

ADOT-FHWA-USACE-USFWS
Programmatic Section 7
Activity Descriptions

These activity are being developed for the statewide Section 7 consultation. This version has been reviewed by ADOT project manager, district and construction staff. However, the descriptions may change as the work on the programmatic continues.

In the meantime, these will likely be helpful for developing Biological Evaluations.

Check for updates frequently.

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Background Information

This document contains the common construction and maintenance activities to be included in the Arizona Department of Transportation (ADOT) Programmatic Consultation under Section 7 of the Endangered Species Act. The below list of 101 common construction and maintenance actions and activities were compiled by reviewing the ADOT 5-Year Plan, the PeCoS Maintenance System, the Los Angeles District Regional General Permit 96, and Best Management Practices for Erosion and Pollution Control and Water Quality. To draft the descriptions for the actions and activities a variety of sources including other statewide Programmatic Section 7 Consultations, ADOT standard drawings, ADOT guidelines and manuals, as well as consultation with Professional Engineers specializing in transportation were referenced to define the standard ADOT methodology. A list of references that were used in the development of this document is included below.

Of the 101 descriptions, there are 28 general actions and 73 activities which are divided between the Bridge Group, Geotechnical Services, Roadside Development, Roadway Group, Traffic Group, and Utility Group. The activities within the groups are organized alphabetically by their main purpose, with the exception of the activity "Inspection and Minor Repairs", which is listed last within each applicable group. The activity "Inspection and Minor Repairs" is intended to cover inspection and minor repairs of existing features present within the appropriate group that do not already have a separate activity specifically for repairs.

Flowcharts have been included for certain activities to provide a visual representation of the sequence of actions in that activity. They are comprised of text boxes which identify the actions or activities that occur to implement the subject activity. Text boxes that are bold and highlighted blue or orange are the activities that are analyzed under the subject activity. Orange text boxes are included as optional steps in the construction sequence that may be required. White text boxes with plain text that include a referenced number are not analyzed under the subject activity. Refer to the listed number for associated impacts related to that activity. Green, circular text boxes that state "Construct Project" are not actions or activities. They are a visual representation of how the subject activity occurs both before and after the main construction of a project. Vertical connections between text boxes signify a sequential order of construction. Horizontal connections between text boxes display potential or related actions and/or activities at that point in the construction sequence. If at any point during the construction sequence an action or activity is not required for the project, skip the action or activity that is not applicable

References

Standard Drawings:

- Structure Detail Drawings
- Traffic Standard Drawings
- Construction Standard Drawings

Manuals and Guidelines:

- *ADOT Erosion and Pollution Control Manual for Highway Design and Construction* published December 2012
- *ADOT Post-Construction Best Management Practices Manual for Water Quality* published January 2016
- ADOT PeCoS Maintenance System 2018 Performance Guidelines
- *Draft ADOT Roadside Vegetation Management Guidelines* dated November 29, 2018
- ADOT Construction Manual
- *Guidelines for Highways on Bureau of Land Management and U.S. Forest Service Lands* updated December 1, 2014

Statewide Programmatic Section 7 Consultations:

- Colorado Department of Transportation Activity Definitions dated 11/04/2015
- Idaho Transportation Department Programmatic Biological Assessment dated March 2010
- Nebraska Activity Checklist and Sources of Impacts Definitions

Definitions

Action – Base level construction or maintenance actions with unique impacts to biological resources. Actions are often combined with one another to form an activity.

Action Area – All areas to be affected directly or indirectly by an action or activity and not merely the immediate area involved in the action or activity.

Activity – A compilation of construction and/or maintenance actions that create a feature or an element of a project. Each activity will have unique impacts to biological resources.

Construction Footprint – The area where construction related equipment will operate.

Ephemeral – A watercourse that only experiences surface flows during or immediately after a storm event. All work occurring within an ephemeral watercourse must be completed when surface water is not present. If the work must occur when surface water is present, treat the watercourse as if it were an intermittent/perennial watercourse.

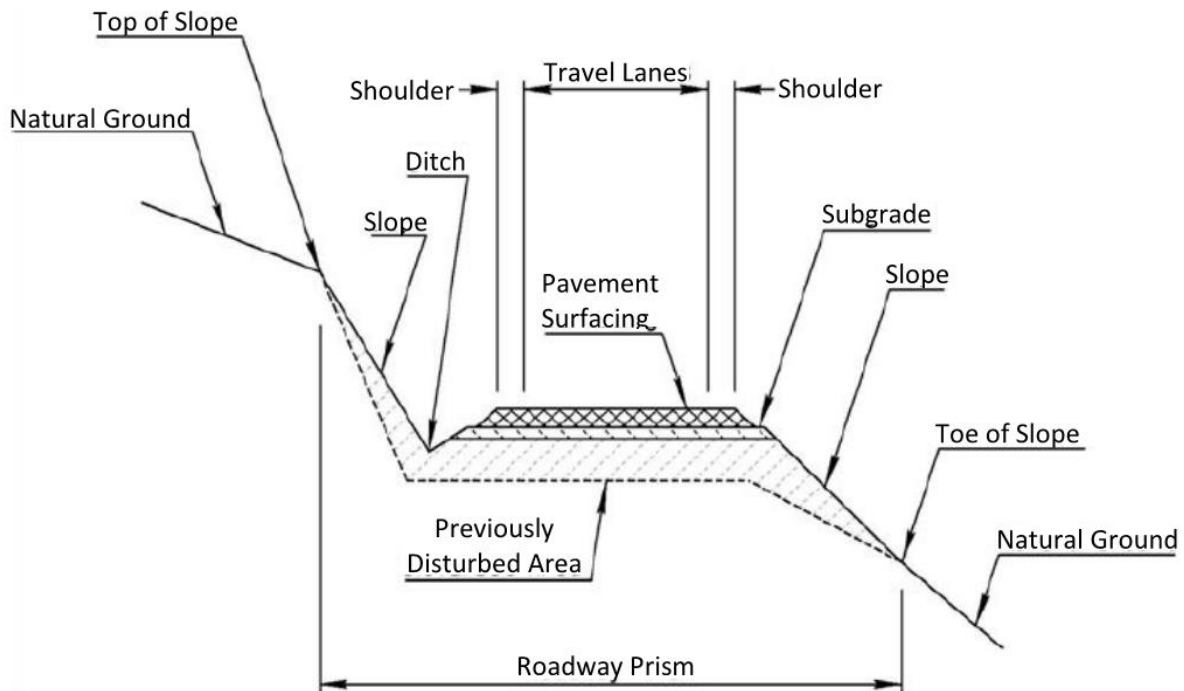
Flowchart – A visual representation of the sequence of actions in an activity.

Intermittent/Perennial – A watercourse that contains surface water periodically or persistently throughout the year. Work within an intermittent/perennial watercourse requires the work to be completed during periods of low surface water, as practicable, and the implementation of additional work practices to avoid impacts to surface water.

Roadside Recovery Area - An area outward from the outer travel lane that is free of obstructions and non-traversable slopes. The width of the roadside recovery area is based on speed, traffic volume and embankment slope, but it is typically 30-feet wide starting from the beginning of the shoulder. The Roadside Recovery Area is also known as the clear zone.

Roadway Prism – The three-dimensional area of a roadway from the top of slope to the toe of slope that was previously disturbed during road construction as depicted in Figure 1. This also includes bridges, drainage culverts, walls, ditches, road surfaces, road shoulders and road fills. The width of the roadway prism varies and depends on the age of the road, construction techniques, and slope. The boundary of the roadway prism is where the existing natural vegetation meets the edge of the road subgrade or edge of cut/fill activities.

Figure 1. Illustration of Roadway Prism



Slight Variation of the Existing Footprint – minor deviations in structure's configuration or filled areas, including those due to changes in materials, construction techniques, requirements of other regulatory agencies or current construction codes or safety standards that are necessary to make the repair, rehabilitation or replacement

Watercourse –a natural or artificial sloped depression that conveys water, including naturally occurring washes, creeks, streams, and rivers; and man-made ditches, canals, or channels.

General Actions (G)

G-01, Blasting

Controlled blasting is required when a substrate is too difficult for earth moving equipment to excavate, typically along rocky slopes. Blasting involves drilling an array of holes (G-19) into the substrate to house charged explosives, which are then detonated to break apart the rock surface. The loosened material is collected with earthmoving equipment to be used elsewhere or wasted (G-07). This process may be repeated several times to reach the desired elevation and grade. Impacts associated with drilling holes and collecting loosened material are covered under G-19 and G-07, respectively.

G-02, Clearing and Grubbing

This action covers the clearing and grubbing of shrubs, brush, and herbaceous vegetation. Clearing is defined as removing and disposing of all unwanted vegetative surface material and grubbing refers to removing and disposing of all unwanted underground vegetative matter, such as roots. Clearing and grubbing is completed with earth moving equipment such as excavator, backhoe, bobcat, grader, bulldozer, front-end loader, or scraper. Above and below ground vegetation is removed, gathered into piles and typically hauled away for proper disposal. This action does not include tree removal, or clearing done by vegetation treatments such as burning, manual removal/trimming, herbicide use and mowing. Impacts associated with tree removal are covered under G-24. Impacts related to vegetation treatments including burning, manual removal/trimming, herbicide use, and mowing, are covered under G-26 through G-29, respectively.

G-03, Install Concrete

This action includes installing concrete by spraying concrete onto a surface, or using slip form, cast-in-place and neat line methods. Spraying concrete, also known as shotcrete, involves pumping liquid concrete through a pneumatically powered hose to project the concrete onto a surface. Shotcrete is typically sprayed on top of rebar, which provides reinforcement to the concrete. Spraying concrete may require an air compressor or generator to be temporarily placed within the action area to operate the machinery. Slip form is a concrete installation method where concrete is poured into a continuously moving, self-propelled machine to construct the desired feature. Rebar or post-tensioning ducts are continuously placed ahead of the form, as it progresses, to provide reinforcement to the final feature. Cast-in-place is a concrete installation method that involves building a form, placing rebar within the form for reinforcement of the final feature, and pouring concrete into the form and around the rebar. Once the concrete has set, the form is typically removed. Neat line concrete forming involves excavating a trench or depression, placing rebar within the excavated area for reinforcement of the final feature and then pouring concrete into the excavated area to be flush with the surrounding ground surface (i.e. the neat line). Installing concrete often requires excavation and grading. For impacts associated with excavation and grading refer to G-06, G-07, and G-08, respectively

G-04, Directional Boring

Directional boring, otherwise known as horizontal directional drilling, uses a surface-launched drilling rig to bore into the substrate along a predetermined horizontal path for activities such as installing underground conduit (U-01), pipe, or duct. The drilling rig used for directional boring is typically hydraulically powered and equipped with a drill bit, or hydraulic cutting jet nozzle for softer soils. Directional boring first involves digging an entrance pit with earth moving equipment and drilling a pilot hole. The pilot hole is then re-drilled with a wider-diameter drill bit once or multiple times to enlarge the boring to the desired diameter of the feature being installed.

G-05, Drone Use

Drones are used for survey, mapping, and to inspect structures within the right-of-way. To conduct a survey or inspection with a drone, an on-site operator navigates the drone over the survey location, or under, around and through structures such as bridges and large culverts to collect imagery and topography information. It may be necessary for the drone to pass over the same area several times to adequately collect all of the desired information.

G-06, Grading Beyond the Roadway Prism

This action involves the use of earth moving equipment such as an excavator, bulldozer, front-end loader, grader, scraper, backhoe, or bobcat to grade or shape the ground surface beyond the roadway prism. The boundary of the roadway prism is where the existing natural vegetation meets the edge of the road subgrade or edge of cut/fill activities and these areas often support naturally occurring vegetation. Impacts associated with grading within the roadway prism are covered under G-07. This action does not include vegetation clearing or tree removal. Refer to G-02 or G-24 for impacts associated with vegetation clearing and tree removal. Likewise, grading within a watercourse is not covered under this action. Refer to G-08 for impacts associated with grading within a watercourse.

G-07, Grading within the Roadway Prism

This action involves the use of earth moving equipment such as an excavator, bulldozer, front-end loader, grader, scraper, backhoe, or bobcat to grade or slope material within the existing roadway prism, where fill material is present from the original roadway construction and has been previously disturbed. The limits of this action encompass road surfaces, road fills, road shoulders, gore areas, and small medians (less than 60-feet wide). Medians greater than 60-feet wide may have areas of natural ground surface or natural vegetation. Grading within areas of natural ground surface or natural vegetation are covered under G-06. Likewise, refer to G-08 for impacts associated with grading within a watercourse.

G-08, Grading within a Watercourse - Ephemeral, Intermittent/Perennial

Grading within a watercourse involves the use of earth moving equipment such as an excavator, bulldozer, front-end loader, grader, scraper, backhoe, or bobcat to grade or shape the ground surface within the bed, or along the banks of a watercourse. Depending on the presence of surface water within the watercourse, this action would be completed in accordance with the following work practices.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the action in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the action to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

G-09, Hydro-Vacuuming

Hydro-Vacuuming utilizes pressurized water and a vacuum system as a non-destructive method of digging or excavation. A hydro-vacuum is typically mounted to a truck and consists of a water reservoir and a debris tank. A hydro-vacuum may be used to excavate soil, rocks, clay, gravel, sediment, debris or plant material that is

blocking a structure or to reveal the scene below. Off-road vehicle (G-14) use may be necessary to perform hydro-vacuuming, refer to G-14 for impacts associated with off-road vehicle use.

G-10, Jackhammering

This action includes the use of a tool that combines a hammer directly with a chisel to break up rock, pavement, or concrete. Jackhammering involves steadying the chiseled end of the tool on the desired substrate, powering on the equipment, and letting the chisel and repeated blows of the hammer break up the substrate while stabilizing and readjusting the tool, as necessary. Several types of tools can be utilized for this action which range from gasoline-operated, pneumatic, or electro-mechanical hand-held tools, to large hydraulic jackhammers or hammer hoes. Pneumatic or electro-mechanical jackhammers may have an air compressor or generator built into the jackhammer, otherwise an air compressor or a generator would be temporarily placed within the action area to operate the machinery. Hydraulic jackhammers or hammer hoes are typically fitted to earth moving machinery, such as excavators or backhoes, and do not require an additional power source since the use of the heavy equipment is powerful enough to exert the force required to break up the targeted substrate.

G-11, Laying Down Pavement

This action includes laying down pavement such as asphaltic concrete and its mixed variations (asphaltic concrete friction course, asphaltic concrete asphalt-rubber, asphaltic concrete friction course asphalt-rubber), and Portland cement concrete pavement. Asphaltic concrete paving materials are hot or cold mixes and require a production plant to produce the pavement. Smaller projects do not require a plant to be constructed, but rather pavement is hauled to the action area. Similar to asphaltic concrete, Portland cement concrete pavement is also typically batched off-site, and stationary mixers or mixing trucks mix the concrete within the action area. Pavement is typically applied over a base or subgrade that has been prepared to the requirements of the pavement material, and then compacted and leveled to blend with the adjacent paved surfaces. Asphaltic concrete is applied by loading the material into or in front of a laydown or paving machine; and Portland cement concrete pavement utilizes a slip form or a self-propelled fixed form paver to lay down the pavement.

G-12, Placing Millings

Millings, or recycled asphaltic concrete, are the byproduct of milling pavement (R-24), and are used to stabilize bare ground surfaces, or protect existing paved surfaces by adding a layer of substrate. Placing millings requires large vehicles or heavy machinery, such as dump trucks, pickup trucks, front-end loaders or tractors, to carry and dump the millings within the anticipated construction footprint, or an elevator may shoot the millings to the area that is requiring stabilization or protection. Once the millings are laid down, a grader or front-end loader will evenly spread out the millings to the desired thickness, and then the millings are rolled or compacted to provide a more durable surface. In instances where small amounts of millings are required, this action may be carried out manually with wheelbarrows and shovels. Also, milling may be sprayed with emulsion to help stabilize the surface. Refer to R-24 for impacts associated with spraying emulsion.

G-13, Night Time Work with Lights

Night time work with lights includes any construction or maintenance activity that takes place at night where temporary lighting is required. Light may be provided from a permanent source that is present in the action area, or a temporary source that is placed in the action area and operated with a generator, or gas-powered globe lights.

G-14, Off-Road Vehicle Use

This activity includes driving any motorized vehicle beyond the roadway prism where natural ground surface is present. Motorized vehicles may include but is not limited to: conventional motorized vehicles (i.e. trucks, cars, etc.), all-terrain vehicles, or utility vehicles. Grading (G-06) and/or the construction of a designated access road (R-30) are not covered under this action; impacts associated with these activities are covered under G-06 and R-30, respectively.

G-15, Manual Post or Pole Installation

Manual post or pole installation is the action of driving a post or pole to a desired depth in the ground, by striking it repeatedly with a post-pounder or mallet. This action is typically utilized to install guardrail support posts (R-18), fencing support posts (R-15), and permanent or temporary sign poles. This action does not include the installation of guardrails on the support posts or the attachment of fencing to support posts. Impacts associated with installing guardrail on support posts and attaching fencing to support posts is covered under R-18 and R-15, respectively.

G-16, Mechanical Post, Pole, or Pile Installation

Mechanical post or pole installation is the action of driving a post or pole to a desired depth in the ground using mechanically generated vibrations or impact. The vibration method of installation involves using an excavator or crane to lift and position a vibratory hammer machine over the post, pole, or pile, fastening the machine to the post, pole, or pile by a clamp and/or bolts, and then the machine transmits vertical vibrations to drive-in the post, pole, or pile. The vibration method can also be used to extract piles and is commonly used to recover steel "H" piles used in temporary foundation shoring. The impact method of installation involves delivering repeated blows to the top of a post, pole, or pile with a diesel pile hammer that is attached to heavy equipment to drive in the post, pole, or pile. This action can be utilized when installing guardrail (R-18), fencing (R-15), piles for a substructure, or permanent or temporary sign poles. This action does not include guardrail work or fencing activities. Impacts associated with guardrail work and fencing activities are covered under R-18 and R-15, respectively.

G-17, Post or Pole Foundation Installation

Post or pole foundations are used to provide a secure and stable base for a vertical feature such as a post or pole. This action involves excavating a hole in the ground to a desired depth using manual equipment, such as a shovel or hand-held auger, or earth moving equipment, such as an excavator or backhoe. Once the hole is excavated, an anchor is typically installed and surrounded by concrete, or concrete is poured and the anchor is embedded into the concrete. Once the concrete has set, the post or pole is then attached to the anchor and the final feature, such as a sign panel or guardrail, is attached to the erected post or pole, as necessary. This action can be utilized when installing fencing (R-15), guardrail (R-18), enforcement and compliance division equipment (T-01), or temporary and permanent signage. Impacts associated with fencing, guardrail, or enforcement and compliance division equipment are covered under R-15, R-18, and T-01, respectively.

G-18, Removing Obstructions

This action involves the removal of large materials such as rocks, boulders, or trees that are obstructing a roadway shoulder, ditch or structure (e.g. catchments, culverts, bridges, etc.) and preventing the proper or intended function. Obstructions are typically removed mechanically with earth-moving equipment such as an excavator, bulldozer, front-end loader, grader, scraper, backhoe, or bobcat. However, large obstructions may need to be broken into manageable sized pieces before they can be removed. Saws (G-20), chainsaws, drills

(G-19), or low-charge explosives (G-01) may be used to dislodge and/or break apart an obstruction. Saw-cutting, rock drilling, or low charge explosives are not covered under this action. Refer to G-20, G-19, and G-01, respectively for the impacts associated with these actions. If the obstruction must be broken apart into small pieces, manual removal rather than mechanical may be appropriate. A cable may also be used to winch objects or a cable and bucket system may be used to remove obstructions from locations that are inaccessible to equipment.

