Assessing and Minimizing Indirect Impacts

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Jason Gipson
Chief, Nevada/Utah Regulatory Section
US Army Corps of Engineers, Sacramento District

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Objectives

- Identify common causes of indirect effects to/loss of aquatic resources
- Identify measures to avoid/minimize these effects/losses

Indirect Impacts

- 33 CFR 330 as amended, defined in NWPs as:

"Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable."

- Reference to direct and indirect impacts throughout the NWP rules.
- Applies equally throughout the Corps Regulatory Program

33 CFR 320.4

- All compensatory mitigation will be for significant resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment.

NWP Allowable Losses

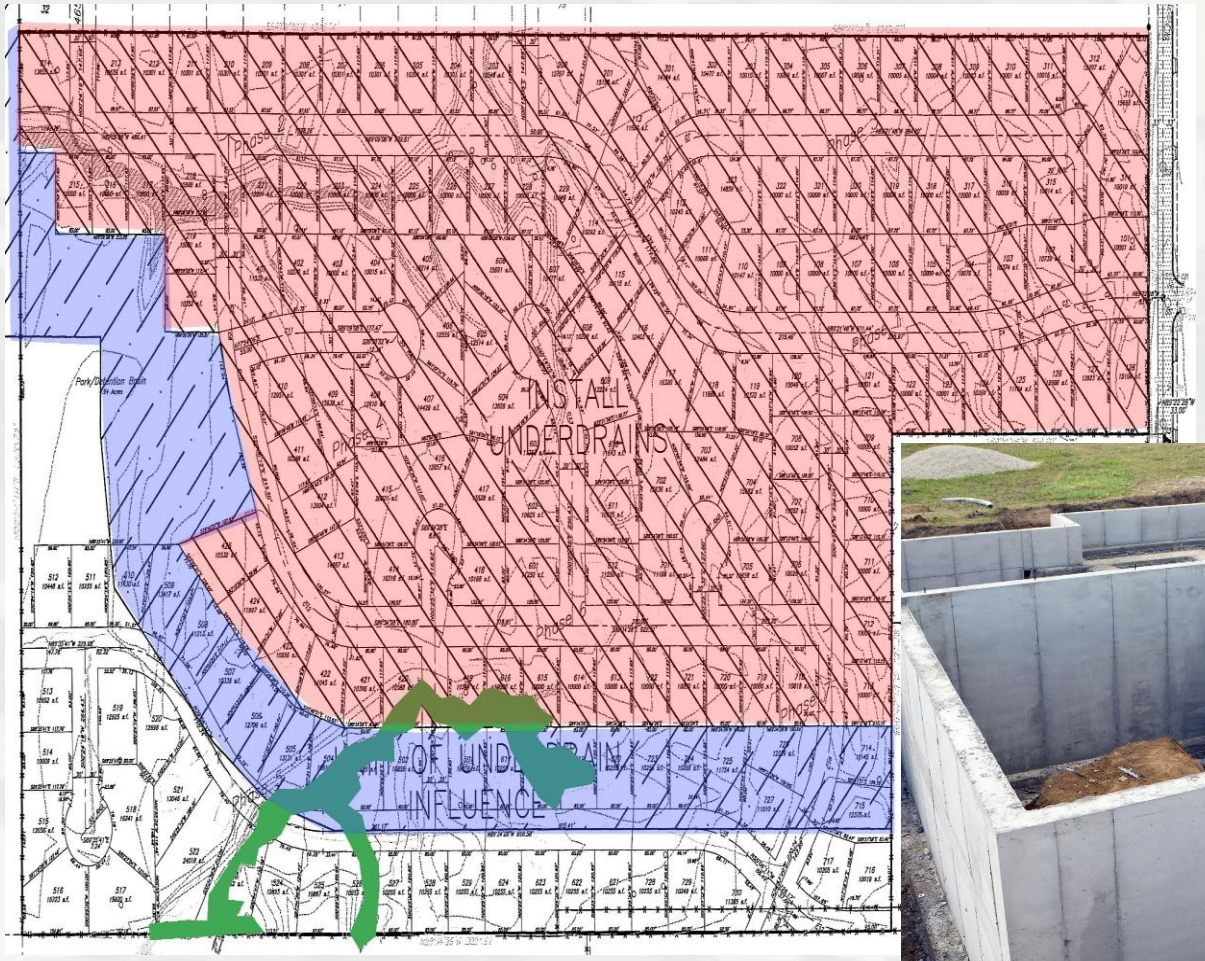
- No more than 0.5 acre cumulative loss of aquatic resource is authorized by most NWPs.

