Joint Legislative Audit and Review Commission
of the Virginia General Assembly

The Future of the Chesapeake Bay Bridge-Tunnel

Staff Briefing
November 19, 2002

Staff for This Study

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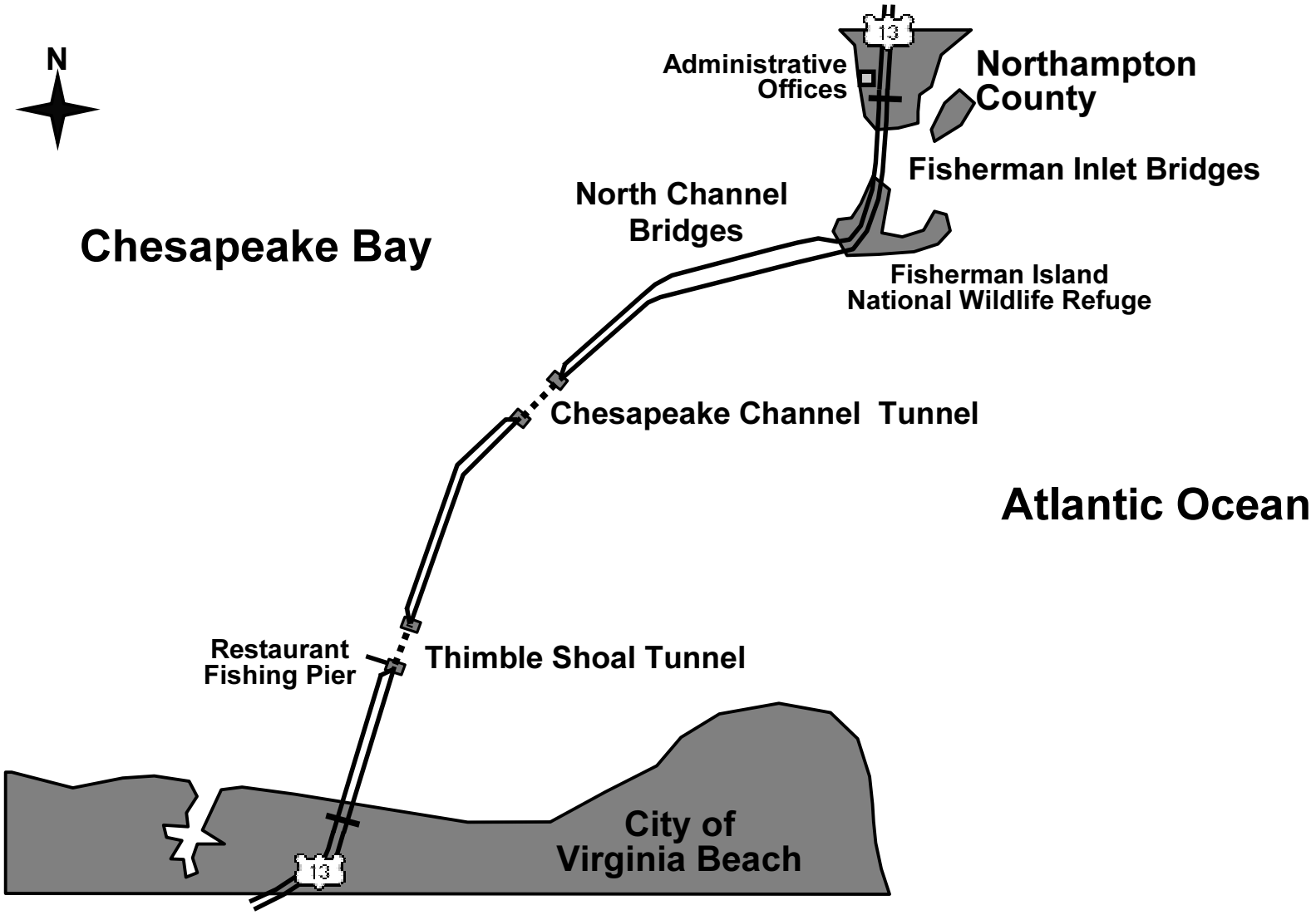
Presentation Outline

- ☑ Introduction
- ☐ Role of the CBBT in Economic Growth
- ☐ The CBBT Toll Structure
- ☐ Toll, Police, and Emergency Operations
- ☐ The CBBT Maintenance Program
- ☐ Administration and Governance

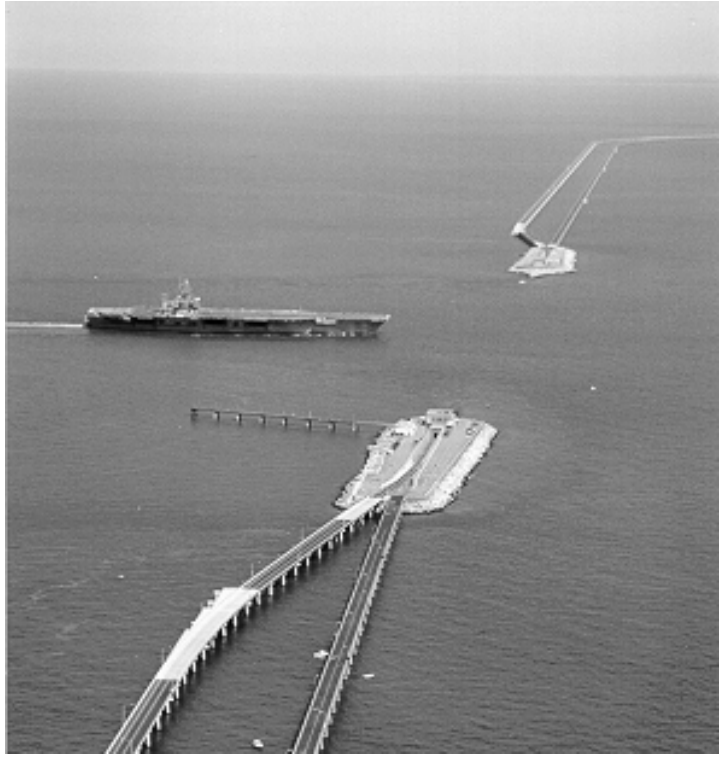
Study Mandate

- HJR 210 (2002) directs JLARC to study the future of the Chesapeake Bay Bridge-Tunnel (CBBT)
- The resolution specifically directs staff to evaluate:
  - The appropriate role for the CBBT in the economic growth and development of the Eastern Shore and the Commonwealth
  - The appropriate toll structure to ensure proper maintenance, sustain operations, meet debt obligations, and plan for capital improvements
  - The efficiency and efficacy of CBBT policies, practices, and operations

The Chesapeake Bay Bridge-Tunnel



The Chesapeake Bay Bridge-Tunnel



Thimble Shoal Tunnel

North Channel Bridges

Study Issues

- To what extent, and in what ways, has the CBBT provided economic benefits to the Eastern Shore and the Commonwealth?

