



Project Controls
E X P O

Project Controls Expo – 16th Nov 2017
Emirates Stadium, London

Enterprise Scheduling and Risk Management
at Los Angeles Metro

By: Julie Owen CCP PSP FAACE
Deputy Executive Officer, Program Control

Julie Owen



- Deputy Executive Officer at Los Angeles Metro
- Served Past-President 2015-2016, AACE International Board of Directors
- Education:
 - Texas A&M University B.S Construction Science
 - University of Redlands M.B.A. Business Administration
- Some Hobbies:
 - Dog Person
 - Scuba diver
 - Enjoy Travel



LA Metro Background

- ❑ 2nd largest public transportation system in US
- ❑ Most populous county in US at 10.4 million
- ❑ 89 incorporated cities
- ❑ Service area covers 1,433 mi²
- ❑ Transportation planner, designer, builder, operator
- ❑ Worst traffic delay in the US

Investment ½ C Sales Tax

- Measure R (\$40B) – 2008 over 30 years
- Measure M (\$120B) – 2016 over 40 years



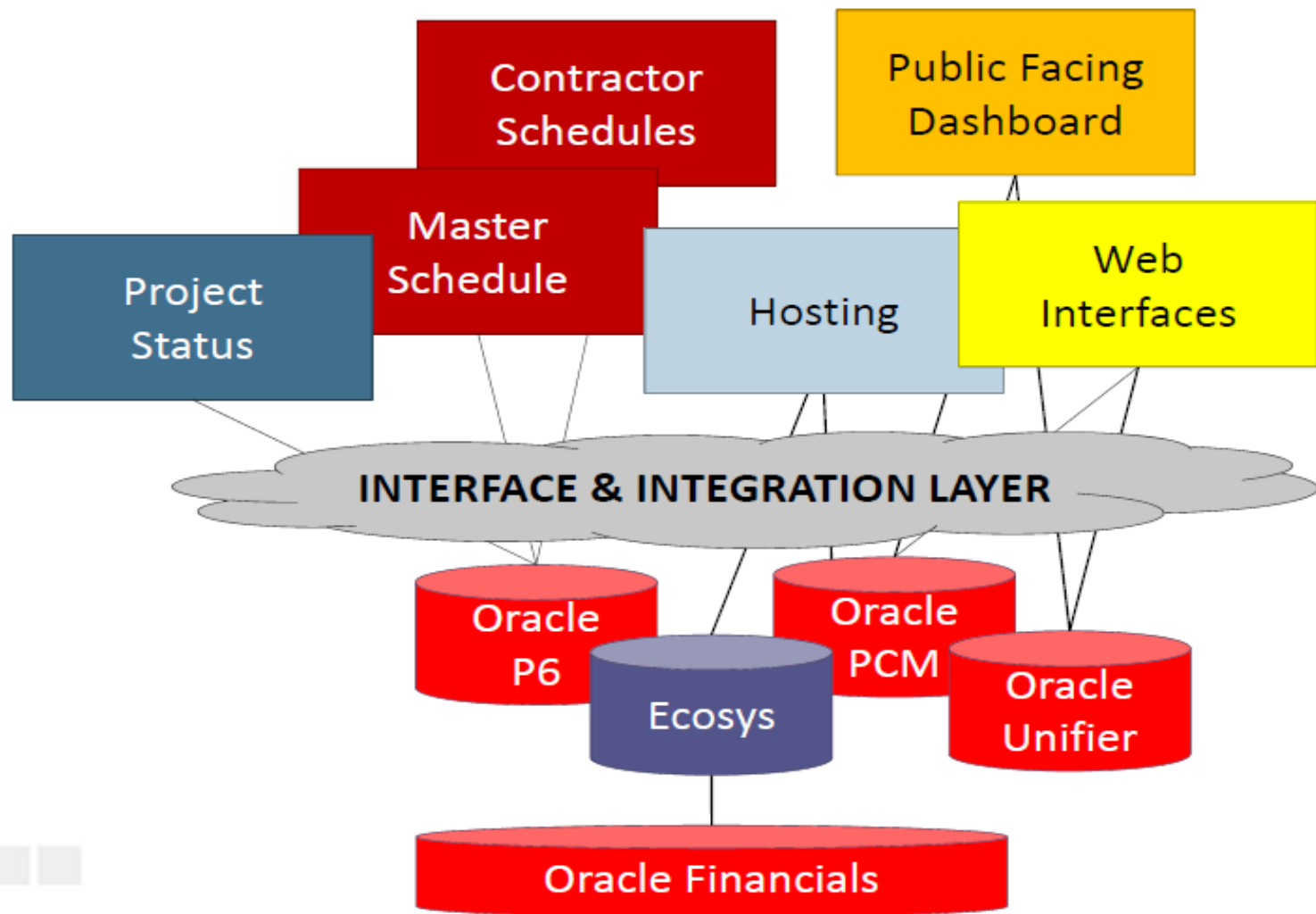
MEASURE M TRANSIT & HIGHWAY PROJECTS



Measure M Expenditure Plan

Subfund	Program	% of Sales Tax (net of Admin)	First Year Amount (FY 2018)	FY 2018 - FY 2032 (15 Years)	FY 2033 - FY 2047 (15 Years)	FY 2048 - FY 2057 (10 Years)	FY 2018 - FY 2057 (40 Years)	
Transit Operating & Maintenance	Metro Rail Operations	5%	\$ 42	\$ 850	\$ 2,320	\$ 2,810	\$ 5,980	
	Transit Operations (Metro & Municipal Providers)	20%	\$ 169	\$ 3,400	\$ 9,280	\$ 11,240	\$ 23,920	
	ADA Paratransit for the Disabled; Metro Discounts for Seniors and Students	2%	\$ 17	\$ 340	\$ 930	\$ 1,120	\$ 2,390	
Transit, First/Last Mile (Capital)	Transit Construction (Includes System Connectivity Projects - Airports, Union Station, and Countywide BRT)	35%	\$ 296	\$ 5,960	\$ 16,230	\$ 19,670	\$ 41,860	
	Metro State of Good Repair	2%	\$ 17	\$ 340	\$ 930	\$ 1,120	\$ 2,390	
