



Executive Director's  
Report to the  
Board of Harbor Commissioners

**DATE: MARCH 27, 2014**

**FROM: EXECUTIVE OFFICE**

**SUBJECT: RESOLUTION NO. \_\_\_\_\_ - REPORT TO LOS ANGELES CITY COUNCIL, TRADE, COMMERCE, AND TOURISM COMMITTEE, ON THE TRAPAC TERMINAL DEVELOPMENT PROGRAM**

**SUMMARY:**

In November 2013, the Los Angeles City Council (City Council) considered and adopted the Second Amendment to Permit No. 881 with TraPac, Inc. to deliver container terminal facility improvements at Port of Los Angeles (Port) Berths 136-147. During its consideration the City Council requested that the City of Los Angeles Harbor Department (Harbor Department) report back on a) specific procedural changes that will be made to rectify the issues raised in the reporting of this program to ensure that such issues do not reoccur, b) the impacts of container terminal automation, and c) a plan for integrating a liaison between Labor and the Harbor Department vendors.

**RECOMMENDATION:**

It is recommended that the Board of Harbor Commissioners (Board):

1. Discuss the recommendations included in this report and its transmittals, and provide staff with direction on any modifications concerning these recommendations;
2. Forward this report and its transmittals, as modified by the Board, to the Los Angeles City Council, Trade, Commerce, and Tourism Committee, for their information; and
3. Adopt Resolution No. \_\_\_\_\_

**DISCUSSION:**

**Background/Context** - On November 19, 2013, the City Council considered and adopted the Second Amendment to Permit No. 881 (Second Amendment) with TraPac, Inc. (TraPac) to design, entitle, and construct container terminal facility improvements to TraPac's existing terminal located at Port Berths 136-147. This Second Amendment allowed the Harbor Department to modify and amend the TraPac Terminal Development Program's scope of work to accommodate new automated container

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terminal operations. This City Council action also approved corrections, clarifications, technical changes to the project scope, and ratification of past Harbor Department actions related to this program. The modified TraPac Terminal Development Program consists of 10 capital projects delivering new wharves, rail facilities, buildings and gate complexes, Alternative Maritime Power ("AMP" or shore power) systems, an automated intermodal container transfer facility (ICTF) rail yard, and the first automated container terminal on the West Coast.

Previous to this City Council action, on September 19, 2013, the Board approved the Second Amendment and increased the \$364 million TraPac Terminal Development Program budget by \$146 million for a total budget of approximately \$510 million.

During its consideration the City Council Trade, Commerce, and Tourism Committee (TCT) recommended that the Harbor Department take the following three actions and report back on the results/findings of these actions. An excerpt of City Council File No. 13-1501 containing this request is attached as Transmittal 1.

- a. Memorialize the "Lessons Learned" and report back on specific procedural changes that will be made to rectify the issues raised in the reporting of this program to ensure that such issues do not reoccur.
- b. Perform a study of the impacts of container terminal automation, specifically impacts on the Port, workforce, community, etc., and a cost/benefit analysis that takes into consideration the competitive challenges facing the Port. Provide a report to the City Council on this study.
- c. Develop a plan for integrating a liaison between Labor and the Los Angeles Harbor Department vendors.

This report provides the specifics on these City Council requests and presents the next steps in implementing recommendations.

### **TraPac Lessons Learned and Procedural Changes**

**Approach** - Through the late summer and fall 2013, the Harbor Department reviewed the lessons learned from the TraPac Terminal Development Program through an After Action Review (AAR) facilitated by the Inspector General of the City of Los Angeles. As this process neared completion it was decided that an independent consultant would best be able to provide the necessary review and recommendations to provide the necessary "best practices" and address the City Council's requests. In December 2013,

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the Harbor Department selected the Bronner Group LLC (Bronner) through an expedited competitive proposal process to perform this assessment. Bronner began work on this assessment in January 2014, and completed its report in late February 2014. Bronner started its work by reviewing the AAR along with the supporting source documents. Bronner conducted over 40 stakeholder interviews with Harbor Department staff, managers, executives, and commissioners along with the AAR facilitator. Bronner provided weekly progress reports and circulated several draft reports that were reviewed at stakeholder meetings. Transmittal 2 is a copy of Bronner's TraPac Terminal Program Assessment dated February 28, 2014.

**Results** - Between 2009 and 2013 the TraPac Terminal Development Program changed from a "conventional" container terminal to an automated terminal with program estimates increasing from \$245 million to \$510 million. Bronner's report summarized the events and timeline leading to these changes and, in combination with the fall 2013 AAR, highlighted gaps in the Harbor Department's operating framework including the following:

- Substantial increases in program construction cost estimates;
- Significant delay in permit amendment filing;
- Failure to follow established tenant lease policies and procedures;
- Communication gaps between Harbor Department divisions, management, and the Board;
- Lack of single point accountability for project ownership across a project lifecycle;
- Lack of clarity regarding the roles and responsibilities of project manager through the project lifecycle; and
- Ineffective action taken to revise tenant lease to adequately protect the Harbor Department against financial risk.

Major elements of the construction cost estimate escalation, as described in Bronner's report, the AAR, and the Executive Director's report to the Board in September 2013, include:

- \$52 million – Electrical and communication system infrastructure (12.5 vs. 4.16 kV)
- \$44 million – Construction phasing, specialty design, construction management
- \$21 million – Concrete paving and foundation due to poor soil conditions
- \$13 million – Storm drain system (to comply with local/state/federal regulations)
- \$8.6 million – Construction inflation
- \$4.8 million – Fire protection system
- \$3.1 million – Safety and secured access (fencing and gates)

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Most but not all of the revised budget increase stems from the Automated Rail Mounted Gantry Stacking Cranes and other infrastructure required for delivering an automated container terminal. The electrical system requires 12.5 kV in order to deliver enough power to operate this new equipment; a typical port terminal uses 4.16 kV. Previously unknown poor soil conditions required stronger and more durable concrete and foundations. Due to soil and groundwater contamination, additional storm drain measures were required at an additional cost of \$13 million to ensure compliance with the City of Los Angeles Watershed Protection Program, the Standard Urban Storm-Water Mitigation Plan and Harbor department environmental standards. Lastly, an additional \$44 million has been added to accommodate more complex construction phasing as a result of a) higher than anticipated levels of cargo in the terminal due TraPac adding to its customer base while under construction, b) incorporating new safety measures required for the automation infrastructure, and c) acceleration costs needed to meet grant funding deadlines (over \$60 million in grant funding has been obtained to help offset increased costs). Cost estimates escalated despite the Harbor Department engaging outside support from consultants who had been involved in the only other automated container terminal previously constructed in the United States in Norfolk, Virginia.

Bronner identified a set of “best-practices” components for organizational effectiveness based on its years of experience evaluating the delivery of public-sector infrastructure. Bronner applied these “best-practices” to the lessons learned through its study and the AAR, then developed a set of recommended actions entitled “Building Better Governance Initiative (BBGI).” This initiative/action item list includes six individual actions focused on two basic themes, 1) improved integration across the entire Harbor Department organization, and 2) strengthened risk management. The six recommended actions and their relative priorities are as noted below and are detailed in Bronner’s report:

<b><i>Recommended Action</i></b>	<b><i>Relative Priority</i></b>
1. Restructure and re-institutionalize the Project Development Committee	High
2. Create a project lifecycle ownership structure	High
3. Implement independent validation and verification in project budgeting and control	Medium

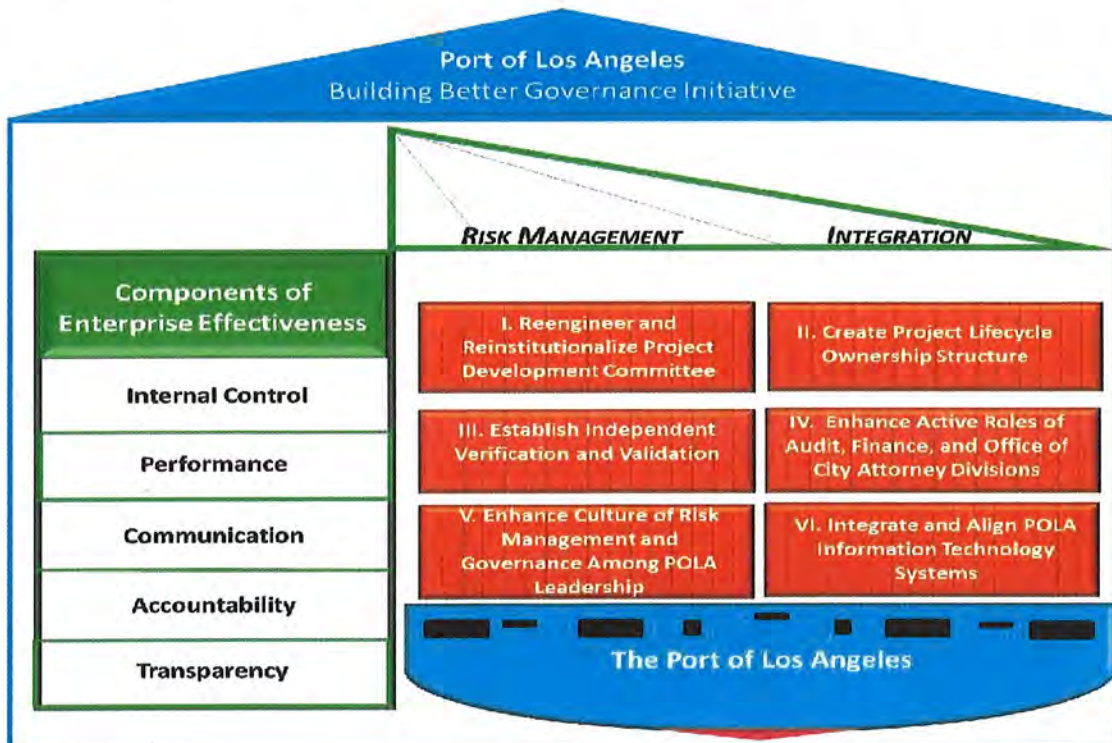
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4. Establish active roles in project control for finance and audit	Medium
5. Promote a culture of risk management across the Harbor Department	Medium
6. Explore opportunities to integrate and align information technology systems	Low

Bronner created the following graphical depiction of these recommendations within the context of the themes of improved integration and strengthened risk management.

Bronner noted that the Harbor Department has implemented many of these recommendations including executive management team realignment, establishing single-point accountability of project managers, and starting implementation of Project Development Committee restructuring.

**Recommendations** - Our recommended “next steps” are to a) review and accept the recommendations included in this report, b) establish and seat a BBGI implementation steering committee, c) assign accountability and timeframe for individual key action items, and d) establish monitoring framework to ensure tasks are accomplished.



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### Impacts of Container Terminal Automation

**Approach** - Harbor Department planning and marketing staff conducted a study on the status of container terminal automation both worldwide and in the San Pedro Bay. Staff extensively researched available studies, conducted in-house working sessions on this subject, and met with stakeholders including terminal operators and labor representatives. Staff summarized the findings and made recommendations in the Container Terminal Automation Study included as Transmittal 3.

**Results** - Twelve container terminals have been automated, worldwide, with three domestic terminals due to open in the months and years ahead (Port of Los Angeles – TraPac; Port of Long Beach – Middle Harbor; and Port of New York/New Jersey – Global Container Terminals). Each automated container terminal is unique; however, some standards for automation are emerging. Decisions to automate are based on a number of considerations including vessel size, labor costs, terminal efficiency, and property available. The Harbor Department neither encourages nor discourages automation due to our role as a landlord that is not involved in the operation of terminals. Rather, terminal operators choose their mode of operation based on their own internal business models which balance the level of service they can provide to their shipping line and cargo-owning customers against the costs of providing that level of service.

Working with the limited information available, staff can make the following statements about the impacts of automation on the Port of Los Angeles, the workforce, and the community:

- **Capacity Impacts** - Because the ultimate capacity of the Port appears to be constrained (primarily) by its berth capacity, automating the Port does not expand the total volume of container cargo that the Port can handle in the long-term.
- **Efficiency/Throughput Impacts** - Automation can improve the efficiency of cargo handling and speed the velocity of cargo, especially as volumes increase. Automation speeds the handling of the newer Super-Post-Panamax vessels. However, full automation is not always required, and terminals can improve efficiency to some degree in partnership with labor.
- **Environmental Impacts** - Automation results in decreases in emissions and greenhouse gases through switching to more use of electricity versus fossil fuels. The TraPac Environmental Impact Report (EIR) addendum, which analyzed the change from conventional to automated terminal, showed a 68% reduction in CO<sub>2</sub>, 93% reduction in CH<sub>4</sub>, and an 82% reduction in N<sub>2</sub>O. Automation is not required to meet Port air emission goals.

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- **Terminal Operating Cost Impacts** - Terminal operating costs are likely to go down under automation. The amount of reduction depends on labor cost savings versus cost of capital employed. The Harbor Department cannot currently provide an estimate, which would require detailed information on automation used and terminal cost structures.
- **Labor/Workforce Impacts** - Automation leads to a reduction in the amount of International Longshore and Warehouse Union (ILWU) labor required. The amount of reduction depends on types of automation employed. The amount of reduction can be offset by new jobs in repair and maintenance of automated equipment. The ultimate impact of automation on the labor force depends upon agreements between labor and management regarding staffing levels and workforce retraining.
- **Harbor Department Financial Impact** - Automation should not impact the Port's income, if volumes are unchanged. Terminal operators are responsible for investment in automation equipment. The Harbor Department is only responsible for terminal improvements. Under the Harbor Department rate of return policy, terminal improvement investments should be recouped by increased revenue from the terminal operator.
- **Competitive Impact** - Automation, if it reduces terminal costs and/or increases terminal efficiency, can provide a competitive advantage to a terminal that implements it. Conversely, if competing ports automate and the Port of Los Angeles does not, it may find itself at a competitive disadvantage. The amount of cargo at risk depends upon the level of cost savings or efficiency gains, which in turn depends on the level of automation and how well it works. Cargo losses (and related job losses) could be significant, but too little is known at present to prepare reliable estimates.

**Estimating Automation Impacts: an Example Using TraPac** - As noted above, a significant amount of information necessary to provide an accurate cost-benefit analysis of future automation is still unknown at present. However, it is possible to prepare a rough estimate of automation impacts using what is known about the TraPac automation project.

- ILWU and TraPac representatives agree that automation at TraPac is likely to result in a 40 to 50% reduction in the number of longshore jobs at the TraPac terminal.
  - Using unmanned straddle carriers instead of manned vehicles reduces the number of workers needed per crane by about 53%.
  - Automating the container backland reduces the number of workers needed per transtainer by 85%.

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- TraPac is only automating a portion of the terminal, with the remainder operating as a traditional manned terminal; thus, the overall impact is between 40 and 50% fewer workers needed at TraPac.
- Based on Pacific Maritime Association reporting on hours and wages, in 2011 the Ports of Los Angeles and Long Beach were served by the equivalent of approximately 9,000 fulltime longshore workers (at 2,080 hours per year).
- Assuming longshore hours are allocated proportionately across terminals based on their container volumes, TraPac was served by the equivalent of 400 longshore workers in 2011.
  - A 40 to 50% reduction in longshore labor equates to a reduction of the equivalent of 160 to 200 longshore jobs
  - Additionally, because longshore jobs are dispatched from a hiring hall, the loss of jobs can be translated into reduced working hours across the pool of longshore labor
    - A loss of 200 longshore jobs equates to a loss of 416,000 hours of work. Spread across 9,000 longshore workers, that is a loss of less than one hour of work per week, or a 2.2% reduction in hours (and pay) overall.
  - Some of this job loss has been offset by the hiring of additional mechanics to service the automated equipment.
- If container volume moves to TraPac from other San Pedro Bay terminals until TraPac reaches its capacity of approximately 2 million TEUs, and the volumes are split evenly between the automated and non-automated portions of the TraPac terminal, job losses would be as high as approximately 600 jobs (or a 7% reduction in hours and pay overall).
  - Growth at other non-automated container terminals could partially or entirely offset this job loss.

The ILWU Local 13 provided data on the geographical distribution of its longshore workers. According to this data, approximately 27.7 percent of the Local 13 workers live in San Pedro and 9.8% live in Wilmington. Assuming the lost jobs match the distribution of Local 13 workers by place of residency, San Pedro and Wilmington could expect to see direct job losses equal to approximately 37.5 percent of the predicted job losses due to automation – between 60 and 75 jobs at current volumes and up to 225 jobs if TraPac reaches capacity by taking volume from other Port terminals.

These job losses will be significant to the local community because longshore jobs pay approximately 85% more than the median household income for the communities of San Pedro and Wilmington. However, the impact will be muted because of the relatively

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low number of jobs lost. While Wilmington and San Pedro have very strong ties to the Port, the Port is not the primary source of employment for these communities.

Occupational Breakdown by Place of Residence

	San Pedro (90731)	San Pedro (90732)	Wilmington (90744)
Construction	6.63%	4.22%	6.89%
Manufacturing	12.77%	12.95%	22.24%
<b>Transportation &amp; Warehousing</b>	<b>10.80%</b>	<b>12.71%</b>	<b>8.06%</b>
Retail Trade	10.32%	8.56%	9.83%
Education, Health & Social Services	18.38%	21.94%	12.42%

(Source: U.S. Census Bureau Summary File (SF3), 2000.)

**Recommendations** - Given the amount that is unknown about how automation is likely to proceed at the Port of Los Angeles and its competitors, Harbor Department staff has developed the following recommendation on dealing with existing and potential future container terminal automation projects:

- Complete TraPac’s first phase (31 acres of 146 acres) of Autostrad automation by mid-2014. The remainder will be completed by 2016.
- Eagle Marine Services/APL has an approved EIR with automated guided vehicle (AGV) automation, as an option, in the 40 new acres. If Eagle Marine Services/APL chooses to automate the 40 acres, the Harbor Department will provide the infrastructure as described in the current scope of work.
- Prepare an EIR for Yang Ming that includes the assessment of automation.
- If terminal operators want to automate their facilities they may do so using their own capital. The Harbor Department will evaluate each such proposal on a case-by-case basis.
- Based on an assessment of (1) the performance outcomes from automated operations at TraPac and other automated terminals, (2) the evolution of shipping alliances and their impacts on future terminal needs and infrastructure, and (3) other competing ports’ approaches to terminal automation, the Harbor Department will proceed to develop a terminal automation strategy.

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### Labor Liaison

**Approach** - Labor issues at the Port are divided into two broad categories. Category one includes labor relations with the organizations that represent Harbor Department employees through a Memoranda of Understanding negotiated by the City of Los Angeles. Harbor Department management is often directly involved in discussions and negotiations with these organizations. The second category includes labor relations between our customers (terminal operating companies and shipping lines) and our contractors and their operating unions. The Harbor Department has no direct relationship in these discussions and negotiations. Nevertheless, our enterprise is directly impacted by the outcome of these relationships and negotiations. It is in this second category that Harbor Department staff focused its efforts in developing a plan to establish a labor liaison. Harbor Department staff determined that the most effective means to provide labor liaison capabilities would be to select a consultant to provide the services discussed below.

**Results** - The Harbor Department has determined that further strengthening of relationships with labor organizations are of strategic importance for its ongoing competitiveness. Recent developments and upcoming contract negotiations indicate the need for a deliberate effort to strengthen relations with our labor stakeholders. Key labor related issues/developments include:

- The ILWU master contract will expire on July 1, 2014. Negotiations with the Pacific Maritime Association (PMA) commence in May 2014. While the Port does not have a seat at the negotiating table, these negotiations could have long-term impact on its competitiveness.
- Negotiations with ILWU Local 56 are also underway.
- The Harbor Department's Master Project Labor Agreement (PLA) will be up in 2015 and discussions will need to commence in the near future.

