



PROJECT MANAGEMENT CENTER FOR EXCELLENCE

A.J. CLARK SCHOOL OF ENGINEERING
Civil & Environmental Engineering Department



CAPTURING COSTS & VALUE OF RESEARCH PRODUCTS

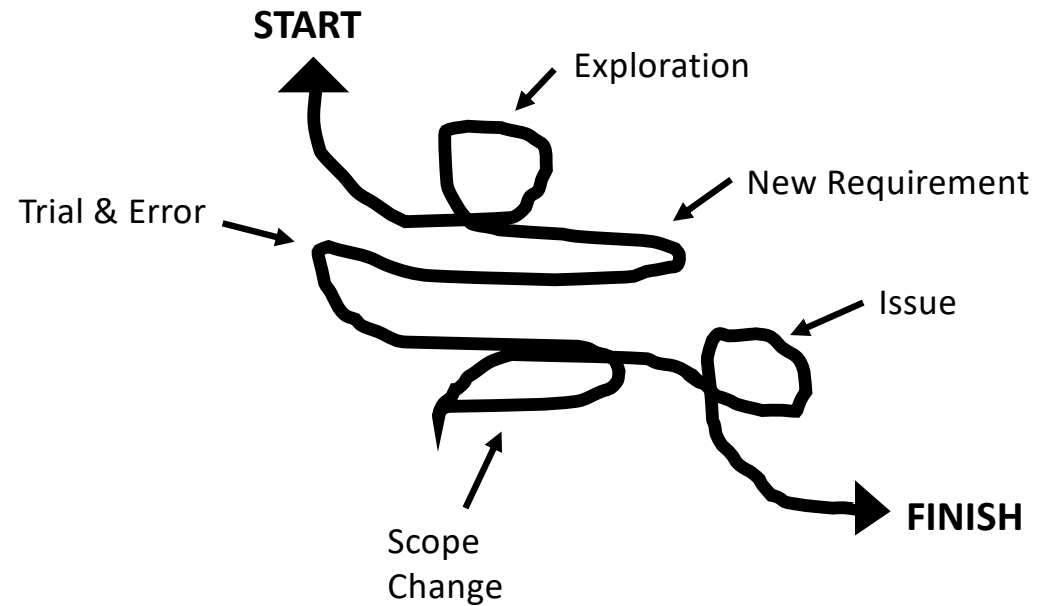
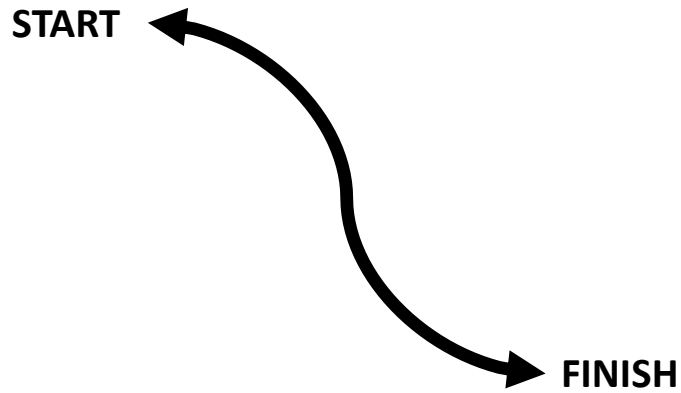
Anne Johnson, PMP

2019 Project Management Symposium

PROJECT EXPECTATIONS

VS

RESEARCH PROJECT REALITY



AGENDA

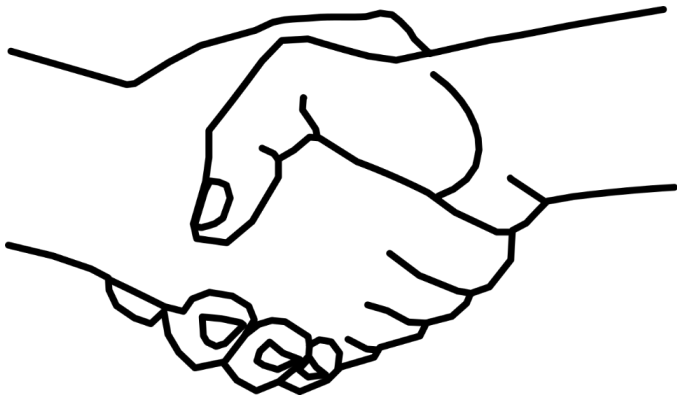
1. Cost Estimation
2. Budget Management
3. Determining Value