Types of Indirect Impacts

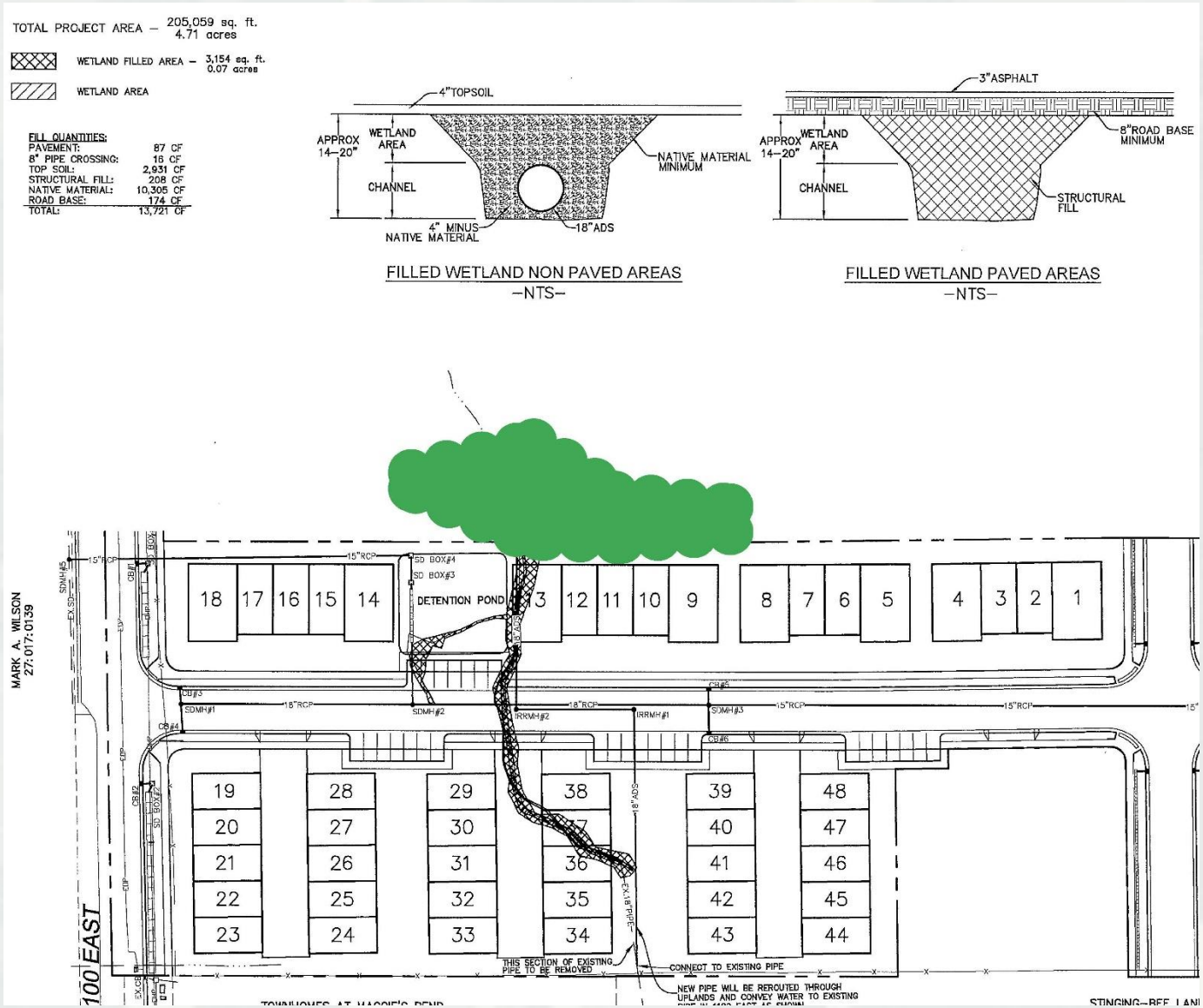
- Draining/dewatering via intercepting groundwater
- Dewatering via interruption of sheet/surface flow
- Isolating from downstream connectivity
- Degradation of functions/services

