Mid-Coast Corridor Transit Project

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Managing Successful Construction Projects, part 2 of 2

What small contractors can do to be successful on construction projects

February 25, 2016

THE TEAM

MID-COAST TRANSIT CONSTRUCTORS

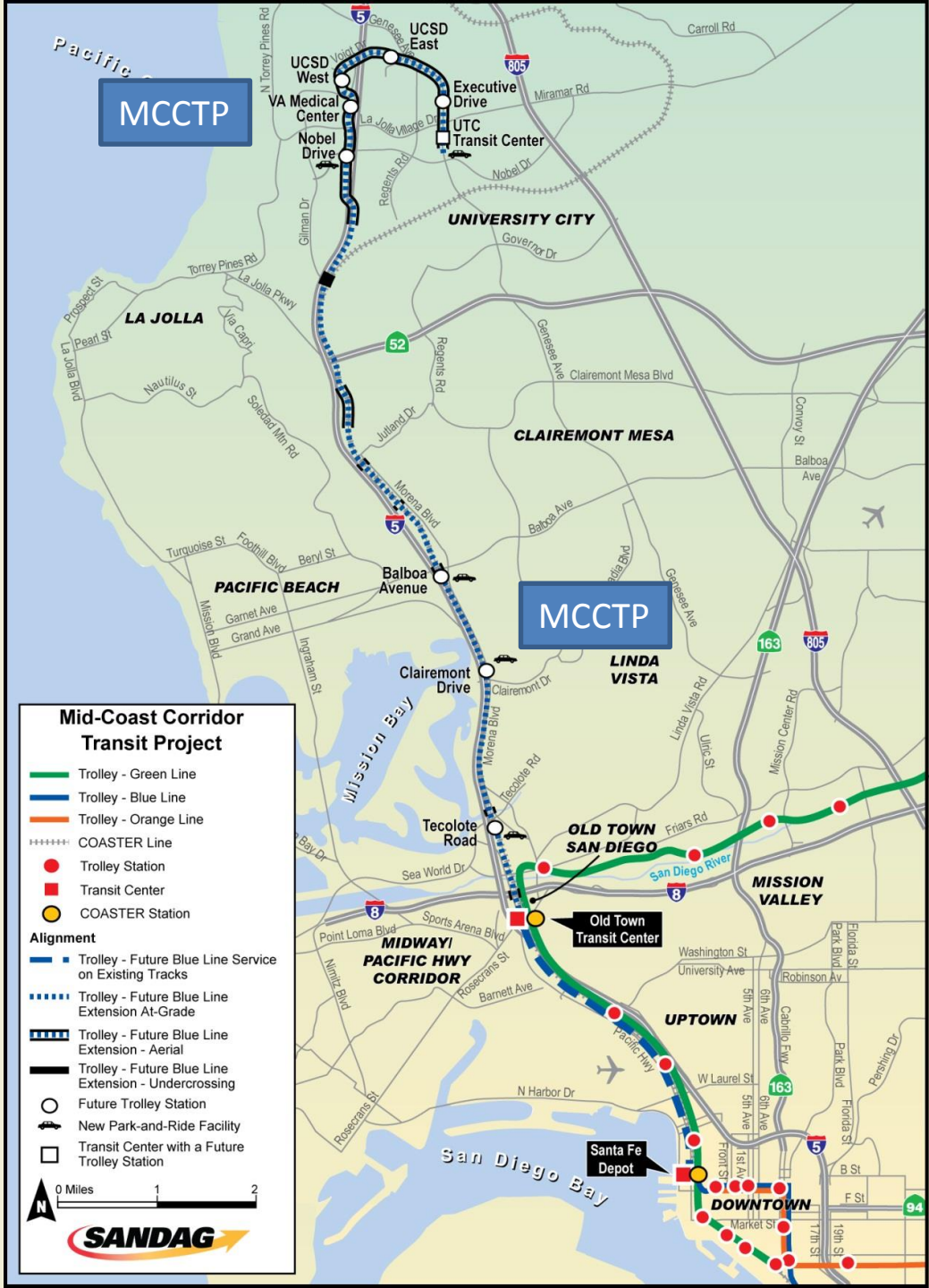
Mid Coast Transit Constructors (MCTC) is a fully integrated Joint Venture of Stacy and Witbeck, Herzog, and Skanska. We have combined these three highly successful construction organizations to bring a collection of talents uniquely suited for the CMGC 1 projects. MCTC team members are heavy civil constructors specializing in CM/GC contracting for rail projects. We are experts at self-performing rail and bridge work proudly managed and built by our own forces.

In the past 10 years our firms have constructed over 600 miles of track for passenger service. Together, our CM/GC experience includes more than 30 rail transit projects with a total value of over $4.7 billion.

Stacy and Witbeck HERZOG SKANSKA

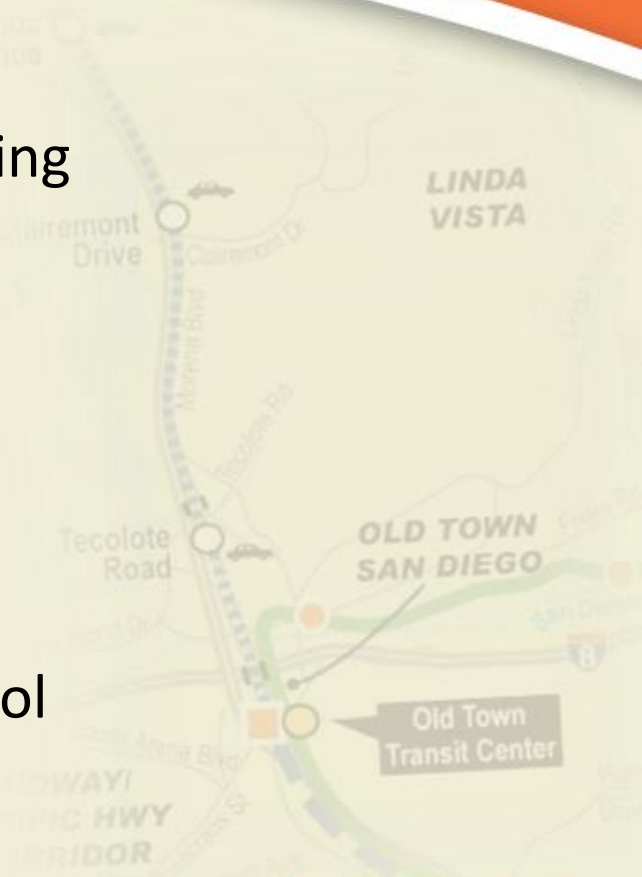
Mid-Coast Corridor Transit Project

- Extension of Trolley Blue Line from Downtown to UTC Transit Center
- 10.9 miles of new LRT tracks
- Nine LRT stations
- Three miles of LRT fall within or adjacent to Caltrans right of way
- Two I-5 Crossings



Welcome and Introductions

- Presenters
  - Tom Holmquist, President, TLH Consulting
  - Andrew Holmquist, MCTC, Engineer
  - Zeb Hutchison, MCTC, Engineer
  - Matthew Heminover, MCTC, Engineer
  - Ryan Richards, MCTC, Engineer
  - Gloria Rossiter, MCTC, Document Control
- Introductions



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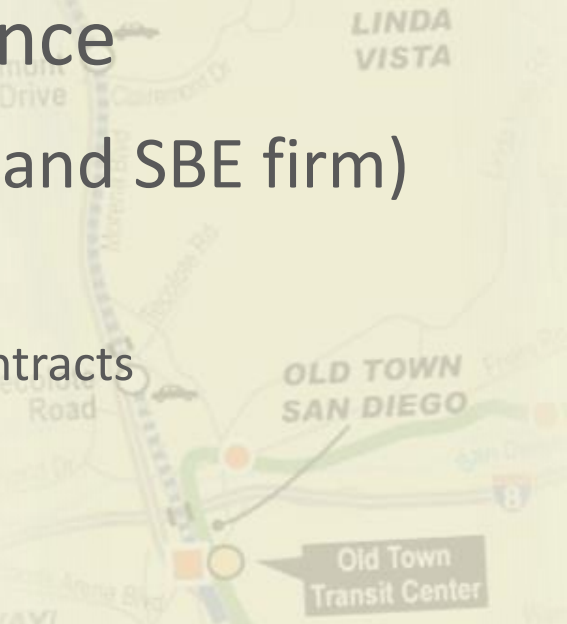
Introduction

John Johnson, MCTC Subcontractor Liaison

- 30 years of construction experience
- Founder/Owner CMSI (DBE, MBE and SBE firm)
- Workshop Series
  - ✓ Estimating & Bidding on MCTC Construction Contracts
  - ✓ Labor Compliance
  - ✓ Using E-Procurement Systems to Win Contracts
  - ✓ The ABCs of Underwriting
  - ✓ Managing Successful Construction Projects (part 1)



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Presentation Outline

- Cash flow
- Progress billing effects on cash flow
- Cost control techniques
- Maximizing field productivity
- Submittals
- Document control
- Q & A

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CASH FLOW

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Introduction

- Tom Holmquist
- President, TLH Management Advisory Services LLC

My Focus:

Provide my clients with financial and operational expertise and support to:

- Identify, develop, and execute business plans to create valuable businesses

My Background & Experience:

- Over 25 years of success leading financial operations of companies such as BAE Systems, Textron, Teledyne, Hughes Aircraft, PricewaterhouseCoopers
- CPA – retired, BS accounting Loyola Marymount University

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Discussion Topic

Cash Flow Analysis

- What is?
- Why is it important?

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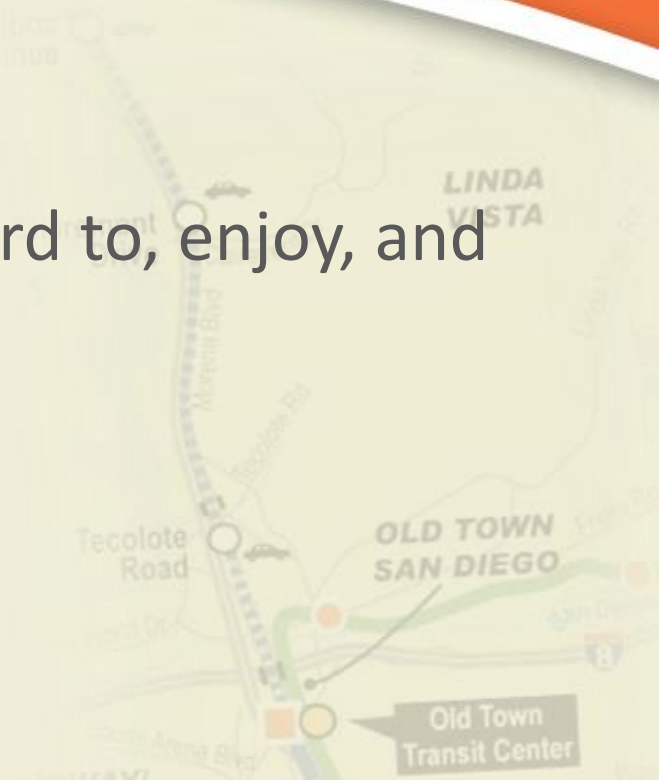
Primary Objective

"Compel you to absolutely, look forward to, enjoy, and celebrate cash flow analysis."



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What is Cash Flow

Measure of Cash your receive (Cash In)

Less: Cash you spend (Cash Out)

= Cash Generated or (Cash Used)

Keep It Simple (KIS)

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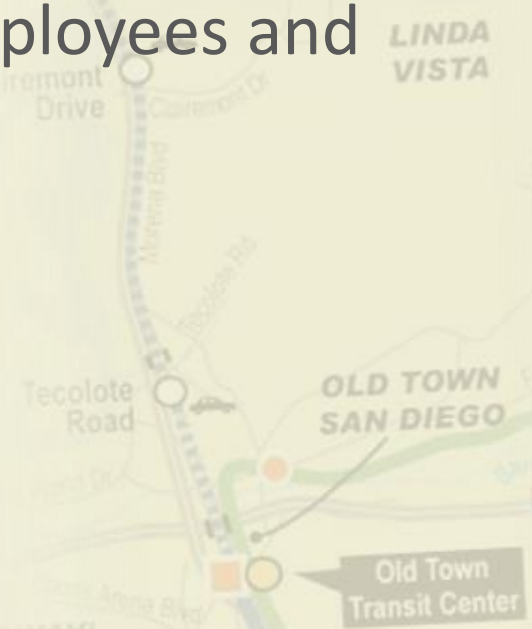
Why is Cash Flow Important?