COST ESTIMATION



Step 1

Determine Scope



- Goals -> Requirements
- Final Outcome
- Constraints
- Risks
- Expectations
- **Agreement**

Step 2

Provide Historical Data

- Schedule data
- Lessons Learned
- Average effort of standard products

Standard Products - Average Effort by Project Type and Resource Grade

Standard Product	Qualitative Project (hrs)			Quantitative Project (hrs)		
	GS-12	GS-13	GS-14	GS-12	GS-13	GS-14
Operations Plan	11	6	7	91	67	28
Analysis Plan	59	22	7	67	17	15
Expert Review	72	43	33			
Analysis	139	106	26	312	132	29
Recommendations	48	30	28	0	0	0
Report	67	21	7	116	65	18

Step 3

Estimate Effort

Deliverables Timeline
↓ ↓

3-Point Estimate
↙ ↘

Level of Confidence
↓

Deliverable	Fiscal Year	Resource A Effort (hrs)			Resource B Effort (hrs)			Confidence
		Optimistic	Most Likely	Pessimistic	Optimistic	Most Likely	Pessimistic	
Deliverable 1	19	5	8	12	5	8	12	high
Deliverable 2	19	24	48	64	16	24	32	medium
Deliverable 3	20	48	72	96	32	48	64	medium

Step 3

Estimate Effort (continued)

Cost Estimate Checklist:

- ✓ Account for all staff involved
- ✓ Project management effort
- ✓ Background research, staff development, onboarding
- ✓ Planning and prep
- ✓ Stakeholder Management
- ✓ Travel expenses
- ✓ Addressing feedback
- ✓ Project closeout

Step 4

Estimate Costs

Statistical PERT® (SPERT®) *Normal Edition*

Minimum	Most Likely	Maximum			Most Likely Confidence
5	8	12	✓	●	High confidence
24	48	64	✓	●	Medium confidence
48	72	96	✓	●	Medium confidence

Factors in Risk/Uncertainty

SPERT Probabilistic Estimates					
90%	85%	80%	75%	70%	
9	9	9	9	9	9
57	55	53	52	51	51
84	82	80	78	77	77

Final Effort Estimates
Training
Overheads

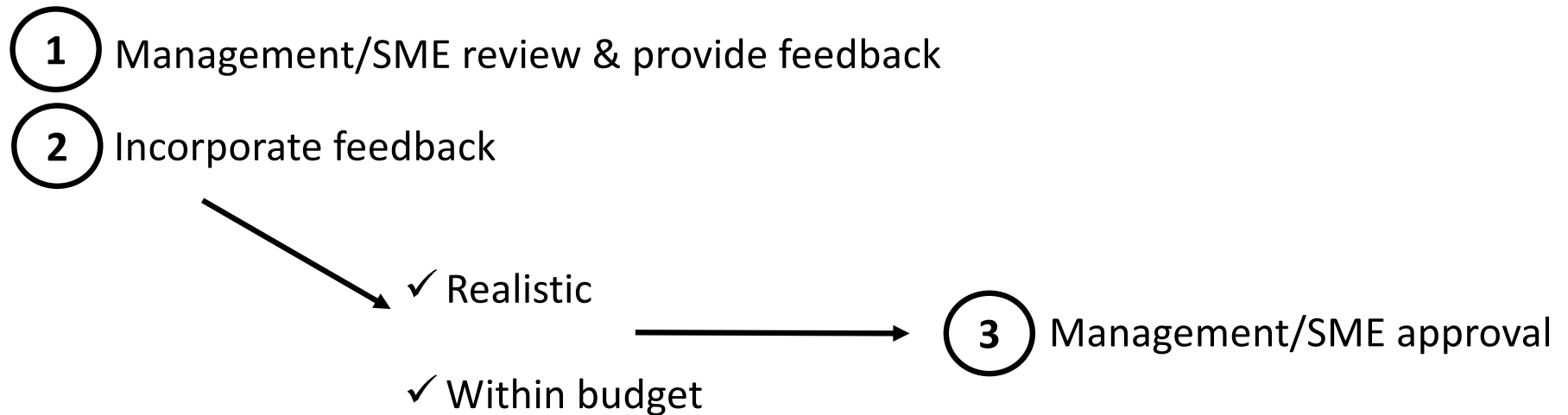
Cost Estimate



U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
[census.gov](https://www.census.gov)