Highway, Active Transportation, Complete Streets (Capital)	Highway Construction (includes System Connectivity Projects - Ports, Highway Congestion Programs, Goods Movement)	17%	\$ 144	\$ 2,890	\$ 7,880	\$ 9,560	\$ 20,330	
	Metro Active Transportation Program (Bicycle, Pedestrian, Complete Streets)	2%	\$ 17	\$ 340	\$ 930	\$ 1,120	\$ 2,390	
Local Return / Regional Rail	Local Return - Base (Local Projects and Transit Services)	16%	\$ 136	\$ 2,720	\$ 7,420	\$ 8,990	\$ 19,130	
	Local Return / Regional Rail (Beginning FY 2040)				3% / 1% →	\$ 690	\$ 2,240	\$ 2,930
	Regional Rail	1%	\$ 8	\$ 170	\$ 460	\$ 560	\$ 1,200	
TOTAL PROGRAMS			\$ 847	\$ 17,010	\$ 46,380	\$ 56,190	\$ 119,590	
Administration /Local Return	0.5% for Administration	0.5%	\$ 4	\$ 85	\$ 230	\$ 280	\$ 600	
	1.0% Local Return	1.0%	\$ 8	\$ 170	\$ 460	\$ 560	\$ 1,200	
GRAND TOTAL			\$ 860	\$ 17,265	\$ 47,070	\$ 57,030	\$ 121,390	

Program Management Information



Business Objectives – Schedule and Risk

□ Enterprise Scheduling

- Set Agency Standards by Mode
- Engage Agency Departments in Planning
- Build Detailed Schedules and Mentor Staff
- Report Summary Schedules to Executives

□ Risk Management

- Risk Management Guidelines by Client
- Set Agency Standards by Transportation Mode
- Evaluate Risks Programmatically
- Leverage information for Strategic Decisions

Enterprise Scheduling - How It Works

Proactive and collaborative schedules are a team effort bringing together several groups:

Monthly Schedule
is Submit to Metro



Input from SMEs
(Metro Departments)
and Stakeholders

Quality Control
with SMEs

Draft Update
Produced

Quality Assurance
per Project
Control Lead
review / PM
Approval

Final Monthly
Project Master
Schedule Updated

Master Schedule
and Narrative to
Configuration
Management

Schedule Reporting
including Level 1-3, MPSR.
PMOC Report, Metro PMIS
Interface / Summary
Schedule etc.

