Director Procurement Director 	<ul style="list-style-type: none"> This will allow the "just in time" availability of needed equipment and thereby minimize procurement-related delays when the rental of specialized or backup equipment vendors are required to complete maintenance and repair work on a timely basis.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
GA 18	Seek increased P-card limits (or pursue alternate supplier arrangements such as the “blanket orders” recommendation below) to avoid having users circumvent Authority policies.	Med	●			<ul style="list-style-type: none"> Deputy CEO Procurement Director 	<ul style="list-style-type: none"> Increasing purchasing card limits to levels that will allow the simplified acquisition of needed tools, materials and supplies quickly will reduce the incentive for cardholders to find workarounds such as splitting a single purchase over multiple cards.
GA 19	Establish blanket contracts with suppliers that are based on established pricing basis (e.g., discount off list) to reduce P-card purchase volumes.	Med	●			<ul style="list-style-type: none"> Bridge and Fleet Directors Procurement Director 	<ul style="list-style-type: none"> Blanket contracts are another effective mechanism for the simplified purchase of routine items by ordering off of a pre-determined price list. An analysis of historical spending patterns will help to identify those often-purchased common items that could benefit from aggregation on an annual contract, resulting in advantageous pricing and ease of acquisition.
GA 20	Establish more multi-year contracts to reduce procurement transaction volumes.	Med	●			<ul style="list-style-type: none"> Bridge and Fleet Directors Procurement Director 	<ul style="list-style-type: none"> Renewable annual contracts, awarded through a competitive bid process and sometimes providing for inflationary price adjustments, work much like blanket purchase agreements. This procurement method is often used for professional and other service contracts.

Index	Recommendation	Priority	Timing			Accountabilities	Implementation Notes
			FY 18	FY 19	Future		
GA 21	Consider contracting for additional purchasing support.	Med	●			<ul style="list-style-type: none"> Deputy CEO Procurement Director 	<ul style="list-style-type: none"> Staff augmentation, especially to meet temporary or peak procurement workload demands, can be a cost-effective approach to meeting fluctuating demand.
GA 22	Ensure all materials inventories are recorded, monitored and managed, to include exploring the expansion of the stockroom services provided at the Walt Whitman facility to the Ben Franklin facility.	High		●		<ul style="list-style-type: none"> Bridge and Fleet Directors Procurement Director 	<ul style="list-style-type: none"> The Authority's ERP system provides robust inventory management capabilities.
GA 23	Implement effective controls on overtime expenditures.	High	●			<ul style="list-style-type: none"> Chief Operating Officer Bridge Directors Fleet Directors Fleet Director 	<ul style="list-style-type: none"> A cultural shift towards understanding overtime as a management tool rather than an employee benefit or entitlement is needed.

IV. MANAGEMENT'S RESPONSE TO THE AUDIT

Throughout the course of the audit, DRPA and Bridge Operations management were closely involved in the review of interim, draft and final deliverables. Based on the feedback provided through the deliverable review and comment process, the audit team independently developed the final set of findings and recommendations included in this audit report.

As shown in the table on the following pages, DRPA management has reviewed the audit team's final recommendations, has indicated the Authority's level of agreement or disagreement with each, and has provided additional commentary supporting the response where necessary and appropriate.

This management response is included in the audit report to provide policymakers with a complete understanding of the final results from the perspectives of both the audit team and DRPA management and, in so doing, to support internal decision-making going forward.

DRPA Management Response to the Audit

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
Organizational Effectiveness								
ORG 1	Fully integrate Bridge Operations planning and goal setting under the DRPA strategic umbrella.	High	●	●	●	Chief Operating Officer Bridge Directors Strategic Initiatives Director	Agree	
ORG 2	Develop Bridge Operations-specific objectives, initiatives and key performance indicators (KPIs) to support each of the five strategic focus areas included in the DRPA strategic plan.	High	●	●		Chief Operating Officer Bridge Directors Bridge Operations Managers and Foremen	Agree	
ORG 3	Use the Authority's Enterprise Resource Planning system to substantiate staffing needs.	High		●	●	Chief Operating Officer Deputy CEO Bridge Directors Fleet Director Bridge Operations Managers and Foremen	Agree	
ORG 4	Eliminate the practice of assigning Coordinators to oversee contractors.	Med	●			Chief Operating Officer Chief Engineer Bridge Directors	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
ORG 5	Consider outsourcing building maintenance functions.	Med		●	●	Chief Operating Officer <i>Bridge Directors</i>	Further Consideration Required	
ORG 6	Develop and deploy a comprehensive Asset Management Plan appropriate for the Authority.	High	●	●		Chief Engineer <i>Chief Operating Officer</i> <i>Bridge Directors</i> <i>Construction & Maintenance Managers</i> <i>Potential consulting support</i>	Agree	
ORG 7	Develop appropriate asset management business processes and performance measures that support Authority goals and facilitate reporting to State and Federal agencies.	High	●	●	●	Chief Engineer <i>Chief Operating Officer</i> <i>Bridge Directors</i> <i>Construction & Maintenance Managers</i> <i>Potential consulting support</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
ORG 8	Acquire and implement Bridge and Pavement Management Software for decision support.	Med		●	●	Chief Operating Officer Chief Engineer <i>Deputy CEO</i> <i>Bridge Directors</i> <i>Construction & Maintenance Managers</i> <i>Potential Consulting Support</i>	Agree	
ORG 9	Develop a GIS-based inventory of pavement assets along with processes for collecting condition and performance data.	Med		●	●	Chief Operating Officer Chief Engineer <i>Deputy CEO</i> <i>Bridge Directors</i> <i>Construction & Maintenance Managers</i>	Agree	
ORG 10	Leverage the close relationship with Engineering to strengthen asset management, capital planning and maintenance program effectiveness.	High	●	●	●	Chief Operating Officer Chief Engineer <i>Bridge Operations staff</i> <i>Chief Engineer</i> <i>Engineering staff</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
ORG 11	Survey customers on their interest in being able to use credit cards and mobile payments on the eventual availability of fully automated toll collection.	Low			●	Chief Operating Officer <i>Potential outside market research consultant</i>	Agree	DRPA does not believe this is a feasible option at this time.
ORG 12	Negotiate a merchant services arrangement with the DRPA bank, to provide fast, low-cost credit card processing.	Low			●	Chief Financial Officer <i>Contract Administrator</i> <i>Bridge Directors</i>	Agree	
ORG 13	Consider expanding the E-ZPass frequent user credit to Pennsylvania E-ZPass holders and evaluate expanding the program to encourage more E-Z Pass use.	Med	●			Chief Financial Officer <i>Chief Executive Officer</i> <i>Board of Commissioners</i>	Agree	DRPA has approached the PA Turnpike about participation in the program and await their response.
ORG 14	Establish a formalized trades apprenticeship program.	High	●			Human Resource Services Director <i>Bridge Operations Directors</i> <i>C&M Managers and Foremen</i>	Agree	
ORG 15	Defer creation of an Assistant Foreman position.	N/A				N/A	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
ORG 16	Consider revisions to temporary upgrade practices to increase organizational effectiveness and lessen the impact of vacant position vacuums.	Med	●			Human Resource Services Director <i>Chief Operating Officer Bridge Directors</i>	Agree	DRPA does not agree to change in approval structure.
Operational Efficiency								
OPS 1	Commit to a consistent focus on preventive maintenance.	High	●	●	●	Chief Operating Officer <i>Bridge Directors C&M Managers C&M Foremen Engineering</i>	Agree	
OPS 2	Standardize preventive maintenance activities across each of the four bridges.	High				Bridge Directors <i>C&M Managers and Foremen Engineering</i>	Agree	
OPS 3	Develop and implement an analytical approach to the insourcing and outsourcing decision.	High				Chief Operating Officer <i>Bridge Directors Fleet Director</i>	Agree	
OPS 4	Incorporate predictive elements into the development of ongoing maintenance programs once the PM program is mature and stable.	Med		●	●	Bridge Directors <i>C&M Managers Technology support Engineering</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
OPS 5	Consider alternative shift schedules to ensure that work activities are maximized in maintaining bridges.	Med	●			Chief Operating Officer <i>Bridge Directors</i> <i>C&M Managers</i>	Agree	
OPS 6	Refine and enhance the Bridge Operations staffing requirements model.	High			●	Bridge Directors <i>C&M Managers and</i> <i>Foremen</i>	Agree	
OPS 7	Eliminate the practice of providing Police escort to return non-paying drivers on the Walt Whitman Bridge to New Jersey.	High	●			Chief Operating Officer <i>Police Chief</i> <i>Chief Financial Officer</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
OPS 8	Pursue necessary legislative authority to enforce toll violators, including the denial of vehicle registrations and/or driver license renewal in both New Jersey and Pennsylvania.	High	●			Chief Executive Officer Chief Operating Officer General Counsel Government Relations	Agree	
OPS 9	Implement multi-mode toll lanes, including credit and debit cards, smartphone apps and, in the future, other alternative payment modes in all lanes.	Low			●	Chief Operating Officer Bridge Directors Toll Collection Managers	Agree	DRPA does not agree that the technology is mature enough at this time and that there would not be a positive ROI.
OPS 10	Consider improvements to signage, including Dynamic Message Boards to better inform drivers of available toll lanes and to support diversion of traffic unable to pay tolls.	High	●			Bridge Directors C&M Managers Toll Collection Managers	Agree	
OPS 11	Acquire modern tolling software to enable the DRPA to transition to mixed-mode toll collections and to enable all electronic tolling as customer and DRPA needs demand it.	Med		●	●	Chief Operating Officer Bridge Directors Toll Collection Managers Information Services staff Potential consulting support	Agree	DRPA does not agree with moving to all electronic tolling.

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
OPS 12	Conduct a traffic engineering study focused on modeling of traffic queues at various traffic volumes and times for each bridge with and without the presence of toll booths.	Med		●		Chief Engineer <i>Chief Operating Officer</i> <i>Bridge Directors</i>	Disagree	Do not agree that the state of automatic tolling technology and supporting collection infrastructure works for DRPA at this time.
OPS13	Begin research and planning for an eventual migration to all electronic tolling.	High	●	●	●	Chief Operating Officer <i>Deputy CEO</i> <i>Bridge Directors</i> <i>Toll Collection Managers</i>	Disagree	This is subject to DRPA Board policy and approval as well as solutions for traffic flow and merging safety concerns particularly at the inner bridges BFB and WWB. DRPA disagrees with this recommendation.
OPS 14	Define requirements and deploy an electronic staffing system.	Low	●			Chief Operating Officer <i>Deputy CEO</i> <i>Bridge Directors</i> <i>Toll Collection Managers</i>	Disagree	We do not expect this to be practical for daily schedules adjusted by Supervisors based on who actually reports to work due to call out and sending personnel to assist other bridges. DRPA disagrees with this recommendation.
OPS 15	Develop written standard operating procedures for common fleet repairs.	High	●			Fleet Director <i>Fleet Manager</i> <i>Fleet Foremen</i>	Agree	
OPS 16	Ensure that automated systems supporting fleet management incorporate best practice data capture and reporting features.	High		●		Deputy CEO <i>Chief Operating Officer</i> <i>Fleet Director</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
OPS 17	Prepare, update and communicate a day-by-day schedule of vehicles and equipment for scheduled preventive maintenance by shop location.	High	●			Fleet Director Fleet Manager Fleet Foremen	Agree	
OPS 18	Consider establishing an internal service fund business model for Fleet Maintenance.	Low		●	●	Chief Operating Officer Chief Financial Officer	Disagree	Current Cost Center arrangement enables departmental accountability and budget justifications in our ERP system once fully implemented.
OPS 19	Address ceiling height constraints at the Walt Whitman shop facility.	Med		●		Fleet Director Chief Engineer Potential design consulting support	Further Consideration Required	DRPA needs a space utilization study to assess and identify options.
OPS 20	Recapture available shop space.	Med		●		Fleet Director Bridge Directors	Further Consideration Required	
OPS 21	Improve inventory controls and eliminate informal inventories.	High		●		Fleet Director DRPA Purchasing	Agree	
OPS 22	Encourage/require fleet maintenance personnel and supervisors to pursue fleet certifications.	Med	●			Fleet Director Human Resource Services Director	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
OPS 23	Provide incentives for fleet technicians to earn and maintain ASE or similar technical certifications.	Med	●			Fleet Director <i>Human Resource Services Director</i>	Disagree	DRPA does not offer these types of incentives.
Safety & Compliance								
SC 1	Develop a formal process for Homeland Security threat identification, reporting, mitigation and implementation of protective measures to thwart or mitigate against an attack.	Med	●			Police Chief <i>Chief Operating Officer Bridge Directors</i>	Agree	
SC 2	Continue the Safety Specialists emphasis on conducting onsite training activities and performance of periodic inspections of Bridge Operations facilities.	Med	●			Safety Center of Excellence <i>Bridge Directors</i>	Agree	Already in practice.
SC 3	Provide effective quality control and oversight of consultant-performed bridge inspections and associated reporting of data to FHWA via the states of New Jersey and Pennsylvania.	High	●			Chief Engineer <i>Bridge Directors</i>	Agree	Already in practice.

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
SC 4	Ensure that biennial inspections continue to address near-term maintenance needs and support the DRPA Strategic Plan.	High	●	●	●	Chief Engineer Chief Operating Officer Bridge Directors C&M Managers Consulting engineers	Agree	Already in practice.
SC 5	Track and report routine and capital maintenance work through a systematic process from inception through completion.	Med		●	●	Bridge Directors C&M Managers	Agree	
SC 6	Develop effective asset management systems and reporting processes aligned to the standards established under MAP 21 and the FAST Act, in consultation with the New Jersey and Pennsylvania Departments of Transportation.	High	●	●	●	Chief Engineer Chief Operating Officer Bridge Directors	Disagree	DRPA does not have state or federal reporting requirements.
SC 7	Use bridge and pavement management technology for decision support and performance reporting.	Low		●	●	Chief Operating Officer Chief Engineer Deputy CEO Bridge Directors	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
SC 8	Proactively engage staff responsible for the Asset Management program areas within the Pennsylvania and New Jersey DOT's as well as the respective FHWA Division Offices in those states.	Med	●	●	●	Chief Engineer <i>Chief Operating Officer</i>	Agree	
General Administration								
GA 1	Provide Bridge Operations management with the training and technical capabilities required to enable sophisticated data analytics and reporting.	Med			●	Chief Operating Officer <i>Deputy CEO Potential consulting support</i>	Agree	
GA 2	Systematically identify, evaluate and address the sources of user acceptance challenges.	High			●	Chief Operating Officer <i>Deputy CEO Potential consulting support</i>	Agree	
GA 3	Contract for the completion of a comprehensive technology strategic plan for Bridge Operations.	Med			●	Chief Operating Officer <i>Deputy CEO Technology planning consultant</i>	Disagree	This effort should be undertaken Authority-wide, including Bridge Operations.

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
GA 4	Form a multi-disciplined team to comprehensively evaluate the sources and value of revenue losses, establish a regular reporting protocol and devise a plan for leakage reduction.	Med			●	Chief Operating Officer Chief Financial Officer Bridge Directors Toll Collection Managers	Agree	
GA 5	Prepare and review regular exception reports to assure the accuracy and integrity of the Authority's revenue accounts.	Med	●			Chief Financial Officer Revenue Audit Manager Office of the Inspector General	Agree	
GA 6	Supplement and strengthen Revenue Audit procedures documentation.	High	●			Chief Financial Officer Revenue Audit Manager	Agree	
GA 7	Require all safes maintained at the bridges to be locked at all times they are not in use.	High	●			Bridge Directors Toll Collection Managers Plaza Supervisors	Agree	
GA 8	Seek relief from the 2% limitation on year-over-year operating expenditure growth.	High		●		Chief Executive Officer Board of Commissioners	Disagree	DRPA does not engage in conflict over policies of the PA / NJ Governors.

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
GA 9	Train/re-train Bridge Operations managers on the usage of the financial system reporting tools to enable effective monitoring and management of both operating and capital budgets.	High		●		Deputy CEO Chief Operating Officer Chief Financial Officer	Agree	
GA 10	Initiate a Lean Six Sigma (LSS) process improvement project to identify and recommend improvements to the current talent acquisition process.	High	●			Chief Administrative Officer Human Resource Services Director Strategic Initiatives Director	Agree	DRPA is constantly investigating approaches to streamline the process to bring in highly qualified candidates into the organization. Lean Six Sigma may not be the most appropriate approach for the onboarding process.
GA 11	Develop a standardized succession planning process and provide managerial training.	High	●	●	●	Chief Administrative Officer Chief Operations Officer Human Resource Services Director Bridge Directors Fleet Management Director	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
GA 12	Develop a standardized new-hire training protocol for all Bridge Operations personnel.	High	●			Bridge Directors <i>Human Resource Services Director</i>	Agree	HRS already has developed a 2.5 day robust new hire orientation program. All new hires are required to attend the session. In addition, HRS provides annual training for all new supervisors. This recommendation appears to relate to a ‘Cultural Integration’ program, which is department specific. Two years ago, CAO and HRS Director developed and implemented a new Cultural Integration Program. We presented the successful program to executive and senior staff, and CEO directed all management to implement a division/department-specific Cultural Integration Program. To the extent that something additional is needed HRS is always available to provide support and guidance, as needed. Needs to be the same across all bridges and consider cross facility training and familiarity.
GA 13	Continue to pursue the ongoing purchasing Lean Six Sigma analysis and implement procedural changes to improve documentation standards and compliance, and increase timeliness and efficiency.	High	●			Deputy CEO <i>Strategic Initiatives Director, Procurement</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
GA 14	Seek increased spending authority to reduce volume of procurements requiring Board approval.	High	●			Chief Executive Officer <i>Board of Commissioners</i>	Agree	DRPA agrees with the intent of this recommendation. The Authority would need Board approval to implement this recommendation.
GA 15	Establish service level agreements and performance standards for completing each procurement step, identify the responsible group/person, and provide performance reporting by step and responsible party.	Low			●	Deputy CEO <i>Procurement Director</i>	Agree	
GA 16	Expand procurement reporting to identify the timeliness of each process step and track when procurement requests are returned to sender.	Med		●		Deputy CEO <i>Procurement Director</i>	Agree	
GA 17	Expand the on-call pool of equipment rental vendors.	Med	●			Fleet Director <i>Procurement Director</i>	Agree	

Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
GA 18	Seek increased P-card limits (or pursue alternate supplier arrangements such as the “blanket orders” recommendation below) to avoid having users circumvent Authority policies.	Med	●			Deputy CEO <i>Procurement Director</i>	Agree	
GA 19	Establish blanket contracts with suppliers that are based on established pricing basis (e.g., discount off list) to reduce P-card purchase volumes.	Med	●			Bridge and Fleet Directors <i>Procurement Director</i>	Agree	This practice is already being done within Bridge Operations.
GA 20	Establish more multi-year contracts to reduce procurement transaction volumes.	Med	●			Bridge and Fleet Directors <i>Procurement Director</i>	Agree	
GA 21	Consider contracting for additional purchasing support.	Med	●			Deputy CEO <i>Procurement Director</i>	Disagree	The procurement policies do not lend themselves to outsourcing.