G-19, Rock Drilling

This action involves drilling rock or a hard substrate surface for the purposes of creating a hole or breaking apart the rock or substrate. Rock drilling uses a drill bit, pressure, and power source to propel the drill bit into the rock or substrate to create a hole or crack. The material that is displaced by drilling is typically expelled or side-cast at the surface around the drill hole. Several types of drills can be utilized for this action which range from battery-powered and pneumatic hand-held tools, to large, hydraulic or pneumatic drilling rigs. Pneumatic or hydraulic drills may have an air compressor or generator built into the drill rig, otherwise an air compressor or a generator would be temporarily placed within the action area to operate the machinery.

G-20, Saw-cutting

Saw-cutting involves the use of a power source to rotate a blade at high speeds to slowly cut a surface or substrate to a desired depth or extent. Water or other lubricants may be used to cool down the blade and/or to control dust when operating a saw. Saw-cutting is often used to precisely cut concrete, pavement, or metal. Saws can be hand-held tools or larger, self-propelled or manually pushed pieces of equipment. They can be powered by fuel (i.e. gas, diesel, or propane), electricity, or hydraulics. Depending on the type of saw used, a generator may be temporarily placed within the action area to operate the machinery.

G-21, Sediment and Debris Removal

This action involves the removal of materials such as sediment and debris from a roadway, shoulder, ditch, or structure (e.g. catchments, drains, culverts, etc.). Sediment and debris may be removed manually with hand tools such as picks, shovels, buckets and wheelbarrows; or mechanically using excavators, backhoes, front-end loaders, bull dozers, hydro-vacuums (G-09), or bobcats.

G-22, Staging and Stockpiling

This action includes the staging and stockpiling of equipment and/or material during a project. Staging and stockpiling may occur at one or several designated areas at or near a project site. Once the project is complete, equipment and material are typically removed, and the area would be restored to pre-construction conditions to the maximum extent practicable. Some projects may require excess material, such as millings, to remain and be utilized for future maintenance activities. Staging and stockpiling may require grading (G-06 or G-07), clearing and grubbing (G-02), or tree removal (G-24); however, impacts associated with grading, clearing and grubbing, or tree removal is covered under G-06 or G-07, G-02, and G-24, respectively. This action does not include staging or stockpiling within a watercourse.

G-23, Survey and Staking

Survey crews traverse the action area to determine and mark the boundaries, areas, and/or elevations of land or structures on the earth's surface, by means of measuring angles and distances. Staking refers to stakes and/or lath which are placed (i.e. driven into the ground with a mallet or hammer) as markers of the delineated boundary, area, or elevation, or to establish survey monuments. This action typically includes some

vehicle and foot traffic in the survey area; however, off-road vehicle use (G-14) is not covered under this action. Impacts associated with off-road vehicle use are covered under G-14.

G-24, Tree Removal

This action includes removing trees within ADOT right-of-way or easement. Trees may be removed using a chainsaw to limb, lop, and buck stems and trunks, or a bulldozer or front-end loader to push or drag trees. Stumps are cut close to the ground to a maximum height of four-inches. Typically, stumps are treated with an herbicide (G-28), the timing of which depends on the treatment plan for the herbicide being used. Limbs, trunks, stems and slash are cut into lengths no longer than six-feet. All cut trees would be chipped, and/or piled and burned (G-26). Large stems, tree trunks and root balls may be bucked, stacked, and hauled away for off-site disposal, or they may be burned (G-26). Suitable wood may also be hauled to a timber mill off-site. This action does not include herbicide use or burning vegetation. Refer to G-28 and G-26 for impacts associated with herbicide use and burning vegetation, respectively.

G-25, Trenching

Trenching is the act of digging a trench to install pipe, conduit or cables underground. Under this action, trenches would be a minimum of four-feet deep and is typically done using earth moving equipment such as a trencher, excavator, backhoe, or bobcat. Excavated material is typically cast to the side of the trench as it is dug. Once dug, temporary shoring may be required to stabilize the sides of the trench while the work is being completed within the trench, or the slopes of the trench would be laid back to the appropriate extent to avoid temporary shoring. After the work is completed, the shoring would be removed and native material would be backfilled. Excess excavated material would be disposed of on or off site, as necessary. This action does not include trenching utilized for irrigation (RD-04). Impacts associated with trenching for irrigation are covered under RD-04.

G-26, Vegetation Treatment- Burning

This action covers the removal of unwanted plant material or waste such as brush, tumbleweeds, and forest litter, by using fire to reduce fuel sources for wildfires, or to control brush by non-chemical means. Prescribed burns can be completed with three methods: controlled broadcast, pile burning within the right-of-way or maintenance yard, or tumbleweed burning. Controlled broadcast burns involve manipulating the fire so that it burns everything within a pre-designated area. Pile burning is more commonly used and involves stacking cut vegetation to dry (typically for a minimum of 6 months) and then burning the pile. Cutting/trimming vegetation or removing trees is not included in this action. Impacts associated with cutting vegetation and removing trees are covered under G-27 and G-24, respectively. Tumbleweed burning includes burning only tumbleweeds. Tumbleweeds, or Russian thistle (*Salsola* spp.), may be gathered and piled, as necessary, and burned while manipulating the fire to avoid other plant species that may be present within the action area. All burning activities require approval and planning prior to burning and water trucks must be present within the action area during the burn. Piles to be burned must not exceed five-feet tall, 20-feet wide, or 20-feet long.

G-27, Vegetation Treatment- Manual Cutting, Trimming, or Pruning

This action covers the manual cutting of shrubs, brush and herbaceous vegetation, as well as trimming or pruning low-lying vegetation and trees. Removing trees is not covered under this action. Impacts associated with tree removal are covered under G-24. Manual cutting, trimming or pruning involves using a chainsaw to limb, lop, and buck thicker stems, and shears or trimmers to trim smaller stems and leafy vegetation. For vegetation to remain viable, no more than 25 percent of the foliage should be removed in any year and pruning should be scheduled for the appropriate season relative to the type of plant involved. Generally,

deciduous vegetation and conifer trees should be pruned during the winter, when they are dormant. Vegetation in the low desert areas can be pruned lightly at any time during the year, but heavier pruning should be restricted to the cooler months. Cut vegetation may be chipped and scattered where feasible for erosion control or piled for burning. This action does not cover burning vegetation. Impacts associated with vegetation burning are covered under G-26.

G-28, Vegetation Treatment- Herbicide

Vegetation within ADOT's right-of-way or easement, including noxious and invasive vegetation, may require herbicide treatments. Broadcast herbicide treatments are applied with a spray-truck whereas spot treatments utilize a hand-wand sprayer. Spray-trucks drive the roadway shoulder and broadcast herbicide within the right-of-way. Spot treatments are used to target individual plants. This treatment is typically administered with a hand-pump sprayer by certified personnel on-foot or on an off-highway vehicle. This action does not include off-road vehicle use. Impacts associated with off-road vehicle use are covered under G-14.

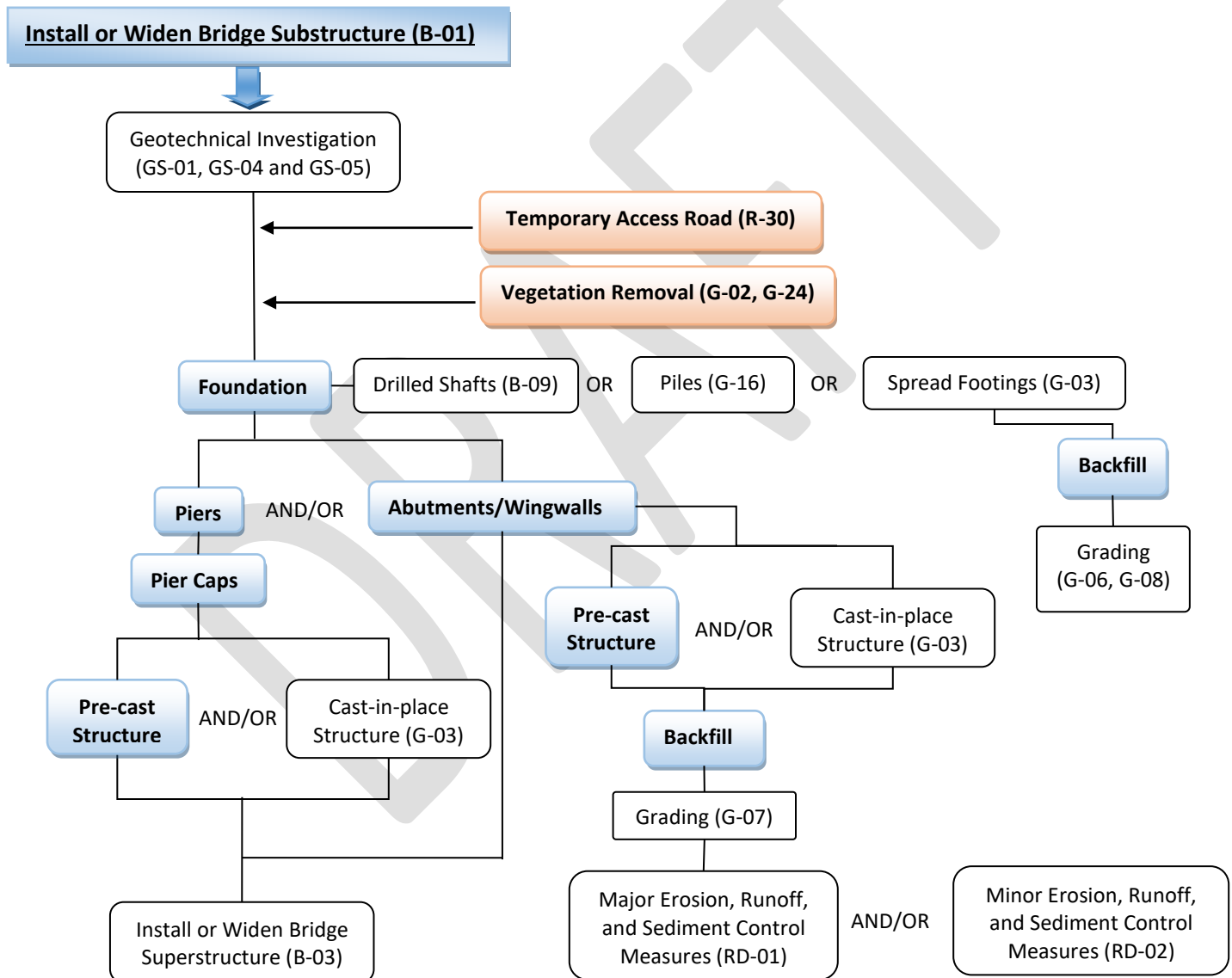
G-29, Vegetation Treatment- Mowing

This action covers using a mower to cut shrubs, brush and herbaceous vegetation to a short, consistent length within ADOT's right-of-way or easement. Mowers can be driven with or without a boom axe attachment and are typically driven along the shoulder or within the recovery area. This action may be used prior to clearing and grubbing (G-02). Refer to G-02 for impacts associated with clearing and grubbing.

Bridge Group Activities (B)

B-01, Install or Widen Bridge Substructure- Ephemeral, Intermittent/Perennial

This activity includes installing or widening spread footings, piers, pier caps, abutments, and wingwalls. A geotechnical investigation (GS-01, GS-04 or GS-05) would be conducted prior to construction to determine the required foundation depths for the structure per the conditions of the action area. The installation of a temporary access road (R-30) and vegetation removal (G-02 and G-24) may also be required prior to construction of this activity. A foundation such as drilled shafts (B-09), driven piles (G-16), or spread footings (G-03) would be installed to support the piers, abutments and wingwalls. If spread footing foundations are installed, a maximum of 10-feet would be over-excavated to install the foundation. Over-excavated areas surrounding the footing would be backfilled and graded (G-06 or G-08).



Next, the abutments and wingwalls and/or piers are constructed atop the foundations. If piers are installed, the pier caps would then be constructed on top of the piers. Pier caps may be pre-cast and placed on the piers; or cast-in-place (G-03) and constructed on the piers. Similarly, abutments and wingwalls may be constructed of pre-cast materials, including mechanically stabilized earth walls, or cast-in-place (G-03). The

construction or installation of the abutments and/or wingwalls would also be over-excavated a maximum of 10-feet to install the feature. Finally, the abutment and/or wingwall is backfilled and the backfilled material is graded (G-07) per the design requirements. Installation or extension of a bridge substructure is typically completed in conjunction with the installation or extension of the superstructure (B-03).

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-02, Repair or Replace (within existing footprint) Bridge Substructure- Ephemeral, Intermittent/Perennial

This activity includes repairing, or replacing spread footings, piers, abutments, or wingwalls within the footprint or slight variation of the existing substructure. Repairing these features may include cleaning the damaged area, patching damaged or worn areas with the appropriate treatment and/or treating the feature to prevent further damage. Severely damaged or worn areas may require removal and replacement of the damaged area or feature which could include actions such as jackhammering (G-10) and saw-cutting (G-20). Refer to G-10 and G-20 for impacts associated with jackhammering and saw-cutting. Stabilization of the superstructure with temporary shoring may be necessary to complete the required repairs or replacements. Temporary shoring may result in additional temporary ground disturbance for a maximum of 25-feet beyond the footprint of the existing substructure. The installation of a temporary access road (R-30) and vegetation removal (G-02, G-24, and G-27) may be also be required prior to construction of this activity. Refer to R-30, G-02, G-24 and G-27 for impacts associated with temporary access road, and vegetation removal.

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

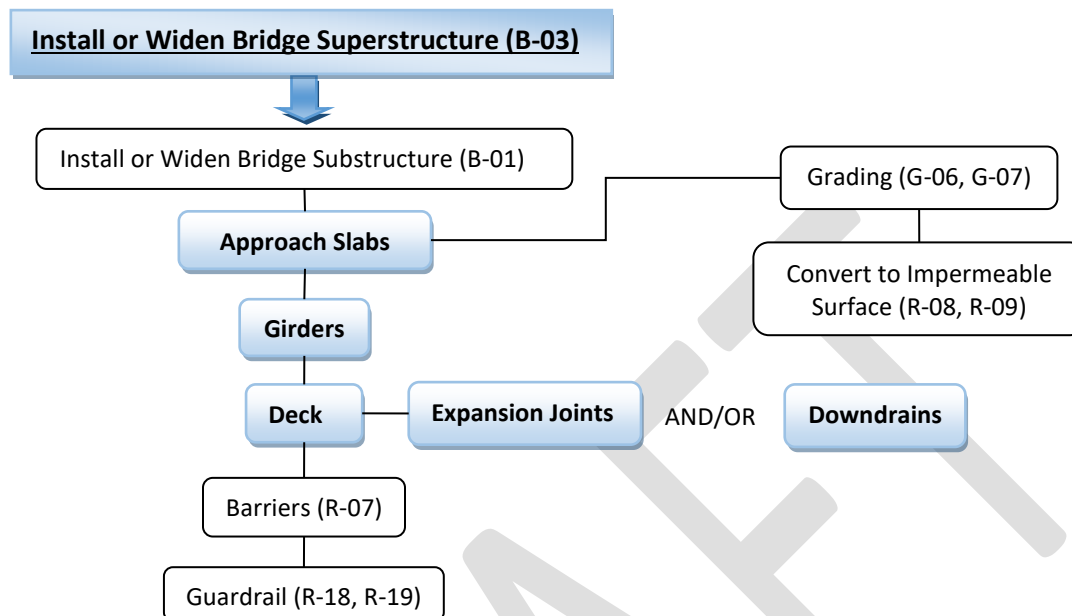
Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-03, Install or Widen Bridge Superstructure- Ephemeral, Intermittent/Perennial

This activity includes installing or widening the girders, bridge deck, expansion joints, downdrains, bridge barriers, and approach slabs. Installation or extension of these features would occur after the installation or extension of a new substructure (B-01). To install a bridge superstructure, the approach slabs, if needed, would be installed atop the abutments on either side of the bridge, and the girders would be set upon the

substructure. The bridge deck would then be installed along with the expansion joints and/or downdrains. Finally, barriers would be constructed on the deck (R-07). After the superstructure is complete, guardrail (R-18 or R-19) may be connected to the bridge barriers. Stabilization of the superstructure with temporary shoring may be required to complete this activity. Temporary shoring may result in additional temporary ground disturbance for a maximum of 25-feet beyond the footprint of the superstructure.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), and a temporary watercourse crossing (B-15 or B-16) may be required. Additionally, the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) would be installed outside of the watercourse to protect water quality.

B-04, Repair or Replace (within existing footprint) Bridge Superstructure- Ephemeral, Intermittent/Perennial

This activity includes repairing, or replacing the girders, bridge deck, expansion joints, downdrains, bridge barriers or approach slabs within or slight variation of the existing footprint. Repairing these features would include cleaning the damaged area, patching the damaged or worn spot with the appropriate treatment, and/or treating the feature to prevent further damage. Severely damaged or worn areas may require removal (G-10, G-20) and replacement of the damaged area or feature. Stabilization of the superstructure with temporary shoring may be required to complete the required repairs or replacements. Temporary shoring may result in additional temporary ground disturbance for a maximum of 25-feet beyond the footprint of the existing superstructure. Containment measures may be required below the superstructure to catch falling debris and material during construction.

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), and a temporary watercourse crossing (B-15 or B-16) may be required. Additionally, the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) would be installed outside of the watercourse to protect water quality.

B-05, Bridge Removal- Ephemeral, Intermittent/Perennial

This activity includes the removal of an existing bridge in its entirety. Removal of an existing bridge is done by first dismantling the superstructure, followed by the substructure. The superstructure may be removed layer by layer, starting with the pavement (R-20) and ending with the girders, or it may be completely separated from the substructure, cut into manageable pieces (G-10 or G-20), and removed via crane or other vertical lift. The use of a crane or other vertical lift typically requires a crane pad and/or a temporary access road (R-30) to be constructed. The superstructure may be loaded directly onto trucks and disposed of properly or may be placed in a lay-down yard or staging and stockpiling area (G-22) and then hauled away. Once the superstructure is removed, the substructure, including the approach slabs, abutments, wingwalls, and piers, would be parceled into manageable pieces (as needed) (G-10, G-20) and hauled away. Or similarly to the removal of the superstructure, it may be separated from the ground surface and removed via crane or other vertical lift. Rather than the structure being entirely removed, the piers may be cut to the existing ground surface elevation, as determined by specific project requirements. Containment measures may be required during portions of deconstruction to catch falling debris and material. Refer to R-20, G-10, G-20, R-30, and G-22 for impacts associated with removing pavement, jackhammering, saw-cutting, temporary access roads, and staging/stockpiling locations, respectively.