**Recommendations** - The Port of Los Angeles' Labor Liaison will provide outreach, education, and advocacy services to the Harbor Department. The Labor Liaison's contract will cover services for a six-month period, for a total amount not to exceed \$30,000. This amount covers all costs (travel and other expenses) associated with the performance of the duties defined in the Scope of Work. The Labor Liaison will:

- A. Prepare a written report identifying labor organizations with the ability to directly or indirectly impact the operations and productivity of the Port of Los Angeles, including but not limited to the ILWU, International Brotherhood of Teamsters, International

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- Brotherhood of Electrical Workers (IBEW), Building Trades, the Harbor Coalition and its affiliated unions, and the LA County Federation of Labor. The report should include an evaluation of each organization's potential impact on Port productivity.
- B. Develop a written outreach strategy, benchmarks, and implementation work plan to cultivate and strengthen relations with organizations identified in (A).
  - C. Implement the outreach strategy defined in (B) and produce verbal and written reports as agreed to in the implementation work plan.
  - D. Educate labor organizations about Port priorities and mobilize support for the Port's legislative and advocacy efforts.
  - E. Educate Harbor Department staff and appointed leaders on the issues and priorities of labor organizations identified in (A).
  - F. Support implementation of the Harbor Department's community outreach and education efforts where a labor-outreach component is involved.
  - G. Train and transition duties performed in this Scope of Work to a Harbor Department employee(s).

The Labor Liaison will be selected by the Executive Director with the contract term and amount falling within the Executive Director's authority limits (not to exceed one year or \$150,000).

#### **ENVIRONMENTAL ASSESSMENT:**

The proposed action is to provide staff with direction on any modifications concerning TraPac Terminal Program Assessment recommendations. As an administrative activity, Director of Environmental Management has determined that the proposed action is exempt from the requirements of the California Environmental Quality Act (CEQA) in accordance with Article II Section 2(f) of the Los Angeles City CEQA Guidelines.

#### **ECONOMIC BENEFITS:**

This Board action will have no employment impact.

#### **FINANCIAL IMPACT:**

The financial impact of the TraPac Terminal Development Program was previously presented in the Board action recommending approval of the Second Amendment to Permit 881. The Labor Liaison proposed will be selected by the Executive Director with the agreement term and amount falling within the Executive Director's authority limits (not to exceed one year and/or \$150,000). Funding in the amount of \$30,000 for the current fiscal year will from Account 54290, Center 0260, Program 000. Funding in the amount of \$150,000 for Fiscal Year 2014/2015 has been requested to be budgeted as

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part of the annual budget adoption process in Account 54290, Center 0260, Program 000.

**CITY ATTORNEY:**

The Office of the City Attorney has reviewed this Board report and finds there are no legal issues at this time.

**TRANSMITTALS:**

1. Excerpts from Los Angeles City Council File Number 13-1501
2. Final Draft of TraPac Terminal Program Assessment Report, February 28, 2014, by Bronner Group LLC
3. Container Terminal Automation Study

FIS Approval:  (initials)  
CA Approval:  (initials)

  
FOR MICHAEL R. CHRISTENSEN, P.E.  
Deputy Executive Director

APPROVED:

  
GARY LEE MOORE, P.E.  
Interim Executive Director

AUTHOR: M. Christensen  
BOARD MEETING: 4/3/2014

# CITY OF LOS ANGELES

CALIFORNIA



ERIC GARCETTI  
MAYOR

Office of the  
CITY CLERK

Council and Public Services  
Room 395, City Hall  
Los Angeles, CA 90012  
General Information - (213) 978-1133  
Fax: (213) 978-1040

SHANNON HOPPE  
Council and Public Services  
Division

[www.cityclerk.lacity.org](http://www.cityclerk.lacity.org)

HOLLY L. WOLCOTT  
Interim City Clerk

When making inquiries relative to  
this matter, please refer to the  
Council File No.

November 20, 2013

To All Interested Parties:

The City Council adopted the action(s), as attached, under Council File  
No. 13-1501, at its meeting held November 19, 2013.



City Clerk  
kw

ADMINISTRATIVE EXEMPTION and TRADE, COMMERCE, AND TOURISM COMMITTEE REPORT relative to proposed second amendment to a permit for the Trapac Terminal Program to undertake cargo handling operations at Berths 136-147.

Recommendations for Council action:

1. ADOPT the determination by the Los Angeles Harbor Department that the proposed action is exempt under the California Environmental Quality Act (CEQA) as provided in Article II, Section 2(i) of the Los Angeles City CEQA Guidelines.
2. APPROVE the second amendment to a permit for the Trapac Terminal Program to undertake cargo handling operations at Berths 136-147, in accordance with Section 606 and 654(a)(1) of the Los Angeles City Charter.
3. RATIFY all previous Executive Director and Board actions undertaken in connection with the improvements Permit No. 881 obligating the City to construct and deliver (including, but not limited to, appropriations and expenditures of funds, contract solicitation and award, and grant funding), so that such actions shall be deemed to have been made pursuant to Permit No. 881 as amended by this second amendment.
4. INSTRUCT the Los Angeles Harbor Department to report in 90 days with:
  - a. Specific procedural changes that will be made to rectify the issues raised in the reporting of this program to ensure that such issues to not reoccur.
  - b. A study on the impacts of automation, specifically on the impacts on the port, workforce, community, etc.; and a cost/benefit analysis that takes into consideration the competitive challenges facing the port.
  - c. A plan for integrating a liason between Labor and the Los Angeles Harbor Department vendors.

Fiscal Impact Statement: The City Administrative Officer (CAO) reports that Harbor Department (Port) estimates that the approximate revenue from the income producing property of the TraPac lease is \$2.26 billion over the life of the 30-year contract term. This amount is assuming an 8.75 percent Rate of Return, with compound growth rate for twenty-foot equivalent units (TEUs). The proposed second amendment to the agreement with TraPac Inc. will commit existing Port land and facilities assets, plus an additional capital expenditure to expand, improve and modernize Port-owned container cargo terminals, wharf and backland properties at Berths 136-147. The proposed amendment will increase TraPac's current budget of \$364,495,525, by a proposed amount of \$145,916,813, for a total budget of approximately \$510.4 million over a 30-year lease agreement. The Port secured grant funding of \$60,081,000, which will be used to off-set the Port of Los Angeles's projected shared budget to a net cost of \$450,331,388 for the TraPac Program. The Port will incorporate into future year's budget requests sufficient funds to address the proposed increase. All revenues will be deposited into the Harbor Revenue Fund and will have no financial impact on the City General Fund.

Community Impact Statement: None submitted.

**TIME LIMIT FILE - DECEMBER 8, 2013**

**(LAST DAY FOR COUNCIL ACTION - DECEMBER 6, 2013)**

SUMMARY

At a regular meeting held on November 19, 2013, your Trade, Commerce and Tourism Committee considered a Port transmittal relative to the proposed second amendment to Permit No. 881 with TraPac Inc., to design, develop and construct container terminal facilities at Port Berths 136-147. The CAO reports that the proposed amendment will allow the Port to modify and amend the TraPac Terminal Program's scope of work and budget, as follows: incorporate new automated container terminal operations; include corrections, clarifications, and technical changes (to the project scope); and increase the current \$364,495,525, budget by a proposed 45,916,813, for a total budget of approximately \$510.4 million over a 30-year lease agreement. The modified TraPac Program consists of 10 capital projects for wharves, rail facilities, building and gate complexes, an Alternative Maritime Power (AMP) system, an intermodal container transfer facility (ICTF), and the first automated terminal on the West Coast.

The ICTF serves to enhance the efficient flow of intermodal (truck and rail) cargo through the Port of Los Angeles and Port of Long Beach. These projects are intended to increase the efficiency of Port operations and will allow for the greater use of Port land and facilities in the future.

An opportunity for public comment was held. After a brief discussion, the Committee moved to approve the recommendations contained in the transmittal as amended in Committee as stated above. This matter is now forwarded to the Council for its consideration.

Respectfully Submitted,

TRADE, COMMERCE, AND TOURISM COMMITTEE



**ADOPTED**

NOV 19 2013

**LOS ANGELES CITY COUNCIL**

**FORTHWITH**

<u>MEMBER</u>	<u>VOTE</u>
LABONGE:	YES
BUSCAINO:	YES
BONIN:	YES

**-NOT OFFICIAL UNTIL COUNCIL ACTS-**

# The Port of Los Angeles TraPac Terminal Program Assessment

February 28, 2014  
Final Report



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## EXECUTIVE SUMMARY

### THE TASK AT HAND

Bronner Group LLC (BRONNER) completed its project to perform an independent, targeted assessment of the TraPac Terminal Development Program (TraPac Program) being implemented by the Port of Los Angeles (POLA). BRONNER conducted its assessment during January 2014.

### THE ASSESSMENT

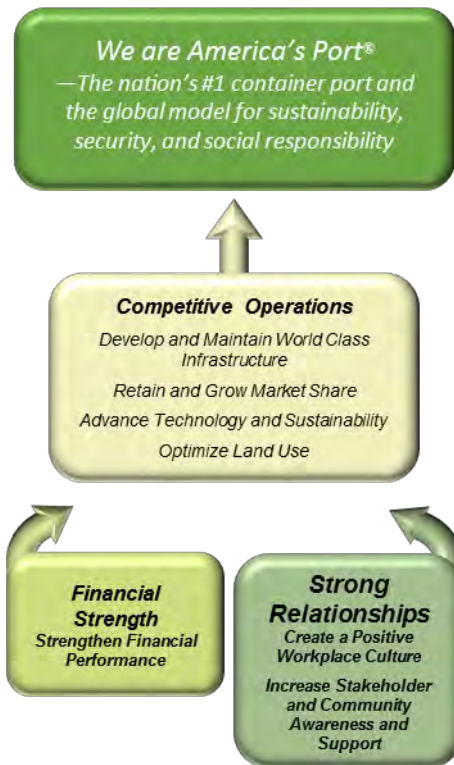
The assessment, which was recommended by an After Action Review (AAR) of the TraPac Program, was directed at analyzing TraPac Program-related events at POLA to identify lessons learned and recommend process changes and improvements that will enhance future project management.

BRONNER’s assessment built upon the work of the AAR and included an examination of documentation relating to pertinent POLA policies, procedures, and organizational and operating framework associated with the development, execution and management of capital projects and programs at POLA,<sup>1</sup> including:

- POLA policies and procedures
- POLA financial documentation
- TraPac Program project reports
- Executive-level TraPac Program project reports
- POLA 2012-2017 Strategic Plan
- June 2011 Industrial, Economic and Administrative Survey (IEAS)

Additionally, BRONNER conducted over 40 on-site and teleconferenced interviews and meetings with individuals engaged or affiliated with the TraPac Program, including current and former POLA staff, managers, and executives; members of the POLA Board of Harbor Commissioners (BOHC); and the AAR facilitator. Interviews focused on TraPac Program-related events; AAR findings and recommendations; and, discussions regarding project control, operations, and governance at POLA.

<sup>1</sup> Projects represent separate components of a larger comprehensive program. Projects can be added to a program through contract and/or lease negotiations between POLA staff and POLA tenants.



## LESSONS LEARNED

BRONNER found that POLA has a body of existing policies and procedures designed to facilitate and maintain a framework of internal controls and operating effectiveness. Additionally, POLA has already taken several proactive steps to address issues regarding the TraPac Program, including:<sup>2</sup>

- Utilizing budgeting and value engineering as cost control mechanisms within the authority of the TraPac contract
- Aligning the Program with the Port’s 2012-2017 Strategic Plan’s goals for growth and competitiveness
- Implementing changes to POLA leadership
- Initiating steps to enhance single point accountability structure

BRONNER’s assessment indicated that there exists a need for an Executive-sponsored, enterprise-wide initiative to enhance and restructure the current POLA operating framework to strengthen risk management and improve integration across business functions. Specifically, this initiative must address issues relating to:

- Promoting increased compliance with existing policies and guidelines in:
  - Project budget estimation
  - Project approval and authorization, particularly with regard to thresholds for submittal to City Council authorization
  - Permit amendment filing
- Developing additional policies and procedures regarding:
  - Project budget review and revision
  - Cost management across project lifecycle
  - Project status and cost reporting
  - Financial risk mitigation in lease agreements
  - Communication of Executive-level decision-making and the consequences of these decisions
  - Communication of decision-making to Executive level and BOHC
- Eliminating gaps in operating framework relating to:
  - Single point of project accountability
  - Efficient and/or accessible project status reporting



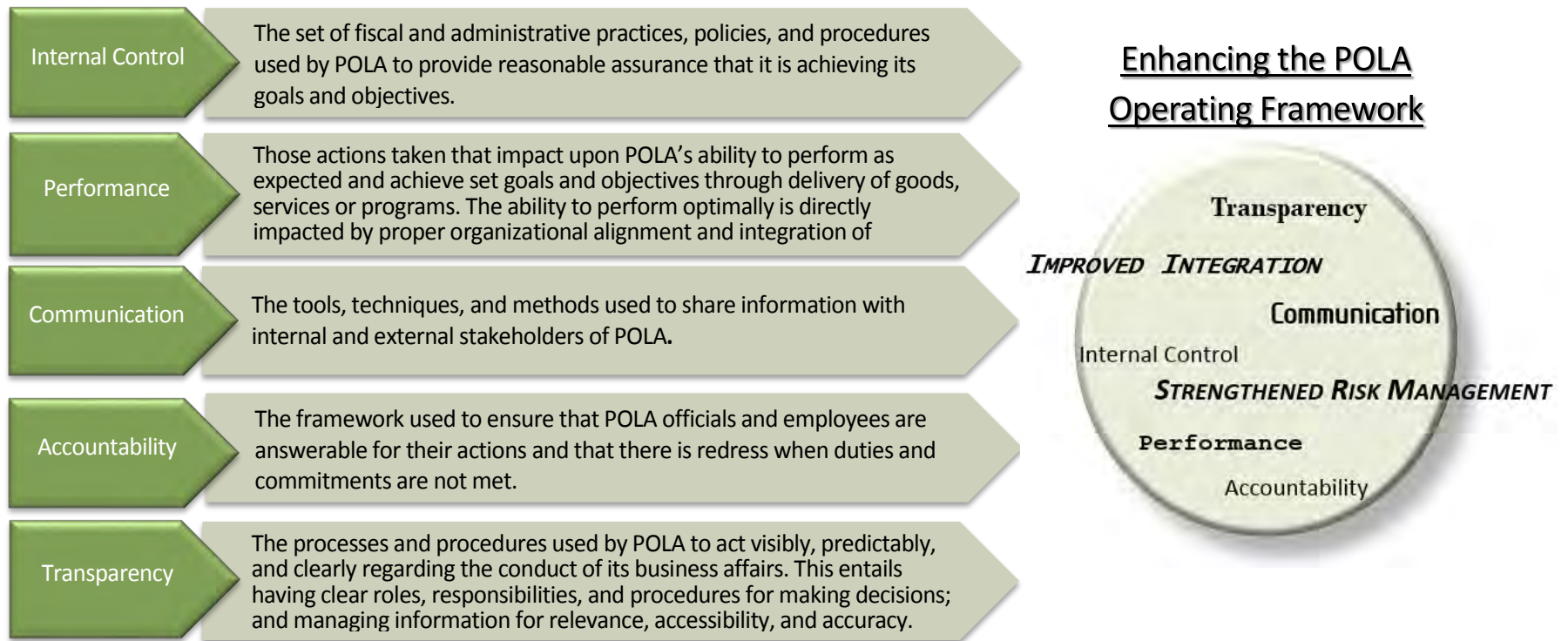
<sup>2</sup> Several of these actions have been identified in the AAR as “Practices to Sustain” for additional POLA projects and programs. See: Campos, Fernando, MPA. “After Action Review (AAR): TraPac Terminal Program – Permit No. 881.” 20 Dec. 2013.

## MOVING FORWARD: APPROACH, RECOMMENDATIONS, AND NEXT STEPS

### THEMATIC APPROACH

BRONNER identified two strategic themes emerging from its assessment that require Executive action: *integration* and *risk management*. The various lessons learned highlight a need for action to immediately improve (1) facilitation of well-informed enterprise-wide decisions about processes, capabilities, investments, resources, and other initiatives across the POLA enterprise, vertically and horizontally, to minimize fragmentation (“silos”); and, (2) the coordinated ability to identify, mitigate, and effectively manage risks faced across POLA’s portfolio of projects and investments.

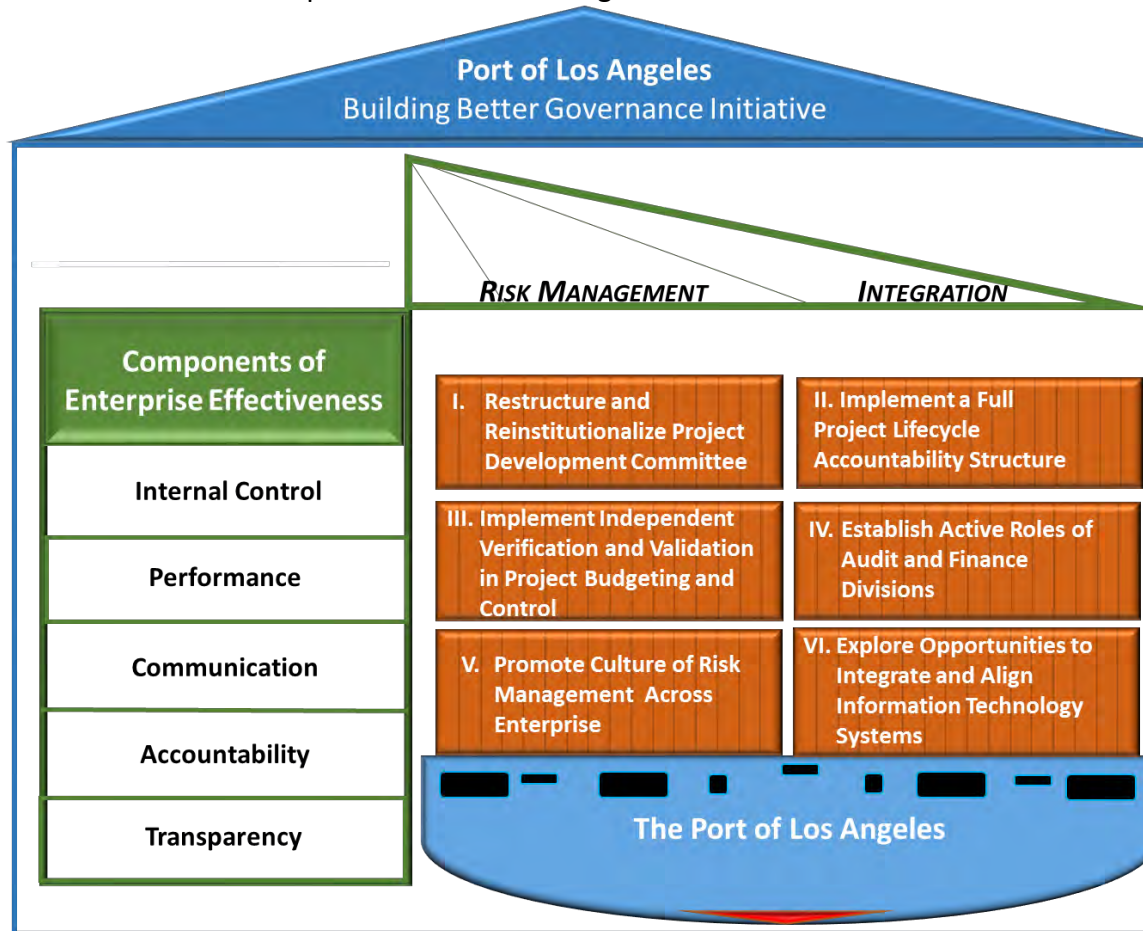
Thematically, BRONNER recommends that POLA commit to enhancing its operating framework through **IMPROVED INTEGRATION** and **STRENGTHENED RISK MANAGEMENT**. Five components that underpin effective integration and risk management, which significantly contribute to enterprise-wide effectiveness and strategic alignment, are identified below:



**RECOMMENDATIONS: BUILDING BETTER GOVERNANCE INITIATIVE**

Emanating from its assessment, BRONNER has developed the POLA *Building Better Governance Initiative* (BBGI), a high-level, leadership-driven enterprise-wide effort designed to enhance POLA’s operating framework by strengthening risk management and improving integration. The BBGI recommendations are informed and supported by the five components of enterprise effectiveness.