<p>GA 22</p>	<p>Ensure all materials inventories are recorded, monitored and managed, to include exploring the expansion of the stockroom services provided at the Walt Whitman facility to the Ben Franklin facility.</p>	<p>High</p>	<p>●</p>	<p></p>	<p>Bridge and Fleet Directors <i>Procurement Director</i></p>	<p>Further Consideration Required</p>	<p>For Fleet Operations, with the proposed enhancement of our ERP system, cataloging and direct order and delivery, there would be a move toward “just-in-time” delivery and no inventorying.</p> <p>A joint Fleet/Bridge stock room operation overseen by Purchasing personnel is an idea worth considering at BFB. However, BFB is significantly constrained by space limitations. There is a Vehicle Storage/Fleet Repair building scheduled in the 5-year capital plan for BFB which would be beneficial; We are planning a space utilization study for both Bridge and Fleet needs to be done next year 2018 with Engineering support as a precursor to confirm justification for the building. Such a building at BFB would help with current facility space constraints and can factor in a stock room similar to WWB. Evaluation of this BFB stockroom idea can be part of the space utilization study with current space as well as concept of the additional new building.</p> <p>Due to emergency response and readiness, some material inventory must be accessible 24 hours around the clock at the bridge department shops.</p> <p>Explore improved controls on satellite inventory/supplies within bridge shop and bridge remote storage areas.</p>
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Index	Recommendation	Priority	Timing			Accountabilities	MANAGEMENT RESPONSE	
			FY 18	FY 19	Future		Agree/ Disagree	Comment
GA 23	Implement effective controls on overtime expenditures.	High	●			Chief Operating Officer <i>Bridge Directors</i> <i>Fleet Directors</i> <i>Fleet Director</i>	Agree	DRPA already has controls in place relating to overtime, but will evaluate and look for opportunities to improve.

APPENDIX A: LIST OF SOURCE DOCUMENTS



BRIDGE OPERATIONS MANAGEMENT AUDIT LIST OF SOURCE DOCUMENTS

Governing Documents

1. DRPA Compact.pdf
2. DRPA By Laws.pdf
3. DRPA Reform_Resolutions

Strategic Planning

1. DRPA Strategic Planning Questionnaire Results (08-16-2016)
2. DRPA Strategic Plan: External Stakeholders & Public Input (12-09-2016)
3. DRPA Summary of Strategic Planning Sessions
4. 2017-2021 Strategic Plan: Goals, Metrics & Key Initiatives (draft document)
5. Strategic Plan, Roadmap to World-Class Stewardship, 2017-2021, March 31, 2017 (draft document)

Customer Service Information

1. World Class Stewards brochure (DRPA by the numbers)
2. DRPA Overview brochure
3. Directions to ATM's brochure (BFB)
4. Directions and Information brochure (WWB)
5. DRPA Bridge Fact Sheets

Organization Charts

1. DRPA Organization Chart (05.18.2017)
2. Betsy Ross Bridge Organization Chart (1-14-2017)
3. Ben Franklin Bridge Organization Chart (06-18-2017)
4. Walt Whitman Bridge Organization Chart (01-19-2017)
5. Commodore Barry Bridge Organization Chart (03-23-2017)
6. Fleet Management Organization Chart (11-07-2016)

Bridge Operations Overview

1. Spotlight Presentation (Robert Hicks PowerPoint presentation)
2. 2017 Bridge Operations Staffing 03-01-2017 (Excel spreadsheet)
3. Bridge Operations Staffing 2013-2017 (Excel spreadsheet)

Asset Management

1. "Transportation Asset Management Plan Development Processes Certification and Recertification Guidance," Federal Highway Administration, June 5, 2017
2. "Transportation Asset Management Plan Consistency Determination Guidance," Federal Highway Administration, June 5, 2017
3. NBI Inspection Report – Betsy Ross Bridge (04-18-2016)

4. NBI Inspection Report – Commodore Barry Bridge (05-16-2016)
5. NBI Inspection Report – Walt Whitman Bridge (05-16-2016)
6. NBI Inspection Report – Ben Franklin Bridge (06-03-2016)
7. WWB 2016 Biennial Inspection Bridge Condition Certificate (09-30-2016)
8. PennDOT’s Asset Management Initiatives (PowerPoint presentation 02-08-2017)
9. PennDOT’s Pavement Asset Management System (PowerPoint presentation 02-08-2017)
10. “Guide to Implementation of GASB Statement 34 and Related Pronouncements,” Government Accounting Standards Board, December 2001
11. “Asset Management and GASB 34 –Challenge or Opportunity?,” Government Accounting Standards Board, Daniel Dorman, P.E.
12. “Asset Management, Management Fad or Prerequisite for Solving the Fiscal Challenges Facing Highway Infrastructure?,” Daniel Dorman, P.E., International Journal of Transportation Management, February 14, 2001

Construction & Maintenance Operations

1. 2017 Facility Manpower Capacity Analysis – BFB and BRB (Excel spreadsheet)
2. 2017 Facility Manpower Capacity Analysis – WWB and CBB (Excel spreadsheet)
3. Bridge Operations C&M Operating Budget Projected Labor Hours – WWB (Excel spreadsheet)
4. Bridge Operations C&M Operating Budget Projected Labor Hours – BFB (Excel spreadsheet)
5. Bridge Operations C&M Operating Budget Projected Labor Hours – BRB (Excel spreadsheet)
6. Bridge Operations C&M Operating Budget Projected Labor Hours – CBB (Excel spreadsheet)

Tolling Operations

1. Toll Manual
2. DRPA Electronic Toll Collection Traffic and Revenue Reporting SOP
3. 2014 Monthly Tolling Reports – BRB
4. 2014 Monthly Tolling Reports – BFB
5. 2014 Monthly Tolling Reports – WWB
6. 2014 Monthly Tolling Reports – CBB
7. 2015 Monthly Tolling Reports – BRB
8. 2015 Monthly Tolling Reports – BFB
9. 2015 Monthly Tolling Reports – WWB
10. 2015 Monthly Tolling Reports – CBB
11. 2016 Monthly Tolling Reports – BRB
12. 2016 Monthly Tolling Reports – BFB
13. 2016 Monthly Tolling Reports – WWB
14. 2016 Monthly Tolling Reports – CBB
15. 2014 Revenue Operations Report
16. 2015 Revenue Operations Report
17. 2016 Revenue Operations Report
18. Toll Evasions DNUBs 2006-2016 (Excel spreadsheet)
19. Monthly revenue reconciliation report
20. DRPA Toll Collector Daily activity log audit trail
21. Collector Tour of Duty Report
22. Daily Collector Activity Report
23. “An Evolution of Tolling,” KPMG Toll Benchmarking Study 2015
24. “Electronic Toll Collection, 2015 Edition,” free abstract publication, Ptolemus Consulting Group

25. "Toll Technology Transforms Mobility for Customers, 2016 National Toll Technology Survey," International Bridge, Tunnel and Turnpike Association
26. "Leveraging Tolls in the 21st Century," HNTB White Paper, January, 2015

Fleet Operations

1. Fleet size and age comparison – 2017 (Excel spreadsheet)
2. Heavy Duty Truck PM Checklist
3. PM Checklist for Tractors, Trucks and Automobiles (Utah State University Cooperative Extension)
4. DRPA vehicle list

Financial Documents

1. DRPA 2015 Annual Report
2. DRPA 2013 Annual Report
3. DRPA 2014 Annual Report
4. Bridge Operations Operating and Capital Budget Totals, 2015-2017 (Excel spreadsheet)
5. DRPA 2016 Capital Budget
6. DRPA 2017 Capital Budget
7. DRPA Approved 2015 Operating Budget
8. DRPA Approved 2016 Operating Budget
9. DRPA Approved 2017 Operating Budget
10. Atos Multi-Site SOC1 (2016)
11. Atos SOC1 Certification Letter (2017)
12. XEROX SOC1 Certification Letter – New Jersey E-ZPass (2016)
13. XEROX SOC1 Certification Letter – New Jersey E-ZPass (2017)
14. Independent Auditor's Exit Conference Report (2014)
15. Independent Auditor's Exit Conference Report (2015)
16. Federal Audit Data Collection Form (2014)
17. Federal Audit Data Collection Form (2015)

Human Resources

1. DRPA Employee Handbook (reviewed on-site with HRS)
2. HR Policies and Procedures (reviewed on site with HRS)
3. DRPA substance abuse testing policy (reviewed on site with HRS)
4. 2014 Drug Testing Annual Report for Bridges (Interstate Mobile Care)
5. 2015 Drug Testing Annual Report for Bridges (Interstate Mobile Care)
6. 2016 Drug Testing Annual Report for Bridges (Interstate Mobile Care)
7. DRPA Connections Employee newsletters (four sample copies)
8. Exit Interview Summaries 2015-2017 (Excel spreadsheet)
9. Commercial Drivers License Holders listing for Bridge Operations (03-29-2016)
10. EEO Compliant Summary (1/1/2012 – 3/7/2017)
11. Bridge Operations Separations Statistics (1/1/2015-2/24/2017)
12. IUOE Memorandum of Agreement July 22, 2016
13. IUOE Agreement, Construction & Maintenance, January 1, 2010 – December 31, 2012

14. IUOE Agreement, Toll Employees & Revenue Operations Clerks, January 1, 2010 – December 31, 2012
15. Recruitment process flowchart

Information Technology

1. Written responses to questions from Kevin La Marca (02/14/2017)
2. Infinity Lane System Upgrade (unsolicited proposal from TransCore)
3. Manual Violation Processing Statement of Work – TransCore (02-17-2017)
4. TransCore Maintenance Service Agreement Pt 1 (03-03-2015)
5. TransCore Maintenance Service Agreement Pt2
6. TransCore 3rd Supplemental Agreement for Maintenance of Toll System Hardware and Software (06-09-2016)

Purchasing

1. OIG PCard Audit Report (02-15-2017)
2. OIG PCard Audit Report Executive Summary (02-15-2017)
3. Contracting and procurement policy
4. Purchasing process flow chart
5. Listing of Major Outsourced Contracts, Walt Whitman Bridge (along with contract copies)
6. Listing of Major Outsourced Contracts (email), Ben Franklin Bridge (along with contract copies)
7. Listing of Major Outsourced Contracts (email), Betsy Ross Bridge (along with contract copies)
8. Multiple Contract agreements
 - a. Janitorial services
 - b. Extermination / pest control services
 - c. Fuel storage
 - d. Safety boat services
 - e. Hazardous material removal
 - f. HVAC maintenance services
 - g. Maintenance platform maintenance and repair services
 - h. Building automation systems maintenance
 - i. Trash disposal
 - j. Weed control

Safety & Risk Management

1. DRPA Safety Administrative Manual (Rev. 10/27/2014)
2. Delaware River Port Authority of PA& NJ and Port Authority Transit Corporation, Fleet Safety Program, (Rev. 02/24/2016)
3. Minimum Training Requirements for Entry-Level Commercial Motor Vehicle Operators, Federal Motor Carrier Safety Administration (03-21-2017)
4. DRPA Motor Vehicle Accident Report, 2014-2017
5. Claim Level External Loss Run Report, 2014-2016
6. DRPA Safety Job Specialist job description

APPENDIX B: LIST OF INTERVIEW PARTICIPANTS

List of Interview Participants

Function / Department	Position / Role	Participant
DRPA Executive Management	DRPA CEO / PATCO President	Hanson, John
	Deputy CEO	Wing, Maria
	Chief Administrative Officer	Brown, Toni
	Chief Operating Officer	Hicks, Robert
	Chief Financial Officer	White, James
	Chief of Police	Stief, John
	Chief Engineer	Venuto, Mike
	PATCO General Manager	Rink, John
Strategic Initiatives	Strategic Initiatives Manager	Maroney, Christina
Emergency Management	Emergency Management Director	Finnegan, Robert
Engineering	Engineering Program Manager	Rustam, Len
	Associate Engineer	Campion, Nicole
Human Resources	Human Resources Director	Forbes, Kelly
	Training Specialist	Wooley, Stephanie
	Recruitment Specialist	Espino, Tamika
	HRIS Specialist	Thompson, Sandi
Information Services	Information Services Director	LaMarca, Kevin
Risk Management / Safety	Risk Management Director	Staszewski, Marianne
	Safety Specialists	Armbruster, Mark
		Christian, Khalil
Purchasing	Purchasing Manager	Squillace, Sue
	Acting Manager, Purchasing & Stores	Betts, Rich
Contract Administration	Contract Administrator	Ash, Amy
Finance	DRPA Finance Director	Lotierzo, John
	Revenue Audit Manager	Griffey, Patty
	Revenue Audit Supervisor	Caruso, Al
	Revenue Analyst	Peffer, Jack
Bridge Operations	Bridge Director	Bradford, Valerie
		Walton, Larry
	Construction & Maintenance Managers	Fergione, Anthony
		McAroy, Joe
		Stricker, Bill (Acting)
		Tutak, Rich
		Gunter, Tyrone
	Toll Collection Managers	Graziani, Jesse
		Panepinto, John
	Electrical Foremen	Dennis New
		Dennis Moore

Function / Department	Position / Role	Participant
Bridge Operations	Electrical Foreman	William Holt
	HVAC Foreman	Tom Meehan
		Steve Hulmes
	Maintenance Foremen	Chuck Wadding
		Dan Mullen
		Bill Nelson
		David Shields
	Highway Foremen	Terrance Mitchell
		Joe Fries
		Renee Nelson
		Carl Casella
		Rocco Parisano
		Jhmal Haseen
		Mark Gallo
Craig Teschko		
Fleet	Fleet Director	Reiners, Steve
	Fleet Manager	Ludovich, Rich
	Fleet Foremen	Licata, Matt
		Byrd, George
	Central Storeroom Supervisor - WWB	Polk, Gail

Employee Focus Groups

Function / Department	Role
Betsy Ross Bridge	Toll Plaza Supervisors
	Toll Collectors
	Skilled Technicians
	Construction & Maintenance Mechanics
Ben Franklin Bridge	Toll Plaza Supervisors
	Toll Collectors
	Skilled Technicians
	Construction & Maintenance Mechanics
Walt Whitman Bridge	Toll Plaza Supervisors
	Toll Collectors
	Skilled Technicians
	Construction & Maintenance Mechanics
Commodore Barry Bridge	Toll Plaza Supervisors
	Toll Collectors
	Skilled Technicians
	Construction & Maintenance Mechanics
Fleet	Fleet Foremen
	Auto Mechanics – BFB
	Auto Mechanics – WWB

APPENDIX C: ORGANIZATIONAL PROFILE

ORGANIZATIONAL PROFILE

This section provides an overview of the current organizational structure, resources and allocated staffing of each major component of the Bridge Operations Division. The organizational profile is purely descriptive in nature – not evaluative - and is provided to document our overall understanding of the current structure, responsibilities, strategies, goals, and operations of the division.

Strategic Plan

The DRPA is presently in the midst of a comprehensive effort to develop and deploy a robust strategic plan and management process for the entire Authority. As directed by the Board of Commissioners, and with the strong support of the Chief Executive Officer, the Department of Strategic Initiatives is managing this large-scale project with the facilitative support of an expert audit team. Representatives from all DRPA business units, including Bridge Operations, are assigned to the strategic planning effort. A draft “Roadmap to Strategic Success” for the period 2017-2021 has recently been published.

The DRPA’s statement of vision is an aspirational description of the ideal future state of the Authority and its services.

“Together we are world-class stewards of public transportation assets. Working collaboratively across all business units, we operate, maintain, improve and protect transportation infrastructure for the benefit of the citizens we serve throughout the Greater Philadelphia Region. We are committed to building credibility, earning public trust and creating public value.”

The DRPA mission statement concisely articulates the specific purpose of the Authority and, by extension, each of its business units.

“As stewards of public assets, we provide for the safe and efficient operation of transportation services and facilities in a manner that creates value for the public we serve.”

The Roadmap to Strategic Success also establishes the core shared values that define the operating philosophy and behaviors expected from all members of the DRPA organization.

- Community Stewardship.
- Authentic Communication.
- Humility.

- Fairness & Equity.
- Diversity & Inclusion.
- Safety First.
- Collaboration, Growth & Development.
- Credibility.
- Continuous Improvement.

The working draft strategic plan identifies five strategic priorities for the Authority, each of which includes specific goals and initiatives applicable to specific business units and programs.

- Infrastructure, facilities & equipment stewardship.
- User and beneficiary satisfaction.
- Organizational strength and capacity.
- Efficiencies and process improvements.
- Prudent deployment of resources.

Among the specific strategic goals and initiatives assigned to or shared with Bridge Operations are the following:

- Infrastructure, facilities & equipment stewardship
 - Ensure availability of financial resources to support the capital program and maintain assets in state-of-good-repair.
 - Asset Management Plan
 - Track percentage of “scheduled” or “planned” projects identified in the Biennial Inspections that are included in the operating budget or capital program.
 - Ensure preventive maintenance and routine inspections (in-house and 3rd party) at facilities are completed on scheduled and at required intervals.
 - Establish maintenance and task order systems to track preventive maintenance at the bridges.
 - Maintain the proper balance in allocating personnel and other resources between capital and maintenance projects to maintain projected timelines.
 - Perform ERP data analysis to improve the performance of routine/preventive maintenance.
 - Improve the environmental impact of the organization.
 - Development of a formal Comprehensive Sustainability Program.
- User and beneficiary satisfaction

- Improve communication and customer satisfaction with the bridge and PATCO users.
 - Create digital communication strategy and plan.
 - Conduct targeted digital media marketing.
 - Integrate messaging with other regional transportation agencies (VMS signage at toll plazas).
 - Provide consumers with reliable and timely real-time information through the development of apps, VMS message boards, etc.
 - Formalize and expand customer satisfaction surveys to capture data.
- Organizational strength and capacity
 - No lead role assigned nor supporting goals or initiatives yet developed or assigned to Bridge Operations.
- Efficiencies and process improvements
 - No lead role assigned nor supporting goals or initiatives yet developed or assigned to Bridge Operations.
- Prudent deployment of resources
 - No lead role assigned nor supporting goals or initiatives yet developed or assigned to Bridge Operations.
- Going forward, Bridge Operations will be developing supporting goals, objectives and performance metrics that directly contribute to the accomplishment of the strategic priorities of the Authority.

Bridge Operations Overview

The Authority's Bridge Operations Division is responsible for the operation and maintenance of four major toll bridges across the Delaware River linking the Pennsylvania and New Jersey sides of the greater Philadelphia metropolitan area.

Bridge Operations is organized and managed as five distinct business units.