- Is the CBBT toll structure adequate for maintenance and operation of the facility, retirement of existing debt, and funding of debt for anticipated capital improvements, considering:
  - Statutory and other requirements,
  - Current and projected traffic,
  - Debt, operating, and maintenance costs, and
  - Future capital improvements?

Study Issues
(continued)

- Has the CBBT implemented a maintenance program that is efficient, protects the interests of bondholders, and ensures that the facility will be available to the traveling public?
- Are CBBT operations efficient and cost effective?
- Are CBBT policies and procedures for personnel, procurement, toll operations, maintenance, and law enforcement appropriate and consistent with other public organizations?

Research Activities

- Interviews of staff and others
- Analysis of economic, demographic, and other data
- Projections of traffic, toll revenues, and expenses
- Field observation of operations and maintenance
- Surveys of motorists
- Review of policies, procedures, and other documents
- Review of prior reports

Summary of Findings

- The CBBT provides a convenient connection between the Eastern Shore and the Virginia mainland that supports commerce in the region
- Economic growth on the Eastern Shore needs to be managed by the local governments, not by the CBBT commission through changes in the tolls
- The toll structure provides adequate revenue for operations, maintenance, and debt service
- The current tolls will not provide adequate revenue for construction of parallel tunnels by 2020

Summary of Findings

(continued)

- The CBBT commission has not developed a long-range plan to address future capital needs and the appropriate long-term toll structure
- Operations of the facility are generally sound, but toll collection and emergency response staffing efficiencies are possible
- Security for the facility is inadequate and employees are not trained to implement the emergency action plan
- Maintenance on the facility is adequate but some projects have been delayed and need attention

Summary of Findings

(continued)

- Salaries and benefits of CBBT employees are comparable to other public agencies
- The CBBT does not have an appropriate employee evaluation process
- The State role regarding the future of the Bridge-Tunnel should be limited to providing an adequate framework for the commission to fund and operate the facility
- The General Assembly may want to repeal the requirement for transfer of the CBBT to VDOT

Background

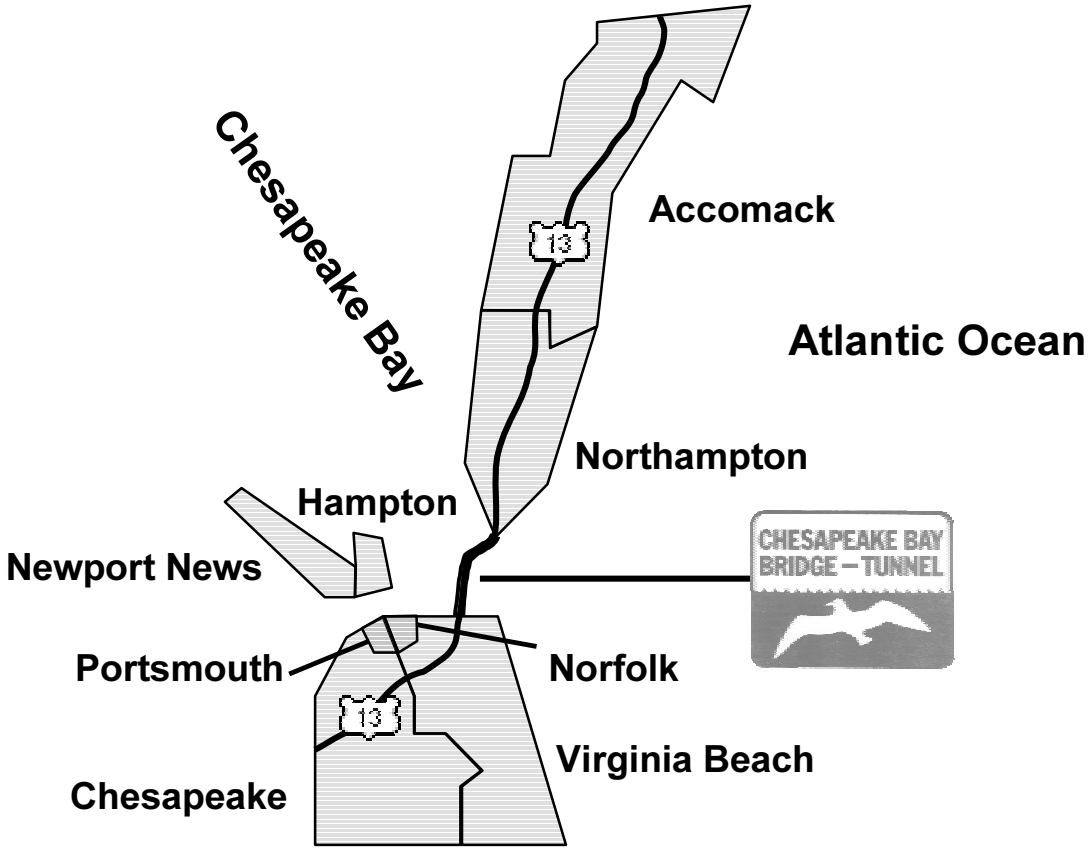
- The Chesapeake Bay Bridge-Tunnel provides a highway link between Northampton County on Virginia's Eastern Shore and the City of Virginia Beach on the Virginia mainland

- The Bridge-Tunnel was opened to traffic in April 1964 as a two-lane, 17.6-mile structure consisting of low-level trestle bridges and two tunnels