Enterprise Schedule Management

□ Level 1 – Summary Schedule Files

- Utilized for management and public.
- Depicts lifecycle phases and key milestones.

□ Level 2 – Control Schedule Files

- Contain Metro activities and contract detail.
- Used to monitor and control project.

□ Level 3 – Contractor Schedule Files

- Greatest level of detail to manage contracts.

Transit Schedule Standards

Work Phases

- Planning/Environmental
- Design Engineering
- Utility Relocation
- Right of Way
- Vehicles
- Support Facilities
- DB or DBB Contract
- Pre-Revenue Testing

Key Milestones

- Admin Draft to FTA
- Engineering Solicitation
- Board Approve LPA
- Begin Engineering
- DB or DBB RFP
- Notice to Proceed
- Substantial Completion
- Revenue Service

Transit Level 2 Control Schedule

		'00 - Working Level 2 Schedule				2015												2020												17-May-17											
Activity ID	Activity Name	Orig. Dur.	Rem. Dur.	Start	Finish																																				
Transit Projects		2180	1615	30-Jan-15 A	04-Oct-23																																				
Environmental		2180	1615	30-Jan-15 A	04-Oct-23																																				
North Hollywood to Pasadena BRT - Current Level 2 Schedule		3170	2285	30-Jan-15 A	04-Oct-23																																				
Alternatives Analysis		968	0	30-Jan-15 A	23-Mar-17 A																																				
NoHoPas-PD-10000	Issue RFP for Technical Analysis	0	0	30-Jan-15 A																																					
NoHoPas-PD-10010	RFP/Bid/Award Technical Analysis Contract Cycle	198	0	30-Jan-15 A	15-Aug-15 A																																				
NoHoPas-PD-10020	Technical Analysis Contract Awarded	0	0		15-Aug-15 A																																				
NoHoPas-PD-10030	Prepare Technical Analysis	204	0	16-Aug-15 A	04-Jan-17 A																																				
NoHoPas-PD-10200	Prepare for Board Cycle	18	0	05-Jan-17 A	21-Mar-17 A																																				
NoHoPas-PD-10220	Technical Study Presented to Board	0	0																																						
Draft Environmental Impact Report (DEIR)		570																																							
NoHoPas-PD-10050	Issue RFP for DEIR / PE		0	03-Jul-17*																																					
NoHoPas-PD-10060	RFP/Bid/Award DEIR/PE Contract Cycle	172	172	03-Jul-17	21-Dec-17																																				
NoHoPas-PD-10070	Board Awards DEIR/PE Contract	0	0		25-Jan-18																																				
NoHoPas-PD-10080	Prepare Draft Notice of Intent/Notice of Preparation (NOP)	32	32	25-Jan-18	25-Feb-18																																				
NoHoPas-PD-10120	Prepare Administrative DEIR	250	250	26-Feb-18	02-Nov-18																																				
NoHoPas-PD-10130	Circulate/Finalize DEIR	45	45	03-Nov-18	17-Dec-18																																				
NoHoPas-PD-10140	Board Approves Locally Preferred Alternative	0	0		24-Jan-19																																				
NoHoPas-PD-10190	Prepare for Board Cycle	32	32	18-Dec-18	18-Jan-19																																				
Final Environmental Impact Report (FEIR)		154	154	24-Jan-19	27-Jun-19																																				
NoHoPas-PD-10160	Prepare Administrative FEIR	48	48	24-Jan-19	12-Mar-19																																				
NoHoPas-PD-10170	Circulate/Finalize Administrative FEIR	45	45	13-Mar-19	26-Apr-19																																				
NoHoPas-PD-10180	Board Certifies FEIR	0	0		27-Jun-19																																				
NoHoPas-PD-10210	Prepare for Board Cycle	50	50	27-Apr-19	15-Jun-19																																				
Preliminary Engineering		356	356	25-Jan-18	24-Jun-19																																				
NoHoPas-DE-3020	Preliminary Engineering	275	275	26-Jan-18	01-Mar-19																																				
NoHoPas-DE-3045	Prep Bid Documents	80	80	04-Mar-19	24-Jun-19																																				
NoHoPas-MS-10070	Start Preliminary Engineering	0	0	25-Jan-18*																																					

