



Value Planning for Capital Infrastructure Projects

Six Steps to Improve Project Definition

What is Value Planning?



A systematic method to improve the "value" of projects or processes by using an examination of function. It is a primary tenet of value planning that basic functions be preserved and not be reduced as a consequence of pursuing value improvements.

What is Value Planning?

Defined Process/Focused on Best Project

- Systematic, Thorough and Focused
- Builds on Team Dynamics
 - Independent Expertise
 - Broad Stakeholder Involvement
 - Creative Process/Ideas Build
- Clarity of Project Purpose
 - Purpose and Need
 - Performance Attributes
 - Function
 - Constraints
 - Risks

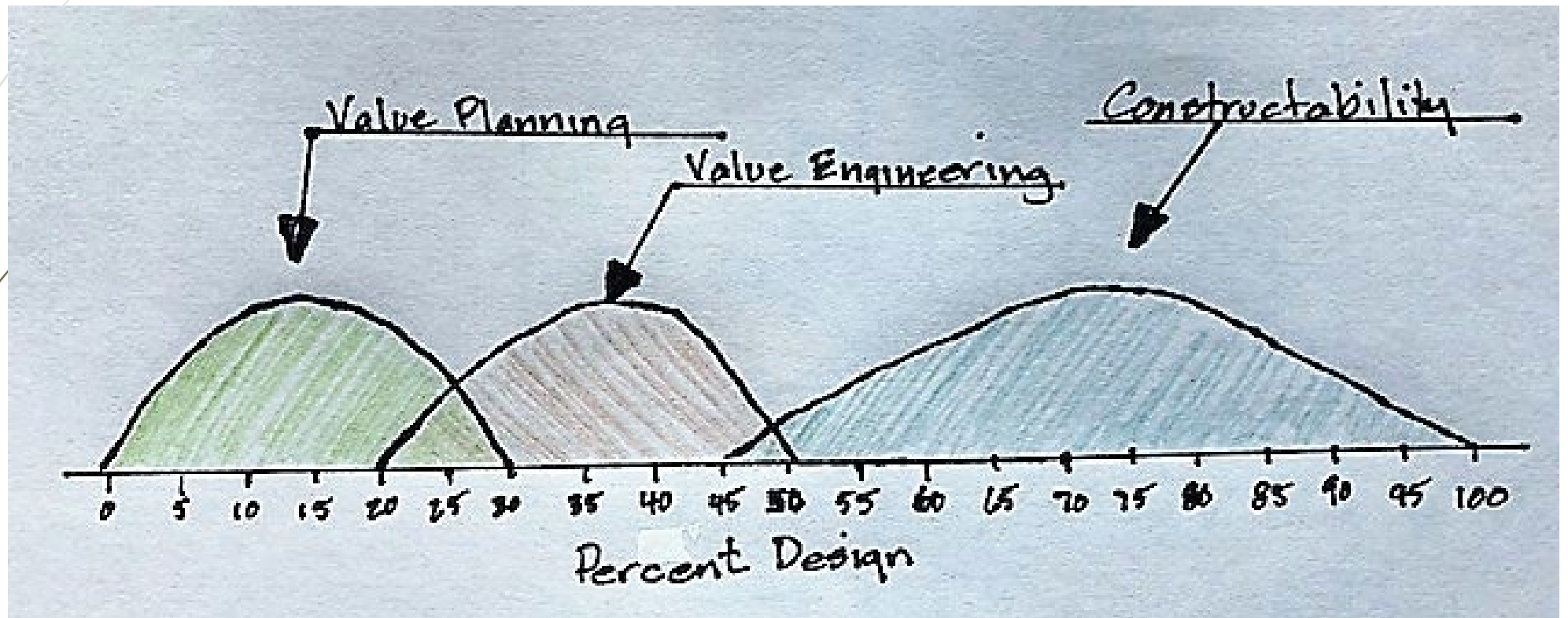
What is Value?

Framing Value

- Purpose and Need
- Goals and Objectives
- Performance Attributes
- External Requirements
- Stakeholder Desires
- Cost
- Schedule
- Constraints
- Risk Profile
- Other



When to Use Value Planning?



Why Use Value Planning?

- Increased focus on defining and meeting goals, objectives and performance attributes
- Review of early decisions that may have prematurely limited the design options being considered
- Introduction of creative ideas early increasing the potential for their adoption
- Integration of impact mitigation into the design, streamlining environmental processes
- Improvement of capital and long-term operating costs of a project
- Improved definition of essential project components as differentiated from stakeholder preferences, providing a foundation to manage scope creep



Value Planning Application?

