



Setting a Table for Effective Benchmarking

APPLES, ORANGES & FRUIT SALAD

Introduction

The session will examine a case study of approaches taken by Mercy Health System Planning Design and Construction to overcome challenges inherent in measuring process improvement and value.

Presenters

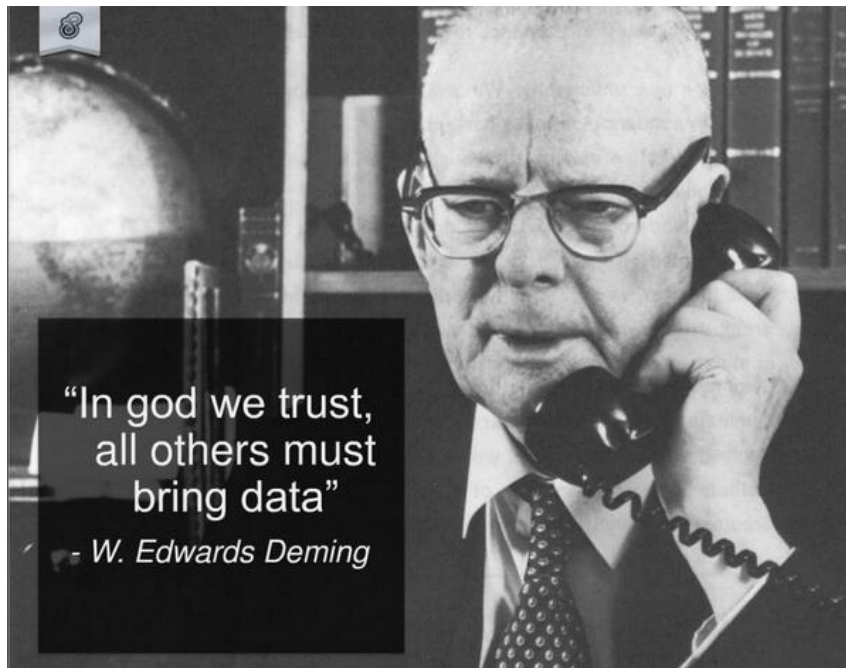
John Kreidich AIA, LEED AP, CHC

McCarthy Building Cos.
Central Div. Saint Louis

Patricia Johnston MT ASCP

Mercy Health
Corporate Saint Louis

Show Me the Data!



While clinical metrics as HCAHPS scoring; re-admission rates; staffing ratios; patient days/DRG, and \$/Adjusted Discharge are commonplace, metrics facilitating apples-to-apples comparisons are rarely available to health care PDC organizations.

We will be covering in this Session . . .

- Issues with available data sources in assessing project performance
- Recognizing “Noise” in existing data sets
- “Tight Data” processes that filter “Data Noise”
- Example process to collect “Tight Data”
- Project assessment application of “Tight Data”

What's in Your Project Cost?

Health Care Construction Cost Comparison

» Square-foot cost comparisons in selected metropolitan markets

Costs as illustrated are for a basic building envelope and do not include site work, land, development and seismic costs; specialty finishes; IT and medical equipment; and selected design fees. Overhead and profit for architects and contractors is included. Projects are to be estimated individually, as square foot costs will vary significantly from project to project. For a detailed listing of building components included in Means square foot costs, order a 2010 Means Square Foot Cost Guide at www.rsmeans.com or call 800-448-8182.

City	2009	2008	%	2009	2008	%	2009	2008	%	2009	2008	%
Atlanta	274.88	264.60	4%	239.54	240.62	0%	140.26	136.98	2%	191.31	171.41	12%
Baltimore	284.14	273.42	4%	247.62	248.64	0%	144.99	141.55	2%	197.75	177.12	12%
Boston	361.35	338.10	7%	314.91	307.45	2%	184.39	175.03	5%	251.49	219.02	15%
Chicago	358.27	338.10	6%	312.21	307.45	2%	182.82	175.03	4%	249.34	219.02	14%
Cleveland	305.76	294.00	4%	266.46	267.35	0%	156.02	152.20	3%	212.80	190.45	12%
Dallas	262.52	249.90	5%	228.78	227.25	1%	133.96	129.37	4%	182.71	161.88	13%
Denver	290.32	279.30	4%	253.00	253.98	0%	148.14	144.59	2%	202.05	180.93	12%
Detroit	318.12	302.82	5%	277.22	275.37	1%	162.33	156.77	4%	221.40	196.16	13%
Houston	268.70	258.72	4%	234.16	235.27	0%	137.11	133.94	2%	187.01	167.60	12%
Kansas City, Mo.	318.12	299.88	6%	277.22	272.70	2%	162.33	155.24	5%	221.40	194.26	14%
Los Angeles	333.56	317.52	5%	290.68	288.74	1%	170.21	164.38	4%	232.15	205.69	13%
Miami	281.05	264.60	6%	244.93	240.62	2%	143.42	136.98	5%	195.60	171.41	14%
Minneapolis	345.91	323.40	7%	301.45	294.09	3%	176.51	167.42	5%	240.74	209.50	15%
New Orleans	271.79	261.66	4%	236.85	237.94	0%	138.69	135.46	2%	189.16	169.50	12%
New York City	410.77	385.14	7%	357.97	350.23	2%	209.61	199.38	5%	285.88	249.49	15%
Philadelphia	355.18	332.22	7%	309.52	302.11	2%	181.24	171.99	5%	247.19	215.21	15%
Phoenix	274.88	261.66	5%	239.54	237.94	1%	140.26	135.46	4%	191.31	169.50	13%
Pittsburgh	308.85	288.12	7%	269.15	262.00	3%	157.60	149.16	6%	214.95	186.64	15%
Portland, Maine	277.97	258.72	7%	242.24	235.27	3%	141.84	133.94	6%	193.46	167.60	15%
St. Louis	315.03	302.82	4%	274.53	275.37	0%	160.75	156.77	3%	219.25	196.16	12%
San Diego	324.29	308.70	5%	282.61	280.72	1%	165.48	159.81	4%	225.70	199.97	13%
San Francisco	382.97	364.56	5%	333.75	331.51	1%	195.42	188.73	4%	266.54	236.16	13%
Seattle	324.29	305.76	6%	282.61	278.04	2%	165.48	158.29	5%	225.70	198.07	14%
Washington, D.C.	305.76	294.00	4%	266.46	267.35	0%	156.02	152.20	3%	212.80	190.45	12%
Winston/Salem, N.C.	237.81	232.26	2%	207.25	211.21	-2%	121.35	120.24	1%	165.51	150.46	10%

SOURCE: REED CONSTRUCTION DATA/RSMEANS, 2009

Typically Not Included (NIC)

- Architecture & Engineering
- Furniture, movable equipment, and . . . *specific fixtures not connected to building*
- Land cost
- Site Improvement costs
- Financing costs
- Testing, Surveying, *other “soft costs”*
- Legal
- Permits
- Miscellaneous fees
- Specialty Costs (*such as traffic study*)
- Demolition costs

How Site Costs Can Matter

Rehab Hospital	SF	Building Cost/ SF	Site Cost/SF	Total Cost / SF
Location A	55,300 SF	\$224 / SF	\$8 / SF	\$232 / SF
Location B	63,200 SF	\$225 / SF	\$38 / SF	\$263 / SF
		0% Δ	475% Δ	17% Δ

Not only the real estate costs, but the cost of site improvements and foundation conditions have a profound impact on total project cost.

