Design Tips

From a Construction Engineer’s Perspective
2nd Level Design Review
CFR 170.461-170.462

Important for: OSG, Program Agreement, PL-638 and Federal Highways Tribes

- Reduces modifications in construction
- Can Identify a quantity “bust”
- Missing or deficient design elements
- Streamline lead agency review

Getting BIA to do it? Health and Safety
Worth the cost to get a second level review of PS&E-
Can be done at 35, 65, 95%. Tribes can contractually
provide the minimum review provided for in the CFR
but regardless of the regulations a 2\textsuperscript{nd} level review is
good practice.

\textbf{Efficiency In Construction= Cost Savings}

- Enhance your project
- Put towards a future project

Note: Consider hiring construction manager at around 65% to begin looking at
constructability, logistics, schedule. Could double as second level review.
Communicate With The Designer

Try and get a comprehensive understanding of the scope and purpose of the project

Ask questions such as:

What design criteria is being used and why?
What drainage systems are being used and why?
How extensive of a subsurface investigation is needed?
Communicate With The Designer

To avoid questions during construction such as:

Is the road being underbuilt or overbuilt? Is it safe?
Do we really need *that there*?
Communicate With The Designer

You want to know:

- Is the drainage system and permanent erosion control adequate to prevent severe damage or maintenance issues?
- How extensive of a subsurface investigation is needed? The higher the level of uncertainty of the subsurface the greater the contingency required. Cost/Benefit.
Communicate With The Designer

Beneficial if at least one person at the Tribal level can read the plans and communicate the design to others.

Ask your design consultant if you don’t understand.
Local Knowledge

In this age of information technology and mapping local knowledge is still often the best source of information in Alaska. Designers are required to meet minimum standards but can gain from communicating with locals regarding design elements such as: drainage, soils, material sites and utilities (always call before you dig).

Note: Utilities conflicts can be a real drag on construction budget.
Keep Your Tribal Council And Staff Up To Date On The Design Project

Likely point of contact for the Tribe is the Transportation Planner or Program Staff
The Challenge:
Design can take years

- Council and staff changes
- Funding changes
- Environmental issues
- Landscape changes
- Other projects in the region that might effect the project
Be Wary Of:

“Shifting Priorities”

If shifting priorities or making significant changes to the design, particularly alignment-do so early in the design process. Too far along and changes in ROW and subsequent agency approvals = extensive delays and more $
The Question You Don’t Want To Hear:

Why is the road being built *here* and not *there*?

Good communication throughout the design process can prevent these types of questions, improve efficiency and improve communication with the lead agency.
Understand The Major Costs Of The Design Engineers Estimate - At A Minimum

Mobilization
Fill Materials
Materials and Material Sites

• Material sites identified in the design phase can often change at the construction phase
• Perhaps depleted, not accessible or not usable
- Can effect the engineers estimate-
  Do you need to reduce the scope?
  Can you broaden the scope?
Material Sites

- Closer is better - Shorter haul times equate to saved $
- Longer haul times equate to additional $

If you are lucky enough to have the luxury of a selection of pits you want to look at quality vs. location in conjunction with the ease (or not) of extraction.
Estimating Fill Quantities

Subsidence plus compaction can be 50% or more than (loose) truck load quantities.

- How is your designer computing fill quantities?
- Can design techniques be used to counter subsidence-geotextiles, thaw prevention?
Basic Cost Estimating
Fill Material

Haul Time

Cost Per Yard + (Labor Hours + Equipment + Fuel)
-Take Away-

Good communication with the designer, Tribal staff, the community and the lead agency results in an overall project cost savings -the savings can be substantial during the construction phase-