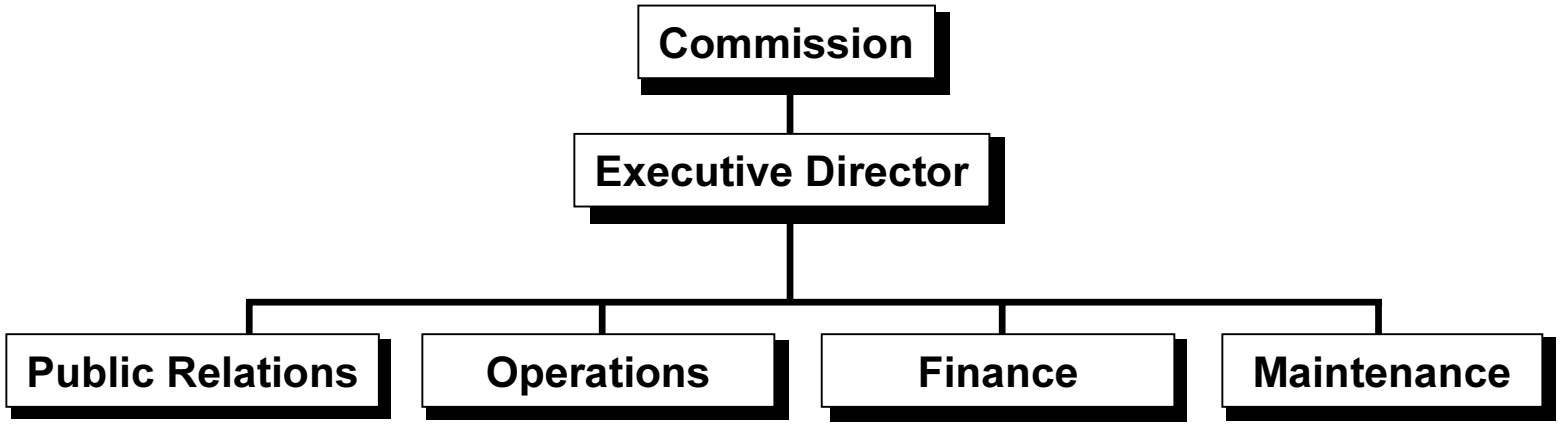
- Parallel bridges were opened to traffic in April 1999; parallel tunnels were not constructed

- Construction and improvements were funded from bonded debt; no federal, State, or local transportation funds were used

