Ted’s Top Ten

10. Never place temp E&SCs in jurisdictional streams or wetlands, unless..
9. Consider turbidity curtains where water impoundments occur downstream
8. Detail management of OTHER construction site pollutants
7. Avoid long runs of silt fence w/out designed breaks/outlets w/sed traps
6. Insist on adequate LOD for staging/stockpiling areas & sediment storage
5. All basins/traps require coir fiber baffles
4. Detail anchor trenching on erosion control matting
3. Specify biodegradable rolled or hydraulic EC product in ESAs
2. Utilize PAMs to provide additional treatment for turbidity reduction
1. Plan to address Inadvertent Returns from Horizontal Directional Drilling
Objectives

• Build Margin into the E&SC Plan Design
• Emphasis on protection at Environmentally Sensitive Areas (ESAs)
Environmentally Sensitive Areas (ESAs)

- Wetlands, surface waters, and surrounding riparian areas requiring special protection during construction

- Designate the ESA with a 50’ “MARGIN” on each side of resource
Terminology

• Construction stormwater management
  – Implementation of temp & perm erosion & sediment control BMPs during the construction phase of a project

• Erosion Controls
  – BMPs that minimize the detachment phase of erosion

• Sediment Controls
  – BMPs that minimize the transport and deposition phase of erosion

• Erosion Control Plan (EC Plan) or…. Erosion and Sediment Control Plan (E&SC Plan)
Pipeline Cross Section

- 50-100’+ ROW swath
- Managing
  - Trench
  - Trench spoils
  - Stockpiles
  - Pipe prep area
  - Excavator/side boom area
  - Access road
- Multiple phases of ongoing work

Figure courtesy of Catchments & Creeks Pty Ltd. July 2017
Common E&SC Plan Implementation Issues

- Operating outside Limits of Disturbance (LOD)
- Perimeter BMP failures at ESAs (wetlands and streams)
- Insufficient BMPs to contain or control sediment on pipeline jobs
ESA Non-structural BMPs for the E&SC Plan Narrative

- Clearing and Grubbing
  - Only clearing, not grubbing, until immediately prior to any grading
  - Implement BMPs after clearing or concurrent with grubbing
ESA Non-structural BMPs for the E&SC Plan Narrative

• Temporary Stream Crossings
  – Permitted
  – Single span bridge or
  – Culverted w/clean backfill
  – Installed prior to grading
ESA Non-structural BMPs for the E&SC Plan Narrative

• Grading
  – Once grading begins, progress in a continuous manner until completed and stabilized
  – No start and stop or hop scotch
• Stage Seeding
  – Establish groundcover on slopes (cuts/fills)
  – No more than 10’ in height measured along the slope
  – No more than one acre of exposed erodible slope area
ESA Non-structural BMPs for the E&SC Plan Narrative

- Seeding and Mulching/Hydroseeding
  - Immediately following final grade establishment
  - No appreciable time should lapse w/out stabilization of...
  - Slopes
  - Conveyances or
  - Other areas in the ESA

HOW ABOUT CONSTRUCTION PHASING CONSIDERATIONS?
ESA Construction Phasing for the E&SC Plan Narrative

• Clearing and Grubbing (C&G)
  – Provide and designate adequate LOD
  – Prior to C&G, designate ESAs with highly visible flagging or fencing
  – Implement perimeter controls before and/or concurrent w/C&G
  – Regulators consider tree cutting a land disturbing operation (canopy removal)
  – Develop a C&G E&SC plan sheet(s)
ESA Construction Phasing for the E&SC Plan Narrative

• Grading
  – Implement intermediate controls upgrade of perimeter devices
  – ESA exposed areas idle for >7 days must be stabilized
  – Provide narrative/details for
    • any dewatering of ESA work areas
    • any temporary culvert work in ESA
  – Provide narrative for stockpile management
  – Develop Intermediate E&SC plan sheet(s)
ESA Construction Phasing for the E&SC Plan Narrative

• Final Grade Phase
  – Demob narrative for large sediment basins or similar
  – Coordination with any structural post-construction stormwater BMPs
  – At 80% perm veg phase, remove ALL temporary BMPs
  – Develop final grade E&SC plan sheet(s)
E&SC Phasing and Narrative Tips

• Notify regulator of start date and job contacts
• Avoid cut/paste
• Anticipate contractor's plan of work
• A critical component of the plan often unused as such
BMPs allowed in ESAs

- Note that EXCAVATED BMPs disallowed
- Design structural BMPs for the Q25 storm
Wetland E&SC Design Tips

- Must be installed on ground surface
- No excavated BMPs
- Design sediment storage outside wetland boundary
- Easily removable upon project completion
- Rock allowed but completely removed
Temporary Span Bridge

**Temporary Span Bridge**

- **Stone Approach**
- **Stream Channel**
- **Wattles to Abut Span Bridge**
- **Extend Stone Upward and Revegetate as Needed to Protect Cut Slopes**

**Maintenance Notes:**
- Remove and dispose of silt accumulations when the depth reaches one-half of the height of the perimeter wattles or one-half capacity of the traps.
- Replace or clean the wattles as needed to allow runoff to slowly dewater through the device between rain events.
- Monitor daily to supplement stone approaches to ensure proper functionality.