Project



Project Program/Functional Definition



Alternative Development



Environmental Challenges



Civil/Structural/Systems Design

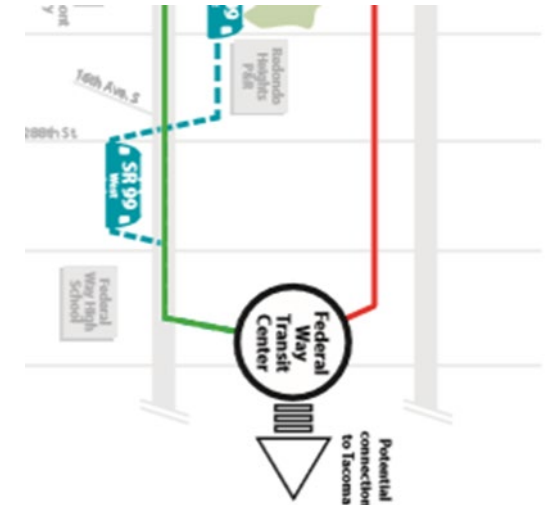


Stations, Interchanges or other Key Components



Contracting Decisions

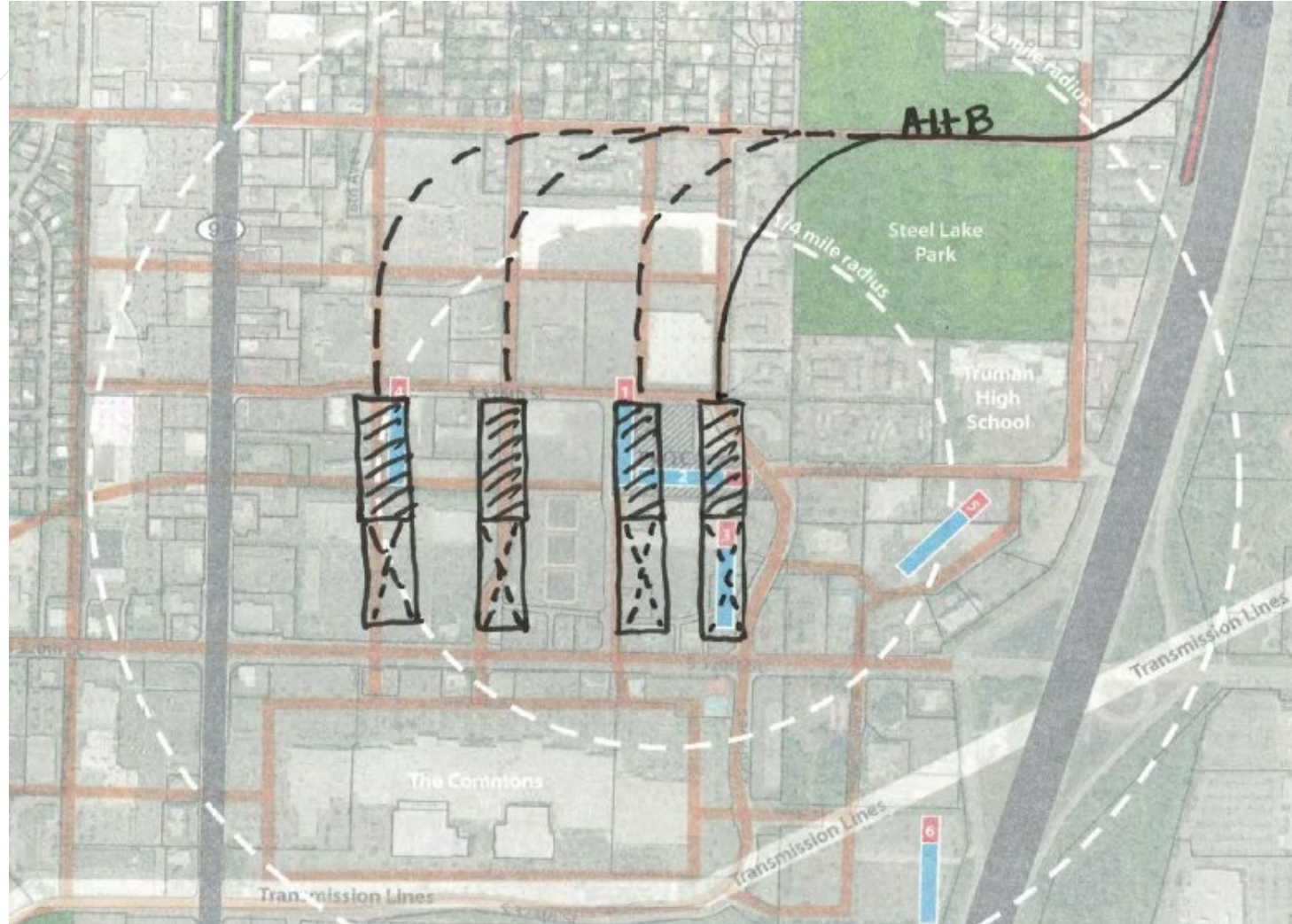
Value Planning Example



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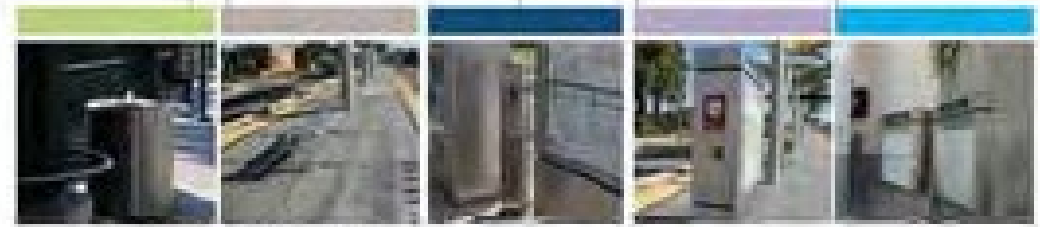
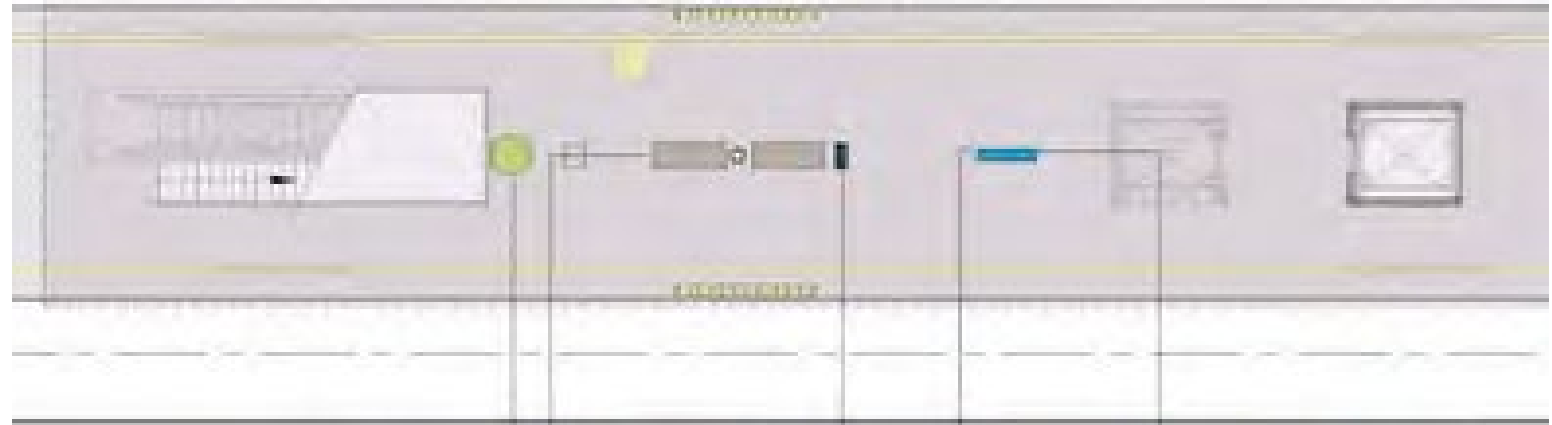
Value Planning Example