Within this assessment report, BRONNER acknowledges the findings of the June 2011 Industrial, Economic and Administrative Survey (IEAS) of the Port of Los Angeles and the AAR as relevant to BBGI. BRONNER’s recommendations complement several findings the AAR and the IEAS audit have identified.



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**BRONNER's proposed BBGI incorporates the following recommendations:****I. RESTRUCTURE AND REINSTITUTIONALIZE THE PROJECT DEVELOPMENT COMMITTEE (PDC)**

The PDC is a committee consisting of managers and Deputy Executive Directors (DEDs) from several divisions that meets monthly to assess projects for submission to BOHC. The PDC has been viewed as being too informally structured and lacking robust standards for project prioritization and control. POLA would benefit from restructuring the PDC to provide greater oversight of project approvals, reporting, and budgeting, as well as reinstitutionalizing the PDC with the authority to establish high standards for greater project and initiative-related internal control, accountability and transparency among divisions and departments.

**II. IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE**

Project managers are currently assigned to each project to act as points of oversight and internal control in addition to their overall responsibility to deliver a completed capital project. Project managers frequently see the structure of project management as defined by the responsibilities of the respective project manager's division. This structure contributes to communication breakdowns and hampers the ability of POLA staff to obtain a complete and accurate understanding of a project's current status in a timely manner. BRONNER recommends that POLA identify and implement a structure that achieves the primary goal of "a single person point of accountability" across the full project development lifecycle or program delivery implementation. The assignment for a single point of project accountability must be empowered with clearly defined roles and responsibilities that would: a) provide for full accountability in managing the budget, scope and schedule of a project/program; b) facilitate enterprise-wide communication and awareness of project status and pertinent information; and, c) ensure identification, communication and resolution of issues impacting budget, scope and schedule.

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**BRONNER's proposed BBGI incorporates the following recommendations:**

- III. IMPLEMENT INDEPENDENT VALIDATION & VERIFICATION (IVV) IN PROJECT BUDGETING AND CONTROL**  
POLA utilizes multiple internal control structures to provide project oversight in the areas of compliance, cost, and scheduling, including reporting documents that tie project cost estimations to the annual POLA budget. These structures do not contain sufficient information regarding changes to project budgets to inform assessments of POLA's long-term financial sustainability or evaluation of POLA's long-term priorities. POLA would benefit from increasing the number and effectiveness of control points built into the project lifecycle and financial assessment processes to facilitate more robust risk management and establish an enterprise-wide context for each project's impact on POLA revenues, costs, and strategic goals. The utilization of procedures that engage third parties to perform reviews of certain project reports and budgets can achieve many of these outcomes for POLA. These validation and verification processes can be performed by independent consultants or project teams that cross-check each other's projects.
- IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT**  
While the Divisions of Audit, Financial Analysis, and Budget Group each play critical roles in the project lifecycle and oversight processes, these Divisions frequently provide input only in response to requests for information. Under this scenario, these Divisions have limited opportunity to provide more proactive and routine oversight, compliance assurance, and risk advisory services throughout the project lifecycle. POLA would benefit from expanding the roles these Divisions play and establishing procedures that augment their ability to engage at the earliest stages in the project lifecycle and enhance internal control, accountability and oversight in the areas of cost management, risk management, and regulatory compliance.

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**BRONNER's proposed BBGI incorporates the following recommendations:****V. PROMOTE CULTURE OF RISK MANAGEMENT ACROSS ENTERPRISE**

During the TraPac Program development process, differing interpretations of the authority of Executive-level decision-making among POLA DEDs led POLA to advance the TraPac Program without receiving sufficient authorization from BOHC or the City Council at that time. The DED of Business Development moved the TraPac Program forward contrary to the requirements of the project approval process. To establish and reinforce enhancements across the POLA operating framework, leadership must set a clear “tone-at-the-top” that prioritizes risk management; ensures compliance with established rules and guidelines; and, integrates the components of enterprise effectiveness into the POLA operating framework. Similarly, POLA leadership would benefit from engaging with the Office of the City Attorney to identify and implement policies and procedures that reduce exposure to financial risk and regulatory non-compliance within tenant agreements.

**VI. EXPLORE OPPORTUNITIES TO INTEGRATE AND ALIGN INFORMATION TECHNOLOGY SYSTEMS**

POLA divisions utilize multiple disparate information technology systems to monitor the status and budgets of projects. Various major systems reside and are managed by different divisions and typically contain information that is most relevant to each division's respective tasks and responsibilities. As a result, reports that are generated by each system may not present and/or include other relevant project information that is required at the executive and enterprise levels. In order to readily access and share comprehensive, accurate and timely project information, POLA should explore opportunities for streamlined integration of information management systems and processes across the various divisions.

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**NEXT STEPS: ALIGNING BBGI WITH THE PORT'S 2012 – 2017 STRATEGIC PLAN**

The Building Better Governance Initiative (BBGI) offers POLA a set of recommendations to address identified issues and improve integration and strengthen risk management across the POLA enterprise. BRONNER believes each recommendation in this report should be appropriately considered for timely action.

In this report, BRONNER identifies and discusses specific recommendations and key action items to address lessons learned arising from the assessment of the TraPac Program. The assessment report also includes an implementation plan that prioritizes each recommendation, establishing accountability for implementation and suggesting time frames to accomplish the recommendations and key action items.

It is important to acknowledge the actions POLA has already undertaken to implement the lessons learned discussed in the AAR. POLA's rapid response demonstrates a notable dedication to improve its project management and cost management structures. With POLA's impressive effort already underway, BRONNER presents the BBGI as a complementary plan that will empower POLA to build on these initial accomplishments and enhance its framework of integration and risk management. Through BBGI, POLA can strengthen its operating framework and enhance its alignment with the Port's 2012-2017 Strategic Plan. With a focus on risk management and integration, BBGI will better enable POLA to advance its competitive operations, augment its relationships with internal and external stakeholders, and reinforce its financial strength.

## INTRODUCTION

### BACKGROUND

Between 2009 and 2013, a terminal development program executed by the Port of Los Angeles (POLA) on behalf of its tenant, TraPac, Inc. (TraPac) increased in estimated and approved cost from \$245 million to \$510 million, due in large part to a change in project scope from a conventional terminal to an automated terminal. During a September 2013 meeting of POLA's governing body, the Board of Harbor Commissioners (BOHC), the then-Executive Director produced a report attributing cost overruns to the change in project scope. The report acknowledged these scope changes were not approved by BOHC or the City Council. The BOHC must approve any expenditure greater than \$150,000 associated with a project, and the City Council must approve any lease or agreement with a duration longer than three years.<sup>3</sup>

As a result of these project control lapses and cost overruns, an After Action Review (AAR) of the TraPac Terminal Development Program (TraPac Program) was conducted. The AAR identified lessons learned and offered recommendations. To address the AAR's recommendation for an independent review, POLA has engaged Bronner Group, LLC (BRONNER) to conduct a targeted assessment of the TraPac Program.

### OBJECTIVES

The objective of BRONNER's assessment was to identify lessons learned based on a review of the TraPac Program and recommend process changes and improvements to enhance future project management.

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<sup>3</sup> See "Port of Los Angeles Engineering Division Policy and Procedure Manual – Operations: 4.2 Board Agreements." The TraPac Program is part of a 30-year lease term.

## **APPROACH & METHODOLOGY**

For this assessment, BRONNER conducted a series of stakeholder interviews with staff and management from several POLA divisions and departments, including Engineering, Real Estate, Finance, Audit, Legal, and Business Development. BRONNER also interviewed current and former members of the BOHC and the facilitator of the AAR. The consulting team conducted a detailed review of POLA documentation related to project development, management, and reporting; budgeting and cost estimation; department organization and oversight; and, strategic planning. The interviews and documentation review were conducted during January 2014.

Based on its analysis, BRONNER has prepared this report which identifies lessons learned from its assessment and presents recommendations for enhancements to POLA integration and risk management frameworks, along with an implementation plan to facilitate POLA's ability to act upon these recommendations.

## RELEVANT TRAPAC TERMINAL DEVELOPMENT PROGRAM EVENTS

### 1997

- TraPac Master Schedule started to construct container terminal

### 1997 – 2005

- POLA constructs TraPac terminal development projects

### 2007

- BOHC certifies EIR for TraPac Terminal Development Program at Berths 136-147

### 2008

- POLA completes design for Berths 145-147 and awards construction contract

### 2009

- POLA formalizes lease for TraPac Program with TraPac in Permit 881 at an initial budget of \$245M
- Permit 881 approved for rubber-tire gantry crane system
- TraPac expresses interest in a fully-automated system

### 2010

- TraPac requests changes in project scope for terminal automation
- Engineering and Real Estate Divisions prepare Second Amendment to Permit No. 811

### PREVIOUS WORK CONDUCTED WITH TRAPAC

A TraPac Master Schedule for terminal infrastructure upgrades has been in place since April 1997. Between April 1997 and September 2005, POLA developed multiple projects on behalf of TraPac, including wharf replacements and a new electrical substation.

In December 2007, the BOHC certified the Final EIR for the TraPac Terminal Development Program, which assumed the use of rubber-tired gantry cranes at the terminal. In September 2008, the design for the Wharf Improvements program at Berths 145-147 were completed and the construction contract was awarded. The design process had progressed during the EIR process.

### INITIATION OF THIRTY-YEAR LEASE RENEWAL WITH TRAPAC

On August 13<sup>th</sup>, 2009, the BOHC approved a lease with TraPac to renew its lease of Berths 136-147 with POLA. In September 2009, this lease was formalized in Permit No. 881, which established a 30-year lease term for TraPac to conduct cargo handling operations at POLA and obligated POLA to enhance terminal infrastructure with an initial project budget of \$245 million.

### SHIFT TO AUTOMATED TERMINAL DESIGN

During design meetings with the Engineering Division In November 2009, TraPac representatives expressed interest in the development of a fully-automated system at the terminal. While terminal automation technology has been deployed at the Port of Virginia in Norfolk, VA, terminal automation is a new and innovative technology and represents an untested practice for any US port on the West Coast.

## **2011**

- Executive Director signs Letter of Agreement with TraPac that accepts new project scope
- Deputy Executive Director of Business Development instructs Real Estate Division to not move forward with Amendment

## **2012**

- Engineering Division contracts with CH2M Hill to review project design
- BOHC approves revised TraPac project budget of \$364.5M

## **2013**

- BOHC receives revised project budget of \$510M
- Executive Director submits report to BOHC with discussion of project cost overruns and incomplete permit amendment
- After Action Report on TraPac program released

## **2014**

- POLA engages BRONNER to conduct independent review of TraPac Program

### **HALTING WORK ON PERMIT AMENDMENT**

In March 2010, TraPac formalized the development of terminal automation by requesting a change to the project scope established in Permit No. 811. The Real Estate Division (RED) prepared the Second Amendment to Permit No. 811 with a revised project budget of \$272.8 million, with the Engineering Division providing supporting documentation.<sup>4</sup> However, in April 2011, the Deputy Executive Director (DED) of Business Development instructed the RED to not proceed with filing the amendment, as the DED had concluded that the amendment was unnecessary.

The DED of Business Development made this decision based on action taken by the former Executive Director. In March 2011, the Executive Director signed and issued a Letter of Agreement with TraPac that agreed to the project scope change and the costs associated with terminal automation. TraPac had committed its own funds to the project, which led the DED of Business Development to conclude that additional revenue or cost sharing provisions were not necessary. The DED of Business Development concluded the lack of change in compensation meant that an amendment to the Permit was not necessary.

### **MOVING FORWARD WITH PROJECT DESIGN**

With the Letter of Agreement issued, the Engineering Division moved forward into project design. The Engineering Division contracted with CH2M Hill, an engineering consulting firm which had worked with the Port of Virginia on its terminal automation project, to verify cost estimations for the TraPac Program project design. Following the design review, the budget for the project was increased to \$364.5 million. The Board approved the revised budget at the April 2012 meeting.

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<sup>4</sup> POLA had previously filed an Amendment to include policy changes that did not materially impact project scope.

### **COST ESCALATIONS RAISE FLAG ON ABSENT PERMIT AMENDMENT**

In January 2013, the BOHC Audit Committee was informed of further project cost escalations. At the April 2013 meeting of the Audit Committee of the BOHC, the Committee received a revised project cost estimate of \$510 million. In September 2013, the Executive Director presented the BOHC with a report that described the sources of the cost overruns, acknowledged the error of choosing not to process the Second Amendment, and requested the Board's approval of the project budget and the Second Amendment. The report also requested an independent review of the project to assess POLA project management processes. The Board approved these requests, with the Mayor of Los Angeles publicly concurring with the need for an assessment.

### **INDEPENDENT ASSESSMENTS OF THE TRAPAC PROGRAM**

In December 2013 an After Action Review (AAR) of the TraPac Program identified lessons learned from the project and established corrective actions to address and mitigate the events of the Program. Recommendations in the AAR included the performance of an independent review by a third party outside the City of Los Angeles government. POLA engaged BRONNER in January 2014 to conduct this assessment.

### **RELATED ISSUES ASSOCIATED WITH TRAPAC EVENTS**

The events described above highlight key issues, which reflect systemic gaps in POLA's operating framework. These issues include the following:

- Substantial increases in project cost estimations<sup>5</sup>
- Significant delay in permit amendment filing
- Failure to follow established tenant lease policies and procedures
- Communication gaps between POLA Divisions, management, and BOHC
- Lack of single point of project accountability across project lifecycle
- Lack of clarity regarding the roles and responsibilities of project manager through the project lifecycle
- Ineffective action taken to revise tenant lease to adequately protect POLA against financial risk

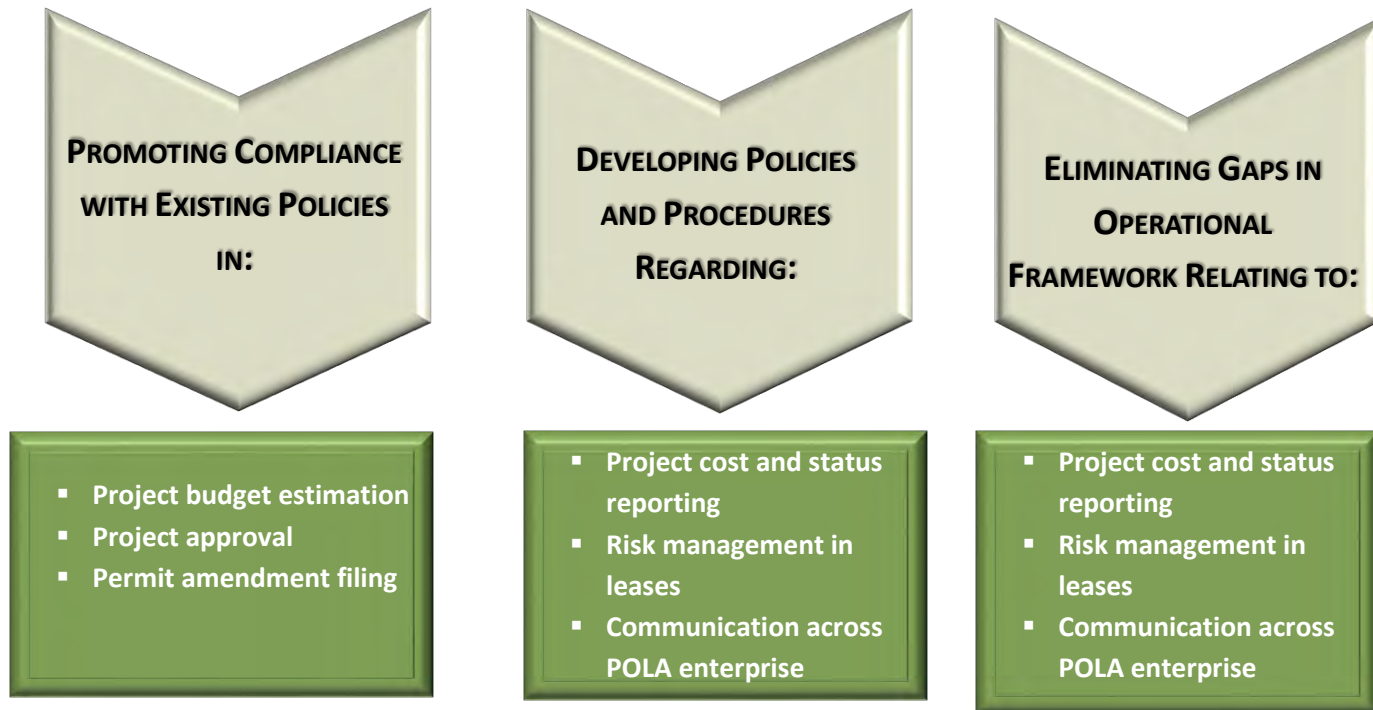
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<sup>5</sup> While a substantial portion of the cost increase was due to a change in project scope that occurred after preparation of the initial project budget, inadequate policies for cost management, including inadequate review of cost estimations prepared by outside consultants and insufficient verification of POLA staff assumptions regarding costs of unfamiliar technology, generated additional cost overruns.

## ISSUES

### Identified Issues and Components of Enterprise Effectiveness

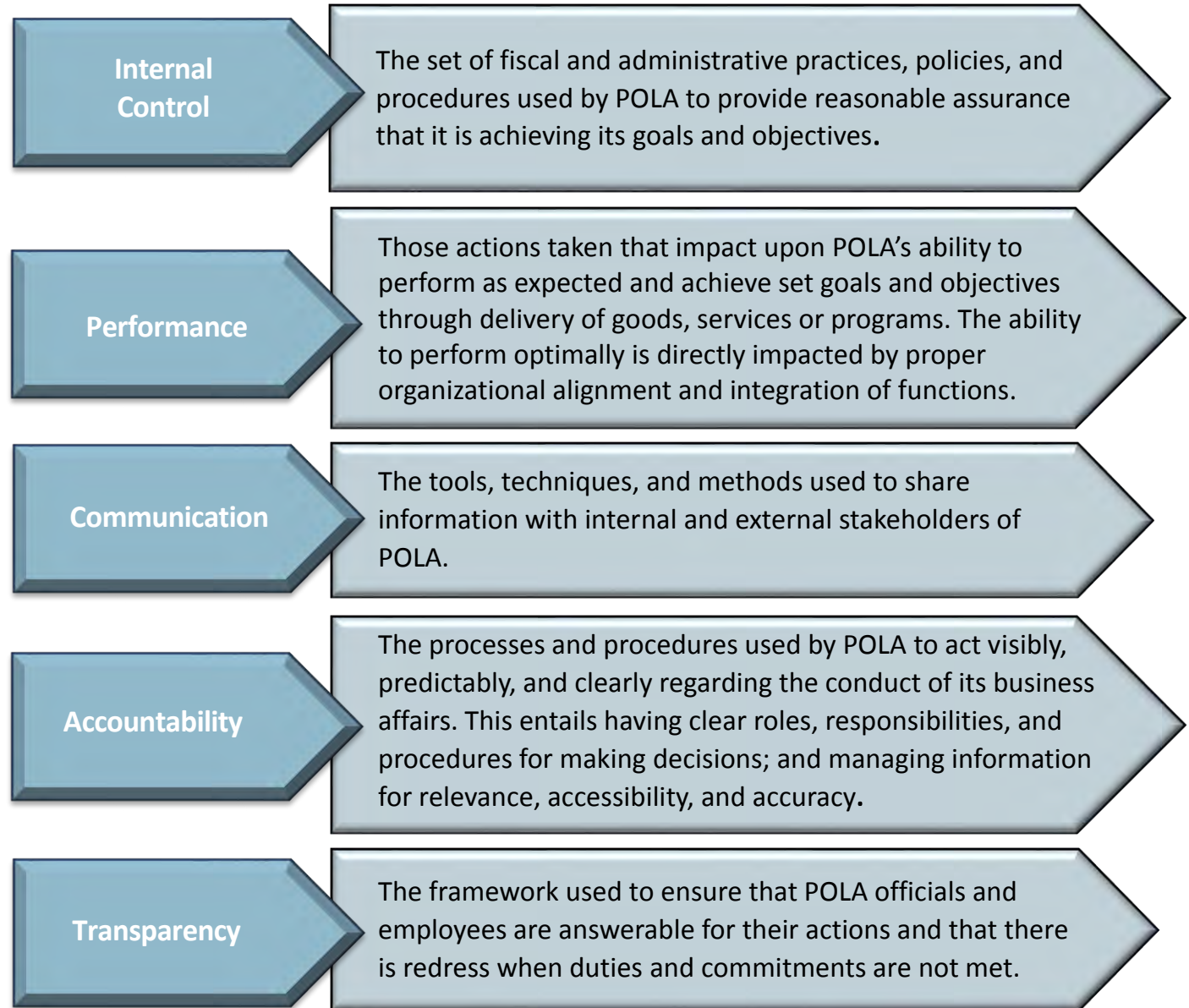
For its assessment, BRONNER reviewed the capability and responsiveness of POLA’s operating framework for project and cost control, communication and accountability in reporting, and compliance with policies and procedures. The assessment of key TraPac Program events identified issues for POLA to address relating to:



From the identified issues, BRONNER recognizes several opportunities to enhance the POLA operating framework in five key components of enterprise effectiveness. Public Sector enterprise effectiveness covers the policies, procedures, and leadership that an agency uses to guide its strategic planning and decision-making, ensure that objectives are met, and operates efficiently and effectively.<sup>6</sup>

<sup>6</sup> Briggs, Lynn. “Building Better Governance.” *Australian Public Service Commission*. 2007.