- These separately budgeted business units include the Betsy Ross Bridge, the Benjamin Franklin Bridge, the Walt Whitman Bridge, Commodore Barry Bridge and the Fleet Services unit.
 - The two northernmost bridges, the Benjamin Franklin and Betsy Ross, are managed by a single Bridge Director.
 - Similarly, the two southernmost bridges, the Walt Whitman and Commodore Barry, are managed by a single Bridge Director.
 - Each bridge as its own Construction & Maintenance Manager, reporting to their respective Bridge Directors.
 - Two Toll Collection Managers are assigned to the northern and southern bridges, respectively, reporting to responsible Director.

- The Fleet Services unit provides vehicle and equipment maintenance to the four bridges as well as to the DRPA administrative units, DRPA police and the Port Authority Transit Corporation.
- The two “inner bridges” – Ben Franklin and Walt Whitman – carry the largest traffic loads directly to and from highly urbanized sections of the City of Philadelphia.
- The two “outer bridges” – Betsy Ross and Commodore Barry – carry significantly less traffic and, in the case of the Commodore Barry Bridge, serve a less urban portion of the service area.

Bridge Operations is a substantial, \$326 million annual enterprise and accounts for a significant portion of the DRPA’s human and financial resources and requirements.

- An overview of the operating costs and revenues derived from bridge operations in 2016 (unaudited figures) is shown in the table below:

Bridge	Toll Revenue	Other Operating Revenue	Operating Expenses	Net Operating Income
Ben Franklin	\$ 101,033,079	\$ 6,633,128	(\$ 14,101,128)	\$..93,564,760
Walt Whitman	\$ 123,340,617	\$ 41,258	(\$ 16,503,552)	\$ 106,878,322
Commodore Barry	\$..55,289,867	\$ 194	(\$ 7,394,778)	\$..47,895,283
Betsy Ross	\$.. 40,114,159	\$ 241	(\$ 7,590,836)	\$..32,523,564
TOTAL	\$ 319,777,722	\$ 6,674,821	(\$ 45,590,614)	\$ 280,861,928

- Bridge Operations unaudited capital project expenditures for FY 2016 totaled just over \$62 million as shown below:

Ben Franklin Bridge	Walt Whitman Bridge	Commodore Barry Bridge	Betsy Ross Bridge	Multi or All Bridges	Total Capital Projects
\$ 8,527,816	\$ 33,255,749	\$ 9,472,679	\$ 8,742,377	\$ 2,078,002	\$ 62,076,623

- Additional capital expenditures were made on behalf of Bridge Operations in 2016, primarily for a variety of technology-related replacements, upgrades and new systems investment.
- Revenues generated by the toll bridges are used to offset the Port Authority Transit Corporation’s operating losses each year. For fiscal year 2017, that loss is projected to approach \$28 million.

- Budgeted operating expenses for the 2017 fiscal year total an \$35,299,029 and capital project expenditures are budgeted at \$77,320,000.

Tolls are collected via cash, electronic and – on a limited basis – credit cards

- The current toll schedule as published on the DRPA website is shown in the table at the top of the following page.

Vehicle Classification	Toll
Passenger vehicles, including motorcycles & small trucks 7,000 lbs. and less gross vehicle weight (Class 1 & 2)	\$5.00
Trucks, mobile homes and recreation vehicles- gross vehicle weight 7,001 lbs. and upper axle	\$7.50
2 axles	\$15.00
3 axles	\$22.50
4 axles	\$30.00
5 axles	\$37.50
6 axles	\$45.00
Buses - per axle	\$3.75
2-axle	\$7.50
3-axle	\$11.25
Extra axles for autos (each)	\$3.75
Extra axles for trucks (each)	\$7.50

- Available discounts include:
 - **E-ZPass Senior Citizen Discount** – Drivers 65 years of age and older) with an active NJ E-ZPass account are eligible for a 50% discount off of the current passenger vehicle toll.
 - **E-ZPass Frequent Commuter Credit** – New Jersey E-ZPass commuters who make 18 or more round-trip bridge crossings during a calendar month receive a \$18.00 monthly account credit. The commuter credit applies only to non-commercial passenger vehicles, including motorcycles and small trucks that are 7,000 lbs. and less.
- Tolls are paid when traveling from New Jersey to Pennsylvania. Westbound-only collection was implemented in 1992 to address traffic congestion on the bridges and approaches.
- Tolls are collected at either manual (cash) or E-ZPass (electronic) lanes. Only commercial vehicles with tolls of \$15 or more are afforded the option to pay by credit card. Approximately 60% of the bridge traffic pays via E-ZPass, with a higher percentage during the business week.
- The current toll lane collection capability, by bridge, is shown in the table below:

TOLL LANE COLLECTION CAPABILITY

Bridge	Total Lanes	Cash Only	E-ZPass Only	Mixed Mode*	Non-Functional
Betsy Ross Bridge	12	6	3	1	2
Walt Whitman Bridge	14	7	2	5	0
Ben Franklin Bridge	13	0	1	12	0
Commodore Barry Bridge	8	4	2	1	1
Totals	47	17	8	19	3

*DRPA does not currently use mixed mode collection capability

- A typical configuration of the toll lanes, by bridge, is as follows:

TYPICAL TOLL LANE CONFIGURATION

Bridge	Total Lanes	Manual Cash	E-ZPass	Mixed Mode*	Unused
Betsy Ross Bridge	12	3	3	0	6
Walt Whitman Bridge	14	6	7	0	1
Ben Franklin Bridge	13	5	8	0	0
Commodore Barry Bridge	8	3	3	0	2
Totals	47	17	21	0	9

*DRPA does not currently use mixed mode collection capability

Bridge Operations relies on a variety of information technologies to conduct its core business activities.

- The table below summarizes the most significant systems employed by Bridge Operations:

Technology	Function Served
ERP Enterprise Resource Planning	An advanced integrated software package supporting the core administrative activities of the entire DRPA enterprise including accounting, financial reporting, purchasing, human resources, payroll and work order management.
TransCore	Hardware for license plate pictures and hardware and software for all cash collection accounting and reporting activities. This is also the company, which provides the treadles, which are axle counting devices embedded in all the cash lanes. Also control cash registers, lane cameras and lane controllers. TransCore is often referred to as the DRPA lane integrator.
Vector	Software for license plate pictures
SATS	Analytical software used by revenue audit in auditing cash collections

Technology	Function Served
ACL	Internal audit software used to document certain audit activities
DVAS	Digital video software for lane traffic
Genetec	Digital video software used for bridge traffic monitoring, toll collector video monitoring and recording and video monitoring of security areas.
Conduent	3 rd party, which provides all E-ZPass related services
Tri-M	Bridge traffic control, building automation, lane and roadway lighting, and traffic control signage control.
Microsoft Office	Desktop productivity applications for such functions as word processing, spreadsheets and presentation graphics.

Staffing and Organization Structure

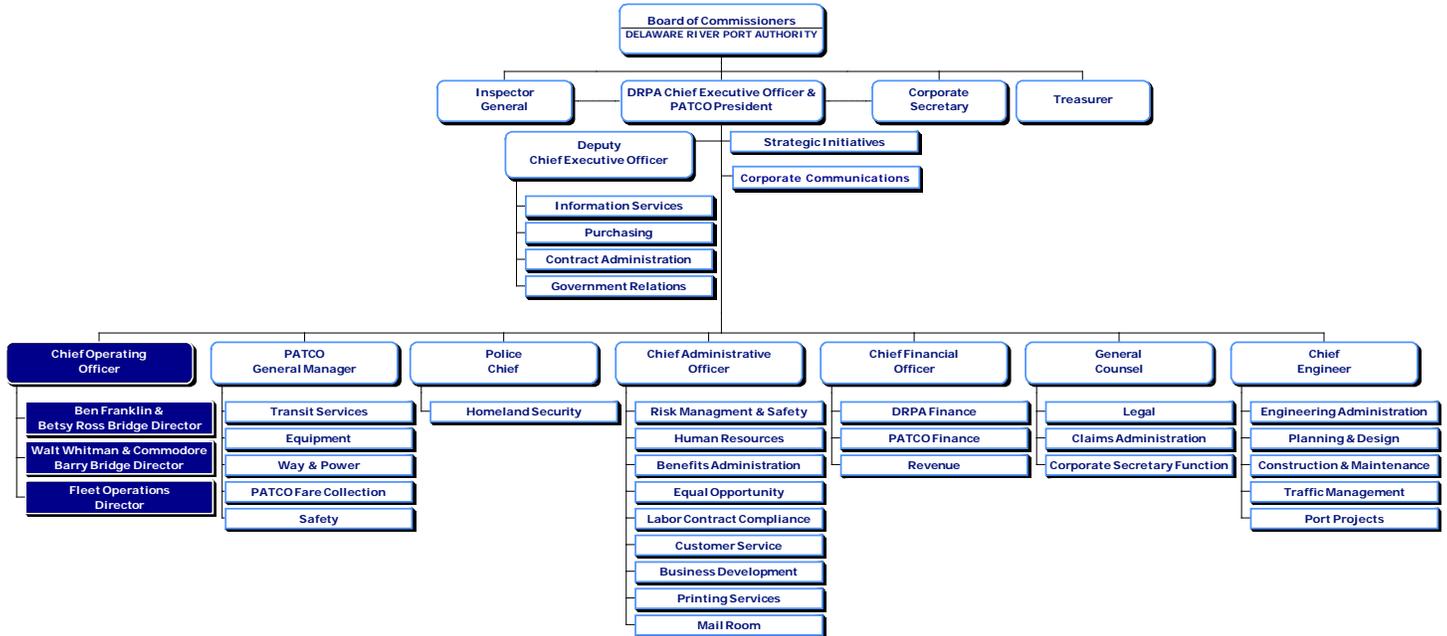
Summary information on the overall staffing of the Bridge Operations Division and the structure of the organization within each of the major operating units.

Based on staffing schedules provided by DRPA, authorized employee headcount for Bridge Operations and Fleet Services have remained stable in recent years.

- Total authorized Bridge Operations headcount for the current fiscal year is 269, including 248 for the maintenance and operation of the four toll bridges and 21 allocated to fleet services.
- Of the 269 authorized positions, approximately 196 are represented by the International Union of Operating Engineers (IUOE), accounting for 73% of the Bridge Operations workforce.
- Staffing levels have been effectively static over the past five years, ranging between 268 and 269 positions since 2013 to date.
- The above figures do not include the Chief Operating Officer and an Administrative Coordinator assigned to the COO's office.
- Full-time Toll Collectors are not assigned to work weekends or holidays. Those periods are covered by temporary Toll Collectors hired through a contracted staffing agency. Temporary Toll Collectors may also be used to cover staffing shortages primarily due to sick and injured (over 14 days) during the week on an as-needed basis.

The overall organizational structure of Bridge Operations within the context of the DRPA organization is shown immediately below.

DRPA / Bridge Operations Organizational Structure

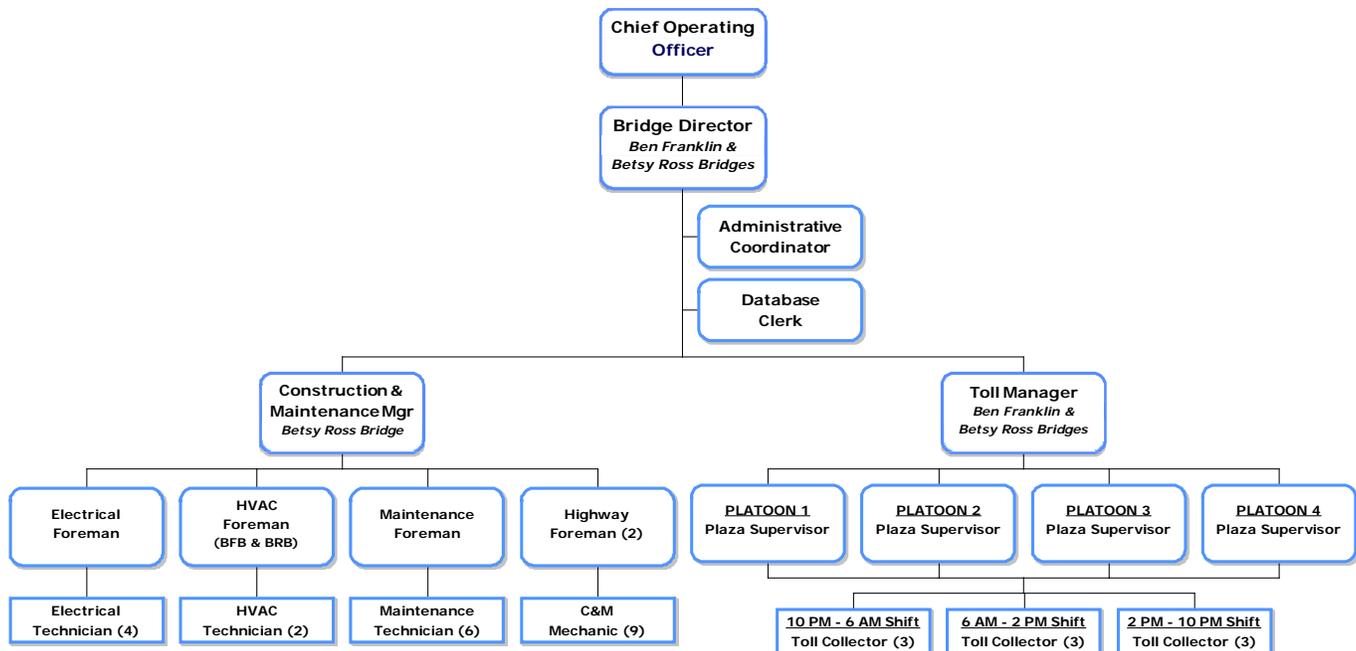


- As illustrated in the organization chart, Bridge Operations is led by the Authority’s Chief Operating Officer (COO), reporting directly to the Chief Executive Officer.
- The COO is one of eight “Chiefs” including, also, the Deputy Chief Executive Officer, the Chief Administrative Officer, the Chief Financial Officer, the Chief Engineer, the General Counsel, the Police Chief and the General Manager of PATCO.
- As a member of the senior executive team of the DRPA, the COO has significant interaction with members of the Board of Commissioners, provides staff support and advice to the Operations Committee of the Board and interfaces with other governmental entities, peer tolling and transportation organizations, local government officials and other key stakeholders.
- In addition to an Administrative Coordinator providing administrative support to the COO, direct reports include two Bridge Directors and the Fleet Services Director. These Directors, in turn, are responsible to the COO for the day-to-day operation and management of the bridges and fleet services.

Betsy Ross Bridge

- The organizational structure of the Betsy Ross Bridge is shown in the chart below.
- The Betsy Ross is the northernmost of the DRPA’s toll bridges.

Betsy Ross Bridge Organization Structure



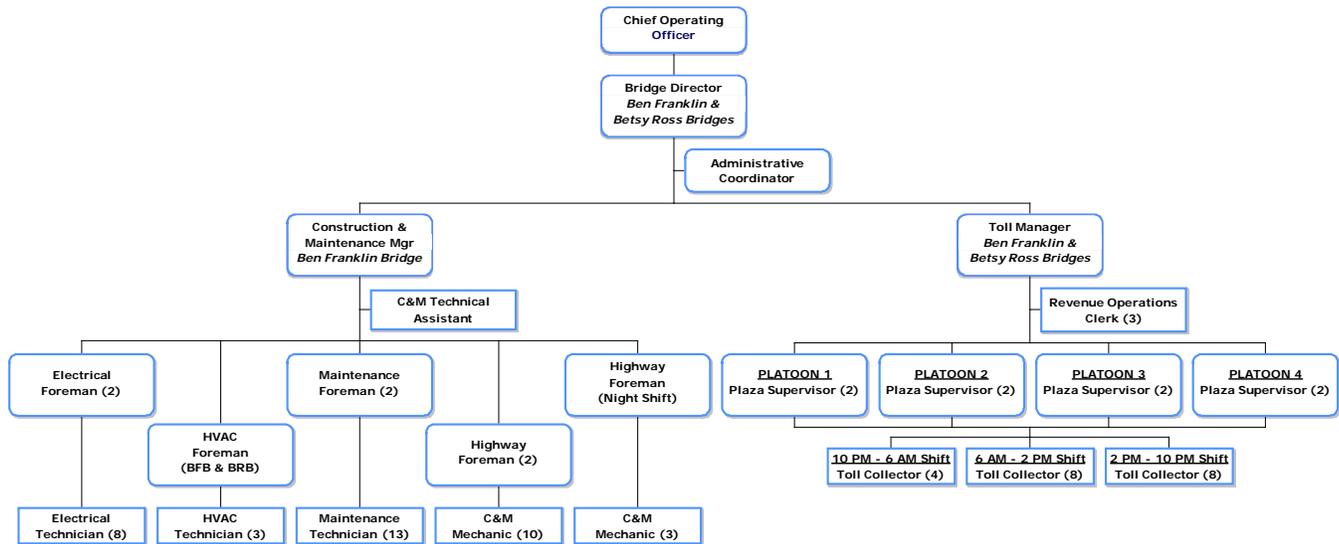
- The following bridge information is provided on the DRPA website:
 - The Betsy Ross Bridge connects Philadelphia to Pennsauken, New Jersey.

- Construction on the bridge began on June 12, 1969 and opened to traffic on April 30, 1976.
- The initial investment in the bridge totaled \$102.3 million
- The travel width, measured from curb to curb, is 90 feet and there are six traffic lanes.
- The length of the bridge is 8,485 feet from abutment to abutment.
- The bridge provides vehicular lanes only on an asphalt roadway surface.
- Total authorized staffing assigned includes:
 - 1 Bridge Director (shared with the Ben Franklin Bridge)
 - 1 Construction & Maintenance Manager
 - 1 Toll Manager (shared with the Ben Franklin Bridge)
 - 1 Electrical Foreman
 - 1 HVAC Foreman (shared with the Ben Franklin Bridge)
 - 1 Maintenance Foreman
 - 2 Highway Foremen
 - 4 Plaza Supervisors
 - 4 Electrical Technicians
 - 2 HVAC Technicians
 - 6 Maintenance Technicians
 - 9 Construction & Maintenance Mechanics
 - 9 Toll Collectors
 - 1 Administrative Coordinator
 - 1 Database Clerk
- Total traffic volume for 2016 is reported at 5,073,301 vehicles

Benjamin Franklin Bridge

- The Ben Franklin is the oldest and best-known of the DRPA bridges and is the second busiest bridge in terms of overall traffic volume.
- The organizational structure of the Ben Franklin Bridge is depicted below.