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Value Planning Example



AERIAL PLATFORM

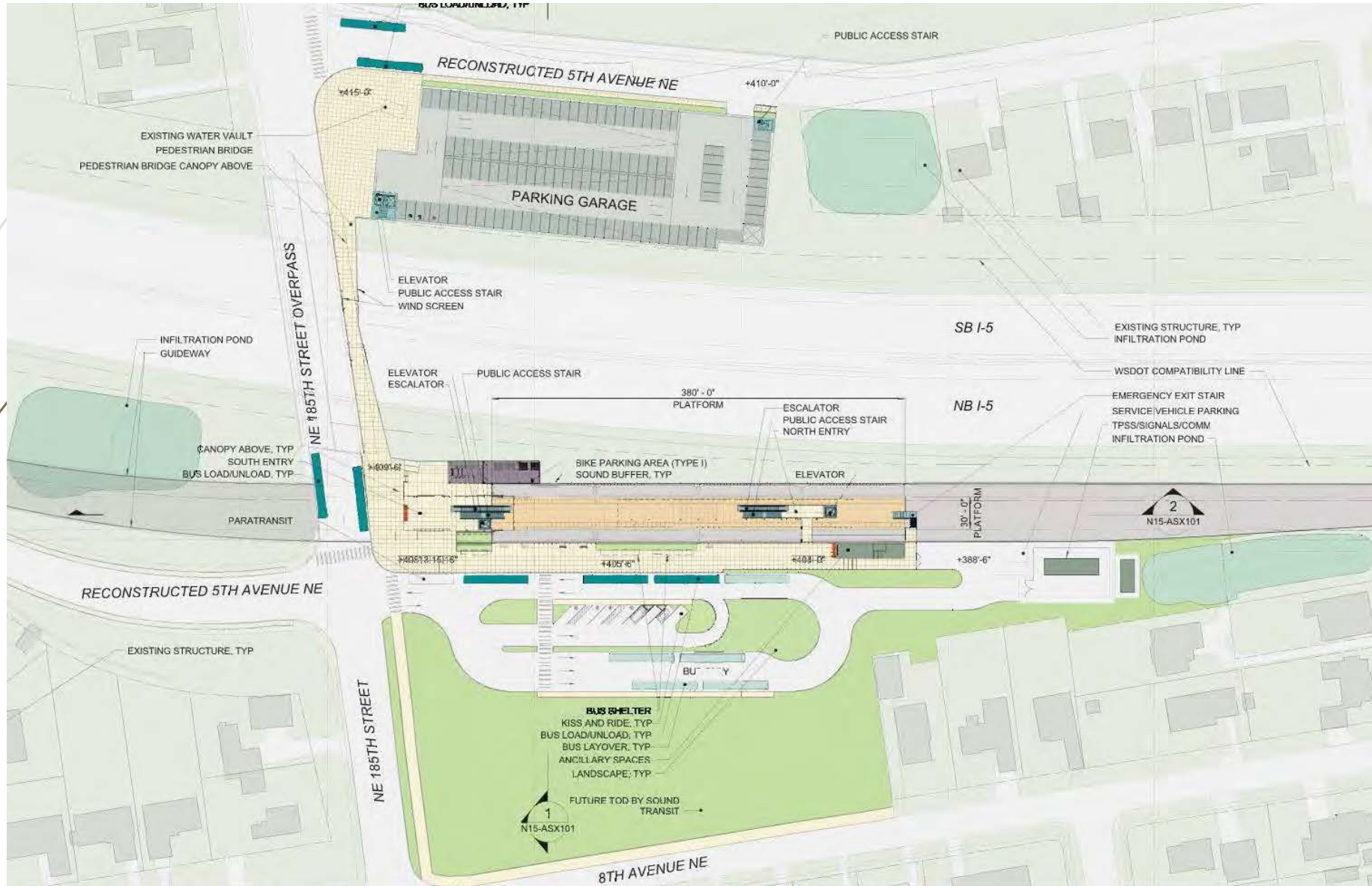


Kit-of-Parts
Stations

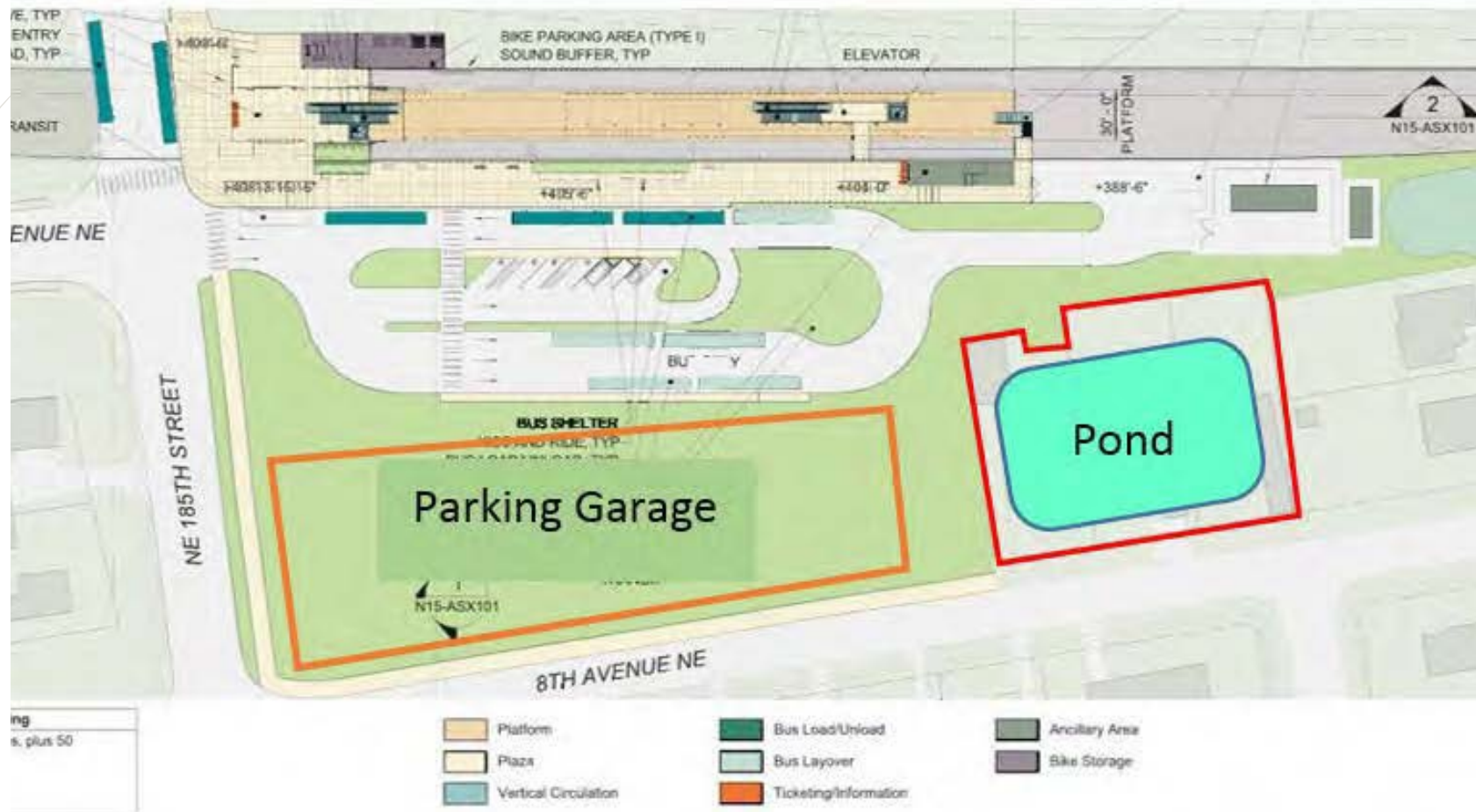
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Value Planning Example



Value Planning Example



Value Planning Example

Cast-in-Place vs Precast Construction



Value Planning Application?

Process



Purpose and Need



Project Goals and Objectives



Partnering Agreements



Financial Agreements
(Capital and Life-cycle)



Public Involvement



Community Stakeholders



Technical Stakeholders (Internal and
External)

Value Planning Example

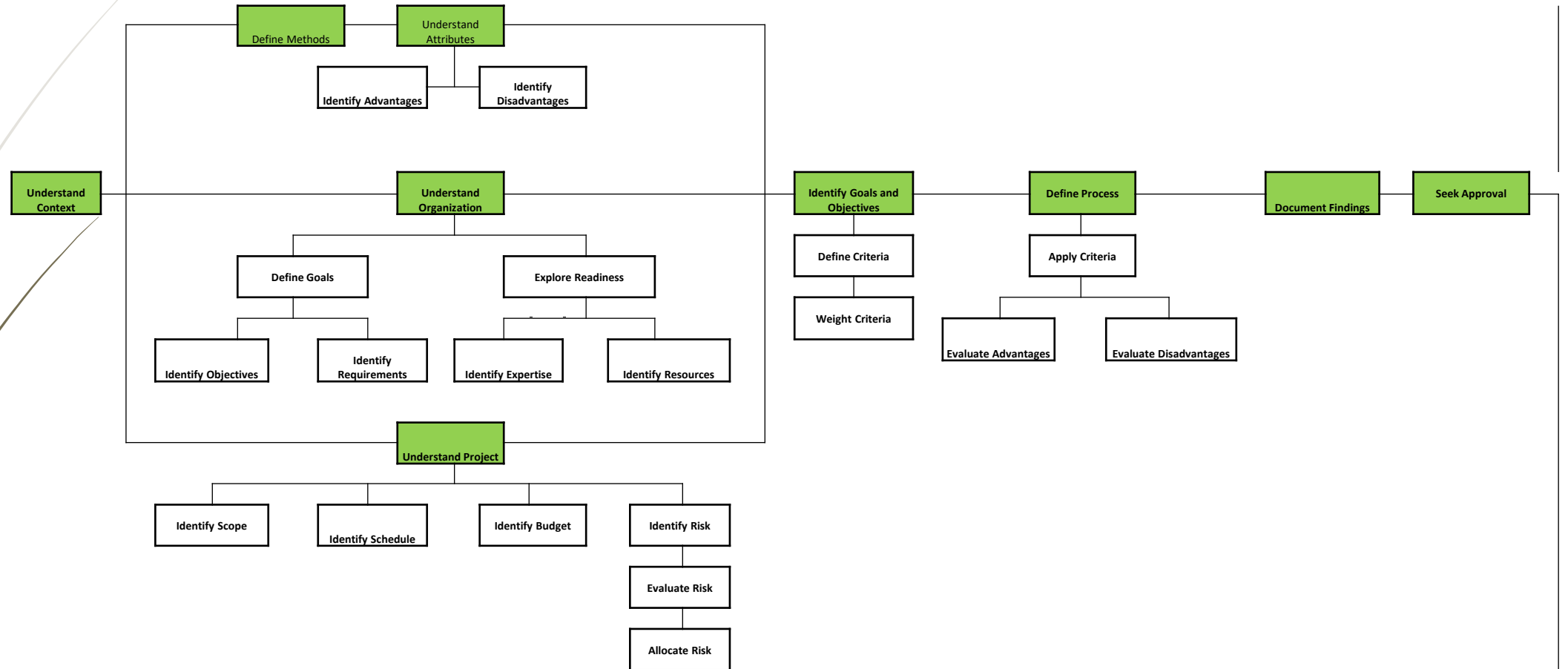
Construction RFP Review

| No. | Description/Comment |
|-----------|---|
| RA | Risk Allocation/Management |
| RA-01 | Provide for independent third-party peer review validation for geotechnical data for contractor proposals along Marymoor Park |
| RA-02 | Provide availability dates to the contractor for all properties to be acquired by Sound Transit |
| RA-03 | Allow contractors to lead negotiations for alternative street closures with the Agencies Having Jurisdiction (AHJ's) with the Sound Transit liaison present |
| RA-04 | For city agreements regarding review of plans and documents, require the city assign specific staff for those reviews |
| RA-05 | Make the city responsible to pay contractor damages if they don't provide reviews within the agreed to timelines (amount capped) (WSDOT/Seattle) |
| RA-06 | Require that the contractor coordinate submittal review by the city |
| RA-07 | Hire seconded consultant staff to cover areas where Sound Transit does not have adequate staff (i.e.; systems integration, systems start-up, vehicle testing, etc.) |
| RA-08 | Hire program management staff to backfill positions Sound Transit can't staff for design reviews |
| RA-09 | Bring in seconded program management or new in-house staff early to allow them to shadow the contractor and get fully trained and up to speed |
| RA-10 | During one-on-one discussions with contractors, ask where they have added contingent sums related to uncertainties to support clarifying addendums as needed, discussion of which party best owns the risk, and the addition of provisional sums as appropriate |
| PR | Prescriptive verses Performance verses Reference |
| PR-01 | For track profiles, provide a horizontal/vertical tolerance for changes and require an Alternative Technical Concept (ATC) submittal to go outside of that window |
| PR-02 | Provide the specification for key elements of the systems to the contractor within supplemental conditions and require them to return the specification with the specific equipment the contractor proposes to use to meet the specification. |
| CS | Cost Savings Pre and Post Selection |
| CS-01 | Use a pre-award Best and Final Offer (BAFO) process (LA Metro) |
| CS-02 | Use VE after selection per the Design Build Institute of America (DBIA) Manual of Practice (#501) |