The relevant components of enterprise effectiveness are: Internal Control, Performance, Communication, Transparency, and Accountability:

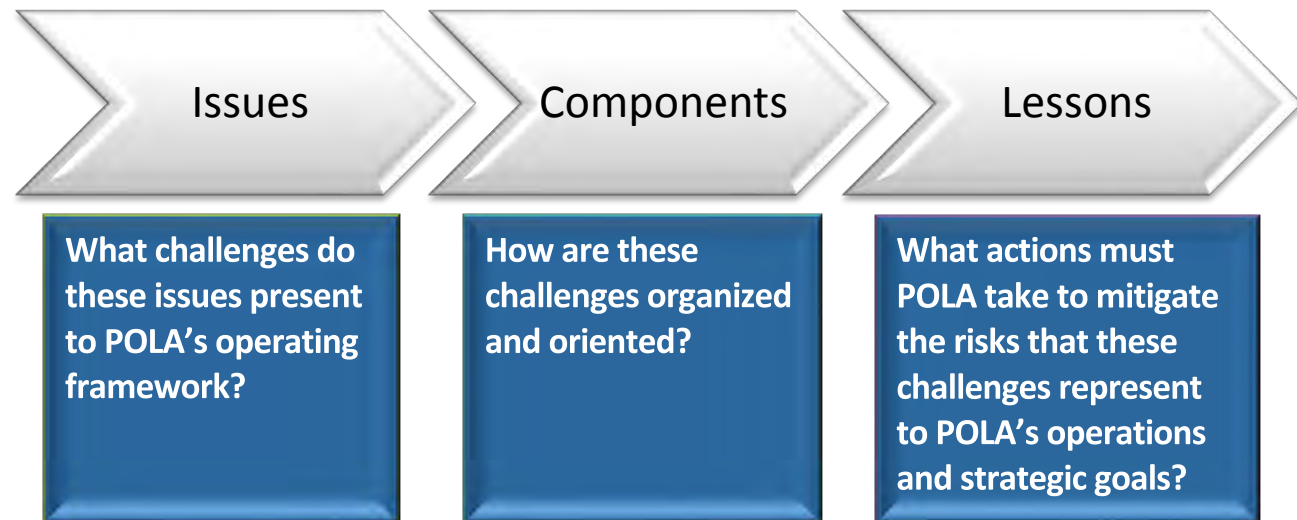


## LESSONS LEARNED

### Identification of Lessons Learned and Components of Enterprise Effectiveness

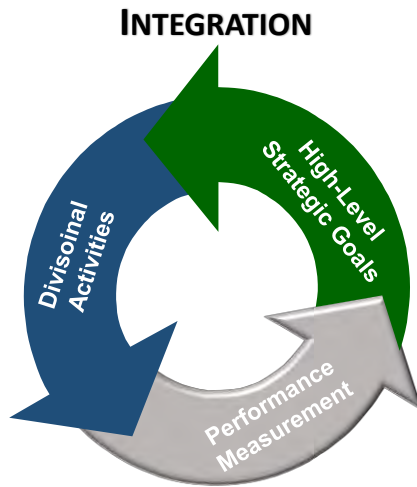
BRONNER’s assessment of the identified issues and the components of enterprise effectiveness leads towards two overarching lessons learned: POLA must improve integration across the enterprise and strengthen risk management processes in its operating framework. Addressing these opportunities will enable POLA to enhance its operating framework within the five components of enterprise effectiveness. It is critical that POLA leadership, management, and staff understand that the components of enterprise effectiveness directly relate to the two approached highlighted in BRONNER’s lessons learned: risk management and integration.

The graphic on the following page demonstrates the alignment between the lessons learned established in BRONNER’s assessment and the five components of enterprise effectiveness.



## LESSONS LEARNED - INTEGRATION

**INTEGRATION** is a systematic and analytical approach to organize an agency's project development and management practices and operations into a cohesive, enterprise-wide system. In an integrated agency, operational planning flows from an agency's strategic goals and priorities to its divisional activities, and a system of performance measurement and evaluation ties every agency function back to its priorities.<sup>7</sup> The five key components of enterprise effectiveness correlate with a robust integration framework:



### ***Internal Control – Integration as Quality Assurance***

- With the establishment of clear performance standards that define and measure success at all levels of the agency, integration facilitates the direct association between staff-level efforts and agency-level goals.

### ***Performance – Integration as Top-Level and Enterprise-Wide Perspective***

- Integration from strategic goals to divisional activities provides a comprehensive perspective of agency operations and facilitates the development of streamlined business operations flow that reduces redundancies and inefficiencies.

### ***Communication – Integration as Inter-Divisional Connectivity***

- An integration framework consistently sets and affirms the standards for actions, responsibilities, and regulations, as well as affirms them through a consistent system that extends across divisions to reduce the risk of misinterpretation and unnecessary redundancies.

<sup>7</sup> Briggs, Lynn. "Building Better Governance." *Australian Public Service Commission*. 2007.

## LESSONS LEARNED - INTEGRATION

### ***Accountability – Integration as Leadership-Driven, Cross-Division Monitoring***

- Integration requires a clear understanding of actions that need to be taken by players in the business process flow, since every division must be aware of a project’s status and ability to progress. Accountability therefore moves up and down organizational hierarchies and transfers across divisions within the integrated agency. Leadership plays a critical role in establishing clear standards as a “tone-at-the-top” that cascades down from the Executive to the divisions.

### ***Transparency – Integration as Seamless System***

- Integration requires a clear and accessible system for the exchange of information and the hand-off of information. Under an integrated operating framework, every step in the project lifecycle has a direct point of responsibility for action, completion, and evaluation.

## LESSONS LEARNED - RISK MANAGEMENT

**RISK MANAGEMENT** is a systematic and analytical process to account for threats to an agency’s assets, evaluate the probability of each threat, and identify actions that reduce the probability of the risk and mitigate its consequences.<sup>8</sup> As with integration, the five key components of enterprise effectiveness directly relate to effective risk management:



### ***Internal Control – Risk Management as Agency-Level Initiative***

- Risk is managed in an integrated and enterprise-wide approach that focuses on alignment of strategy, objectives, risks, and controls in each business process and each department not only sustaining financial viability but achieving agency-wide goals that secure the organization’s existence.

### ***Performance - Risk Management as Driver of Agency Excellence***

- Integrated risk management approaches protect against potential downsides and enhance overall business performance through risk minimization and optimization of internal controls for compliance, fiscal sustainability, and performance management.
- Risk management facilitates consistency of cost management across multi-department, multi-year project lifecycles.

### ***Communication – Risk Management as Comprehensive Approach***

- Governments are challenged to move away from a “silo-by-silo” approach to manage risk more comprehensively and coherently.

### ***Accountability – Risk Management as Leadership Initiative***

- Risk assessment and monitoring are now built into the organizational structure and driven by executive-level management to manage and measure all aspects of risk.

### ***Transparency - Risk Management as Safeguard of Public Trust***

- Establishment of an oversight framework to minimize risk and maintain costs enhances the transparency and accountability of agency operations.

<sup>8</sup> Decker, Raymond J. United States Government Accountability Office. 31 Oct. 2001.

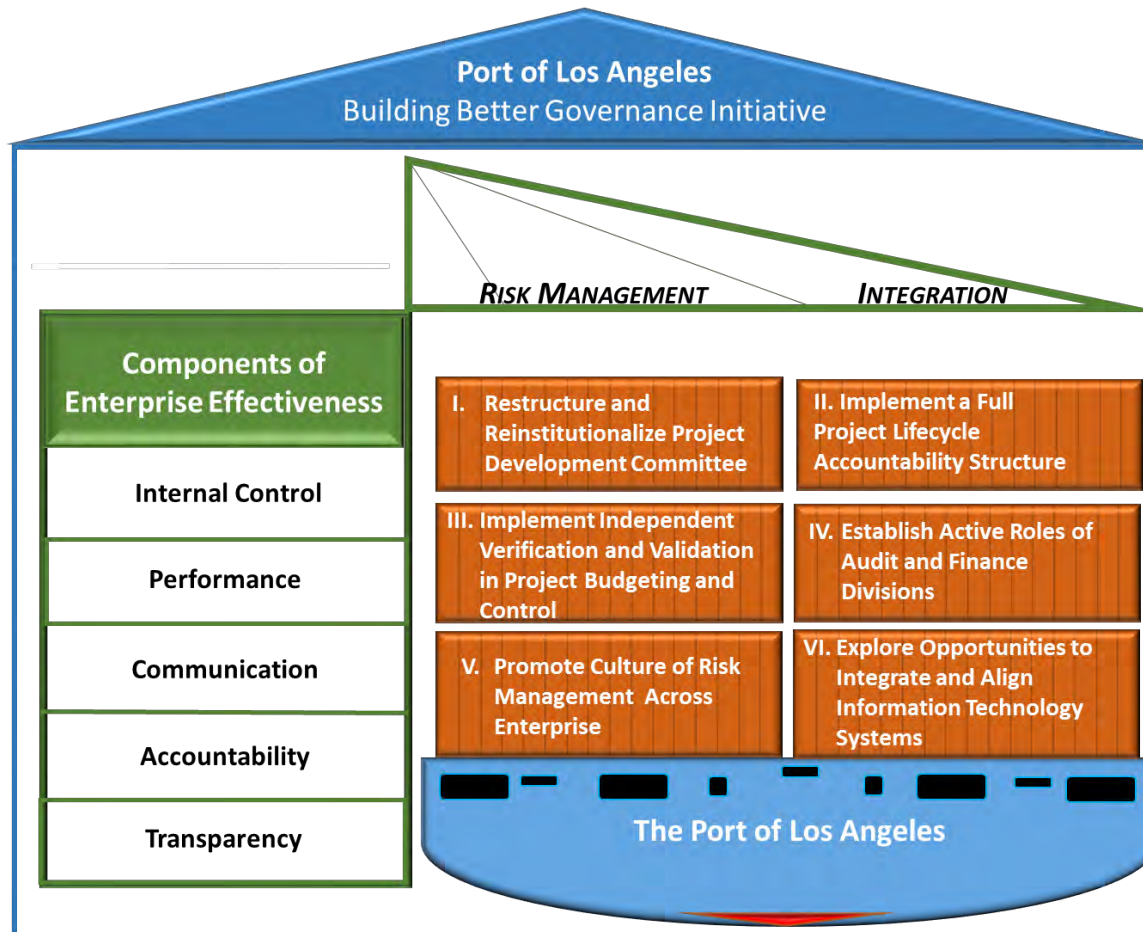
## LESSONS LEARNED - SUMMARY

### Alignment of Lessons Learned and Components of Enterprise Effectiveness in Integration and Risk Management



## RECOMMENDATIONS – BUILDING BETTER GOVERNANCE INITIATIVE

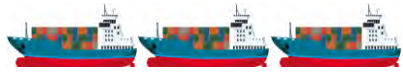


BRONNER has organized its recommendations for enhancing the POLA operating framework into a comprehensive, leadership-driven plan: the Building Better Governance Initiative (BBGI). BBGI links every action to the components of enterprise effectiveness to ensure POLA can expand its capacity for optimal risk management and enterprise integration. BBGI provides clear, measurable actions to enhance performance and oversight across the organization in seamless alignment with the Port’s 2012-2017 Strategic Plan.



## RECOMMENDATIONS, KEY ACTIONS, AND PRIORITY RANKING

The following pages present each recommendation and discuss the recommendation’s associated key action items. These discussions provide each key action item’s purpose and scope parameters. Each page presents target outcomes that can act as criteria for evaluation of POLA’s progress in the implementation of these recommendations.

Recommendation priority rankings are assigned using the following system:

	<p><b>HIGH PRIORITY</b></p>
	<p><b>MEDIUM PRIORITY</b></p>
	<p><b>LOW PRIORITY</b></p>

Each page highlights goals and objectives of the Port’s 2012-2017 Strategic Plan that the recommendations support and advance. As identified in the 2011 IEAS audit, formal connection between POLA project management and POLA strategic goals can play a critical role in enterprise-wide management and performance effectiveness.<sup>9</sup>

The six recommendations are as follows:


- I. RESTRUCTURE AND REINSTITUTIONALIZE PROJECT DEVELOPMENT COMMITTEE
- II. IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE
- III. IMPLEMENT INDEPENDENT VALIDATION & VERIFICATION (IVV) IN PROJECT BUDGETING AND CONTROL
- IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT
- V. PROMOTE CULTURE OF RISK MANAGEMENT ACROSS ENTERPRISE
- VI. EXPLORE OPPORTUNITIES TO INTEGRATE AND ALIGN INFORMATION TECHNOLOGY SYSTEMS

<sup>9</sup> Thompson, Cobb, Bazilio and Associates and Norbridge, Inc. “Industrial, Economic and Administrative Survey Report: Los Angeles Harbor Department.” June 2011.

“The Port of Los Angeles is the nation’s number one port and is a major economic driver for our local, regional, and national economy. ... Keeping our port at peak performance is key.”


Mayor of Los Angeles  
Eric Garcetti  
in 89.3 KPCC Southern  
California Public Radio  
October 22, 2013

## RECOMMENDATION I: RESTRUCTURE AND REINSTITUTIONALIZE PROJECT DEVELOPMENT COMMITTEE

- 
- ➔ **Review and formalize Project Development Committee charter, membership and participation rules**
    - PDC policies and procedures will clearly establish the Committee's authority and balance authority and decision-making between PDC, ED, and BOHC
    - PDC structure and participation rules will include specific guidelines for ED's engagement and participation in the PDC
  
  - ➔ **Establish and formalize criteria, policies and procedures for PDC to assess project at different lifecycle stages**
    - PDC will set a "tone-at-the-top" to demonstrate high-level commitment to robust project control and quality management that protects POLA against financial risk
  
  - ➔ **Implement policies and procedures for divisions to submit and review project status reports with PDC**
    - PDC policies and procedures will establish a workflow of project review and approval to the BOHC, including project deliverables
    - Policies and procedures will include a framework for change control that can account for modification in assumptions for a project's business case

## RECOMMENDATION I: RESTRUCTURE AND REINSTITUTIONALIZE PROJECT DEVELOPMENT COMMITTEE

### DESIRED STRUCTURE AND AUTHORITY FOR PROJECT DEVELOPMENT COMMITTEE



**Determine assignment of responsibilities  
in project review and approval process**

Which PDC member(s) can and should do what?

**Define needs and objectives for  
project review and approval**

What does the PDC want to do?

What are the PDC's objectives?

- Risk management
- Integration

**Determine authority and capacity  
for project review and approval**

Which PDC member(s) can and should do what?

- Legal framework
- Political realities

**Priority Level**



## RECOMMENDATION I: RESTRUCTURE AND REINSTITUTIONALIZE PROJECT DEVELOPMENT COMMITTEE

### Target Outcomes

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- Adequate number of control points in project lifecycle under PDC oversight
- Established schedule of PDC meetings and agendas
- Reduction in project cost overruns
- Reduction in non-compliant actions

### Alignment with 2012 – 2017 Strategic Plan Goals and Objectives

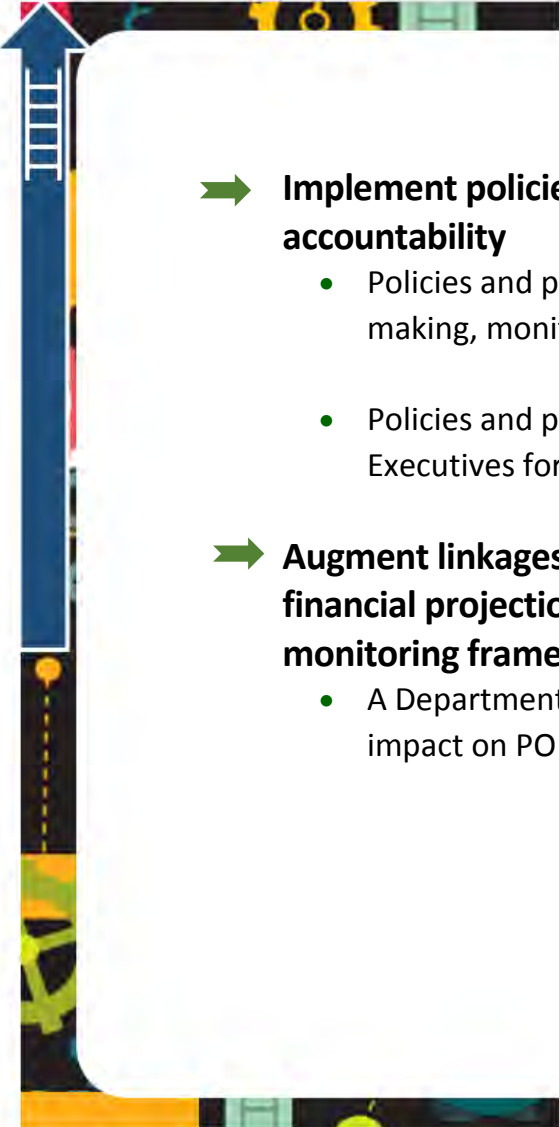
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- Competitive Operations
- Financial Strength
- Grow Market Share
- Strengthen Financial Performance

## RECOMMENDATION II: IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE

- 
- ➔ **Redefine or expand the project management roles and responsibilities that would enable a single human point of accountability throughout a project's full development lifecycle**
    - Project Accountability structure must foster effective collaboration and coordination among all staff from various divisions
    - Consider expanding the current concept and designation of a Project Manager, which does not necessarily have to be from the Engineering Division
    - Roles, responsibilities and authority of the Project Manager will be based on the requirements of the project scope and lifecycle, not necessarily on the staff's position within the POLA organizational structure
    - Roles, responsibilities and authority of the Project Manager will be clearly defined across the various stages of the lifecycle and in relation to staff from other divisions
    - Roles and responsibilities of project team members across divisions will be clearly defined across the various stages of the lifecycle and in relation to the Project Manager