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

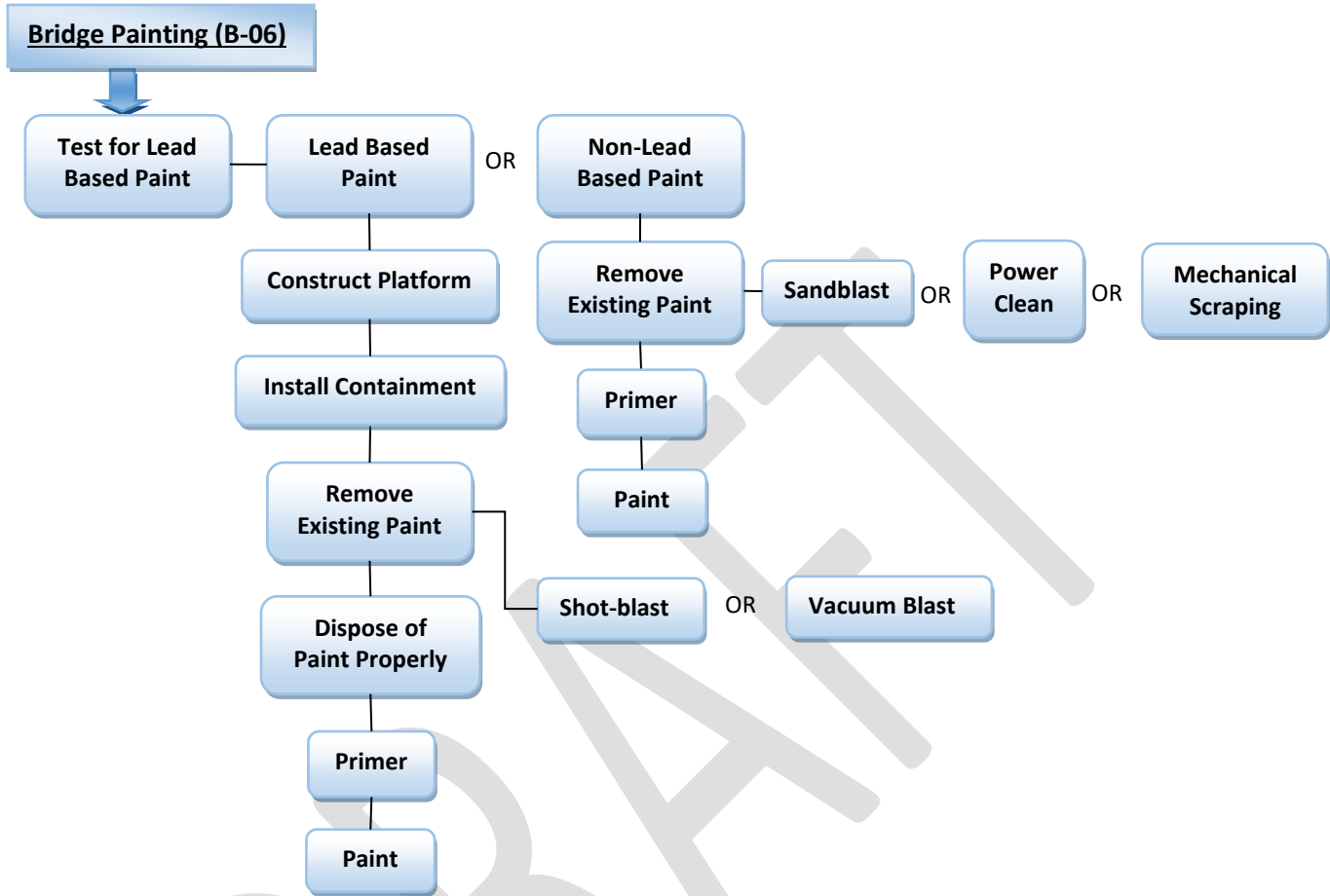
Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-06, Bridge Painting- Ephemeral, Intermittent/Perennial

This activity includes painting any portion of the substructure or superstructure of an existing bridge. To paint an existing bridge, first the existing paint on the structure is tested for lead-based paint. Any detected lead-based paints require a work platform to be constructed and a containment system to be installed. Once the containment system is in place, the paint is removed via shot-blasting or vacuum blasting and disposed of

properly. Paints that do not contain lead are removed by either sandblasting, power cleaning, or mechanically scraping to expose a clean surface. A primer is then applied, followed by the appropriate paint type. Enclosure measures may be required to contain overspray.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. To protect the water quality, the appropriate temporary erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-07, Cofferdams

A cofferdam is a temporary watertight enclosure that is constructed within a watercourse around the action area for construction activities that require a dry environment. Cofferdams are often used in dewatering (B-08) to enclose the action area. Cofferdams may also be constructed around the construction footprint in an intermittent watercourse to protect the area from inundation during the period when there is potential for surface water. Cofferdam design and construction can vary greatly based on the requirements of the project,

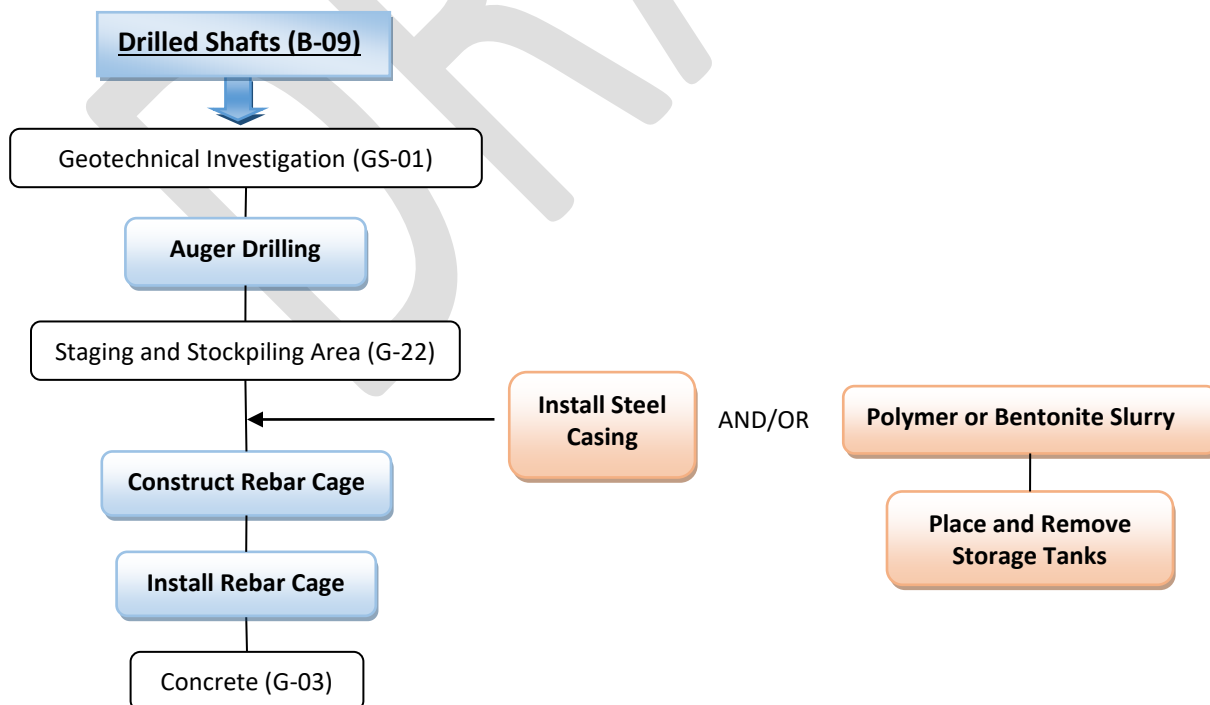
and may consist of materials such as timber, steel, concrete or plastic, or a combination of these materials. Once project construction is complete, cofferdams are typically removed.

B-08, Dewatering

This activity involves the removal or draining of water from a constructed or naturally occurring enclosure in a watercourse. Dewatering is often accomplished by first constructing a barrier or enclosure such as a cofferdam (B-07) around the action area within a watercourse. Surface water is subsequently removed or drained from the action area with a pump, hydro-vacuum (G-09), or water diversion to expose the bottom of the watercourse allowing work activities to occur in a dry environment. Water that is removed from the action area goes through erosion, runoff, and sediment control measures (RD-01 or RD-02) to remove sediments that may be present within the water. After sediments are removed, the water is pumped or released back into the watercourse downstream of construction activities. Removing or draining water from an existing enclosure in the action area, and temporary diversion of streams or channels to direct surface water away from the action area are also considered dewatering. Water diversions may include a barrier such as a cofferdam (B-07) within the watercourse to isolate the action area from surface water; or the construction of a channel, pipe or culvert, or installation of a pump to convey surface water around the construction footprint.

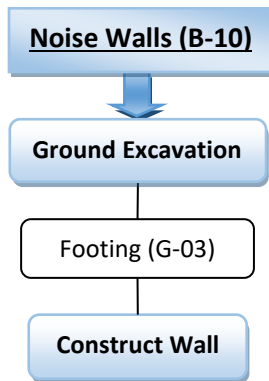
B-09, Drilled Shafts

Drilled shafts are a form of deep foundations for a structure. To install a drilled shaft an auger is used to drill a hole of appropriate diameter and depth as determined from a geotechnical investigation (GS-01). A rebar cage is constructed at a nearby staging area (G-22) and then installed in the hole. Finally, concrete is poured or pumped into the drilled hole to complete the foundation (G-03). Sometimes temporary or permanent steel casing is placed in the hole or a polymer or bentonite slurry is injected into the shafts to prevent the hole from collapsing. If a polymer or bentonite slurry is used, a staging or stockpiling area (G-22) would be required within the action area for large storage tanks to produce the slurry. Refer to G-22 for impacts associated with staging and stock piling



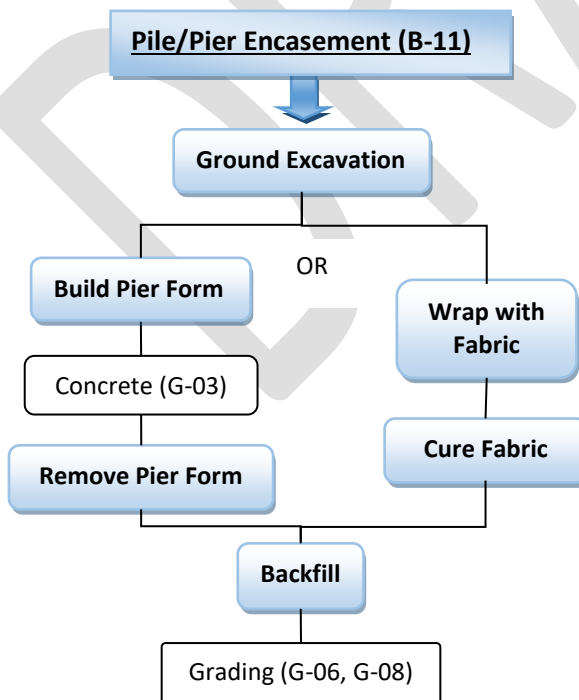
B-10, Noise Walls

Noise walls are solid obstructions built between a roadway and housing or sensitive land use area. They are typically constructed of concrete or masonry and run parallel to the roadway within or along the edge of the right-of-way. To install a noise wall, the extent of the wall is excavated using a trencher, excavator, backhoe, or bobcat, rebar is installed for reinforcement, and a concrete footing is poured (G-03). Once the footing is complete, the vertical portion of the wall is constructed atop the footing. Noise walls can also be constructed on top of retaining walls or bridges.



B-11, Pile/Pier Encasement- Ephemeral, Intermittent/Perennial

This activity includes encasing piles or piers on an existing structure. Encasing piles or piers requires the area around the existing pile or pier to be excavated and exposed. A form would be built around the pile or pier and concrete is poured to improve structural integrity of the support member (G-03). Once the concrete has cured, the form is removed and the pile or pier would be backfilled and graded to match the surrounding ground surface elevation and slope (G-06 or G-08). The encasement can also take the form of proprietary fiber-reinforced fabrics that are wrapped around the structure and cured in place to create external reinforcement.



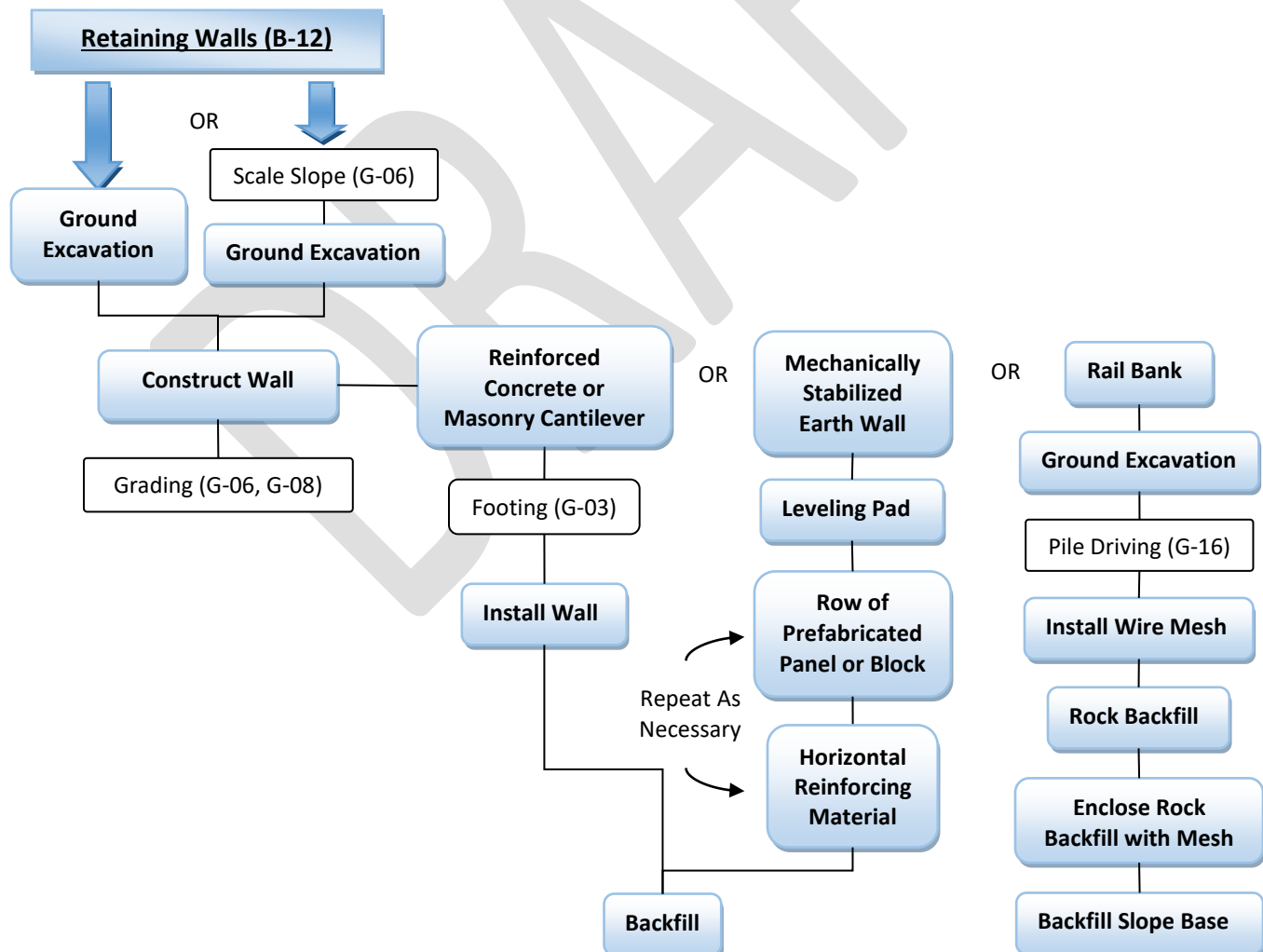
If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-12, Retaining Walls

This activity includes the installation of retaining walls such as reinforced concrete or masonry, mechanically stabilized earth, or rail bank retaining walls. A retaining wall is a structure that holds back soil or rock from a building, structure or area. Retaining walls prevent downslope movement or erosion and provide support for vertical or near-vertical grade changes. They may be constructed on, or at the base of a slope, and require backfill and grading to contour the slope to the wall; or they may be tied into an existing embankment and require the existing slope to be scaled or cut-back prior to construction (G-06).

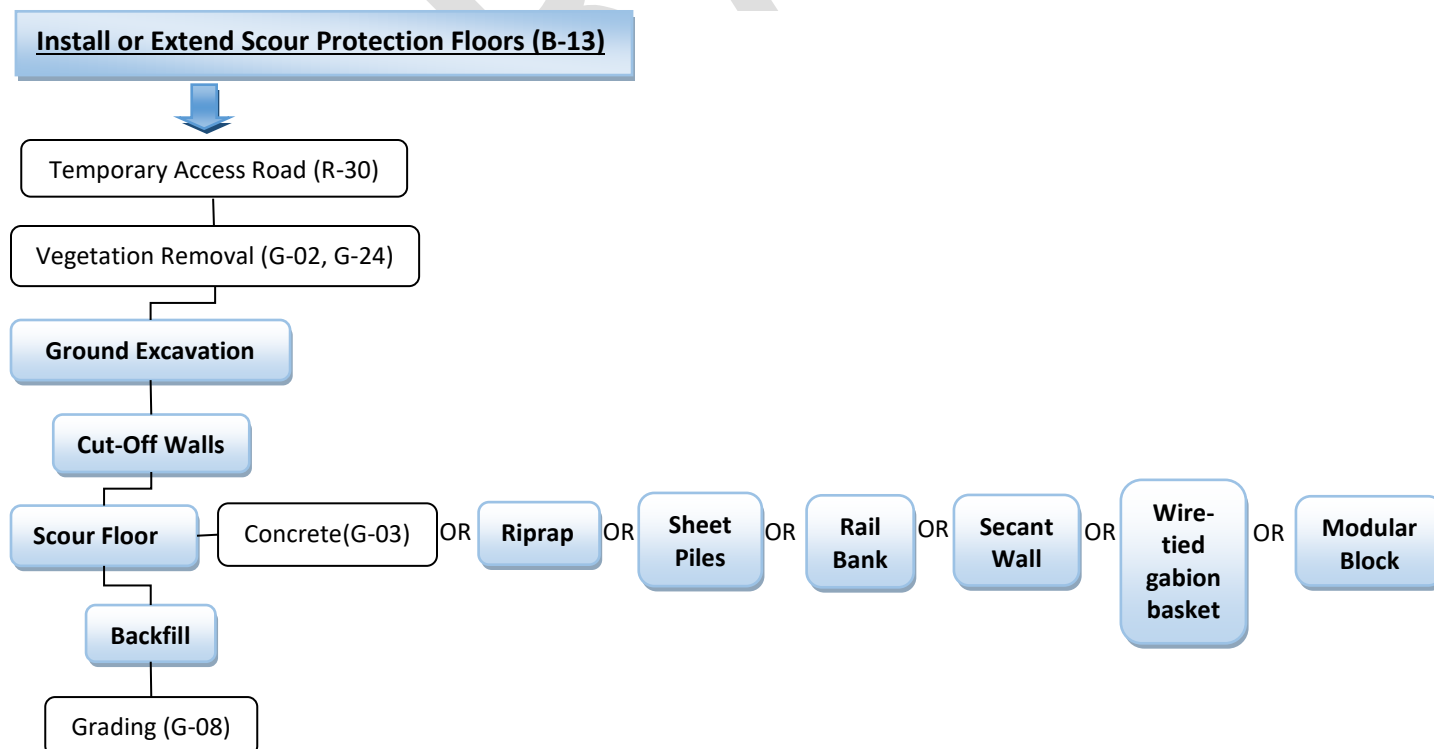


To install reinforced concrete or masonry walls, a footing is constructed (G-03) and then the vertical portion of the wall is attached to the footing. To install mechanically stabilized earth retaining walls, a leveling pad is first installed (G-03), and then prefabricated panels or blocks are installed in lifts on the leveling pad. Between each layer of prefabricated panels or blocks, horizontal reinforcing material, is installed to anchor the prefabricated panel or block into the soil behind the wall. To install railbank retaining walls, the base of the slope is first excavated. Then the rails are anchored by driving (G-16) long rails at a 30-degree angle into the base of a slope; or by driving (G-16) short rails at a 30-degree angle into the slope, in addition to the long rail in the base of the slope, to form an A-frame. Next, galvanized wire mesh is installed between the long rails and along the excavated base, and slope to form an enclosure. The wire mesh enclosure is backfilled with rock and then wire mesh is installed over the top of the rock back fill to entirely enclose the rock. Finally, over excavation at the base of the slope is backfilled with native material (G-06).

B-13, Install or Extend Scour Protection Floors- Ephemeral, Intermittent/Perennial

This activity includes installing or extending scour protection floors and/or cut-off walls beneath or adjacent to an existing bridge substructure. Scour protection floors are installed to stabilize the bed of a watercourse and prevent future erosion. Cut-off walls which extend deeper than the scour protection floor, are often installed on the upstream and downstream edges of the scour protection floor to prevent undercutting and erosion of the scour protection floor and associated bridge substructure.

Materials to construct scour protection floors and/or cut-off walls may be comprised of concrete, riprap, sheet piles, rail bank, secant wall, wire-tied gabion baskets, or modular blocks. Installing or extending scour protection floors and/or cut-off walls require the extent of these features to be excavated with a trencher, excavator, backhoe, or bobcat, and then the desired floor material is installed. Once construction of the scour protection floors and/or cut-off walls is complete, the floor may be buried with the native material that was excavated from the watercourse for the scour floor and cut-off wall installation. The installation of a temporary access road (R-30) and vegetation removal (G-02 and G-24) may also be required prior to construction of this activity.