Value Planning Example

Process Diagram



Workshop Planning

- Workshops are commonly 3 to 5 days (may be longer for extremely complex projects or when using large teams)
- Workshop planning includes identification of internal and external participants, identification of facilitator and independent experts, scheduling, contracting and related logistics
- Ideally completed 5 to 10 weeks in advance of the workshop

Who Participates

- Project Manager
- Project Team
- Design/Engineering Team
- Operations
- Maintenance
- Staff Users
- Funding Agencies
- Permitting Agencies
- Customer Users
- Technical Stakeholders
- Community Stakeholders
- Agency Stakeholders
- Owner Management
- Project Decision Makers

Think Inclusive!



Independent Expertise (SME's)

Commonly a Team of 3 to 8

- Desired/Needed Expertise
- Experienced with Project Type
- Good in a Group
- Good Listener
- Communicative
- Open Minded
- Available for Full Study
- From the Private Sector/University/Peer Agency
- Independent


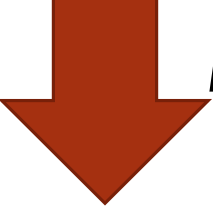
Step #1 Information Stage

- Goals
- Objectives
- Purpose and Need
- Performance Attributes
- Program
- Constraints
- Schedule
- Budget
- Constraints
- Alternatives Reviewed
- Reports, Plans, etc.
- Pictures/Site Tour

And More...

Step #2 Function

What is a Function?

Active  Measurable 

Verb - Noun

Function



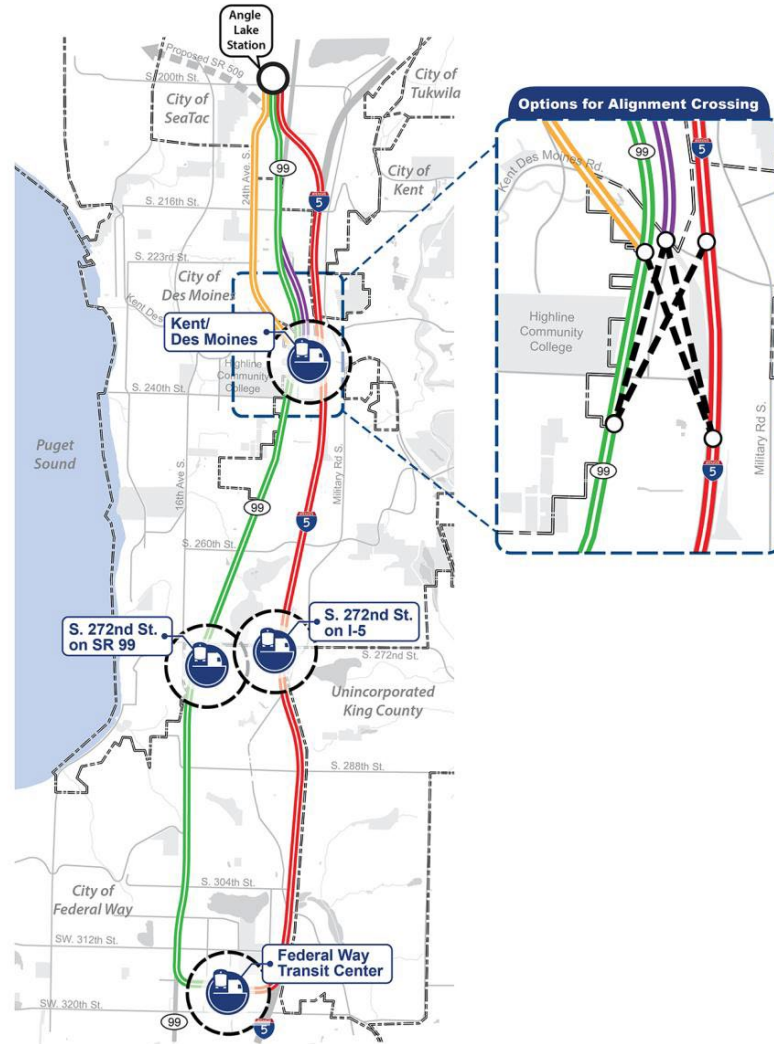
Deliver force
Remove items
Identify manufacturer
Provide grip
Connect components

Function

- Higher Order
- Basic
- Secondary
- Assumed
- All-the-time
- Requirements/Standards
- One-time



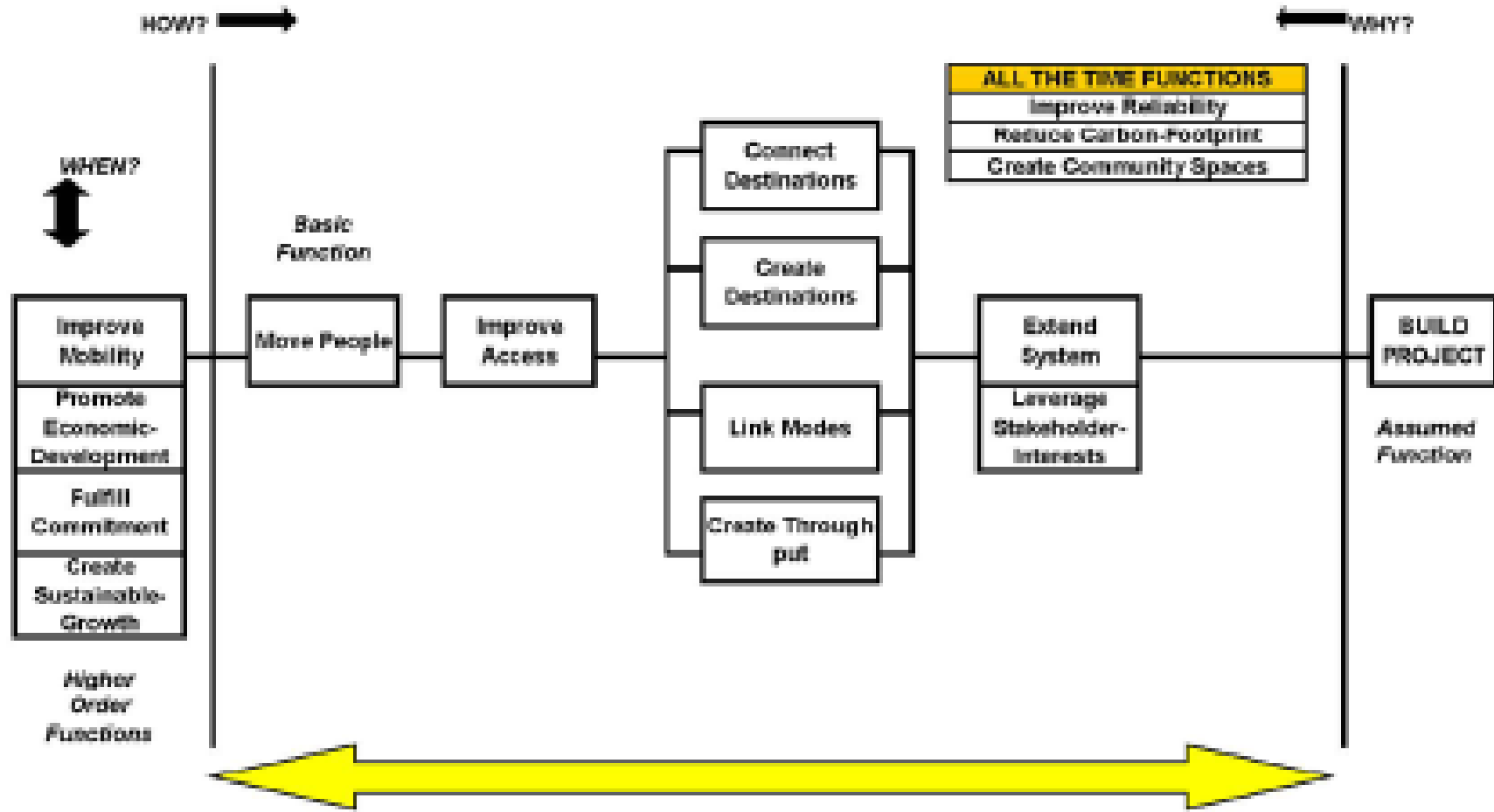
Function



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Function



Function Exercise

Rebuild Four-way Street Intersection



Step #3 Creativity

How else could that function be provided?