Getting “Apples to Apples”

Traditional Project Cost Assessment

Traditional Project Cost Assessment

CSI Ref

Codes Included

C) Design & Precon Costs

00	Architectural Design Costs	Project to category 200 + 20x.100d							
00	MEP Design Costs	Project to category 100 + 20x.12xx							
00	Misc Design Costs	Project to category 100 + 20x.13xx							
00	Total Design Costs								
00	Builder Preconstruction Fee								
SUBTOTAL C: Design and Precon Fees		sum of above							

D) Builder's CM Fees, General Conditions, Insurance

01	Builder's CM Fee	20x.x01.0							
01	Builder's Management & General Supervision	20x.x01.1							
01	Project General Requirements - Builder	20x.x01.4							
01	Builder Bond / Subguard	20x.x01.2							
01	Builder Insurance	20x.x01.3							
SUBTOTAL D: Builder Fees & GC's		sum of above							

PART 1 TOTAL: Basic Cost

(= Project to category 200 + select design costs)

sum subtotals A+B+C+D

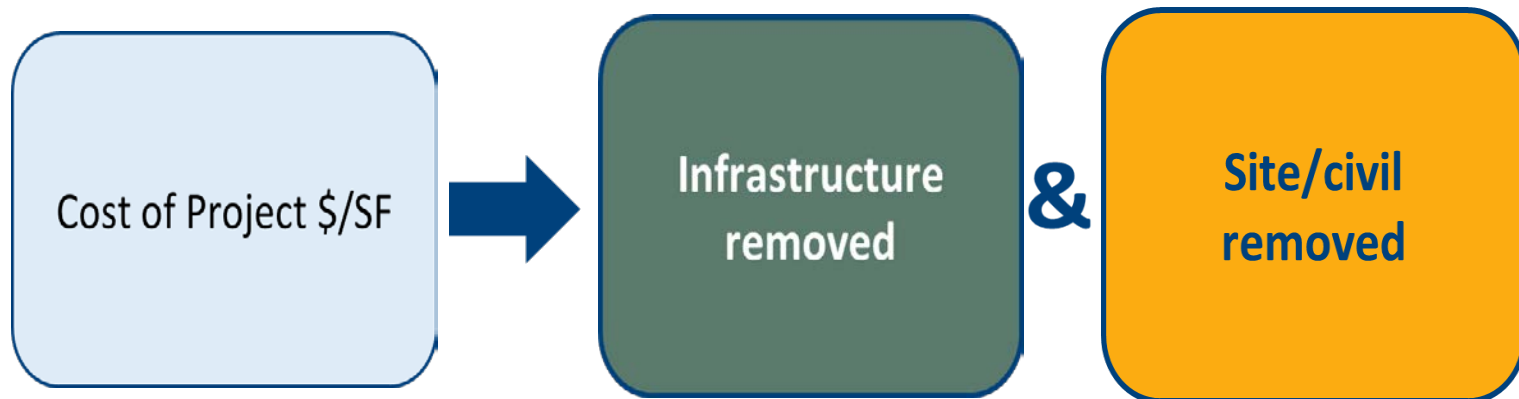
Project 1 (name)		Project 2 (name)		Project 3 (name)	
Mercy Proj #:	from Project	Mercy Proj #:	from Project	Mercy Proj #:	from Project
Architect:	from Project	Architect:	from Project	Architect:	from Project
Contractor:	from Project	Contractor:	from Project	Contractor:	from Project
Project BG SF:	from Project	Project BG SF:	from Project	Project BG SF:	from Project
Project CSSF:	from Project	Project CSSF:	from Project	Project CSSF:	from Project
Project PFSF:	from Project	Project PFSF:	from Project	Project PFSF:	from Project
Project CASF:	from Project	Project CASF:	from Project	Project CASF:	from Project

Cost

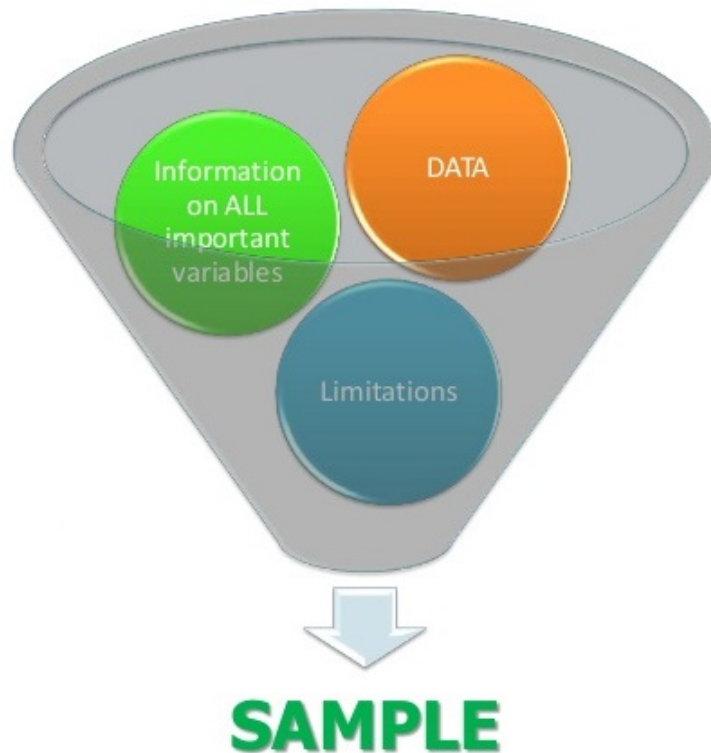
"TOTAL PROJECT COST" INCLUDES TOO MANY VARIABLES TO MAKE VALID "APPLES-TO-APPLES" COMPARISONS

“TOTAL PROJECT COST” INCLUDES TOO MANY VARIABLES TO MAKE VALID “APPLES-TO-APPLES” COMPARISONS

“Tight Cost” Concept



“Tight Data” Primary Objective



Reduce
variability within
the sample

Establishing a Sampling Field

Establish
Relevant Building
Types

Sample breadth & size matters!

“Healthcare” is too broad a category.

One option to increase sample size is to incorporate peer group participation.

Set limiting criteria to screen out irrelevant work

Mercy Chart of Accounts Format



Five Work Categories

CHART OF ACCOUNTS WORK CATEGORIES

Category 1 Design Phase Services	Category 2 Enabling & Exterior	Category 3 Core & Shell	Category 4 Program Fit-out	Category 5 Common Area Fit-out
Acct #'s	Acct #'s	Acct #'s	Acct #'s	Acct #'s