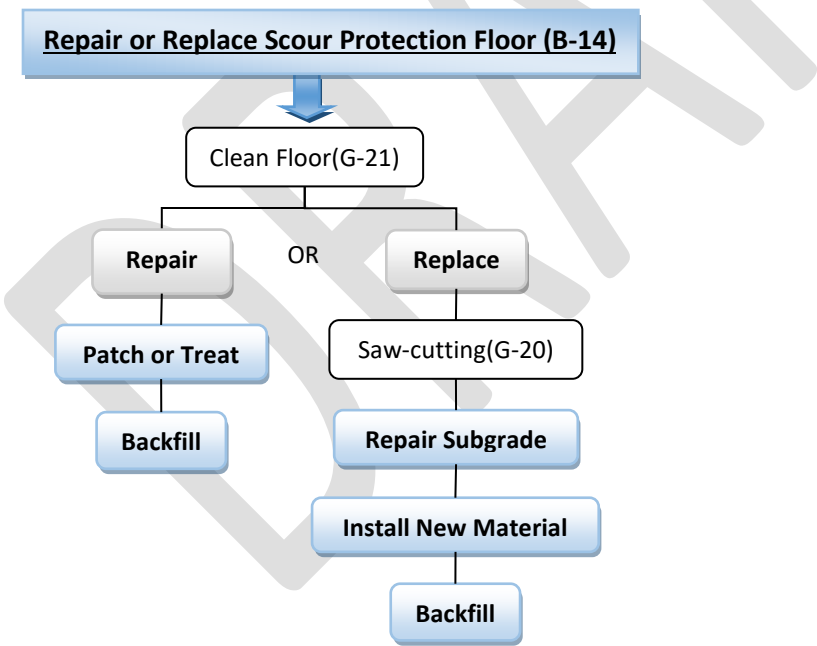
If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-14, Repair or Replace (within existing footprint) Scour Protection Floors- Ephemeral, Intermittent/Perennial

This activity includes repairing or replacing scour protection floors and/or cut-off walls within or slight variation of the footprint of the existing scour protection floor and/or cut-off wall. Repairing a scour protection floor or cut-off wall requires the floor or wall to first be cleaned of sediment and debris (G-21), and then patching the damaged or worn spot with the appropriate treatment, and/or treating the feature to prevent further damage. Severely damaged or worn scour protection floors or cut-off walls may require removal of the damaged area by saw-cutting (G-20), repairing the subgrade to meet the appropriate grade and compaction requirements and then installing the new material.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

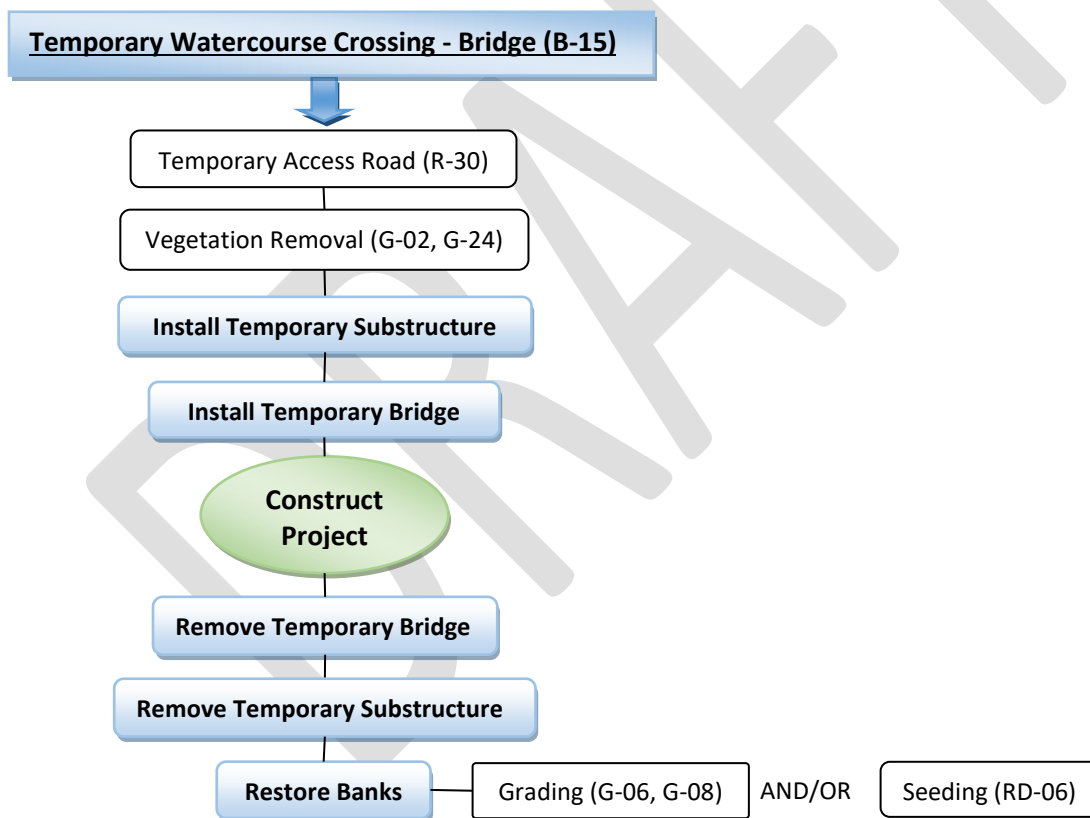
Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures

(RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

B-15, Temporary Watercourse Crossing- Bridge

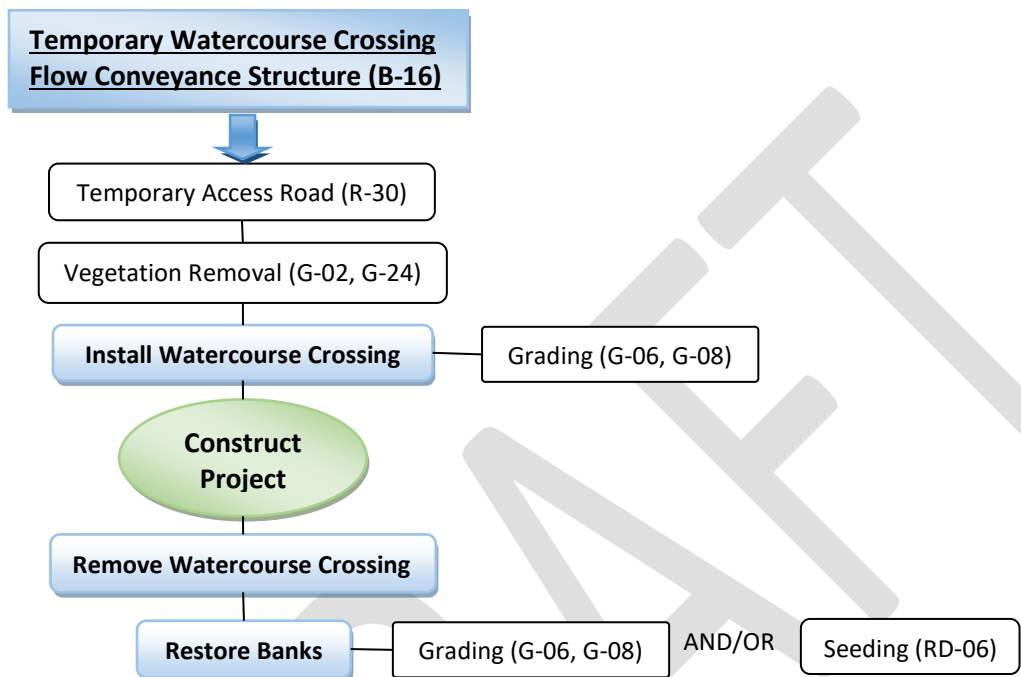
A temporary watercourse crossing in the form of a bridge is a temporary structure placed across a watercourse from bank to bank to allow personnel, vehicles, and equipment to cross the watercourse while maintaining stream flows that are present or may become present during a construction activity. A temporary bridge can be comprised of a variety of different materials including steel, concrete and timber; and once installed, would span the watercourse. The abutments of the temporary bridge would impact the banks of the watercourse, but no portion of the temporary bridge would contact the surface water in a watercourse channel. Temporary watercourse crossings that contact surface water are covered under B-16. A temporary access road (R-30) and/or the use of heavy machinery would likely be required to install a temporary bridge. Once construction is complete, the temporary bridge crossing would be removed and impacted areas along the banks of the watercourse would be restored to the maximum extent possible.



B-16, Temporary Watercourse Crossing- Flow Conveyance Structure

A temporary watercourse crossing in the form of a flow conveyance structure is a structure or material placed within and across a watercourse to allow personnel, vehicles, and equipment to cross the watercourse while maintaining stream flows that are present or may become present during a construction activity. Temporary flow conveyance structures can be comprised of a variety of different materials that can be used independently or together such as a temporary platform, mats, pipes, or clean gravel. Temporary flow conveyance structures would occur within the watercourse channel and may span the low flow channel or

from bank to bank, and may contact surface water, if it is present. These structures would maintain stream flows through the action area; however, flow capacity may be temporarily restricted within the footprint of the flow conveyance structure while it is in place. Temporary watercourse crossings that only impact the banks of a watercourse and do not contact surface water, are covered under B-15. A temporary access road (R-30), vegetation removal (G-02, G-24) and/or grading (G-06, G-08) would likely be required to install a temporary conveyance structure. Once construction is complete, the flow conveyance structure would be removed and impacted areas would be restored to the maximum extent possible.



B-17, Repair or Replace (within existing footprint) Walls

This activity includes repairing or replacing walls, such as noise walls and retaining walls, within or a slight variation of the footprint of the existing structure. Repairing these features may include patching damaged or worn areas with the appropriate treatment and/or treating the feature to prevent further damage. Severely damaged walls may require removal and replacement of the damaged area which could include actions such as jackhammering (G-10) and saw-cutting (G-20). Refer to G-10 and G-20 for impacts associated with jackhammering and saw-cutting. Replacing portions of a retaining wall may require any spilled backfilled material to be replaced and graded (G-07).

Geotechnical Services Activities (GS)

GS-01, Drilling

Drilling is used to retrieve subsurface soil and rock samples to be analyzed and tested. The drill method is determined by the type of soil and rock to be penetrated, groundwater conditions and the type of samples required. Four commonly used methods include hollow-stem augers, rotary drilling, percussive air drilling and core drilling. To perform drilling, a drill rig is positioned over the boring location, hydraulic rams are used to level the rig and a derrick is raised. The construction of a drill pad may be required if drilling is occurring on a slope. The size of the drill pad depends on the drill rig being used, but commonly a 30-foot by 30-foot pad is utilized. Drill pads are constructed by adding fill material to the slope or cutting the slope to create a level drill pad (G-06 or G-07). A temporary access road (R-30) or off-road vehicle use (G-14) may be required to access the boring locations.

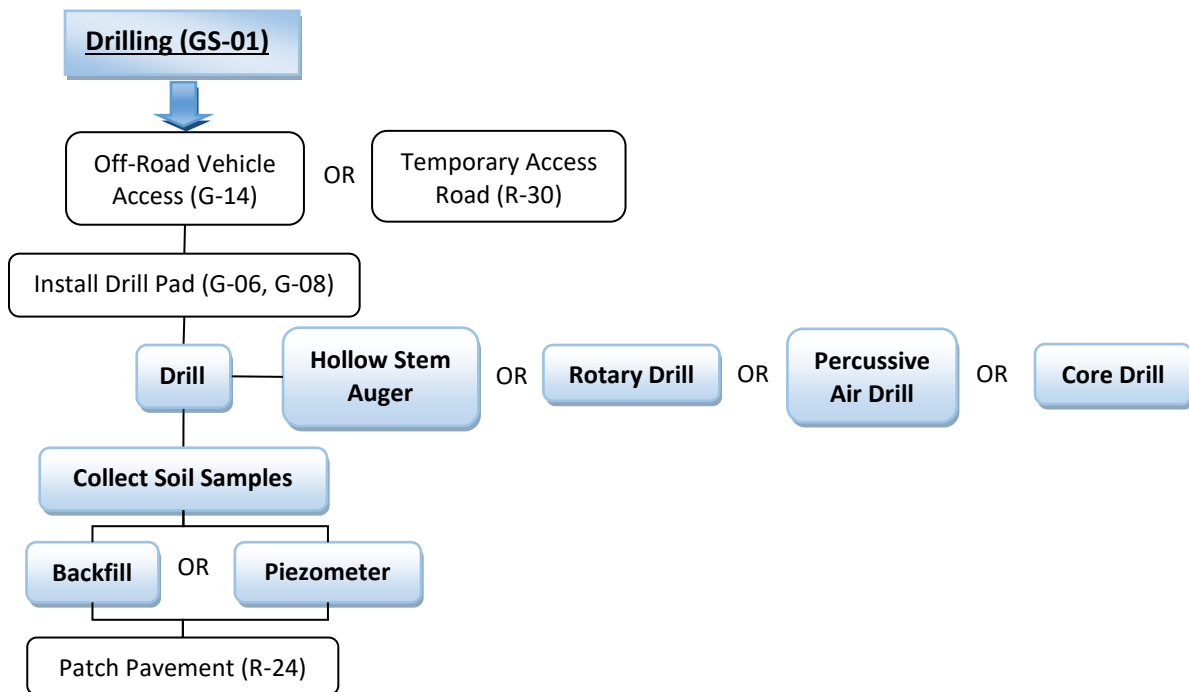
Hollow-stem augers- Commonly used in cohesive or granular soil, above groundwater level. Hollow-stem auger consists of a pilot bit and drill rod that is encompassed by a hollow outer section. Auger sections are 5 feet in length, and are attached to the drive head, which turns the auger to advance it into the soil. Soil samples are obtained at pre-determined intervals. At the desired sampling depth, the auger is disconnected from the drive head, the drill rod and pilot bit are hoisted out of the hollow section, a soil sampling device is attached to another section of drill rod, and the sampler is lowered back into the hollow auger section. Once a soil sample is obtained at the desired depth, the drill rod and pilot bit are once again placed inside the hollow auger section, the drive head of the drill rig is reattached to the auger, and the auger is advanced to the next sampling depth. This process is repeated until the augers have been advanced and soil samples have been obtained to the specified depth of the boring. Raising and lowering of the drill rod into and out of the auger sections is accomplished with wire-line hoists that run up and over the derrick and are attached to the base of the drill rig.

Rotary drilling- Commonly used in dense or granular soil, soft weathered rock that is difficult to penetrate with an auger or below groundwater level. A drill bit is used to cut into the substrate and drilling fluids support the borehole and lift cuttings to the surface. A casing is advanced by being driven or rotated into the borehole when the desired sampling depth is reached or when the borehole can no longer be supported with drilling fluids. Soil samples are obtained at pre-determined intervals. Once the borehole is cased and a sample is retrieved, drilling resumes.

Percussive air drilling- Preferred in alluvial gravels. Similar to rotary drilling but the drill bit cutting action is aided by an air operated down-hole hammer. Cuttings are blown to the surface by the air, and the borehole is supported by advancing a casing simultaneous with the drill rod.

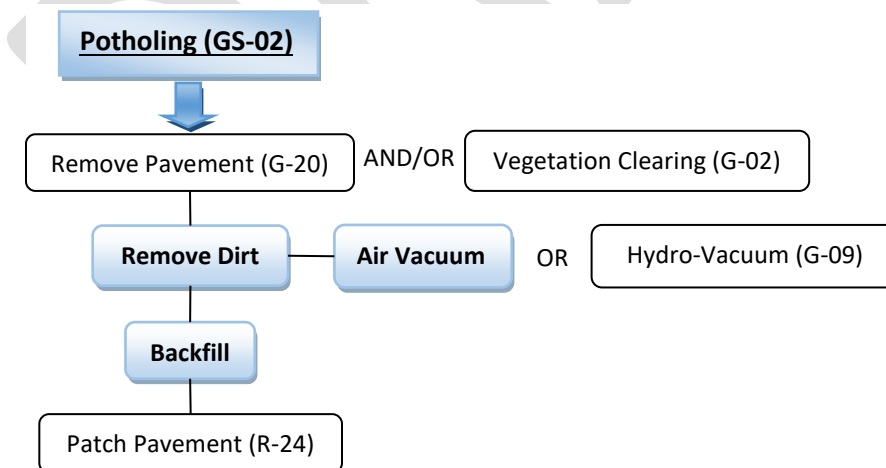
Core drilling- Primarily used to bore through rock. Rotating diamond bits cut through the rock while circulating drilling fluids such as water, mud, compressed air or compressed air with foam additive cools the bit, and lift cuttings to the surface. The bits are circular and allow the cut rock to pass into a 5-foot long hollow barrel. At every 5-foot interval until the desired sampling depth is reached, drilling is halted and the full barrel is retrieved and replaced with an empty barrel by a wire line.

After the investigation is complete, the bore hole is typically backfilled to the current ground surface elevation and patched if the boring occurred on a paved surface (R-24). Bore holes may also be used to house piezometer equipment. Piezometer installation involves placing the piezometer equipment (i.e. sensor and cable, tubing, or standpipe) into the bored hole and filling the hole with grout, sand, and/or bentonite.



GS-02, Potholing

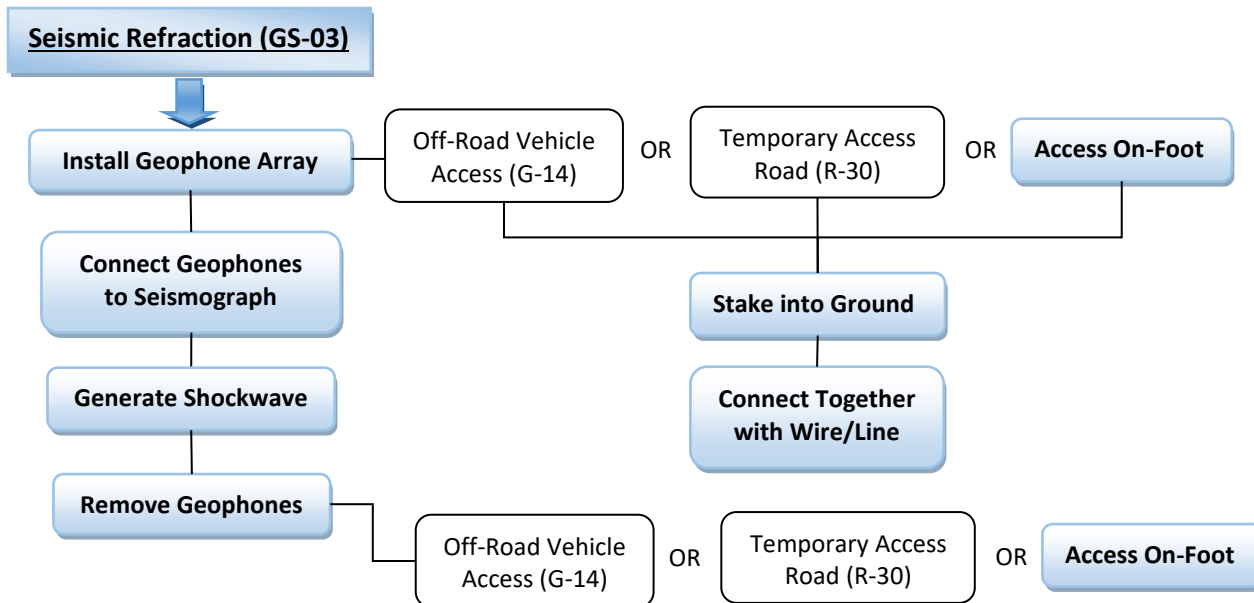
Potholing is an excavation process that uses a vacuum to expose and locate underground utilities and structures. Potholing takes place in previously disturbed areas to confirm the location of existing utilities and structures. Potholing requires the ground surface to be exposed; therefore, paved areas will first require a portion of the pavement to be saw-cut and removed (G-20), and vegetation clearing (G-02) may be necessary. Once the ground surface is exposed, an air-vacuum or hydro-vacuum (G-09) excavator removes the dirt to expose the sub-surface condition. After the investigation is complete, the pothole is backfilled to the current ground surface elevation, and paved areas are leveled and patched (R-24).