Guidelines for Creativity:

- All ideas are good ideas
- Don't evaluate the ideas in creativity
- Questions to clarify are okay
- Think broadly
- Build off others ideas
- A little crazy is good



Creativity

Brainstormed

- Connect Destinations
- Create Destinations
- Link Modes
- Support Trains

| | |
|-------------|--|
| I5CR | Create Destinations |
| I5CR-01 | Move Kent-Des Moines Station west to Community College |
| I5CR-02 | Use prototypical stations for the alignments |
| I5CR-03 | Create a kit-of-parts for all stations |
| I5CR-04 | Go under Kent Des Moines Road to Highline Community College |
| I5CR-05 | Interim parking developed as shared parking with adjacent uses |
| I5CR-06 | Keep Highline station east of SR99 to facilitate TOD |
| I5LM | Link Modes |
| I5LM-01 | Orient Federal Way Station north-south with pedestrian mall |
| I5LM-02 | Upgraded bike facilities at stations |
| I5LM-03 | Break up super blocks at Federal Way Station to improve pedestrian accessibility to/from the station |
| I5LM-04 | Facilitate opportunities for last mile connection shuttles, vans, etc. |
| I5LM-05 | Provide for uses under the guideway that enhance the station environment |
| I5LM-06 | Facilitate bus access at the stations |
| I5LM-07 | Facilitate trail access at the stations |
| I5LM-08 | Obtain Puget Sound Regional Council grants to facilitate station area planning early |
| I5LM-09 | Provide significant parking at stations for commuters |
| I5LM-10 | Provide no structured parking to allow land use flexibility |
| I5LM-11 | Shared parking with adjacent uses |

Creativity



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Step #4 Evaluation

What is a good idea?

Function
Resources
for
Defined Performance
Attributes

Evaluation

Techniques

- Gut Feel
- Paired Comparison
- Nominal (Dot Voting)
- Multi-Criteria Assessment
- Risk Based Decision Making

Evaluation

- 7 – Excellent opportunity for improvement
- 6 – Significant opportunity for improvement
- 5 – Good opportunity for improvement
- 4 – Minor opportunity for improvement
- 3 – Minor degradation
- 2 – Significant degradation
- 1 – Fatal flaw
- DS – Design Suggestion (workbook prepared)

| Value Relationship | | Value = $\frac{\text{Function}}{\text{Cost}}$ | | | | | |
|--------------------|-------------------|---|-----|---------|-----|---------|---------|
| Rating | | | | | | | |
| 5. | Great Opportunity | P | P+ | P++ | P++ | P++ | P++ |
| | | C-- | C-- | C | C- | C-- | C+ |
| 4. | Good Opportunity | P- | P | P+ | P+ | P+ | P++ (*) |
| | | C-- | C- | C | C- | C+ | C++ |
| 3. | Moderate Value | P-- | P- | P++ (*) | | | |
| | | C- | C- | C++ | | | |
| 2. | Poor Value | P-- | P-- | P | P | P++ (*) | |
| | | C | C-- | C+ | C++ | C++ | |

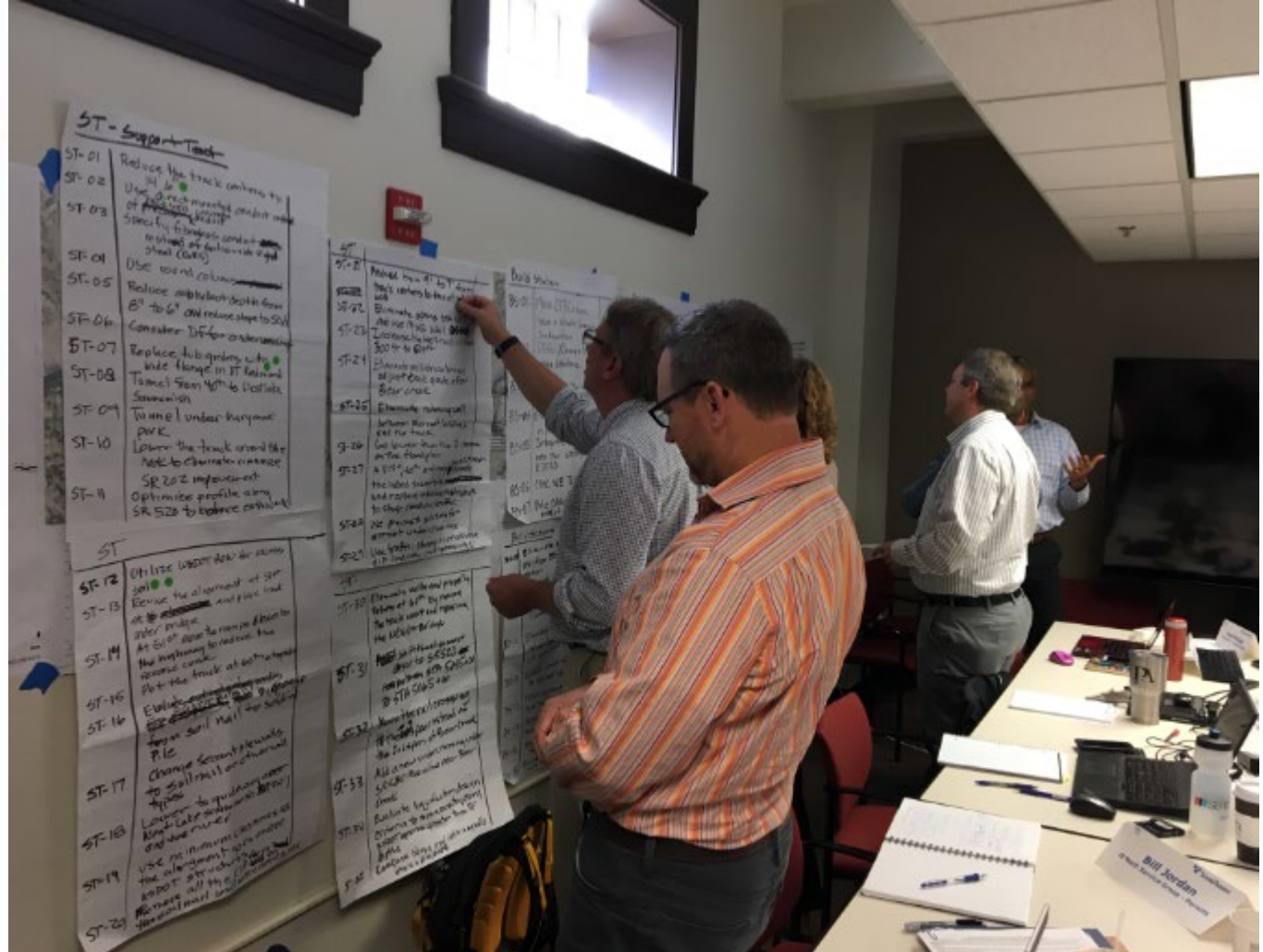
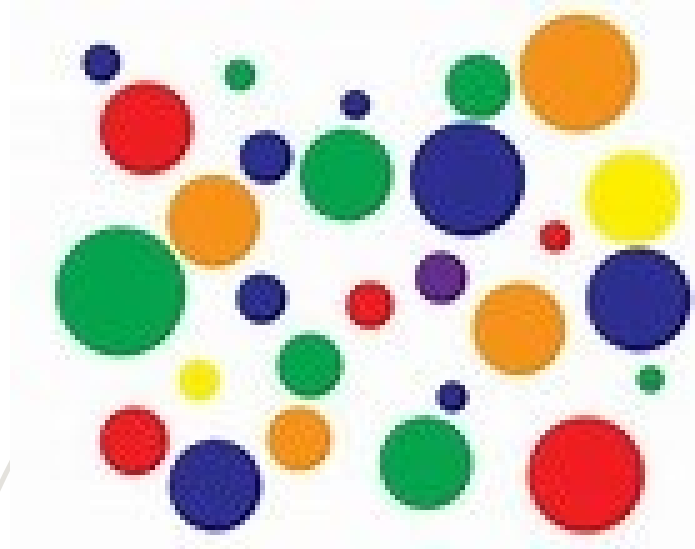
*Is the Function/ Performance improved to the point that it overcomes the high cost?