Ben Franklin Bridge Organization Structure



- The following bridge information is provided on the DRPA website.
 - The Ben Franklin Bridge connects Center City Philadelphia to Camden, New Jersey.
 - Construction on the bridge began on January 6, 1922 and opened to traffic on July 1, 1926.
 - The initial investment in the bridge was \$45.2 million.
 - The travel width, measured from curb to curb, is just under 78 feet and there are seven traffic lanes.
 - The length of the bridge is 7,546 feet from abutment to abutment.
 - The bridge supports three transportation modes including vehicle lanes on an asphalt roadway surface, PATCO rail transit lines and two pedestrian walkways.
- Total authorized staffing assigned includes:
 - 1 Bridge Director (shared with the Betsy Ross Bridge)
 - 1 Construction & Maintenance Manager
 - 1 Toll Manager (shared with the Betsy Ross Bridge)
 - 2 Electrical Foremen (one of which is pending)
 - 1 HVAC Foreman (shared with the Betsy Ross Bridge)
 - 2 Maintenance Foremen
 - 2 Highway Foremen
 - 1 Night Shift Highway Foreman
 - 8 Plaza Supervisors
 - 8 Electrical Technicians

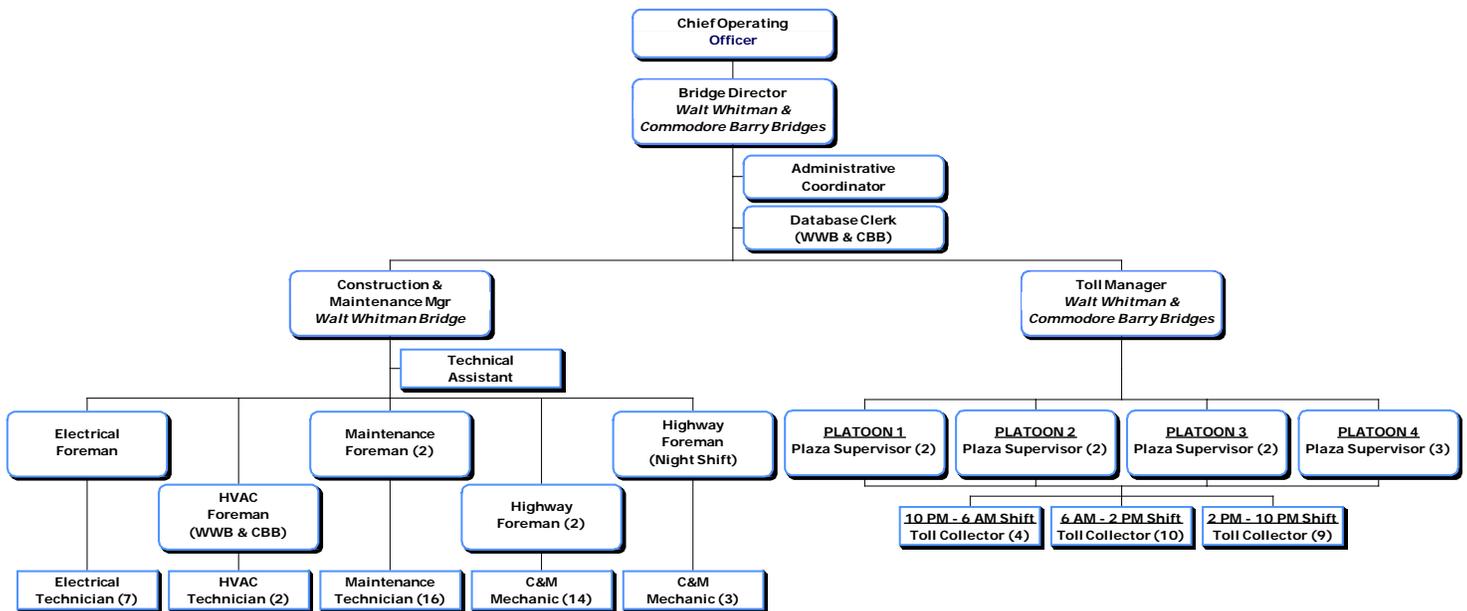
- 3 HVAC Technicians
 - 13 Maintenance Technicians
 - 13 Construction & Maintenance Mechanics
 - 20 Toll Collectors
 - 3 Revenue Operations Clerks
 - 1 Technical Assistant
 - 1 Administrative Coordinator
- Total traffic volume for 2016 on the Ben Franklin Bridge is reported at 17,154,553 vehicle trips.

Walt Whitman Bridge

The Walt Whitman Bridge is the busiest of the four DRPA bridges.

- The organizational structure of the Walt Whitman Bridge is depicted in the organization chart below.

Walt Whitman Bridge Organization Structure



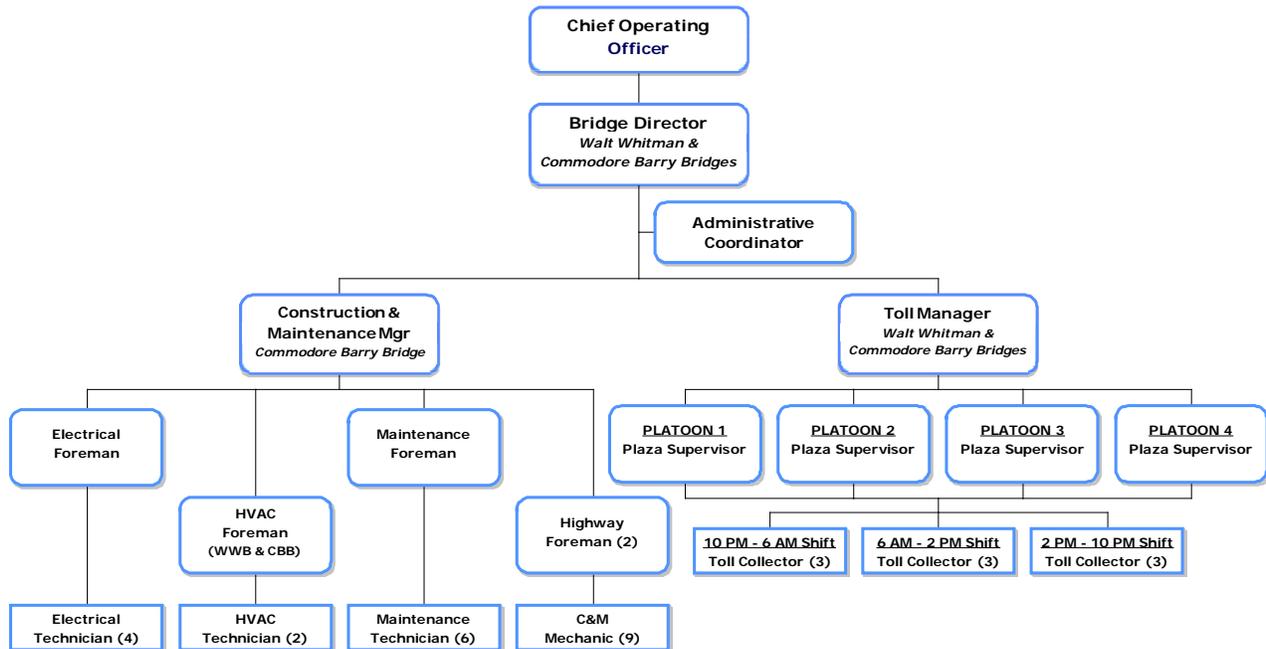
- The following bridge information is provided on the DRPA website.
 - The Walt Whitman Bridge connects Philadelphia to Gloucester City, New Jersey.
 - Construction on the bridge began in August or 1953 and opened to traffic on May 6, 1957.
 - The initial investment in the bridge was \$39.3 million.
 - The travel width, measured from curb to curb, is 79 feet and there are seven traffic lanes.
 - The length of the bridge is 11,981 feet from abutment to abutment.
 - The bridge provides vehicular lanes only on an asphalt roadway surface.

- Total authorized staffing assigned includes:
 - 1 Bridge Director (shared with the Commodore Barry Bridge)
 - 1 Construction & Maintenance Manager
 - 1 Toll Manager (shared with the Commodore Barry Bridge)
 - 1 Electrical Foreman
 - 1 HVAC Foreman (shared with the Commodore Barry Bridge)
 - 2 Maintenance Foremen
 - 2 Highway Foremen
 - 1 Night Shift Highway Foreman
 - 9 Plaza Supervisors
 - 7 Electrical Technicians
 - 2 HVAC Technicians
 - 16 Maintenance Technicians
 - 17 Construction & Maintenance Mechanics
 - 23 Toll Collectors
 - 1 Administrative Coordinator
 - 1 Database Clerk (Shared with the Commodore Barry Bridge)
 - 1 Constructions & Maintenance Technical Assistant
- Total traffic volume for 2016 on the Walt Whitman Bridge is reported at 19,256,558 vehicle trips.

Commodore Barry Bridge

- The organizational structure of the Commodore Barry Bridge is shown in the chart on the following page.
- The Commodore Barry Bridge is the southernmost most of the DRPA's toll bridges.

Commodore Barry Bridge Organization Structure



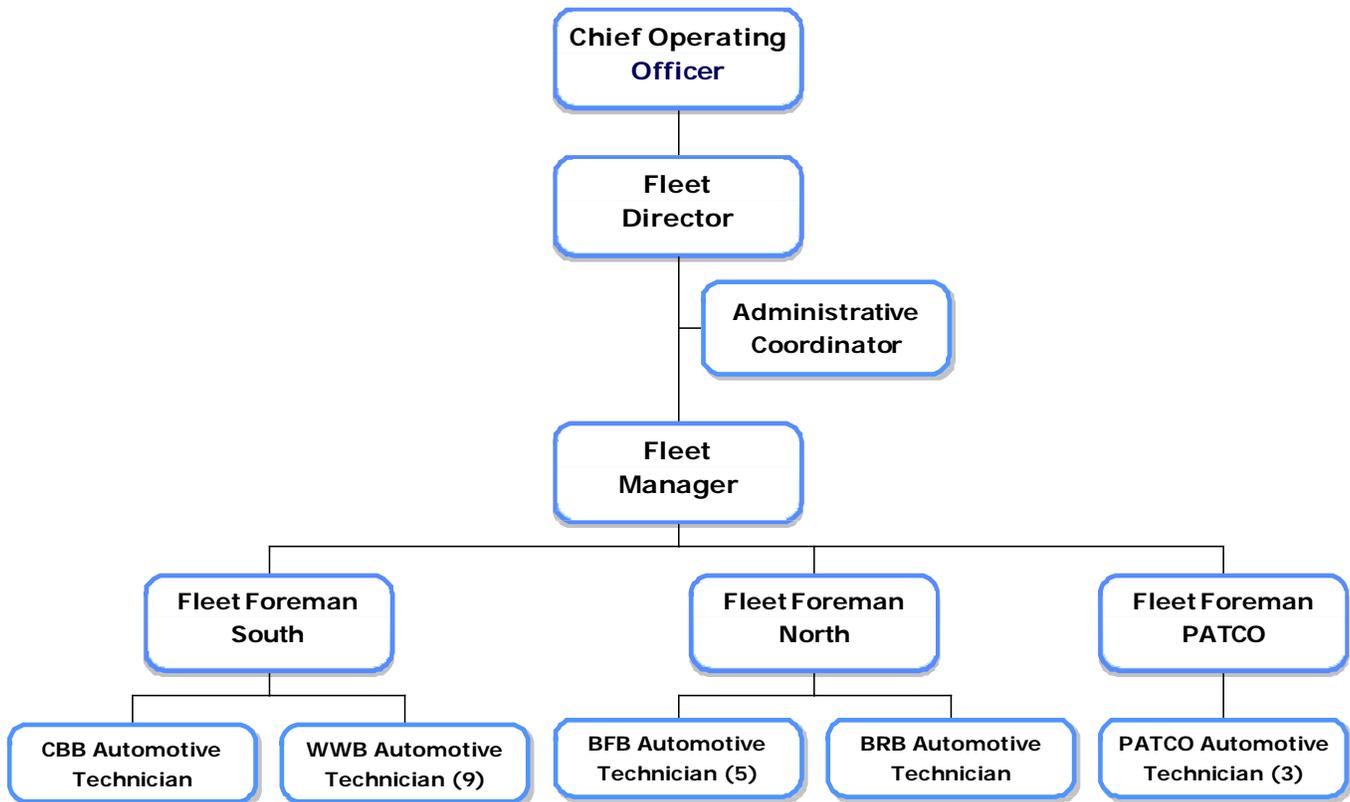
- The following bridge information is provided on the DRPA website.
 - The Commodore Barry Bridge connects Chester, Pennsylvania to Bridgeport, New Jersey.
 - Construction on the bridge began on April 14, 1969 and opened to traffic on February 1, 1974.
 - The initial investment in the bridge totaled \$126.7 million
 - The travel width, measured from curb to curb, is 60 feet and there are five traffic lanes.
 - The length of the bridge is 8,485 feet from abutment to abutment.
 - The bridge provides vehicular lanes only on a concrete roadway surface.
- Total authorized staffing assigned includes:
 - 1 Bridge Director (shared with the Walt Whitman Bridge)
 - 1 Construction & Maintenance Manager
 - 1 Toll Manager (shared with the Walt Whitman Bridge)
 - 1 Electrical Foreman
 - 1 HVAC Foreman (shared with the Walt Whitman Bridge)
 - 1 Maintenance Foreman
 - 2 Highway Foremen
 - 4 Plaza Supervisors
 - 4 Electrical Technicians
 - 2 HVAC Technicians
 - 6 Maintenance Technicians

- 9 Construction & Maintenance Mechanics
- 9 Toll Collectors
- 1 Administrative Coordinator
- Total traffic volume for 2016 is reported at 6,657,301 vehicles

Fleet Services

- Fleet Services is responsible for the maintenance and repair of all vehicles and equipment owned and operated by the DRPA and PATCO.
- The current organizational structure of Fleet Services is depicted in the chart on the next page.

Fleet Services Organization Structure



- The scope of the vehicle fleet and equipment inventory managed and maintained by Fleet Services is sizeable and varied.

- 1 Aerial Platform
- 10 Arrow Boards
- 25 Traffic Attenuators
- 1 Attenuator Truck
- 4 Backhoes
- 6 Bucket Trucks
- 3 Cement Mixers
- 1 Chipper
- 7 Compressors
- 5 Cone Trucks
- 1 Controls Truck
- 1 Crain
- 8 Crew Cab Trucks
- 1 Ditch Witch
- 35 Dump Trucks
- 5 Flusher Trucks
- 7 Forklifts
- 4 JLG Lifts
- 4 Lite Towers
- 14 Loaders
- 1 Mortar Mixer
- 1 Utility Body Truck
- 38 Police Patrol Vehicles
- 80 Pickup Trucks
- 1 Flatbed Truck
- 3 Platform Trucks
- 20 Staff / Pool Vehicles
- 2 Roller Trailer
- 2 Scissor Lift
- 1 Scrubber
- 2 Sewer Jets
- 4 Bobcats
- 5 Stakebody Trucks
- 5 Sweepers
- 3 Tar Pots
- 1 Tow Truck
- 17 Tractors
- 25 Trailers
- 9 Public Safety Trucks / SUV
- 3 Utility Body Trucks
- 1 Vactor Truck
- 11 Vans
- 14 VMS Signs and trailers
- 1 Welder

- Authorized staffing for Fleet Services includes:
 - 1 Fleet Director
 - 1 Fleet Manager
 - 3 Fleet Foremen
 - 19 Automotive Technicians
- The fleet management north crew is primarily an automotive shop, located at the Ben Franklin Bridge and is responsible for the management of police vehicles, administrative sedans and other light vehicles and trucks.
- The fleet management south crew is primarily a heavy equipment shop, located at the Walt Whitman Bridge and responsible for the management of construction equipment, tractors, large trucks.
- Fleet Services is in the process of assuming responsibility for the management of the PATCO vehicle and equipment inventory, exclusive of rail cars.

APPENDIX D: CITIZEN'S ADVISORY COMMITTEE INPUT

DRPA CITIZEN'S ADVISORY COMMITTEE INPUT

DRPA Board Resolution 10-093 established a Citizen's Advisory Committee (CAC) of not more than 20 members, with membership equally divided among residents of New Jersey and Pennsylvania. The role of the CAC is to provide an independent customer perspective to the Board on topics of current concern.

Approach

The Azimuth Group's audit project manager, along with the Acting Inspector General, attended the April 12, 2017 CAC meeting to update the members to invite their comments and suggestions on improvements to Operations services. Using the "plus/delta" focus group technique, CAC members were asked to describe those aspects of Operations that they felt were the most positive aspects of the Bridge Operations services and activities ("pluses") and then to list those aspects of Operations and its services they felt could benefit from positive change ("deltas"). They were then asked to list and rank order specific suggestions for improvement.

Summary of Results

The overall results of the CAC input process are summarized below.

CAC members identified a relatively small number of "pluses":

- The availability of discounts for frequent users and senior citizens.
- The ability to adjust the number of lanes to account for peak demand capacity needs.
- The attractiveness and community pride associated with the iconic Ben Franklin Bridge.
- The lack of disruption of traffic flow due to shipping traffic on the river (i.e. no bascule or drawbridges.)
- The efficiency of the staff's snow removal efforts.

They had numerous suggestions for improvements, generally addressing:

- Minimization of traffic congestion.
- Improvement of the amount of information made available to the commuting public through expanded and enhanced signage and/or technology applications.
- Provision of multiple alternative forms of toll payment including cash, E-ZPass, credit card and smartphones.
- Expanding pedestrian access on the Ben Franklin Bridge.

The top improvement suggestions, as ranked by the CAC members, included:

Using the “plus/delta” focus group technique, CAC members were asked to describe those aspects of Operations that they felt were the most positive aspects of the Bridge Operations services and activities (“pluses”) and then to list those aspects of Operations and its services they felt could benefit from positive change (“deltas”). They were then asked to list and rank order specific suggestions for improvement.

3. Treat personal passenger vehicles with high gross vehicle weight as cars and not commercial vehicles.
4. Provide an “express” E-ZPass lane – one that does not include a gate – to reduce congestion (tie).
3. Provide signage of E-ZPass lane status well in advance of the toll gates to allow drivers to get in the proper lanes (tie).
5. Open pedestrian access on the Ben Franklin Bridge to 24 x 7 availability (tie).
6. Improve access to major highways from both the Ben Franklin and Walt Whitman bridges.
7. Concentrate the E-ZPass lanes to be adjacent to one another, rather than intermixed with cash lanes (tie).
4. Improve the catwalk on the north side of the Ben Franklin Bridge (tie).
5. Limit traffic lane closures when there is no construction/maintenance work underway. Turn off the “red X” signage (3).
6. Improve both informational signage and technology to push information on lane closures, traffic conditions, alternative routing to customers (tie).
7. Streamline the sign-up process for senior citizen E-ZPass accounts and provide for multi-year account validity (tie).
6. Accept multiple alternative forms of payment - cash, credit, smartphone, etc. - in all lanes (tie).
6. Develop an E-ZPass toll account application for smartphones (tie).
6. Improve traffic signal synchronization between the Ben Franklin Bridge and the City of Philadelphia (tie).

The complete listing of “pluses” and “deltas” cited by the CAC members, along with the voting tallies of the improvement opportunities, is shown in the table below.