GS-03, Seismic Refraction

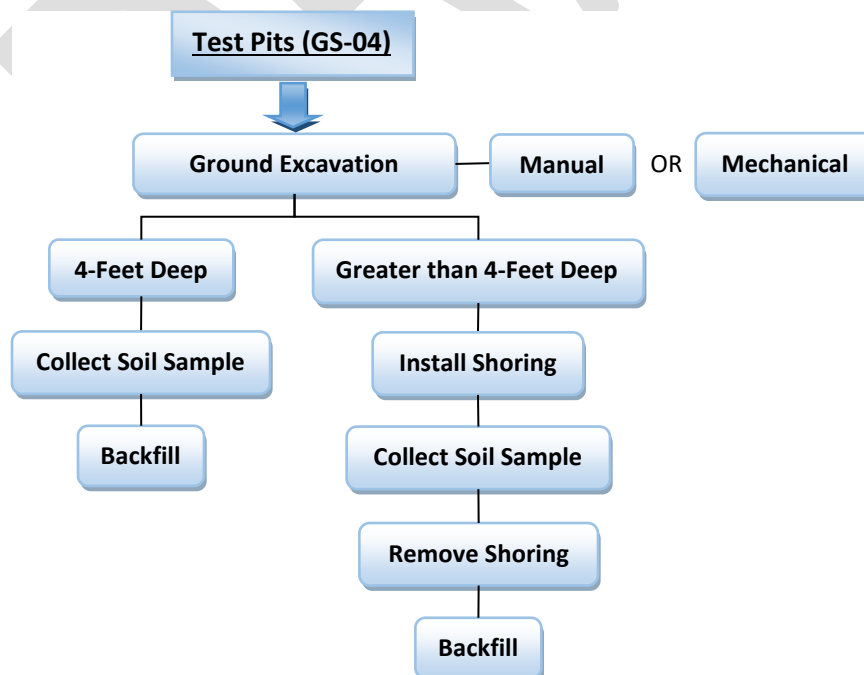
Seismic refraction utilizes the refraction of seismic waves on geologic layers and rock/soil units, to characterize the subsurface geologic structure and conditions. To conduct seismic refraction, an array of geophones are pounded into the ground on stakes and connected together with wire or lines to a seismograph. A controlled shot of seismic energy such as a hammer blow generates a shock wave that travels through the test location

by refraction along material boundaries. The energy is received by the geophones, analyzed for structure and velocity by the seismograph, and modeled using either layer-based or tomographic techniques. Once the seismic refraction test is complete, the geophone stakes and connecting wires are removed. Seismic refraction surveys typically install and remove the geophone stakes on-foot.



GS-04, Test Pits

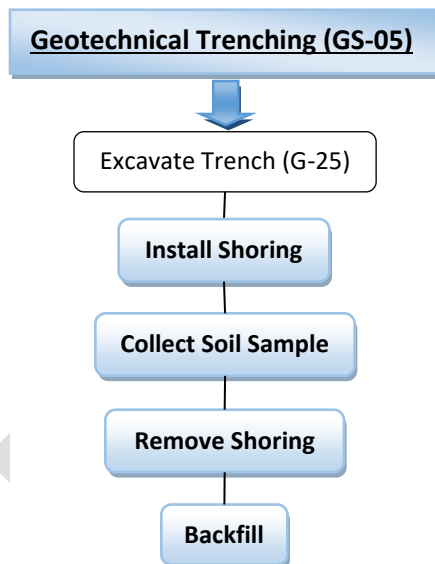
Test pits are manually dug or mechanically dug with an excavator, backhoe, or bobcat to allow detailed visual examination and sampling of the sub-surface condition, at desired depths. Test pits may vary greatly in size and depends on the desired sample depth, sample type, soil composition and groundwater conditions. Dewatering (B-08) may be necessary if ground water is encountered during construction of a test pit. Refer to B-08 for impacts associated with dewatering. Typically, the minimum size of a test pit is three-feet wide by five-feet long, or four-feet wide by six-feet long, at a depth of four-feet.



Test pits at four-feet below the ground surface typically do not require temporary shoring, but similar to trenching (GS-05), test pits at depths greater than four-feet do require temporary shoring as well as additional lateral excavations to slope the walls of the pit for safety purposes. Once the investigation is complete, temporary shoring would be removed and the disturbed area would be backfilled to the current ground surface elevation. Off-road vehicle use (G-14) or a temporary access road is typically required (R-30) for access to test pits. Refer to G-14 and R-30 for impacts associated with off-road vehicle use and temporary access roads, respectively.

GS-05, Geotechnical Trenching

Trenching for geotechnical services involves excavating a trench (G-25) to expose the sub-surface conditions and collecting a soil sample for the geotechnical investigation. The dimensions of the trench are dependent upon the equipment being used; however, trenching for geotechnical investigations are typically at least four-feet deep and require temporary shoring. Similar to test pit investigations (GS-04), deeper trenches require lateral excavations, or benches, for safety purposes. Once the desired depth of the trench is met and temporary shoring is installed to support the walls of the trench, soil sampling and the geotechnical investigation would occur. Once the investigation is complete, shoring would be removed, and the trench would be backfilled to current ground surface elevation.



Roadside Development Activities (RD)

RD-01, Major Erosion, Runoff, and Sediment Control Measures

Major erosion, runoff, and sediment control measures include all control measures that require the ground surface to be excavated or graded in order to install the control measure. This may include common measures such as mini-benching, slope roughening, rock plating, crown ditches, earthen dikes, drainage swales, lined ditches, stabilized construction entrance and exits, silt fence, sediment wattles, sediment logs, gravel bag protections, sediment traps, sediment control berms, and sediment basins. Erosion, runoff, and sediment control measures are installed during the construction of a project or after construction is complete. Thus, the installation of major erosion, runoff, and sediment control measures would occur in areas that will be disturbed by a construction project or have been previously disturbed as a result of the construction project. This activity does not include inlet and outlet stabilization measures (RD-03) or seeding activities (RD-06). Impacts associated with stabilization measures or seeding activities are covered under RD-03 and RD-06, respectively. Similarly, off-road vehicle use may be necessary to install major erosion, runoff, and sediment control measures, refer to G-14 for impacts associated with off-road vehicle use.

RD-02, Minor Erosion, Runoff, and Sediment Control Measures

Minor erosion, runoff, and sediment control measures include all control measures that do not require the ground surface to be excavated or graded in order to install the control measure. This may include applying rock mulch, geotextiles, erosion control blankets, soil binders, compost socks, rock berms, check dams, and fabric filters on the ground surface. Anchoring, such as pounding stakes, may be necessary to install some of these control measures. Installing measures such as rock mulch, geotextiles, erosion control blankets, soil binders, rock berms, check dams, may require manual or mechanical spreading of materials across the ground surface. Erosion, runoff, and sediment control measures are typically installed during the construction of a project or after construction is complete. Thus, the installation of minor erosion, runoff, and sediment, control measures would occur in areas that are will be disturbed or have been previously disturbed as a result of the construction project. Off-road vehicle use may be necessary to install minor erosion, runoff, and sediment control measures, refer to G-14 for impacts associated with off-road vehicle use.

RD-03, Inlet and Outlet Stabilization

Inlet and outlet stabilization is the installation of material at the inlet and/or outlet of a culvert, storm drain, spillways, downdrains, or catch basin to prevent erosion and slow the flow of surface water. Material used to stabilize inlets and outlets may include, concrete, shotcrete, engineered block, or riprap such as loose rock, grouted, or wire-tied riprap. These materials are installed by placing fill material or excavating the ground at the feature inlet or outlet to achieve or maintain positive flow (G-06, G-07, or G-08). Once the appropriate elevation and grade is achieved, the stabilization material is laid down. Impacts associated with grading are covered under G-06, G-07 and G-08.

Refer to G-03 for installation methods and impacts associated with concrete and shotcrete. Engineered block is installed by connecting interlocking blocks to form a solid surface. Loose rock riprap may be dumped or spread out to create a stabilized surface using earth moving equipment. To install grouted riprap, angular stones are placed at the inlet and/or outlet, and then grout is poured into the rock voids. Wire tied riprap is installed by first placing wire mesh baskets at the inlet and/or outlet, and then filling them with loose rock riprap. To form a stabilized surface, several wire mesh baskets are often connected to one another creating a mattress.

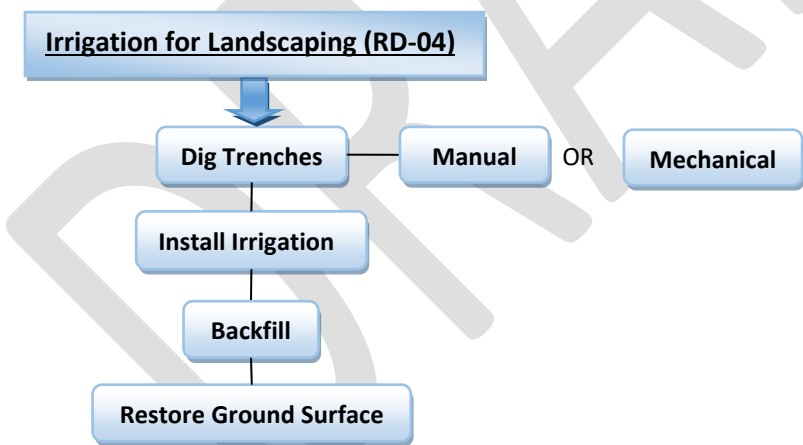
If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), and a temporary watercourse crossing (B-15 or B-16) may be required. Additionally, the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) would be installed outside of the watercourse to protect water quality.

RD-04, Irrigation for Landscaping

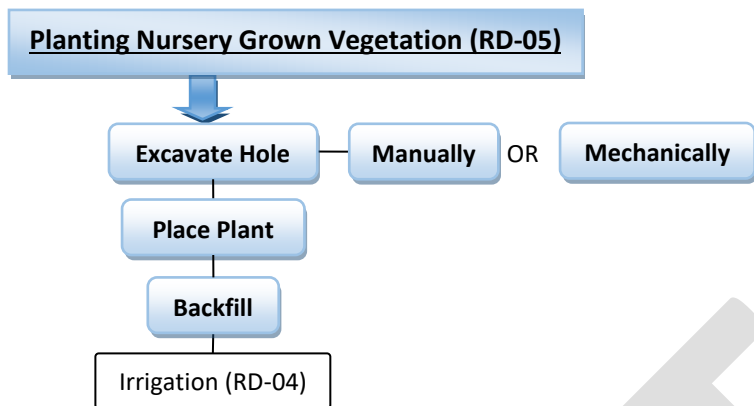
This activity includes the installation of irrigation equipment, and mainline and lateral irrigation lines which transport and deliver water to salvaged, or nursery grown vegetation that is planted in a project site. Mainline irrigation lines occur from the water source to an area where salvaged or nursery grown vegetation is planted. Lateral and sub-lateral irrigation lines extend from the mainline irrigation line to individual plants. Irrigation lines are installed by digging trenches manually with a shovel, or mechanically with a trencher. Trenches dug for mainline irrigation lines are a minimum of 18-inches deep, whereas lateral irrigation lines are a minimum of 12-inches deep. The maximum depth for both lines is two-feet. Once the irrigation lines are installed in the trenches, the trenches are backfilled and the ground surface is restored to the desired condition. Only trenching for the installation of irrigation lines is covered under this activity. Refer to G-25 for impacts associated with trenching for other activities.



RD-05, Planting Nursery Grown Vegetation

This activity includes planting nursery grown vegetation, such as containerized, bare root plants, tall pots or pole plantings to stabilize soils, prevent erosion, or to replace dead or severely damaged trees, shrubs, and ground cover plants. Planting nursery grown vegetation is typically associated landscaped areas along urban roadways; however, rural areas may also receive nursery grown vegetation to provide or restore habitat, create a living snow fence, control blowing dust, provide sand abatement, and/or replace damaged plants as a result of a repair. Planting nursery grown vegetation involves excavating a hole manually or mechanically to the desired width and depth, placing the plant within the hole, and backfilling the area. Irrigation (RD-04) is typically installed in urban environments or may be temporarily installed in rural areas for a minimum of two

years during the landscaping establishment period. Replanting salvaged plants is covered under RD-07; refer to RD-07 for associated impacts.

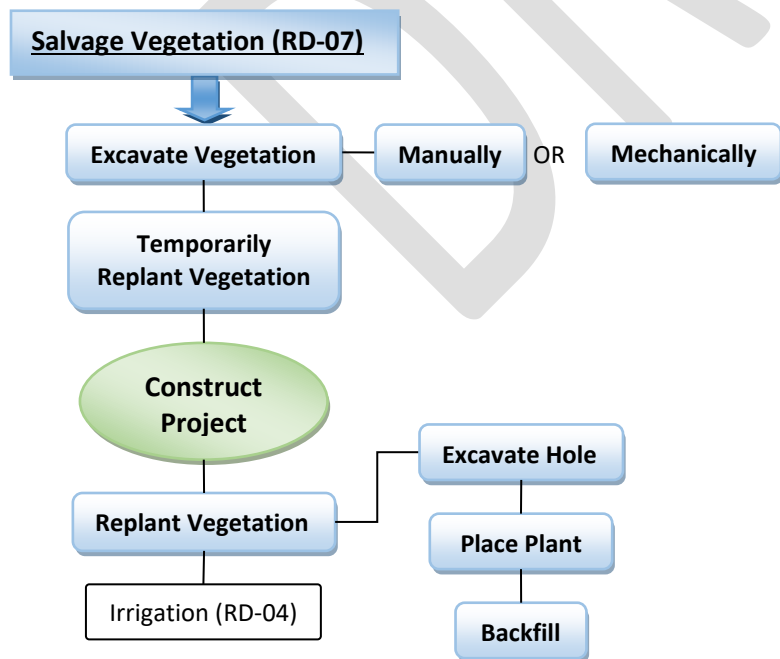


RD-06, Tilling and Seeding/Mulch Cover

A cover of grass and forb seeds, and/or wood-fiber or straw mulch are applied to eroded or disturbed areas as an erosion control practice to stabilize exposed soils and slopes. Prior to the application of seed and/or mulch cover, the area would be tilled with a chisel plow or ripper bar to a minimum depth of 6-inches, with the chisels being no more than 12-inches apart. Tillage prepares the seedbed and creates an optimal germination environment by enabling soils to retain uniform moisture. Seed and/or mulch is then applied to a prepared seedbed or roughened soil surface with hand held or electric broadcast seeders, drill seeding equipment or a hydro-seeder. Fine and fluffy seeds, or straw may be applied with a liquid tackifier; and if necessary, raked, dragged or crimped into the soil to prevent the applied cover from being carried away by wind.

RD-07, Salvage Vegetation

Vegetation salvage involves the excavation of plants with their roots intact, with the intention of replanting the salvaged vegetation within the action area after project completion. To salvage vegetation, plants are extracted mechanically or manually from within an area anticipated for construction or maintenance.



Excavated plants are temporarily replanted outside the construction footprint in an area containing similar soils; or placed into temporary containers and stored in a nursery. Once the construction or maintenance project is complete, salvaged plants are replanted within the action area for revegetation purposes and to assist in stabilizing soils. Irrigation may be permanently (RD-04) or temporarily installed for a minimum of two years during the landscaping establishment period. Temporary irrigation is installed above grade and does not require trenching. Refer to RD-04 for impacts associated with the installation of permanent irrigation.

RD-08, Inspection and Minor Repair- Roadside Development

This activity includes performing inspections and minor repairs to inlet and outlet stabilization and irrigation for landscaping. Inspecting these features may be completed on-foot or with a vehicle off-road (G-14). Off-road vehicle use is not covered under this activity, refer to G-14 for the impacts associated with off-road vehicle use. Under this activity, minor repairs to inlet and outlet stabilization would occur within the footprint of the existing stabilization material and result in no new ground disturbance. To conduct repairs to irrigation lines, the line in need of repair would be excavated, appropriate repairs would be conducted, and then the line would be backfilled. All irrigation lines would be located in areas that contain salvaged, or nursery grown vegetation that were previously disturbed. A maximum of 100-square-feet of ground disturbance to excavate an existing irrigation line is covered by this activity. Refer to RD-04 for impacts associated with the relocation, or installation of new irrigation lines.

Roadway Group Activities (R)

R-01, Install or Extend Bank Stabilization– Ephemeral, Intermittent/Perennial

Installing or extending bank stabilization includes lining the existing banks/slopes along a watercourse with structural supports to secure the structural integrity, prevent slumping and undercutting, and provide overall erosion prevention to the bank. Bank stabilization may be constructed with permeable materials such as riprap, gabion mattresses, rail bank protection, and bioengineered techniques; or impermeable materials such as shotcrete (G-03), concrete (G-03), or cement stabilized alluvium (G-03). Installing, or extending an existing stabilization feature may require grading and compaction of the existing watercourse banks with heavy machinery (G-08). Once the banks are compacted and rebuilt to the desired elevation and grade, the desired permeable or impermeable material can be constructed along the bank. Refer to G-08 and G-03 for impacts associated with grading and concrete installation respectively.

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

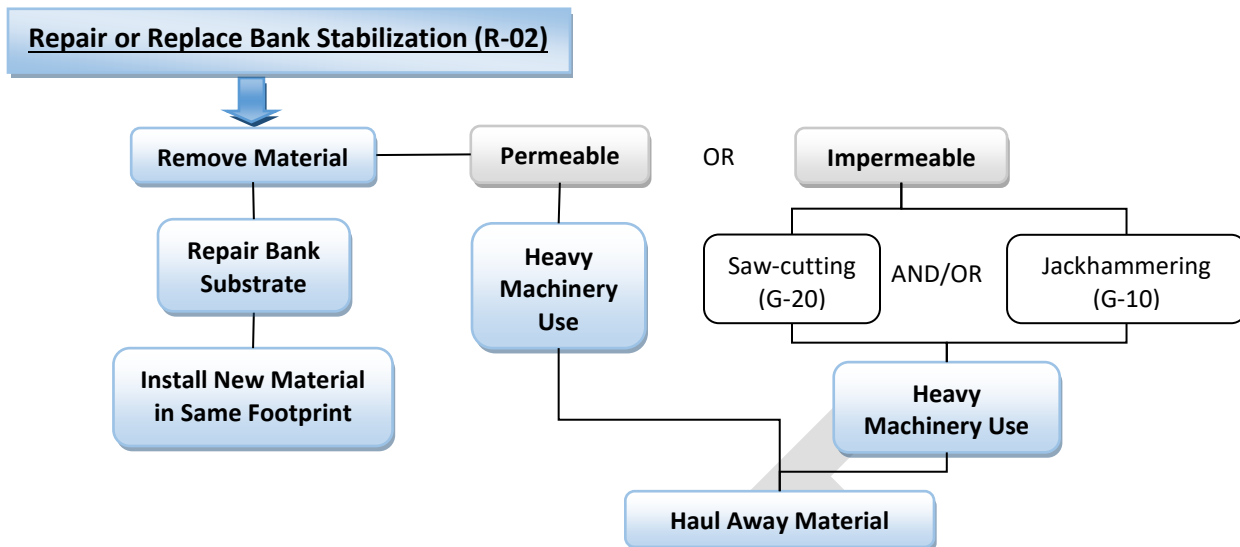
Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

R-02, Repair or Replace (within existing footprint) Bank Stabilization– Ephemeral, Intermittent/Perennial

This activity includes the repairing or replacing permeable or impermeable bank stabilization materials within or slight variation of the footprint of the existing bank stabilization to maintain the structural integrity and operational capacity of the bank stabilization. To complete the repair or replacement, the damaged or worn area is first cleaned of sediment and debris. Minor repairs may include patching a damaged area with the appropriate material or conducting maintenance on the stabilization material to prevent further or future damage or wear.