Evaluation

| | | | | | | Total | Raised total | % | |
|--------------------------|---|---|---|-----|---|-------|--------------|-----|-------|
| Ease of Construction: | A | b | c | d | a | f | 1 | 2 | 9.5 |
| Ease of Maint. | B | b | d | b | f | | 3 | 4 | 19 |
| Meet Construction Sched: | c | d | c | c/f | | | 2.5 | 3.5 | 17 |
| Enhance safety: | o | d | f | | | | 4 | 5 | 24 |
| Provides Innovation | E | f | | | | | 0 | 1 | 5 |
| Permit Compliance: | F | | | | | | 4.5 | 5.5 | 26 |
| | | | | | | | 15 | 21 | 100.5 |

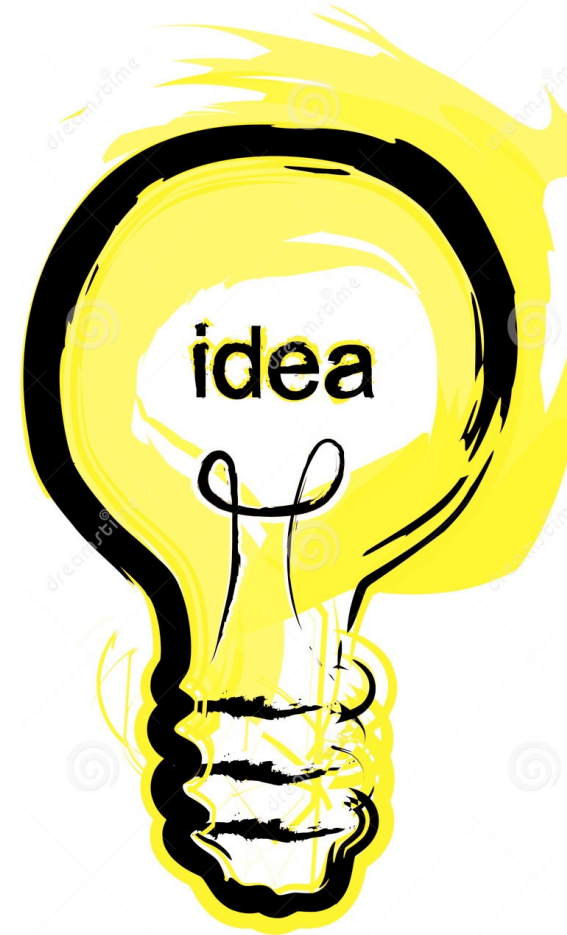
Evaluation



Step #5 Development

Techniques

- Write-ups
- Sketches/Pictures
- Processes
- Schedules
- Decision Trees



VALUE PLANNING PROPOSAL CM-39

Sound Transit
Lynnwood Link Extension Project
Seattle, WA

| | | | |
|---|---------------|---|-----------------------|
| TITLE: Move parking garage at 185th to east side within future TOD area | | | |
| FUNCTION: Connect Modes | | | |
| BASELINE ASSUMPTION: The parking garage structure for the 185th Station is located on the west side of I-5. The station is located on the east side of I-5. A pedestrian bridge will be constructed across I-5 to provide access from the garage to the station. | | | |
| PROPOSED ALTERNATIVE: The proposed alternative would relocate the parking garage structure to the east side of I-5, adjacent to the 185th Station. This would eliminate widening the existing NE 185th Street bridge structure over I-5 and reconstructing 5th Avenue NE. The garage would be more integrated with the station site. | | | |
| BENEFITS | | RISKS/CHALLENGES | |
| <ul style="list-style-type: none"> The existing NE 185th Street bridge over I-5 would not need to be widened The parking garage would be located at the station site, which is a benefit to the users Right-of-way would not be required from the school district on the west side of I-5, including the stormwater facility footprint Stormwater treatment facilities for the station and garage could potentially be consolidated Simplifies construction by eliminating construction over I-5 traffic lanes and consolidating the work area into one site Eliminates reconstruction of 5th Avenue NE on the west side of I-5 Reduces shoring and excavation for the garage structure as the site is more level on the east side Eliminates utility relocation on 5th Avenue NE Eliminates the retaining wall on the west side | | <ul style="list-style-type: none"> The garage would conflict with the future TOD area Requires additional right-of-way on the east side to accommodate a stormwater facility for the garage | |
| COST SUMMARY | | | |
| | Initial Costs | O&M Costs | Total Life Cycle Cost |
| BASELINE ASSUMPTION: | \$ 23,575,000 | \$ - | \$ 23,575,000 |
| PROPOSED ALTERNATIVE: | \$ 15,285,000 | \$ - | \$ 15,285,000 |
| TOTAL (Baseline less Proposed) | \$ 8,290,000 | \$ - | \$ 8,290,000 |
| | | | SAVINGS |

Workbooks

VALUE PLANNING PROPOSAL CM-39

Sound Transit
Lynnwood Link Extension Project
Seattle, WA

| TITLE: Move parking garage at 185th to east side within future TOD area | | | | | | | | |
|--|--------|---------------------|-------|--------------|----------------------|-------------------------------------|-----------|------------------|
| DESIGN ELEMENT | Markup | BASELINE ASSUMPTION | | | PROPOSED ALTERNATIVE | | | |
| Description | % | Unit | Qty | Unit Cost \$ | Unit Cost \$ | TOTAL \$ | | |
| Widening Existing Concrete Bridge (Including Removal) | 20% | SF | 7470 | 300.00 | | 2,689,200 | | |
| Roadway Reconstruction Allow - 2 Travel Lanes, Asphalt, 5th Avenue NE | 20% | LF | 750 | 822.00 | | 739,800 | | |
| Roadway Reconstruction Allow - Curb & Sidewalk, 5th Avenue NE | 20% | LF | 750 | 316.00 | | 284,400 | | |
| Retained Cut Wall | 20% | SF | 12700 | 75.00 | | 1,143,000 | | |
| Structural Excavation | 20% | CY | 18330 | 27.22 | 598,731 | 5431 | 37.22 | 177,402 |
| Shoring (Steel Sheet Pile) | 20% | SF | 11254 | 52.39 | | 707,516 | | |
| Parking Garage | 20% | SP | 500 | 24,053.54 | 14,432.126 | 500 | 24,053.54 | 14,432,126 |
| Right-of-Way | 20% | SF | 96902 | 27.00 | 2,670,354 | 25011 | 27.00 | 675,297 |
| Relocate Water Line | 20% | LF | 630 | 125.00 | | 94,500 | | |
| Relocate Water Supply Station | 20% | EA | 1 | 10,000.00 | | 12,000 | | |
| Relocate Gas Line | 20% | LF | 540 | 150.00 | | 81,000 | | |
| Relocate Sanitary Sewer | 20% | LF | 320 | 150.00 | | 57,600 | | |
| Relocate Transmission Line | 20% | LF | 540 | 100.00 | | 64,500 | | |
| | | | | | | 23,575,000 | | 15,285,000 |
| | | | | | | 23,575,000 | | 15,285,000 |
| | | | | | | CWE (BASELINE LESS PROPOSED) | | 8,290,000 |
| | | | | | | | | SAVINGS |