Need cash flow to obtain the resources to:

- Conduct business (recruit and pay employees and suppliers)
- Invest in capital equipment
- Invest in facilities
- Invest in new products
- Pay down debt
- Be financially viable (a key to winning more business)



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Why is Cash Flow Important?

THE GOAL – Generate cash flow to Increase the "Value of you Business"

Example:

A $100,000 Certificate of Deposit generates $10,000 in annual cash flow at 10% interest

How much is your business worth if you can generate $10,000 in annual cash flow?

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Keys to Generating Cash Flow

- Measure and manage (Implement Cash Flow Analysis Tool)
- Know and manage your cost structure
- Bid, win, and execute **profitable** contracts
- Invest in people, resources, tools, facilities, equipment that will generate cash flow (Return on Investment Analysis)

" A difficult thing to do is spend money"

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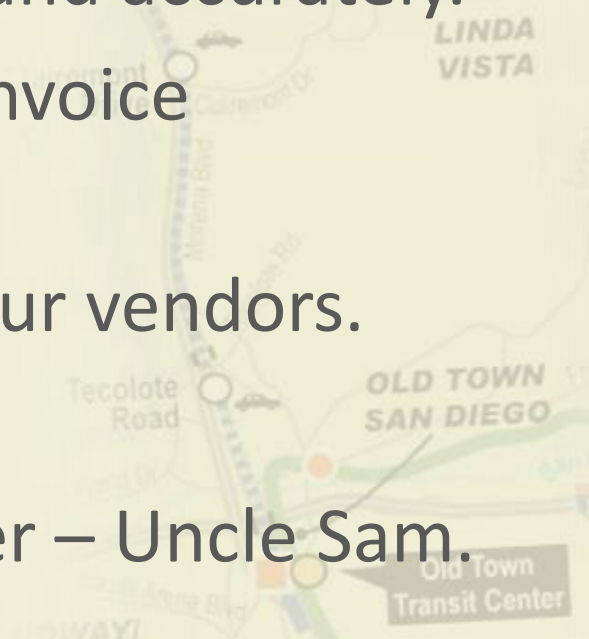
Keys to Generating Cash Flow

- Submit customer invoices timely and accurately.
- Be the squeaky wheel regarding invoice collection.
- Negotiate payment terms with your vendors.
- Negotiate optimal banking terms.
- Manage your 20% or more partner – Uncle Sam. Don't forget tax obligations.



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Example - Weekly Cash Flow Plan

BEGINNING BALANCE	**125,000.00**	
TOTAL CASH IN	130,121.00	
TOTAL CASH OUT	73,620.21	
ENDING BALANCE	**181,500.79**	**03/13/16**

Forecasted Cash Generated/(Used) **56,500.79**

	Actual			Forecast		
CASH FLOW IN	**02/07/16**	**02/14/16**	**02/21/16**	**02/28/16**	**03/06/16**	**03/13/16**
Beginning Balance	**125,000.00**	**121,076.68**	**131,011.69**	**143,085.70**	**163,828.38**	**161,456.79**
Job # 1		12,000.00		26,965.00		18,956.00
Job # 2	15,000.00		20,000.00		15,000.00	
OTHER		6,500.00		7,200.00		8,500.00
TOTAL CASH IN	**15,000.00**	**18,500.00**	**20,000.00**	**34,165.00**	**15,000.00**	**27,456.00**
CASH FLOW OUT						
Payroll - Job #1	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00
Payroll - Job #2	2,300.00	2,300.00	2,300.00	2,300.00	2,300.00	2,300.00
ABC Material Supplier				6,000.32		
CBA Material Supplier	4,523.32					
Home Depot			500.99			
Credit Card Payments					2,986.59	
Rent	1,200.00				1,200.00	
Truck Payment						
Gas	100.00	95.00	125.00	122.00	85.00	112.00
Repairs		69.99				
Telephone	200.00				200.00	
Insurances	600.00				600.00	
Owner's Draw	5,000.00				5,000.00	
Other Bills		350.00				
Other Bills		500.00				
Other Bills		250.00				
TOTAL CASH OUT	**18,923.32**	**8,564.99**	**7,925.99**	**13,422.32**	**17,371.59**	**7,412.00**

Weekly Cash Generated/(Used)	**(3,923.32)**	**9,935.01**	**12,074.01**	**20,742.68**	**(2,371.59)**	**20,044.00**
To Date Cash Generated/(Used)		**6,011.69**	**18,085.70**	**38,828.38**	**36,456.79**	**56,500.79**

PROGRESS BILLING

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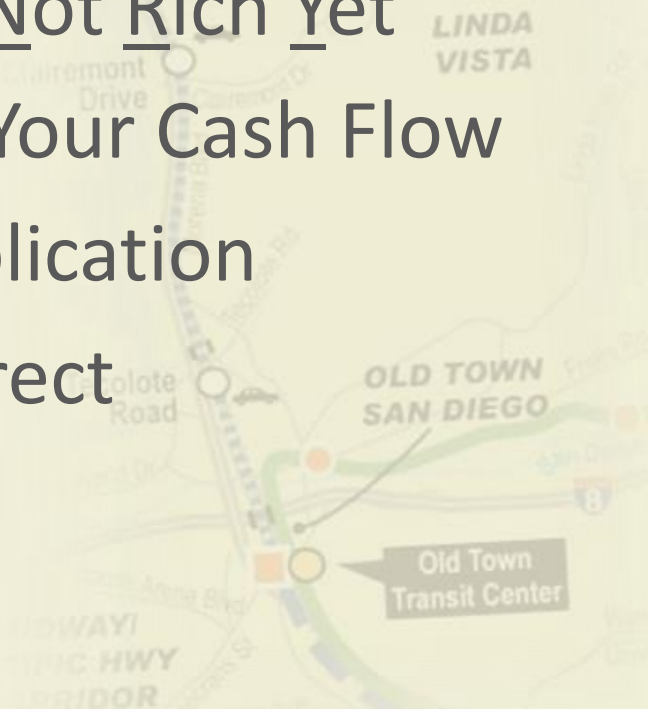
Introduction

- Andrew Holmquist, PE
- Education
  - Licensed Civil Engineer
  - Bachelors & Masters in Civil

    Loyola Marymount University
- Resume – 15 year Career
  - First job $1/day
  - Second job $10,000/software license
  - Third job $100,000/design contract
  - Fourth job $1B/construction project

Progress Billing

- Henry Principle – High Earning Not Rich Yet
- Progress Billing is One Piece of Your Cash Flow
- 8 Steps to Submitting a Pay Application
- Clear, Concise, Complete & Correct



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This is Henry

LINDA VISTA

OLD TOWN SAN DIEGO

Old Town Transit Center

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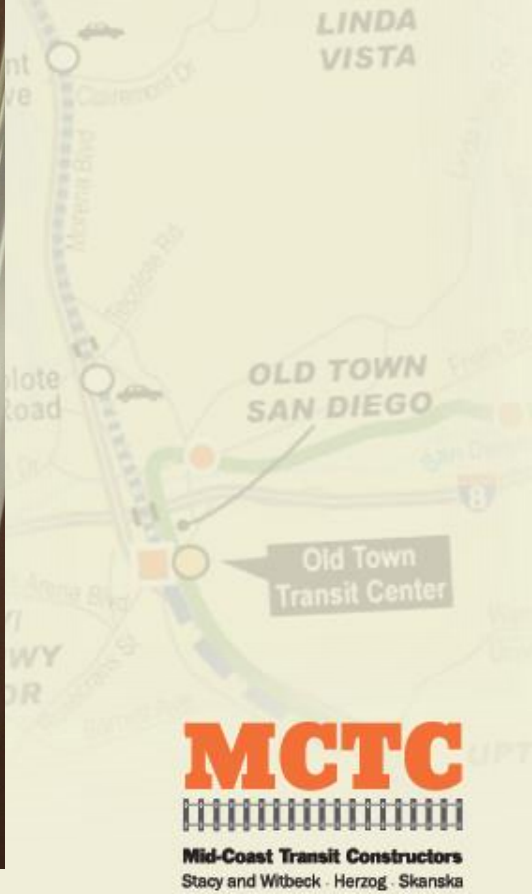
Billing Might Feel Like a New Animal



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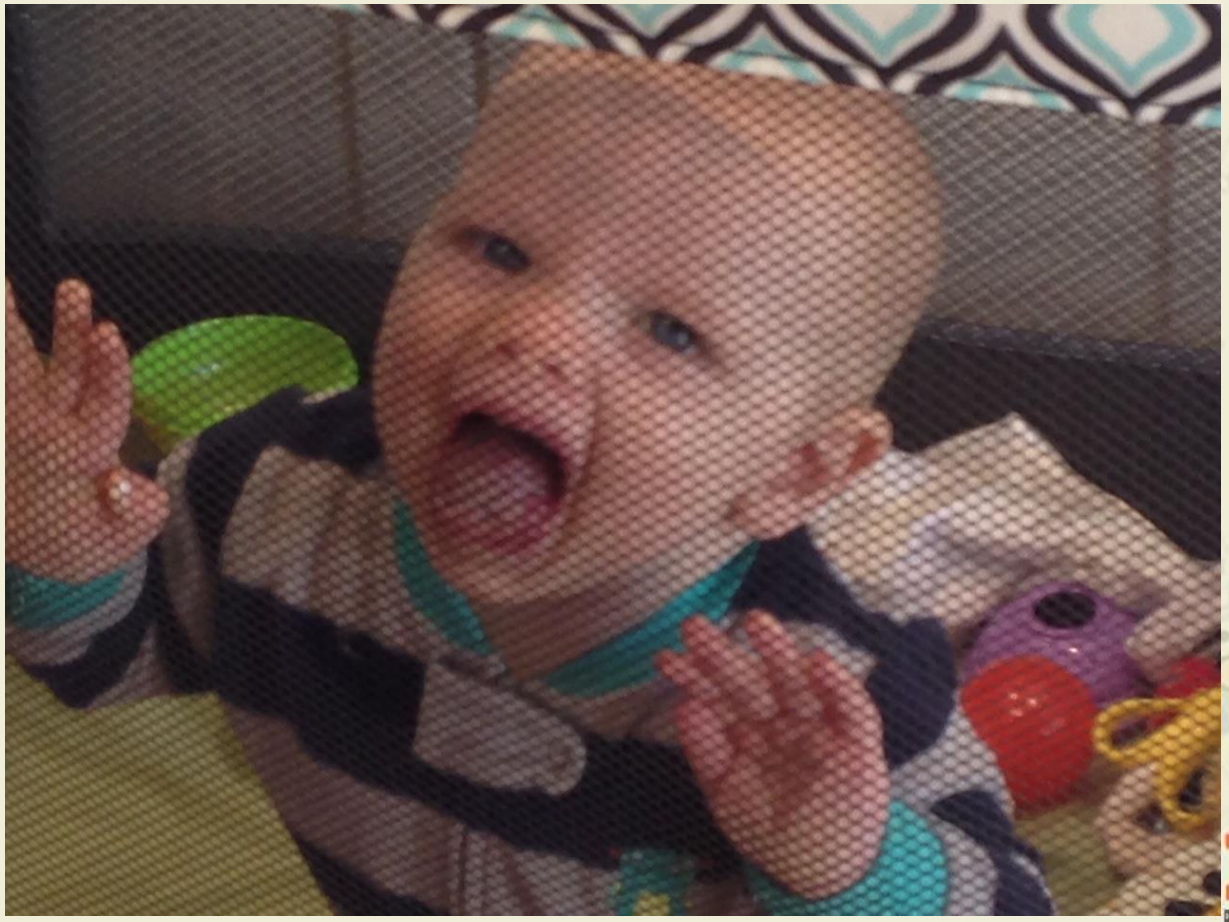
Step 1 - Prepare to Accomplish the Task



Step 2 – Select the Right Vehicle

Step 3 – Coordinate with the Prime

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Step 4 – Brainstorm Solutions

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Step 5 – Resolve any Issues

Step 6 – Submit a 4 C's Pay App

The 4 Cs

- Clear
- Complete
- Correct
- Concise

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Step 7 – Don’t Just Wait for the Check