The CBBT District



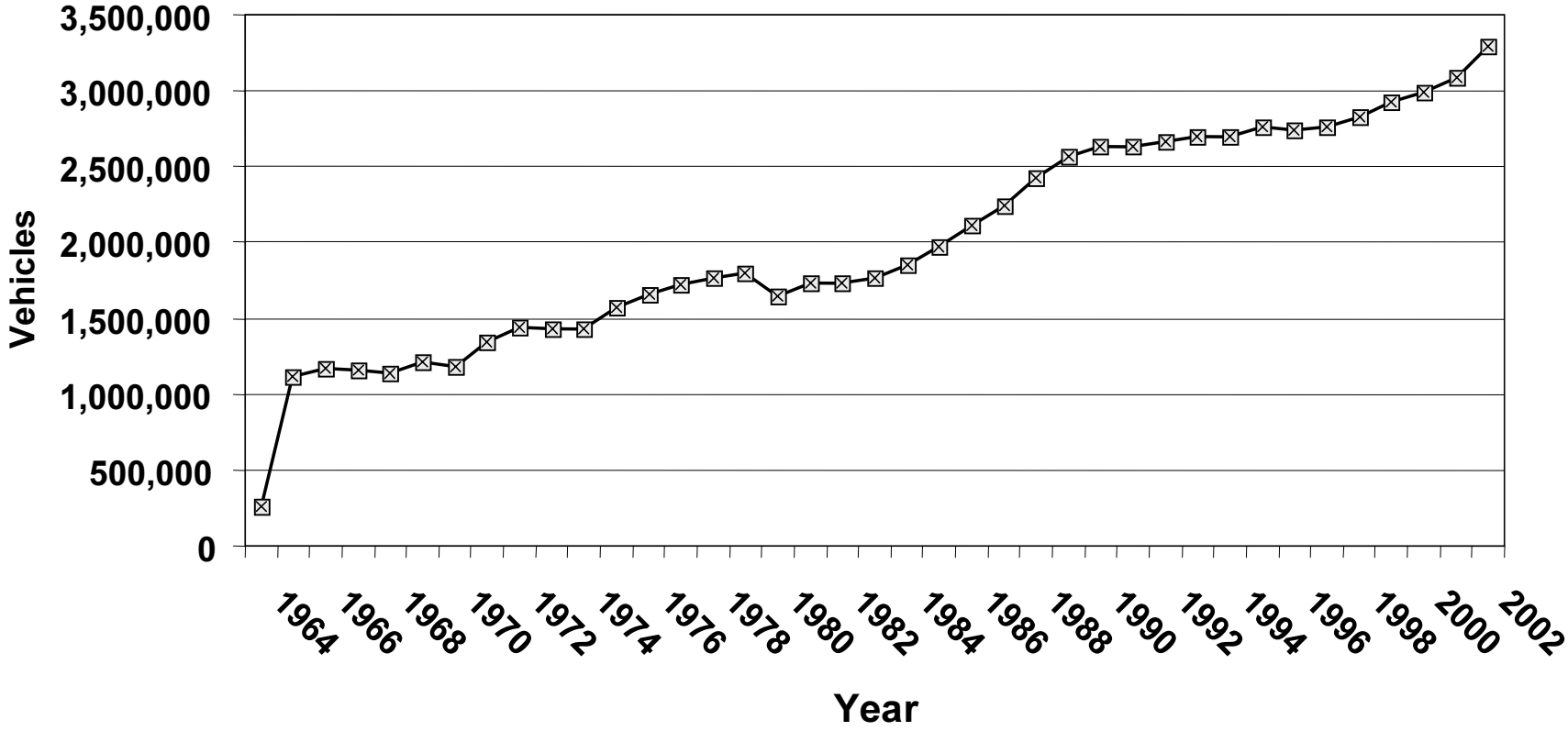
CBBT Organization



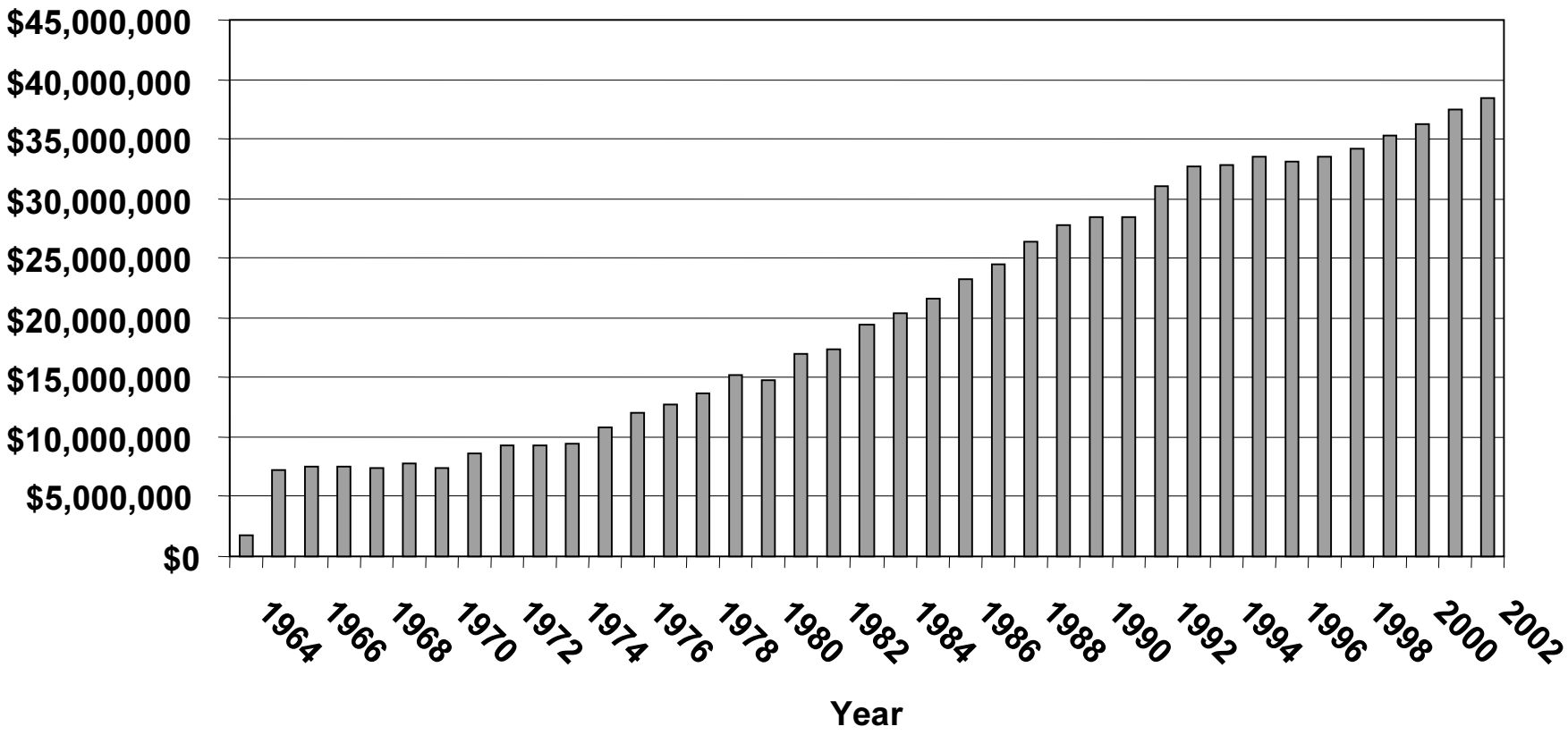
Public Relations	Operations	Finance	Maintenance
Public Relations	Law Enforcement	Toll Audit	Engineering
Marketing	Toll Collection	Accounting	Electrical/Mechanical
Mailroom	Emergency	Human Resources	Electronics/Communications
Switchboard		Risk Management	Equipment/HVAC
			Highway Maintenance

165 Total Employees

CBBT Traffic



CBBT Toll Revenues



CBBT Operating Costs

Administrative Account	FY 2002 Expenses	FY 2003 Budget
Administration	$ 285,585	$ 312,400
Public Relations	678,824	718,200
Finance	259,936	290,100
Operations	2,928,207	3,156,700
Maintenance	2,467,415	2,668,850
General Expenses	1,747,347	1,817,200
Consultants, Legal, etc.	537,172	402,400
Utilities	474,968	475,000
Total	$9,379,453	$9,840,850

CBBT Total Expenses

Expense Category	FY 2002
Operating	$ 9,379,453
Reserve Maintenance	3,740,818
Debt Service	13,693,249
Total	$26,813,520

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- ☐ Administration and Governance

Background

- Study was completed in the context of the controversy over modification of the Bridge Tunnel toll structure to provide a round-trip discount:
  - Some favor lowering tolls and providing discounts to encourage development and economic growth, which is seen as essential to improving the quality of life for many on the Eastern Shore
  - Others favor retaining current toll levels without discounts in order to discourage development, which is seen as a threat to the rural quality of life on the Eastern Shore

The Local Economies

- The CBBT district encompasses to distinct local economies:
  - Rural, agricultural economy on the Eastern Shore
  - Urban, diverse economy in Hampton Roads
- Among those government officials and business leaders interviewed for this study, the consensus was that the Bridge-Tunnel has a more fundamental impact on the Eastern Shore economy than on Hampton Roads

Relationship Between the CBBT and Economic Growth

- There are few measurable changes in employment or income on the Eastern Shore that may be associated with the CBBT
- CBBT traffic was found not to have a measurable impact on employment in Hampton Roads, but did have a relationship to hotel revenues
- Employers view the CBBT as essential in ensuring the minimum level of traffic and connection between the Eastern Shore and the mainland

The CBBT Is Not Expected to Manage Growth

- Employers and business owners interviewed for this study said that CBBT tolls and traffic did not affect their business decisions; concerns focused on workforce development, the Route 13 corridor, and the adequacy of planning and zoning by the counties

- Local government officials, employers, and business owners interviewed for this study concluded that economic growth and development should be managed by local governments, not the CBBT commission

CBBT Tolls Cannot Be Used to Restrict or Enhance Growth

- CBBT commissioners reported that their duty is to ensure proper operation of the Bridge-Tunnel, not to manage economic growth