Groundwater Interception

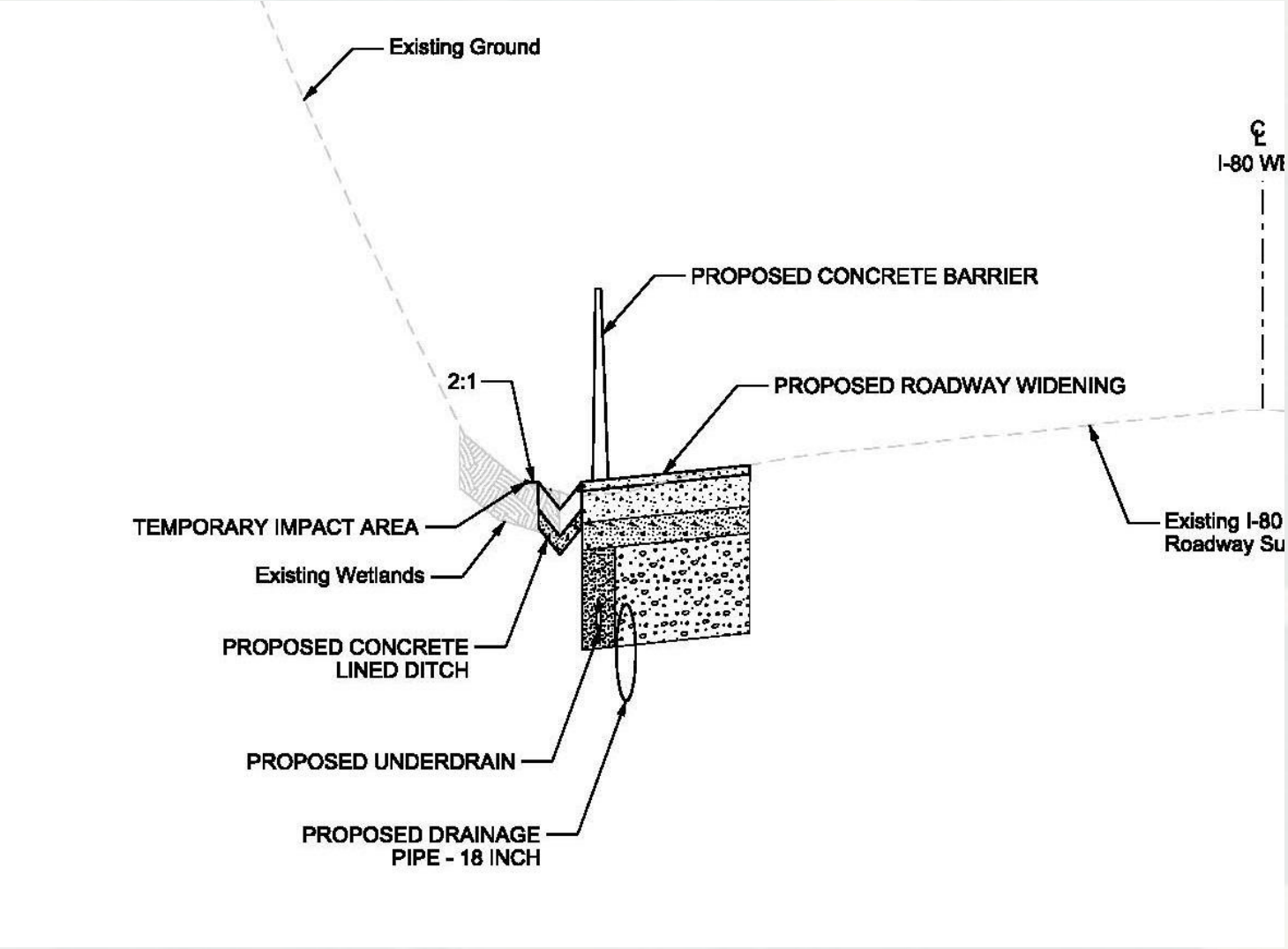
Groundwater Drains



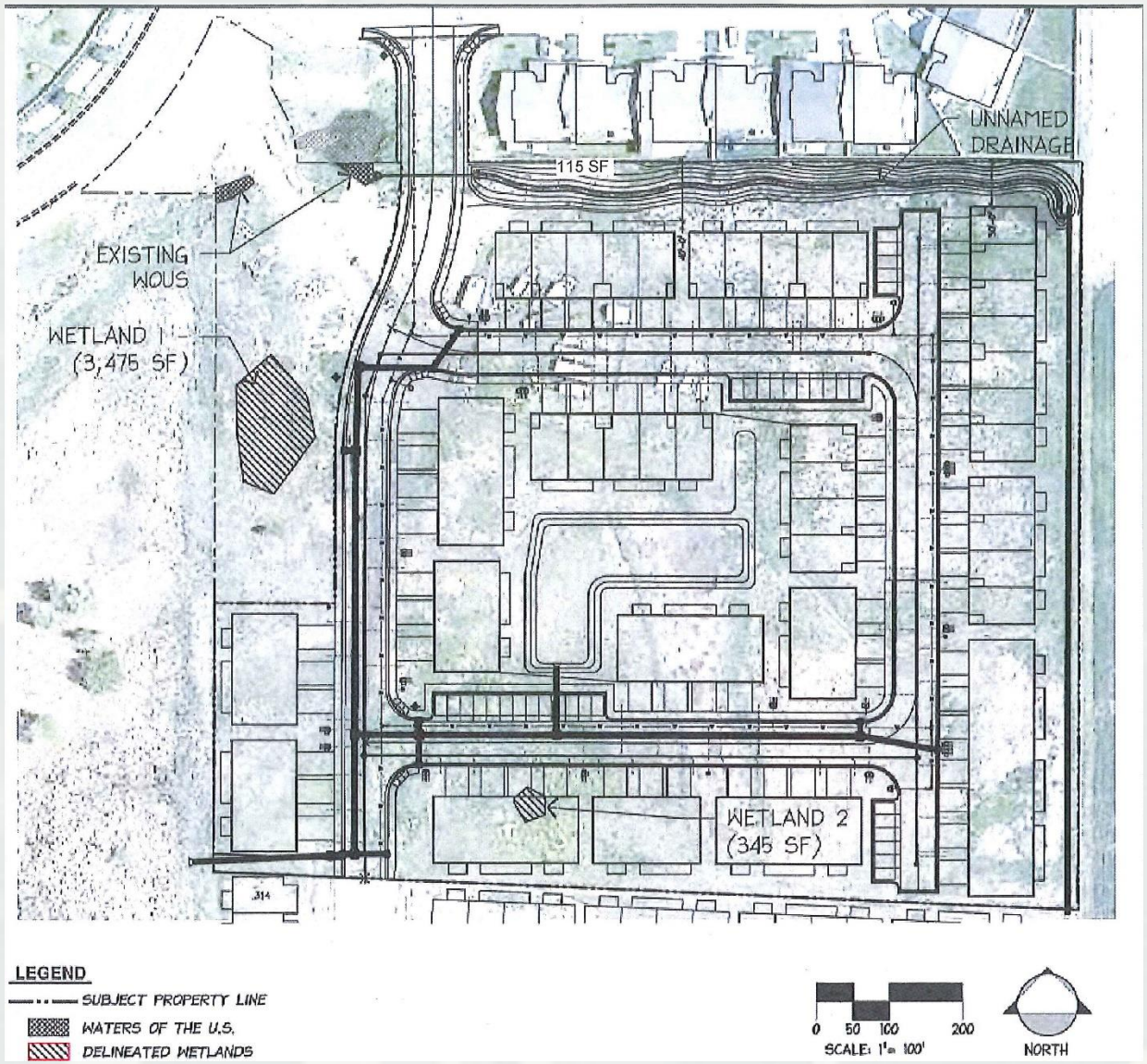
Off-Project Site Losses



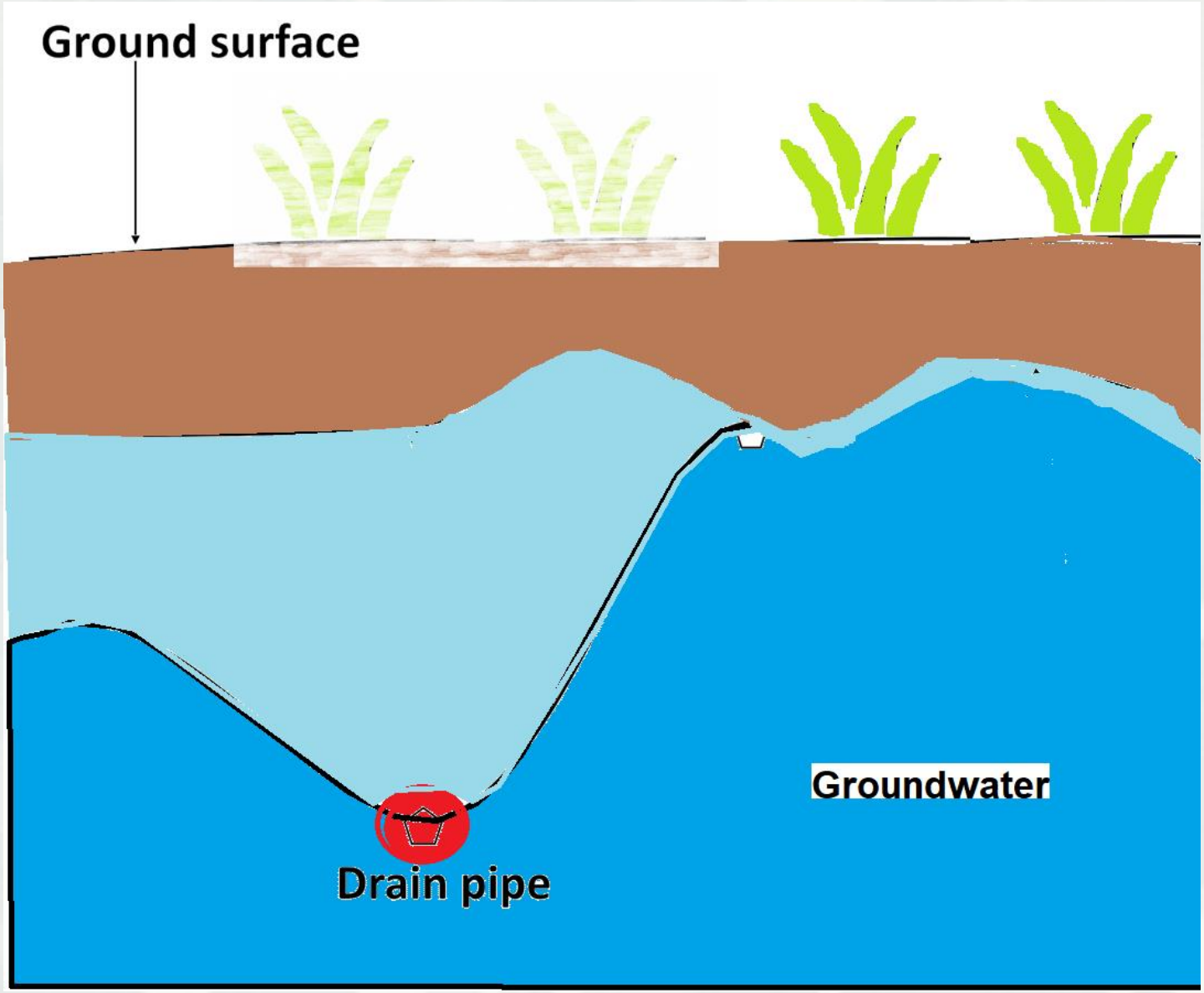
Roadway Underdrains