+ (What's working well?)	▲ (What would benefit from change?)
<ul style="list-style-type: none"> + The availability of frequent driver toll discounts + The availability of senior citizen toll discounts + The “zipper truck” to adjust lanes for peak traffic volumes + The “iconic” nature of the bridges + Lighting on the Ben Franklin Bridge + No bridges have to open up to allow river traffic to pass + Snow removal on the bridges is very fast and thorough 	<ul style="list-style-type: none"> ▲ Treat personal passenger vehicles with high gross vehicle weight as cars and not commercial vehicles (6) ▲ Provide an “express” E-ZPass lane – one that does not include a gate – to reduce congestion (5) ▲ Provide signage of E-ZPass lane status well in advance of the toll gates to allow drivers to get in the proper lanes (5) ▲ Open pedestrian access on the Ben Franklin Bridge to 24 x 7 availability (5) ▲ Improve access to major highways from both the Ben Franklin and Walt Whitman bridges (4) ▲ Concentrate the E-ZPass lanes to be adjacent to one another, rather than intermixed with cash lanes (3) ▲ Improve the catwalk on the north side of the Ben Franklin Bridge (3) ▲ Limit traffic lane closures when there is no construction/ maintenance work underway. Turn off the “red X” signage (3) ▲ Improve both informational signage and technology to push information on lane closures, traffic conditions, alternative routing to customers (3) ▲ Streamline the sign-up process for senior citizen E-ZPass accounts and provide for multi-year account validity (2) ▲ Accept multiple alternative forms of payment - cash, credit, smartphone, etc. - in all lanes (2) ▲ Develop an E-ZPass toll account application for smartphones (2) ▲ Improve traffic signal synchronization between the Ben Franklin Bridge and the City of Philadelphia (2) ▲ Convert to multi-mode toll lanes (1) ▲ Move towards cashless collection technology, but provide at least one staffed lane (1)

<p>+</p> <p>(What's working well?)</p>	<p>▲</p> <p>(What would benefit from change?)</p>
	<ul style="list-style-type: none">▲ Build an online dashboard showing open lanes on each bridge▲ Eliminate barbed wire from all DRPA properties

APPENDIX E: INTERNAL SUPPORT SERVICES SURVEY RESULTS

INTERNAL SUPPORT SERVICES SURVEY RESULTS

The efficiency and effectiveness of Bridge Operations service delivery are dependent in many respects on the performance of certain shared support services provided by other DRPA departments. As part of the management audit plan, the AGI team designed and administered an online survey to members of the Bridge Operations management and supervisory team to assess the degree of their satisfaction with the level of support services provided and to provide an opportunity for constructive feedback to the service providers.

The specific support service providers included within the scope of the survey include:

- Benefits Administration.
- Contract Administration.
- Finance.
- General Counsel.
- Human Resources.
- Information Systems.
- Purchasing.

The detailed response data from the survey has been provided under separate cover.

Response Profile

The Internal Support Satisfaction Survey was distributed to 71 Bridge Operations managers, supervisors and administrative support staff members. Of those employees, 54 returned a survey, for a 75% return rate and 49 completed the survey for an effective response rate of 69%. The distribution of those 54 respondents by department is illustrated in the chart on the following page, as follows:

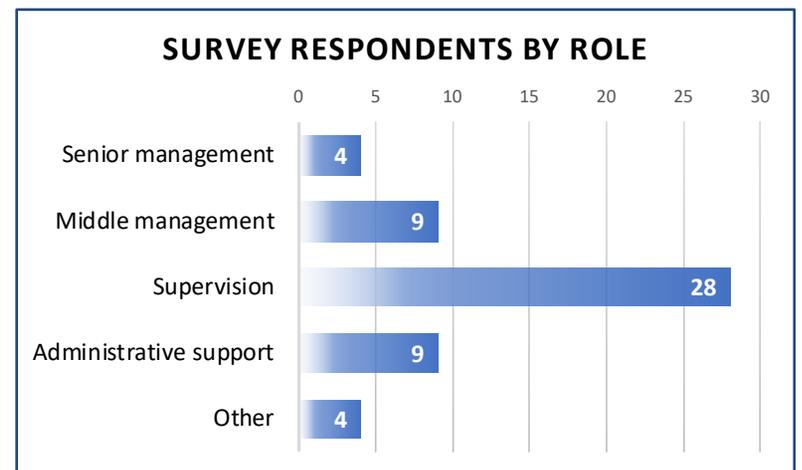
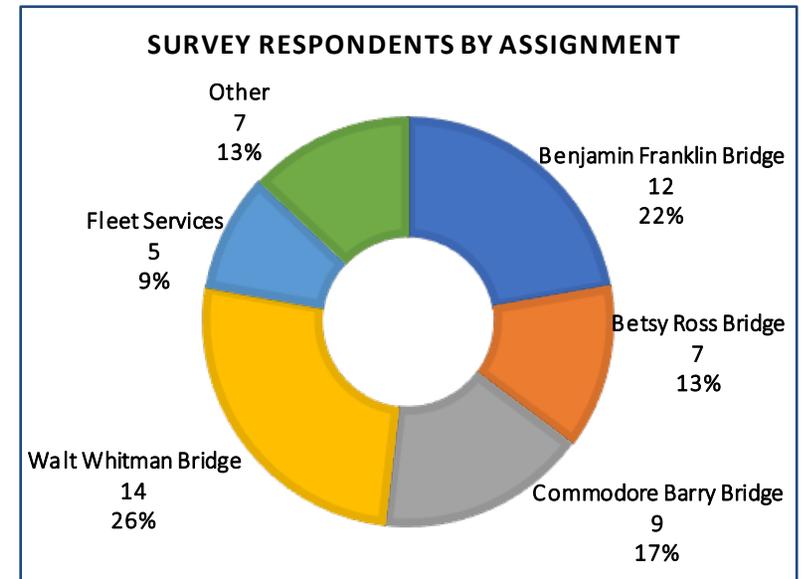
- 14 were from the Walt Whitman Bridge.
- 12 were from the Ben Franklin Bridge.
- 9 were from the Commodore Barry Bridge.
- 7 were from the Betsy Ross Bridge.
- 5 were from Fleet Services.
- 7 selected “Other.”

Respondents were then asked to classify their role within Bridge Operations. Of those:

- 4 were senior managers at the Chief or Director levels.
- 9 were middle managers at the Manager level.
- 28 were in supervision at the Foreman or Plaza Supervisor level.
- 4 selected “Other.”

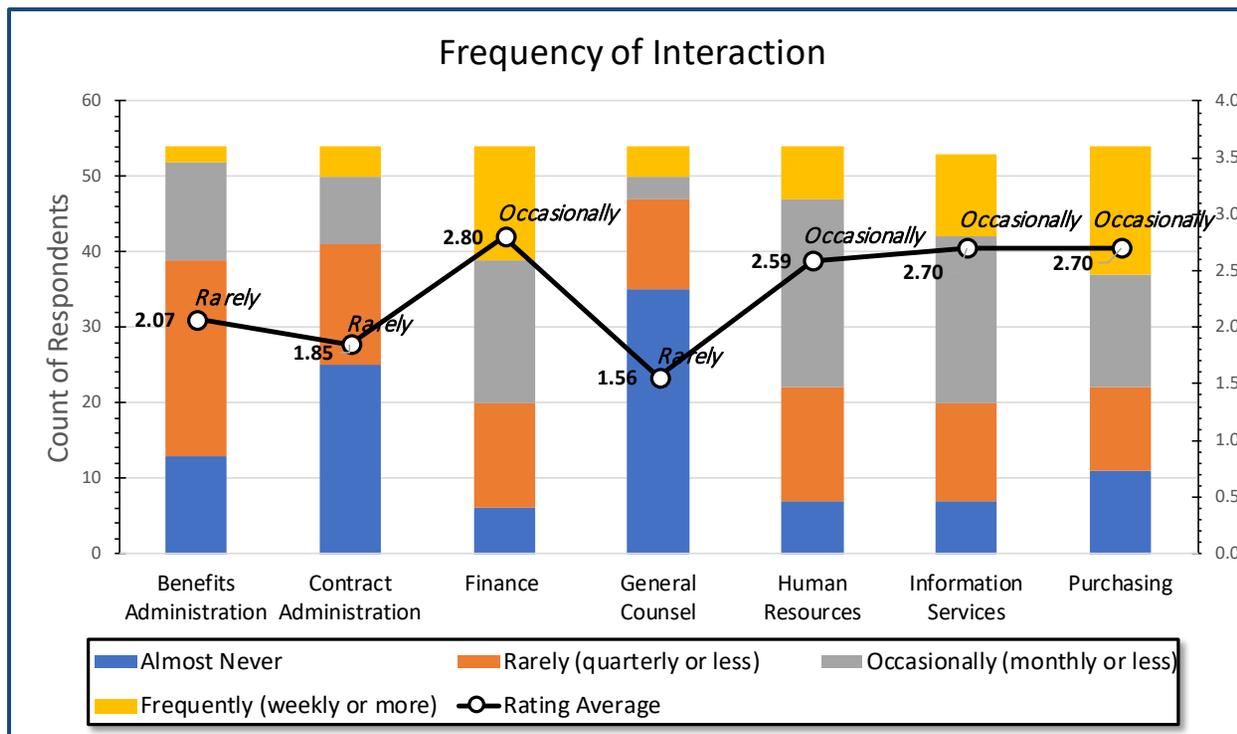
Frequency of Interaction with Internal Support Services

Those participating in the survey were asked to choose their frequency of interaction with the internal support organizations (Finance, Purchasing, Human Resources, Contract Administration, Information Systems, General Counsel, and Benefits Administration) on a four-point scale, listed below:



- 1 – Almost Never
- 2 – Rarely (Quarterly or less)
- 3 – Occasionally (Monthly or less)
- 4 – Frequently (Weekly or more)

The graphic on the below presents the reported frequency of contact and shows that many of the respondents have infrequent need to interact with most of these service providers directly.



- **Benefits Administration**, with a frequency rating average of 2.07 indicates those that the typical survey participant will only “Rarely” have a need to interact or work with this service provider. directly.

- **Contract Administration**, shows a frequency rating average of 1.85, which scores as “Rarely.” 25 of the 54 respondents who answered this item have need to interact with Benefits “Almost Never.”
- **Finance**, had the highest interaction rating at 2.80 indicating that the typical Bridge Operations manager, supervisor or administrative staff member will interact with Finance only “Occasionally.” Finance showed the lowest number of “Almost Never” responses, with only six of the 54 responses, or 11%, indicating such infrequent contact.
- **General Counsel**, received an interaction rating average of 1.56 or “Rarely” and only slightly above “Almost Never.” This service provider had the largest proportion of “Almost Never” reported interactions, with 35 of the 54 respondents, or 65%, have virtually no need to contact the General Counsel staff.
- **Human Resources**, received interaction rating average of 2.56 or “Occasionally.” Just under 60% of the respondents report either occasional or frequent contact with this department.
- **Information Services**, shows an “Occasionally” interaction result, with a rating average of 2.7 and 62% of the survey respondents reporting that they interact with IS either Occasionally or Frequently.
- **Purchasing** was rated at an average of 2.7, indicating that survey respondents, on average, interact with this department “Occasionally.” However, Purchasing received the largest number of “Frequently” interaction responses, with 31% of the survey respondents that level of regular interaction.

These results show that the majority of Bridge Operations managers and administrators level of interaction with the various internal support services can best be described as occurring “Occasionally” or less. Not surprisingly, the most interaction occurs with the Finance, Information Services, Purchasing and Human Resources units, while the least frequent interaction is with the office of the General Counsel, followed by Contract Administration and Benefits Administration.

Departmental Evaluation

For each of the shared support functions included in the survey, the respondent results and a selected sample of narrative comments are provided. For each survey item, a series of statements descriptive of the range of services provided by the service provider afforded respondents an opportunity to indicate their level of satisfaction with the services on a six-point scale:

- 1 - Very Dissatisfied.
- 2 - Dissatisfied.
- 3 - Somewhat Dissatisfied.

4 - Somewhat Satisfied.

5 - Satisfied.

6 - Very Satisfied.

Additionally, respondents could indicate that an item was “Not Applicable / No Opinion” and were also given an option to provide free-form responses to clarify the basis of their evaluations. In computing the average satisfaction scores on each item, only the respondents that expressed an opinion are included in the calculations.

Benefits Administration

The results of the following four areas of Benefits Administration services are summarized in the chart appearing at the top of the following page.

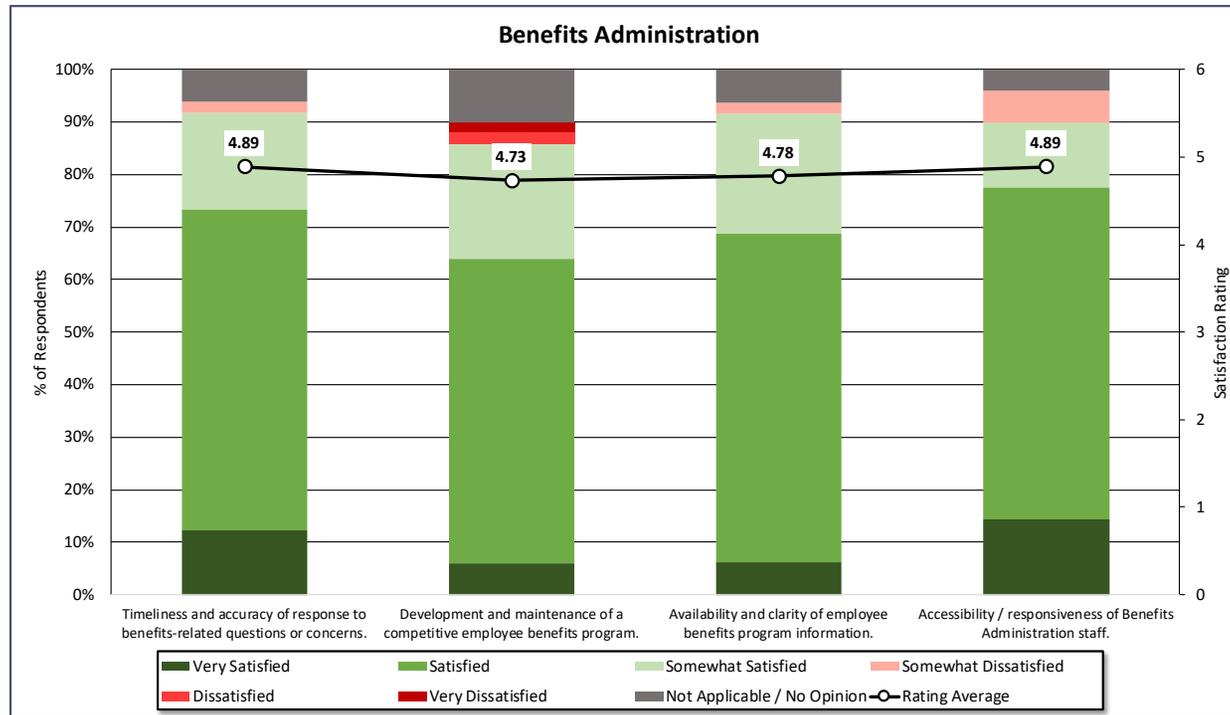
- **Timeliness and accuracy of response to benefits-related questions or concerns** scored an average satisfaction rating of 4.89 or “Satisfied”.
- **Development and maintenance of a competitive employee benefits program** earned a rating average of 4.73 or “Satisfied”.
- **Availability and clarity of employee benefits program information** shows an average satisfaction score of 4.78 or “Satisfied”.
- **Accessibility / responsiveness of Benefits Administration staff** earned a rating average of 4.89 or “Satisfied”

Only three narrative comments were received from survey responses related to Benefits Administration and these include the following:

“I am new to management and have not yet started benefits with the DRPA as opposed to union benefits.”

“Who works in this department now?”

“Certain employees do a good job. Others are useless.”

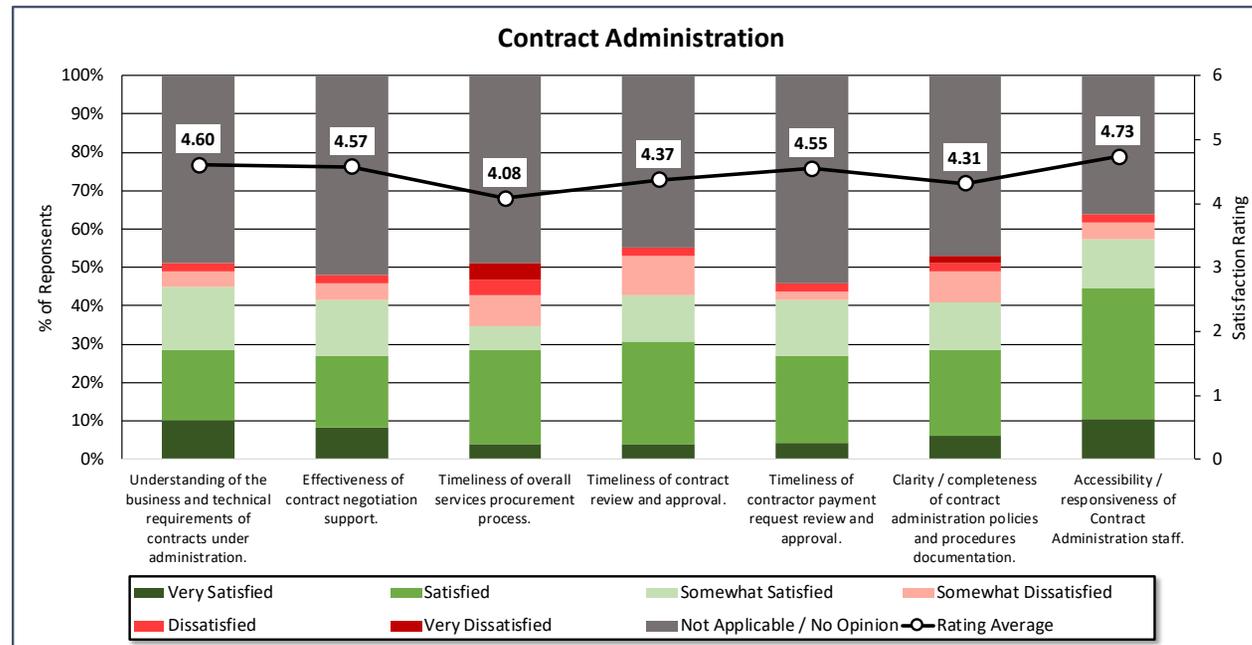


These results indicate that most Bridge Operations management and administrative personnel working with the Benefits Administration team are, in the main, satisfied with the services and support provided.

Contract Administration

The level of satisfaction reported on the following seven Contract Administration items are summarized below and in the chart on the following page.

- **Understanding of the business and technical requirements of contracts under administration** earned an average satisfaction rating of 4.60 or a favorable “Satisfied”.