- The *Acts of Assembly* authorize the commission to "fix, revise, charge, and collect" tolls to pay for operations, maintenance, and debt service – adjustment of the tolls for other purposes is not authorized

The CBBT Role in Economic Growth

- The Chesapeake Bay Bridge-Tunnel's appropriate role in economic growth and development is to provide a safe, well-maintained facility, with appropriate capacity, at the lowest practical cost

- This does not mean that the toll structure has no impact on economic activity, but rather that the economic impacts cannot be used to drive the toll structure

- An appropriate toll structure provides sufficient revenue to support the lowest practical costs for operations, maintenance, debt service, and future capital requirements

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Overview of CBBT Tolls

- CBBT toll structure has 14 rates, grouped into three general categories of vehicles: passenger cars, buses, and heavy trucks
- Tolls range from $10 for a 2-axle passenger car to $36 for a 6-axle truck
- Toll for over-dimension truck $60, plus an additional $60 if an escort is required
- Passenger cars making a round trip within 24 hours receive a $6 discount on the return trip

Tolls Are Adequate for Operations Maintenance, and Debt Service

- JLARC staff examined the adequacy of toll and other revenues over the short, intermediate, and long term
- Projected toll and other revenues compared to estimates of operating, maintenance, and debt service costs
- Over the short term, revenues are more than adequate, with more than $2 million in net revenues for FY 2003 and FY 2004

Tolls Are Adequate for Operations Maintenance, and Debt Service

(continued)

- Over the intermediate term (2003 – 2012), net revenues may total more than $106 million, permitting early defeasance of CBBT bonds
- Over the long term (2003 – 2025), revenues may exceed expenses by more than $386 million
  - Toll revenues total $1.005 billion
  - Total revenues total $1.290 billion
  - Total expenses total $904 million

Tolls May Be Inadequate for Future Capital Improvements

- While revenues appear adequate for operations, maintenance, and existing debt service, the district may have insufficient funds to begin the construction of parallel tunnels when needed

- To assess ability of the CBBT to fund construction of the parallel tunnels, JLARC staff completed a two-part analysis:
  - Examination of traffic and other factors to determine when tunnels might be needed
  - Projection of CBBT fund balances (cash) and future bonding capacity to pay for the project

Parallel Tunnels May Be Needed by 2020

- General Assembly authorized CBBT to construct parallel bridges and tunnels in 1990; bridges were completed in 1999, but tunnels were not built
- Construction of tunnels should be based on one or more objective criteria: increases in traffic, improvements to safety, need for maintenance, the need to increase the depth of the shipping channel
- Analysis found that tunnels may be needed by 2020 based on traffic and that other criteria did not justify a need prior to that year

Projected Monthly Traffic

Month	Actual 2001	Estimated Traffic Count in Each Month				
		2005	2010	2015	2020	2025
January	168,622	218,869	242,207	250,680	278,047	292,208
February	169,054	212,269	235,651	244,136	271,566	285,606
March	199,509	251,496	274,919	283,417	310,909	324,814
April	260,991	300,711	324,178	332,690	360,243	374,024
May	274,632	326,716	350,226	358,751	386,366	400,026
June	304,646	341,634	365,184	373,723	401,400	414,942
July	394,554	442,394	465,992	474,545	502,283	515,712
August	390,561	441,731	465,370	473,938	501,736	515,055
September	273,471	323,936	347,622	356,205	384,064	397,275
October	248,321	295,539	319,269	327,869	355,787	369,048
November	258,321	281,881	305,656	314,274	342,250	355,505
December	236,573	267,892	291,712	300,348	328,383	341,653

Parallel Tunnels May Be Needed by 2020

- CBBT will need to account for the time necessary to design, engineer, and construct the tunnels:
  - 2 Years for planning, design, and engineering
  - 4 – 6 years for construction
- With a 2020 completion date, the project would need to begin planning by 2012 and construction by 2014

Revenues May Be Inadequate for Parallel Tunnels

Year	General Fund Balance	Total Debt Capacity	Principal Out	Debt Capacity Available	Total Funds Available	Tunnel Construction Costs	Funding (Shortage)/ Excess
2002	$ 64.2	$315	$218.7	$ 96.3	$160.5	$468.9	$(308.4)
2010	119.9	390	114.9	275.1	395.0	558.1	(163.1)
2014	220.8	399	113.7	285.3	506.1	608.8	(102.7)
2015	246.8	409	113.2	295.8	542.6	622.2	(79.6)
2020	350.8	449	71.5	377.5	728.3	693.8	34.5
2025	450.5	453	0	453.0	903.5	773.5	130.0

The District Needs a Long-Range Capital Plan

- District should develop a long-range capital plan to address need for the parallel tunnels and other capital improvements

- At least three alternatives should be considered in development of the plan:
  - *No build* – Do not construct the tunnels, and provide toll reductions over time
  - *Build When Current Revenues Are Sufficient* – Delay construction until adequate revenues and bonding capacity are available, probably after 2020
  - *Revise Tolls to Advance Construction* – Increase tolls and reconsider discounts to provide funding for construction at an earlier date

Recommendations

- The Chesapeake Bay Bridge and Tunnel Commission should develop a long-range capital plan that includes a specific decision regarding the construction of parallel tunnels for the Thimble Shoal and Chesapeake channels, as well as other capital needs of the district. The long-range plan should be based on a comprehensive analysis of the need for construction due to increases in traffic, improved safety, and other factors established by the commission. The plan should also consider the results of a comprehensive financial analysis which identifies alternatives for funding future capital needs.

- The Chesapeake Bay Bridge and Tunnel Commission should postpone consideration of any future toll discount programs until a long-range capital improvement plan for the district has been developed. Based on analysis of the impact of the current discount on the ability of the district to meet its capital requirements, it may also want to re-evaluate the long-term feasibility of the 24-hour round trip discount program.