Chart of Accounts

Mercy - Chart of Accounts

CSI MASTERFORMAT 2012 CATEGORY INDEX

CHART OF ACCOUNTS WORK CATEGORIES

CHART OF ACCOUNTS WORK CATEGORIES					
Category 1 Design Phase Services	Category 2 Enabling & Exterior	Category 3 Core & Shell	Category 4 Program Fit-out	Category 5 Common Area Fit-out	
Acct #'s	Acct #'s	Acct #'s	Acct #'s	Acct #'s	
02 Existing Conditions			2030	3030	4030 5030
03 Building Concrete			2040	3040	4040 5040
04 Building Masonry			2050	3050	4050 5050
05 Metals			2060	3060	4060 5060
06 Carpentry & Woodwork			2070	3070	
07 Thermal and Moisture Protection			2080	3080	4080 5080
08 Openings				3090	4090 5090
09 Finishes			2100		4100 5100
10 Specialties					
11 Equipment		1110			4110 5110
12 Furnishings		1120			4120 5120
13 Special Construction				3130	4130 5130
14 Conveying Equipment				3140	4140 5140
21 Fire Suppression			2210	3210	4210 5210
22 Plumbing		1220	2220	3220	4220 5220
23 Heating, Ventilating, and Air Conditioning (HVAC)		1230	2230	3230	4230 5230
25 Integrated Automation			2250	3250	4250 5250
26 Electrical		1260	2260	3260	4260 5260
27 Communications (by Contractor)		1270	2270	3270	4270 5270
28 Electronic Safety & Security		1280	2280	3280	4280 5280
31 Earthwork			2310		
32 Exterior Improvements		1320	2320		
33 Utilities			2330		

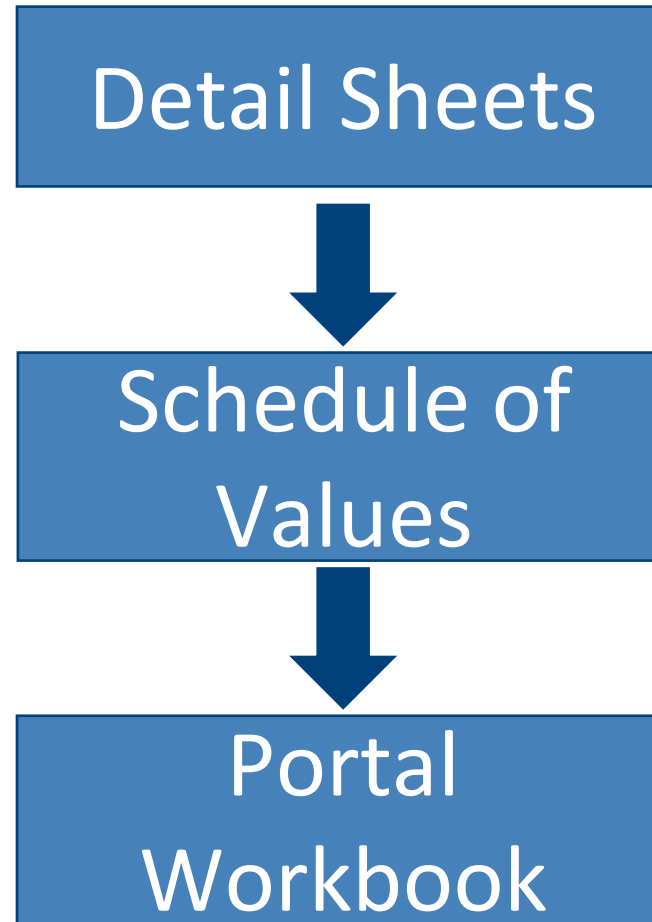
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Populating the Chart of Accounts

- **Objective –**
Capture detailed cost data at end of each project using
 - **Alternate Schedule of Values (SOV) not tied to the standard Application for Payment**
 - **A prerequisite for payments after establishing a GMP**

Data Collection Process

- **Basic Concept**



Data Collection Process

Mercy - Chart of Accounts

CSI MASTERFORMAT 2012 CATEGORY INDEX

CHART OF ACCOUNTS WORK CATEGORIES

Primary Division Number	Chart of Accounts Index Titles	Category 1 Design Phase Services	Category 2 Enabling & Exterior	Category 3 Core & Shell	Category 4 Program Fit-out	Category 5 Common Area Fit-out
		Acct #'s	Acct #'s	Acct #'s	Acct #'s	Acct #'s
00	Builder Preconstruction / Design-Build Design					
	Builder Preconstruction	1000				
	Design-Build Design	1001				
01	Fee, General Conditions & Requirements					
	Builder Fee		2010	3010	4010	5010
	Builder Management & General Supervision		2011	3011	4011	5011
	Bonds (Subguard)		2012	3012	4012	5012
	Insurance		2013	3013	4013	5013
	Project General Requirements by Builder		2014	3014	4014	2014
02	Existing Conditions		2020			
03	Building Concrete		2030	3030	4030	5030
04	Building Masonry		2040	3040	4040	5040
05	Metals		2050	3050	4050	5050
06	Carpentry & Woodwork		2060	3060	4060	5060
07	Thermal and Moisture Protection		2070	3070		
08	Openings		2080	3080	4080	5080
09	Finishes			3090	4090	5090
10	Specialties		2100		4100	5100
11	Equipment	1110			4110	5110
12	Furnishings	1120			4120	5120
13	Special Construction			3130	4130	5130
14	Conveying Equipment			3140	4140	5140
21	Fire Suppression		2210	3210	4210	5210
22	Plumbing	1220	2220	3220	4220	5220
23	Heating, Ventilating, and Air Conditioning (HVAC)	1230	2230	3230	4230	5230
25	Integrated Automation		2250	3250	4250	5250
26	Electrical	1260	2260	3260	4260	5260
27	Communications (by Contractor)	1270	2270	3270	4270	5270
28	Electronic Safety & Security	1280	2280	3280	4280	5280
31	Earthwork		2310			
32	Exterior Improvements	1320	2320			
33	Utilities		2330			

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Enabling & Exterior

Contractor: EXAMPLE SUBCONTRACTOR - FIRE PROTECTION
Job: INPUT EXAMPLE
Project No:
Contract No:

M-2210

2210

Detail Sheet – Category 3

3210

Core and Shell Work

Cost Code Detail

Contractor: **EXAMPLE SUBCONTRACTOR - FIRE PROTECTION**

Job: INPUT EXAMPLE

Project No:

Contract No:

Item No	Description	Scheduled Value	Work From Previous Applications	Work Completed This Invoice	Stored Materials	Total Completed & Stored to Date	%	Balance To Finish
						~	#DIV/0!	~
						~	#DIV/0!	~
3	Prefabricated Material	7,413.45	7,413.45	~	-	7,413.45	100.0%	~
4	Fitter Labor	8,976.00	8,976.00	~	-	8,976.00	100.0%	~
5	Equipment Rental	564.30	564.30	~	-	564.30	100.0%	~
						~	#DIV/0!	~
	CO #1	510.00	510.00	~	-	510.00	100.0%	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
Totals w/ Change Orders:		17,463.75	17,463.75	0.00	~	17,463.75	100.0%	~

M-3210

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4

Program Fit-out Work

Contractor: **EXAMPLE SUBCONTRACTOR - FIRE PROTECTION**

Job: INPUT EXAMPLE

Project No:

Contract No:

Totals w/ Change Orders:	29,810.90	28,427.00	1383.90	~	29,810.90	100.0%	~
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Page 1

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Detail Sheet – Category 5

5210

Common Area Fit-out Work

Cost Code Detail

Contractor: **EXAMPLE SUBCONTRACTOR - FIRE PROTECTION**

Job: INPUT EXAMPLE

Project No:

Contract No:

Item No	Description	Scheduled Value	Work From Previous Applications	Work Completed This Invoice	Stored Materials	Total Completed & Stored to Date	%	Balance To Finish
						~	#DIV/0!	~
						~	#DIV/0!	~
	Prefabricated Material	3,010.31	3,010.31	~		3,010.31	100.0%	~
	Fitter Labor	3,644.80	3,644.80	~		3,644.80	100.0%	~
	Equipment Rental	229.14	229.14	~		229.14	100.0%	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
						~	#DIV/0!	~
Totals w/ Change Orders:		6,884.25	6,884.25	0.00	~	6,884.25	100.0%	~