Severely damaged bank stabilization may require some of the permeable or impermeable material lining the banks/slopes of a watercourse to be removed and replaced. Permeable material is typically removed with heavy machinery such as an excavator, backhoe, or bobcat; and impermeable material is typically saw-cut (G-20) or jackhammered (G-10) to separate into manageable pieces, and then removed with heavy machinery. Removed material would be hauled away and reused elsewhere or disposed of properly. After the existing material is removed, the underlying bank is repaired to meet the desired compaction, elevation and grade, and then the new bank stabilization material is installed. If only a portion of the bank stabilization is replaced, then the new material would be similar to the surrounding material. If full replacement is necessary, a different, more effective bank stabilization material may be installed. However, the new material must be installed within the same footprint of the previous bank stabilization material. A replacement that requires a change to the footprint of the bank stabilization would be covered under R-01.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.

R-03, Catch Basins, Storm Drains, and Light Wells

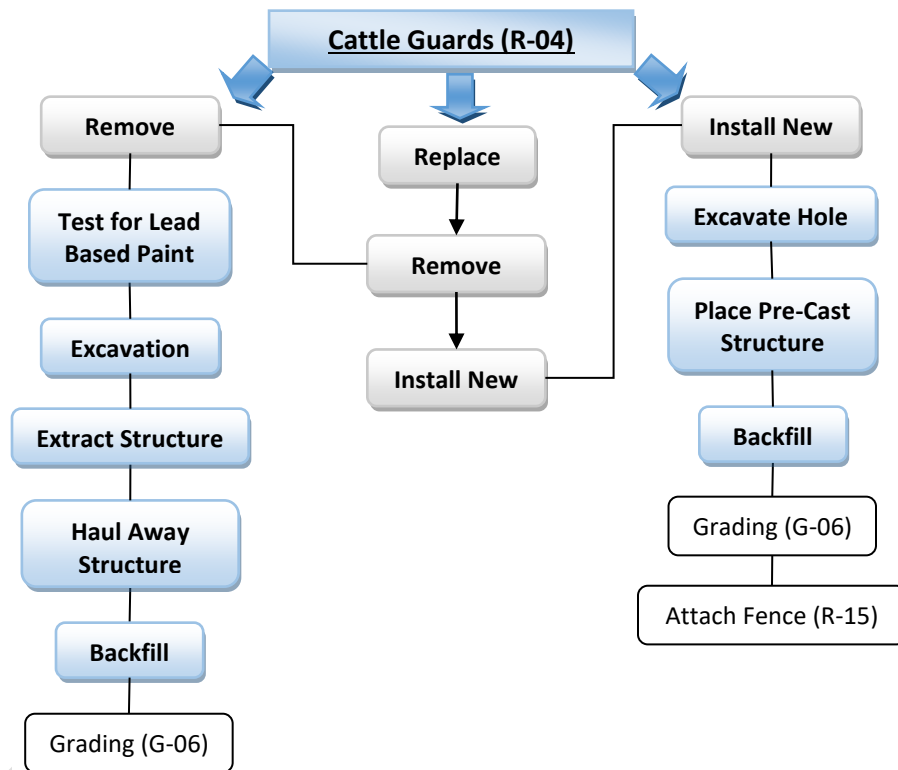
This activity includes constructing or installing catch basins, slotted drains, storm drains, and light wells. Catch basins are commonly built concurrently with slotted drains and storm drains as they work together to convey stormwater from the roadway or median to a stormwater outfall or culverts while filtering out sediment and debris. Median storm drains that outlet to the ceiling of a culvert are often installed for the additional purpose of providing light and increasing the visibility within the culvert for maintenance or wildlife passage. Features covered under this activity are typically located along curbs and gutters, culvert inlets, roadway shoulders or in the median of a divided highway. They are often comprised of a combination of materials and may be installed as prefabricated structure or constructed.

R-04, Cattle Guards

This activity includes the removal, replacement, and installation of cattle guards. Removing a cattle guard involves first excavating around the existing structure with an excavator, backhoe, or bobcat to expose the structure. Next the exposed cattleguard is attached to a mechanical lift and extracted from the excavated hole and hauled away for re-use elsewhere or disposal. Existing cattle guards are typically tested for lead based paint prior to removal. If paint on the cattle guard is determined to be lead based, abrasive tools or methods that may disturb the paint would not be used while removing the cattle guard, and the paint would be abated once the cattle guard is extracted. After extracting the cattleguard, the hole is backfilled, or if a replacement is

required, a cattleguard is installed as described below. Backfilled material would be compacted and graded to match grade and elevation of the abutting roadway (G-06).

Installing a cattle guard involves using an excavator, backhoe, or bobcat to excavate a hole to the dimensions of the cattle guard, and then placing the pre-cast cattle guard into the excavated hole with a mechanical lift. Once the cattle guard has been leveled and secured within the hole, the over-excavated area surrounding the cattle guard is backfilled, and the backfilled material is compacted and graded (G-06) to match grade and elevation of the abutting roadway. Finally, fencing would be tied into both sides of the cattle guard (R-15).



R-05, Install or Extend Channelization– Ephemeral, Intermittent/Perennial

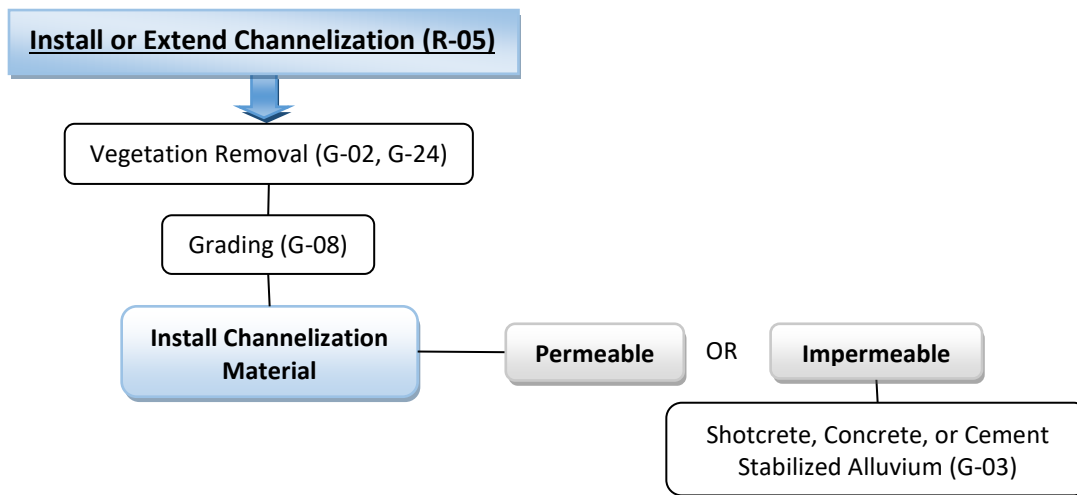
Installing or extending channelization includes modifications to the length, capacity, or flow path of a watercourse or ditch. Channelization may require grading and compaction to shape the channel or ditch and achieve the desired grade and elevation (G-08). Once the banks and floor of the channelized watercourse or ditch are established, the channel would be stabilized with permeable materials such as vegetation, riprap, gabion mattresses, and bioengineered techniques; or impermeable materials such as shotcrete, concrete, or cement stabilized alluvium (G-03). All watercourse or ditch channelization would maintain connection and positive flow with the existing watercourse channel or ditch, both upstream and downstream of the channelization. Vegetation removal (G-02 and G-24) may be required prior to construction of this activity.

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures

(RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.



R-06, Repair or Replace (within existing footprint) Channelization– Ephemeral, Intermittent/Perennial

This activity includes the repairing or replacing of permeable or impermeable channelization materials within or slight variation of the footprint of the existing channelized watercourse or ditch to maintain the structural integrity and operational capacity of the channel. To complete the repair or replacement, the damaged or worn area is first cleaned of sediment and debris (G-21). Minor repairs may include patching a damaged area with the appropriate material or conducting maintenance on the channelization material to prevent further or future damage or wear.

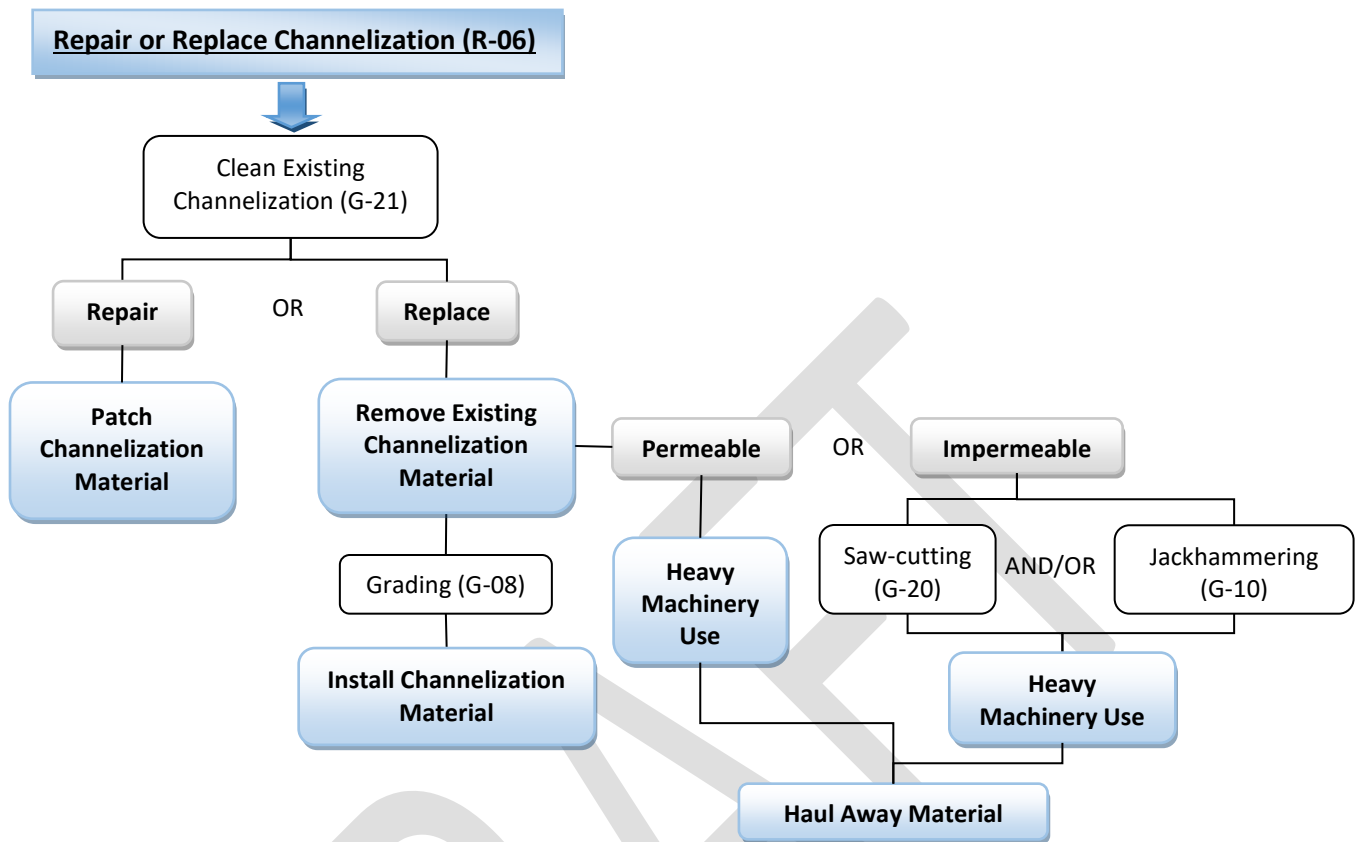
Severely damaged channelization may require some of, or all of, the permeable or impermeable material lining a watercourse or ditch to be removed and replaced. Permeable material is typically removed with heavy machinery such as an excavator, backhoe, or bobcat; and impermeable material is typically saw-cut (G-20) or jackhammered (G-10) to separate manageable pieces, and then removed with heavy machinery. Removed material would be hauled away and reused elsewhere or disposed of properly. After the existing material is removed, the underlying channel would be graded meet the desired compaction, elevation and grade (G-08), and then the new channelization material is installed. If only a portion of the channel is replaced, then the new material would be similar to the surrounding material. If full replacement is necessary, a different more effective channelization material may be installed. However, the new material must be installed within the same footprint of the previous channelization material. Any changes to the channel footprint or flow path of the channel would be covered under R-05.

If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable, and the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) for the action area would be installed outside of the watercourse to protect water quality. Depending on the size of the watercourse, extent of inundation, and proximity of the activity

to the watercourse, a cofferdam (B-07), dewatering efforts (B-08), or a temporary watercourse crossing (B-15 or B-16), may be required.



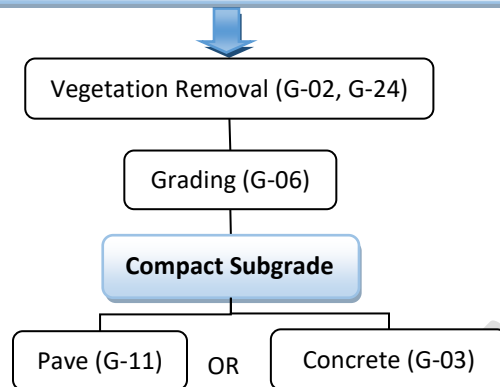
R-07, Concrete Barriers

Installing concrete barriers within a roadway median or along a roadway shoulder, may be completed by constructing the barriers (G-03) or using precast barriers. Precast barriers would be installed by using a mechanical lift to set the barrier in place. Barriers that are constructed would use a slip form or cast-in-place methods (G-03) and require dowels to be drilled into the pavement to anchor the barrier to the roadway. Installing concrete barriers may require pavement to be saw-cut (G-20) and footings to be excavated (G-07). Once the barrier is set and the concrete is cured, barrier fencing (R-15) may be installed on top of the concrete barrier or guardrail (R-18 or R-19) may be tied into the barrier, and areas behind the barrier may need to be backfilled, compacted, and graded (G-07).

R-08, Convert to an Impermeable Surface- Beyond the Roadway Prism

Converting surfaces to impermeable features beyond the roadway prism is a lateral extension of paved areas, including the construction of the fill, base and subgrade, and pavement (G-11) or concrete (G-03). This activity may include adding or extending turnouts, bike lanes, turn lanes, travel lanes, crossovers and driveways that are located outside of the existing roadway prism but tie into the existing roadway. This activity may also include the construction of sidewalks, or multi-use paths, that are not adjacent to the existing roadway and are located entirely outside of the existing roadway prism. To extend features along an existing roadway, or add new features beyond the roadway prism, the action area would be cleared of vegetation (G-02 and G-24), graded (G-06), and compacted to the requirements of the base and subgrade of the anticipated material. Once the base and subgrade are prepared, pavement (G-11) or concrete (G-03) would be installed and tie into the existing roadway, as applicable. This activity does not include new roadway alignments.

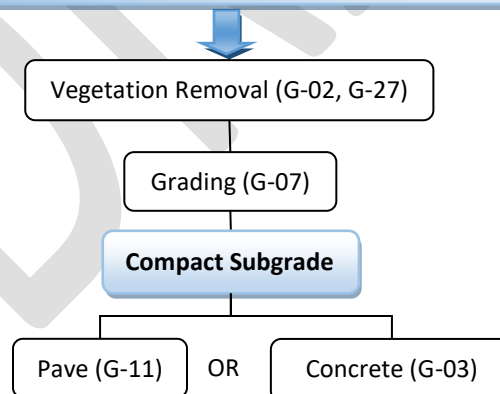
Convert to an Impermeable Surface – Beyond the Roadway Prism (R-08)



R-09, Convert to an Impermeable Surface- within the Roadway Prism

Converting surfaces to an impermeable surface within the existing roadway prism includes paving areas such as the median, gore areas, and shoulders, constructing crossovers and driveways, or constructing or extending pads for safety barrier end treatments within the roadway prism. This activity also includes constructing sidewalks and multi-use paths that are located directly adjacent to the existing roadway within the roadway prism. To pave the median, gore areas, or shoulders, or construct crossovers, driveways, sidewalks, and multi-use paths, the proposed area would be graded (G-07) and compacted to the requirements of the base and subgrade. Once the base and subgrade are prepared, the appropriate pavement material (G-11) or concrete (G-03) would be laid down and tied into the existing roadway. Some vegetation removal (G-02) or trimming (G-27) may be necessary prior to this activity for vegetation that has encroached on the areas to be paved. All ground disturbance for this activity would occur in previously disturbed areas. Conversion of surfaces to impermeable beyond the roadway prism is not covered by this activity. Refer to R-08 for the impacts associated with converting surfaces to impermeable beyond the roadway prism.

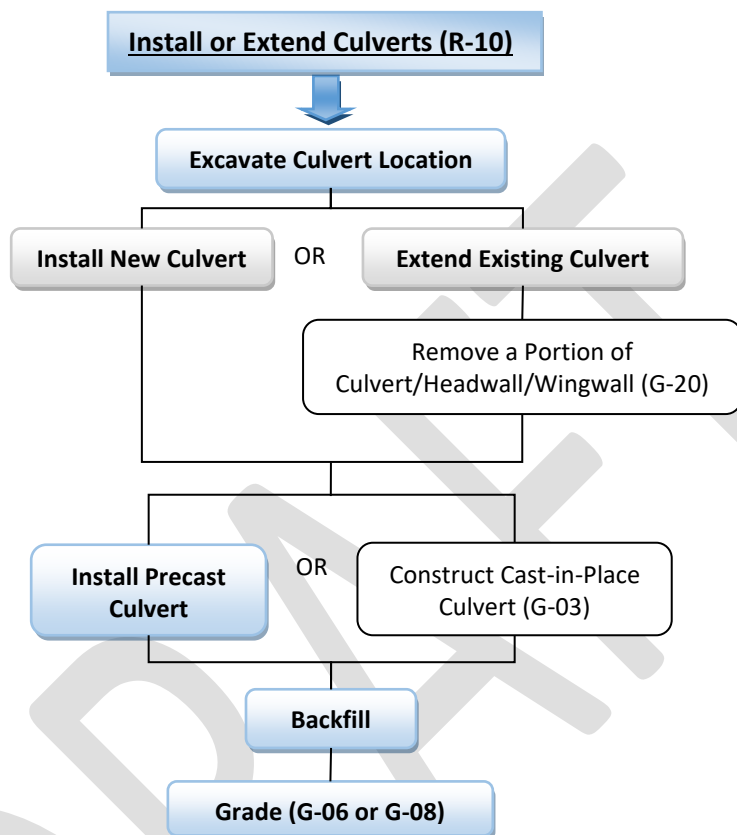
Convert to an Impermeable Surface – Within the Roadway Prism (R-09)



R-10, Install or Extend Culverts– Ephemeral, Intermittent/Perennial

This activity includes the installation or extension of culverts and their associated headwalls and/or wingwalls within a new area, and therefore would result in new ground disturbance. Culverts may be comprised of many materials such as metal, corrugated metal, plastic, or concrete; and types including but not limited to pipe culverts, arch culverts, and concrete box culverts. Culverts provide an opening under a roadway and are typically installed to convey watercourse across a roadway, but they may also be used for pedestrian, traffic or

wildlife passage. Depending on the culvert type and material composition, new culverts may be installed as pre-cast structures or constructed. This activity would typically require the use of heavy machinery to excavate the culvert location, place/construct the culvert, and then backfill and grade around the structure (G-06 or G-08) once it is placed/constructed. Culvert extensions may require a small portion of the existing culvert and their associated headwalls and/or wingwalls to be removed prior to the extension (G-20). Once the required portion of the culvert is removed, the extension would then be constructed/installed.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