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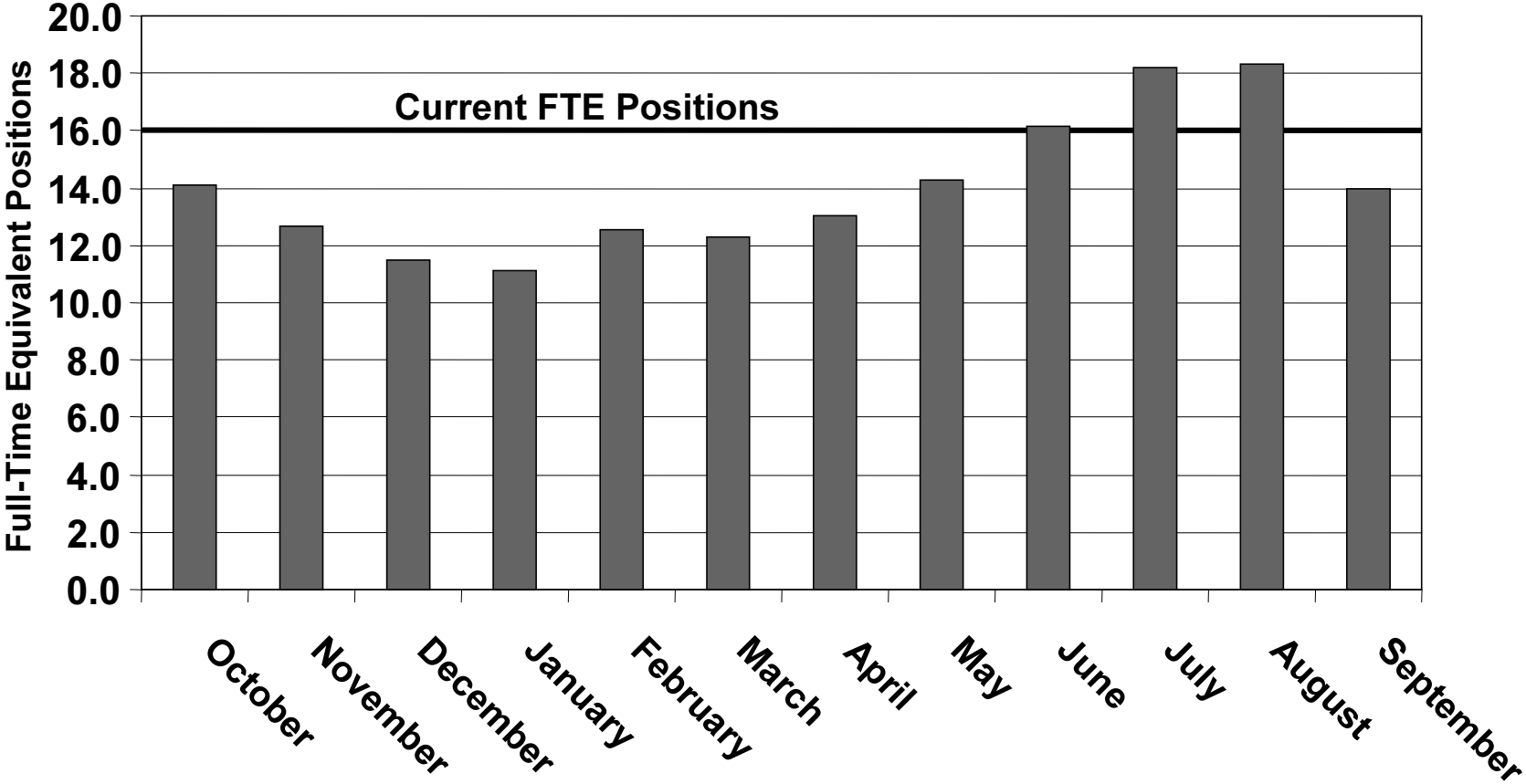
Overview of CBBT Operations

- CBBT operations consists of toll collections, law enforcement and security, motorist assistance, and emergency response
- The operations division includes 16 toll collectors, 45 police officers, and 26 emergency crew workers
- The CBBT is the only highway transportation facility in Virginia with its own police force
- Emergency crew workers respond to vehicle breakdowns and accidents, and patrol the two tunnels

Analysis of Toll Collections Staffing Based on Workload

- The CBBT currently has 16 full-time toll collectors to staff the two toll plazas
- At least one lane at each plaza must be open 24 hours a day, requiring 9.8 full-time positions
- To determine the staffing needed beyond the minimum, JLARC staff completed an analysis of the variation in traffic by hour for each month for the past year
- The analysis estimated the staffing needed to handle 250 vehicles per lane/hour in each direction of travel