Step 5

Review & Update Cost Estimate



Step 6

Develop Cost Estimate Memo

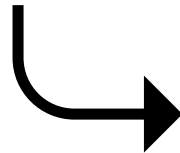
- To sponsor
- Summary of costs
- Project proposal/scope statement
- Cost saving options (if applicable)
- High-level/milestone schedule
- Routing list
- CC list
- Cost estimate breakdown (overheads, training, etc.)
- Assumptions, constraints, risks

Step 7

Send & Negotiate Cost Estimate

Send draft cost estimate memo to sponsor

- Feedback deadline
- Highlight important information



Sponsor reviews and provides feedback

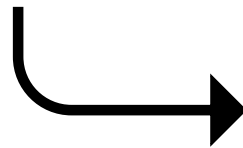
- Negotiation meeting
- If the sponsor is trying to cut costs, determine ways to cut back on scope without compromising the integrity of the project

Step 8

Follow Up & Finalize

Follow up with sponsor

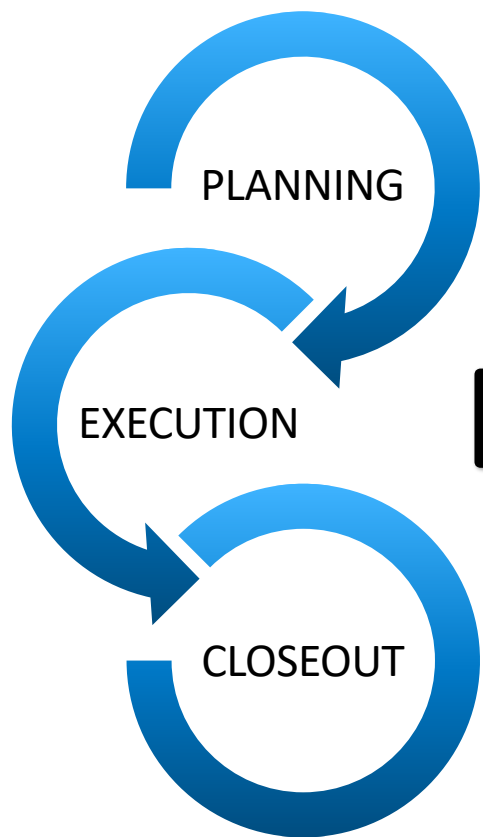
- Incorporate changes
- Send revised memo
- Receive sponsor approval



Finalize costs

- Route for necessary approvals
- Distribute to CC list
- Update project status
- Store finalized memo and notes

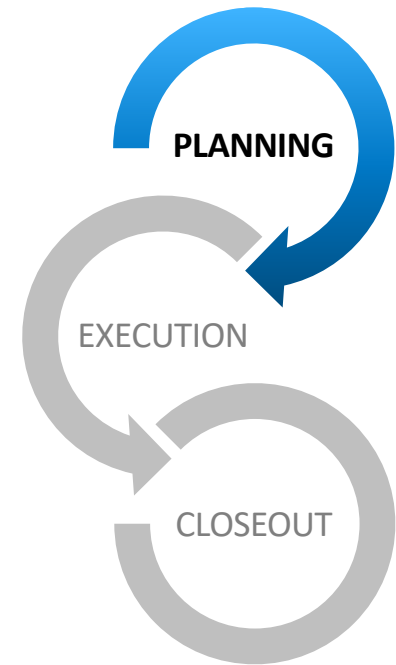
Execute project & manage your budget!