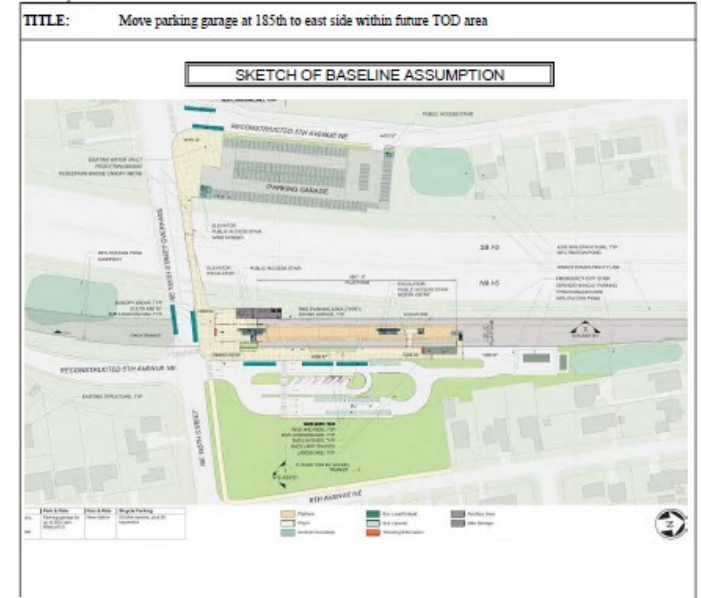
VALUE PLANNING PROPOSAL CM-39

Sound Transit
Lynnwood Link Extension Project
Seattle, WA

| | |
|---|--|
| TITLE: Move parking garage at 185th to east side within future TOD area | |
| DISCUSSION/JUSTIFICATION: Moving the parking garage to the east side of I-5 eliminates the need to widen the existing NE 185th Street bridge for pedestrian access and eliminates having a work area over I-5 traffic. The proposal eliminates the reconstruction of 5th Avenue NE on the west side of I-5, including the retaining wall and utility relocation. The station site (east side of I-5) is relatively level and would require less grading and shoring to construct the garage. The baseline garage site on the west side of I-5 is built into a steep hillside. Consolidating the work into a single site will improve construction efficiency. It is highly desirable and advantageous to have the station parking garage in close proximity to the station to encourage ridership. Long travel distances may discourage use, particularly from disadvantaged users. Additionally, there may be increased traffic congestion from kiss-and-ride drop offs if the garage remains on the west side. These features likely reduce the cost of construction and improve the functionality of the station overall. The garage is located on the future TOD site therefore limiting future TOD. | |
| IMPLEMENTATION CONSIDERATIONS: Additional right-of-way would be required on the east side for the garage stormwater facility. | |

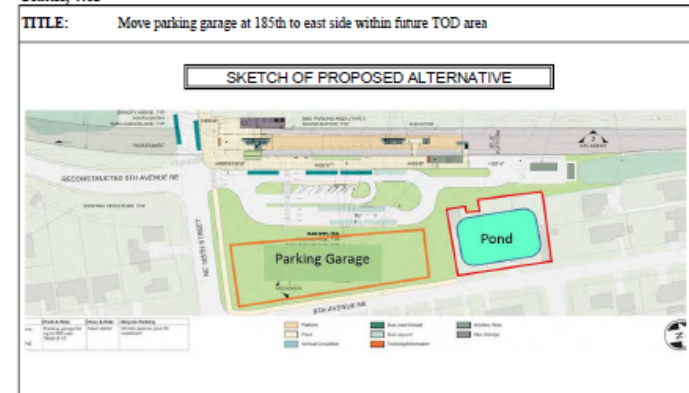
VALUE PLANNING PROPOSAL CM-39

Sound Transit
Lynnwood Link Extension Project
Seattle, WA



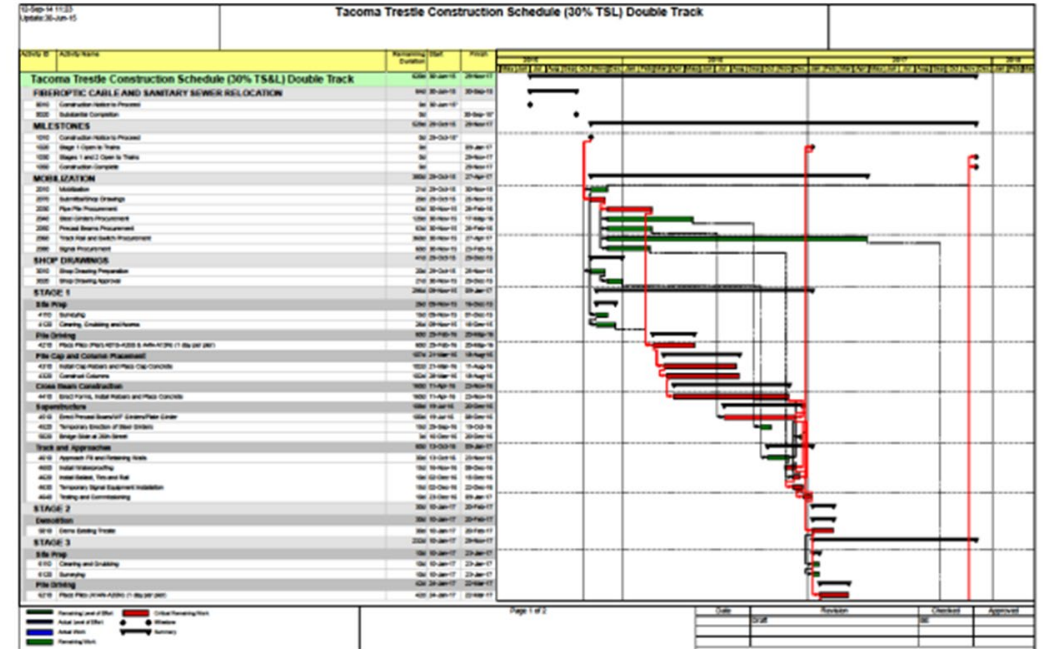
VALUE PLANNING PROPOSAL CM-39

Sound Transit
Lynnwood Link Extension Project
Seattle, WA



Other Tools

| Probability of Occurrence | | Highly Likely | Likely | Possible | Unlikely | Very unlikely | MATRIX KEY | | | |
|---------------------------|--|---------------------------|-------------------------|------------------------------|-----------------|---------------|-----------------|--------------------------|---|--|
| Severity of Impact | | Catastrophic | Substantial | Moderate | Marginal | Negligible | | | | |
| Risk Rating | | Extremely High | High | Moderate | Low | | | | | |
| | | Red (25 - 100) | Orange (15 - 49) | Yellow (3 - 14) | Green (0 - 2.5) | | | | | |
| Identify the Risk | Assign the Risk | Classify the Risk | | Quantify | Quantify | Risk Response | | | | |
| Risk ID | Description of Risk | Who does the risk affect? | Probability of Impact % | Severity of Impact (numeric) | Risk Rating | \$5 Impact | Schedule Impact | Avoid? Mitigate? Accept? | Plan of action and risk champion/wr ner. | |
| | Understand utility conditions affecting cost and/or schedule. | Owner, contractor | 70% | 50 | 100.0 | | | | Build a Civil Information Model, driving to identify all utilities. Have private utilities perform their work early. | |
| | There is a 70-year old power ductbank not currently identified in the plans. | Owner, contractor | 100% | 50 | 250.0 | | | | Investigate location, resolve conflicts during design. | |
| | Adjacent Trestle contracts are assuming shared staging areas, risk and opportunity. | Owner, both contractors | 35% | 20 | 20.0 | | | | Sound Transit project teams to manage and communicate regarding schedule. | |
| | Hazardous soils at OMF site. | Owner | 70% | 50 | 100.0 | | | | Pile-driven foundation. Add bid item for hazardous materials. | |
| | Hazardous soils throughout the corridor, particularly deep excavations for utilities and OCS foundations. (Aurora - near Ruston Way) | Owner | 35% | 20 | 20.0 | | | | Add bid item for hazardous materials. Sampling to identify existing contaminated areas. | |
| | Condition of tunnels in MLK - structural, waterproofing. | Owner | 50% | 20 | 20.0 | | | | Consider block rail with steel plate to span. Hospital as-built information needed. Structural engineer to assess existing conditions. | |
| | Impacts of OCS foundations on vaulted subways. | Owner | 100% | 20 | 100.0 | | | | Investigate existing vault spaces during design. Structural engineer to evaluate. | |
| | Impacts to historic structures and sensitive facilities. | Owner, contractor | 100% | 5 | 25.0 | | | | Identify during design. Monitor during construction. Pre-construction documentation of conditions. | |
| | Third party utility coordination with PSE. | Owner | 40% | 50 | 50.0 | | | | Obtain updated as-builts. Early coordination with PSE. | |
| | Coordination and availability of water department crews for final connections and service transfers. | Owner | 40% | 50 | 50.0 | | | | Pre-planning and coordination for dedicated crews. | |
| | Work in vicinity of Stadium High School - safety, schedule | Owner, contractor | 100% | 20 | 100.0 | | | | Schedule work during summer in full closure. Consider detours, weekend closures, one-way traffic. | |
| | Slope grades affect operations of structure. | Owner | | | 0.0 | | | | Design considerations to isolate structure operations from traffic, and to reduce grades in vicinity from Division to Tacoma. Or eliminate left turn at Broadway. | |



Step #6 Presentation



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Presentation

Techniques

- Project Walk Through
- Maps/Wall Graphics/Pictures
- Modified Plans/Profiles/Sketches
- Modified Schedules
- Project Segments/Topic Areas
- Advantage Summaries