Needed Toll Collector Staffing Varies by Month



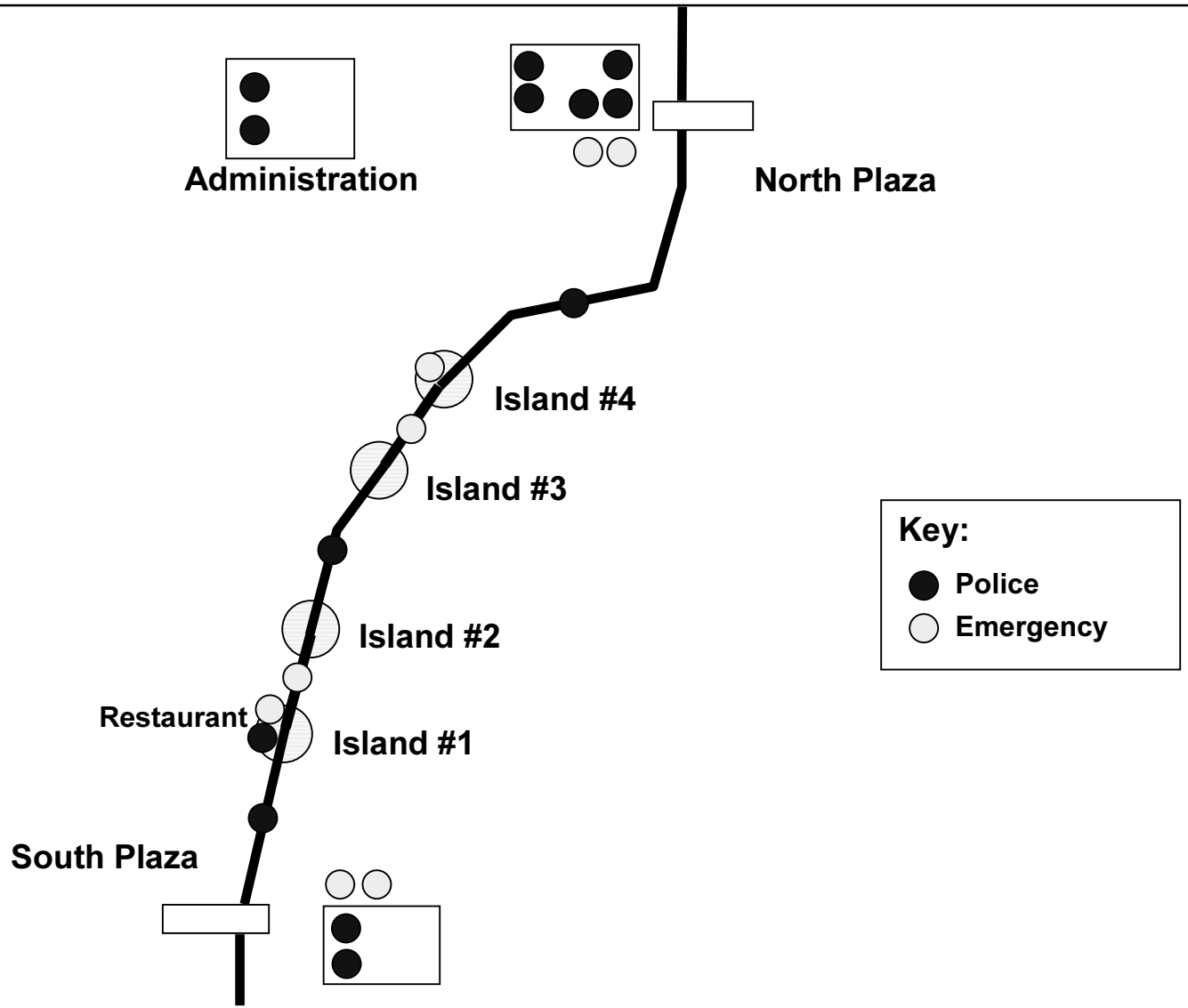
Toll Collections Staffing Could Be Better Matched to Workload

- In the two peak summer months, the CBBT needs at least 18 full-time equivalent positions to handle traffic
- In the winter months, fewer than 12 full-time equivalent positions are needed
- The district could address the variability in traffic by using a combination of full-time and part-time toll collections positions

Analysis of Police and Emergency Staffing Based on Duty Stations

- Analysis of police and emergency crew staffing based on a two-step process:
  - Determine the number of 24-, 16-, and 8-hour duty stations needed
  - Calculate the number of full-time equivalent positions needed to staff each of the duty stations
- Duty stations were evaluated based on reviews of position descriptions, interviews with staff, analysis of workload data, and on-site observation of operations

Police and Emergency Duty Stations



FTEs Needed Based on Available Work Hours

- Available work hours reduced by leave, holidays, training, court attendance, etc.
- Available hours:
  - Police: 1,675.2
  - Emergency: 1,772.1
- Full-time equivalent positions needed based on duty stations and available hours:
  - Police: 43.2 (actual = 45)
  - Emergency: 24.0 (actual = 26)

Emergency Crew Staffing Could Be Reduced with Use of Video Cameras

- Unlike other tunnel facilities in Hampton Roads, the CBBT does not have video surveillance cameras in the tunnels
- Installation of cameras could reduce emergency crew staffing by five full-time positions
- Cameras would also enhance security on the facility and improve response to incidents

Recommendations

- The Chesapeake Bay Bridge and Tunnel District should restructure staffing for toll collections to better account for the seasonal variation in traffic. The district should consider the use of fewer full-time and more part-time collectors, and more flexible scheduling of shifts to match actual traffic volume. The district should use part-time toll collectors to cover partial shifts, meal breaks, and to provide other relief. It should discontinue the use of police officers for toll collections.

- The Chesapeake Bay Bridge and Tunnel District should reduce the full time equivalent staffing for emergency crew workers to 24 positions.

Recommendations (cont.)

- The Chesapeake Bay Bridge and Tunnel District, after installing appropriate video surveillance equipment in the tunnels, should redeploy personnel who patrol the tunnels to monitor video of the tunnels, and should reduce emergency crew staffing by five full-time equivalent positions.

New Strategies Needed to Slow Traffic

- No change to police staffing is recommended in order to accommodate a need for move visible police patrols

- Completion of the parallel bridges has resulted in increased speeds on the facility:
  - 428 summonses for reckless driving in 1994
  - 2,030 summonses for reckless driving in 2000

- New strategies are needed to slow traffic to posted speeds, including more visible patrol, radar/speed signs, and reduction of the current tolerance

Recommendation

- The Chesapeake Bay Bridge and Tunnel District should develop additional strategies for slowing traffic to the posted speed limits. Among the actions that should be considered are: (1) reduction of the current tolerance above the posted speed, (2) use of radar/speed indicator signs; and (3) more visible police patrols.

Facility Security Appears Inadequate

- The CBBT's status as a major transportation facility and its location near major military installations could make it vulnerable to sabotage
- While a readiness plan for terrorist attacks has been developed, it is not an adequate substitute for a comprehensive security plan
- On-site observation found physical security on the facility to be minimal, with the public having access to areas which should be secure

Recommendation

- The Chesapeake Bay Bridge and Tunnel District should retain the services of a qualified security consultant to develop a plan of action for providing proper security for the toll plazas, ventilation buildings, tunnels, and other assets of the district. The evaluation should assess the risks to various district assets and develop specific countermeasures for each risk identified. To improve security prior to completion of a final security plan, the district should limit access to tunnel islands, toll plaza buildings, and maintenance facilities and vehicles.

Capital Improvements Are Needed to Enhance Operations

- Toll plaza buildings are generally adequate for toll operations
- The buildings are not adequate for police operations:
  - Inadequate office space for police supervisors
  - Inadequate locker rooms for police officers
  - No secure holding area for persons arrested by CBBT police pending transfer to local jails
- Toll plazas do not support Smart Tag toll collection and will have too few lanes to adequately handle future increases in traffic

Recommendations

- The Chesapeake Bay Bridge and Tunnel Commission should direct a review of the adequacy of the north and south toll plaza buildings and plaza areas by an independent consultant. The review should evaluate the adequacy of the plaza buildings for both toll collections and police operations. Replacement or renovation of the toll plaza buildings should be considered as a part of the development of the long-range capital plan.