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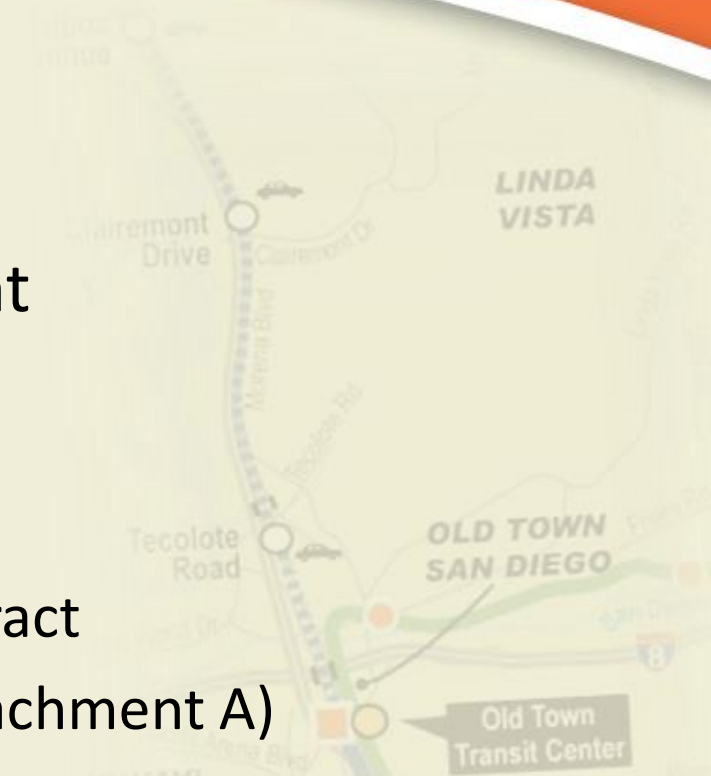
Step 8 - Keep Building More Work

Progress Billing

- Types of Agreements
  - Sub-Contract
  - Materials Purchase Agreement
  - Service Agreement
- Schedule of Values (SOV)
  - A line item breakdown of the contract
  - Follow the contract line items (Attachment A)
  - Review SOV with the Prime Contractor before 1st progress billing



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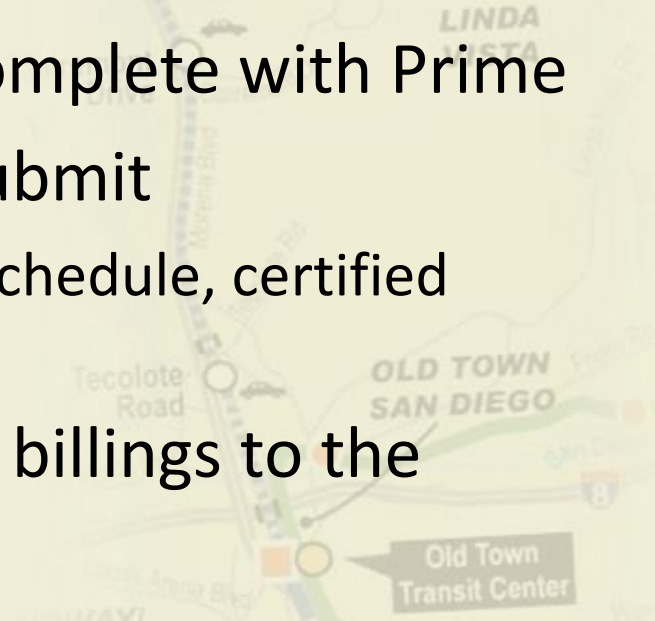
Progress Billing

- Billing and payment procedure
  - Agree on percentage of work complete with Prime
  - Fill in the pay application and submit
    - Include waiver release, updated schedule, certified Payroll, etc.
  - FYI, the Prime submits Progress billings to the Owner on a Monthly basis



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Back Up Might Include

- Receipts for Materials on Hand
- As-Built Drawings
- T&M Tickets
- Photos

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Sample Pay App

REQUEST AND CERTIFICATION FOR RELEASE OF FUNDS

TO PROJECT MANAGER: PROJECT:

FROM CONTRACTOR:

OWNER:

APPLICATION NO: 2
PERIOD ENDING:
PROJECT NO:
CONTRACT #:
CONTRACT DATE:

DISTRIBUTION TO:
- ☐ OWNER
- ☐ PROJECT MGR.
- ☐ CONTRACTOR
- ☐

CONTRACTORS REQUEST FOR PAYMENT

1	ORIGINAL CONTRACT SUM		$250,000.00
2	Net change by Change Orders		$0.00
3	CONTRACT SUM TO DATE(LINE 1 +2)		$250,000.00
4	TOTAL COMPLETED AND STORED TO DATE (Column G on G703)		$181,295.00
5	RETAINAGE		
	a. 10% of Completed Work (Columns D + E on G703)	$18,130.00	
	b. _____% of Stored Materials	$0.00	
	Total retainage (Line 5a + 5b or Total in Column I of G703)		$18,130.00
6	TOTAL EARNED LESS RETAINAGE (Line 4 less Line 5 Total)		$163,165.00
7	LESS PREVIOUS CERTIFICATES, FOR RELEASE OF FUNDS (Line 6 from prior Certificate)		$115,025.00
8	CURRENT PAYMENT DUE		$48,140.00
9	BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$86,835.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous Month by Owner	$0.00	$0.00
Total approved this Month	$0.00	$0.00
TOTALS	$0.00	$0.00
NET CHANGES by Change Orders	$0.00	$0.00

The undersigned Contractor certifies to the best of the Contractor's knowledge, information and belief that the work covered by this request for release of funds has been completed in accordance with all Contract documents, that all amounts have been paid to the Contrractor for work for which previous requests for release of funds were issued and payments received from owner and that current payment

CONTRACTOR:

DATE:

CERTIFICATE FOR RELEASE OF FUNDS

In accordance with the Contract, based on on-site observations and the data comprising this request, the Construction Project Manager certifies to Owner that to the best of the Construction Project Manager's knowledge, information and belief the work has progressed as indicated, the quality of the work is in accordance with the Contract and the codes and ordinances of the Owner and has been approved by the project participant and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED: **$48,140.00**

Construction Project Manager:

By: DATE:

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

Sample Pay App Continued

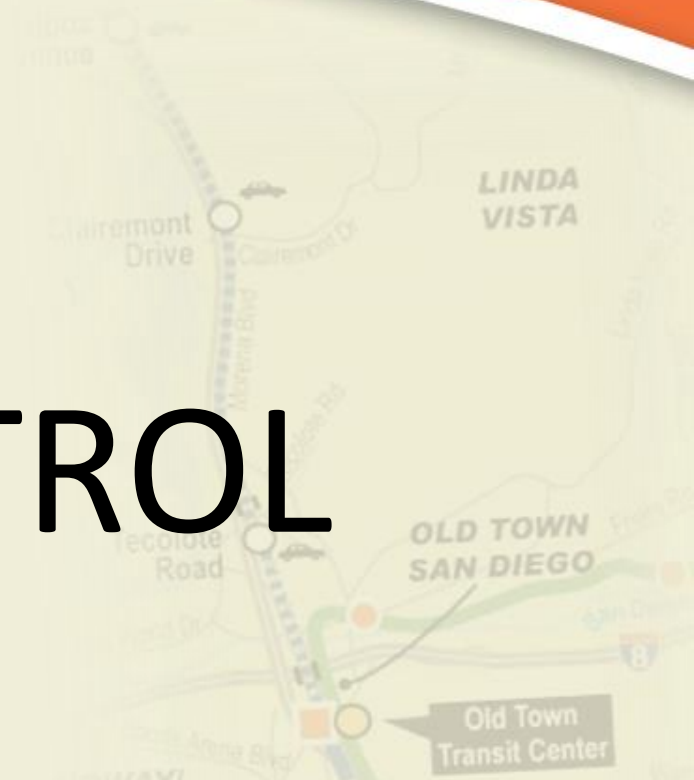
CONTINUATION SHEET

REQUEST AND CERTIFICATION FOR RELEASE OF FUNDS,
containing Contractors signed Certification, is attached.
In tabulations below, amounts are stated to the nearest dollar.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 2
APPLICATION DATE:
PERIOD TO:
PROJECT NO:

A	B	C	D	E	F	G		H	
			WORK COMPLETED		MATERIALS PRESENTLY	TOTAL COMPLETED			
ITEM NO	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D+E)	THIS PERIOD	STORED (NOT IN D OR E)	AND STORED TO DATE (D+E+F)	% (G / C)	BALANCE TO FINISH (C - G)	RETENTION
1	Grading & Excavation	$ 50,000.00	$ 50,000.00	$ -	$ -	$ 50,000.00	1.00	$ -	$ 5,000.00
2	Underground	$ 50,000.00	$ 50,000.00	$ -	$ -	$ 50,000.00	1.00	$ -	$ 5,000.00
3	Concrete	$ 25,000.00	$ -	$ 25,000.00	$ -	$ 25,000.00	1.00	$ -	$ 2,500.00
4	Fencing	$ 15,000.00	$ -	$ 15,000.00	$ -	$ 15,000.00	1.00	$ -	$ 1,500.00
5	Other	$ 60,000.00	$ -	$ -	$ -	$ -	0.00	$ 60,000.00	$ -
6		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
7		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
8		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
9		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
10		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
10		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
11		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
12		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
14		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
15		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
16		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
17		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
18		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
19		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
20		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
21		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
22		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
23		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
24		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
25		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
26		$ -	$ -	$ -	$ -	$ -	#DIV/0!	$ -	$ -
27	CONTRACTOR FEE	$ 50,000.00	$ 15,025.00	$ 26,270.00	$ -	$ 41,295.00	0.83	$ 8,705.00	$ 4,129.50
	TOTALS	$ 250,000.00	$ 115,025.00	$ 66,270.00	$ -	$ 181,295.00	0.73	$ 68,705.00	$ 18,129.50

COST CONTROL



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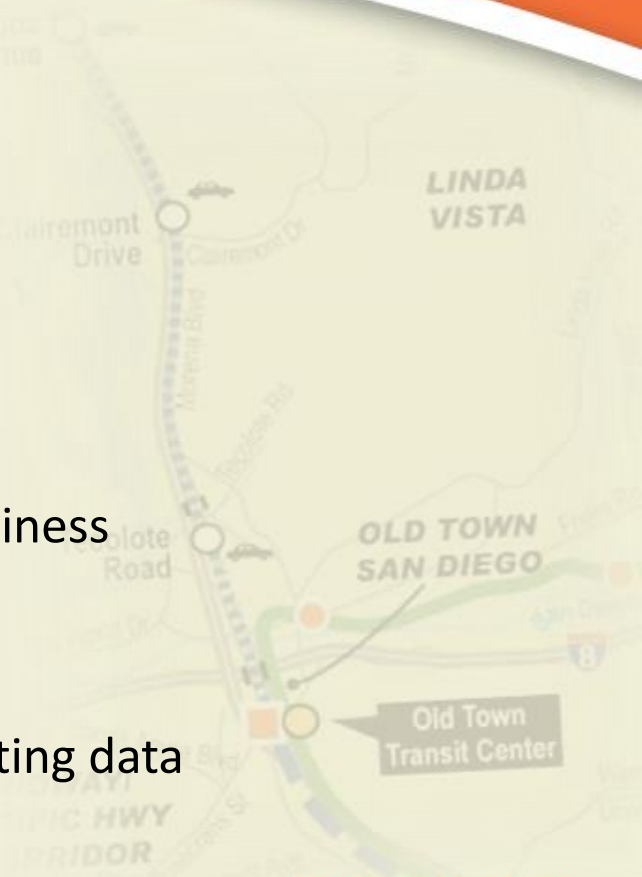
Cost Controls

- Description of cost controls
  - ➢ What are cost controls?
    - ✓ Technical description
    - ✓ What they really are
  - ➢ Why are they important?
    - ✓ It is the vital other half of a functioning business
    - ✓ You can't control what you don't know
    - ✓ Allows for accurate forecasting
    - ✓ Accurate cost tracking allows for live operating data
    - ✓ Cash flow



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Cost Control

- Cost Tools
  - ➢ Budget
    - ✓ Set up for success
    - ✓ Materials, Labor, Equipment, Indirects

Cost Code	Biditem Description	Activity	Description	Quantity	Units	Total Labor	Permanent Material	Subs	Eqp Oper Expenses	Owned Equipment	Trucking	Rental Equipment & Services	Direct Total
04100-115-101	DISTRIBUTE TIES AND OTM			4,185.00	TF								
	FREIGHT TRACK MAINLINE CONSTRUCTION, CWR	04100-430	Distribute Rail	1,772.00	TF								
	CONSTRUCT TEMPORARY TRACK 115, WT CWR	04100-430	Distribute Rail	1,338.00	TF								
	CONSTRUCT TEMPORARY TRACK 115, WT CWR	04100-430	Distribute Rail	1,075.00	TF								
04100-117-101	DISTRIBUTE RAIL			4,185.00	TF								
	PROCURE FREIGHT RAIL/TIMBER TIES 136RE	04000-100	Ballasted Track	1.00	LS								
	CONSTRUCT TEMPORARY TRACK 115, WT CWR	04000-100	Ballasted Track	1,338.00	TF								
	SHIFT EXISTING TRACK	04100-560	Replace Ties	90.00	EA								
	SHIFT EXISTING TRACK	04100-562	Shift Track	1,554.00	TF								
	CONSTRUCT TEMPORARY TRACK 115, WT CWR	04000-100	Ballasted Track	1,075.00	TF								
	SHIFT EXISTING TRACK	04100-560	Replace Ties	66.00	EA								
	SHIFT EXISTING TRACK	04100-562	Shift Track	1,075.00	TF								
	Remove & Reinstall Track	04125-250	Install Joint Ba	8.00	EA								
	Remove & Reinstall Track	04125-250	Install Joint Ba	4.00	EA								