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Page 1

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Categories 2 thru 5 - Collected

Mercy - Chart of Accounts

CSI MASTERFORMAT 2012 CATEGORY INDEX

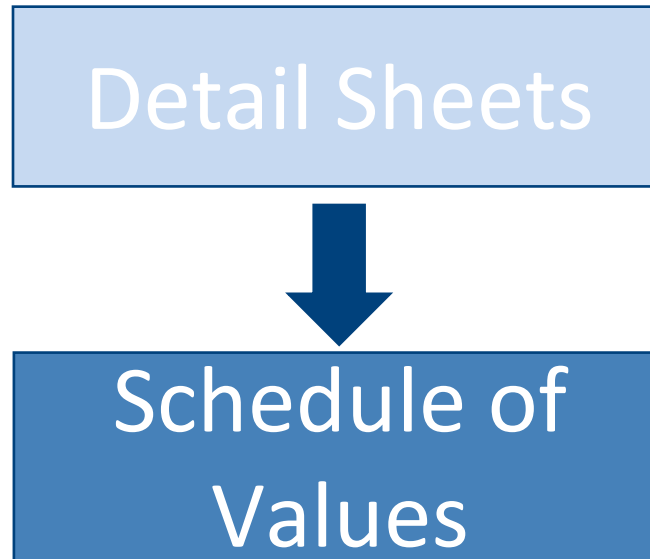
CHART OF ACCOUNTS WORK CATEGORIES

Primary Division Number	Chart of Accounts Index Titles	Category 1 Design Phase Services Acct #'s	Category 2 Enabling & Exterior Acct #'s	Category 3 Core & Shell Acct #'s	Category 4 Program Fit-out Acct #'s	Category 5 Common Area Fit-out Acct #'s
00	Builder Preconstruction / Design-Build Design					
	Builder Preconstruction	1000				
	Design-Build Design	1001				
01	Fee, General Conditions & Requirements					
	Builder Fee		2010	3010	4010	5010
	Builder Management & General Supervision		2011	3011	4011	5011
	Bonds (Subguard)		2012	3012	4012	5012
	Insurance		2013	3013	4013	5013
	Project General Requirements by Builder		2014	3014	4014	2014
02	Existing Conditions		2020			
03	Building Concrete		2030	3030	4030	5030
04	Building Masonry		2040	3040	4040	5040
05	Metals		2050	3050	4050	5050
06	Carpentry & Woodwork		2060	3060	4060	5060
07	Thermal and Moisture Protection		2070	3070		
08	Openings		2080	3080	4080	5080
09	Finishes			3090	4090	5090
10	Specialties		2100		4100	5100
11	Equipment	1110			4110	5110
12	Furnishings	1120			4120	5120
13	Special Construction			3130	4130	5130
14	Conveying Equipment			3140	4140	5140
21	Fire Suppression		2210	3210	4210	5210
22	Plumbing	1220	2220	3220	4220	5220
23	Heating, Ventilating, and Air Conditioning (HVAC)	1230	2230	3230	4230	5230
25	Integrated Automation		2250	3250	4250	5250
26	Electrical	1260	2260	3260	4260	5260
27	Communications (by Contractor)	1270	2270	3270	4270	5270
28	Electronic Safety & Security	1280	2280	3280	4280	5280
31	Earthwork		2310			
32	Exterior Improvements	1320	2320			
33	Utilities		2330			

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Data Collection Process

- **Basic Concept**



Schedule of Values

CM/GC Schedule of Values

Mercy PDC permits CM/GC use of this form in lieu of the AIA G703 pay application continuation sheet.

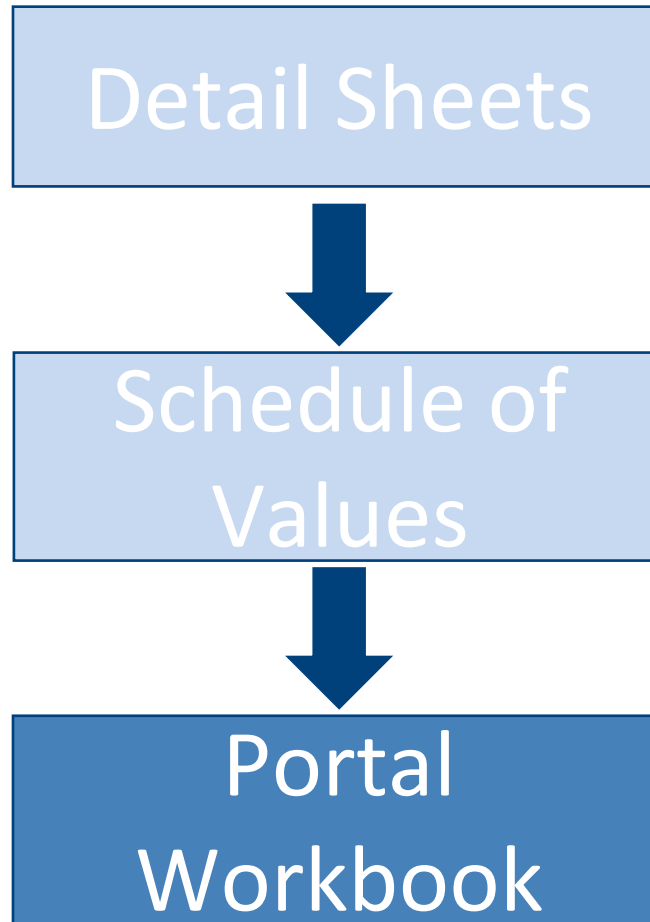
0010	BUILDER FEE	Application No:									
	BUILDER MANAGEMENT & GENERAL	Application Date:									
		Period To:									
		Architect Proj No:									
0011	SUPERVISION	from Previous Applications	Work Completed This Invoice	Stored Materials	Total Completed & Stored to Date	%	Balance To Finish	Total Retainage	Current Payment Due		
		~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
0012	BONDS (SUBGUARD)	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
0013	INSURANCE	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
	PROJECT GENERAL REQUIREMENTS BY	~	~	~	~	#DIV/0!	~		~		
	REQUIREMENTS BY	~	~	~	~	#DIV/0!	~		~		
0014	BUILDER	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
	CONTINGENCY	~	~	~	~	#DIV/0!	~		~		
0015	PLACEHOLDERS	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
	BUILDER	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
1000	PRECONSTRUCTION	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
1001	DESIGN-BUILD DESIGN	~	~	~	~	#DIV/0!	~		~		
		~	~	~	~	#DIV/0!	~		~		
Page Totals:		~	~	~	~	#DIV/0!	~	~	~	0.00	

M-CM/GC

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Data Collection Process

- **Basic Concept**



Portal Workbook (Tab2 by Builder)

Bldr Chrt of Accts Input (Tab2)