Questions



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Additional Information

Ann Jamison, AICP, CVS

- Value Planning
- Value Engineering
- Risk Assessment
- Constructability Review
- Partnering

206 930 8324

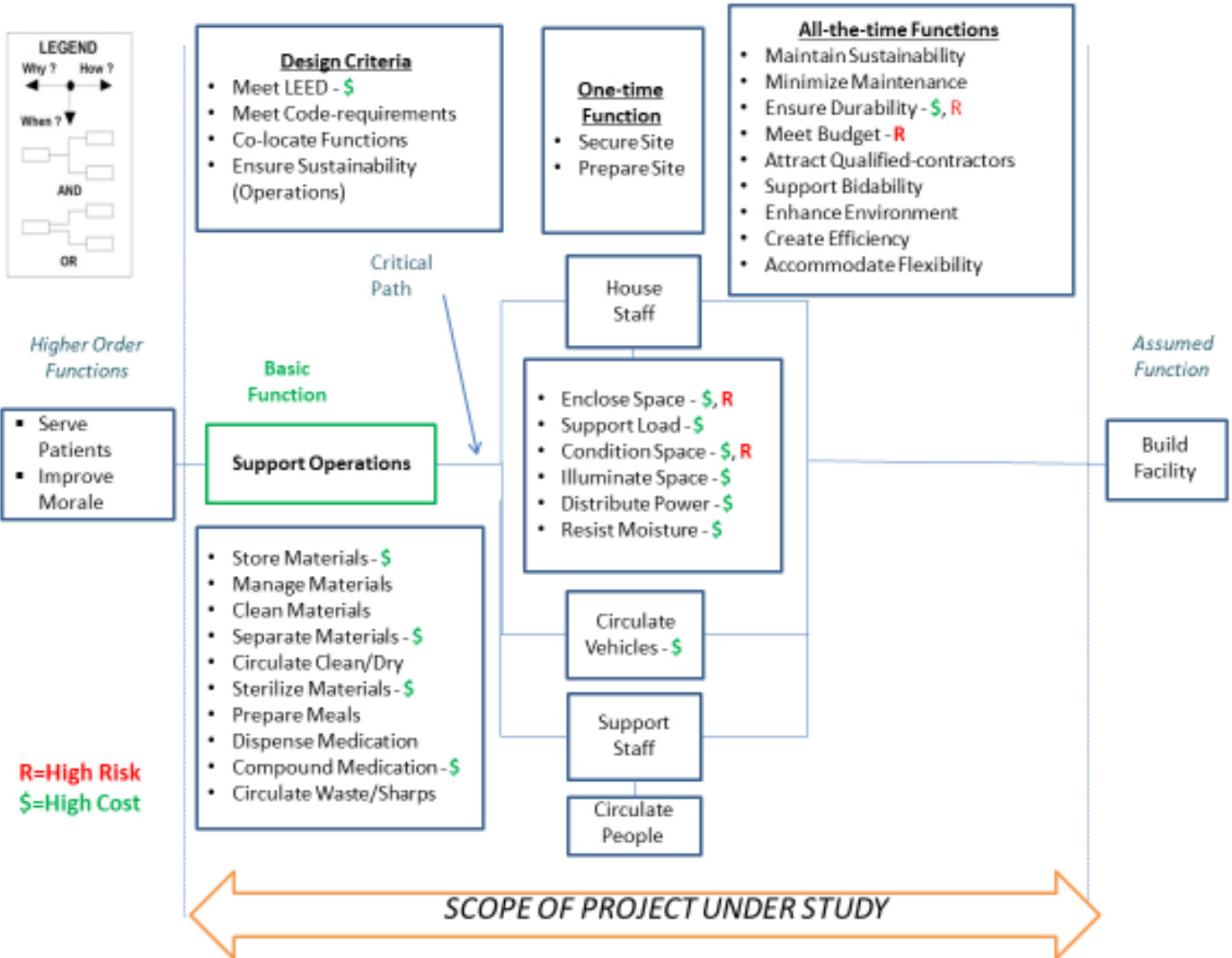
RHA, LLC

Bend, Oregon

Glendale, Arizona



Function



Function



- Project Requirements**
- Mitigate Vibration
 - Mitigate Noise **R**
 - Optimize TOD
 - Accommodate All Abilities
 - Meet Requirements
 - Model Sustainability

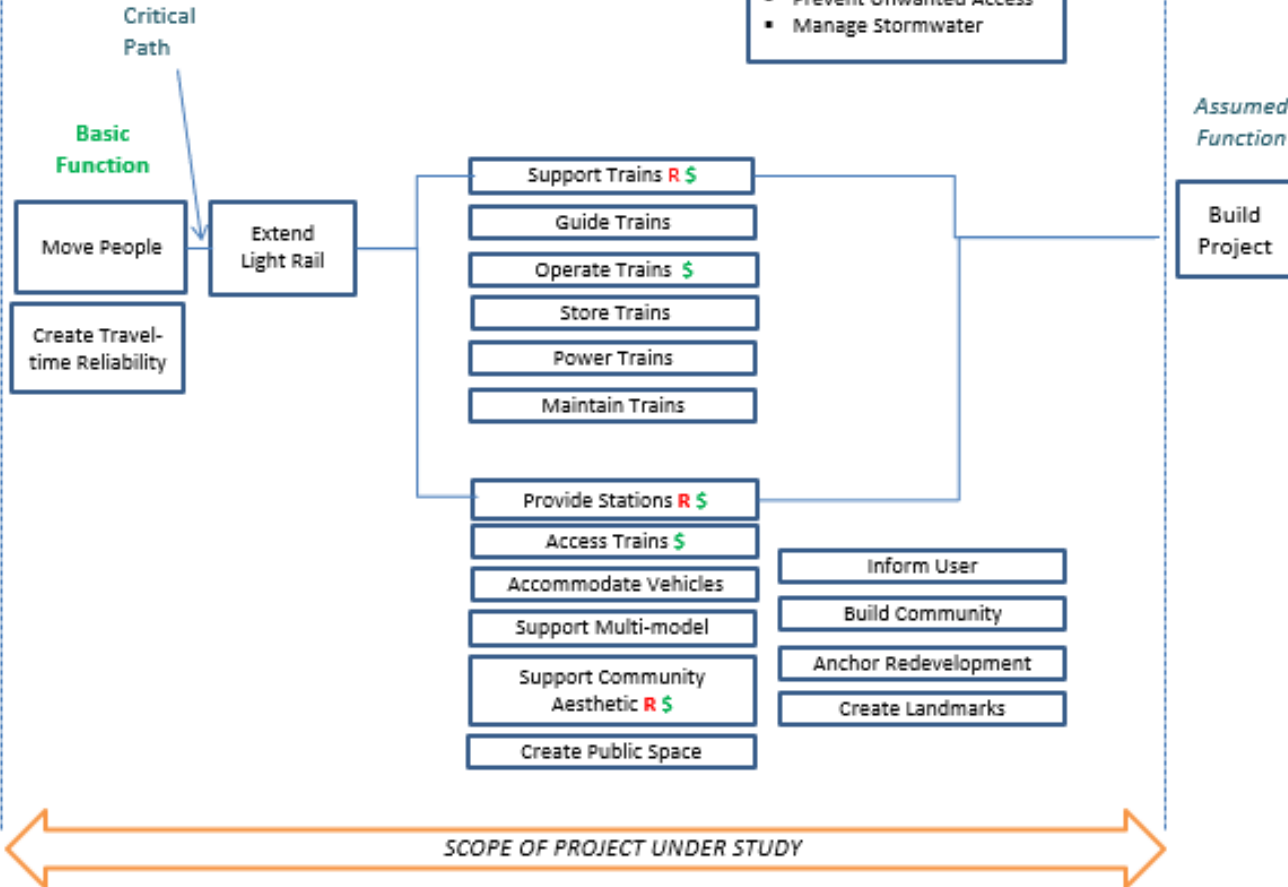
- One-time Functions**
- Acquire Right-of-way **R \$**
 - Enhance Bidability
 - Minimize Disruption

- All-the-time Functions**
- Sustain Headways
 - Accommodate Event Crowds
 - Protect Environment **R**
 - Maintain Reliability
 - Assure Convenience
 - Assure Rider Comfort
 - Prevent Unwanted Access
 - Manage Stormwater

Higher Order Functions

- Enhance Mobility
- Connect Communities
- Create Jobs
- Enhance Connectivity
- Reduce SOVs
- Build Spine
- Spur Economic Development

R=High Risk
\$=High Cost



C