## RECOMMENDATION II: IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE

- 
- ➔ **Implement policies and procedures that would support a single point of accountability**
    - Policies and procedures must facilitate effective cross-divisional participation, decision-making, monitoring, and reporting
    - Policies and procedures will clearly define participation and involvement of POLA Executives for executive oversight, directions, and issue resolution
  
  - ➔ **Augment linkages between project budgets, CIP, annual POLA budget, long-term financial projections, and strategic goals through consistent, enterprise-wide monitoring framework**
    - A Department-wide context is necessary to evaluate each project in terms of its overall impact on POLA's financial sustainability

## RECOMMENDATION II: IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE

### Transitioning to Full Accountability



#### Current Project Management Structure

**Project Manager:** Responsible for day-to-day operational management and information management

**Project Sponsor:** Responsible for strategic decisions regarding project

#### Future Project Accountability Structure

**Project Manager:** Single Human point of accountability with appropriate level of authority to obtain and manage information, move projects forward, and elevate issues for resolution

#### Priority Level



## RECOMMENDATION II: IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE

### Target Outcomes

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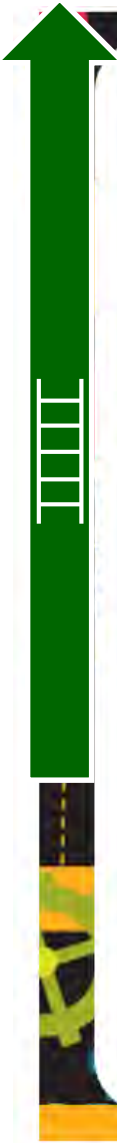
- Department-wide use of Project Lifecycle Accountability Structure as primary source of project information and decision-making
- Quicker communication of specific information to Executive level
- Enhanced consistency of data and information between divisions
- Improved outcomes in POLA performance metrics measuring financial sustainability

### Alignment with 2012 – 2017 Strategic Plan Goals and Objectives

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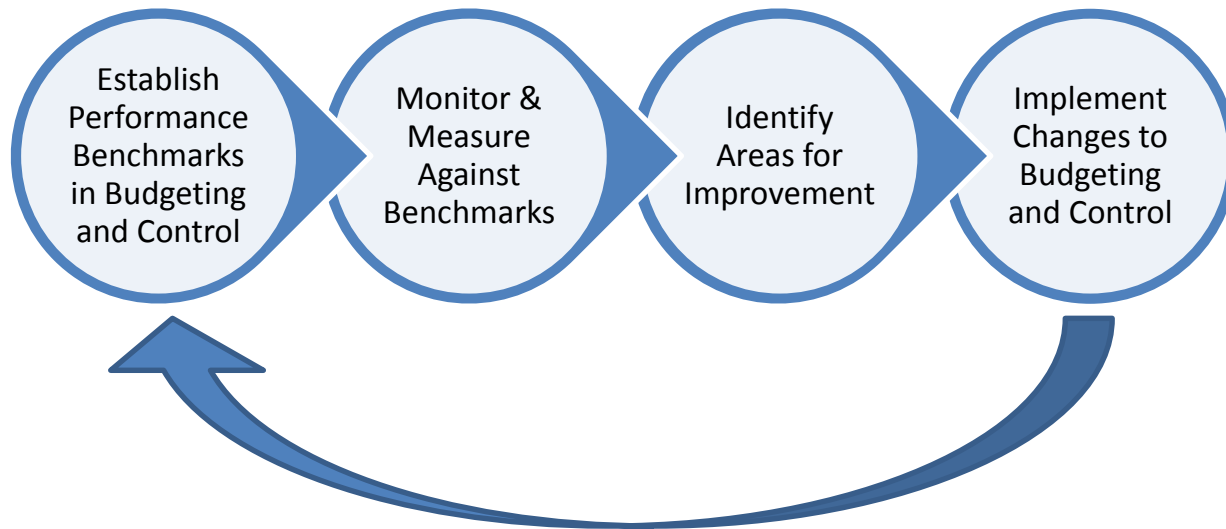
- Competitive Operations
- Financial Strength
- Grow Market Share
- Strengthen Financial Performance

## RECOMMENDATION III. IMPLEMENT INDEPENDENT VALIDATION & VERIFICATION (IVV) IN PROJECT BUDGETING AND CONTROL

- 
- **Establish policies and procedures for review of cost estimations**
    - Cost estimation reviews will operate both internally and externally
    - Outside consultation will provide project cost review services, but not as a substitute for internal controls on project cost management
  - **Establish verification and validation processes at multiple control points across project lifecycle**
    - Responsibility for processes will not belong to any single division or project team
    - Processes will rely on the technical expertise of each division
  - **Facilitate and strengthen linkage between initial budgets, subsequent revisions, and budget tracking**
    - Tracking history of budget revisions within each project will facilitate the identification and mitigation of project cost overruns
  - **Implement policies and procedures for communication and distribution of project information**
    - Specific standards and reporting structures are necessary to ensure that the flow of budget information is consistent and accurate

## RECOMMENDATION III. IMPLEMENT INDEPENDENT VALIDATION & VERIFICATION (IVV) IN PROJECT BUDGETING AND CONTROL

### Independent Verification and Validation



#### Priority Level



## RECOMMENDATION III. IMPLEMENT INDEPENDENT VALIDATION & VERIFICATION (IVV) IN PROJECT BUDGETING AND CONTROL

### Target Outcomes

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- Reduction in project budget revisions
- Fewer project cost overruns
- Adequate number of control points in project lifecycle
- Improved outcomes in POLA performance metrics measuring financial sustainability
- Development of oversight over performance metrics
- Enhanced consistency of data and information between divisions
- Shorter project development timeline

### Alignment with 2012 – 2017 Strategic Plan Goals and Objectives

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- Competitive Operations
- Financial Strength
- Grow Market Share
- Strengthen Financial Performance

## RECOMMENDATION IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT




➔ **Implement policies and procedures for Finance Division to participate adequately on project cost estimations and lease agreements**

- Policies will establish precise points at which Finance Division participates in the budget review and lease agreement processes to ensure that projects remain within acceptable cost parameters and to remain aware of any changes in project cost and scope
- The goal is for the Finance Division to be aware of changes to project budgets, understand why these changes occurred, and have a system in place to evaluate the impact on POLA's financial sustainability

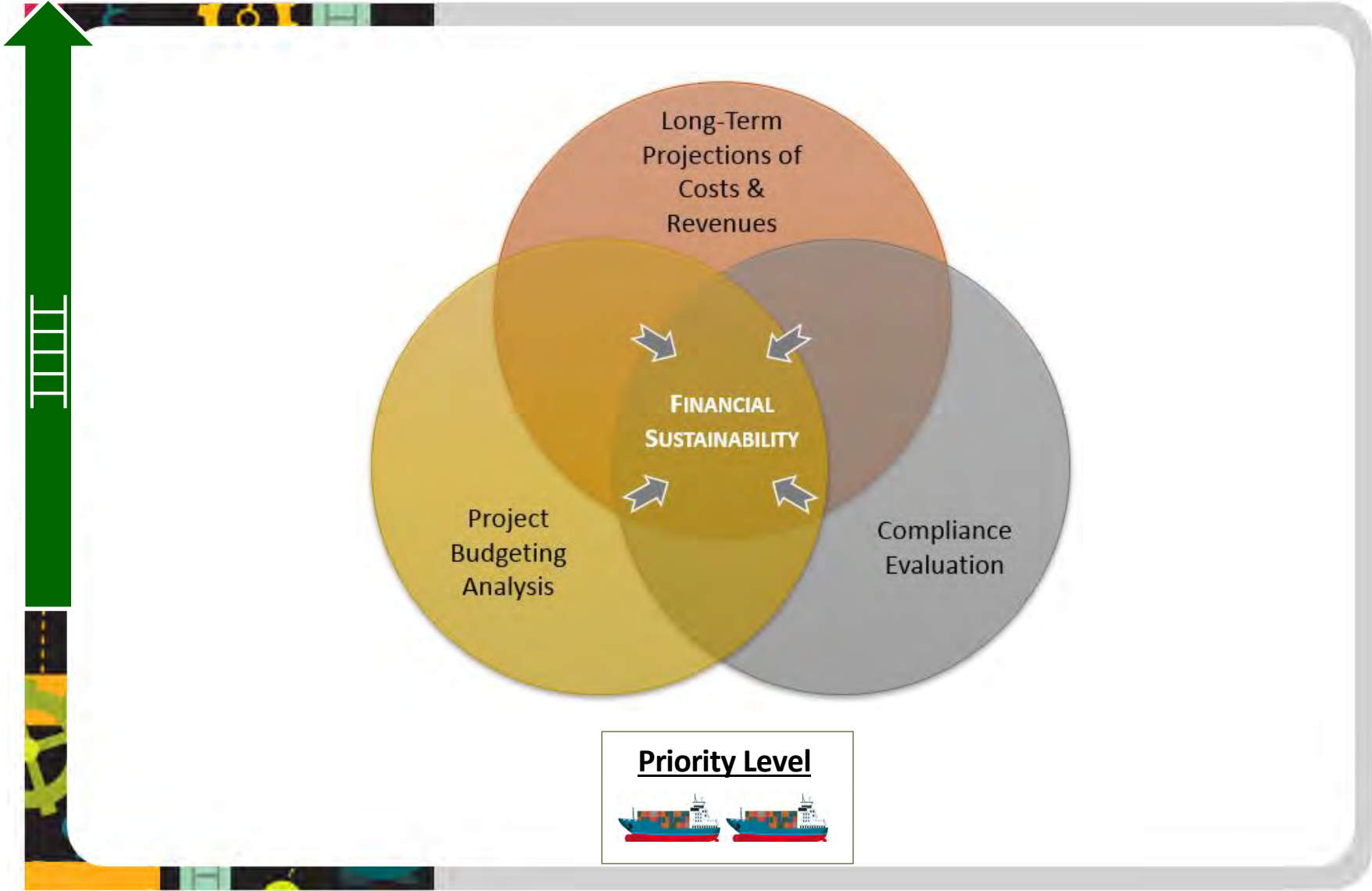
➔ **Establish program wherein Audit conducts spot audits on sample of active projects to ensure compliance**

- Spot audits can and will be conducted on a cycle basis for judgmentally sampled projects at any project phase or at any time to maintain the integrity of information across the project lifecycle
- Assessment parameters should include cost estimates and change orders, project schedules, and authorizations and approvals received

## RECOMMENDATION IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT

- 
- ➔ **Engage Financial Analysis Group in early stages of project budgeting for assessment of financial sustainability**
    - Policies will establish precise points in project budgeting at which Financial Analysis Group conducts review of project budgets to evaluate adherence to POLA annual budget and adequacy of cost controls and to evaluate the value and impact of the project lifecycle over a longer timeframe

# RECOMMENDATION IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT



## RECOMMENDATION IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT



### Target Outcomes

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- Enhanced participation of Finance Division in project budgeting estimation and reporting
- Fewer project cost overruns
- Greater cost / revenue / risk sharing as percentage of project cost in project leases
- Reduction in non-compliant actions
- Improved outcomes in POLA performance metrics measuring financial sustainability
- Development of oversight over performance metrics

### Alignment with 2012 – 2017 Strategic Plan Goals and Objectives

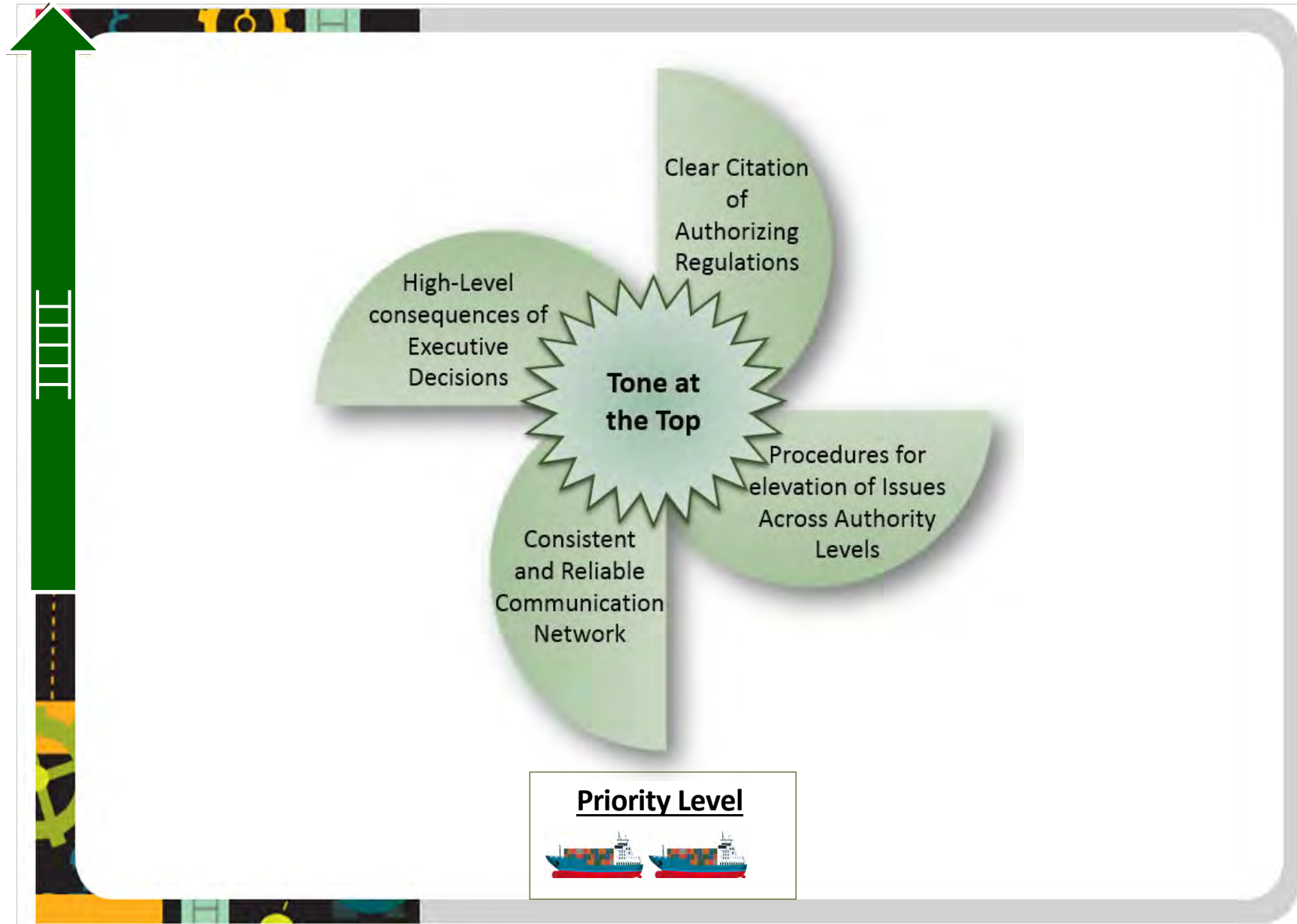
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- Competitive Operations
- Financial Strength
- Grow Market Share
- Strengthen Financial Performance

## RECOMMENDATION V. PROMOTE CULTURE OF RISK MANAGEMENT ACROSS ENTERPRISE

- 
- ➔ **Initiate meeting between Office of City Attorney and Real Estate Division to review terms of lease agreement**
    - Engaging the Office of City Attorney in the review of the written agreement between POLA and tenant will enhance RED's ability to reduce POLA's risk exposure and balance risk sharing with the tenant
  - ➔ **Request Office of City Attorney to recommend process to ensure City contracting authority is upheld**
    - Process will produce more robust oversight procedures that ensure established project lease policies are followed and minimize the risk of non-compliant actions related to lease negotiations
  - ➔ **Establish policies and procedures for communication and distribution of Executive decisions to set a clear “tone-at-the-top”**
    - POLA staff and management must have a reliable source of consistent information on Executive decision-making to ensure enterprise-wide coordination on POLA priorities and strategic direction

## RECOMMENDATION V. PROMOTE CULTURE OF RISK MANAGEMENT ACROSS ENTERPRISE



## RECOMMENDATION V. PROMOTE CULTURE OF RISK MANAGEMENT ACROSS ENTERPRISE



### Target Outcomes

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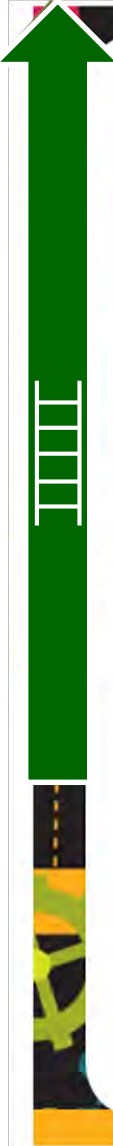
- Shorter project development timeline
- Reduction in non-compliant actions
- Enhanced reporting of Executive decisions and the specific actions that those decisions authorize

### Alignment with 2012 – 2017 Strategic Plan Goals and Objectives

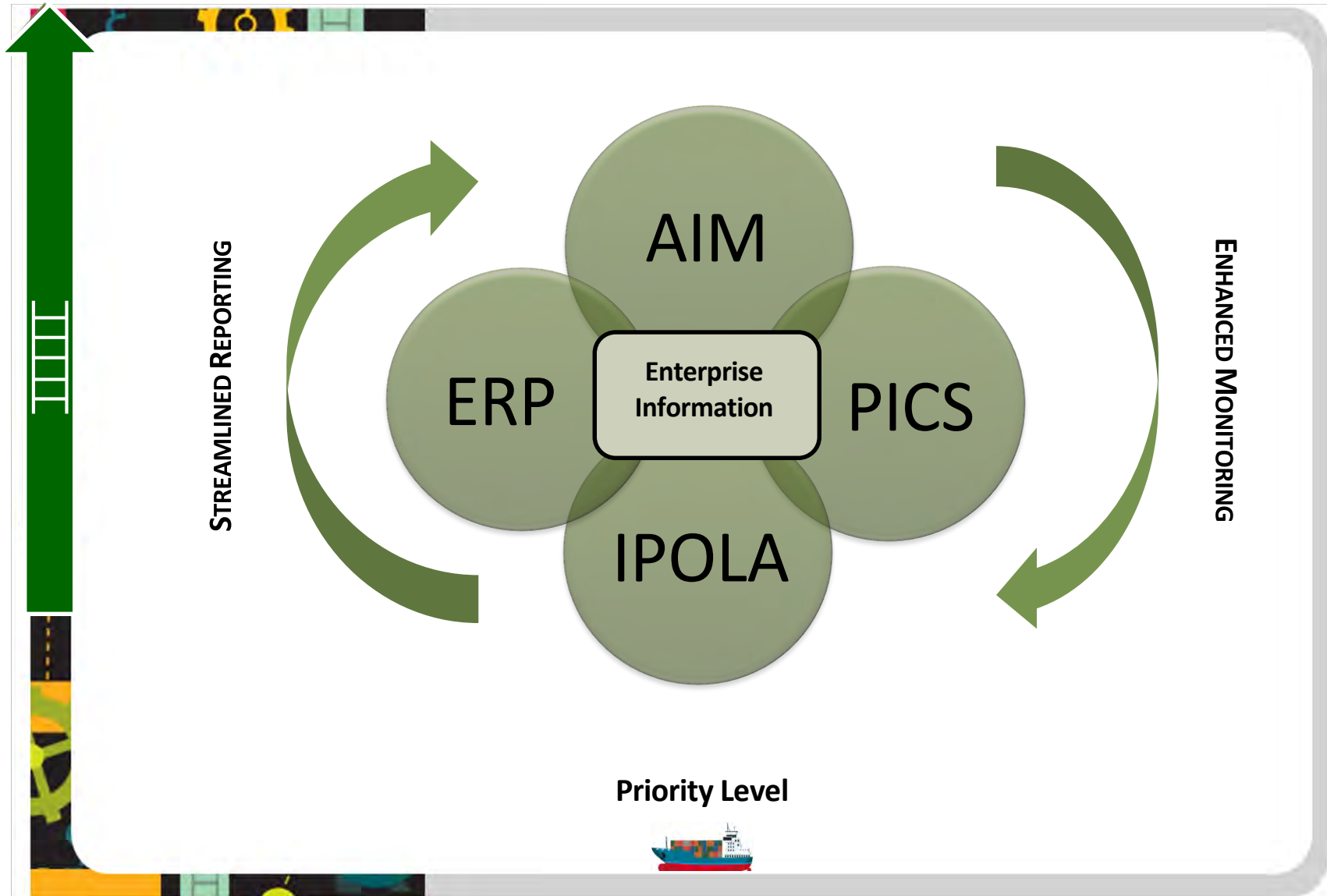
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- Competitive Operations
- Financial Strength
- Grow Market Share
- Strengthen Financial Performance

## RECOMMENDATION VI. EXPLORE OPPORTUNITIES TO INTEGRATE AND ALIGN INFORMATION TECHNOLOGY SYSTEMS

- 
- ➔ **Explore further the feasibility of integrating PICS / AIM / ERP / IPOLA and other relevant systems to integrate project information and streamline reporting**
    - Integrated project information will augment efforts to conduct and maintain enterprise-wide analyses of POLA financial sustainability, as discussed in the 2011 IEAS Audit's finding on interfacing financial accounting systems
    - Integrated systems will facilitate the exchange of understandable, accessible information between Divisions that is relevant to the functions of each Division
  - ➔ **Establish automated workflows and case management systems that enhance project status reporting and monitoring**
    - POLA should consider implementing trigger mechanisms that automatically notify staff about outstanding project issues or tasks

## RECOMMENDATION VI. EXPLORE OPPORTUNITIES TO INTEGRATE AND ALIGN INFORMATION TECHNOLOGY SYSTEMS



## RECOMMENDATION VI. EXPLORE OPPORTUNITIES TO INTEGRATE AND ALIGN INFORMATION TECHNOLOGY SYSTEMS



### Target Outcomes

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- Greater breadth and depth of financial information in POLA information systems
- Enhanced consistency of data and information between divisions




### Alignment with 2012 – 2017 Strategic Plan Goals and Objectives




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- Competitive Operations
- Financial Strength
- Grow Market Share
- Strengthen Financial Performance

## RECOMMENDED IMPLEMENTATION PLAN

The following table summarizes BRONNER’s recommendations and key action items, which requires POLA’s input to assign the respective timeframe and key action item owner. Ranking of the recommendations uses a cargo ship to indicate priority, with a larger number of cargo ships signifying greater priority for implementation. Recommendations are listed in descending order of priority.