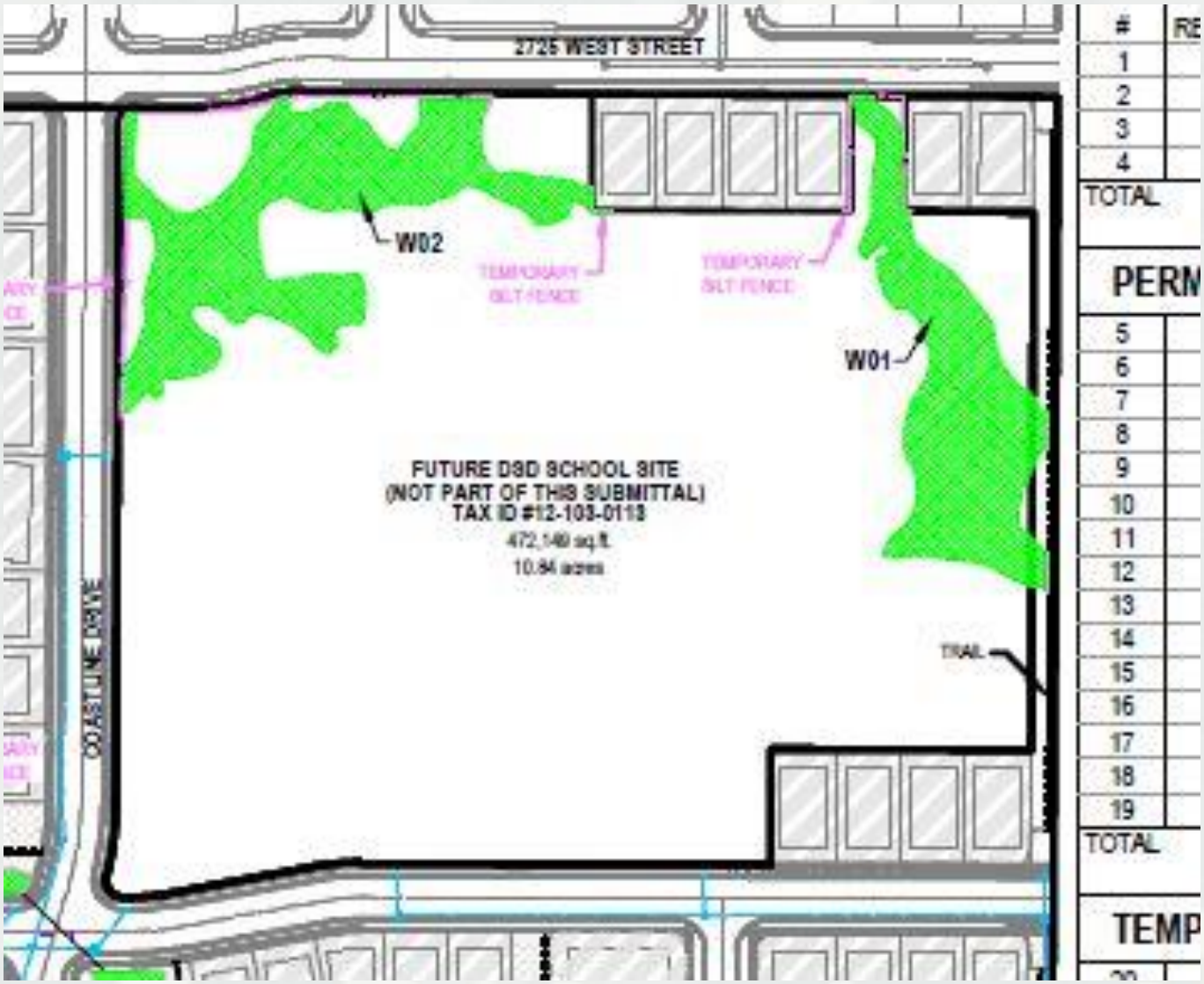
Utility Lines



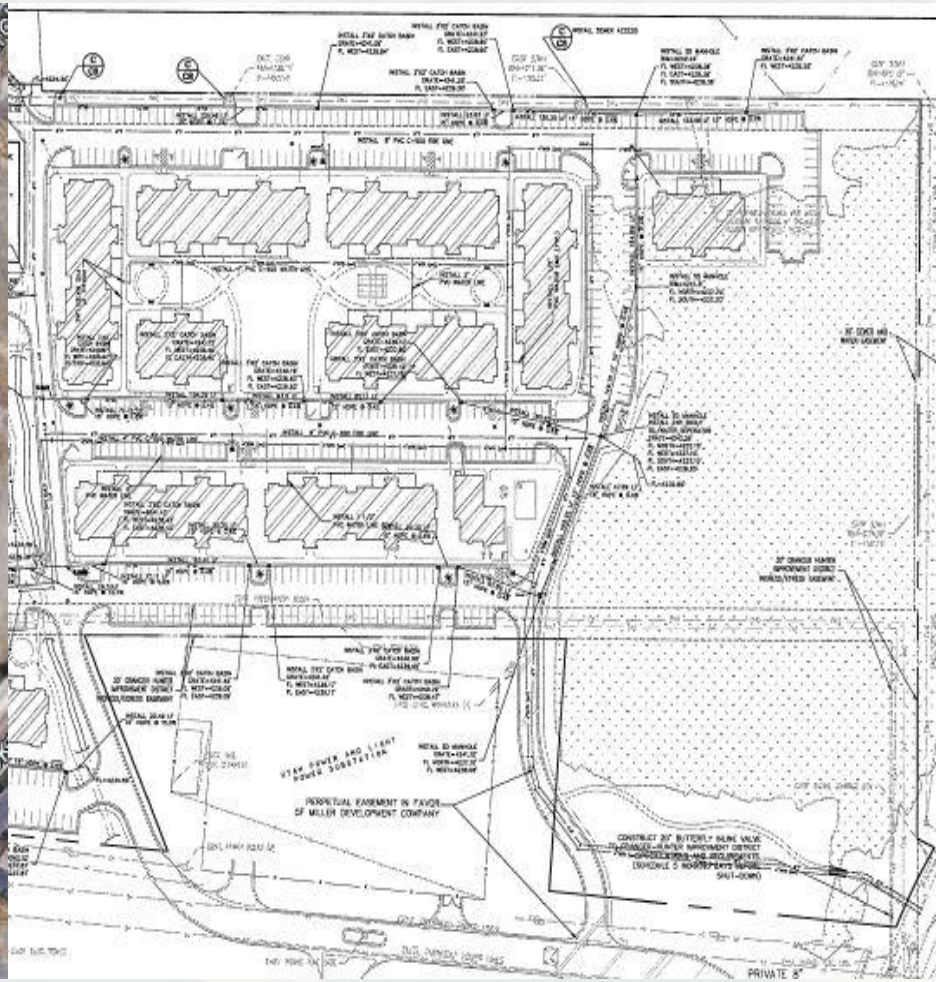
Cone of Depression Effect



Interruption of Surface Flow



Isolating Downstream Connection



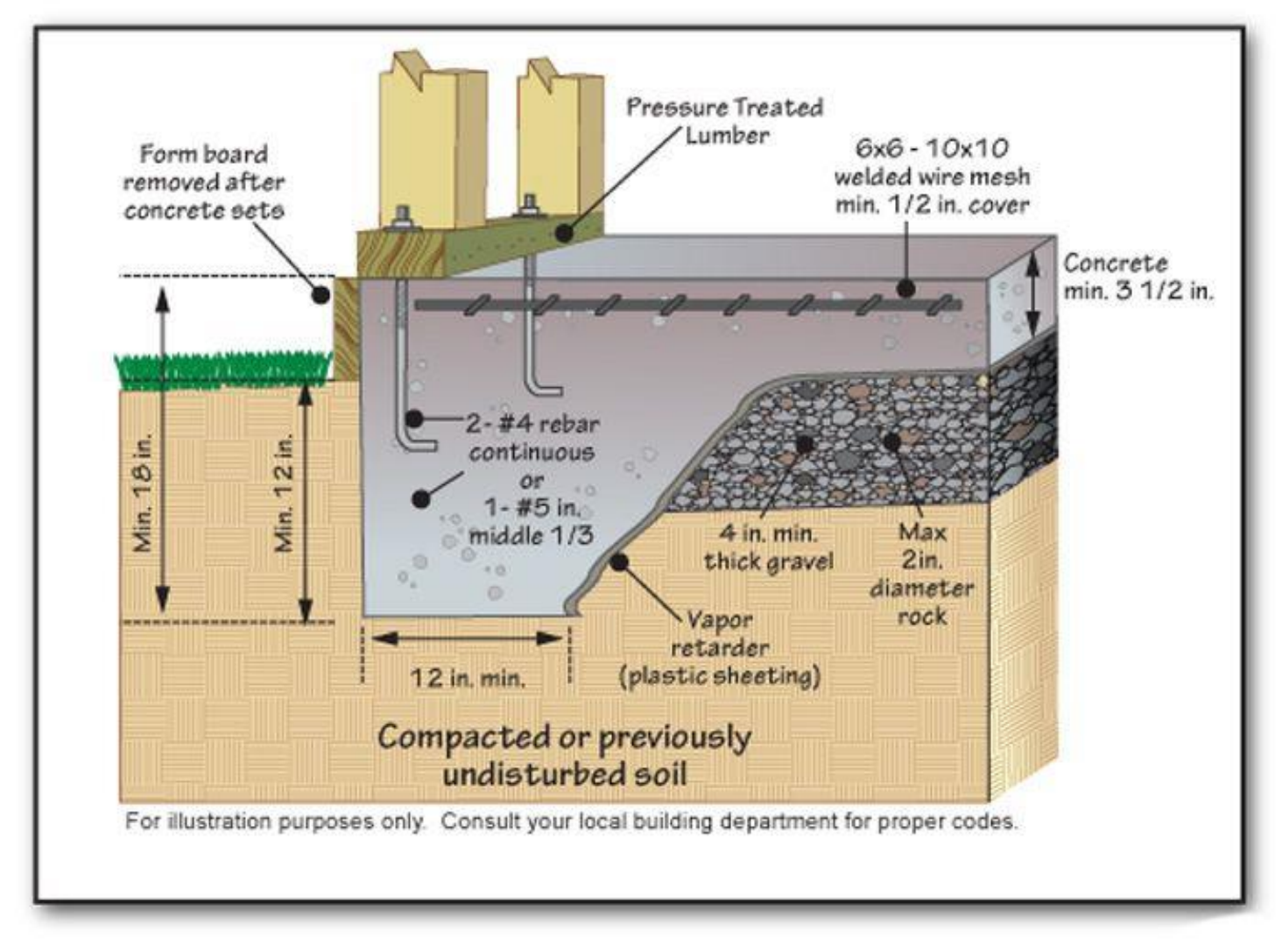