- In its renovation or replacement of the toll plaza buildings, the Chesapeake Bay Bridge and Tunnel District should include: (1) additional toll lanes to accommodate future increases in traffic and (2) installation of the Smart Tag electronic toll collection system.

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Overview of CBBT Maintenance

- The CBBT maintenance program has two major components:
  - Ordinary maintenance – patching potholes, repairing guardrail, cleaning tunnels, repairing faulty wiring, maintaining vehicle fleet, mowing grass
  - Reserve maintenance – major repair or renovation projects, typically contracted out, such as replacing all light fixtures in the tunnels, replacing the deck on the fishing pier, installing a new toll collection system, and replacement of trucks or police vehicles
- Expenditures in FY 2002:
  - Ordinary Maintenance -- $2.3 million
  - Reserve Maintenance -- $3.7 million

CBBT Completes Required Inspections

- Ordinary and reserve maintenance needs are identified by CBBT staff and in the annual inspection of the consulting engineer
- Annual inspection complies with two requirements:
  - Federal bridge inspection program, administered by VDOT
  - CBBT bond resolutions
- Annual inspection is more comprehensive than the requirements of the federal program, and includes tunnels as well as bridges

Ordinary Maintenance Appears Adequate

- According to annual inspection reports from the consulting engineer, the CBBT ordinary maintenance program keeps the facility generally well maintained
- A JLARC staff review of CBBT assets also found the facility to be well maintained, with a few exceptions

Some Reserve Maintenance Projects Have Been Delayed Too Long

- On-site review of Bridge-Tunnel assets found several significant maintenance needs which have not been addressed:
  - Repairs to bridge piles for northbound portion of the trestle bridge which runs from Virginia Beach to the Thimble Shoal Tunnel
  - Rehabilitation of the interiors of both tunnels
  - Repairs to concrete and brick in the four ventilation buildings
- The need for these repairs was identified by the consulting engineer as long as eight years ago

Old Patches on Piles

Failure of Old Patches

Damage in Tunnel Interiors

Damage on Tunnel Sidewalks

Rusted Handrail on Tunnel Sidewalk

Damage to Concrete in Ventilation Buildings

Damage to Ventilation Building Exterior

Funding Is Available for Needed Repairs

- Reserve maintenance projects can be funded from the reserve maintenance fund and from the CBBT general fund
- FY 2002 balances in the funds were:
  - $4.5 million in reserve maintenance fund
  - $64.2 million in general fund
- Estimated costs for the needed repairs is $15.4 million

Recommendations

- The Chesapeake Bay Bridge and Tunnel District should, except during emergencies, close the pedestrian sidewalks of both tunnels to all employees until the handrails have been tested for secure attachment to the wall. Repairs to the pull-boxes and other access panels in or under the tunnel sidewalk should be accelerated. The plywood ramps covering pull boxes should be removed as soon as practical. The district should implement weekly safety inspections of tunnel sidewalks when all the of the repairs have been completed.

- The Chesapeake Bay Bridge and Tunnel Commission should accelerate completion of reserve maintenance projects to renovate the tunnel interiors, to repair bents for northbound trestle A, and to repair the exterior and interior walls of the tunnel ventilation buildings.

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Adequate Administrative Policies Have Been Developed

- The CBBT has developed adequate administrative policies:
  - Employee Handbook
  - Employee General Safety Policy Manual
  - Investment Policy
  - Drug and Alcohol Free Workplace Policy
  - Operations Division Manual
  - Public Relations Plan
  - Purchasing Policy Manual
  - Public Comment Policy
- One major exception: Lack of employee evaluation process

CBBT Does Not Have an Employee Evaluation Process

- The district does not have a comprehensive performance evaluation system for employees
  - No standard instruments for supervisors to use in evaluating employees
  - No guidelines on when employees should be evaluated
  - No criteria for supervisors to use when evaluating employees
  - No written documentation of evaluations
- The commission also does not complete an evaluation of the executive director

Recommendation

- The Chesapeake Bay Bridge and Tunnel District should implement a formal written performance evaluation process for all employees. Promotions, salary actions, and disciplinary actions should be based on the performance evaluation system. Supervisors should be trained on how to perform employee performance evaluations and how to document employee performance.

- The Chesapeake Bay Bridge and Tunnel Commission should establish written performance expectations for the executive director, and direct its executive committee to prepare a written evaluation of the executive director annually. The evaluation should be based on the specific performance expectations established in advance by the commission.

Salaries Are Comparable to Other Public Agencies

- Salaries for administrative, toll collection, and maintenance positions were found to be comparable to salaries for employees of VDOT and the Richmond Metropolitan Authority

- Salaries for police officers were found to be comparable to those of deputy sheriffs with law enforcement duties

Benefits Are Appropriate But Could Be Enhanced for Police Officers

- Benefits for employees were found to be comparable to those of employees in other public organizations:
  - VRS retirement, annual and sick leave, health insurance, life insurance, deferred compensation, etc.
- CBBT police are not provided the enhanced benefits of the LEOS retirement system (age 50 with 25 years of service; cash supplement)
- Estimated additional cost to provide LEOS benefits is $359,000 annually

Recommendation

- The Chesapeake Bay Bridge and Tunnel Commission may wish to consider providing uniformed police officers with the enhanced retirement benefits of the Local Enforcement Officers Retirement System administered by the Virginia Retirement System.

The State Role Should Remain Limited

- The Bridge-Tunnel is generally well maintained and operated
- There is no evidence that either the commission or the staff have discharged their duties other than in the interests of the facility and its users
- The State, through the Commonwealth Transportation Board and the Virginia Department of Transportation, is unlikely to be a significant source of additional funding for either operations or capital improvements
- There is no evidence the commission has acted irresponsibly with regard to its prior use of debt financing

Recommendation

- **The Virginia General Assembly may wish to repeal Chapter 714, §10 of the 1956 *Acts of Assembly*, which transfers the Chesapeake Bay Bridge-Tunnel to the State highway system upon retirement of all bonded debt. The General Assembly may also wish to amend the Acts of Assembly to authorize the Chesapeake Bay Bridge and Tunnel Commission to use tolls to fund operations, maintenance, and future capital improvements.**