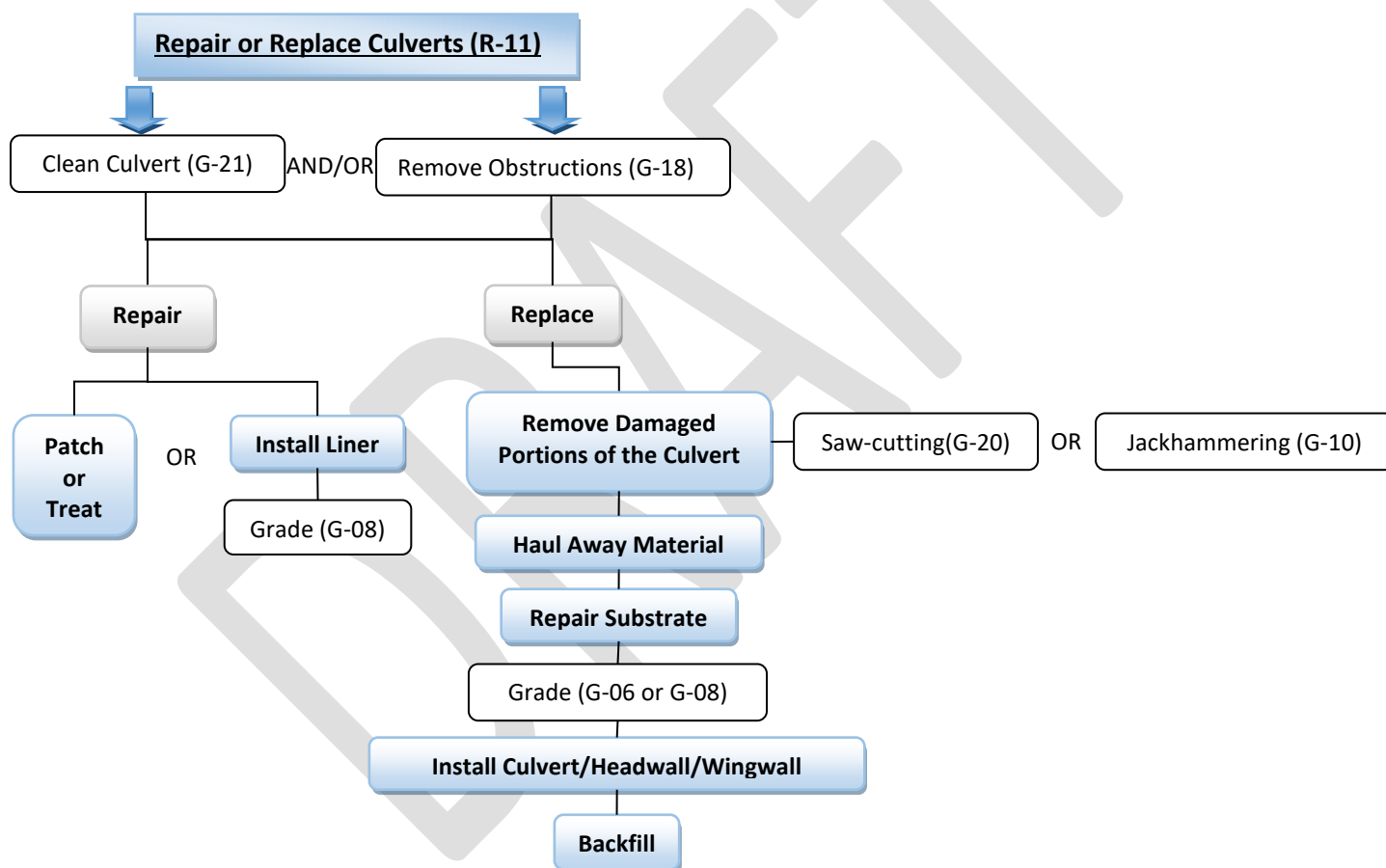
Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. However, a cofferdam (B-07), dewatering efforts (B-08), and/or a temporary watercourse crossing (B-15 or B-16), will likely be required for this activity. Additionally, the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) would be installed outside of the watercourse to protect water quality.

R-11, Repair or Replace (within existing footprint) Culverts– Ephemeral, Intermittent/Perennial

This activity includes repairing or replacing culverts and their associated headwalls and/or wingwalls within or slight variation of the existing footprint of these features to maintain the structural integrity and operational capacity of the culvert. To complete the repair or replacement, the damaged or worn area is first cleaned of sediment and debris (G-21), and/or obstructions are removed (G-18). Minor repairs may include patching a damaged area with the appropriate material or conducting maintenance on these features to prevent further or future damage or wear. Larger repairs may include installing a liner within an existing culvert which requires

the liner to be placed on one side of the culvert and pulled through the other side with heavy machinery. Lining a culvert would require grading beyond culvert in order to install the liner (G-08).

Severely damaged culverts may require some of the culvert, headwall, or wingwall within their existing footprints to be removed and replaced. Typically, these features can be saw-cut (G-20) or jackhammered (G-10) to remove only the damaged features. If the entire culvert requires removal, the appropriate steps would be taken as described under R-12. Removed material would be hauled away and reused elsewhere or disposed of properly. After the damaged features are removed, the underlying substrate is repaired to meet the desired compaction, elevation and grade (G-06 or G-08), and then the new culvert, headwall, or wingwall is installed. If only a portion of the culvert is replaced, then the new culvert portion would be installed to match the existing culvert material and type. If full replacement is necessary, a different, more effective material or culvert type may be installed. However, the replaced area must be installed within the same footprint of the previous culvert. A replacement that requires a change to the footprint of the culvert would be covered under R-10.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

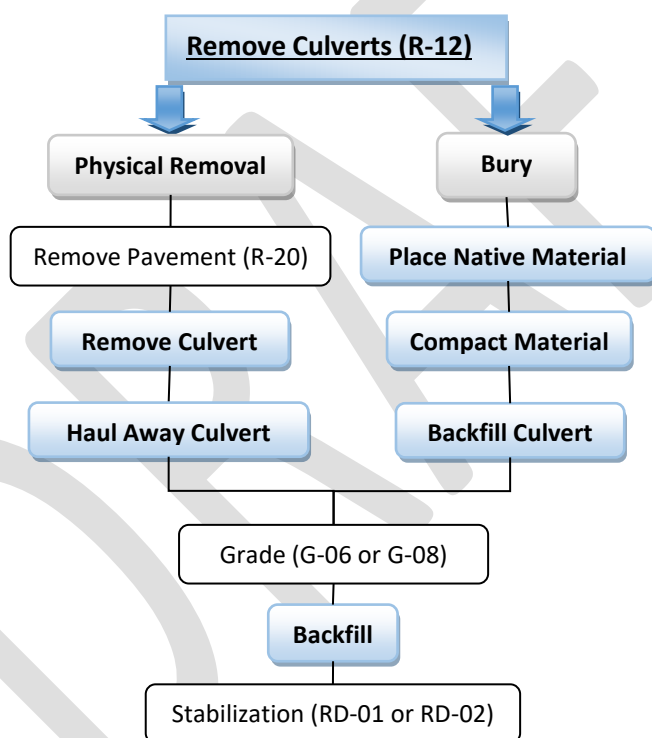
Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. However, a cofferdam (B-07), dewatering efforts (B-08), and/or a temporary watercourse crossing (B-15 or B-16), will likely be required for this activity. Additionally, the

appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) would be installed outside of the watercourse to protect water quality.

R-12, Remove Culverts– Ephemeral, Intermittent/Perennial

This activity involves the permanent removal of a culvert including its associated headwalls and wingwalls by physically removing or burying the culvert. Culverts for this activity may be comprised of different materials (e.g. metal, plastic, concrete, etc.) and types (e.g. pipe culverts, arch culverts, box culverts, etc.), but are described as providing an opening under a roadway typically for the conveyance of a watercourse. However, culverts may also provide passage to pedestrians, traffic or wildlife. To physically remove a culvert, the roadway above the culvert must first be removed (R-20). Once the roadway above the culvert is removed, heavy machinery would break the culvert into manageable sections that would be hauled away and reused elsewhere or disposed of properly. Burying the culvert involves placing native material at the mouths of the culvert, compacting the material, and backfilling the culvert. After the culvert is removed or buried, grading (G-06 or G-08), backfill and stabilization (RD-01 or RD-02) may be required to match the surrounding ground surface condition. Culverts replacement is not covered under this activity. Refer to R-11 for culvert replacement activities.



If any portion of this activity is occurring within a watercourse, the following work practices would be completed, as necessary.

Ephemeral- Work would be completed when surface water is not present. If the work must occur when surface water is present, complete the activity in accordance with the practices for an Intermittent/Perennial watercourse.

Intermittent/Perennial- Work would be completed during periods of low surface water to the maximum extent practicable. However, a cofferdam (B-07), dewatering efforts (B-08), and/or a temporary watercourse crossing (B-15 or B-16), will likely be required for this activity. Additionally, the appropriate erosion, runoff and sediment control measures (RD-01 or RD-02) would be installed outside of the watercourse to protect water quality.

R-13, Curb and Gutter

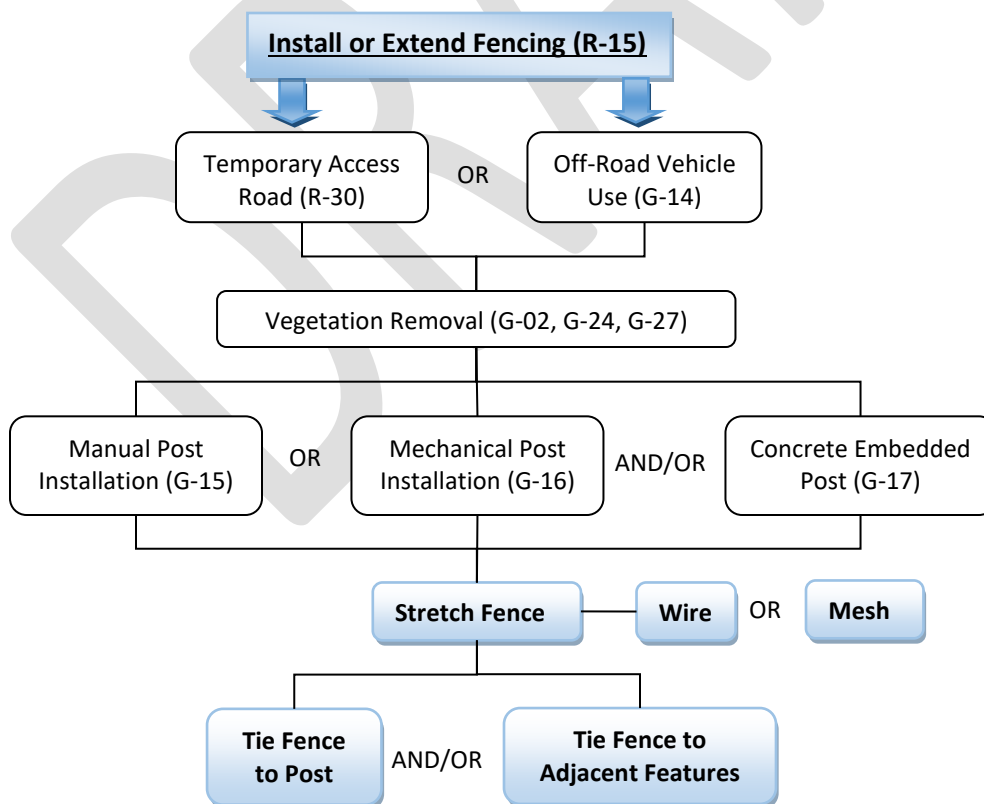
Curb and gutter areas are constructed in urban areas to direct stormwater runoff to storm drains. Installing curbs and gutters involves excavating the ground within the roadway prism (G-07) to the extent of the anticipated curb and gutter, and then installing concrete (G-03). Refer to G-07 and G-03 for impacts associated with grading within the roadway prism and installing concrete, respectively.

R-14, Embankment Downdrains and Slope Drains

This activity includes the construction of embankment downdrains and slope drains which are stormwater conveyance structures that are used to intercept and convey stormwater runoff into a stabilized drainage. Embankment downdrains and slope drains typically have an inlet located within the roadway prism, a conduit of concrete-lined channel or pipe which conveys runoff down a slope, and a stabilized outlet at the toe of slope. These structures are commonly installed in roadway fill slopes associated with traffic interchanges or overpasses but may also be installed to prevent erosion on steep slopes and road cuts along the roadway. To construct this activity, vegetation removal (G-02 and/or G-27) and grading within the roadway prism (G-07) may be required. However, new ground disturbance is not usually associated with this activity due to the location of these features within the roadway prism. Refer to G-02 and G-27 for impacts associated with vegetation removal, and to G-07 for impacts associated with grading.

R-15, Install or Extend Fencing

This activity includes installing or extending fence posts, corner posts, and fencing such as barbed wire fencing, wire mesh fencing, or barrier fencing. Installing or extending barbed wire or wire mesh fencing would involve off-road vehicle use (G-14) or a temporary access road (R-30) to access the proposed fence line.



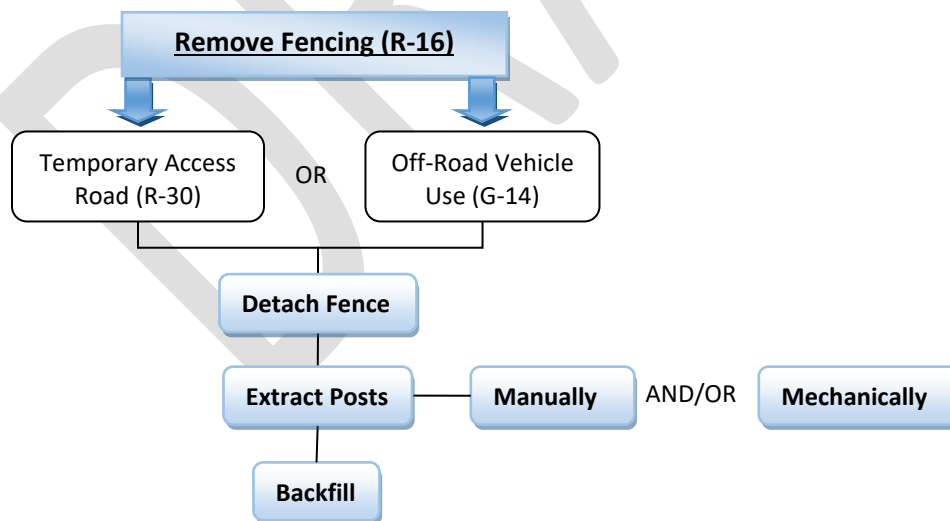
Vegetation would be cleared from the proposed fence line (G-02, G-24, and G-27) and fence posts would be pounded into the ground mechanically (G-16) or manually (G-15). Corner posts, as well as some fence posts, may be embedded in concrete (G-17). Once the fence posts and corner posts are installed, or the concrete has cured, barbed wire or wire mesh would be stretched along the fence line and tied to the fence posts or adjacent features, such as culverts or cattle guards. Barrier fencing is installed by attaching the support posts to the anchors located on top of existing concrete barriers. Ground disturbance would not be generated from the installation of barrier fencing.

R-16, Repair or Replace (within existing footprint) Fencing

This activity includes repairing and replacing fencing within or slight variation of the footprint of the existing fencing. Repairing fencing would involve replacing a strand or section of broken fence and reattaching it to the existing fence or corner posts. If the fence or corner posts are damaged, then replacing the post and a portion of fencing may be required. Damaged fence or corner posts would be extracted manually or mechanically as described in R-17; and new fence posts would be installed in place of the damaged post by using methods described in R-15. New barbed wire or wire mesh fencing would then be attached to the replaced fence and/or corner posts. Off-road vehicle use (G-14) or a temporary access road (R-30) may be required to access the fencing being repaired or replaced. Refer to G-14 or R-30 for impacts associated with off-road vehicle use or a temporary access road, respectively.

R-17, Remove Fencing

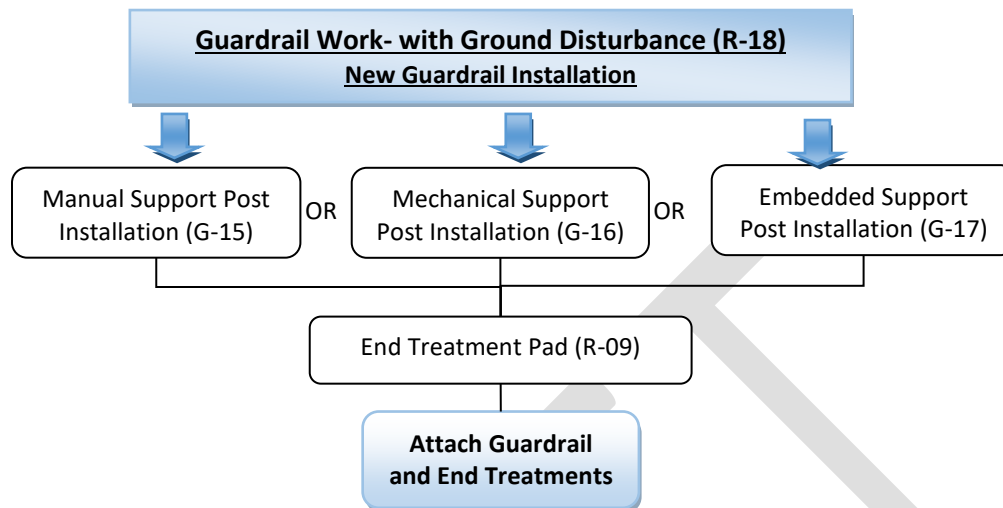
This activity includes the permanent removal of fence posts, corner posts, and fencing such as barbed wire or wire mesh. Barbed wire or wire mesh would be detached or cut from the fence posts and corner posts and reused elsewhere or disposed of properly. The fence posts and corner posts would then be extracted from the ground manually or mechanically with a cable tied to an off-highway use vehicle or by using heavy machinery, as necessary. Some excavation and backfill may be associated with the removal of corner posts. Off-road vehicle use (G-14) or a temporary access road (R-30) may be required to access the fencing being removed.



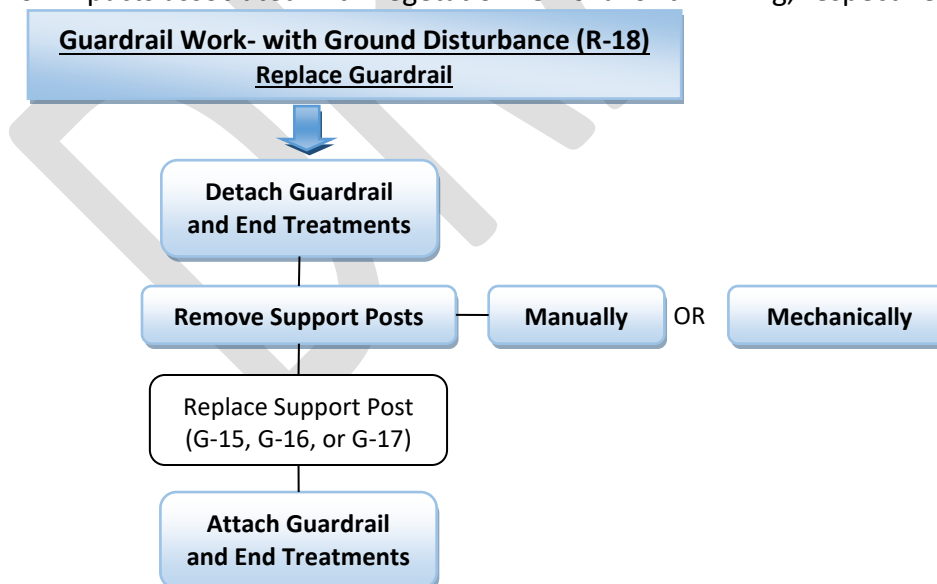
R-18, Guardrail Work- with Ground Disturbance

This activity includes guardrail work that generates ground disturbance such as the installation, repair, or replacement of support posts which may be installed in conjunction with guardrail and/or guardrail end treatments. Guardrail is used to prevent vehicles from veering off the roadway, especially along horizontal curves and when approaching and exiting bridges. To install new guardrail, support posts are pounded into the

ground manually (G-15), mechanically (G-16), or embedded (G-17) within the existing shoulder. Refer to G-15, G-16, or G-17 for impacts associated with manual, mechanical, or embedded support posts, respectively. Once the support posts are installed, a new pad for the guardrail end treatment would be installed (R-09) and the new guardrail and appropriate end treatments are attached to the posts.