BUDGET MANAGEMENT

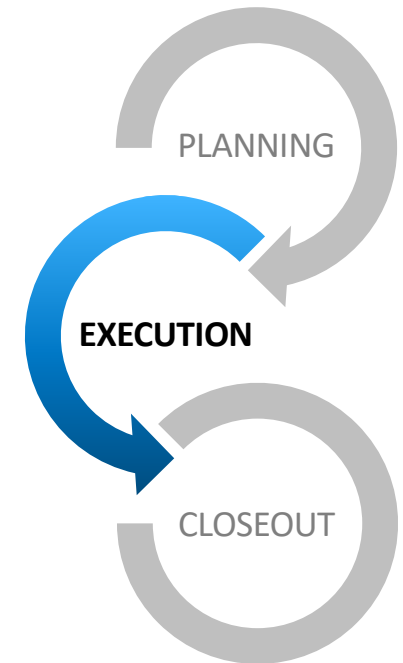
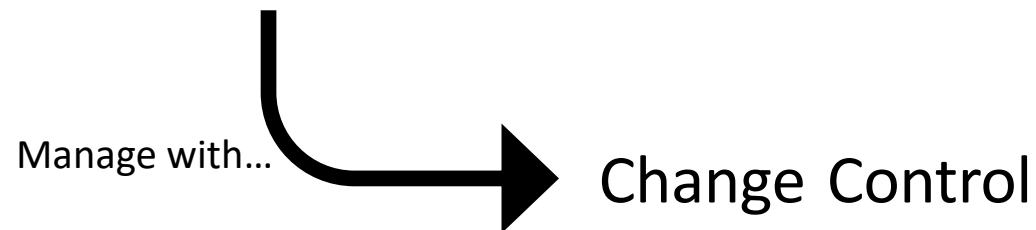
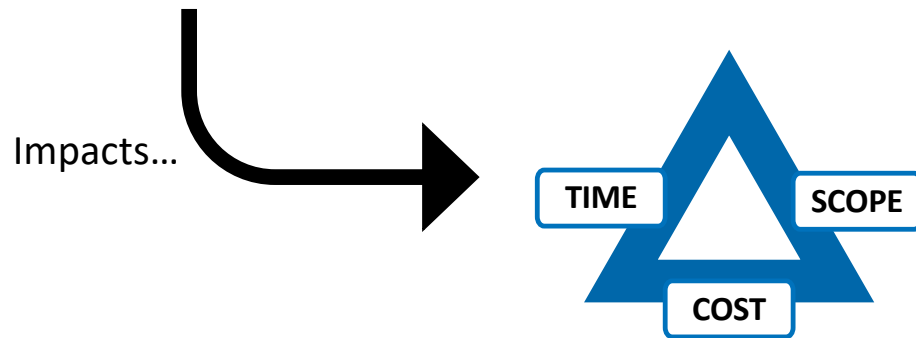
Project Kick-Off

- Confirm funding
- Tolerance for budget variance
- Frequency/format of budget updates
- Initial risks