Recommendations and Key Action Items	Priority Ranking	Timeframe	Key Action Item Owner
<b><i>I. RESTRUCTURE AND REINSTITUTIONALIZE PROJECT DEVELOPMENT COMMITTEE (PDC)</i></b>			
I.1. Review and formalize PDC charter, membership and participation rules			
I.2. Implement policies and procedures for divisions to submit and review project status reports with PDC			
I.3. Establish and formalize specific criteria, policies and procedures for PDC to assess projects			
<b><i>II. IMPLEMENT A FULL PROJECT LIFECYCLE ACCOUNTABILITY STRUCTURE</i></b>			
II.1. Redefine or expand the project management roles and responsibilities that would enable a single human point of accountability throughout a project’s full development lifecycle			
II.2. Implement policies and procedures that would support a single point of accountability			
II.3. Augment linkage between project budgets, CIP, annual POLA budget, long-term financial projections, and strategic goals through consistent, enterprise-wide monitoring framework			
<b><i>III. IMPLEMENT INDEPENDENT VALIDATION &amp; VERIFICATION (IVV) IN PROJECT BUDGETING AND CONTROL</i></b>			
III.1. Establish policies and procedures for review of cost estimations			
III.2. Establish verification and validation processes at multiple points across project lifecycle			

Recommendations and Key Action Items	Priority Ranking	Timeframe	Key Action Item Owner
III.3. Facilitate and strengthen linkage between initial budgets, subsequent revisions, and budget tracking			
III.4. Implement policies and procedures for communication and distribution of project information			
<b>IV. ESTABLISH ACTIVE ROLES IN PROJECT CONTROL FOR FINANCE AND AUDIT</b>			
IV.1. Implement policies and procedures for Finance Division to participate adequately on project cost estimations and lease agreements			
IV.2. Establish program wherein Audit conducts spot audits on sample of active projects to ensure compliance			
IV.3. Engage Financial Analysis Group in early stages of project budgeting for assessment of financial sustainability			
<b>V. PROMOTE CULTURE OF RISK MANAGEMENT ACROSS ENTERPRISE</b>			
V.1. Initiate meeting between Office of City Attorney and Real Estate Division to review terms of lease agreement			
V.2. Request Office of City Attorney to recommend process to ensure City contracting authority is upheld			
V.3. Establish policies and procedures for communication and distribution of Executive decisions to set a clear “tone-at-the-top”			
<b>VI. EXPLORE OPPORTUNITIES TO INTEGRATE AND ALIGN INFORMATION TECHNOLOGY SYSTEMS</b>			
VI.1. Explore further the feasibility of integrating PICS / AIM / ERP / IPOLA and other relevant systems to integrate project information and streamline reporting			
VI.2. Establish automated workflows that enhance project status reporting and monitoring			

## NEXT STEPS

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To transform the results of BRONNER's assessment into tangible improvements to the POLA operating framework, BRONNER recommends the following Next Steps for POLA leadership and management:

1. Review and accept recommendations and key action items
2. Establish and seat a BBGI Implementation Steering Committee
3. Assign accountability and timeframe for individual key action items
4. Establish monitoring framework to ensure tasks are accomplished



## CONCLUSION: MOVING FORWARD WITH BBGI

**“Maintaining our position as the nation’s premier trade gateway to the Pacific Rim requires a renewed and revitalized commitment to our key factors for success”**

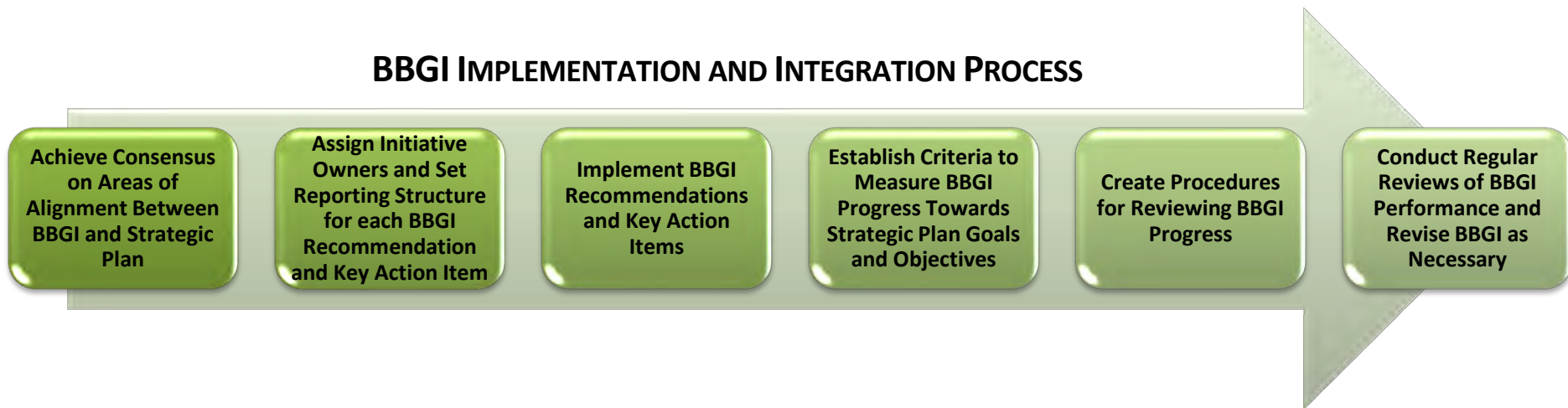
**Port of Los Angeles  
2012 – 2017 Strategic Plan**

In this report, BRONNER identifies and discusses specific recommendations to address lessons learned arising from the assessment of the TraPac Program. To enhance the POLA operating framework, BRONNER has established the Building Better Governance Initiative (BBGI): a series of recommendations to improve integration and strengthen risk management across the enterprise.

In recognition of the excellent work in the IEAS audit and the AAR that have preceded BRONNER’s assessment, along with the impressive efforts that POLA has already taken to act upon the suggestions of these reviews, BRONNER offers the BBGI recommendations as further improvements to existing efforts. BBGI establishes a structure for enhancements that extends targeted improvements to project controls and the project lifecycle throughout the POLA operating framework.

With this comprehensive perspective in place, BRONNER is confident that BBGI will integrate seamlessly into the Port’s 2012-2017 Strategic Plan as a tool to ensure that POLA has the policies, procedures, practices, and culture of leadership to pursue its goals and objectives at every functional level. With a targeted focus on risk management and integration as a framework for robust internal control, BBGI will enable POLA to advance its competitive operations, augment its strong relationships with internal and external stakeholders, and reinforce its financial strength.

### BBGI IMPLEMENTATION AND INTEGRATION PROCESS



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# Container Terminal Automation

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March 2014

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City of Los Angeles  
Harbor Department  
Planning and Economic  
Development Division

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## Overview of Automated Container Terminal Technologies

In the context of this report<sup>1</sup>, automated terminals are defined as terminals with at least some container handling equipment operating without direct human interaction for 100% of the duty cycle of the equipment. In most cases, drivers have been physically removed from the cranes, although in some cases drivers remain in the equipment cabins but are not needed for the entire duty cycle.

There are several types of automated container terminal types around the world. The two primary types are:

- 1) **Automated Stacking Cranes (ASCs).** ASCs are rail mounted gantry cranes (RMGs) that are generally aligned perpendicular to the berth and interface with the terminal at the ends of the stacks. The ASCs both lift and carry loaded containers along the row to their destination within the row. Each ASC row typically has two ASCs running on the same set of rails: one for stevedoring work, and one for landside (gate and rail) work. ASC terminals are the current world standard for automated container terminals. ASCs do most of their duty cycle with no human interaction and can be driven remotely as needed. ASCs can be fed by automated shuttle carriers; however, other types of horizontal transport such as automated guided vehicles (AGVs), automated straddle carriers (Autostrads), manual shuttles, or tractors and terminal chassis can also be used within the same approximate terminal footprint.
- 2) **Cantilever RMGs.** This terminal design uses large cantilever RMGs running either parallel or perpendicular to the wharf to handle containers in a very high density layout. RMGs are in use in many terminals worldwide, particularly in Asia, and are coming into use in rail terminals in this country. Unlike ASC systems, the number of RMGs is not fixed; for instance, land and water side rows can have different numbers of RMGs. RMGs of this type are usually serviced by manual tractors.

Other less common automated terminal types include:

- 3) **Rubber Tired Gantry (RTG) cranes.** RTGs are usually manually driven with drivers on the crane, and served by manual tractors and bombcarts. The only exception worldwide is the Tobishima Terminal in Nagoya, Japan, which has a unique design with unmanned RTGs serviced by AGVs. Due to the technical difficulty involved in automating a rubber-tired crane as opposed to a rail mounted crane, new automated terminal designs are unlikely to involve automating RTGs.
- 4) **Automated straddle carrier (Autostrad).** An Autostrad terminal involves using an unmanned straddle carrier (strad) as both the dock crane service vehicle and yard crane storage type. However, since Autostrad rows require generous spacing to give the vehicle room to maneuver and low stacking heights due to height limitations on the strad itself, this yields a very low density overall.
- 5) **Bridge Crane Terminal.** In a bridge crane terminal, yard cranes are mounted atop heavy concrete pillars to keep them separate from terminal traffic below. This system allows stacking up to eight containers high. However, due to the high cost of fixed infrastructure compared to an RMG system, this design has not been implemented

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<sup>1</sup> Source: "Port of Los Angeles Automated Container Survey", AECOM US, May 1, 2012.

outside of Pasir Panjang Terminal in Singapore and will not be implemented in further expansions at that terminal.

Twelve existing terminals from around the world and two terminals at the Port of Los Angeles (POLA) are included in the survey.

### **North America**

There is one existing automated terminal in North America, an ASC terminal in Norfolk, Virginia. There is an ASC system paired with an autostrad system planned for a portion of the TraPac terminal at the POLA, and a proposed cantilever RMG system for a 41 acre portion of APL-EMS Pier 300 terminal at the POLA. The Port of Long Beach is constructing its Middle Harbor ASC terminal, and the Port of New York/New Jersey is building an ASC terminal in Bayonne.

### **Australia**

There is one automated terminal in Australia, an automated strad terminal operated by Patrick Terminals at the Port of Brisbane.

### **Asia**

There are five automated terminals in various locations across Asia, three of which have cantilever RMGs in the container yard:

- Pusan Newport, Pusan, South Korea
- Hong Kong International Terminal 6-7, Hong Kong
- Kaohsiung Evergreen Terminal, Kaohsiung, Taiwan.

In addition, Tobishima Terminal has automated RTGs and PSA Pasir Panjang in Singapore has bridge cranes in parts of the terminal, both of which are unique to these locations.

### **Europe**

There are five automated terminals in locations across Europe, all of which feature ASCs:

- Euomax Terminal, Rotterdam, the Netherlands
- DPW Antwerp Gateway Terminal, Antwerp, Belgium
- Container Terminal Altenwerder, Hamburg, Germany
- Container Terminal Burchardkai, Hamburg, Germany
- TTI Algeciras, Algeciras, Spain.

Most automated terminals that are under development worldwide are focused on ASC designs. These allow for not only the cranes to be automated, but also the horizontal transport. In very high labor cost areas such as POLA, this is a motivating factor in terms of reducing overall operating cost. The optimal style of horizontal transport is still very much in debate.

In ASC facilities, a stacking height of 1-over-5 has become the industry standard. The taller stacks may be possible, but pose more of a challenge for precisely level stacking areas, and also result in delay in retrieving local imports from tall stacks. The current range of ASC stack length varies from 36-59 total ground slots (TGS) (770 to 1260 feet). While these are not necessarily hard limits, stacks that are too short make poor use of expensive ASCs, and stacks that are too long may not allow for sufficient crane capacity to place or remove containers to make full use of them.

All ASC systems in the world, with the exception of the two facilities in Hamburg, use two identical ASCs on the same set of rails. All ASC systems in the world with the exception of the first ECT terminal in Rotterdam (which was not surveyed in this report) are designed to allow trucks to back directly into ASC buffer slots at one end of the ASC stack. ASC based terminals also have the advantage of allowing street trucks to turn off engines while waiting for service after backing into an ASC buffer; this results in significantly reduced trucks emissions. There may also be conversion challenges in shifting from existing RTG+top-pick operations to ASC systems in terminals with non-rectangular shapes, such as the TraPac terminal plan that entails ASC stacks of different orientations/length. In addition, ASC facilities have a landside access limitation due to a maximum of one landside ASC per ASC module, which may have trouble keeping up with local gate arrivals.

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## ASC Terminals

Table 1 below summarizes the key properties of current ASC terminals worldwide, as well as the ASC system under construction at the TraPac terminal at the POLA.

	CTA Hamburg	Euromax Rotterdam	DPW Antwerp	TTI Algeciras	CTB Hamburg	APMT Norfolk	TraPac POLA Expansion
ASC Height (Containers)	4/5	5	5	5	4/5	5	4
ASC Width (Containers)	10/12	10	9	8	10/12	8	8
Current No. ASCs	52	58	14	32	15	30	40
Horizontal Transport Equipment	AGV	AGV	Strad	Shuttle	Strad	Shuttle	Shuttle
ASC Stack Length (TGS)	37	36	41	45	45	59	37
Total CY Ground Slots (TGS)	9,620	10,440	7,545	5,760	17,000	7,080	5,824
Stacking Height	4	5	3	5	3	5	4
Max Practical Stacking Utilization	75%	75%	75%	75%	75%	75%	75%
Max Practical Stacking Height	3.0	3.8	2.3	3.8	2.1	3.8	3.0
Total CY Static Capacity (TEU)	28,860	39,150	17,129	21,600	35,700	26,550	17,472
Overall Terminal Size (acres)	247	208	138	74	346	234	155
Est. 2011 Vessel Throughput (TEU)	2,300,000	1,800,000	1,000,000	1,000,000	2,900,000	700,000	NA
2011 Lifts at 1.75 TEU/Container	1,300,000	1,000,000	600,000	600,000	1,700,000	400,000	NA
Berth Length (ft)	4,590	4,920	6,100	3,940	9,350	3,025	3,450
No. Dock Cranes	15	16	9	8	25	6	
Dock Crane Gage (ft)	100	100	100	100	115	100	100
Dock Crane Type	Dual trolley, automated 2nd hoist	Dual trolley, automated 2nd hoist	Single Hoist	Single Hoist	Dual trolley, manual 2nd hoist	Single Hoist	
Local / Transhipment Terminal	2/3 Local 1/3 T/S	2/3 Local 1/3 T/S	3/4 Local 1/4 T/S	Mostly T/S	2/3 Local 1/3 T/S	Mostly Local	Mostly Local

Table 1: ASC Terminal Properties

Both ASC terminals at the Port of Hamburg (CTA and CTB) have unique designs compared to other facilities worldwide. CTA and CTB both have two sets of ASC rails of different gauges for each stack; this allows the smaller gauge ASC to pass underneath the larger gauge ASC. CTB also has three ASCs per module with two ASCs of the smaller gauge. No other ASC terminal worldwide has more than two ASCs per run. In addition, the smaller gauge ASC at both Hamburg facilities limits container stacks to 4-high, whereas all other ASC terminals can stack 5-high.

Most existing ASC terminals have stacks perpendicular to berth. One exception is the TraPac plan to have a few stacks parallel to the berth at their Port of Los Angeles terminal due to the non-rectangular shape of the facility. The planned APL terminal expansion at the Port of Los Angeles will also have parallel stacks, and the planned Bayonne expansion will have stacks set on a diagonal to maximize space on a narrow pier. ASC stack lengths typically vary from 36 to 45 TGS with 59 TGS at APMT Virginia, much higher than the norm. ASCs generally vary from 8 to 10 containers wide, with the exception of the larger-gauge 12-wide ASC at CTA and CTB Hamburg, sized to be able to pass the 10-wide ASC. 8 to 10 containers wide is considered ideal as wider cranes are heavier and more expensive and may not be able to keep up with peak stevedoring requirements, whereas narrower cranes are less space efficient and may result in more cranes purchased than necessary.

The two facilities converting from strad to ASC-strad terminals (DPW Antwerp and CTB Hamburg) use strads rather than shuttle carriers for horizontal transport in order to utilize

existing equipment. All existing surveyed new-build sites all use either shuttles or AGVs. Note that the mean stack heights for the two ASC-strad terminals are lower than other ASC-terminals; this represents a terminal-wide average at current phasing including ASC and strad modules across the terminal. DPW Antwerp ASC modules have 5-high container stacks, while CTB has 4-high ASC stacks. ASC stacks are limited to 5-high worldwide as higher stacks are too difficult to manage.

In ASC terminals with shuttles or strads used for dock crane service, there are typically about 3 service vehicles per dock crane, compared to 7-8 yard tractors at most terminals at Port of Los Angeles. This yields significant reductions in labor requirements for horizontal transport, even in systems with manned shuttles rather than autoshuttles.

All the ASC terminals surveyed have some on-terminal rail facilities. CTA Hamburg, CTB Hamburg, Euromax Rotterdam, and DPW Antwerp all have cantilever RMG intermodal yard with 1-2 total IYRMGs. TTI Algeciras also has a small amount of on-terminal rail, but the facility is mostly transshipment, not local. AMPT Virginia has a manned RTG railyard.