Cost Control

- Cost Tools
  - Budget
    - ✓ Set up for success
    - ✓ Materials, Labor, Equipment, Indirects
  - Scheduling

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Cost Control

		January																												
		M	T	W	R	F	S	S	M	T	W	R	F	S	S	M	T	W	R	F	S	S	M	T	W	R	F	S	S	M
		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8
Item	**Resp.**																													
ELVIRA TO MORENA DOUBLE TRACK																														
PERMITS																														
JROE Permit	Matt F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
CalTrans Encroachment	J Miller	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
CONTRACTS																														
Quote from SoCal	Vicente	X	X																											
RFP $ to Sandag	Eric			X																										
MCTC / Sandag Negotiate Contract	Eric				X	X																								
Sandag Develop Contract	Sharon						X	X	X	X	X	X	X	X	X															
NTP	Sharon															NTP														
SUBCONTRACTS																														
SoCal Finish Certified Payroll for Shooflies	Brent	X	X	X	X	X	X	X	X	X	X	X	X	X																
Pay SoCal for Shooflies	Zeb														X															
Train Additonal Crew	Vicente															X														
CONSTRUCTION																														
EMDT C&M Precon	Matt F										P																			
Bird Surveys	Ingrid												B				B			B										
Survey Request	Jared			R																										
Survey ESA Fence	Jared								S	S	S	S	S	S	S															
Photos of stakes submitted to USFWS	Ingrid															P	P													
3 Day waiting period?	Ingrid																	W	W	W										
Install ESA Fence	Rick B																	E	E	E	E	E	E	E	E	E	E	E	E	E
Chain/Mow all areas pending 2/14 date	Rick B																				X	X	X	X	X	X	X	X	X	X
Chain/Mow all remaining	Rick B																													
SAN DIEGO RIVER DOUBLE TRACK																														
PERMITS																														
404 Permit	Cheryl	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
Use & Occupancy	Zeb	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
CONTRACTS																														
Revised $ to Sandag	Tony	X																												
Sandag Develop Contract	Sharon		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
NTP	Sharon																	NTP												
SUBCONTRACTS																														
SoCal Finish Certified Payroll for Shooflies	Brent	X	X	X	X	X	X	X	X	X	X	X	X	X																
Pay SoCal for Shooflies	Zeb														X															
Train Additonal Crew	Vicente															X														
CONSTRUCTION																														
SDRDT C&M Precon	Matt F											P																		
Bird Surveys	Ingrid															B			B			B								
Survey Request	Jared			R																										
Survey ESA Fence	Jared								S	S	S	S	S	S	S															
Photos of stakes submitted to USFWS	Ingrid																	P	P											
3 Day waiting period?	Ingrid																			W	W	W								
Install ESA Fence	Rick B																						E	E	E	E	E	E	E	E
Chain/Mow	Rick B																						X	X	X	X	X	X	X	X

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Cost Control

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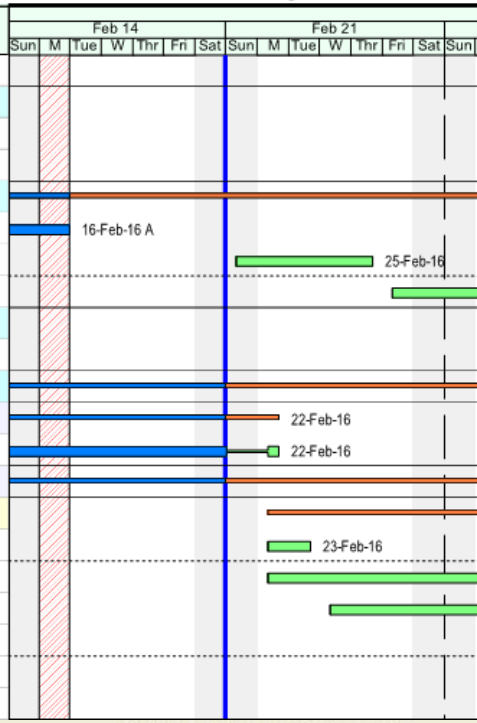
6-Week Look-Ahead Schedule
Mid-Coast Corridor Transit Project

Activity ID	Activity Name	Orig Dur	Rem Dur	Percent Complete	Start	Finish	Company / Sub	ESA	PTC Change
A4320	W37.5 - ELB New 12" Water and Install PRV (xxx')	8	8	0%	25-Mar-16	05-Apr-16	MCTC		
W37.6 - New 12" Water (Balboa & City Yard) NIGHT WORK		22	22		04-Mar-16	04-Apr-16			
A4330	W37.6 - ELB New 12" Water (xxx')	20	20	0%	04-Mar-16	31-Mar-16	MCTC		
A5004	W37.6 - Chlor/Dechlor	2	2	0%	01-Apr-16	04-Apr-16	Pro-Link		
W37.4 - New 36" Water (Balboa & Santa Fe) NIGHT WORK		58	44		12-Feb-16 A	21-Apr-16			
A5114	W37.4 - Caltrans will Not Allow Ramp Closure on Holiday Weekend - Delay Pothole	5	0	100%	12-Feb-16 A	16-Feb-16 A	MCTC		
A5104	W37.4 - Pothole for New 36" Water Transmission Line (1+90 to 10+28)	5	5	0%	21-Feb-16	25-Feb-16	MCTC		
A2020	W37.4 - Fab for New 36" Water Transmission Line (1,220')	40	40	0%	26-Feb-16	21-Apr-16	MCTC		
W48.2 - New 12" Water (Santa Fe)		35	35		25-Mar-16	12-May-16			
A4450	W48.2 - ELB New 12" Water (xxx')	35	35	0%	25-Mar-16	12-May-16	MCTC		
Reach X: CP Rose (Sta 900+00 to 920+20)		165	127		23-Dec-15 A	18-Aug-16			
Permits / Right of Way / Design / Procurements		36	1		23-Dec-15 A	22-Feb-16			
A4030	Procure Concrete Ties for March AWW	36	1	97.22%	23-Dec-15 A	22-Feb-16	MCTC		
Guideway Work		138	127		03-Feb-16 A	18-Aug-16			
Civil for Guideway		127	127		22-Feb-16	18-Aug-16			
A4530	Soil Decompaction/Ripping/Mixing	2	2	0%	22-Feb-16	23-Feb-16	MCTC		
A4350	Perimeter Fence - TBD	9	9	0%	22-Feb-16	03-Mar-16	Legend Fence		
A2390	Plant and Hyrdoseed Slopes PH1	5	5	0%	24-Feb-16*	01-Mar-16	Diversified		
A2400	Landscape Establishment - Water Truck Irrigation	120	120	0%	02-Mar-16	18-Aug-16	Leinaias		
A4300	Cable Railing for Headwalls Culv A,C,D	5	5	0%	14-Mar-16*	18-Mar-16	Legend Fence		
A2410	CP Rose Projection Completion	0	0	0%		18-Mar-16	MCTC		



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Cost Control

- Cost Tools (cont.)
  - ➢Cash flow
    - ✓Backlog
    - ✓Business strategy
  - ➢Production
    - ✓Share with field
    - ✓Track weekly / monthly / quarterly
    - ✓Just like cost: Can't control what you don't know
    - ✓Efficiency and profit

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Cost Control

- Areas that affect cost
  - ➢ Estimating
    - ✓ Understand scope
    - ✓ Accurate Takeoffs (technology)
    - ✓ Know what is in the drawings and specs
    - ✓ Make clear your assumptions
    - ✓ Procure multiple pricing

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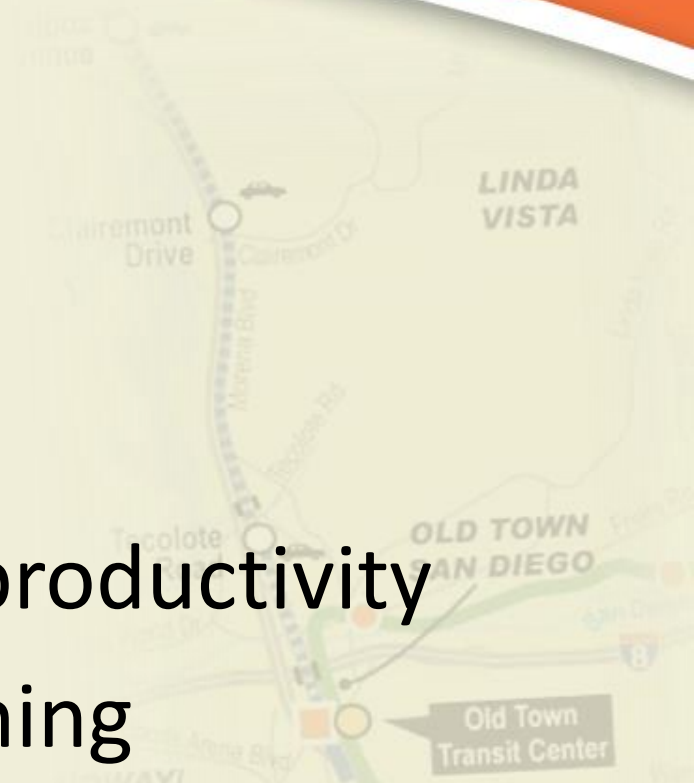
Cost Control

- Areas that affect cost
  - ➢Scheduling
    - ✓Integral to success
    - ✓Directly affects field productivity
    - ✓Allows for work planning
    - ✓Greatly reduces risk



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Cost Control

- Areas that affect cost
  - ➢Project Management
    - ✓Can be good or bad
    - ✓Control other costs
    - ✓Fully support field

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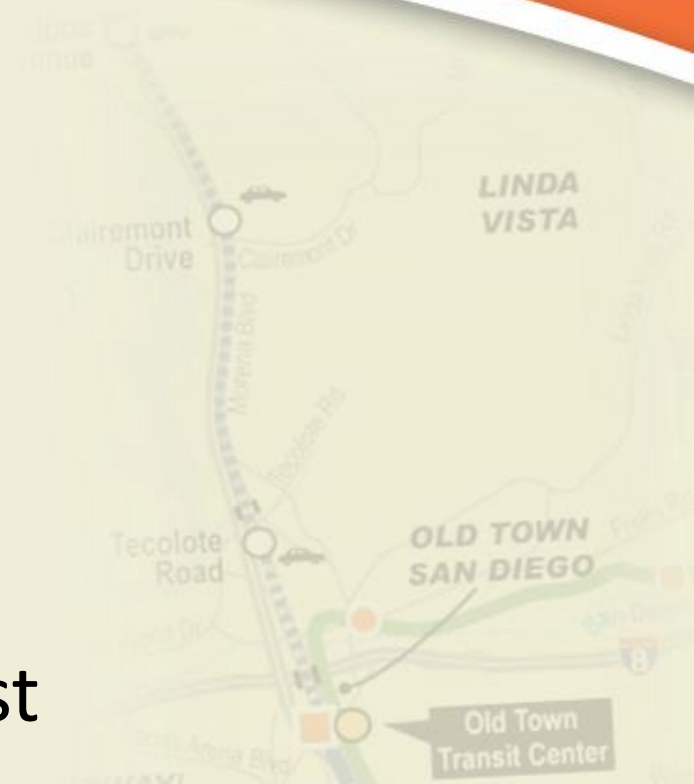
Cost Control

- Controlling Costs
- Tracking
  - ➢Budget and cost coding
    - ✓Do it early!
  - ➢Tracking quantities and cost
  - ➢Make adjustments (cut or capitalize)
  - ➢Focus on the big $$’s



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Cost Control

- Forecasting
  - ➢ Steps
    - ✓ Set a baseline (budget)
    - ✓ Calculate a variance
      - ❖ Project your costs
      - ❖ Be conservative but not too conservative
      - ❖ 20% budget rule
      - ❖ Quantities are important