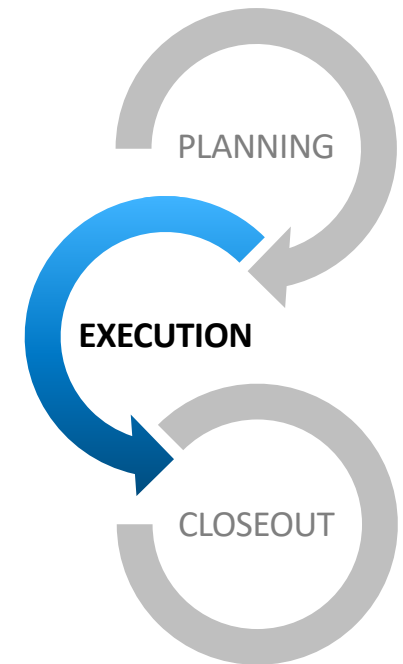
Change Management

Research = Evolving Scope

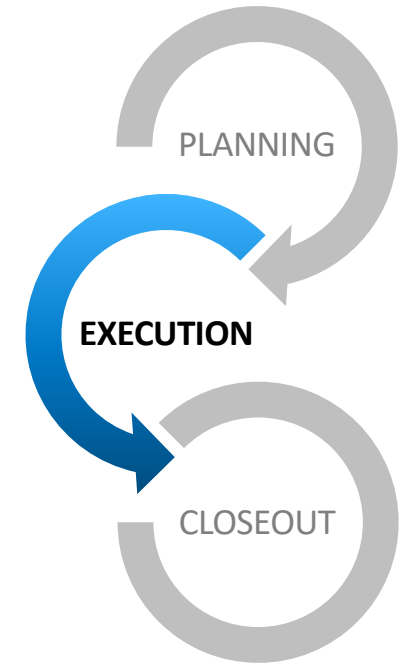
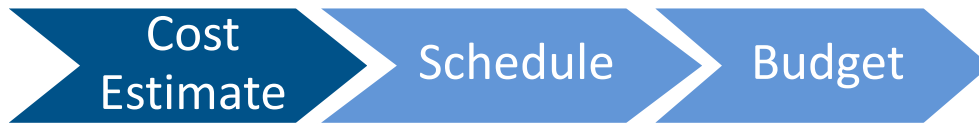


Risk Management

- Calculate impact [Cost (\$) x Probability (%)]
- Prioritize
- Ongoing identification & management
- Communicate risks!



Schedule Management



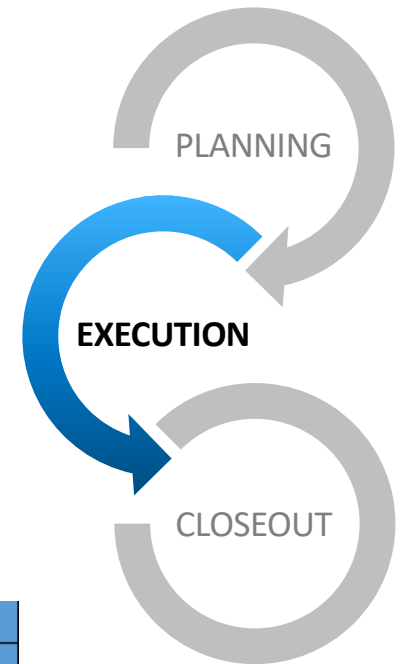
Example – Over-Budget Schedule Task

Task Name	Actual Work	Baseline Work
[-] NSCH Questionnaire Design Cognitive Testing	309.5 hrs	152 hrs
Resource 1	17.5 hrs	4 hrs
Resource 2	149.5 hrs	38 hrs
Resource 3	68.5 hrs	19 hrs
Resource 4	74 hrs	19 hrs
Resource 5	0 hrs	72 hrs
	\$40,000	\$16,000

This task is \$24,000 or 150% over budget.

Budget Reporting

- Regular/frequent
- Utilizes project data
- Informative
- Meets sponsor needs

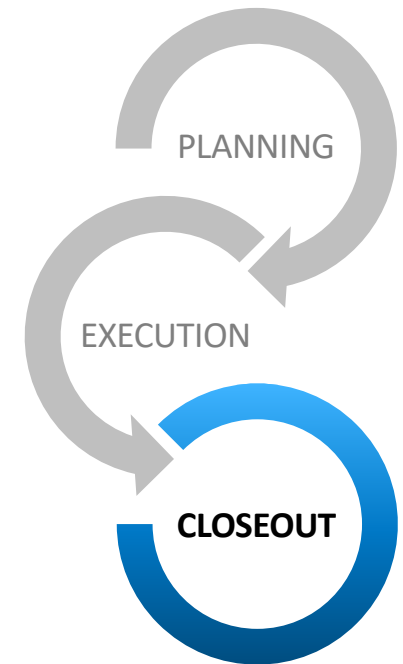


Example: Monthly Budget Report

Project	Cost of Completed Work	Cost of Remaining Work	Total Costs			Variance			
			Estimated	Original Plan	Current Plan	From Original Plan	% Diff from Original	From Current Plan	% Diff from Current
Project 1	\$ 303,022	\$ 355,980	\$ 659,002	\$ 611,093	\$ 712,811	\$ (47,909)	-8%	\$ 53,809	8%
Project 2	\$ 498,494	\$ 449,951	\$ 948,445	\$ 1,119,685	\$ 1,119,685	\$ 171,240	15%	\$ 171,240	15%
Project 3	\$ 169,776	\$ 71,146	\$ 240,922	\$ 412,389	\$ 219,272	\$ 171,467	42%	\$ (21,650)	-10%
Project 4	\$ 211,234	\$ -	\$ 211,234	\$ 171,708	\$ 224,092	\$ (39,526)	-23%	\$ 12,858	6%