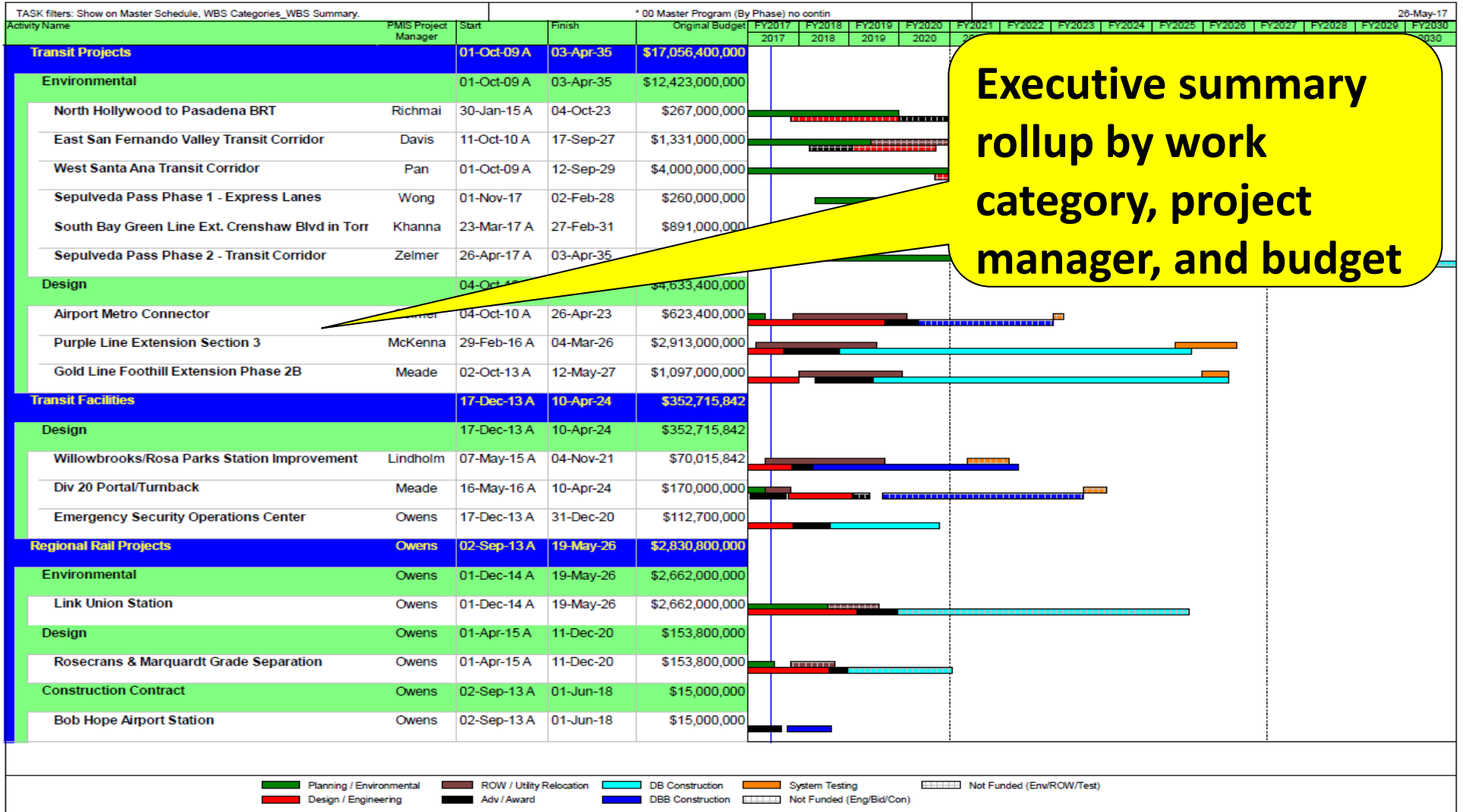
Displays detailed planning activities and milestones across lifecycle