BUILDER INPUT WORKSHEET		Project Name Strategic Mercy Clinic Zumbehl Rd.		Project # 1540-00161	
Description	Guidance	Subcontractor/Vendor	Pay App Item Amount	Account #	Account # Amount
Fee, General Conditions & Requirements					
Builder Fee				200.0010	\$138,488.12
CM Fee	The Portal Workbook has 5 TABS	CM/GC	\$138,488.12		
Builder Management & General Super	Mercy completes TAB-1			200.0011	\$217,611.66
General Conditions		CM/GC	\$217,611.66		
Bonds (Subguard)	Builder completes TAB-2			200.0012	\$51,114.23
Sub-Guard (Bond)		CM/GC	\$51,114.23		
Insurance	Insurance Builders Risk			200.0013	\$40,006.96
Insurance		CM/GC	\$34,991.96		
Builders Risk		CM/GC	\$5,015.00		

Portal Workbook (Tab3 - Merge List)

Project Merge List

ACCT_UNT_NAME	GC_INPUT	ACCT_UNT_NO	ACCT_AMT
Builder Preconstruction		200.1000	\$0.00
Design Build Design		200.1001	\$0.00
Equipment (Furnish and/or Install by Contractor)		200.1110	\$0.00
Furnishings (Furnish and/or Install by Contractor)		200.1120	\$0.00
Plumbing		200.1220	\$0.00
Heating, Ventilating, and Air Conditioning (HVAC)		200.1230	\$0.00
Electrical		200.1260	\$0.00
Communications (by Contractor)		200.1270	\$0.00
Electronic Safety & Security (by Contractor)		200.1280	\$0.00

Project Merge List

ACCT_UNT_NAME	GC_INPUT	ACCT_UNT_NO	ACCT_AMT
Project General Requirements by Builder		200.4014	#DIV/0!
Building Concrete		200.4030	\$0.00
Building Masonry		200.4040	\$0.00
Metals		200.4050	\$0.00
Carpentry & Woodwork		200.4060	\$0.00
Openings		200.4080	\$0.00
Finishes		200.4090	\$0.00
Specialties (Furnish and/or Install by Contractor)		200.4100	\$0.00
Equipment (Furnish and/or Install by Contractor)		200.4110	\$0.00

Builder Fee	\$0.00	200.001000
Builder Management & General Supervision	\$0.00	200.001100
Bonds (Sub-guard)	\$0.00	200.001200
Insurance	\$0.00	200.001300
Project General Requirements by Builder	\$0.00	200.001400
GRAND TOTAL	#DIV/0!	
Divisions 02 thru 33 Subtotal	\$0.00	
Cost Sub-Category 2 Enabling & Exterior Work (EW)	\$0.00	#DIV/0!
Cost Sub-Category 3 Core and Shell Work (CS)	\$0.00	#DIV/0!
Cost Sub-Category 4 Program Fit-out Work (PF)	\$0.00	#DIV/0!
Cost Sub-Category 5 Common Area Fit-out Work (CA)	\$0.00	#DIV/0!
Contingency Placeholders	\$0.00	200.001500

Portal Workbook (Tab4 Input Test)

Includes 2 tests to check completeness and accuracy of Builder input into Tab 2

- **WORK CATEGORY TEST** – verifies Builder work categories 3, 4, and 5 \$ input are complete and reasonable.
- **CSI DIVISION DISTRIBUTION TEST** – verifies distribution of costs among Divisions 3 through 28 are within a reasonable range based on past like projects.

Work Category Test (Example)

TEST 1			
PROJECTO ACCOUNT NAME	PROJECTO ACCOUNT NUMBER.	\$ AMOUNT	TEST 1 WORK CATEGORIES 3, 4 and 5 % ALLOCATION
CORE & SHELL			
Building Concrete	200.3030	\$141,000.00	OK
Building Masonry	200.3040	\$205,924.00	OK
Metals	200.3050	\$228,918.00	OK
Carpentry & Woodwork	200.3060	\$17,136.00	OK
Thermal and Moisture Protection	200.3070	\$135,140.00	OK
Openings	200.3080	\$155,787.00	OK
Finishes	200.3090	\$72,137.00	OK
Fire Suppression	200.3210	\$37,845.00	OK
Plumbing	200.3220	\$30,000.00	OK
Heating, Ventilating, and Air Conditioning (HVAC)	200.3230	\$0.00	NO INPUT VALUE - VERIFY
Electrical	200.3260	\$0.00	NO INPUT VALUE - VERIFY
Communications (by Contractor)	200.3270	\$0.00	NO INPUT VALUE - VERIFY
Electronic Safety & Security (by Contractor)	200.3280	\$0.00	NO INPUT VALUE - VERIFY
PROGRAM FIT OUT			
Building Concrete	200.4030	\$0.00	OK
Building Masonry	200.4040	\$0.00	OK
Metals	200.4050	\$0.00	OK
Carpentry & Woodwork	200.4060	\$128,903.00	OK
Openings	200.4080	\$42,899.00	OK
Finishes	200.4090	\$357,054.00	OK
Fire Suppression	200.4210	\$0.00	VERIFY INPUT VALUE
Plumbing	200.4220	\$441,800.00	OK
Heating, Ventilating, and Air Conditioning (HVAC)	200.4230	\$0.00	VERIFY INPUT VALUE
Electrical	200.4260	\$321,200.00	OK
Communications (by Contractor)	200.4270	\$19,500.00	OK
Electronic Safety & Security (by Contractor)	200.4280	\$44,934.00	OK
PUBLIC AREA FIT OUT			
Building Concrete	200.5030	\$0.00	OK
Building Masonry	200.5040	\$0.00	OK
Metals	200.5050	\$0.00	OK

“NO INPUT VALUE” indicates need for Contractor to itemize MEP costs by Work Category

“VERIFY INPUT VALUE” indicates need for Contractor to correctly itemize “Core and Shell” versus “Fit Out” costs

CSI Distribution Test (Example)

TEST 2						
CSI CATEGORY TIGHT PROJECT COST NAME Includes all costs for CORE & SHELL + PROGRAM FIT OUT + PUBLIC AREA FIT OUT	CSI DIVISION NO.	TIGHT PROJECT \$	% TIGHT PROJECT \$	TEST 2 % DISTRIBUTION BY CSI DIVISION FOR FREESTANDING MOB PROJECTS	Adjstd. High Limit	Adjstd. Low Limit
Building Concrete	03	\$141,000.00	5.8%	OK	11.0%	3.3%
Building Masonry	04	\$205,924.00	8.4%	OK	11.3%	7.3%
Metals	05	\$228,918.00	9.4%	OK	12.0%	8.0%
Carpentry & Woodwork	06	\$146,039.00	6.0%	OK	8.3%	2.5%
Thermal and Moisture Protection	07	\$135,140.00	5.5%	OK	9.8%	3.5%
Openings	08	\$198,686.00	8.1%	OK	9.8%	7.5%
Finishes	09	\$429,191.00	17.6%	OK	21.0%	12.3%
Fire Suppression	21	\$37,845.00	1.5%	OK	2.0%	1.3%
Plumbing	22	\$471,800.00	19.3%	OK	19.8%	0.0%
Heating, Ventilating, and Air Conditioning (HVAC)	23	\$0.00	0.0%	DIV.23&25 % NOT TYPICAL *	15.5%	0.0%
Electrical	26	\$321,200.00	13.2%	OK	14.8%	7.5%
Communications (by Contractor)	27	\$19,500.00	0.8%	OK	3.0%	0.3%
Electronic Safety & Security (by Contractor)	28	\$44,934.00	1.8%	OK	2.0%	0.5%