Project Closeout

- Acceptance of final deliverable
- Final budget report
- Lessons Learned
- Release remaining funds





VALUE





Usefulness

- Did the customer use the final product?
- Were the recommendations implemented?
- Did project results influence decisions?
- Did the research lead to cost saving efficiencies?



Monetary Value

Track Costs using schedule data

Task Name	Actual Start	Actual Finish	Actual Work
CPS CATI Optimization Preliminary Results	Thu 8/25/16	Fri 1/6/17	96 hrs
Resource 1	Tue 12/20/16	Fri 1/6/17	16.5 hrs
Resource 2	Mon 11/21/16	Thu 1/5/17	34.5 hrs
Resource 3	Tue 9/6/16	Tue 9/6/16	1 hr
Resource 4	Wed 11/30/16	Tue 1/3/17	16 hrs
Resource 5	Wed 12/14/16	Tue 1/3/17	28 hrs
CPS CATI Optimization Report	Tue 1/3/17	Wed 3/29/17	112.5 hrs
Resource 1	Tue 1/3/17	Wed 3/29/17	72.5 hrs
Resource 2	Mon 1/9/17	Wed 3/15/17	12 hrs
Resource 3	Wed 1/4/17	Wed 3/15/17	7 hrs
Resource 4	Mon 1/9/17	Wed 3/15/17	21 hrs

No Report saves...

- 112.5 hours of effort
- Over 2.5 months of staff availability
- Approximately \$13K

Monetary Value (cont.)

Potential Money Saving Examples

- Operations Plan instead of Analysis Plan saves an avg of...
 - 64 hrs on qualitative projects
 - 87 hrs on quantitative projects
- Recommendations without a Report- saves an avg. of 95 hrs on qualitative projects

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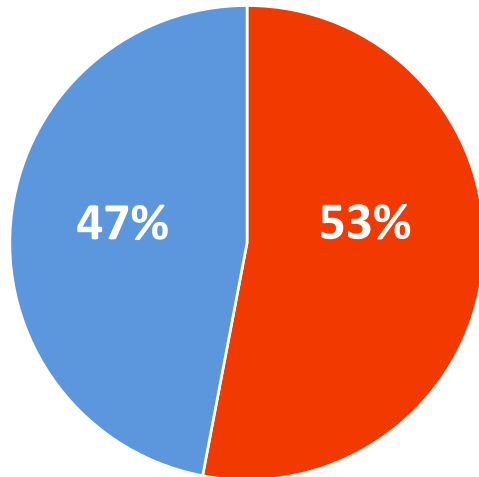


Understanding Value

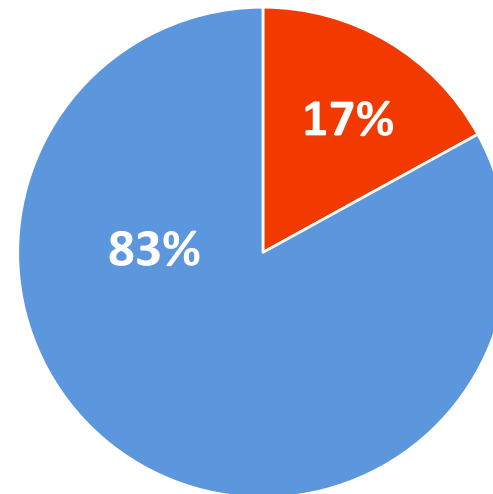
- Better decision making
- More efficient use of funding
- More effective resource utilization
- Less time wasted
- Improved project outcomes -> happier sponsors

Project Budget Improvements

2015-2017



2018-2019



■ Over Budget
■ Under Budget

Questions?

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