- **Effectiveness of contract negotiation support** shows an average rating of 4.57 or **“Satisfied”**.
- **Timeliness of the overall service procurement process (from RFP creation to contract award)** was evaluated at a satisfaction rating average of 4.08, or **“Somewhat Satisfied.”**
- **Timeliness of contract review and approval** scored a 4.37 average satisfaction rating or **“Somewhat Satisfied”**.
- **Timeliness of contractor payment request review and approval** earned a 4.55 rating average score or **“Satisfied”**.
- **Clarity / completeness of contract administration policies and procedures documentation** shows a 4.31 satisfaction rating result or **“Somewhat Satisfied”**.
- **Accessibility / responsiveness of Contract Administration staff** earned the highest average satisfaction rating for this department, at 4.73 or **“Satisfied”**.

Note that for Contract Administration the level of “Not Applicable / No Opinion” was quite high, ranging between 36% and 52% (17 to 25 respondents) of the total responses on these items. This indicates that a comparatively small number of Bridge Operations have direct contact with this service area. This is validated by the “Frequency of Interaction” responses previously described, which indicate that that Bridge Operations survey participants “Rarely” interact with Contract Administration.

Three narrative responses regarding Contract Administration were provided as follows:

“It's ok when a repeated process such as a new contract for an existing expired contract. But slow and delayed when a new venture. Contract Admin is not effective in generating a new RFP or new contract from scratch.”

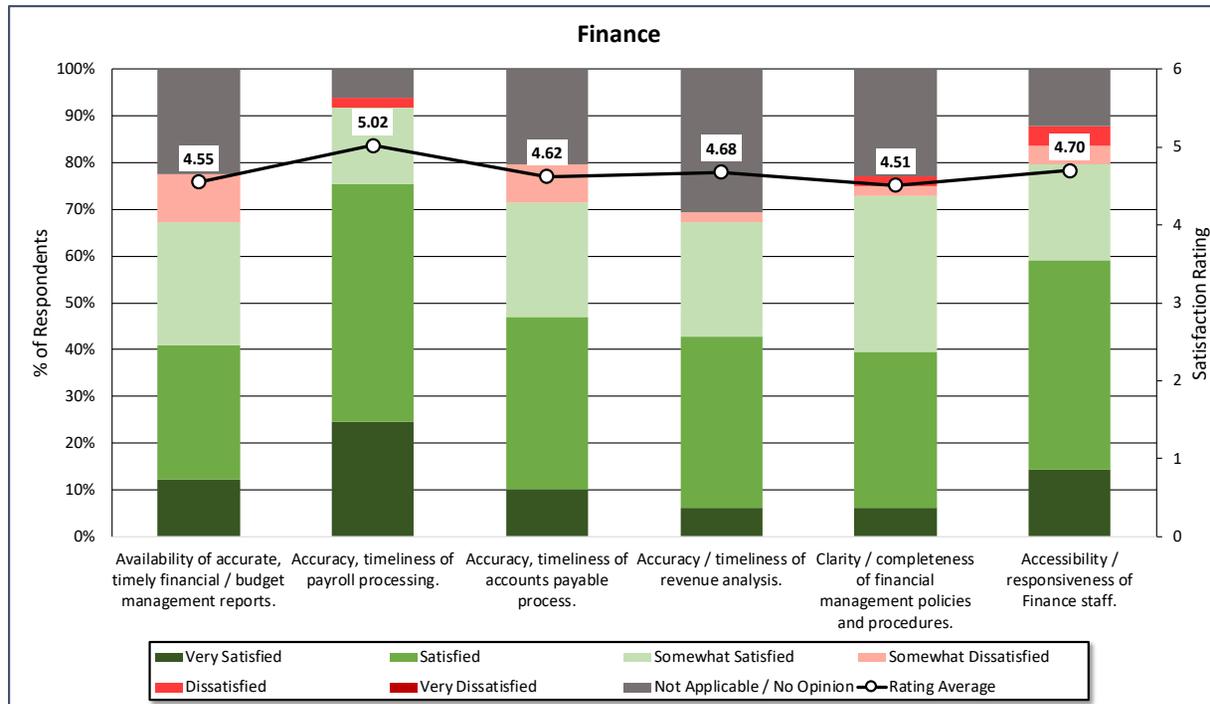
“The process [for contract review and approval] takes too long.”

“[Contract administration policies and procedures documentation is] not clear and concise.”

These results indicate that, on balance, those members of the Bridge Operations management and administrative staff who have occasion to work with Contract Administration are mildly pleased with the services received, with satisfaction levels hovering between “Somewhat Satisfied” and “Satisfied.”

Finance

Respondents were asked to indicate their level of satisfaction with the services received from the DRPA Finance Department in six separate categories, the results of which are summarized and depicted graphically below.



- **Availability of accurate, timely financial/budget management reports** shows an average satisfaction rating of 4.55 or **“Satisfied”**.
- **Accuracy/Timeliness of payroll processing** reflects an evaluation level of **“Satisfied”** with the highest average rating for this department of 5.20.
- **Accuracy/Timeliness of accounts payable process** shows an average rating of 4.62 or **“Satisfied”**.
- **Accuracy/Timeliness of revenue analysis** with an average rating of 4.68 reflects a **“Satisfied”** response.
- **Clarity/Completeness of financial management policies and procedures** scored an average rating of 4.51 or **“Satisfied”**.

- **Accessibility/Responsiveness of Finance staff** with an average satisfaction rating of 4.70, indicates an overall “Satisfied” result on this aspect of Finance services.

A representative selection of the narrative responses to the open-ended items in this survey section include:

“When one of our employees has a problem with their paycheck, we contact the person in payroll at times it seems as an imposition. In order to better serve our employees on contact person should be assigned the responsibility of responding in an appropriate manner when questions regarding payroll are left via voicemail or email.”

“Issue with payroll and failure to communicate in advance with action that impact employee pay – i.e. the IUOE retro payments.”

“Not clear how to get budget reports and Finance no longer provides expenditure reports.”

“Need training on reporting.”

“Every year the payments that are due to AFLAC are not sent in a timely fashion. Either AFLAC is being untruthful and sending letters requiring payment, or the DRPA is late in sending the payment out to them. Regardless communication is very important and something that needs to improve at the DRPA.”

“I changed my direct deposit on a Tuesday and by Friday the change was made.”

“We do not receive revenue analyses from Finance although we get daily traffic reports which were started by Bridge Ops and taken over by Finance.”

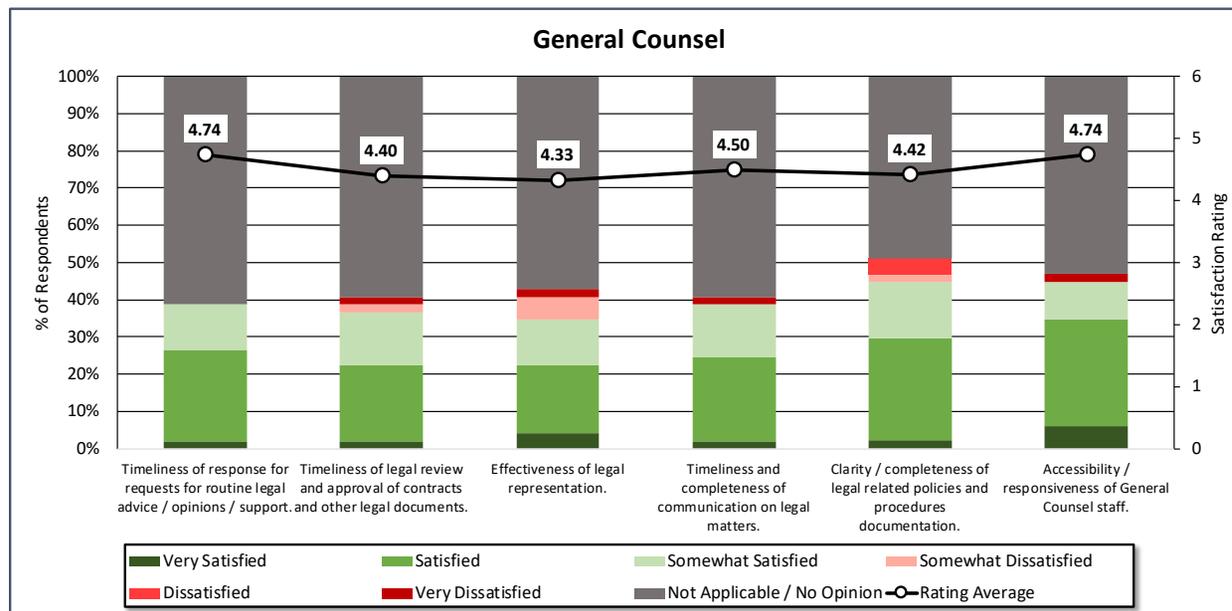
“Do not know how to run reports in ERP. Finance staff also not sure of some ERP procedures, workflow aspects and outcomes.”

“I have never called Finance and actually had someone answer the call. Always voicemail.”

Finance received across-the-board “Satisfied” levels of response for the services they deliver to Bridge Operations. However, some of the above-quoted narrative response may provide evidence of what areas could be improved to move these scores even higher. Respondents have concerns about the level of responsiveness / helpfulness they sometimes experience when working with Finance staff and are also frustrated with a range of issues related to the ERP implementation.

General Counsel

Six categories summarizing the key services of the office of the General Counsel were included in the satisfaction survey. The results obtained are summarized in both graphical and narrative form below.



- **Timeliness of response for requests for routine legal advice / opinions / support** scored an average rating of 4.74 or **“Satisfied”**.
- **Timeliness of legal review and approval of contracts and other legal documents** earned an average rating of 4.405 or **“Somewhat Satisfied”**.
- **Effectiveness of legal representation (disciplinary matters, litigation support, contract negotiation, etc.)** shows an average rating of 4.33 or **“Somewhat Satisfied”**.
- **Timeliness and completeness of communication on legal matters (case status, regulatory changes, pending legislation, policy revisions, etc.)** scored an average rating of 4.50 or **“Somewhat Satisfied”**.

- **Clarity / completeness of legal related policies and procedures documentation** earned the second highest average rating of 4.42 or “**Somewhat Satisfied**” for this category.
- **Accessibility / responsiveness of General Counsel staff** scored the highest average rating 4.74 or “**Satisfied**”.

As with Contract Administration, the General Counsel related responses include a very high level of “Not Applicable / No Opinion” responses, with these response accounting for approximately 50%-60% of the total number of responses obtained on these six items. Similarly, survey respondents reported the lowest level of interaction frequency for this office, with 35 of 54 respondents (65%) reporting that they have virtually no regular contact with this office.

Only three narrative replies to the open-ended survey items were provided for this office, as follows:

“Long turnaround time [for contract and other legal documents]”

“Depending on the document, the review process can be very timely (sic) and result in a delay in services.”

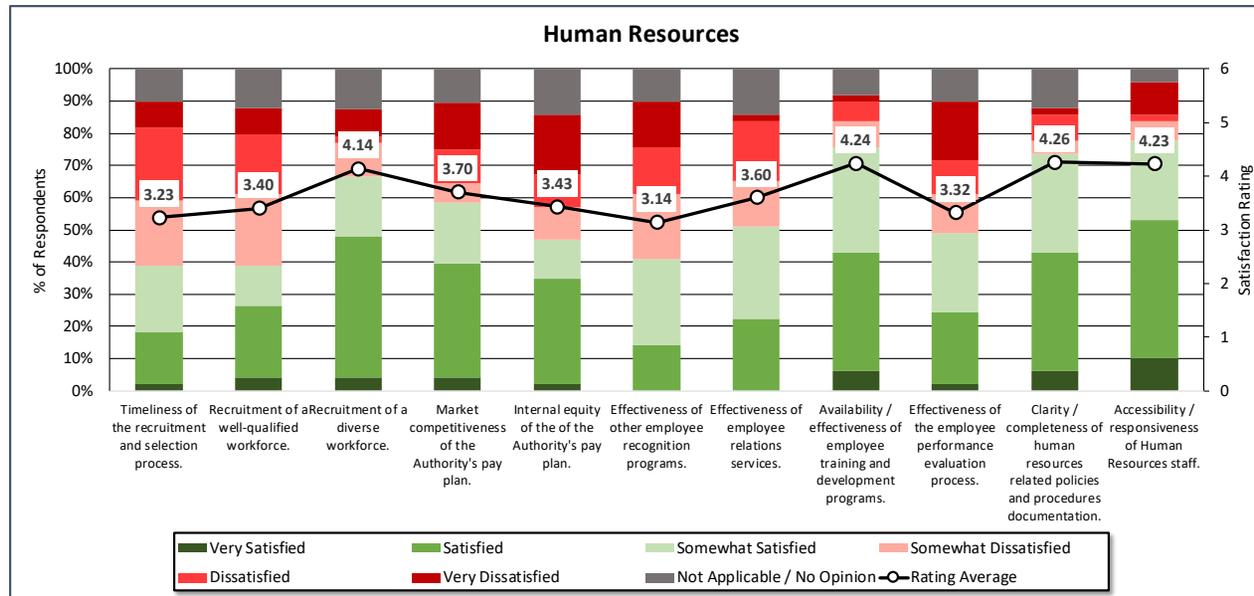
“There are no communications. Very, very poor communications out of Legal as to such matters [as case status, regulatory changes, pending litigation, policy changes, etc.]”

Bridge Operations managers and supervisors who provided satisfaction ratings for the General Counsel indicate that they are “Somewhat Satisfied” to “Satisfied” with the legal support they receive.

Human Resources

Satisfaction levels with Human Resources services and support were evaluated against 11 categories as shown below.

- **Timeliness of the recruitment and selection process** (including both new hires and promotional processes) produced a average satisfaction rating of 3.23, indicating “**Somewhat Dissatisfied**”.
- **Recruitment of a well-qualified workforce**, scored a 3.40 satisfaction rating average indicating Bridge Operations respondents are “**Somewhat Dissatisfied**” in this area.
- **Recruitment of a diverse workforce** earned an average satisfaction rating of 4.14 or “**Somewhat Satisfied**”.
- **Market competitiveness of the Authority's pay plan** received an average satisfaction rating of 3.70 or “**Somewhat Satisfied**”.
- **Internal equity of the Authority's pay plan** with an average rating of 3.43 or “**Somewhat Dissatisfied**”.



- **Effectiveness of other employee recognition programs** (longevity, service awards, etc.) earned a satisfaction rating average of 3.14 or **“Somewhat Dissatisfied”**. This item received the lowest satisfaction score of the 11 items surveyed for this service area.
- **Effectiveness of employee relations services** (disciplinary actions, grievances, etc.) shows an average satisfaction rating of 3.60 which would indicate a **“Somewhat Dissatisfied”** assessment in this area of Human Resources.
- **Availability/effectiveness of employee training and development programs** saw satisfaction levels rated, on average, at 4.24 or **“Somewhat Satisfied”** which was echoed in the following comments:
- **Effectiveness of the employee performance evaluation process** earned an average satisfaction rating of 3.32 or **“Somewhat Dissatisfied”**.
- **Clarity/completeness of human resources related policies and procedures documentation** earned the highest rating in this category with an average rating of 4.26 or **“Somewhat Satisfied”**.
- **Accessibility/responsiveness of Human Resources staff** revealed an average satisfaction rating of 4.32 or **“Somewhat Satisfied”**.

The responses to these items generated a comparatively large number of narrative responses to the open-ended questions in each of the service areas. Selected excerpts from these comments are provided below.

- **Recruitment and Selection**

“Worked short-handed for 6 months waiting for a replacement.”

“Process takes too long to fill vacancies. For instance, sometimes even when a vacancy is known in advance and with a candidate list it takes a while to fill. Multiple steps and approval cycles in HR.”

“It’s who you know. Nothing is done on merit around here. Seen many people who were not deserving of a promotion get a promotion due to who they know. One of the biggest problems here at DRPA.”

“Challenge getting gender, race and geographic diversity in trades. Toll is fine.”

- **Compensation and Recognition**

“As it pertains to our department further evaluation of other Authorities should be revisited..”

“Compression is too close between workers and management.”

“The pay plan should reflect the responsibilities of the position from the start. With the current pay grade ranges most employees will never reach the top of the grade.”

“As far as I am aware the DRPA no longer recognizes longevity in any way. There was a time when they did.”

“The DRPA could do a better job with employee recognition programs.”

- **Employee Relations**

“Too many slaps on the wrist.”

“No assistance from HR. Operations handles within. HR just seeks documentation.”

- **Training and Development**

“They do offer enough classes.”

“Getting better with more offerings.”

“Due to the nature of our 24-hour business, some departments may not receive the necessary trainings need to enhance their potential for further growth within the authority.”

- **Performance Evaluation**

“The evaluation process is standard. Since our employees are union workers regardless of what is said on the yearly performance review a raise is mandatory due to the union contract. Although you are able to address issues as they arise, sometimes money is the only way to reach certain individuals.”

“The process is very subjective. Even though there are evaluation guidelines every evaluator rates his or her employees a little different. Some evaluators consistently rate high and some consistently rate low. How can these evaluations be effective and fair? A more effective and fair evaluation may be as simple as rating an employee satisfaction or un-satisfaction with an explanation when marked un-satisfaction.”

- **Policies and Procedures**

“Anything new Human Resources makes sure you know about it.”

- **Accessibility of Human Resources Staff**

“Most phone calls placed to HR you get voicemail. No one answers their phone in HR for the most part.”

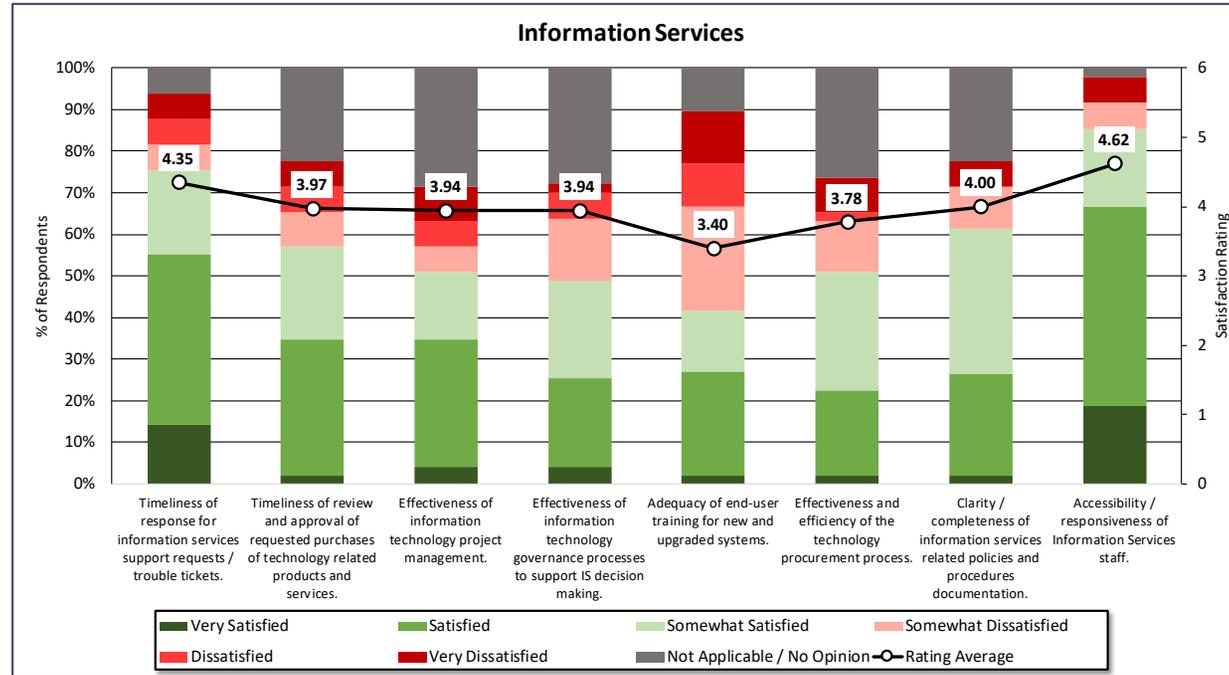
“Do not get prompt responses and sometimes no response to inquiries or needs.”