*In this example the contractor reported HVAC combined with Plumbing

Cost Data Comparison Example

CSI #	CSI DESCRIPTION	TIGHT \$/BGSF-Shell	AVERAGE	CLINIC 1	CLINIC 2	CLINIC 3	CLINIC 4	CLINIC 5	CLINIC 6
	TIGHT CONSTR. SV			19500	16500	25,456	13650	13600	13650
				0	0	0	0	0	0
				19,500	16,500	25,456	13,650	13,600	13,650
CSI #	CSI DESCRIPTION	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell
03	Building Concrete	\$12.52	\$19.66	\$14.84	\$13.01	\$9.20	\$8.08	\$10.33	
04	Building Masonry	\$16.26	\$16.73	\$19.88	\$15.65	\$13.60	\$16.62	\$15.09	
05	Metals	\$16.82	\$22.16	\$18.49	\$11.48	\$17.71	\$14.30	\$16.77	
06	Carpentry & Wood	\$10.60	\$13.71	\$5.33	\$13.88	\$10.52	\$9.47	\$10.70	
07	Thermal and Moisture Protection	\$12.24	\$10.34	\$18.27	\$15.40	\$9.70	\$9.81	\$9.90	
08	Openings	\$14.94	\$16.20	\$18.20	\$12.53	\$14.33	\$13.82	\$14.56	
09	Finishes	\$30.18	\$29.96	\$26.24	\$29.40	\$30.33	\$33.72	\$31.44	
10	Specialties (Furnish and/or Install by Contractor)	\$1.20	\$0.02	\$1.25	\$0.82	\$1.92	\$1.53	\$1.64	
11	Equipment (Furnish and/or Install by Contractor)	\$0.62	\$0.69	\$1.82	\$1.21	\$0.00	\$0.00	\$0.00	
12	Furnishings (Furnish and/or Install by Contractor)	\$2.94	\$0.00	\$8.99	\$1.44	\$2.37	\$1.92	\$2.91	
13	Special Construction (by Contractor)	\$1.48	\$1.08	\$2.11	\$1.28	\$2.20	\$0.00	\$2.20	
14	Conveying Equipment (by Contractor)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
21	Fire Suppression	\$2.86	\$2.78	\$2.96	\$2.96	\$2.77	\$2.90	\$2.77	
22	Plumbing	\$11.29	\$12.76	\$13.91	\$13.00	\$9.68	\$9.00	\$9.40	
23	Heating, Ventilating, and Air Conditioning (HVAC)	\$18.31	\$21.58	\$10.06	\$12.99	\$22.94	\$19.34	\$22.97	
25	Integrated Automation	\$0.92	\$0.00	\$3.84	\$1.67	\$0.00	\$0.00	\$0.00	
26	Electrical	\$20.95	\$18.38	\$17.32	\$21.33	\$25.02	\$20.12	\$23.53	
27	Communications (by Contractor)	\$2.87	\$2.74	\$5.55	\$3.42	\$1.73	\$2.34	\$1.43	
28	Electronic Safety & Security (by Contractor)	\$2.31	\$1.69	\$1.88	\$1.35	\$2.81	\$2.86	\$3.29	
	TOTAL	\$179.30	\$190.47	\$190.92	\$172.82	\$176.83	\$165.85	\$178.92	
	TOTAL BARE TIGHT CONSTR. Cost Sub-Categories 3, 4, & 5		\$190.47	\$190.92	\$172.82	\$176.83	\$165.85	\$178.92	

Greyed-out lines are included in total but are not statistically significant for comparison between projects

Noteworthy High & Low Numbers

		AVERAGE						
	BGSF ->	17,059	19,500	16,500	25,456	13650	13600	13650
	BGSF - SHELL ->	17,059	CLINIC 1	CLINIC 1	CLINIC 1	CLINIC 1	CLINIC 1	CLINIC 1
CSI #	CSI DESCRIPTION	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell
5	Metals	\$16.82	\$22.16	\$18.49	\$11.48	\$17.71	\$14.30	\$16.77
6	Carpentry & Woodwork	\$10.60	\$13.71	\$5.33	\$13.88	\$10.52	\$9.47	\$10.70
8	Openings	\$14.94	\$16.20	\$18.20	\$12.53	\$14.33	\$13.82	\$14.56
9	Finishes	\$30.18	\$29.96	\$26.24	\$29.40	\$30.33	\$33.72	\$31.44
22,23,25	Combined Plumbing, HVAC & Automation	\$30.52	\$34.34	\$27.80	\$27.66	\$32.62	\$28.35	\$32.37
26	Electrical	\$20.95	\$18.38	\$17.32	\$21.33	\$25.02	\$20.12	\$23.53
27	Communications (by Contractor)	\$2.87	\$2.74	\$5.55	\$3.42	\$1.73	\$2.34	\$1.43
TOTAL		\$179.30	\$190.47	\$190.92	\$172.82	\$176.83	\$165.85	\$178.92
TIGHT PROJECT DURATION (Calendar Days/1,000SF) KILLER RATIO (T/\$)		18 0.82	15 0.63	21 0.24	14 0.41	20 1.11	18 0.96	17 1.58
T RATIO - Snail Time / Tight Construction Duration		0.26	0.11	0.11	0.16	0.33	0.36	0.46
\$ RATIO - Bare Enabling & Exterior Work \$ / Bare Tight Constr. Svs. \$		0.33	0.17	0.46	0.39	0.30	0.38	0.29
Construction Management % Total 01 - 33 + contingency		\$35.88	\$30.47	\$41.04	\$53.37	\$32.83	\$29.46	\$28.10
Preconstruction		\$1.92	\$1.84	\$5.24	\$3.01	\$0.56	\$0.45	\$0.42
Professional Design Svs. Commitment - total \$ to date		\$15.33	\$20.12	\$16.58	\$0.00	\$16.26	\$17.13	\$21.90
Total Precon + Design Services % Total 01 - 33		\$17.25	\$21.95	\$21.82	\$3.01	\$16.83	\$17.58	\$22.32