Transit Level 1 Summary Schedule

		*00 - Working Level 1 Schedule					
Activity ID	Activity Name	Orig. Dur.	Rem. Dur.	Start	Finish	FY2017 2017	FY2018 2018
Transit Projects		1855	1815	30-Jan-15 A	04-Oct-23		
North Hollywood to Pasadena BRT		1855	1815	30-Jan-15 A	04-Oct-23		
Key Dates		1571	1571	03-Jul-17	04-Oct-23		
CORL-MS-10030	Begin Environmental/Engineering Contract Solicitation	0	0		03-Jul-17	•	
CORL-MS-10080	Board Approves Contract for Environmental/PE	0	0		25-Jan-18	•	
CORL-MS-10070	Start Preliminary Engineering	0	0	26-Jan-18		•	
CORL-MS-10040	Board Approves Locally Preferred Alternative	0	0		24-Jan-19		
CORL-MS-10080	Start FEIR	0	0	24-Jan-19			
CORL-MS-01200	Commence Revenue Operations	0	0		04-Oct-23		
Planning / Environmental		582	498	30-Jan-15 A	26-Jun-19		
CORL-PL-2000	Alternative Analysis	191	0	30-Jan-15 A	23-Mar-17 A		
CORL-PL-2010	Draft EIR	390	390	03-Jul-17	23-Jan-19		
CORL-PL-2020	Final EIR	108	108	24-Jan-19	26-Jun-19		
Design Engineering		540	540	01-May-17	24-Jun-19		
CORL-DE-3030	Design RFP	0	0	01-May-17	01-May-17		
CORL-DE-3000	Preliminary Engineering	358	358	25-Jan-18	24-Jun-19		
ROW / Advanced Utility Relocation / Vehicles		540	540	27-Jun-19	19-Aug-21		
CORL-RW-4020	Vehicle Procurement	518	518	27-Jun-19	16-Jul-21		
CORL-RW-4010	Special Conditions / Utilities	194	194	10-Nov-20	19-Aug-21		
Adv/Award		258	258	25-Jun-19	02-Jul-20		
CORL-BID-1000	Bid Documents/Bid Cycle	258	258	25-Jun-19	02-Jul-20		
Construction Contract		559	559	06-Jul-20	23-Sep-22		
CORL-CO-5010	Final Design	258	258	06-Jul-20	14-Jul-21		
CORL-CO-5000	Construction	518	518	03-Sep-20	23-Sep-22		
System Testing		86	86	26-Sep-22	31-Jan-23		
CORL-SY-6000	System Testing	86	86	26-Sep-22	31-Jan-23		

Displays high level phases and milestones across project lifecycle. Summary schedules linked to control via level of effort activities for management ease

Transit Executive Level Schedule



Highway Summary

Highway Projects		02-Jan-08 A	10-May-30	\$12,506,580,000	
Environmental		Chaves	02-Jan-08 A	10-May-30	\$11,722,500,000
I-710 South		Chaves	02-Jan-08 A	01-Mar-30	\$8,023,100,000
I-605 "Hot Spot" Interchanges		Chaves	01-Jun-14 A	10-May-30	\$3,699,400,000
Arterial Intersections - Long Beach		Chaves	01-Jun-14 A	01-Jul-19	\$1,500,000
Arterial Intersections - La Mirada		Chaves	02-Jun-14 A	02-Mar-20	\$4,300,000
Arterial Intersections - Cerritos		Chaves	01-Jun-14 A	02-Mar-20	\$2,900,000
Arterial Intersections - Bellflower		Chaves	01-Jun-14 A	02-Mar-20	\$1,200,000
Arterial Intersections - Whittier		Chaves	02-Jun-14 A	01-Jul-21	\$5,600,000
I-605/I-5 Interchange Improvements		Chaves	01-Oct-15 A	01-Sep-27	\$1,108,100,000
I-605/SR-91 Interchange Improvements		Chaves	01-Jun-16 A	01-Aug-25	\$1,100,000,000
I-605/SR-60 Interchange Improvements		Chaves	31-Aug-16 A	01-May-30	\$1,232,000,000
I-710/SR-91 Interchange Improvements		Chaves	01-Aug-17	15-Jun-20	\$530,000,000
I-605/I-405 Interchange Improvements		Chaves	01-May-17	10-May-30	\$670,500,000
Design		Ogunrinde	02-Jul-12 A	29-Apr-22	\$784,080,000
I-5 North Capacity Enhancement (SR-14 to Parker Rd.)		Ogunrinde	02-Jul-12 A	29-Apr-22	\$784,080,000
I-5 N Express Lanes		Ogunrinde	02-Jul-12 A	29-Apr-22	\$784,080,000