		Budgeted			JTD				To Complete			Final		
						C / A				Best Guess	D * E	A + D	I / G	C + F
					A	B	C		D	E	F	G	H	I
Description	*UOM*	*Quantity*	*Unit Cost*	*Cost*	*Quantity*	*Unit Cost*	*Cost*	*%*	*Quantity*	*Unit Cost*	*Cost*	*Quantity*	*Unit Cost*	*Cost*
Ex. / Lay / Backfill / Pour Mainline	LF	24,633.00	$ 19.57	$ 481,990.94	22,148	$ 11.64	$ 257,764.38	89%	2,737	$ 14.00	$38,318.00	24,885	$ 11.90	$296,082.38
Ex. / Set / Backfill Type 1 MH's	EA	31.00	$ 1,222.97	$ 37,912.15	31	$ 1,045.31	$ 32,404.76	97%	1	$ 1,200.00	$1,200.00	32	$ 1,050.15	$33,604.76
Ex. / Lay / Backfill / Pour TE Ductbank	LF	3,538.00	$ 31.08	$ 109,962.50	5,144	$ 21.50	$ 110,620.17	100%	-	$ 28.00	$0.00	5,144	$ 21.50	$110,620.17
Set Type 2 (TE) Manholes	EA	19.00	$ 2,488.86	$ 47,288.25	19	$ 1,392.21	$ 26,451.94	100%	-	$ 1,400.00	$0.00	19	$ 1,392.21	$26,451.94
Install Type 7 Handholes	EA	7.00	$ 542.14	$ 3,794.99	11	$ 3.37	$ 37.12	73%	4	$ 200.00	$800.00	15	$ 55.81	$837.12
Ex. / Lay / Backfill / Pour Laterals	LF	10,975.00	$ 24.44	$ 268,206.90	16,989	$ 6.67	$ 113,233.62	87%	2,610	$ 15.00	$39,150.00	19,599	$ 7.78	$152,383.62
Install Type 6 Handholes	EA	54.00	$ 542.11	$ 29,273.77	26	$ 130.81	$ 3,401.15	57%	20	$ 250.00	$5,000.00	46	$ 182.63	$8,401.15
TOTAL				**$978,429.50**			**$543,913.14**				**$84,468.00**			**$628,381.14**

Cost Control

- Forecasting
  - ✓ Investigate variances
    - ❖ Look for red flags
    - ❖ Go after the $$
    - ❖ Use notes to remember your assumptions
    - ❖ Make adjustments
  - ✓ Take action

		Budgeted			JTD				To Complete			Final		
						C / A				Best Guess	D * E	A + D	I / G	C + F
					A	B	C		D	E	F	G	H	I
Description	*UOM*	*Quantity*	*Unit Cost*	*Cost*	*Quantity*	*Unit Cost*	*Cost*	*%*	*Quantity*	*Unit Cost*	*Cost*	*Quantity*	*Unit Cost*	*Cost*
Ex. / Lay / Backfill / Pour Mainline	LF	24,633.00	$ 19.57	$ 481,990.94	22,148	$ 11.64	$ 257,764.38	89%	2,737	$ 14.00	$38,318.00	24,885	$ 11.90	$296,082.38
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TOTAL				**$978,429.50**			**$543,913.14**				**$84,468.00**			**$628,381.14**

Cost Control

- Summary
  - Build a budget
  - Scheduling and planning
  - Calculate productions
  - Setup tracking system
  - Track and react
  - Forecast
  - Make adjustments

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MAXIMIZING FIELD PRODUCTIVITY

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Maximizing Field Productivity

- Production
  - ➢ Type of production…
    - ✓Labor production
    - ✓Equipment production
  - ➢ Simple definition for a complex subject – how long it takes to do something (unit & time)
  - ➢ The production number isn't as critical as understanding the factors that are associated with that number
    - ✓Data collection verses data processing (hearing vs listening)

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Maximizing Field Productivity

- Topic Overview
  - ➢Production factors
  - ➢Managing production
  - ➢Production reporting

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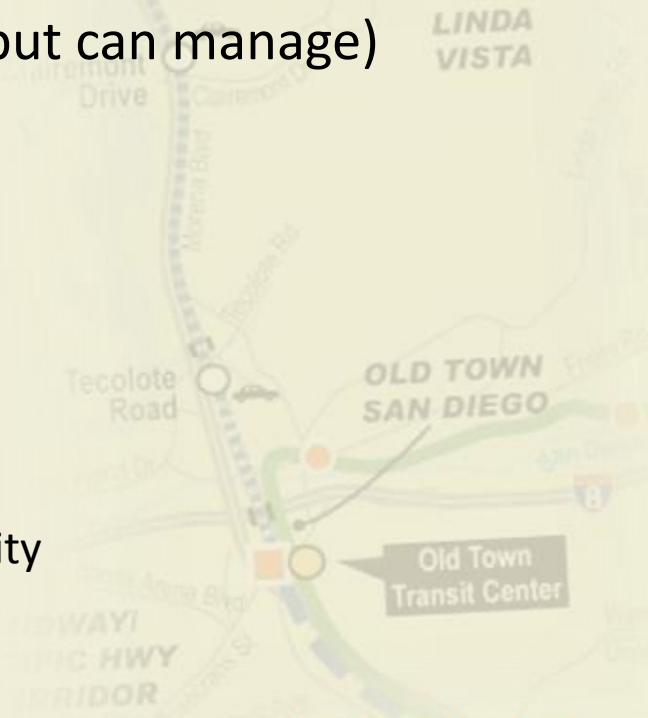
Maximizing Field Productivity

- Production Factors
  - External factors – what you can't control (but can manage)
    - ✓ Weather
    - ✓ Work environment
    - ✓ Schedule constraints (milestones)
  - Internal factors – what you can control
    - ✓ Labor
    - ✓ Equipment / tools
    - ✓ Supervision

Safety & Quality



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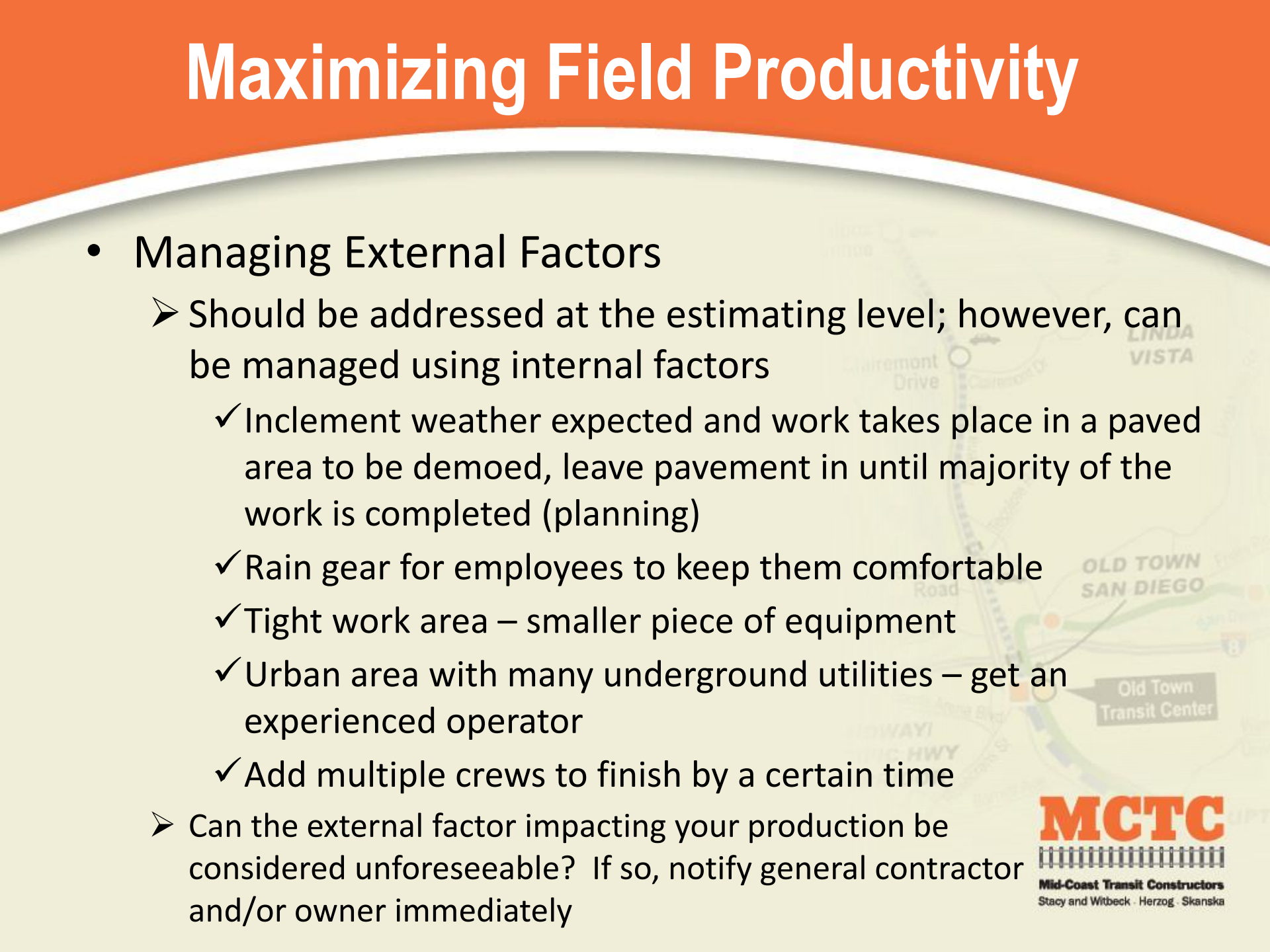
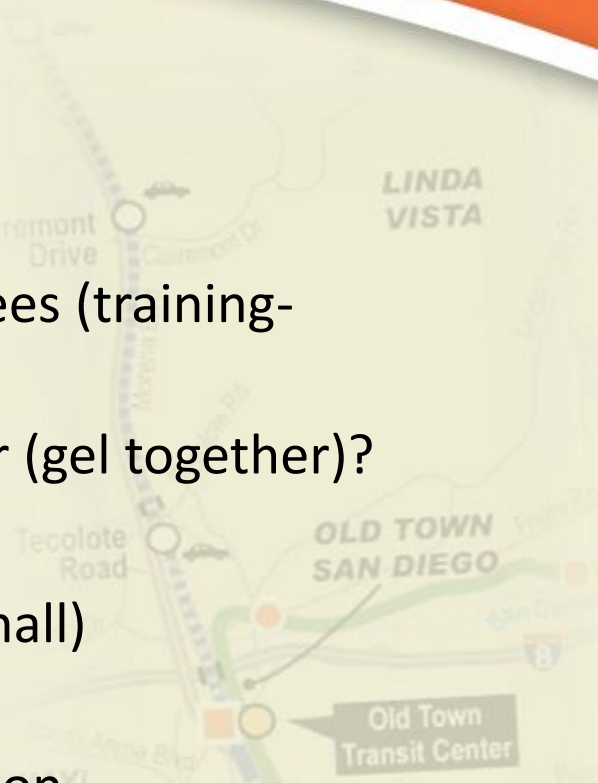
Maximizing Field Productivity

- Managing External Factors
  - Should be addressed at the estimating level; however, can be managed using internal factors
    - ✓Inclement weather expected and work takes place in a paved area to be demoed, leave pavement in until majority of the work is completed (planning)
    - ✓Rain gear for employees to keep them comfortable
    - ✓Tight work area – smaller piece of equipment
    - ✓Urban area with many underground utilities – get an experienced operator
    - ✓Add multiple crews to finish by a certain time
  - Can the external factor impacting your production be considered unforeseeable? If so, notify general contractor and/or owner immediately



Maximizing Field Productivity

- Managing Internal Factors
  - ➢ Labor
    - ✓How many employees on a crew?
    - ✓What's the experience of those employees (training-including safety & quality training.)?
    - ✓Does the crew get along with each other (gel together)?
  - ➢ Equipment/Tools
    - ✓Equipment size (not too big – not too small)
    - ✓Reliable (routine maintenance)
    - ✓Enough dump trucks to support excavation
      - ❖Excavator shouldn't be waiting on dump trucks; dump trucks shouldn't be lined up waiting for excavator
    - ✓Do you have the best tool for the job?
      (Hammering a nail with a tape measure)