Degrading Functions/Services

Options to Avoid/Minimize Indirect Impacts

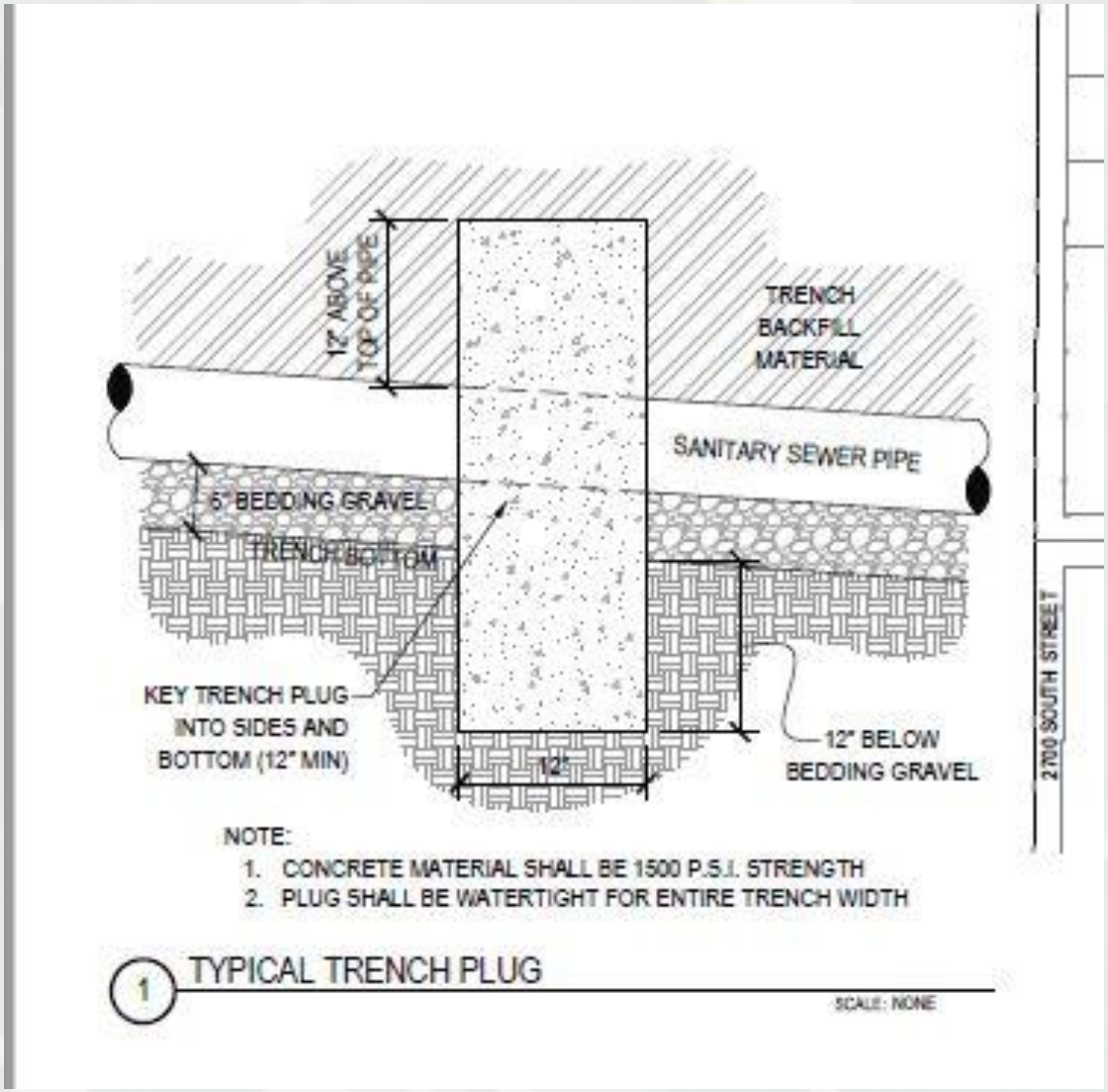
Options

- Slab on grade construction
  - ▶ No land/perimeter drains
- Add utility line trench plugs/breaks
  - ▶ Impermeable clay/bentonite
- Re-direct runoff to ARs
  - ▶ Grade development towards ARs/open space
  - ▶ Curb cuts/drainage grates
- Maintain downstream connectivity
  - ▶ Construct boardwalks
- Use buffer/filter strips