Table 2 lists some common statistics to compare existing ASC facilities. Note that terminal-specific TEU throughput values are proprietary; terminal throughputs for all facilities are estimated based on a ratio of (individual terminal area) / (port-wide container terminal area) \* 2011 port-wide TEU throughput. These values are meant to demonstrate the approximate level of utilization for each terminal.

	CTA Hamburg	Euromax Rotterdam	DPW Antwerp	TTI Algeciras	CTB Hamburg	APMT Norfolk	TraPac POLA
TGS/Acre	39	50	55	78	49	30	38
TEU Static Capacity/Acre	117	189	124	291	103	113	113
Berth Length (ft) / No. Dock Cranes	306	308	678	493	374	504	NA
2011 Est TEU/Acre	9,300	8,700	7,300	13,500	8,400	3,000	NA
2011 Est Lifts/Dock Crane	87,000	63,000	67,000	75,000	68,000	67,000	NA
2011 Est Lifts/Berth-ft	280	200	100	150	180	130	NA
Dwell Time (Days)	4.6	7.9	6.3	7.9	4.5	13.8	NA

Table 2: ASC Terminal Calculated Statistics

## Cantilever RMG Terminals

Table 3 below summarizes the key properties of three existing container terminals with cantilever RMG yards, as well as the proposed cantilever RMG system at the APL-EMS-Pier 300 terminal at the POLA.

	HIT T67 Hong Kong	Pusan Newport	Evergreen Kaohsiung	APL Pier 300 Expansion
RMG Height (Containers)	6	5	5	6
RMG Width (Containers)	12	10	11	13
No. Yard Cranes	24	120	24	22
Horizontal Transport Equipment	Tractor	Tractor	Tractor	AGV
Stack Orientation vs. Berth	Perpendicular	Parallel	Both	Parallel
CY Ground Slots (TGS)	11,754	42,240	5,742	3,900
Stacking Height	5.5	5.0	5.0	6.0
Max Practical Stacking Utilization	75%	75%	75%	75%
Max Practical Stacking Height	4.1	3.8	3.8	4.5
Total CY Static Capacity (TEU)	48,486	158,400	21,533	17,550
Overall Terminal Size (acres)	158	706	99	41
Est. 2011 Vessel Throughput (TEU)	4,000,000	7,200,000	1,600,000	NA
2011 Lifts at 1.75 TEU/Container	2,300,000	4,100,000	900,000	NA
Berth Length (ft)	9,797	14,100	2,670	1,250
No. Dock Cranes	27	37	9	6
Dock Crane Gage (ft)	80	140	100	100
Dock Crane Type	Single Hoist	Dual Hoist	Single Hoist	Dual Hoist
Local / Transshipment Terminal	1/2 Local 1/2 T/S	1/2 Local 1/2 T/S	1/2 Local 1/2 T/S	Mostly Local

Table 3: Cantilever RMG Terminal Properties

The orientation of container stacks to the berth in cantilever RMG container yards varies. Kaohsiung has two berths at a 90 degree angle to one another, so stacks are parallel to south berth and perpendicular to west berth. Container stacks under the RMGs vary from 5 to 6 high. At Port of Hong Kong's HIT Terminal 6-7, there is a mix of 5-high RTG stacks and 6-high RMG stacks, reflected in the stacking height of 5.5.

All existing RMG terminals all use manual tractors for horizontal transport, which is typical in Asia due to lower labor rates. The RMG expansion at POLA APL Pier 300 is planned to use AGVs, the only potential exception. Unless a secondary transfer system is used (as was proposed at APL Pier 300), cantilever systems must be serviced by manual tractors because street trucks and stevedoring vehicles use the same cross aisles. It is unsafe to mix either manual shuttles or any type of automated vehicles with manual trucks in the same area. For this reason, automated terminals with cantilever RMGs typically do not save any labor for horizontal transport compared with a manual terminal.

Table 4 lists some common calculated statistics to compare existing terminals with cantilever RMG container yards.

	<b>HIT T67 Hong Kong</b>	<b>Pusan Newport</b>	<b>Evergreen Kaohsiung</b>	<b>APL Pier 300 Expansion</b>
TGS/Acre	74	60	58	95
TEU Static Capacity/Acre	307	224	218	428
Berth Length (ft) / No. Dock Cranes	363	381	297	208
2011 Est TEU/Acre	25,300	10,200	16,200	NA
2011 Est Lifts/Dock Crane	85,000	111,000	100,000	NA
2011 Est Lifts/Berth-ft	230	290	340	NA
Dwell Time (Days)	4.4	8.0	4.9	NA

Table 4: Cantilever RMG Terminal Calculated Statistics

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## Other Automated Terminals

In addition to the more common ASC and cantilever RMG-based container terminals, three other unique automated terminal configurations were included in the survey. These are: an automated straddle carrier facility operated by Patrick terminals at the Port of Brisbane, an automated RTG/AGV terminal the Port of Nagoya's Tobishima Terminal, and an overhead bridge cranes at PSA's Pasir Panjang Terminal in Singapore.

Table 5 below summarizes the key properties of each of the three facilities.

	Brisbane Australia	Tobishima Terminal	Singapore T3 Bridge Cranes
Automated Yard Crane Type	Autostrad	Auto RTG	Bridge
Yard Crane Dimensions:			
Height (Containers)	2	4	8
Width (Containers)	1	6	10
No. Yard Cranes	27	24	44
Horizontal Transport Equipment	Autostrad	AGV	Tractor
Stack Orientation vs. Berth	Perpendicular	Parallel	Parallel
Stack Dimensions	1W x 35L x 2H	6W x 38L x 4H	10W x 8H x 32L
CY Ground Slots (TGS)	5,766	4,422	10,273
Stacking Height	2.0	4.0	8.0
Max Practical Stacking Utilization	75%	75%	75%
Max Practical Stacking Height	1.5	3.0	6.0
Total CY Static Capacity (TEU)	8,649	13,266	61,636
Overall Terminal Size (acres)	99	88	136
Est. 2011 Vessel Throughput (TEU)	500,000	600,000	3,900,000
2011 Lifts at 1.75 TEU/Container	300,000	300,000	2,200,000
Berth Length (ft)	3,050	2,460	7,230
No. Dock Cranes	5	6	24
Dock Crane Gage (ft)	90	100	100
Dock Crane Type	Single Hoist	Single Hoist	Single Hoist
Local / Transshipment	Mostly Local	Mostly Local	Mostly T/S

Table 5: Unique Automated Terminal Properties

Overall, each terminal design has at least one significant flaw that makes it unlikely to be popular worldwide. Autostrad terminals have very low density due to the stack spacing requirements and limiting stacking height of strads. However, automated shuttles have generated a great deal of interest as a transport device in combination with ASCs and are planned for TraPac POLA. Bridge cranes have a very high cost of fixed infrastructure for the concrete pillars upon which the overhead cranes run compared to the cost of steel required for RMGs, with not enough benefit to justify it; PSA is not planning to use bridge cranes in further expansions. Rubber-tired machines are also less precise than rail-mounted cranes making automation of RTGs technically difficult; therefore automated RTGs are also unlikely to be popularized.

Table 6 lists common statistics for each of these three terminals. Note that Pasir Panjang Terminal (Singapore T3) statistics refer to bridge crane modules along with adjacent wharves and dock cranes only, not RTG areas of terminal.

	<b>Brisbane Australia</b>	<b>Tobishima Terminal</b>	<b>Singapore T3 Bridge Cranes</b>
TGS/Acre	58	50	76
TEU Static Capacity/Acre	88	151	453
Berth Length (ft) / No. Dock Cranes	610	410	301
2011 Est TEU/Acre	5,100	6,800	28,700
2011 Est Lifts/Dock Crane	60,000	50,000	92,000
2011 Est Lifts/Berth-ft	100	120	300
Dwell Time (Days)	6.3	8.1	5.8

Table 6: Unique Automated Terminal Calculated Statistics

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## Overall Automated Terminal Statistics

This section compares some key statistics of the surveyed facilities across all terminal types. Figure 1 compares the dock crane gauges for the twelve existing terminals and the ASC system under construction at the TraPac terminal.

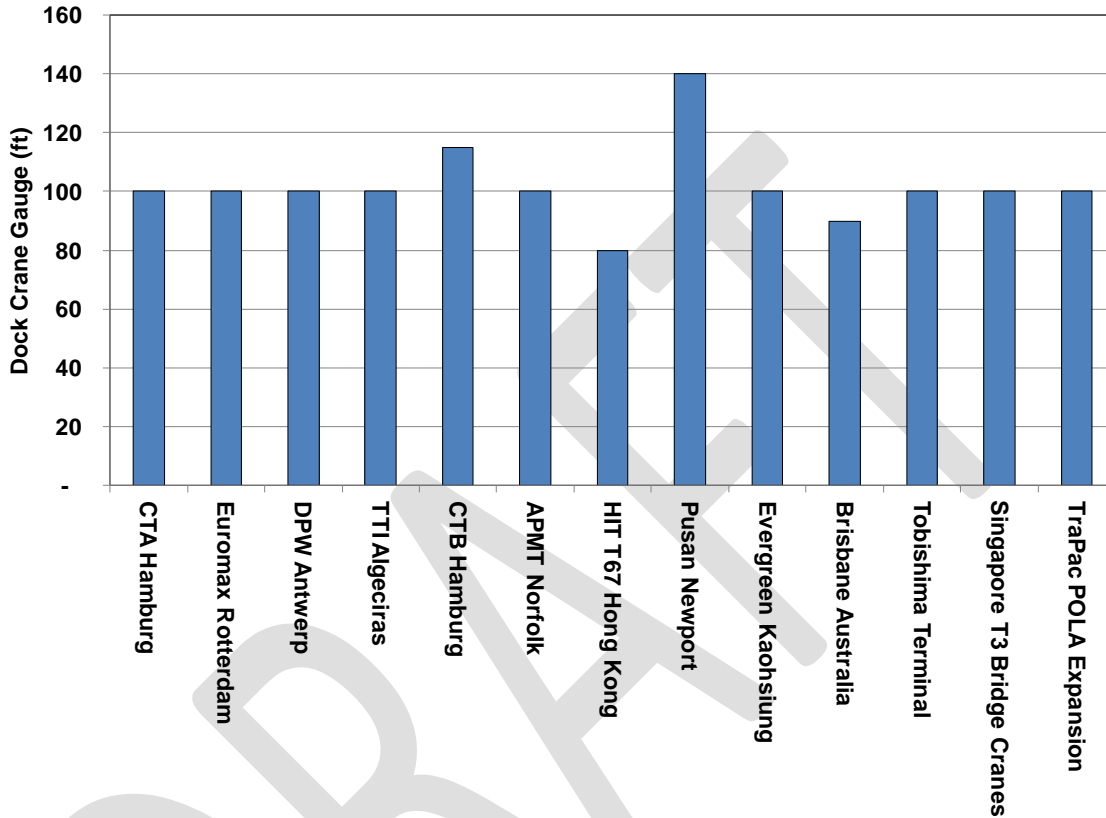


Figure 1: Dock Crane Gauge by Terminal

Some facilities have a range of dock crane gauges; in this case, the gauge of the largest and newest cranes is displayed on the figure. CTB Hamburg's planned ASC expansion will feature dock cranes with a 115' gauge at the berth adjacent to the ASC modules, with smaller gauge cranes remaining at berths adjacent to strad storage areas. Pusan Newport also has a very large 140' dock crane capable of tandem-40 lifts (i.e. lifting two 40' containers in one move). Generally, 100' gauge cranes is a standard size for automated terminals, used for most existing ASC terminals. Some terminals with automated equipment have smaller dock cranes gauges, particularly at Hong Kong International Terminal 6-7, which contributes to their ability to have a very dense terminal footprint (see Figure 2: Static Container Yard Capacity; TEU per Acre).

Figure 2 summarizes the static capacity of the container yard (TEU/acre); i.e., the total number of containers than can be physically stacked in the yard at one time divided by total acreage) for each surveyed terminal.

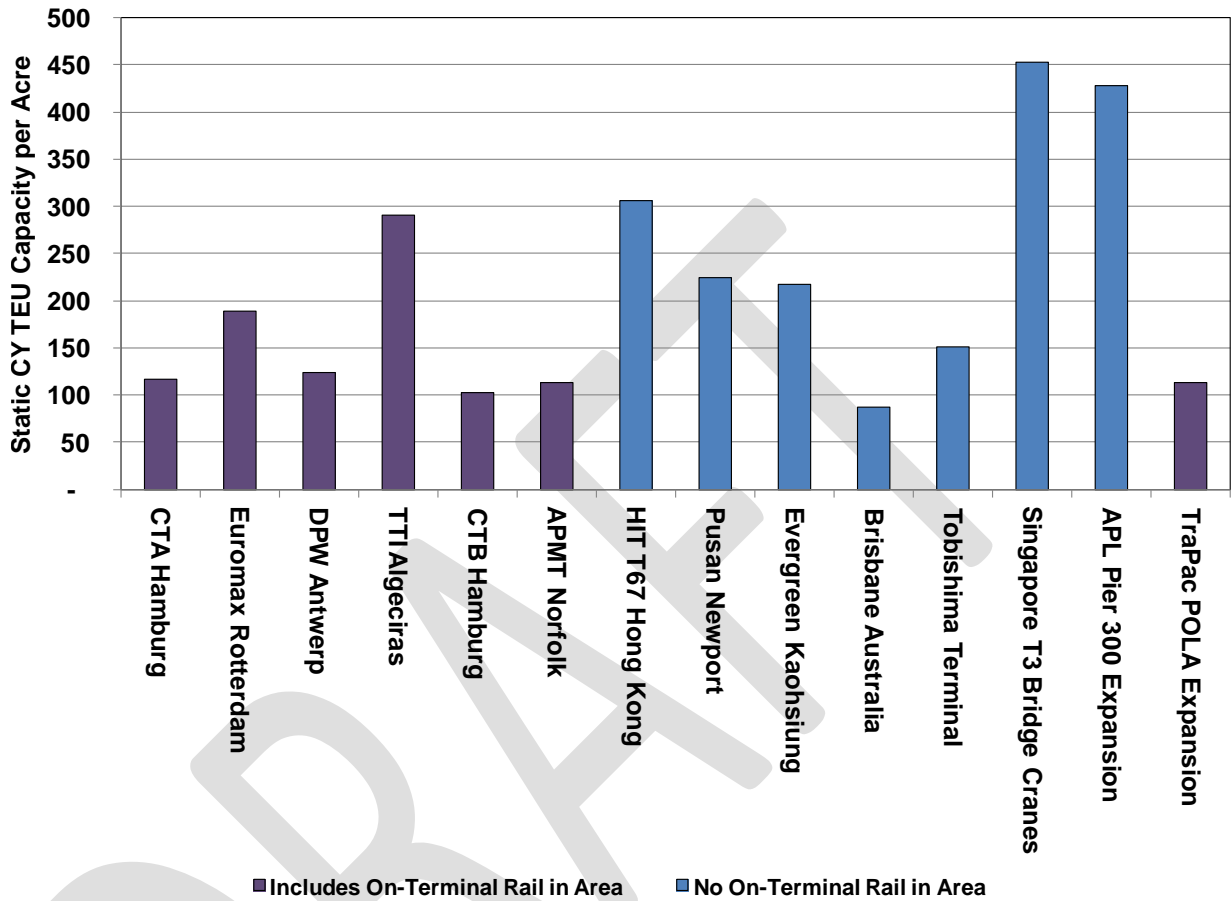


Figure 2: Static Container Yard Capacity: TEU/Acre

It is important to note that the type of terminal area measured in Figure 2 is not necessarily identical between terminals and includes more than just pure container stacking areas. Facilities with and without on-terminal rail are differentiated; in general, terminals without on-terminal rail will have more static capacity (TEU/acre) due to not having to average in non-stacking areas to the total terminal acreage.

Some facilities, such as APMT Norfolk and DPW Antwerp, are not completely developed and have unimproved acreage within the bounds of the terminal; these undeveloped areas are subtracted from total terminal acreage. The Singapore value refers only to the bridge crane modules on the terminal and adjacent berths only, yielding a high TEU/acre value with the high stacking heights at the Pasir Panjang bridge crane terminal. The APL Pier 300 facility entry also refers to the 41-acre expansion only, which includes mostly pure stacking area and berths, rather than any rail, administration buildings, etc., yielding a high capacity (TEU/acre) value. TTI Algeciras is a very densely stacked terminal and while it has some on-terminal rail, the terminal is mainly used for transshipment and the total rail area is lower than at other ASC terminals, yielding a higher density.

Figure 3 compares estimated 2011 lifts per dock crane across all existing surveyed terminals. Recall that terminal-specific TEU throughput values are proprietary; terminal throughputs for all facilities are estimated based on a ratio of: (individual terminal area) / (port-wide container terminal area) \* 2011 port-wide TEU throughput.

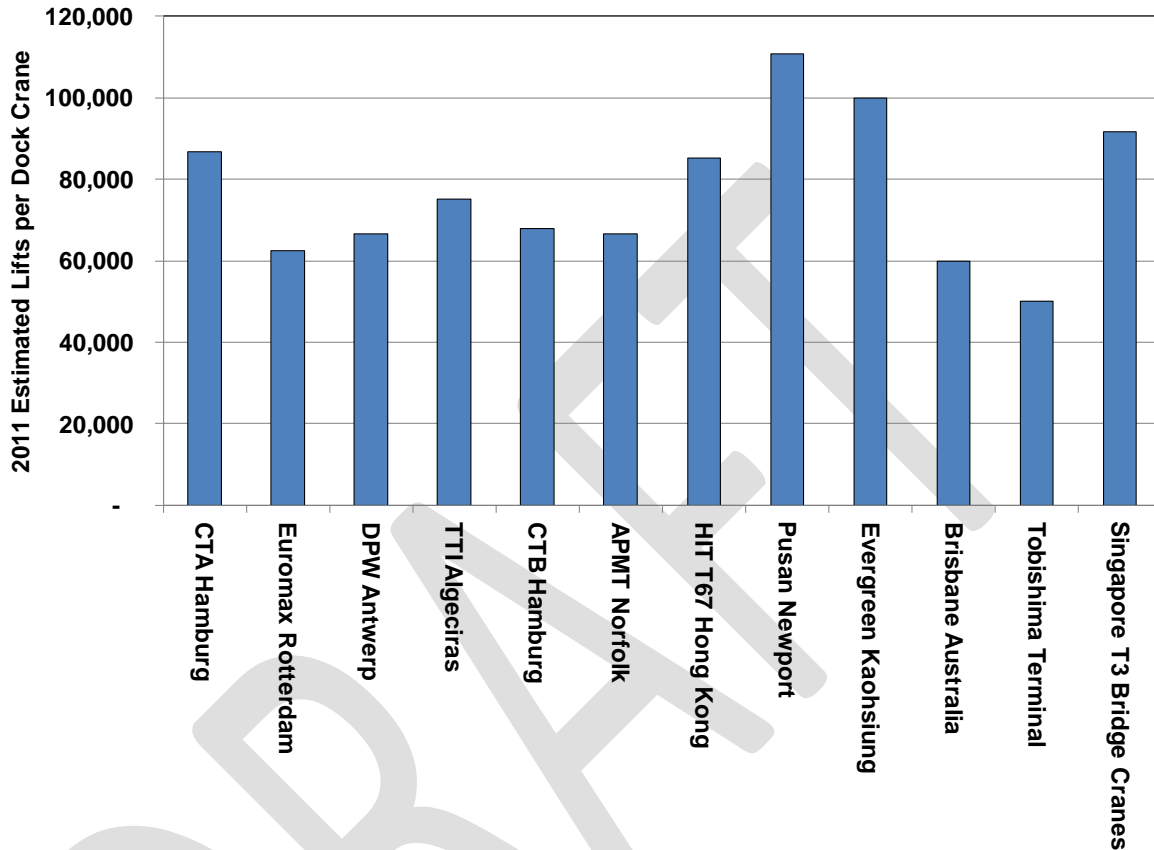


Figure 3: 2011 Estimated Lifts per Dock Crane at 1.75 TEU/Container

As a rule of thumb, 100,000 annual lifts per dock crane is used as a limit on per-crane capacity for planning purposes. Most terminals were at lower levels of dock crane utilization, with the exception of the highly utilized Pusan Newport tandem-40 dock cranes, and Evergreen Kaohsiung terminal with about 100,000 lifts per dock crane. Utilization levels are driven primarily by demand, not crane capacity; lower values do not indicate that cranes cannot reach 100,000 annual lifts or higher with adequate market demand. It is important to note that in the surveyed terminals, terminals generally run on a 24 hour a day, 7 day a week basis. By contrast, most US West Coast terminals run closer to 16 hours a day annually due to ILWU regulations, making 100,000 annual lifts per dock crane difficult to achieve.

