Sustainability at the Conceptual Design Phase

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1

Sustainability and Conceptual Design

- Where to begin?
  - Baseline assumptions
  - Conceptual Design challenges
  - Adding tools to the toolbox.
    - Common, less common and some of the newer tools
  - Applying what we know to the design/bid/build process.
    - Pitfalls and tips.

2

Goals for Today's Session

- High level understanding of technologies and approaches available at the early stages of project development.
- What to look for when using these technologies on your project.
- Matching the needs of the client with the available options.
- Alerting ourselves to emerging sustainable practices.

3

Baseline assumptions and expectations

- Sustainability needs client involvement
  - Understand the client's goals, needs and priorities.
- Sustainable solutions vary. Get your client deeply involved and invested.
- Be a consultant.
- DO NOT WAIT – Act early.

4

Baseline assumptions and expectations

- Discussion assumes Design/Bid/Build delivery
- Your project may vary.

5

Conceptual Design

- Defining the Scope
- Small amount of data
- Budget, Budget, Budget
- Be 'Responsibly Conservative' in your designs

6

Filling my toolbox – frequently used tools

- High Efficiency Fixtures
- Stormwater Capture for irrigation

7

High Efficiency Fixtures

- Need to balance between saving water and maintaining a working system
- Drain line carry – need to maintain 2 FPS through the entire system

8

Stormwater Capture for Irrigation

- In most climates, water is available, just look up!
- Coordinate and match the available water with the use.
- Utilize widely available rainfall data to determine available water.
- Encourage the team's landscape consultant to use native plantings.
- Size storage based upon usage and the client's tolerances.
- Use drip irrigation for captured stormwater irrigation systems.

9

Stormwater Capture for Irrigation

- Size storage based upon usage and the client's tolerances to drought.
- Use drip irrigation.

10

Filling the toolbox – more tools

- Water capture/reclaim for other uses
- Solar Thermal Water Heating

11

Water capture/reclaim for other uses

- Stormwater, Condensate, Graywater
  - Consider the use case
  - Stay cost conscious. Balance the water gain with the costs.
  - Keep systems as centralized as possible.
  - Filtration and treatment will be needed

12

Solar Thermal Water Heating

- Most common collector types:
  - Flat plate
  - Vacuum tube
- Be careful how you select collection fields!
  - Don't accidentally shade.

13

Solar Thermal Water Heating

- The quandary of the roof in sustainable conceptual design:
  - Multiple uses for sustainability
  - Only so much roof space to go around.

14

Solar Thermal Water Heating

- Right-sizing your solar thermal system
  - Only so much heat can be captured.
  - But, my client wants it all!
  - When at a loss for guidance, start looking at 30% of the total load.
    - Iterative process, recommend using software to calculate for the entirety of the year.
  - Be wary of attempting to meet 100 percent of the load.

15

Filling the toolbox – shiny newer concepts

- Water to carbon calculator
- Building Electrification
- Heat pumps for domestic hot water

16

Heat Pumps for Domestic Hot Water

- Long used on the hydronic side
- Newer to being used for domestic hot water
- Make a 'heat map' and decide where these systems work.
- Don't let 'edge cases' rule the day.
- Stay Up to Date – Manufacturer's offerings and their capabilities are changing frequently.

17

Building Electrification

- No natural gas means larger electrical loads.
- Coordinate

18

Water Impact to Carbon Footprint

- Relatively new concept.
- Addresses the carbon costs of water transport to/from the building.
- Costs vary widely, but are generally more expensive in the southwest due to longer transport distances.
- Look at options other than cooling towers in arid locations.
- Cost can be calculated, but data is hard to come by.

19

In Conclusion

20

Questions?

21