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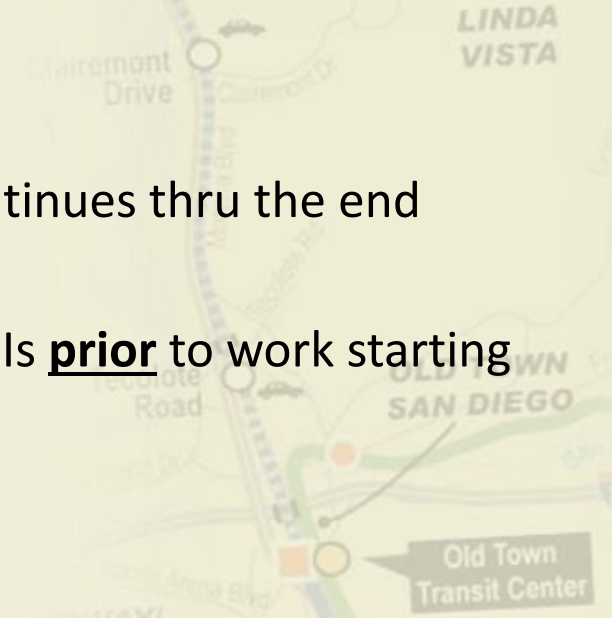
Maximizing Field Productivity

- Managing Internal Factors, cont.
  - ➢ Supervision
    - ✓Plan the work and work the plan
      - ❖Starts at the estimating phase & continues thru the end
      - ❖Get submittals approved.
      - ❖Clarify any questionable scopes – RFIs **prior** to work starting
      - ❖Analyze risks and external factors
        - ○ Onsite verses offsite fabrication
    - ✓Communication
      - ❖Workplan (Includes safety & quality)
    - ✓Team motivation (set goals)
    - ✓Safety & quality checks
    - ✓Data collection (time cards – quantity entry)



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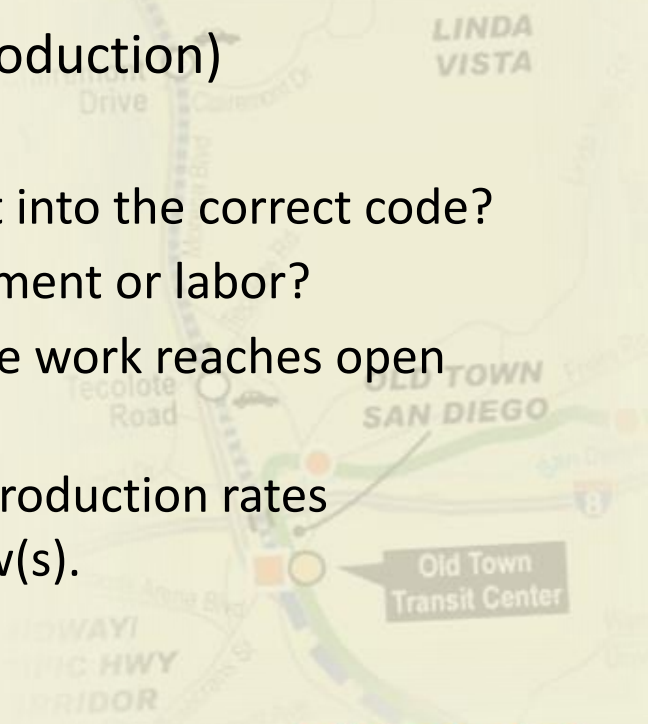
Maximizing Field Productivity

- Supervision, cont.
  - ✓ Data processing (key to maximizing production)
    - ❖ Why is the production low or high?
    - ❖ Did the right hours/quantities get put into the correct code?
    - ❖ Does the crew need more/less equipment or labor?
    - ❖ Will the production rate change as the work reaches open area?
    - ❖ Adapt to change, revise plan/target production rates accordingly and communicate to crew(s).



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Maximizing Field Productivity

- Production Reporting
  - Cost account/code setup
  - Units of measure
  - Quantity claiming scheme

- Sample Reports *(Next slides)*

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Maximizing Field Productivity

Example Daily Production Sheet

Cost Code: 12-3456-7810
Description: Sewer Pipe Install (Ex, Lay, Bckfll)
Budget Qty (J): 1500 LF
Budget MHrs (K): 850 MHrs
Budget Production (L): 1.76 LF/MHr
71 LF/Day (5 man crew working 8hrs a day)

	A	B	C	D	E	F	G	H	I	
Date	Daily Qty	Daily Mhrs	Daily Units/MHr (A/B)	JTD Qty (Previous JTD + A)	JTD Mhrs (Previous JTD + B)	JTD Units/MHr (D/E)	Daily MHr Gain/Loss (A/L) - B	JTD MHrs Gain/Loss (D/L) - E	Production to Meet Budget (J-D) / (K-E)	Comments
1/11/2016	16.50	10	1.65	16.5	10	1.65	-0.65	-0.65	1.77	
1/12/2016	56.10	40	1.40	72.6	50	1.45	-8.21	-8.86	1.78	
1/13/2016	43.55	40	1.09	116.15	90	1.29	-15.32	-24.18	1.82	
1/14/2016	52.80	40	1.32	168.95	130	1.30	-10.08	-34.26	1.85	
1/15/2016	48.60	40	1.22	217.55	170	1.28	-12.46	-46.72	1.89	
1/18/2016	78.20	40	1.96	295.75	210	1.41	4.31	-42.41	1.88	Added piece of equipment
1/19/2016	81.60	40	2.04	377.35	250	1.51	6.24	-36.17	1.87	
1/20/2016	83.30	40	2.08	460.65	290	1.59	7.20	-28.97	1.86	

Maximizing Field Productivity

Example Claiming Scheme

Cost Code: 12-3456-7810
Description: Sewer Pipe Install (Ex, Lay, Bckfll)
Budget Qty: 1500 LF

	Excavate		Lay		Backfill		Total
	33%		33%		34%		100%
Date	Sub Qty	Qty Ratio	Sub Qty	Qty Ratio	Sub Qty	Qty Ratio	Total to Claim
1/11/2016	50.00	16.50		0.00		0.00	16.50
1/12/2016	110.00	36.30	60.00	19.80		0.00	56.10
1/13/2016		0.00	65.00	21.45	65.00	22.10	43.55
1/14/2016	100.00	33.00	60.00	19.80		0.00	52.80
1/15/2016		0.00	70.00	23.10	75.00	25.50	48.60
1/18/2016	100.00	33.00	70.00	23.10	65.00	22.10	78.20
1/19/2016	100.00	33.00	70.00	23.10	75.00	25.50	81.60
1/20/2016	100.00	33.00	70.00	23.10	80.00	27.20	83.30
						Total:	460.65

Maximizing Field Productivity

- Summary
  - Two basic forms of production (labor & equipment) and two main categories that factor into your production rate (external & internal)
  - Identify the external factors and account for them in your estimate. Manage with internal factors
  - Use production reports/claiming schemes to manage internal factors. (Data processing)

SUBMITTALS

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Presentation Outline

- What is a Submittal
- Contents of a submittal
- How to compile the contents
- Examples
- Schedule
- Tracking
- Approval process

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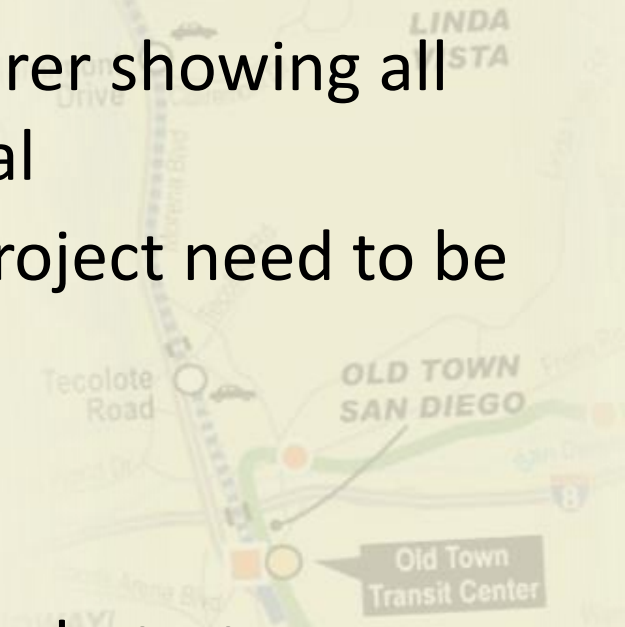
Submittals

- What is a Submittal
  - Product data from the manufacturer showing all properties of that specific material
  - All permanent materials on the project need to be submitted
  - Submittals are project specific
  - Process can be long or expedited
  - All submittals approved before work starts



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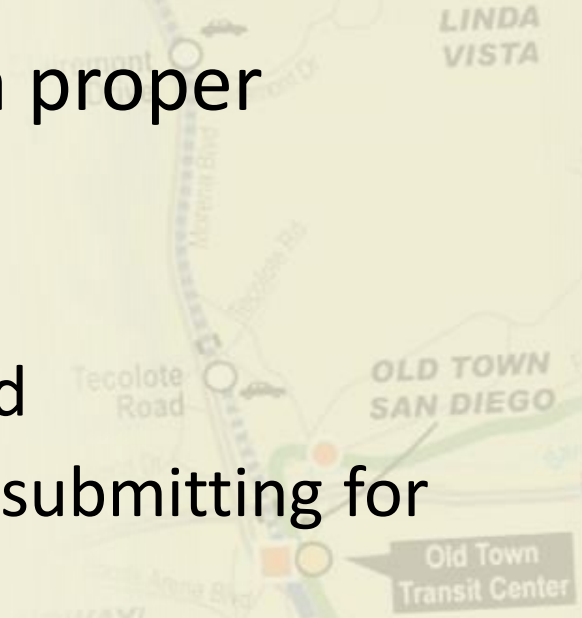
Submittals

- Contents
  - Components that make up a proper submittal
    - What is it
    - What spec is being referenced
    - List any assumptions you are submitting for



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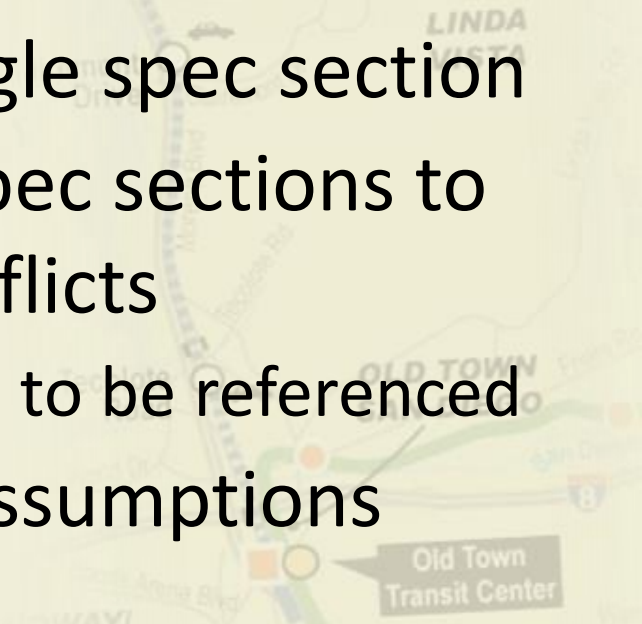
Submittals

- Compiling the contents
  - Not all info is always in a single spec section
  - Make sure to reference all spec sections to ensure that there are no conflicts
    - Often times more than 1 spec to be referenced
  - Make sure to spell out any assumptions being made with a submittal



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Good Submittal Sample

SANDAG

CONTRACTOR SUBMITTAL

Subcontractor	N/A				Subcontractor Sub no	N/A	
MCTC Sub no	MCTC-0046	Project Code	CPROSE-ELMO		Submit to SANDAG date	July 21, 2015	
Spec/Plan Reference	234 11 26.13		Sub Section		Project Description	Early Package 2,3 &4	
Submittal Description	Vulcan AREMA No.4A Ballast (2"- ¾")						
Submittal Action	FYI (Record only) ☐	For Approval ☒	Submission Type	New Submittal ☒	Resubmittal ☐		

Submittal Type:
AD-Administration
CT–Certifications
MS–Material Safety Data Sheets
OM–Operations Manual
PD–Product Data
PL–Plan/Program
SD–Shop Drawings
TR–Test Reports

Disposition Legend
1 – NET
2 – EAN
3 – EAN/R&R
4 – R&R
5 – No Action

Disposition Definitions
No Exceptions Taken
Exceptions as Noted
Exceptions as Noted/Revise and Resubmit for the record
Revise & Resubmit

Response Requested By
August 18, 2015

Resubmittal Required

Item	Type (See Above)	Submittal Title	Instructions to Reviewer
1	PD	Vulcan Chula Vista Pit AREMA No.4A Ballast Pit Qualifications	

I certify that I have reviewed the submittal package in its entirety and this package meets the requirements of the contract plans and specifications.