For Human Resources, the satisfaction ratings hover between the “Somewhat Satisfied” and “Somewhat Dissatisfied” levels. Though “lukewarm,” the reported satisfaction levels are highest in the areas of recruitment diversity, market competitiveness of the compensation program, employee relations, training and development, policies and procedures documentation and the accessibility of the Human Resources staff. Areas of concern include the timeliness of the recruitment process, the quality of candidate qualifications, the absence of non-compensation employee recognition programs and the effectiveness of the performance appraisal process. Responses to the open-ended items tend to reinforce these observations.

Information Services

The results obtained by Bridge Operations survey participants of eight items related to the delivery of technology-related support to the organization are summarized in this section of the report. A graphical presentation of these results is found at the top of the following page.

- **Timeliness of response for information services support requests / trouble tickets** scored a satisfaction rating average of 4.35 or **“Somewhat Satisfied”**.
- **Timeliness of review and approval of requested purchases of technology-related products and services** scored at 3.97, indicates a satisfaction rating of **“Somewhat Satisfied”**.
- **Effectiveness of information technology project management** shows an average satisfaction rating of 3.94 or **“Somewhat Satisfied”**.



- **Effectiveness of information technology governance processes to support IS decision making** (priorities, funding, technology standards, etc.) also scored at the “**Somewhat Satisfied**” level with a rating average of 3.94.
- **Adequacy of end-user training for new and upgraded systems** received a “**Somewhat Dissatisfied**” average satisfaction score of 3.4, the lowest satisfaction category within the Information Systems group of survey items.
- **Effectiveness and efficiency of the technology procurement process** (requirements gathering, user involvement, vendor selection and due diligence, quality assurance, etc.) earned an average satisfaction rating of 3.78 or “**Somewhat Satisfied**”.
- **Clarity / completeness of information services related policies and procedures documentation** produced a satisfaction rating of “**Somewhat Satisfied**” with an average score of 4.0.
- **Accessibility / responsiveness of Information Services staff** was the highest rated aspect of IS service delivery, with an average satisfaction rating of 4.62 or “**Satisfied**”.

Selected responses to the open-ended items related to Information Services include:

“We are a 24 hrs. 7 days a week operation and the IS department is not available after 5 or weekends and there not a phone # to contact someone if there is a problem.”

“IS does not always follow up or send out completion for trouble tickets.”

“ERP was poor management. In general IS is not strong in project management.”

“No training.”

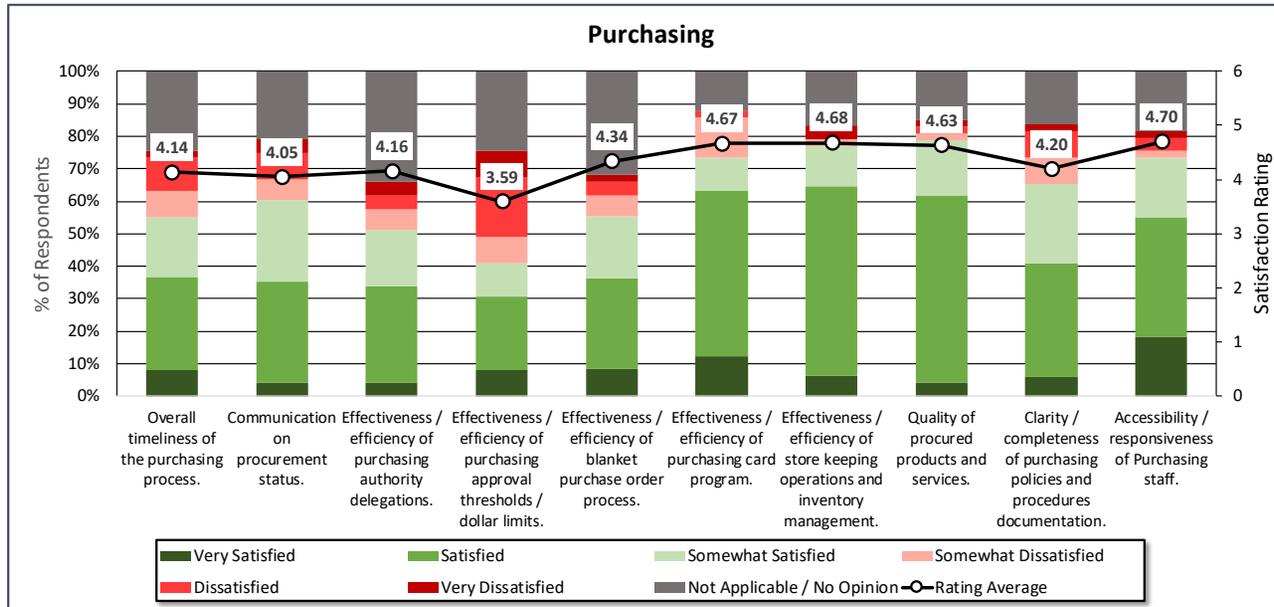
“Some staff do not get back to Operations and are not responsive or do not communicate on project mgmt level.”

Overall responses to the Information Services satisfaction survey items were concentrated in the “Somewhat Satisfied” range. While Bridge Operations respondents indicate that IS personnel are generally accessible and responsive, the adequacy of the training provided on new and upgraded systems is an area of concern.

Purchasing

Ten survey items tested the satisfaction of Bridge Operations managers and administrative staff with the service and support provided by the DRPA Purchasing organization. Results include:

- **Overall timeliness of the purchasing process** with an average satisfaction rating of 4.14 indicates that Bridge Operations respondents are “**Somewhat Satisfied**” with this aspect of Purchasing.
- **Communication on procurement status** (changes, delays, vendor concerns, etc.) shows an average satisfaction score of 4.05 indicating a “**Somewhat Satisfied**” level.
- **Effectiveness / efficiency of purchasing authority delegations** scored an average satisfaction rating of 4.16 or “**Somewhat Satisfied**” overall.
- **Effectiveness / efficiency of purchasing approval thresholds / dollar limit**, with the lowest average satisfaction rating in this category of 3.59 and in the very low range of the “**Somewhat Satisfied**” level.



- **Effectiveness / efficiency of blanket purchase order process**, earned an average satisfaction rating score of 4.34 or “**Somewhat Satisfied**”.
- **Effectiveness / efficiency of purchasing card program** shows a satisfaction rating average of 4.67 or “**Satisfied**”.
- **Effectiveness / efficiency of store keeping operations and inventory management** produced a “**Satisfied**” result with an average satisfaction rating of 4.68.
- **Quality of procured products and services** showed an average satisfaction rating of 4.63 or “**Satisfied**”.
- **Clarity / completeness of purchasing policies and procedures documentation**, earned a satisfaction rating “**Somewhat Satisfied**” at 4.20 average result on the rating scale.
- **Accessibility / responsiveness of Purchasing staff** with the highest average satisfaction rating in the Purchasing section at 4.70 or “**Satisfied**”.

A selection of narrative responses to the Purchasing items, by broad category, are presented below:

- **Purchasing Timeliness**

“Procurement process takes way too long. Multiple steps and low \$ authorization thresholds for approvals. Some projects can not be completed in single year due to long procurement process of 4 to 6 months plus product long lead. Delays projects.”

“Lack of Staffing in Purchasing slows the processing of requisitions to purchase orders.”

- **Approval Thresholds and Dollar Limits**

“Threshold and limits are too low and not efficient. Must go to Board for items over \$25,000 which delays procurements. Used to be items over \$100,000.”

The current approval thresholds are too restrictive to be efficient. The dollar limits need to be raised.”

- **Purchasing Card Program**

“Limits should be raised for Managers and Directors to expedite purchases.”

“A change is needed to allow bridge operation to use a p-card for capital purchases. All current P-card purchases are charged to the bridge operating budget.”

- **Accessibility and Communication**

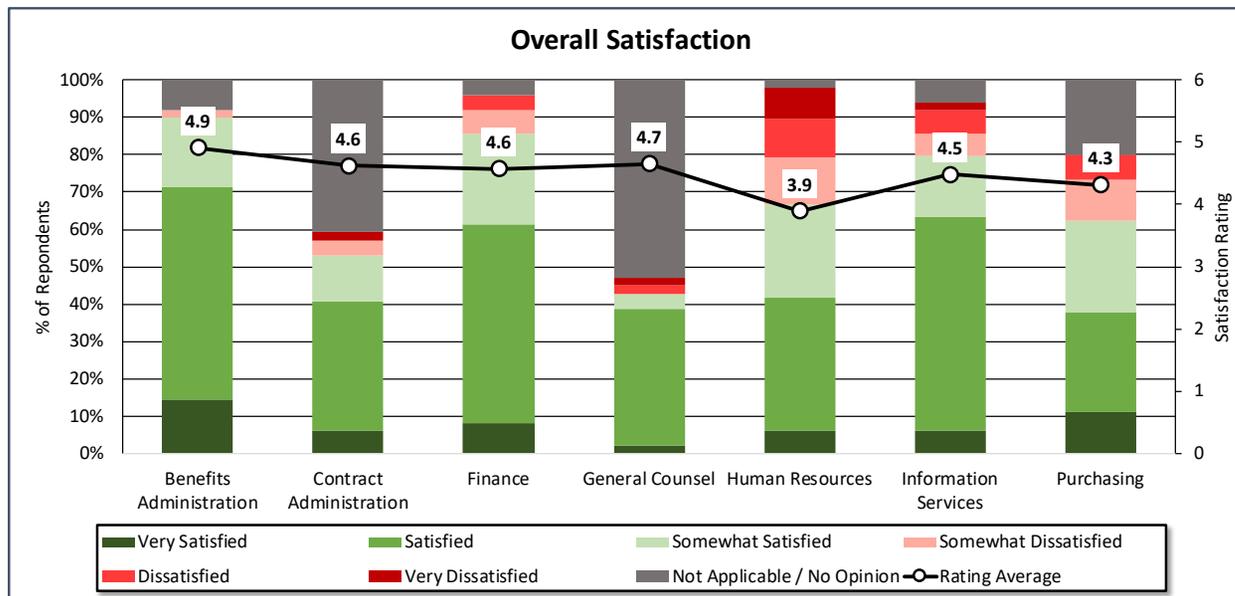
“No communications. Do not know status unless you chase down info from Purchasing Mgr or buyer which is time-consuming.”

“No consistency, the policies and procedures are always changing at all levels.”

Despite some of the challenges illustrated in the above-listed quotes, Bridge Operations leaders and administrative support staff survey responses indicate general satisfaction with the services received from the Purchasing Department. Average responses cluster in the “Somewhat Satisfied” to “Satisfied” range. Purchasing staff is seen as accessible and responsive, the purchasing card program is seen as effective and efficient and many are satisfied with the quality of the products and services procured. The most notable area of concern relates to the adequacy of the spending authority thresholds.

Overall Satisfaction by Department

At the conclusion of the survey, participants were asked to consider the entirety of their responses and provide an “overall” satisfaction rating for each service providing department. Overall satisfaction ratings are graphically depicted in the following chart and summarized below.



- **Benefits Administration** received the highest average rating score with a satisfaction rating of 4.9 or “**Satisfied**”.
- **Contract Administration** received an average satisfaction score of 4.6 or “**Satisfied**”.
- **Finance** (accounting, payroll, budget, etc.) received an average satisfaction rating of 4.6 or “**Satisfied**”.
- **General Counsel** received an average satisfaction rating of 4.7 or “**Satisfied**”.
- **Human Resources** (recruitment, selection, compensation, training, etc.), scored an average satisfaction rating with 3.9 or “**Somewhat Satisfied**”.
- **Information Services**, received an average satisfaction rating of 4.5 or just at the threshold of the “**Satisfied**” level.
- **Purchasing**, scored an average satisfaction rating of 4.3 or “**Somewhat Satisfied**”.

Narrative responses to the final open-ended question, “Please provide any additional information that may be helpful in assessing the level and quality of internal support services provided to Bridge Operations” yielded the following comments:

“For the most part the internal support for Bridge Operations is good. If it was not for the time delays due to Board requirements I would find the support to be very good.”

“Communication throughout the Authority is a necessity if Bridge Operations are going to operate as smoothly as possible. It is vital to Bridge Operations that Police Dispatch relay activity that pertains to traffic and accidents on and around the bridge to Plaza Supervisors. Consistency and transparency to all employees on all levels so everyone knows what is going on within and with the Authority.”

“The promoting process is a joke. If you have lots of experience from the outside sector working and exceed the qualifications of the job there is always something HR finds something wrong with your First Part of the Application before you can get a chance to proceed to the next step of the application process.”

“Future surveys need to consider Public Relations and Communications (external) rather than just internal support.”

Internal Support Services Satisfaction Summary

On average, the Bridge Operations leaders and support staff who participated in this survey – **and who expressed an opinion** - are “Satisfied” to “Somewhat Satisfied” by the internal support services at provided by the seven departments included in the survey. While the satisfaction ratings were positive overall, there are areas that can benefit from improvement noted in several areas critical to the functional efficiency and effectiveness of Bridge Operations.

These opportunities for improvement include:

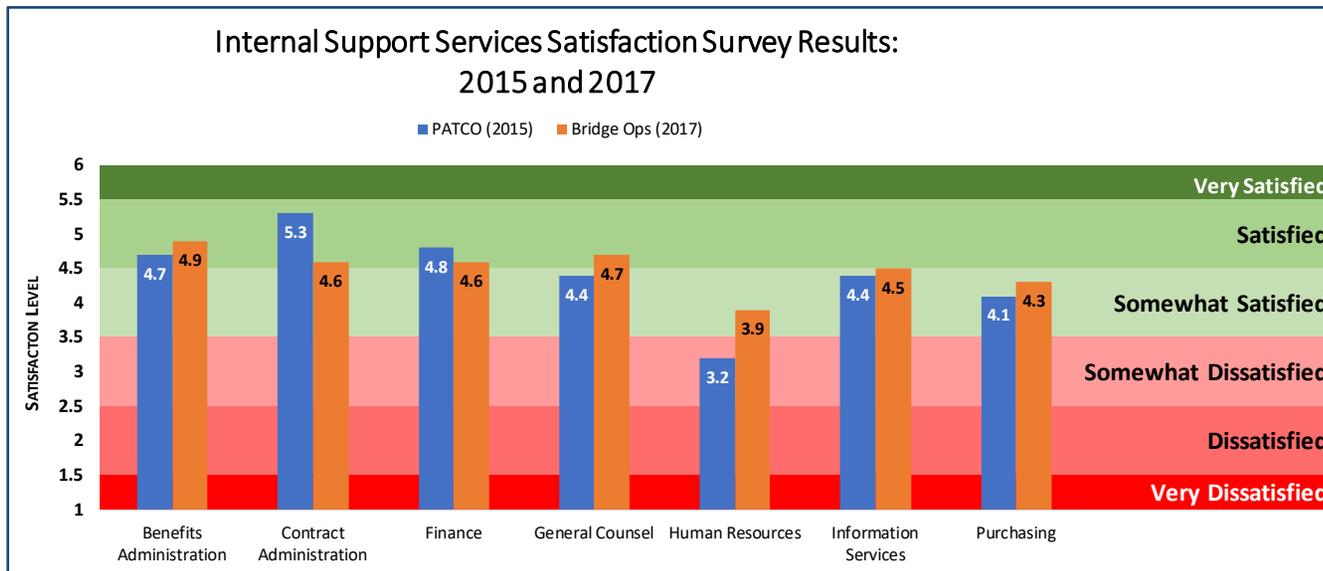
- Collaboration between HR and Bridge Operations management to streamline the process of recruiting and selecting qualified employees.
- Reforming certain aspects of the DRPAs purchasing process and rules, especially related to raising the current purchasing authority thresholds established by current Board policy.
- Improving the quality of software applications training to end-users when new or upgraded systems are deployed and placed into production.

In many of the areas surveyed, significant numbers of respondents indicated that they had no opinion or that the item was non-applicable to their job. This was most pronounced in the areas of Contract Administration and legal service provided by the General Counsel. The staff support functions should be focused on the development of working and consultative partnerships with the direct service providing departments. It is also vital that line managers, supervisors and support staff be fully conversant, knowledgeable and trained in the requirements, processes and procedures employed by their support providers to effectively leverage the DRPA organization’s capabilities to the benefit of their respective organizations.

Comparison to PATCO Results

The internal support services satisfaction survey conducted for the Bridge Operations Management Audit replicated an identical survey completed for the 2015 audit of the Port Authority Transit Corporation (PATCO). As with the survey conducted for Bridge Operations, the PATCO survey was administered to all members of management and supervision, along with the administrative support staff. The same seven internal support functions were included and – with the exception of items included in the 2015 related to the then-upcoming implementation of new ERP software – the same survey items were used.

The graphic immediately below compares the overall satisfaction scores on each of the support services obtained in 2015 and 2017. While it is important to remember that the two surveys were administered to two entirely different sets of participants, the comparison may have some limited utility in gauging any changes over time.



As the chart above shows, the reported 2017 satisfaction levels with each of the support services are similar to those observed in 2015.

- For Benefits Administration, the overall satisfaction scores fell within the “Satisfied” scoring band in both years.
- For Contract Administration, the observed scores also fall within the “Satisfied” band in both years, although the 2017 level general satisfaction was slightly lower than in 2015.

- Finance received very similar evaluations in both surveys, within the “Satisfied” scoring band, though the raw numerical rating dropped slightly.
- General Counsel scores improved incrementally, though sufficiently to move the overall rating up from “Somewhat Satisfied” in 2015 to “Satisfied” in 2017.
- Human Resources satisfaction ratings showed the largest increase in satisfaction ratings – in terms of the raw numerical results – and indicate an overall improvement in the satisfaction level from “Somewhat Dissatisfied” to “Somewhat Satisfied.”
- Overall satisfaction ratings for Information Services are virtually identical from 2015 to 2017, though the “Somewhat Satisfied” rating inched upward to the border of the “Satisfied” band.
- Purchasing saw a modest increase in the raw number satisfaction scores, while falling within the “Somewhat Satisfied” band in both years.