Example Mercy Metrics Analysis

TIGHT CONSTR. SVS. \$ C&S-(PF&CA Fitout)		CLINIC 1	CLINIC 2	CLINIC 3	CLINIC 4	CLINIC 5	CLINIC 6	CLINIC 7	CLINIC 8	CLINIC 9
BGSF ->		19,500	16,500	25,456	32,951	13,650	13,600	13,650	7,400	20,577
CSI #	CSI DESCRIPTION	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell
03	Building Concrete	\$19.66	\$14.84	\$13.01	\$8.76	\$9.20	\$8.08	\$10.33	\$7.32	\$7.16
04	Building Masonry	\$16.73	\$19.88	\$15.65	\$8.80	\$13.60	\$16.62	\$15.09	\$17.33	\$1.80
05	Metals	\$22.16	\$18.49	\$11.48	\$15.76	\$17.71	\$14.30	\$16.77	\$13.78	\$18.92
06,07,08	Carpentry & Woodwork +Thermal & Moisture Protect.+ Openings	\$40.25	\$41.80	\$41.81	\$35.83	\$34.55	\$33.11	\$35.15	\$41.60	\$31.61
09	Finishes	\$29.96	\$26.24	\$29.40	\$36.01	\$30.33	\$33.72	\$31.44	\$34.31	\$29.86
10	Specialties (Furnish and/or Install by Contractor)	\$0.02	\$1.25	\$0.82	\$2.93	\$1.92	\$1.53	\$1.64	\$1.59	\$1.40
21	Fire Suppression	\$2.78	\$2.96	\$2.96	\$2.00	\$2.77	\$2.90	\$2.77	\$0.00	\$3.07
22	Plumbing	\$12.76	\$13.91	\$13.00	\$11.68	\$9.68	\$9.00	\$9.40	\$16.27	\$7.47
23,25	HVAC & Automation	\$21.58	\$13.89	\$14.66	\$21.86	\$22.94	\$19.34	\$22.97	\$24.87	\$17.12
26	Electrical	\$18.38	\$17.32	\$21.33	\$28.72	\$25.02	\$20.12	\$23.53	\$23.21	\$16.82
27	Communications (by Contractor)	\$2.74	\$5.55	\$3.42	\$1.94	\$1.73	\$2.34	\$1.43	\$1.35	\$4.11
	MTS	\$11.06	\$8.02	\$17.68	\$8.69	\$16.12	\$24.26	\$16.12	\$11.37	\$10.35
28	Electronic Safety & Security (by Contractor)	\$1.69	\$1.88	\$1.35	\$2.00	\$2.81	\$2.86	\$3.29	\$2.88	\$4.32
	Divisions 26, 27 & 28 + MTS	\$33.87	\$32.77	\$43.78	\$41.35	\$45.68	\$49.59	\$44.37	\$38.81	\$35.61
TOTAL TIGHT COST		\$190.47	\$190.92	\$172.82	\$179.82	\$176.83	\$165.85	\$178.92	\$185.35	\$143.68
TIGHT PROJECT DURATION (Calendar Days/1,000SF)		15.0	21.0	14.0	17.2	20.0	18.0	17.0	48.5	18.4
SNAIL Killer Ratio (T/\$)		0.626	0.239	0.413	0.577	1.106	0.959	1.575	1.264	0.277
T RATIO - SNAIL Time / Tight Construction Duration		0.107	0.111	0.161	0.128	0.327	0.365	0.458	0.296	0.132
\$ RATIO - Bare Enabling & Exterior Work \$ / Bare Tight Constr.Svs. \$		0.171	0.464	0.391	0.221	0.295	0.380	0.291	0.234	0.478
Bare Enabling & Exterior Work (EW) Cost Sub-Category 2		\$32.59	\$88.58	\$67.50	\$39.82	\$52.22	\$63.05	\$52.08	\$43.46	\$68.63
Total Cost Sub-Categories 2, 3, 4, & 5		\$223.07	\$279.51	\$240.32	\$219.63	\$229.05	\$228.90	\$231.00	\$228.81	\$212.30
Construction Management % Total 01 - 33 + contingency		13.7%	14.7%	16.8%	11.4%	14.2%	12.6%	12.0%	14.7%	20.0%
TOTAL TIGHT COST + Construction Management		\$220.94	\$231.96	\$215.04	\$204.78	\$209.66	\$195.31	\$207.02	\$219.59	\$186.16
Preconstruction		\$1.84	\$5.24	\$3.01	\$0.26	\$0.56	\$0.45	\$0.42	\$0.00	\$2.94
		D/B Team A	D/B Team A	D/B Team A	D/B Team B	D/B Team B	D/B Team A/B	D/B Team B	D/B Team C	D/B Team D
Total Precon + Design Svs. % Total 01 - 33 + contingency \$/BGSF		8.66%	6.81%	8.72%	7.79%	6.39%	6.69%	4.93%	8.15%	6.89%

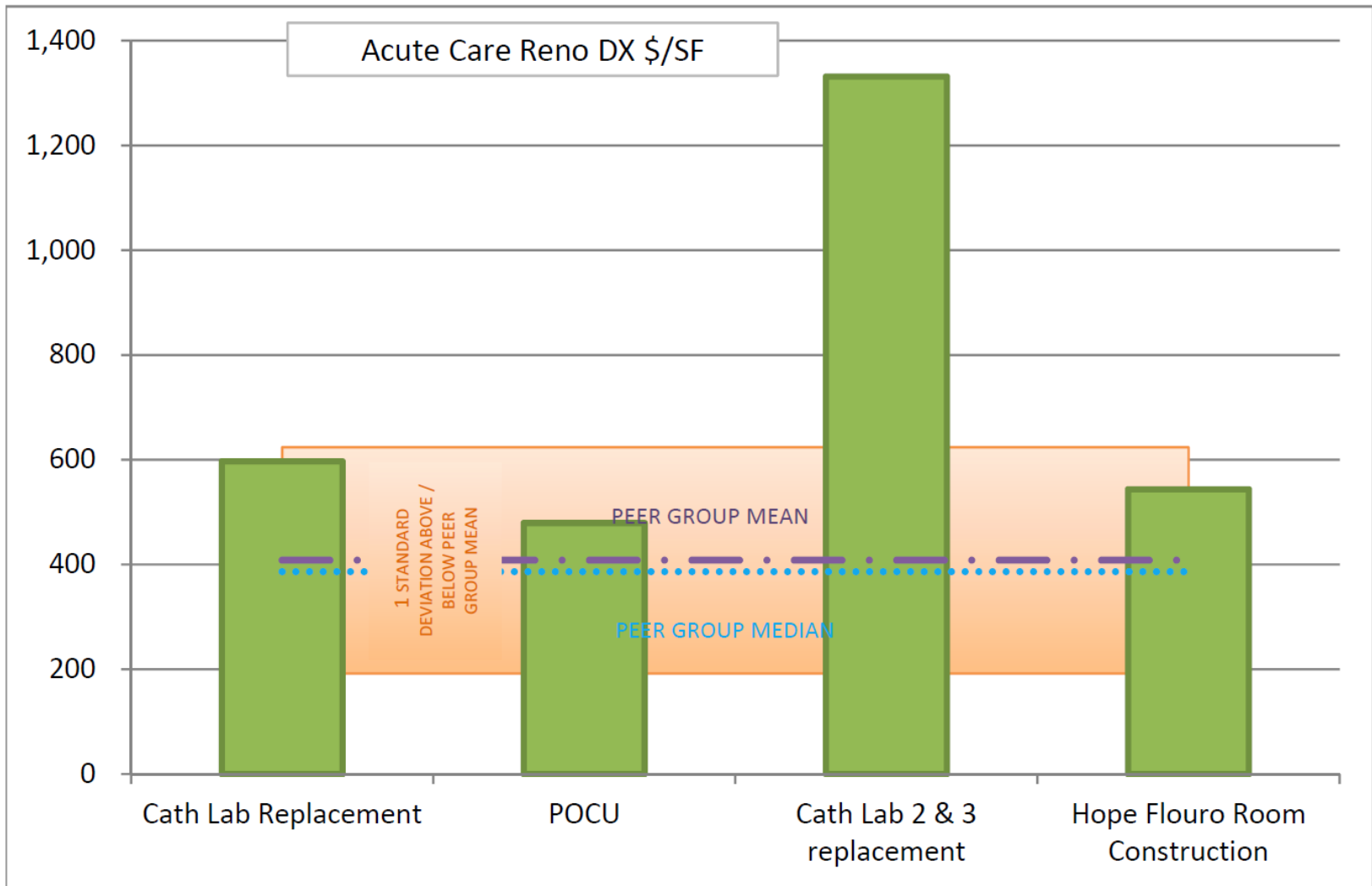
Example Mercy Metrics Analysis

- Team A+A/B Architect over the course of four projects started with a total tight cost of \$190.47 and ended with \$166.45 – a 13% reduction.
- Team A+A/B Architect Design + Precon costs dropped from 8.66% to 6.36% – a 27% reduction.
- Team B Design + Precon costs dropped from 7.79% to 4.93% – a 37% reduction.
- While using a local designer at Clinic 8 was expected to expedite the project, the end result was: highest tight cost & the 2nd highest tight cost + construction mgmt. of the 9 projects.