High level summary by work category, Project Manager and budget

Risk– Background / Opportunity

Construction Best Practice Audit:

- Ingrain into Project Delivery Culture
- Implement Readiness Review Across Lifecycle
- Employ Scaled Risk Management on All Projects
- Enforce Risk Procedures to Manage Contingencies

Opportunity:

- Establish Uniform Risk Management Policy/Procedure
- Implement Web-Based Centralized Risk Tracking
- Manage Programmatic Risk and Apply Strategies

Risk management - Implementation



1. Coordinate with SME's to review current information and the requirements for risk tracking
2. Strategically map information to appropriate fields within P6
 - Some native, some augmented with UDF's
3. Develop import scripts to transfer data from MS Access to Primavera P6

Risk Management Solution Design

1. Risk Register Snapshots
 - Point in time snapshots for comparative analysis
 - Added security for administrator data publish
2. Drop down lists for UDF
 - Uses P6 UDF as dictionaries (similar to codes)
3. Review Comments / Justification
 - Automatically move text Current, to Last, to History

SAMPLE Risk Register WITH FILTERS

ID	Description	Probability	SCC Code	Type	Risk Owner Group	FTA Milestone	Status	Score	Actions
20	Discovery		20	Construction Risk	RCC / Metro	50% Constr	Active	1	Delete Edit
220	Contamin...		40	Construction Risk	Metro	50% Constr	Active	1	Delete Edit
225	Inadequa...		10	Construction Risk	Metro	50% Constr	Active	10	Delete Edit
236	As environmental issues are likely to be present during t...		10	Construction Risk	Metro	50% Constr	Active	1	Delete Edit
248	Project may impact the Little Tokyo community beyond anti...		80	Construction Risk	Metro	50% Constr	Active	3	Delete Edit
306	Discovery of historic artifacts during station box and cu...		20	Construction Risk	Metro	50% Constr	Active	2	Delete Edit

Risk OVERVIEW AND MANAGEMENT

1
2
3
4

Risk Overview & Management
Assessment
Actions
Comments

General Information & Details

* Risk ID	FTA Milestone	Location	
Risk ID <input type="text" value="R-001"/>	Select FTA Milestone <input type="text"/>	Select Locations <input type="text"/>	
* Type	* Status	* SCC L1	SCC L2
Select risk type: <input type="text"/>	Proposed <input type="text"/>	Select SCC L1 <input type="text"/>	Select SCC Codes <input type="text"/>

Current Management

Risk Owner	Mitigation Strategy	Risk Reconciliation Date	Ongoing?	Program Level Risk
Select a Risk Owner Group <input type="text"/> Select a Risk Owner <input type="text"/>	Select a Mitigation Strategy <input type="text"/>	Reconciliation Date <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>

Description

Current <input style="width: 95%; height: 40px;" type="text"/> <div style="border: 1px solid #ccc; padding: 2px; font-size: 0.8em;"> B I U ↵ 14 A ☰ ☰ ☰ T 🔗 📄 ? </div>	Original <input style="width: 95%; height: 40px;" type="text"/>
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Risk ASSESSMENT / SCORING

1 Risk Overview & Management 2 **Assessment** 3 Actions 4 Comments

Contingency Management

Dollar Impact to Project	Project Contingency Set-aside	Schedule Impact to Project in Working Days	Project Schedule Contingency in Working Days
<input type="text" value="0"/> *39000*	<input type="text" value="0"/> *50000*	<input type="text" value="Schedule Impact"/> *40*	<input type="text" value="Schedule Contingency"/> *90*