APPENDIX F: SAMPLE TRANSPORTATION ASSET MANAGEMENT PLAN CONTENTS

SAMPLE TRANSPORTATION ASSET MANAGEMENT PLAN TABLE OF CONTENTS

1.0 Introduction

- 1.1 Objectives of TAM Program
- 1.2 Objectives of this document
- 1.3 Scope of the TAMP
- 1.4 TAMP Structure

2.0 Asset Management Structure and Objectives

- 2.1 Asset Management Business Structure
- 2.2 TAM Relationship to Other Business Plans
- 2.3 TAMP Tools

3.0 Asset Inventory and Performance Measures

- 3.1 Current System
- 3.2 System Demand
- 3.3 Pavements
- 3.4 Bridges

4.0 Performance Targets and Conditions

- 4.1 Performance Targets
- 4.2 Pavement Performance Targets
- 4.3 Pavement Condition Summary
- 4.4 Bridge Performance Target
- 4.5 Bridge Condition Summary

5.0 Whole Life Management

- 5.1 Pavement Management
- 5.2 Bridge Management

6.0 Risk Management Analysis

- 6.1 Risk Management and Risk Register Compilation Process
- 6.2 Initial Risk Register
- 6.3 Updating the Risk Register
- 6.4 Role of Risk Management in the Asset Management Process

7.0 Financial Plan, Gap Analysis and Sustainability

- 7.1 Overall Financial Resources
- 7.2 Overall Budget Allocation
- 7.3 Historical funding levels for pavement and bridge
- 7.4 Pavement Budget Allocation and Condition Forecast
- 7.5 Bridge Funding Allocation and Condition Forecast
- 7.6 Pavement and Bridge Funding Gap Analysis
- 7.7 Asset Sustainability

8.0 Investment Strategies

- 8.1 Overall Strategies
- 8.2 Pavement Specific Strategies
- 8.3 Bridge Specific Strategies
- 8.4 Investment Strategy Development Process

9.0 Asset Management Process Enhancements

- 9.1 Improvement Plan
- 9.2 Asset Management Process Enhancements
- 9.3 Implementation of Suggested Enhancements
- 9.4 TAMP Update Process
- 10.0 References

APPENDIX G: SAMPLE OUTSOURCING SCORING METHODOLOGY

SAMPLE OUTSOURCING SCORING METHODOLOGY

Note: The higher the score, the higher the potential for privatizing

Department: Division: Service:

• Issue	Response	Points
Is this a core DRPA service?		Yes = 0 No = 10
Is this a core Construction and Maintenance Division service?		Yes = 0 No = 10
Is this service available in the private sector? • How many vendors provide this service? • How would the DRPA replace a vendor if performance so dictated? • How much specialized professional or technical expertise would be required of vendors?		Yes = 20 No = 0 Many = 10 Some = 5 Easily = 10 With difficulty = 0 A lot = 0 Some = 5 None = 10
What is the expected level of political opposition to the outsourcing effort? • Has this service been successfully outsourced by other Port Authorities? • Has this service been outsourced by the DRPA in the past, and subsequently brought back in-house? • Have other Port Authorities or government entities in the local area, privatized this service and subsequently resumed the provision of in-house services?		High = 0 Medium = 10 Low = 20 Yes = 10 No = 0 Yes = 0 No = 10 Yes = 0 No = 10
• Are there legal barriers to privatizing?		Yes = 0 No = 10 If “yes”, add 5 points if not difficult to change

<p>Does this service have quantifiable and measurable performance measures?</p> <p>How difficult will it be to assess a contractor's performance?</p> <ul style="list-style-type: none"> • Would DRPA be able to reward or penalize a contractor based on performance? • What level of risk would be involved if a contractor did not perform? • Is DRPA able to transfer liability to the contractor for poor performance? 		<p>Yes = 10 No = 0</p> <p>Very = 0 Somewhat = 5 Not = 10</p> <p>Yes = 10 No = 0</p> <p>Low to none = 10 Some = 5 High = 0</p> <p>Yes = 10 Maybe = 5 No = 0</p>
<p>What are the current costs of providing this service?</p> <ul style="list-style-type: none"> • What percentage of these costs are fixed? • What percentage of these costs are variable? • How does DRPA's cost compare with available information from potential vendors? • How difficult would contract monitoring be if this service were outsourced? • How difficult would constructing a performance contract be if this service were outsourced? • What are the estimated costs of contract development? • What are the estimated costs of contract monitoring? 		<p>High = 10 Medium = 5 Low = 0</p> <p>High = 0 Medium = 5 Low = 10</p> <p>High = 10 Medium = 5 Low = 0</p> <p>High = 10 Similar = 5 Low = 0</p> <p>Difficult = 0 Somewhat = 5 Not difficult = 10</p> <p>Difficult = 0 Somewhat = 5 Not difficult = 10</p> <p>High = 0 Medium = 5 Low = 10</p> <p>High = 0 Medium = 5 Low = 10</p>

What are the potential impacts on DRPA employees? <ul style="list-style-type: none"> • How many employees are impacted? • How many jobs face possible elimination? 		<5 = 10 >5 = 0 <5 = 10 >5 = 0
Are there unmet maintenance problems which contracting allows DRPA to avoid?		Yes = 10 No = 0
Are there specialized equipment or supply needs which can be more economically provided by a contractor (due to economies of scale, large scale procurements, etc.)?		Yes = 10 No = 0
Would the contractor need access to confidential information?		Yes = 0 No = 10
Does another Department or Division of DRPA have excess capacity to perform this service?		Yes = 0 No = 10
What is DRPA's comfort level in outsourcing this service?		Very = 20 Somewhat = 10 Not = 0
Final Score		

Are there other issues which cannot be quantified but which need to be considered in assessing the outsourcing potential of this service?

RECOMMENDED ACTION:

APPENDIX H: FLEET CLASSIFICATION CODES

Fleet Classification Codes

Recommendation OPS 16 identifies a need to create and use fleet classification codes within the fleet management system. The purpose of having such a data structure is to support “apples-to-apples” comparisons of vehicle and technician productivity and costs (support benchmarking efforts). Such benchmarking can be used internally (to identify specific units or locations that are experiencing unusual cost or availability patterns) or externally, to compare DRPA’s fleet costs against peers.

While some fleets choose to develop in-house classification systems, using industry standard fleet classification systems leverages the past efforts of peers and while simplifying the steps needed to perform external benchmarking. Accordingly, the consultant team strongly encourages the DRPA to adopt one of the existing fleet classification schemas.

Two of the available organizations that provide fleet classification reference resources are NAFA (the National Associate of Fleet Administrators) and APWA (the American Public Works Association). Links to the websites where equipment categorization resource document can be purchased are found below but additional details follow:

NAFA - [https://www.nafa.org/Products/NAFA-Publications/Downloadable/NAFA-Vehicle-Classification-System-\(e-Download\).aspx](https://www.nafa.org/Products/NAFA-Publications/Downloadable/NAFA-Vehicle-Classification-System-(e-Download).aspx) - \$39.00

APWA- <http://www.apwa.net/store/detail.aspx?id=PB.AEQU> - \$15.00 for APWA member or \$20.00 for non-members

1. NAFA Approach

The NAFA classification approach provides enough category specificity that each type of equipment should only fit into a single class code configuration. This approach provides the optimal benchmarking basis but in highly diverse fleets like the DRPA, it can result in have so many equipment classifications that each equipment type may only have a small number of units. This creates statistical concerns related to data variance and reliability associated with a small population of data (a single fleet classification category). To address this issue, one approach is to identify each unit into the specific category to which it is best suited but then aggregate these categories into broader groupings. Such an approach supports the ability to look the fleet both narrowly (at a specific type of equipment) or more broadly (at a family of similar units) while supporting more statistically valid reporting.

In the 2010 DRPA Management Audit, part of the DRPA fleet analysis involved segregated the (then) 519 unit DRPA fleet into 90 equipment category codes for benchmarking purposes. These original 90 codes were then aggregated into 56 categories (see Table 1). However, even with this initial consolidation, the number of units available in each category provided statistically insufficient to reliably estimate maintenance hour requirements. Accordingly, the 56 equipment categories were aggregated into 18 categories for reporting (see Table 2). Table 3 identifies the classification code aggregation schema used.

2.APWA Approach

The APWA equipment classification approach is described as follows:

“The system utilizes a ten-digit, alphanumeric code... Each digit field used numeric and alpha designations.

By choice or by system limitation, some users may employ only the first five positions of the code, which provide the “main” elements for fleet benchmarking. Although more detail is available with the use of more code positions, it is possible to compare information between fleet based on the first five positions.

Comparisons are also possible between a fleet that might employ only three positions (the minimum required for any operation) and one that employs seven positions. The number of positions employed beyond three is determined solely by the user.¹”

3.Classification Comparison

In practice, the NAFA and APWA categorization approaches are both acceptable. They effectively represent variations on trying to accomplish the same result – supporting fleet benchmarking.

4.Other Related Comments

Recommendation OPS 23 from this report encourages DRPA to have its fleet supervisors and management participate in fleet management organizations. Both NAFA and APWA have chapters in the greater Philadelphia area. Websites for these regional chapters are identified below:

NAFA - <https://www.nafaphiladelphia.org/>

APWA <http://sepenn.apwa.net/>

Of note, NAFA is a fleet-focused organization. However, most members come from the private sector and many operate car or light-duty focused fleets. However, NAFA has a well-respected fleet certification program and its chapters tend to be active and can provide excellent opportunities to identify fleet industry contacts.

The APWA is a public-sector focused organization. As the “public works” part of its name suggests, members tend to come from local government. The focus of these chapters varies but typically these organization provide technical workforce training for the maintenance forces (e.g., geotechnical surveying, traffic management, water management, etc.). However, these entities tend to operate a similar mix of equipment types to DRPA (light and heavy-duty equipment as well as off-road and

¹ “APWA Equipment Code”, APWA, December 2000, p.2

construction machinery). Some chapters have active fleet subcommittees and APWA also has a well-respected fleet management certification program.

With both NAFA and APWA, the actual mix of public sector members and focus on fleets like DRPA varies significantly by chapter. However, the relative focus tends to be driven by the interest of the active members, which tends to change over time.

Table 1: NAFA Classification Code Categories from 2010 DRPA Management Audit

NAFA Code	Class	Group	Service	Type	2010 DRPA Unit Count
0116	Non Self Propelled	Attachments	Snow Removal	Snow Blowers	3
0129	Non Self Propelled	Attachments	Grounds	Other	15
0212	Non Self Propelled	Skid Mounted	Generators	> 101 kW	11
0214	Non Self Propelled	Skid Mounted	Generators	Light Plant > 1001 watts	1
0315	Non Self Propelled	Trailer Mounted	Generators	Arc Welder	44
0380	Non Self Propelled	Trailer Mounted	Concrete Mixers		9
0415	Non Self Propelled	Vehicle Mounted	Generators	Arc Welder	4
0423	Non Self Propelled	Vehicle Mounted	Air Compressors	> 151 CFM	8
0472	Non Self Propelled	Vehicle Mounted	Sewer Equipment	Jet Rodders	3
0513	Non Self Propelled	Stationary	Generators	> 750 KW	1
0520	Non Self Propelled	Stationary	Air Compressors		1
0531	Non Self Propelled	Stationary	Pumps	<2"	1
0540	Non Self Propelled	Stationary	Pressure Washers		7
0630	Non Self Propelled	Grounds	Wood Chipper		2
0652	Non Self Propelled	Grounds	Leaf Machines	Vacuum	4
0713	Non Self Propelled	Trailer	Flat Bed	>10,001 GVW	31
0741	Non Self Propelled	Trailer	Van Body	< 6000 GVW	3
0781	Non Self Propelled	Trailer	Boat Trailer	< 6000 GVW	3
0810	Non Self Propelled	Semi-Trailer	Flat Bed		1
0900	Non Self Propelled	Other			2
0912	Non Self Propelled	Other	Portable Tools	Powered	5
1216	< 8500 GVW	Light Vehicles	Carts	All Terrain Vehicle	1
1342	< 8500 GVW	Automobile	Full Size	Sedan	15
1348	< 8500 GVW	Automobile	Full Size	Law Enforcement	50
1418	< 8500 GVW	Van	Window	Mini	1

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NAFA Code	Class	Group	Service	Type	2010 DRPA Unit Count
1534	< 8500 GVW	Pickups	3/4 Ton	Utility Body	73
1622	< 8500 GVW	Sport Utility	Half Ton	4 Passenger	14
1648	< 8500 GVW	Sport Utility	Emergency Services	Law Enforcement	23
2411	8501- 10,000 GVW	Van	Window	General Purpose	18
2513	8501- 10,000 GVW	Pickups	One Ton	Crew Cab	12
2713	8501- 10,000 GVW	Straight Trucks	General Purpose	Utility Bed	1
2744	8501- 10,000 GVW	Straight Trucks	Public Utility	Platform Aerial	1
3423	10, 001- 14,000 GVW	Van	Cargo	Hi-Cube	1
4712	14,001- 16,000 GVW	Straight Trucks	General Purpose	Dump Bed	4
5731	16,001- 19,500 GVW	Straight Trucks	Service	Tow Recovery	3
6712	19,501- 26,000 GVW	Straight Trucks	General Purpose	Dump Bed	22
6713	19,501- 26,000 GVW	Straight Trucks	General Purpose	Utility Bed	8
7712	26,001- 33,000 GVW	Straight Trucks	General Purpose	Dump Bed	15
7731	26,001- 33,000 GVW	Straight Trucks	Service	Tow Recovery	1
7741	26,001- 33,000 GVW	Straight Trucks	Public Utility	Crane	7
7771	26,001- 33,000 GVW	Straight Trucks	Public Works	Mechanical Street Sweeper	11
8779	>33,000 GVW	Straight Trucks	Public Works	Special Purpose Vehicle	9
9110	Off Road and Construction	Wheeled	Skid Steer Loaders		3
9132	Off Road and Construction	Wheeled	Articulated Loaders	2-4 CY	3
9133	Off Road and Construction	Wheeled	Articulated Loaders	> 4 CY	10
9142	Off Road and Construction	Wheeled	Loader/Backhoes	Medium	4
9310	Off Road and Construction	Material Handling	Forklifts		6
9330	Off Road and Construction	Material Handling	Man Lifts		9
9410	Off Road and Construction	Public Works	Sweepers/Scrubbers		2
9440	Off Road and Construction	Public Works	Rollers		1
9450	Off Road and Construction	Public Works	Paint Stripers		1
9462	Off Road and Construction	Public Works	Trenchers	Wheeled	1

NAFA Code	Class	Group	Service	Type	2010 DRPA Unit Count
9600	Off Road and Construction	Grounds			2
9612	Off Road and Construction	Grounds	Riding Mowers	> 15 HP	10
9623	Off Road and Construction	Grounds	Utility Tractors	> 30 HP	15
9990	Off Road and Construction	Other			3
56	Codes				519 units

Table 2: Consolidated NAFA Classification Code Categories from 2010 DRPA Management Audit

Consolidated NAFA Codes	Class	Group	Service	Type	2010 DRPA Unit Count
0900	Non Self Propelled	Other			160
1342	< 8500 GVW	Automobile	Full Size	Sedan	16
1348	< 8500 GVW	Automobile	Full Size	Law Enforcement	50
1534	< 8500 GVW	Pickups	3/4 Ton	Utility Body	73
1622	< 8500 GVW	Sport Utility	Half Ton	4 Passenger	6
1623	< 8500 GVW	Sport Utility	Half Ton	6 Passenger	8
1648	< 8500 GVW	Sport Utility	Emergency Services	Law Enforcement	23
2411	8501- 10,000 GVW	Van	Window	General Purpose	19
2513	8501- 10,000 GVW	Pickups	One Ton	Crew Cab	14
4712	14,001- 16,000 GVW	Straight Trucks	General Purpose	Dump Bed	4
5731	16,001- 19,500 GVW	Straight Trucks	Service	Tow Recovery	4
6712	19,501- 26,000 GVW	Straight Trucks	General Purpose	Dump Bed	22
6713	19,501- 26,000 GVW	Straight Trucks	General Purpose	Utility Bed	8
7712	26,001- 33,000 GVW	Straight Trucks	General Purpose	Dump Bed	15

Consolidated NAFA Codes	Class	Group	Service	Type	2010 DRPA Unit Count
7741	26,001- 33,000 GVW	Straight Trucks	Public Utility	Crane	7
7771	26,001- 33,000 GVW	Straight Trucks	Public Works	Mechanical Street Sweeper	11
8779	>33,000 GVW	Straight Trucks	Public Works	Special Purpose Vehicle	9
9000	Off Road and Construction				70
18	Codes				519 units

Table 3: NAFA Classification Codes Consolidation Schema from 2010 DRPA Management Audit

DRPA Codes - base	Code-Rev1	Code-Final
0116	0116	0900
0123	0129	0900
0125	0129	0900
0126	0129	0900
0129	0129	0900
0134	0129	0900
0211	0212	0900
0212	0212	0900
0213	0214	0900
0215	0415	0900
0240	0540	0900
0314	0315	0900
0315	0315	0900

DRPA Codes - base	Code-Rev1	Code-Final
0372	0472	0900
0380	0380	0900
0411	0415	0900
0415	0415	0900
0423	0423	0900
0472	0472	0900
0513	0513	0900
0520	0520	0900
0531	0531	0900
0540	0540	0900
0630	0630	0900
0652	0652	0900
0711	0713	0900
0712	0713	0900
0713	0713	0900
0741	0741	0900
0781	0781	0900
0810	0810	0900
0900	0900	0900
0912	0912	0900
1216	1216	0900
1342	1342	1342
1343	1342	1342
1348	1348	1348
1418	1418	1342

DRPA Codes - base	Code-Rev1	Code-Final
1421	2411	2411
1511	1534	1534
1521	1534	1534
1522	1534	1534
1531	1534	1534
1532	1534	1534
1533	1534	1534
1534	1534	1534
1612	1622	1622
1622	1622	1623
1623	1622	1622
1648	1648	1648
2411	2411	2411
2511	2513	2513
2513	2513	2513
2713	2713	2513
2744	2744	2513
3423	3423	2411
3712	4712	4712
4712	4712	4712
5731	5731	5731
5741	5731	5731
6712	6712	6712
6713	6713	6713
6731	6713	6713

DRPA Codes - base	Code-Rev1	Code-Final
6744	6712	6712
7712	7712	7712
7713	7712	7712
7731	7731	5731
7741	7741	7741
7743	7741	7741
7771	7771	7771
7774	7771	7771
8741	8779	8779
8776	8779	8779
8779	8779	8779
9110	9110	9000
9132	9132	9000
9133	9133	9000
9142	9142	9000
9310	9310	9000
9330	9330	9000
9410	9410	9000
9440	9440	9000
9450	9450	9000
9462	9462	9000
9600	9600	9000
9611	9612	9000
9612	9612	9000
9621	9623	9000

DRPA Codes - base	Code-Rev1	Code-Final
9623	9623	9000
9990	9990	9000
90 codes	56 codes	18 codes



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