*Diagram showing the construction and maintenance of a temporary span bridge.*
Other ESA related E&SC Design Tips

• High Quality Waters
  – Q25; one mile and draining to project

• Trout waters and T&E aquatic listed species
  – Q25; NC trout buffer waivers; use flocculants in the design

• 303(d) Impairment for Turbidity
  – Q25; one mile and draining to project
BMP Implementation and Maintenance Principles

- Divert clean water
- Slow down dirty water
- Treat it...
- Impound it...
- Settle it...
- Release it...
- Maintain it
Hay Bales

• Not recommended on pipeline jobs!
• Undermine, bypass, deteriorating strings ….
• Superior alternative tools available in BMP Toolbox
Temporary Diversion/Water Bar

- Excavated “or bermed” channel that directs runoff into a sediment control structure (NOT DIRECTED TO TSF)
- Used randomly throughout project to manage runoff across open grade
- Be aware of correct tracking techniques
Clean Water Diversion

- Conveyance system that intercepts “clean” sheet flow up gradient of a project
- Transports clean “run on” water around the construction area and safely discharges

ALL PIPELINE JOBS NEED CLEAN WATER DIVERGIONS
Clean Water Diversion

- May extend poly or fabric to top or over soil berm
- Alternative methods exist

*CROSS SECTION (NOT TO SCALE)*

*Geotextile fabric should extend up and over the inside face of the berm for projects with jurisdictional trout waters.*
Temporary Clean Water Diversion

Example of potential location for clean water diversion and omit water bars if easement will allow

goal to keep clean water clean and not run across grade
Temporary Wattle Diversion

- Option for hard to access areas or in areas with rapid phase sequencing
- Pin down and “teepee” stake to obtain good soil contact
Sediment Containment BMPs

- Silt Basin/Trap
- Skimmer Basin
- Rock Sediment Dam
- Coir Fiber Baffle
Temporary Silt Fence

- Cannot construct pipeline with silt fence as primary sediment control
- Slope length and slope steepness are major E&SC challenges for pipeline ops
Sediment Storage at ESAs

Consider matting on exposures on either side of sag SDOs such as the 4 corner entry points into ESA, consider Wattle Outlet or SFO outlet to provide storage and impoundment before entering SDO...global

This corner is protected with SFO
Silt Basin/Trap

• Suggest a BMP for this location
• Think back on our Imp&Mnt principles
Silt Basin/Trap

- Collects sediment
- Used on SFOs, water bars, locations to slow velocity, impound stormwater, and settle/store sediment
- Maintenance - regularly clean out sediment at ½ design capacity
Silt Fence Outlets/Breaks

- Serves as a drainage break in long runs of silt fence to intercept runoff
- Provides additional sediment control in low areas
- Hardware cloth w/stone or Wattles can be used in the break
Silt Fence Outlets/Breaks

- All pipeline jobs w/ SFO’s need sediment storage (pit/basin) and baffles
- No construction related discharge should leave job w/out basins and baffles
Silt Fence Outlets/Breaks

- More examples of basins w/baffles at outlet locations
Coir Fiber Baffle

- Used to spread flow out across basin and to reduce turbulence.
- Steel posts, 4’ spacing, 700 g/m2 coir matting, wire support, zip ties
Silt Fence Break with Sediment Control Stone

- Secure overlap sections b/w silt fence and hardware cloth
- Uniform height on sediment control stone
- Install at low point or sag
Silt Fence Break with Wattle

- One foot overlap b/w wattle and silt fence
- Well installed wattles
E&SC Strategies for Adjacent Farm Ponds

- PAM on water bar wattles
- Increase storage at SFOs
- Supplemental wattle cks with PAM
- Rock cks w/excelsior & PAM
- Intercept clean run on water
- Immediate Seeding and Mulching

- Matting on steeper slopes
- Additional easements for sediment storage
- Turbidity curtain at pond
Supplemental E&SC design tips for downstream Ponds

ALL PIPELINE JOBS ENCOUNTERING CLAY .....NEED FLOCCULANT (PAM)

Consider more aggressive E&SCs with downstream pond...such as PAM on water bar wattle j-hooks; increasing the storage at SFO; add supplemental wattle checks w/ PAM or rock checks w/ excelsior and PAM downstream of SFO; immediate S&M or matting on disturbances in this drainage area; intercept clean run on and pipe through easement w/temp. corrugate plastic pipe; Dbl TSF noted.
Wattles Coir / Excelsior

• Function as an alternative to rock silt checks
• Effective delivery devices for polyacrylamide (PAM)
• Requires matting underneath and proper staking
Wattle
Temporary Rock Check Dam with Matting & Flocculant

• Constructed of Class B rip-rap and #5 or #57 sediment control stone
• Uses excelsior matting to cover sediment control stone and serves as platform for flocculant application
Inadvertent Returns on Horizontal Directional Drilling (HDD)

- Provide perimeter protection around HDD bore pits and solids management systems
Inadvertent Returns (IR) on HDD Operations

- Have a written IR plan to address containment, recovery, and restoration of drilling fluids
Pulling It All Together

• What are some supplemental BMPs for this pipeline location?
Summary

- Follow, implement, update E&SC plan
- Attention to detail!
- Manage runoff
- Flocculants (PAM)
- Bains/Baffles
- Clean water diversions
- Limit amount and duration of exposure
- What is my buffer b/w work zone & watercourse?
- Maintain E&SC measures
- Achieve rapid stand of ground cover
Erosion & Sediment Control Lessons Learned on Pipeline Operations

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