Quantitative Assessment

Dollar Impact	Schedule Impact
Minimum	Minimum
<input type="text" value="0"/>	<input type="text" value="Minimum Schedule Impact"/>
Most Likely	Most Likely
<input type="text" value="0"/>	<input type="text" value="Most Likely Schedule Impact"/>
Maximum	Maximum
<input type="text" value="0"/>	<input type="text" value="Maximum Schedule Impact"/>

Qualitative Assessment

Scores

Cost Impact

Schedule Impact

Probability

Risk MITIGATION ACTION PLANS

1 Risk Overview & Management 2 Assessment 3 **Actions** 4 Comments

Actions

	Action Name	Action By	Action Status	Due Date
1	<input type="text"/> <small>0 of 255</small>	Select a Risk Owner ▼	Select a status ▼	Due Date
2	<input type="text"/> <small>0 of 255</small>	Select a Risk Owner ▼	Select a status ▼	Due Date
3	<input type="text"/> <small>0 of 255</small>	Select a Risk Owner ▼	Select a status ▼	Due Date
4	<input type="text"/> <small>0 of 255</small>	Select a Risk Owner ▼	Select a status ▼	Due Date
5	<input type="text"/> <small>0 of 255</small>	Select a Risk Owner ▼	Select a status ▼	Due Date

Cancel Submit Back Next

Risk comments and justifications

Comments (Justification for Change / Review Comments)

The screenshot displays a software interface for managing risk comments and justifications. At the top, a navigation bar features four steps: 1. Risk Overview & Management, 2. Assessment, 3. Actions, and 4. Comments, with the fourth step being the active page. Below the navigation bar, the main content area is titled "Comments & Justifications". It is divided into two main sections: "Justifications for Change" and "Review Comments". Each section contains a "Current" text editor with a rich text toolbar (including Bold, Italic, Underline, text color, background color, bulleted list, numbered list, link, unlink, and help icons) and a "New Justification" or "New Comments" button. To the right of the "Current" editor are two vertical panels labeled "Last" and "History", which are currently empty. A character count "0 of 255" is visible at the bottom of each text editor.

Risk Display

Assessment		
Scores		
Current	6	■
Original	2	■
Dollar Impact		
Minimum	Current	Original
	\$100.00	\$100.00
Most Likely	Current	Original
	\$250.00	\$250.00
Maximum	Current	Original
	\$400.00	\$400.00
Schedule Impact		
Minimum	Current	Original
	0	0
Most Likely	Current	Original
	0.25	0.25
Maximum	Current	Original
	0.5	0.5
Justifications for Change		
Current	11/30/2016: Time score changed from 1-2 during PMOC/FTA Risk Refresh.	
Last	6/8/2016: Risk score adjusted P 5-3. Risk will continue until reaching inverts at all locations. Risk is getting less and less as excavation continues down to the invert. Biggest concern is utilities (and we know a lot about utilities).	
History	5/26/2016: New risk split from Risk 194 to cover station boxes risk. Flower piling impacted by tie-backs. RCC, in coordination with Antonelli/Pendse/Patel for their respective areas.	
Review Comments		
Current	1/11/2017: Excavation ongoing at Broadway and Flower. Hope excavation is close to invert. Only other excavation is 1st St leg.	
Last	11/30/2016: Time score changed from 1-2 during PMOC/FTA Risk Refresh.	
History	5/26/2016: New risk split from Risk 194 to cover station boxes risk. Flower piling impacted by tie-backs. RCC, in coordination with Antonelli/Pendse/Patel for their respective areas. 6/8/2016: Risk score adjusted P 5-3. Risk will continue until reaching inverts at all locations. Risk is getting less and less as excavation continues down to the invert. Biggest concern is utilities (and we know a lot about utilities). 8/31/2016: 2nd/Broadway and Flower Street are still issues; risk remains. 10/11/2016: 1st/Central risk has gone away and excavation at 2nd/Hope is nearly complete (excavated 75 of 110 ft) with no obstruction issues.	

Next Steps / Lessons Learned

- Scheduling
 - Expand Scheduling for all Capital Projects
 - Evaluate Resource/Role Loading in P6
 - Create Executive Dashboard Reports
- Risk Management
 - Deploy Risk Tracking All Transportation Modes
 - Develop Risk Process for All Capital Projects
 - Leverage Risks Programmatically for Strategy

Questions



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