Jake Muir — Preparer's Signature
7/21/15 — Date
QA/QC Verification Complete ☑ — QA/QC Manager Initials
Contractor's Project Engineer Signature
7/21/15 — Date

Reviewer(s) please print:
Date Sent:
No. Copies Sent: Due Date: Return To: Date Returned:

Reviewers Comments:

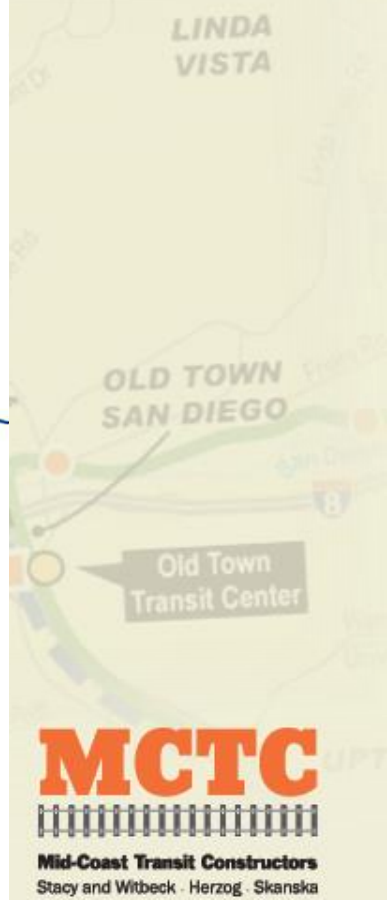
Disposition is 1-NET, No Exceptions Taken

Reviewer's Recommended Disposition: (circle one – See Legend above) (1) 2 3 4 5

Reviewer's Signature: [signature] **Date:** 8/6/15

RE's Signature: [signature] **Date Returned to Contractor:** 8/6/15

Any action shown does not relieve the contractor of the responsibility/liability for the accuracy of this submittal or for full compliance with the contract documents.
Contract no. 5008600



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Good Submittal Sample

Vulcan
Materials Company

Contractor: ***Mid Coast Transit Constructors*** June 5, 2015

Project: ***Mid Coast Trolley***

Plant: ***Vulcan Materials / Chula Vista***

Material: ***2" - 3/4" Ballast (AREMA Size No. 4A)***

This is to certify that Vulcan Materials Company, Western Division, **Chula Vista**, will supply Size 4A Ballast (2" - 3/4") to the above listed project and that this product will conform to Section 2.4 of A.R.E.M.A. 2014. Due to the natural efects of segregation, this product is guaranteed in spec. at the point of delivery and when sampled in accordance with ASTM D75. All products produced from this quarry are primarily comprised of Andesite, a non-carbonate, Traprock aggregate.

Sieve Size		A.R.E.M.A. Size No. 4A	Percent Passing
62.5 mm	(2 1/2")	100	100
50 mm	(2")	90-100	93
37.5 mm	(1 1/2")	60-90	65
25 mm	(1")	10-35	12
19 mm	(3/4")	0-10	3
12.5 mm	(1/2")	------	1
9.5 mm	(3/8")	0-3	1

	Method	Result	Spec.
% Passing #200	C 117	0.3%	1.0% max
Bulk Sp. Gr. (SSD)	C 127	2.71	2.60 min
Absorption	C 127	0.9%	1.0% max
Clay Lumps and Friable Particles	C 142	0.0%	0.5% max
Degradation	C 535	11%	25% max
Soundness	C 88	0%	5% max
Flat Particles (3:1)	D 4791	4%	5% max
Elongated Particles (3:1)	D 4791 Method A	0%	5% max
Magnesium Carbonate	C 25	na	na

Submitted by:

Jeff Pollard
Manager Technical Services

San Diego Regional Laboratory
10051 Black Mountain Road • San Diego, California 92126 • Tel (858) 547-4981

AMRL Certified

Please Note: NOT VALID IF ALTERED

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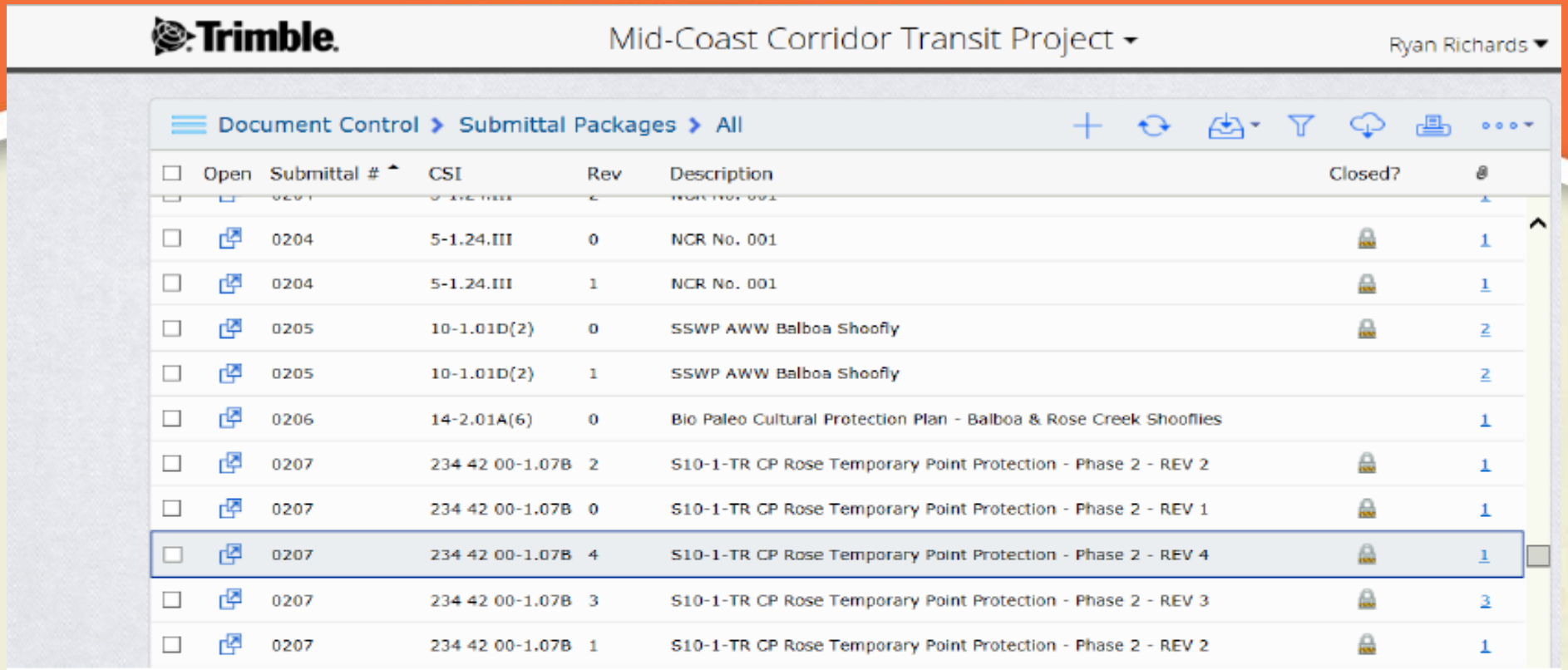
Bad Submittal Sample

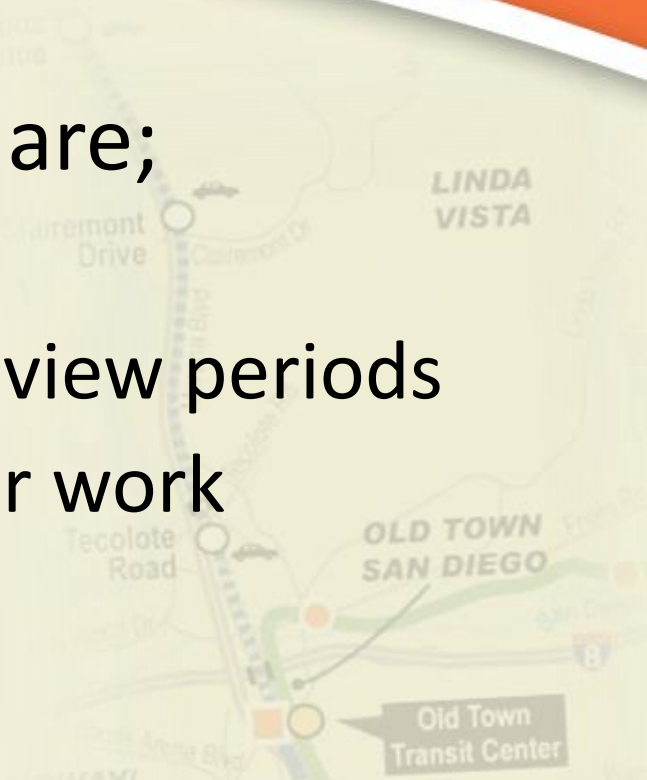


Open	Submittal #	CSI	Rev	Description	Closed?	
	0204	5-1.24.III	0	NCR No. 001		1
	0204	5-1.24.III	1	NCR No. 001		1
	0205	10-1.01D(2)	0	SSWP AWW Balboa Shoofly		2
	0205	10-1.01D(2)	1	SSWP AWW Balboa Shoofly		2
	0206	14-2.01A(6)	0	Bio Paleo Cultural Protection Plan - Balboa & Rose Creek Shooflies		1
	0207	234 42 00-1.07B	2	S10-1-TR CP Rose Temporary Point Protection - Phase 2 - REV 2		1
	0207	234 42 00-1.07B	0	S10-1-TR CP Rose Temporary Point Protection - Phase 2 - REV 1		1
	0207	234 42 00-1.07B	4	S10-1-TR CP Rose Temporary Point Protection - Phase 2 - REV 4		1
	0207	234 42 00-1.07B	3	S10-1-TR CP Rose Temporary Point Protection - Phase 2 - REV 3		3
	0207	234 42 00-1.07B	1	S10-1-TR CP Rose Temporary Point Protection - Phase 2 - REV 2		1

1. More than 2 revisions is unnecessary.
2. If the submittal is that complicated, make sure to review with your CM contact before submitting
3. Specs are important and need to be followed but it is equally important to know what your reviewer is looking for before submitting.

Submittal Schedule

- Identify key submittals that are;
  - Long lead material items
  - Items that have 60-90 day review periods
  - Project schedule – know your work sequence



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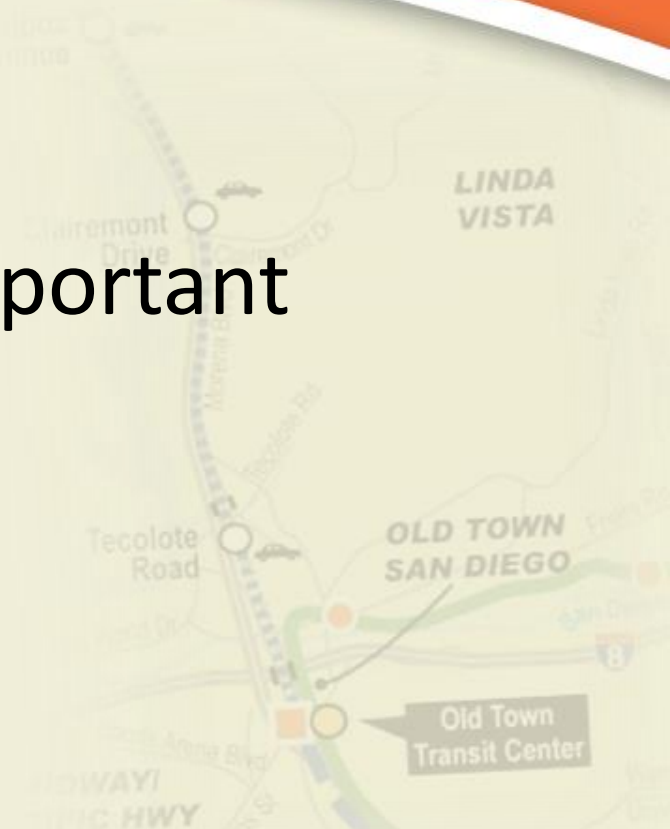
Submittal Schedule

- Submittal Log *(sample next slide)*
  - ✓Tracking lead times is important



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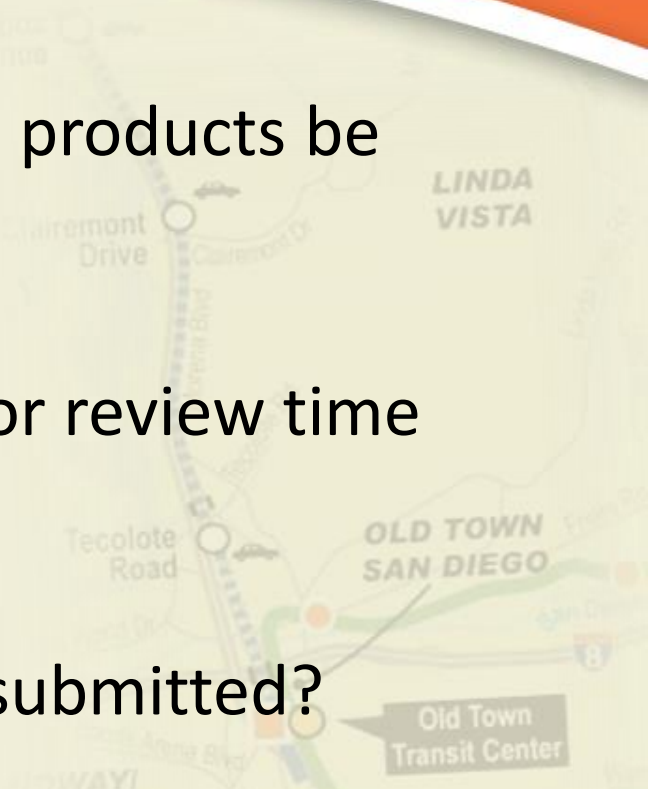
Submittal Log