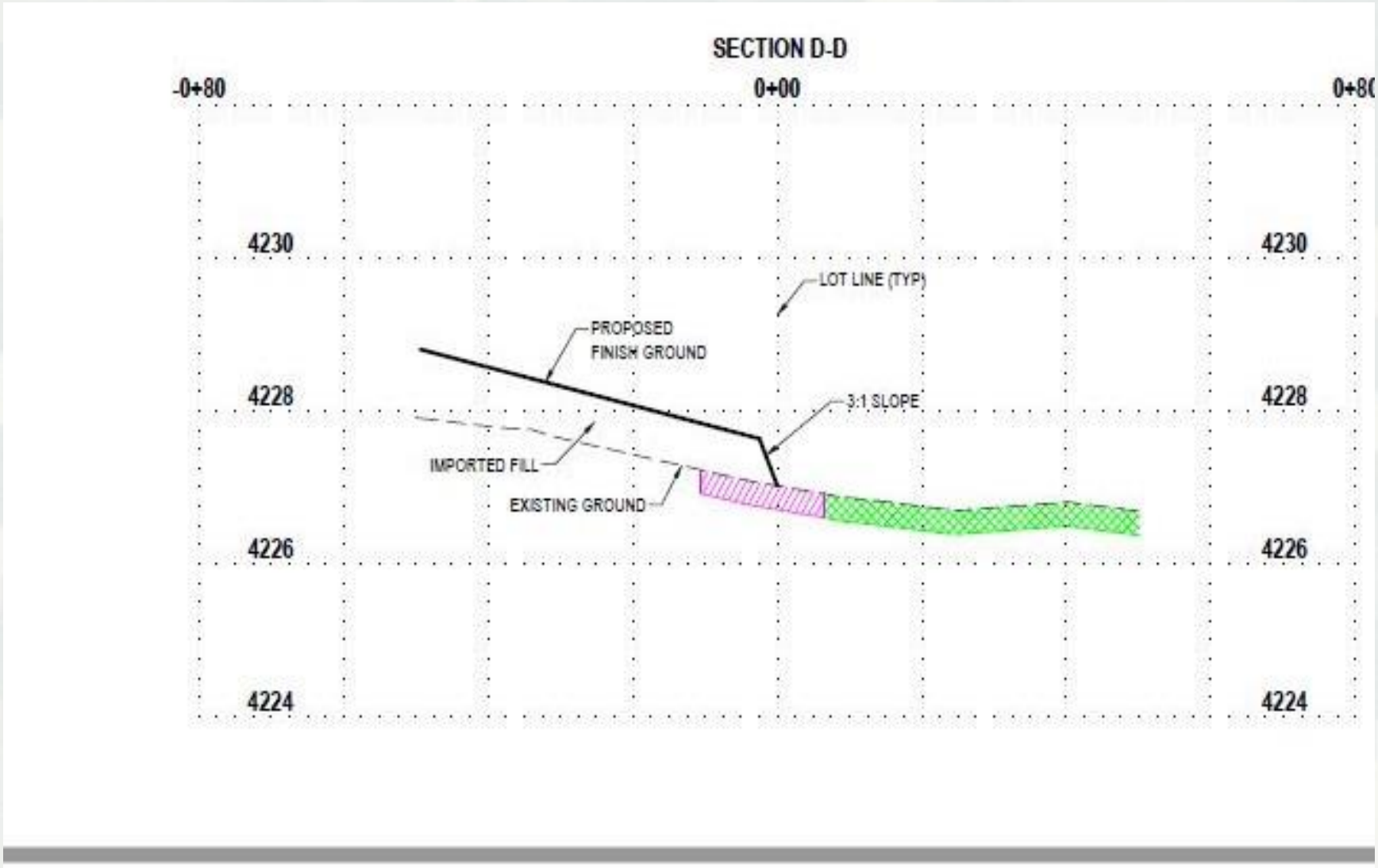
Slab-on-Grade Construction



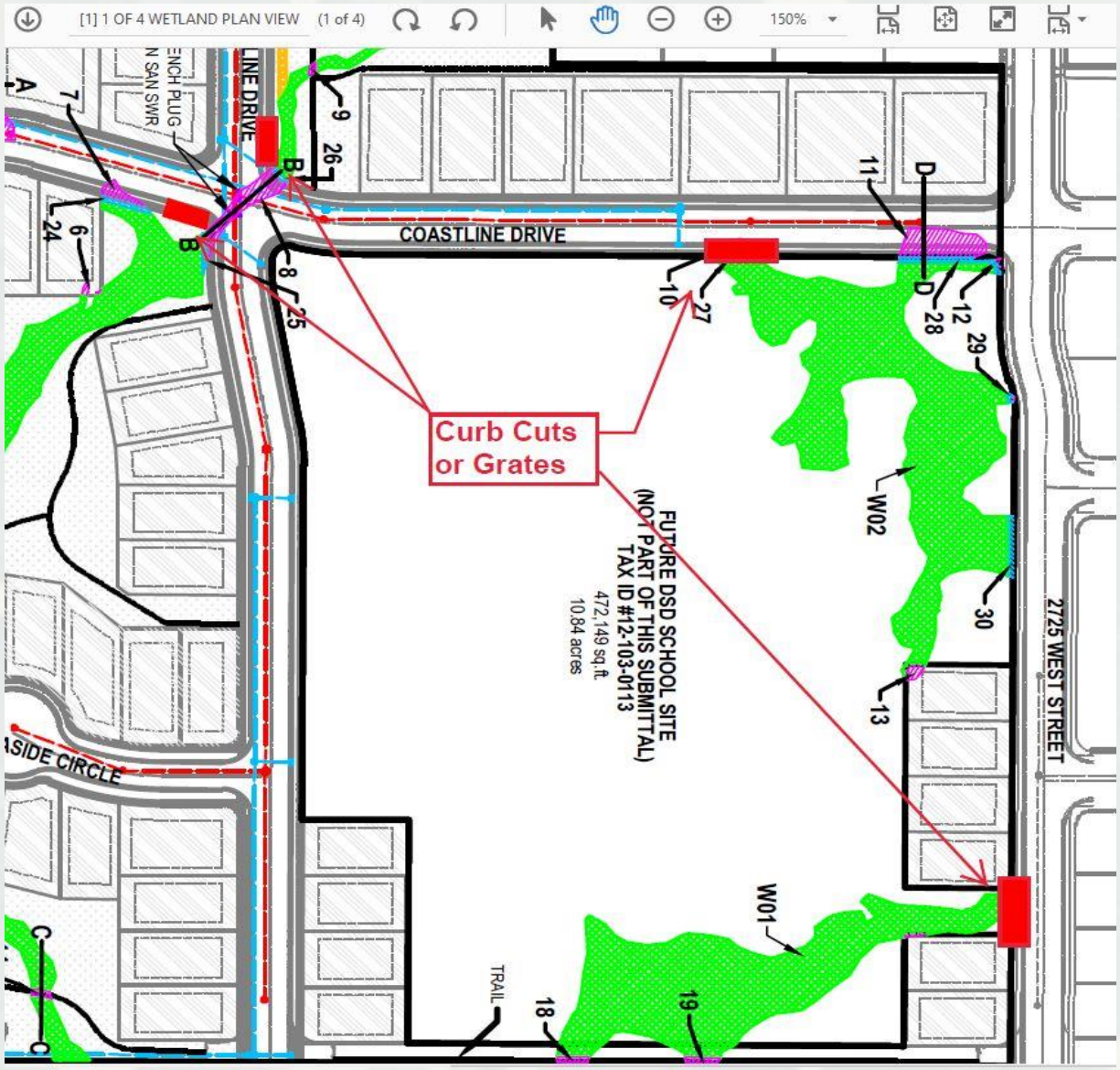
Utility Line Trench Plugs/Breaks



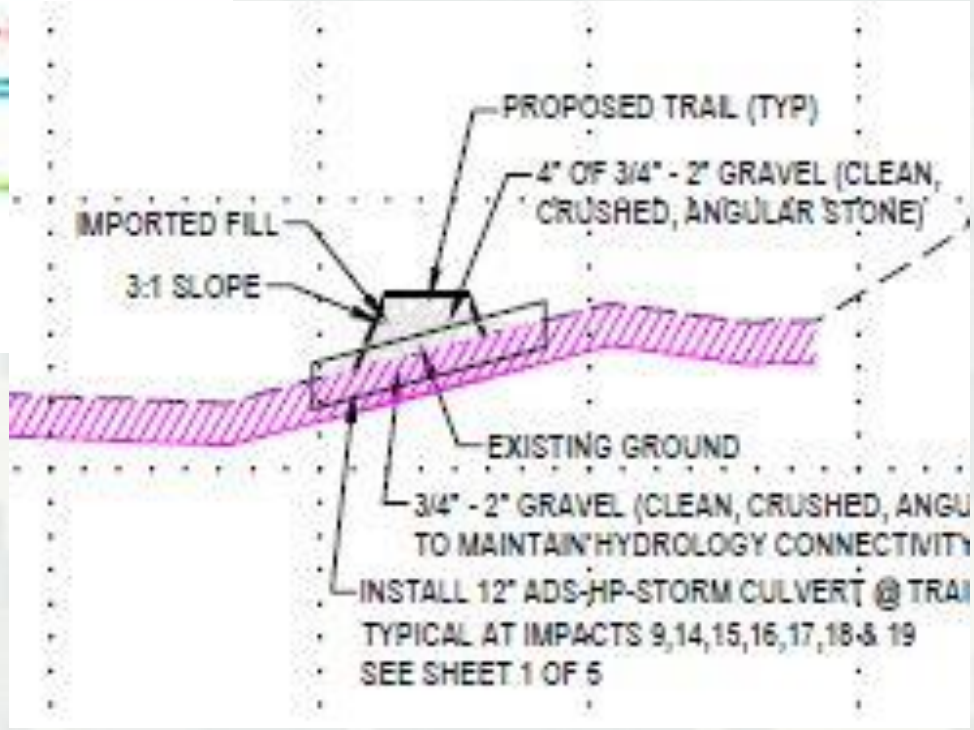
Re-direct Stormwater



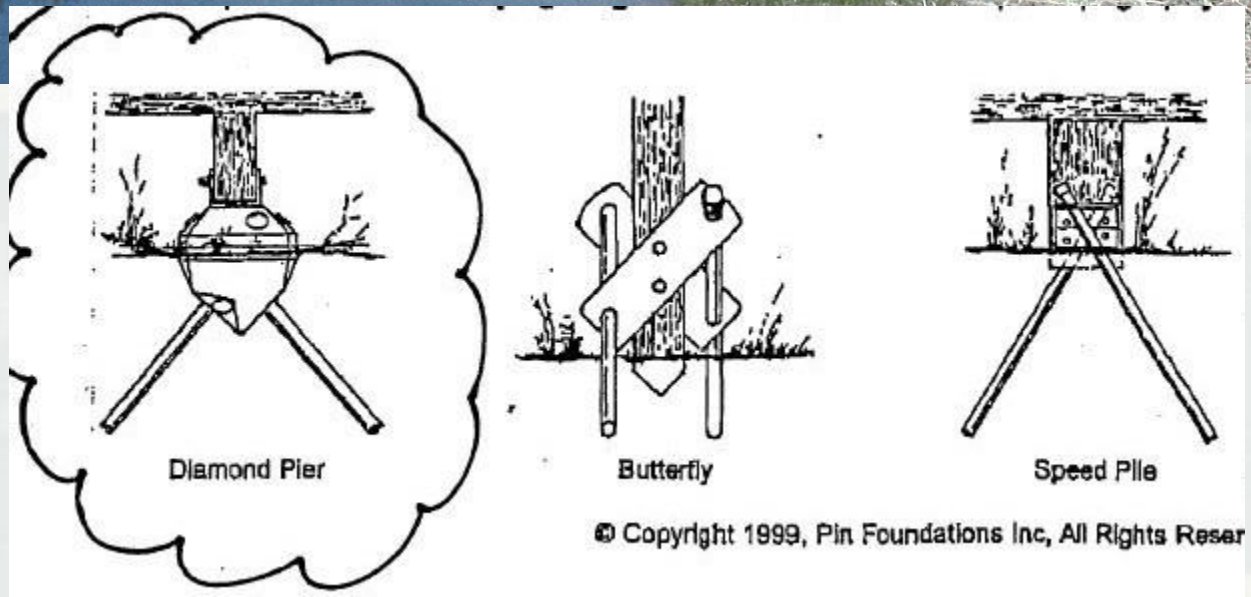
Re-direct Stormwater



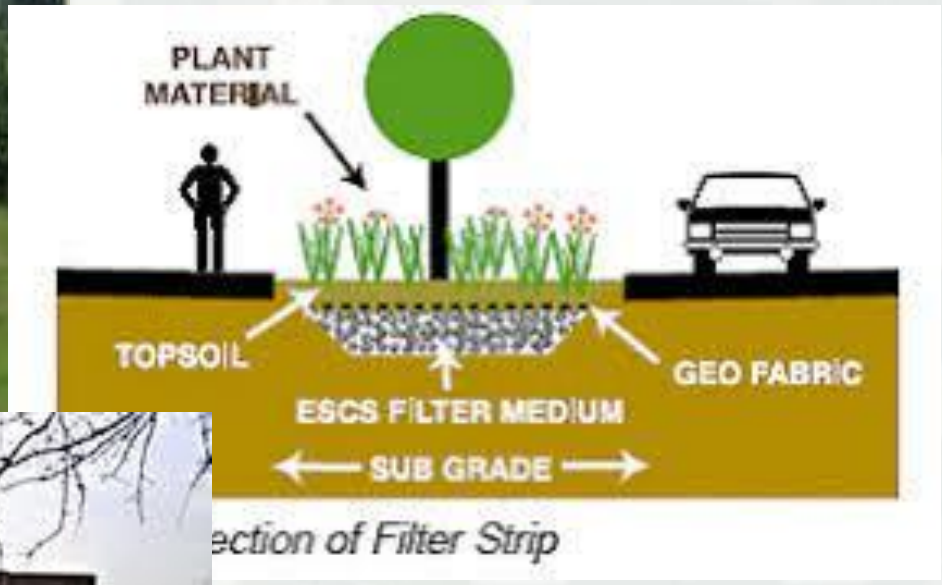
Maintain Downstream Connection



Construct Boardwalks



Buffer/Filter Strips



ection of Filter Strip

Questions?

Thank You

Contact Information:

Jason Gipson
U.S. Army Corps of Engineers
Bountiful Regulatory Office
533 West 2600 South, Ste. 150
Bountiful, Utah 84010
(801) 295-8380 ext 14
Email: jason.a.gipson@usace.army.mil

Web Page:

http://www.spk.usace.army.mil/Missions/Regulatory.aspx