Example Mercy Metrics Analysis

TIGHT CONSTR. SVS. \$ C&S-(PF&CA Fitout)		CLINIC 1	CLINIC 2	CLINIC 3	CLINIC 4	CLINIC 5	CLINIC 6	CLINIC 7	CLINIC 8	CLINIC 9
BGSF ->		19,500	16,500	25,456	32,951	13,650	13,600	13,650	7,400	20,577
CSI #	CSI DESCRIPTION	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell	TIGHT \$/BGSF-Shell
03	Building Concrete	\$19.66	\$14.84	\$13.01	\$8.76	\$9.20	\$8.08	\$10.33	\$7.32	\$7.16
04	Building Masonry	\$16.73	\$19.88	\$15.65	\$8.80	\$13.60	\$16.62	\$15.09	\$17.33	\$1.80
05	Metals	\$22.16	\$18.49	\$11.48	\$15.76	\$17.71	\$14.30	\$16.77	\$13.78	\$18.92
06,07,08	Carpentry & Woodwork +Thermal & Moisture Protect.+ Openings	\$40.25	\$41.80	\$41.81	\$35.83	\$34.55	\$33.11	\$35.15	\$41.60	\$31.61
09	Finishes	\$29.96	\$26.24	\$29.40	\$36.01	\$30.33	\$33.72	\$31.44	\$34.31	\$29.86
10	Specialties (Furnish and/or Install by Contractor)	\$0.02	\$1.25	\$0.82	\$2.93	\$1.92	\$1.53	\$1.64	\$1.59	\$1.40
21	Fire Suppression	\$2.78	\$2.96	\$2.96	\$2.00	\$2.77	\$2.90	\$2.77	\$0.00	\$3.07
22	Plumbing	\$12.76	\$13.91	\$13.00	\$11.68	\$9.68	\$9.00	\$9.40	\$16.27	\$7.47
23,25	HVAC & Automation	\$21.58	\$13.89	\$14.66	\$21.86	\$22.94	\$19.34	\$22.97	\$24.87	\$17.12
26	Electrical	\$18.38	\$17.32	\$21.33	\$28.72	\$25.02	\$20.12	\$23.53	\$23.21	\$16.82
27	Communications (by Contractor)	\$2.74	\$5.55	\$3.42	\$1.94	\$1.73	\$2.34	\$1.43	\$1.35	\$4.11
	MTS	\$11.06	\$8.02	\$17.68	\$8.69	\$16.12	\$24.26	\$16.12	\$11.37	\$10.35
28	Electronic Safety & Security (by Contractor)	\$1.69	\$1.88	\$1.35	\$2.00	\$2.81	\$2.86	\$3.29	\$2.88	\$4.32
	Divisions 26, 27 & 28 + MTS	\$33.87	\$32.77	\$43.78	\$41.35	\$45.68	\$49.59	\$44.37	\$38.81	\$35.61
TOTAL TIGHT COST		\$190.47	\$190.92	\$172.82	\$179.82	\$176.83	\$165.85	\$178.92	\$185.35	\$143.68
TIGHT PROJECT DURATION (Calendar Days/1,000SF)		15.0	21.0	14.0	17.2	20.0	18.0	17.0	48.5	18.4
SNAIL Killer Ratio (T/\$)		0.626	0.239	0.413	0.577	1.106	0.959	1.575	1.264	0.277
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Bare Enabling & Exterior Work (EW) Cost Sub-Category 2		\$32.59	\$88.58	\$67.50	\$39.82	\$52.22	\$63.05	\$52.08	\$43.46	\$68.63
Total Cost Sub-Categories 2, 3, 4, & 5		\$223.07	\$279.51	\$240.32	\$219.63	\$229.05	\$228.90	\$231.00	\$228.81	\$212.30
Construction Management % Total 01 - 33 + contingency		13.7%	14.7%	16.8%	11.4%	14.2%	12.6%	12.0%	14.7%	20.0%
TOTAL TIGHT COST + Construction Management		\$220.94	\$231.96	\$215.04	\$204.78	\$209.66	\$195.31	\$207.02	\$219.59	\$186.16
Preconstruction		\$1.84	\$5.24	\$3.01	\$0.26	\$0.56	\$0.45	\$0.42	\$0.00	\$2.94
D/B Team A		D/B Team A	D/B Team A	D/B Team A	D/B Team B	D/B Team B	D/B Team A/B	D/B Team B	D/B Team C	D/B Team D
Total Precon + Design Svs. % Total 01 - 33 + contingency \$/BGSF		8.66%	6.81%	8.72%	7.79%	6.39%	6.69%	4.93%	8.15%	6.89%

Peer Benchmarking Example



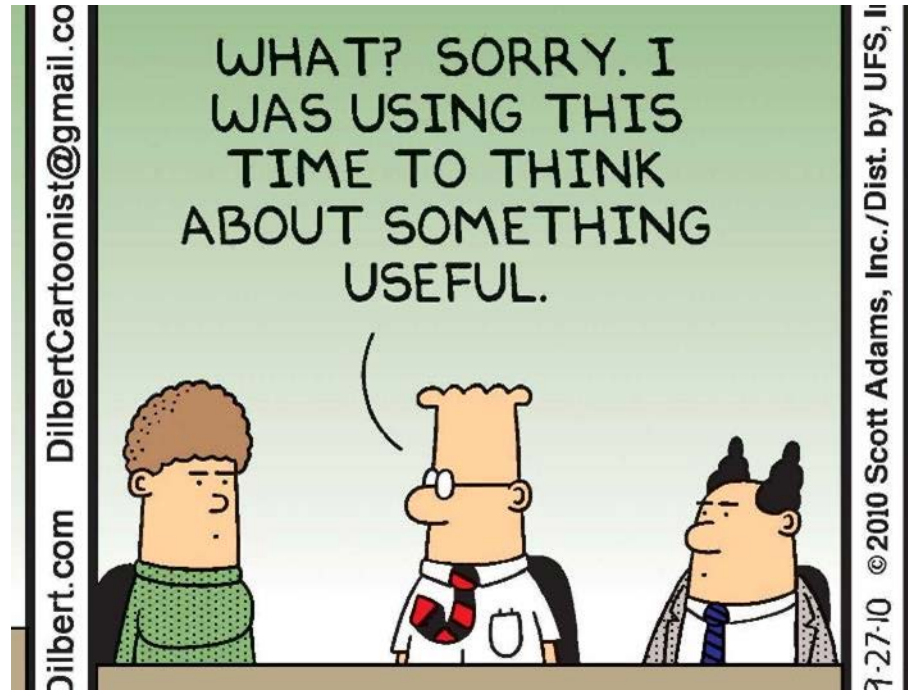
Setting the Table for Analytics



We Covered in this Session . . .

- Issues with available data sources in assessing project performance
- Recognizing “Noise” in existing data sets
- “Tight Data” processes that filter “Data Noise”
- Example process to collect “Tight Data”
- Project assessment application of “Tight Data”

Any Questions?



THANK YOU!

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