Figure 4 compares estimated 2011 average dwell times for all existing surveyed terminals. Dwell time is calculated as:  $(365 \text{ days per year} / [2011 \text{ estimated throughput}/\text{static CY capacity}])$ . Because the terminal specific throughput statistics are rough approximations, dwell time statistics which are derived from them are similarly approximate.

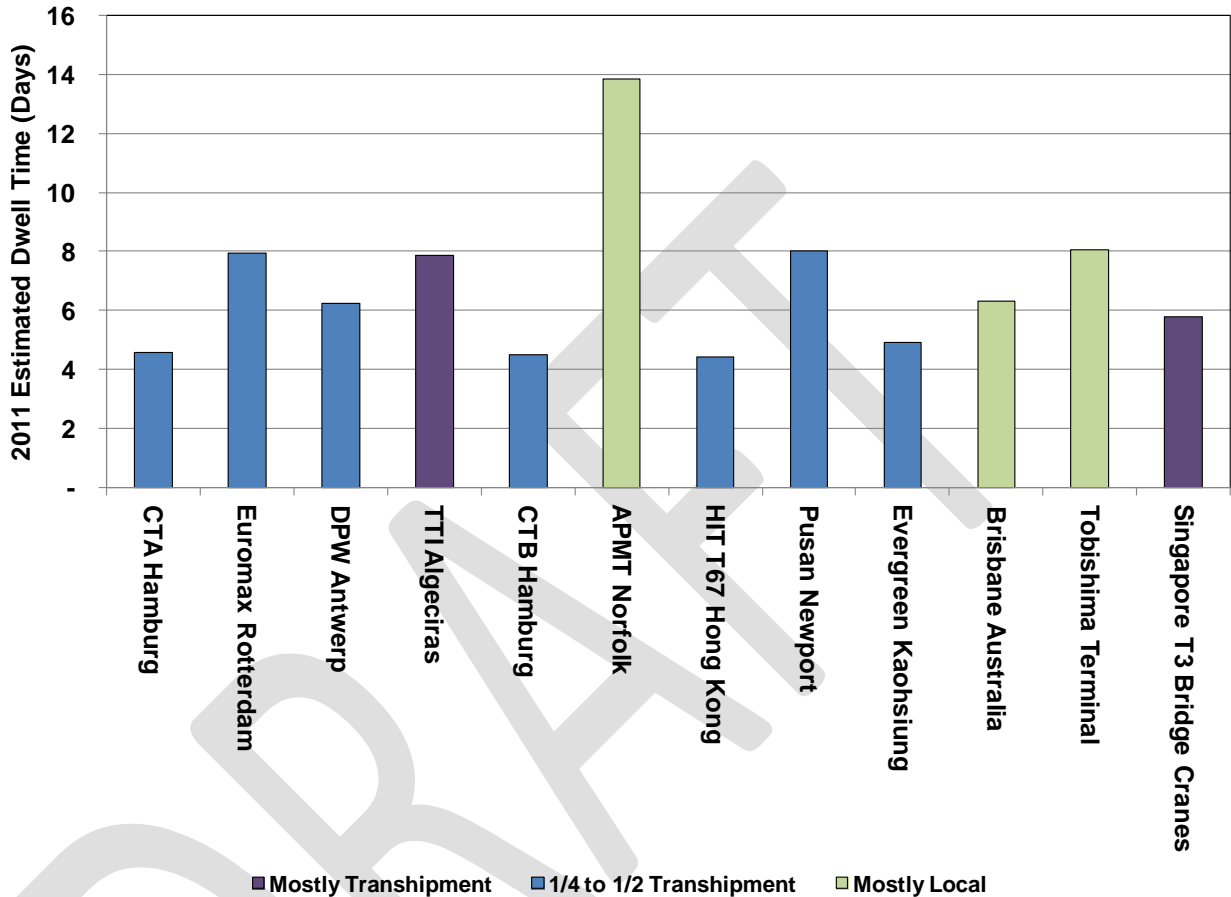


Figure 4: Average 2011 Estimated Dwell Time

Figure 4 separates terminals into categories based on the amount of transshipment as a percent of total throughput: mostly transshipment (over 75%), 25% to 50% transshipment, and mostly local (under 5% transshipment). This is relevant because each transshipment container that enters the terminal will result in two moves across the berth: once to enter the terminal from the first vessel, and again to be loaded onto a subsequent vessel. On a facility that handles mostly transshipment such as TTI Algeciras, each container is actually being stored closer to 15 days on average rather than 7-8 days because of this effect. Dwell time is also tied very closely to market demand. APMT Norfolk's high level of dwell time is due to lower overall utilization, which allows them to store containers for long periods of time. Higher density terminals such as HIT 6-7 are able to force lower dwell times due to higher levels of market demand.

## **Role of the Harbor Department in Container Terminal Automation**

### **The Los Angeles Trust Grant**

In 1911, the state granted to the City of Los Angeles control over all state tidelands and submerged lands in the San Pedro-Wilmington area “solely for the establishment, improvement, and conduct of a harbor... for all purposes of commerce and navigation.” In 1929, the purposes provision of the grant was revised to state “commerce, navigation and fishery.” In 1970, the purposes of the grant outside the Port area were greatly expanded, but the Port’s tidelands purposes were explicitly excluded from these broader purposes and remained limited to commerce, navigation and fishery.

Subsequent legislation in 2003 expanded the purposes allowed on Port lands to include the traditional commerce, navigation, and fisheries purposes, together with the 1970-added purposes, so long as those new purposes “comply with the terms of the trust and are matters of statewide, as distinguished from local or purely private, interest and benefit.”

These added purposes include: establishment of harbors, commercial and industrial purposes, airports, highways, streets, bridges, belt line railroads, parking facilities, transportation and utility facilities, public buildings, convention centers, public parks, public recreation facilities, small boat harbors and marinas, snack bars, cafes, cocktail lounges, restaurants, motels, hotels, protection of wildlife habitats, open space areas and areas for recreational use with open access to the public, and “any other uses or purposes of statewide, as distinguished from purely local or private, interest and benefit which are in fulfillment of those trust uses and purposes described in this act.”

### **The Board of Harbor Commissioners**

Under the City of Los Angeles Charter, the five-member Board of Harbor Commissioners has possession, management and control of all navigable waters, and all tidelands and submerged lands comprising the Port of Los Angeles. The Commissioners are appointed by the Mayor and confirmed by the City Council for five-year terms. The lands and waters they control are known as the Harbor District. The City of Los Angeles Harbor Department is a proprietary department of the City, self-funding through fees from shipping and other services.

### **The Harbor Department as a Landlord**

The Port of Los Angeles is considered a landlord port. The Harbor Department leases its property to tenants who in turn operate their own facilities. As a landlord, the Harbor Department does not:

- operate any of the cargo terminals;
- invest in any capital equipment (cranes, yard equipment, etc.) used in operations;
- hire labor to staff the terminal;
- take part in labor negotiations between terminal operators and the ILWU.

The Harbor Department does invest in the physical plant of the Port (channels, roads, rail, docks, berths, and terminal infrastructure). When these investments are made at the request of a tenant, the Harbor Department should follow its rate of return guidelines to ensure that the compensation paid by the tenant increases to reflect the increased value of the improved terminal.

## **The Decision to Automate**

Automation has been a contentious issue between labor and management, and the Harbor Department has assumed no role in these discussions. The most recent agreement between the ILWU and the terminal operators, in 2008, permitted terminal operators to begin implementing automation technology at their terminals.

As was seen earlier in this report, automation can take a number of different forms, each of which has different advantages and disadvantages.<sup>2</sup> Each individual terminal operator will make its own decision as to automate or not, and if so, to what extent they introduce automated technology.

Because of the Harbor Department's role as a landlord that is not involved in the operation of the terminals, the Harbor Department neither encourages nor discourages automation. It is the terminal operators who decide whether or not to exercise their ability under their labor agreement to implement some form of automation. The Harbor Department then responds by providing terminal infrastructure needed to support the terminal operators' projects, subject to the Harbor Department's terminal development process and agreement on commercial terms.

Terminal operators choose their mode of operation (amount of labor employed per vessel, terminal operating hours, degree of automation) based upon their own internal business models which balance the level of service they can provide to their shipping line and cargo-owning customers against the costs of providing that level of service.

As shipping lines have begun operating larger vessels to reduce their own operating costs by capturing economies of scale, this has placed increased pressure on terminal operators and labor to improve their efficiency in handling an increasing number of containers arriving in a smaller window of time. A 12,000 TEU vessel calling at one terminal places a greater strain on existing operations than what previously would have been two 6,000 TEU vessels calling at different times (and perhaps terminals).

With the trend towards larger vessels likely to continue, the need for increased efficiency will continue to grow. Terminals that cannot provide the level of service required by larger vessels could potentially see their cargo diverted to terminals (both within and outside the region) that can provide better service or lower costs. Automation is one of the strategies that a terminal operator can pursue to reduce costs or improve efficiency; however, given the high cost of automating terminals, terminal operators may limit how much technology they employ, and may also work with labor to find non-automated routes to improving terminal efficiency.

## **The Impacts of Automation at the Port of Los Angeles**

Harbor Department staff reviewed publicly-available studies of automation technologies. However, hard numbers detailing the impacts of future automation at the Port of Los Angeles are difficult to generate. First, information on the cost structures, business models, and long-term business plans for terminal operators is not readily available. Container terminals have

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<sup>2</sup> See also: "New Conceptual Handling Systems in Container Terminals", K. Kim, M. Thi Phan & Y. Woo, *Industrial Engineering & Management Systems*; "A Paper on Automation in Leading Container Terminal Units", T. Anupama, I. Murthy & K. Deepa, ICOQM-10.

different ground lease rates, operate under different level of service models, and may have financial relationships with related shipping line companies that mask the underlying true cost of service. Because terminal operators compete with one another, they have a strong interest in keeping this information confidential. This is true both with and without automation.

Second, the actual efficiency improvements to be gained through automation at the Port depend upon both the theoretical capabilities of the mix of automation technologies a terminal operator may select and the actual real-world operation of the automated systems. There is a large body of research dedicated to simulation modeling and automation optimizing in an effort to ensure that real-world results match the promised theoretical results of automation.<sup>3</sup>

Third, it is unclear how terminal operators will actually alter their labor demand once automated systems are online. Labor demand is partly determined through complex negotiations between ILWU and terminal operators. Terminal operators may choose not to fully automate; even in the case of fully automated terminals, the operators may not reduce their workforces as much as their equipment would allow. For example, in the 1960's with the rise of containerization, terminal operators helped smooth the transition to a lower labor demand by paying guaranteed wages to displaced workers. Furthermore, there is a potential for offsetting job losses by retraining ILWU workers in the repair and maintenance of the automated equipment. It is impossible at present to estimate the extent to which these mitigating factors, which would be the result of future negotiations between labor and management, would reduce potential job losses due to automation.

Fourth, the automation of the Port of Los Angeles is not occurring in isolation. Potential job losses at the Port through automating would need to be weighed against potential job losses that would occur if a competing port (such as Seattle or Prince Rupert) were to automate and the Port did not. If the cost reductions or efficiency gains through automating were great enough to give a competing port a competitive advantage over Los Angeles, then the resulting regional job losses due to cargo diversion could be much larger than the job losses from automation at the Port of Los Angeles.

To prepare a true cost-benefit analysis, staff would need reliable data on cost of service at local terminals and competing terminals, as well as reliable data on the actual job losses expected. Given the amount of information that is currently unknown about the form that automation may take at the Port of Los Angeles and its competitors, including the impacts of discussions between labor and management on future staffing levels and worker retraining, it is not possible at this time to produce a cost-benefit analysis that accurately predicts the impacts of future automation.

Working with the limited information available, staff can make the following statements about the impacts of automation on the Port of Los Angeles, the workforce, and the community:

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<sup>3</sup> For example: "3D Virtual and Physical Simulation of Automated Container Terminal and Analysis of Impact on Inland Transportation", B. Khoshnevis & A. Asef-Vaziri; "Optimizing automated container terminals to boost productivity", Y. Saanen & A. de Waal, Port Technology International.

- Capacity Impacts
  - Because the ultimate container cargo capacity of the Port appears to be constrained (primarily) by its berth capacity, automating the Port does not appear to expand the total volume of container cargo that the Port can handle in the long-term.
- Efficiency/Throughput Impacts
  - Automation can improve the efficiency of cargo handling and speed the velocity of cargo, especially as volumes increase.
  - Automation speeds the handling of the newer Super-Post-Panamax vessels.
  - Full automation is not always required, and terminals can improve efficiency to some degree in partnership with labor.
- Environmental Impacts
  - Automation results in decreases in emissions and greenhouse gases through switching to more use of electricity versus fossil fuels.
    - The TraPac EIR addendum, which analyzed the change from a conventional to automated terminal, showed a 68% reduction in CO<sub>2</sub>, 93% reduction in CH<sub>4</sub>, and an 82% reduction in N<sub>2</sub>O.
  - Automation is not required to meet Clean Air Action Plan air emission goals.
- Terminal Operating Cost Impacts
  - Terminal operating costs are likely to go down under automation.
  - The amount of reduction depends on labor cost savings versus cost of capital employed.
  - The Harbor Department cannot currently provide an estimate, which would require detailed information on automation used and terminal cost structures.
- Labor/Workforce Impacts
  - Automation leads to a reduction in the amount of ILWU labor required.
  - The amount of reduction depends on types of automation employed.
  - The amount of reduction can be offset by new jobs in repair and maintenance of automated equipment.
  - The amount of reduction can also be offset by terminal operator concessions.
  - The ultimate impact of automation on the labor force depends upon agreements between labor and management regarding staffing levels and workforce retraining.
- Harbor Department Financial Impact
  - Automation should not impact the Port's income, if volumes are unchanged.
  - Terminal operators are responsible for investment in automation equipment.
  - The Harbor Department is responsible for terminal improvements.
  - Under the Harbor Department rate of return policy, terminal improvement investments should be offset by increased revenue from the terminal operator.
- Competitive Impact
  - Automation, if it reduces terminal costs and/or increases terminal efficiency, can provide a competitive advantage to a terminal that implements it.
  - Conversely, if competing ports automate and the Port of Los Angeles does not, it may find itself at a competitive disadvantage.
  - The amount of cargo at risk depends upon the level of cost savings or efficiency gains, which in turn depends on the level of automation and how well it works.

- Cargo losses (and related job losses) could be significant, but too little is known at present to prepare reliable estimates.

### **Estimating Automation Impacts: an Example Using TraPac**

As noted above, a significant amount of information necessary to provide an accurate cost-benefit analysis of future automation is still unknown at present. However, it is possible to prepare a rough estimate of automation impacts using what is known about the TraPac automation project.

- ILWU and TraPac representatives agree that automation at TraPac is likely to result in a 40 to 50% reduction in the number of longshore jobs at the TraPac terminal.
  - Autostrad automation reduces the number of workers needed per crane by about 53%.
  - Automating the container backland reduces the number of workers needed per transtainer by 85%.
  - TraPac is only automating a portion of the terminal, with the remainder operating as a traditional manned terminal; thus, the overall impact is between 40 and 50% fewer workers needed at TraPac.
- Based on Pacific Maritime Association reporting on hours and wages, in 2011 the Ports of Los Angeles and Long Beach were served by the equivalent of approximately 9,000 fulltime longshore workers (at 2,080 hours per year).
- Assuming longshore hours are allocated proportionately across terminals based on their container volumes, TraPac was served by the equivalent of 400 longshore workers in 2011.
  - A 40 to 50% reduction in longshore labor equates to a reduction of the equivalent of 160 to 200 longshore jobs
  - Additionally, because longshore jobs are dispatched from a hiring hall, the loss of jobs can be translated into reduced working hours across the pool of longshore labor
    - A loss of 200 longshore jobs equates to a loss of 416,000 hours of work. Spread across 9,000 longshore workers, that is a loss of less than one hour of work per week, or a 2.2% reduction in hours (and pay) overall.
  - Some of this job loss has been offset by the hiring of additional mechanics to service the automated equipment.
- If container volume moves to TraPac from other San Pedro Bay terminals until TraPac reaches its capacity of approximately 2 million TEUs, and the volumes are split evenly between the automated and non-automated portions of the TraPac terminal, job losses would be as high as approximately 600 jobs (or a 7% reduction in hours and pay overall).
  - Growth at other non-automated container terminals could partially or entirely offset this job loss.

The ILWU Local 13 provided data on the geographical distribution of its longshore workers. According to this data, approximately 27.7 percent of the Local 13 workers live in San Pedro and 9.8% live in Wilmington. Assuming the lost jobs match the distribution of Local 13 workers by place of residency, San Pedro and Wilmington could expect to see direct job losses equal to approximately 37.5 percent of the predicted job losses due to automation – between 60 and 75

jobs at current volumes and up to 225 jobs if TraPac reaches capacity by taking volume from other Port terminals.

These job losses will be significant to the local community because longshore jobs pay approximately 85% more than the median household income for San Pedro. However, the impact will be muted because of the relatively low number of jobs lost. While Wilmington and San Pedro have very strong ties to the Port, the Port is not the primary source of employment for these communities.

Occupational Breakdown by Place of Residence

	San Pedro (90731)	San Pedro (90732)	Wilmington (90744)
Construction	6.63%	4.22%	6.89%
Manufacturing	12.77%	12.95%	22.24%
<b>Transportation &amp; Warehousing</b>	<b>10.80%</b>	<b>12.71%</b>	<b>8.06%</b>
Retail Trade	10.32%	8.56%	9.83%
Education, Health & Social Services	18.38%	21.94%	12.42%

(Source: U.S. Census Bureau Summary File (SF3), 2000.)

**Port of Los Angeles Position on Container Terminal Automation**

Given the amount that is unknown about how automation is likely to proceed at the Port of Los Angeles and its competitors, the Harbor Department’s Business Development team has developed a position on dealing with existing and potential future container terminal automation projects:

- Complete TraPac’s first phase (31 acres of 146 acres) of Autostrad automation by mid-2014. The remainder will be completed by the year 2016.
- Eagle Marine Services/APL has an approved EIR with AGV automation, as an option, in the 40 new acres. If Eagle Marine Services/APL chooses to automate the 40 acres, the Port will provide the infrastructure as described in the current scope of work, which includes compensation by the customer meeting the Harbor Department’s rate-of-return policy.
- Prepare an EIR for Yang Ming that includes an assessment of automation.
- If terminal operators want to automate their facilities they may do so using their own capital. The Harbor Department will evaluate each such proposal on a case-by-case basis.
- Based on an assessment of (1) the performance outcomes from automated operations at TraPac and other automated terminals, (2) the evolution of shipping alliances and their impacts on future terminal needs and infrastructure, (3) the financial contributions terminal customers are willing to make towards automation projects, and (4) other competing ports’ approaches to terminal automation, the Harbor Department will proceed to develop a terminal automation strategy.

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