Supplement 1 - Submittal Sheet

Submittal ID (Sec. & Sub Sec)	Submittal Description	Submittal Due Date	Specification Section Description	Submittal Type / Category	Discipline (see list next tab)	Contractor	Subcontractor Submittal #	Comment	MCTC Responsible Party
20-14.01B	Work plan for maintaining willow cuttings	Before Work	Willow Cuttings	Approval	Landscaping	MCTC			
20-14.01B	Product data including installation instructions	Before Work	Willow Cuttings	Approval	Landscaping	MCTC			
51 Concrete Structures									
	No Submittals in the special provisions. See CalTrans 2010								
65 Concrete Pipe									
65-2 Reinforced Concrete Pipe									
65-2.01C	Resilient joint materials for testing and authorization	If resiliant joint materials are used	Reinforced Concrete Pipe	Approval	Drainage	MCTC			
65-2.01C	Shop drawings	Before Work	Reinforced Concrete Pipe	Approval	Drainage	MCTC			
65-2.01C	Proof of adequacy for modified design proposals	Before Work	Reinforced Concrete Pipe	Approval	Drainage	MCTC			
65-2.01C	Copy of concrete mix design	Before Placing Concrete	Reinforced Concrete Pipe	Approval	Drainage	MCTC			
65-2.01C	COC for each pipe shipment	After Receiving	Reinforced Concrete Pipe	Approval	Drainage	MCTC			
70 Miscellaneous Drainage Facilities									
70-3 Welded Steel Pipe Drainage Facilities									
70-3.02B(3)	Color options for finish paint	Before Work	Factory Applied Fusion Bonded Epoxy Coating	Approval	Drainage	MCTC			
70-7 Casings for Bridges									
70-7.01	Shop drawings for temporary supports of casings at abutments	Before Work	Casings for Bridges	Approval	Drainage	MCTC			
70-8 Articulated Concrete Block									
70-8.01B	Procedures	Before Work	ACB	Approval	Drainage	MCTC			
70-8.01B	Product data including installation instructions	Before Work	ACB	Approval	Drainage	MCTC			
70-8.01B	Manufacturer's hydraulic testing and calcs	Before Work	ACB	Approval	Drainage	MCTC			
70-8.01B	Sample of tapered, overlapping ACB revetment	Before Work	ACB	Approval	Drainage	MCTC			
70-8.01B	Manufacturer's standard warranty	Before Work	ACB	Approval	Drainage	MCTC			
70-9 Steel Casing									
70-9.01B	Jacking and Boring Plan and Procedures	Before Work	Steel Casing	Approval	Drainage	MCTC			
70-9.01B	Emergency remediation plan	14 days prior to work	Steel Casing	Approval	Drainage	MCTC			
73 Concrete Curbs & Sidewalks									
73-3 SIDEWALKS, GUTTER DEPRESSIONS, ISLAND PAVING, CURB RAMPS AND DRIVEWAYS									
73-3.01C Submittals	prefabricated detectable warning surface 5-year manufacturer's warranty		prefabricated detectable warning surface 5-year manufacturer's warranty of replacement for defects in dome shape, color fastness, sound-on-cane acoustic quality, resilience, and attachment.	Record	Street Improvements	MCTC			

Procedure/Approval Process

- Identify any QC Specs – Requires all products be submitted
- Workflow – Contract says 30 days for review time once it gets to the RE.
- Which items have previously been submitted?



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Procedure/Approval Process

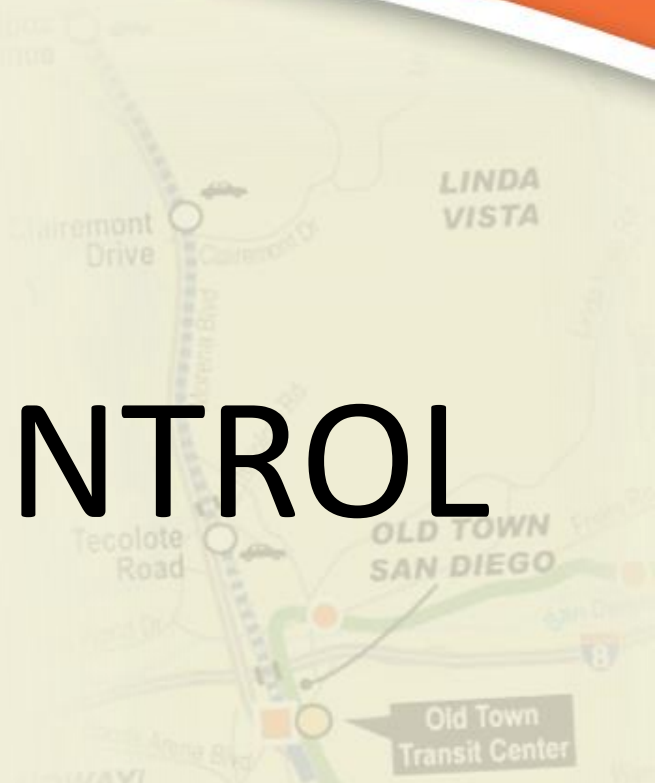
This record is currently in workflow (step number 6) using the Submittal CPROSE - ELMO Early Packages 2,3&4 template

Visual Workflow | Workflow Grid

Add Distribution List... | Add Approvers... | Delete | Prev Step | Next Step

Workflow...	Role	Company	Contact	Sent Date	Due Date	Action	Action Date
1	Project Engineer - Segment 1 & 2	Mid-Coast Transit Constructors	Zeb Hutchison	2/19/2016	2/21/2016		
1	Construction Manager - Segment 1 & 2	Mid-Coast Transit Constructors	Tony Foster	2/19/2016	2/21/2016		
1		Mid-Coast Transit Constructors	Ryan Richards	2/19/2016	2/21/2016	Reviewed	2/19/2016
2	MCTC Quality Control (QC Check)	Mid-Coast Transit Constructors	Aaron Portilla	2/19/2016	2/21/2016		
2	MCTC Quality Control (QC Check)	Mid-Coast Transit Constructors	Jake Muir	2/19/2016	2/21/2016		
2	MCTC Quality Control (QC Check)	Mid-Coast Transit Constructors	Leonard Paulino	2/19/2016	2/21/2016	Reviewed	2/19/2016
3	Project Engineer	Mid-Coast Transit Constructors	Eric Meisgeier	2/19/2016	2/21/2016	Reviewed	2/20/2016
4		Mid-Coast Transit Constructors	Gloria Rossiter	2/20/2016	2/22/2016	Reviewed	2/22/2016
5		Safe Work	Deborah Christensen	2/22/2016	2/27/2016		
5		Safe Work	Melissa Keating	2/22/2016	2/27/2016	Reviewed	2/22/2016
5		AECOM	Paul Svacina	2/22/2016	2/27/2016		
5		Jacobs	Roshan Boralessa	2/22/2016	2/27/2016		
6		HDR	Ryan Boley	2/22/2016	2/25/2016		
6		HDR	Janine Andres	2/22/2016	2/25/2016		
7		AECOM	Paul Svacina				
8		Safe Work	Deborah Christensen				
8		Safe Work	Melissa Keating				

DOCUMENT CONTROL



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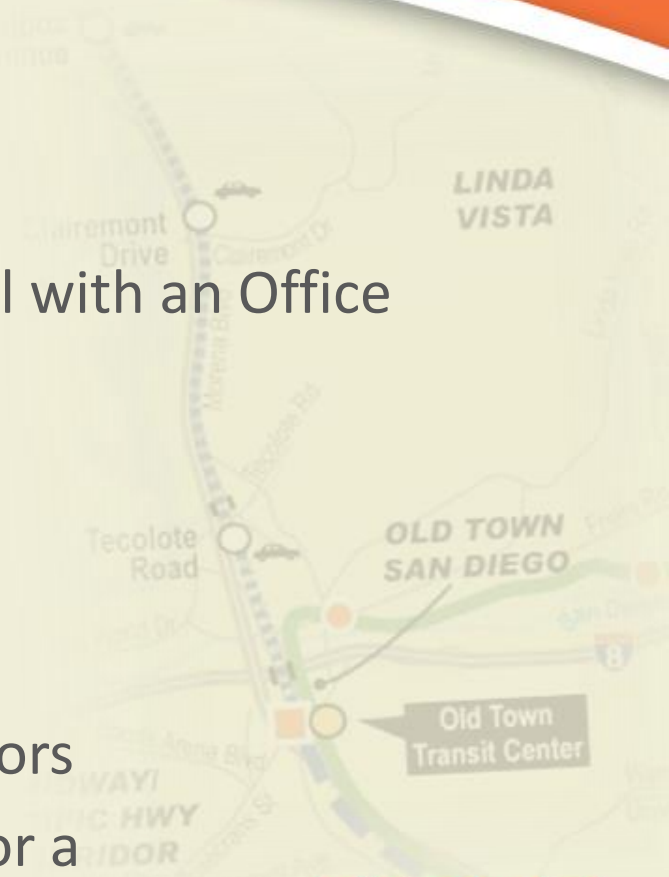
Introduction

Gloria Rossiter, CAP-OM

- Certification
  - Certified Administrative Professional with an Office Management specialty
- Resume – 35 year Career
  - Field worker
  - Office manager for an association
  - Support for a CEO, CFO and 5 Directors
  - Controlling the document process for a $1B/construction project



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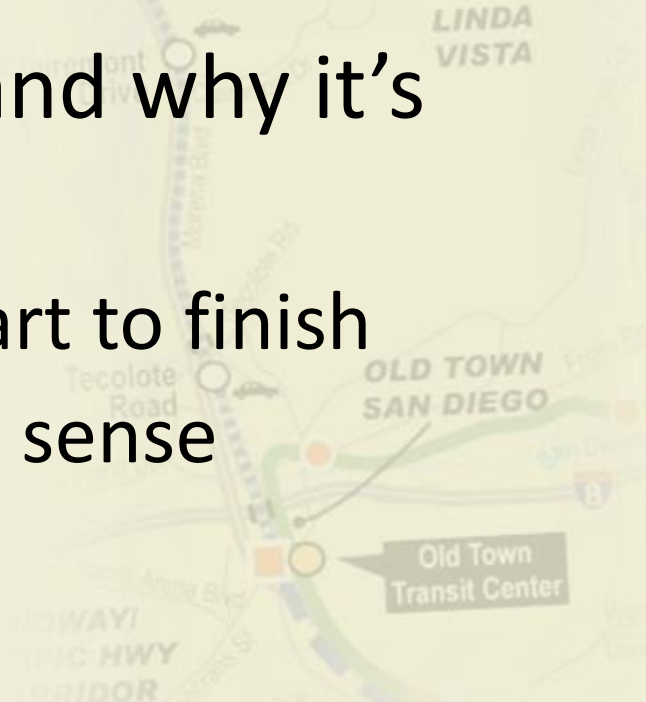
Document Control

- What is document control and why it's important
  - Process for record – from start to finish
  - Naming protocols that make sense
  - Keep the end in mind



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Document Control

- Electronic documentation
  - Wave of future…future is here
  - Email communication / information sharing
  - Mega projects use sophisticated DC systems
  - Facilitates tracking of action items (Ball in Court)
  - Good for the environment

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Document Control

- When is hardcopy required
  - ➢Official records
    - ✓Permits, certifications, etc.
  - ➢Any others?

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Document Control

- Electronic vs Hardcopy filing
  - Less space needed for records
  - Less expensive
  - Hybrid system
  - Keep to a minimum

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Document Control

- Review samples
  - Letters
  - Transmittals
  - Logs

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Document Control

- Conclusion
  - What is document control
  - Why it's important
  - Electronic documentation
  - When is hardcopy required
  - Electronic filing vs hardcopy filing

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Closing Discussions

- Questions & Answers
- Evaluation Survey

Stay updated! Visit MCTC's website regularly @ www.mctcjv.com

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