Repairing damaged support posts typically results in the full replacement of the support post. Replacing support posts would involve detaching the guardrail/guardrail end treatment from the support post and removing the post manually or mechanically. A new post would then be installed in its place or immediately adjacent. Once installed, the guardrail and/or guardrail end treatment would be reattached to the support post. Guardrail work that does not generate ground disturbance, such as repairing or replacing only the guardrail or guardrail end treatments, is covered under R-19. Some vegetation removal (G-02) or trimming (G-27) may be necessary prior to this activity for vegetation that has encroached on the shoulder. Refer to G-02 or G-27 for impacts associated with vegetation removal or trimming, respectively.



R-19, Guardrail Work- without Ground Disturbance

This activity includes guardrail work that does not generate ground disturbance such as the repair or replacement of guardrail and guardrail end treatments. Guardrail is used to prevent vehicles from veering off the roadway, especially along horizontal curves and when approaching and exiting bridges. Repairing guardrail

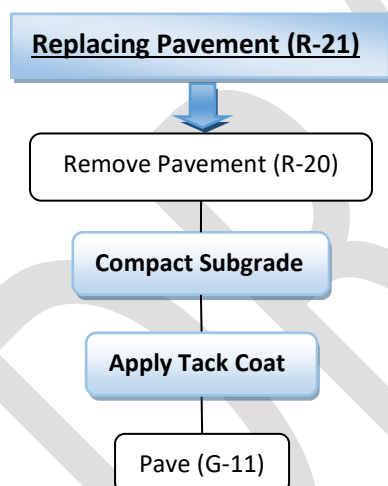
and guardrail end treatments typically results in the full replacement of the damaged feature. Replacing guardrail involves unbolting or cutting the damaged guardrail from the support posts and adjacent undamaged guardrail and installing new guardrail in-kind. Guardrail work that generates ground disturbance such as the installation, repair, or replacement of support posts, is covered under R-18.

R-20, Remove or Obliterate Pavement

This activity includes the removal or obliteration of pavement which is usually done when removing the full depth of the roadway material, or patching sections of the roadway. To remove or obliterate small portions of pavement, the pavement would be saw-cut (G-20) or jackhammered (G-10) and then hauled off away. To remove larger portions of pavement, the existing pavement may be milled by grinding or cold planing or removed with earth moving equipment such as an excavator, backhoe, or bobcat. Pavement that has been removed may be replaced (R-21) or patched (R-24). However, pavement that is obliterated is typically not replaced and the remaining sub-grade would be graded (G-07) and stabilized to match the surrounding ground surface condition. Refer to G-07 for impacts associated with grading.

R-21, Replacing Pavement

Replacing pavement is required for damaged areas of existing pavement that are too large to be patched (R-24). Refer to R-24 for impacts associated with patching pavement. Damaged pavement would be removed (R-20). The base material would then be compacted using a roller or compressor, and the area would be tacked. Once the area is tacked, the pavement would be installed (G-11).



R-22, Rest Area Work- with Ground Disturbance

Rest areas are public areas along an existing roadway that allow the traveling public to rest or use the facilities present on-site. This activity includes any ground disturbing work associated with the repair, replacement, or new installation of above ground and below-ground features at an existing rest area. Above-ground features may include, but are not limited to, comfort station buildings, shade ramadas, caretaker residences, parking lots, ramps, sidewalks, curbs and gutters, and signage. Below-ground features may include irrigation, utility lines, water lines, and the wastewater septic disposal systems including the septic tank, reservoir, leach field, clean-out valves, and booster pumps. Major repairs, full replacements, or new installation of above ground and below-ground features may generate ground disturbance at existing rest areas by removing the damaged feature, replacing the feature in-kind, or installing a new feature that may have a different footprint from the previous feature. Specifically, for below-ground features, an excavator, backhoe, or bobcat may be required to expose the buried feature to complete the anticipated work. Once the feature is exposed, the work is

conducted, and the feature is re-buried upon completion of work. If any of the following activities are required to perform the anticipated work, refer to each activity for associated impacts.

- Installing Signage (G-15, G-16, G-17)
- Installing Sidewalks and Ramps (R-08)
- Installing Curbs and Gutters (R-13)
- Installing Irrigation (RD-04)
- Tilling and Seeding/Mulch Cover (RD-06)
- Removing Utility lines (U-02)
- Installing Utility lines (U-01)

All work for this activity would occur within the boundaries of an existing rest area where habitat has been previously disturbed or is frequently disturbed. Work at existing rest areas that do not generate ground disturbance, such as painting a structure or patching existing pavement, is covered under R-23. This activity does not include the construction of new rest areas.

R-23, Rest Area Work- without Ground Disturbance

Rest areas are public areas along an existing roadway that allow the traveling public to rest or use the facilities present on-site. This activity includes any non-ground disturbing work associated with the repair or rehabilitation of above ground and below-ground features at an existing rest area. Above-ground features may include, but are not limited to, comfort station buildings, shade ramadas, caretaker residences, parking lots, ramps, sidewalks, curbs and gutters, and signage. Below-ground features may include utility lines, water lines, and the wastewater septic disposal systems including the septic tank, reservoir, leach field, clean-out valves and booster pumps. Under this activity, repairs or rehabilitations to above ground and below-ground features must not generate ground disturbance from completing the repair or rehabilitation. This may include, but is not limited to, removing and replacing paint on structures; completing repairs to the restroom facilities; replacing sign panels; repairing sidewalks; removing and replacing pavement (R-20 and R-21); patching pavement (R-24); and restriping the parking lot (T-03). Refer to R-20, R-21, R-24, and T-03 for impacts associated with removing and replacing pavement, patching pavement, and striping, respectively. Work at existing rest areas that generates ground disturbance is covered under R-22.

R-24, Roadway Treatments on Existing Pavement

This activity includes completing any roadway treatment on existing pavement, such as sealing cracks and joints, patching and leveling pavement, resurfacing pavement, milling pavement, and installing rumble strips. Roadway treatments on existing pavement are typically used to extend the life of the pavement, with the exception of rumble strips. These methods of treating existing pavement would not generate ground disturbance or extend beyond existing paved surfaces.

Preventative maintenance measures (i.e. sealing cracks and joints, and patching and leveling) first require any cracks, joints, potholes, or depressions to be routed or cleaned to remove unstable, loose, or deteriorated pavement. The base of the damaged area is then stabilized, as needed, and the appropriate pavement material would be placed into the crack, joint, pothole, or depression (G-11). Refer to G-11 for impacts associated with laying down pavement. Resurfacing pavement is also used as a preventative maintenance measure and is the application of an additional layer of surfacing material such as Fog/Slurry Seal or Armor Coat/Chip Seal on top of an existing pavement. Fog/Slurry Seal is the preservation of old asphalt surface, sealing small cracks and surface voids by spraying emulsions diluted with clear water. In the case of Armor

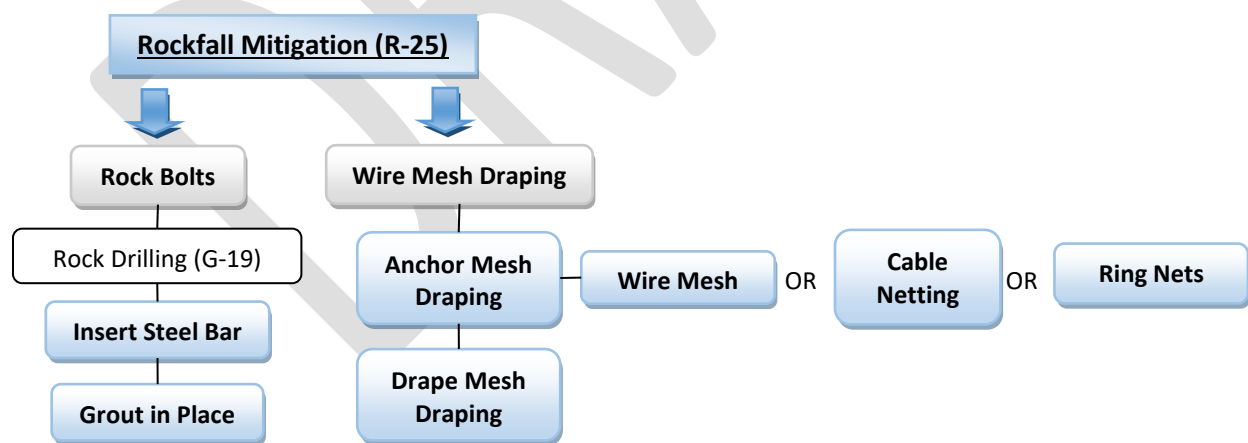
Coat/Chip Seal, the roadway is sprayed with asphalt and a thin covering of gravel/crushed stone is placed atop the asphalt. After the sealant is applied, the sealed areas are compacted with a roller.

Milling pavement is a process by which the existing pavement is removed and salvaged from the roadway. Milling is generally done with a large machine that grinds the surface material to a certain depth. The cut or removed material, referred to as millings, are often recycled into other work or loaded directly into trucks and removed from the project. Milling may be used to remove surface irregularities, including longitudinal wheel ruts or to provide a base for placement of a new pavement. Millings may be reused for the new surfacing along a roadway or applied elsewhere within or beyond the roadway prism (G-12). Refer to G-12 for impacts associated with placing millings.

Rumble strips are used to alert drivers of an unexpected change in the roadway, such as the need to change lanes, slow down or stop, or changes in the roadway alignment. They are usually placed along a roadway centerline, shoulder or edge line, but also include transverse rumble strips that are placed within a travel lane. To construct rumble strips the paved surface may be milled, rolled, or formed; or the rumble strips may be installed on the pavement surface to create a raised repeating pattern.

R-25, Rockfall Mitigation

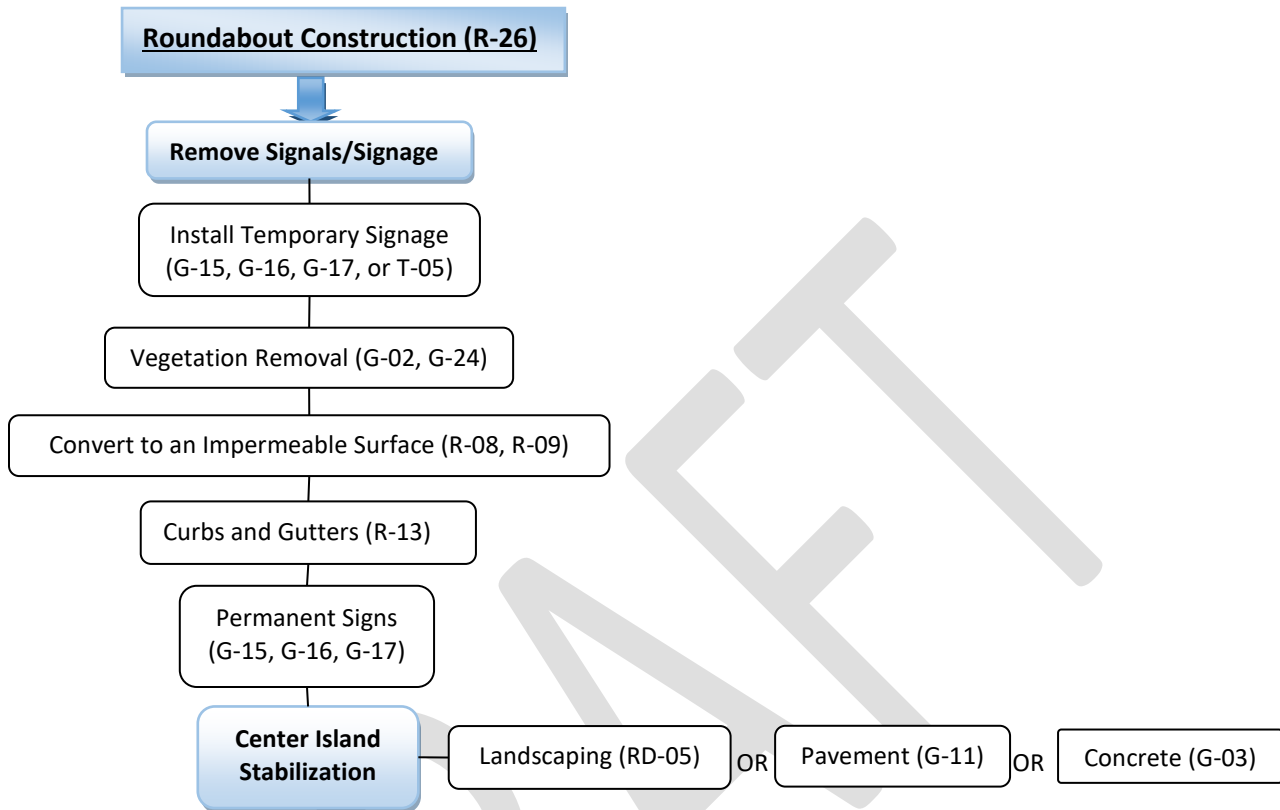
This activity includes installing rock bolts and wire mesh draping as mitigation to protect roadway users from falling rocks along a cliff face, steep slope or road cut. Rock bolts are used typically used to stabilize potentially unstable boulders on a rock cut, and wire mesh draping is used to control rocks as they fall from a rock cut. Installing rock bolts involves drilling through and beyond the rock failure surface to stable rock within the rock cut (G-19). A steel bar is then inserted into the drilled hole and grouted into place. Wire mesh draping is anchored from the top of the rock cut and wire mesh, cable netting, or ring nets are draped over the rock cut to control rocks as they fall. The wire mesh, cable netting, or ring nets may also be periodically anchored on the face of the rock cut to keep the draping in place. These two mitigation methods may be installed together on the same slope or utilized separately. This activity does not include blasting (G-01) or scaling slopes (R-27). Refer to G-01 and R-27 for impacts associated with blasting and scaling slopes, respectively.



R-26, Roundabout Construction

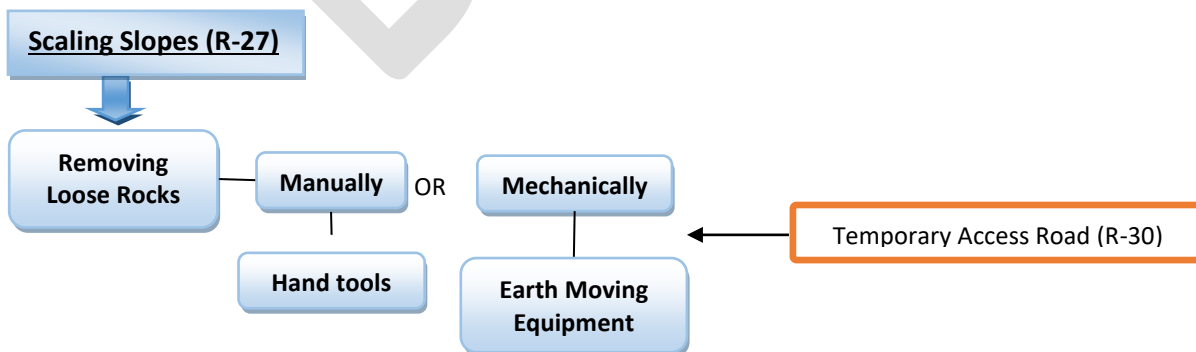
New roundabout construction replaces a traditional intersection with a roundabout. To accommodate existing traffic along the roadway, it is likely that the roundabout and center island would be constructed one half at a time. To construct the new roundabout, all signals or signage at the existing intersection is removed and temporary signage is installed (G-15, G-16, or G-17). Next, vegetation within the roundabout construction footprint is removed (G-02 and/or G-24), and the ground surface is converted to an impermeable surface

(R-08 or R-09) and tied into the existing roadways located beyond the intersection. Curbs and gutters (R-13), sidewalks (R-08 or R-09), and new signage (G-15, G-16, or G-17) would also be installed during construction and landscaping, pavement (G-11), or concrete (G-03) may be applied to the center island per the project design.



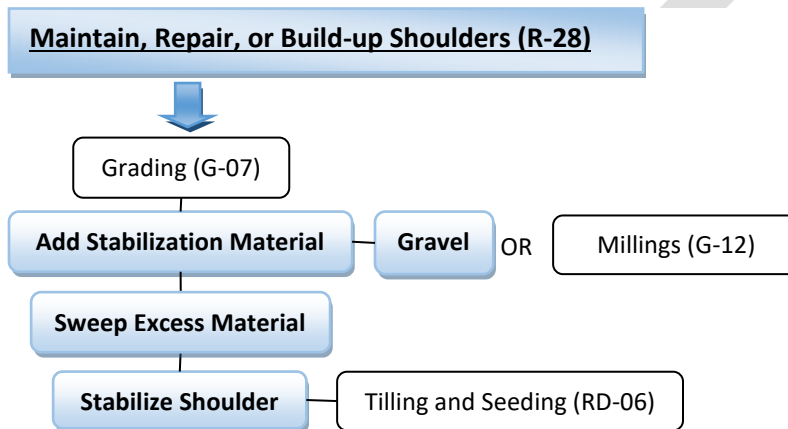
R-27, Scaling Slopes

Scaling slopes is the removal of loose rocks from a slope, typically adjacent to a roadway, and can be completed manually or mechanically. Manual scaling involves removing unstable or potentially unstable rocks using hand tools and a rappel (as needed). Mechanical scaling utilizes earthmoving equipment to cut back slopes starting from the top of the slope and working downward until the extent of the desired slope is reached. Mechanical scaling may be performed from the existing roadway with an excavator or require a temporary access road (R-30) to access the top of the slope. Refer to R-30 for impacts associated with a temporary access road.



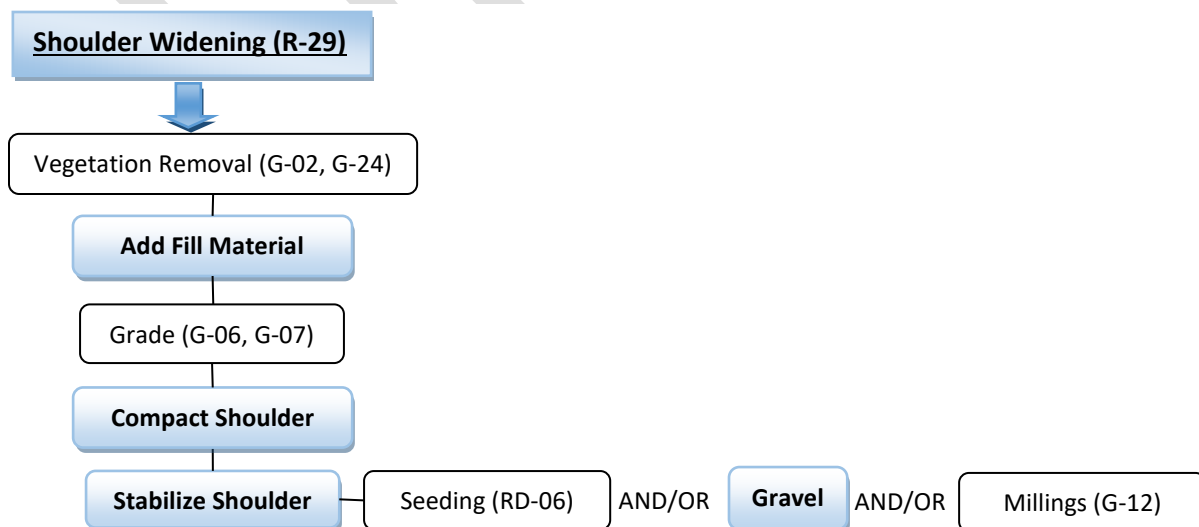
R-28, Maintain, Repair or Build-up Shoulders

This activity includes shoulder repairs, maintenance and build-up within the footprint of the existing shoulder to correct pavement drop-off, rutting, excess build-up of material, and to restore a smooth, safe surface with proper drainage. Shoulder repair and maintenance is typically completed with a grader or blade which makes several passes over the shoulder to distribute, smooth and shape the shoulder material to the original configuration (G-07). If necessary, additional material such as such as pavement millings or gravel may be added to the existing shoulder as build-up to restore its original elevation and configuration (G-12). Once the desired shoulder configuration is achieved, all excess material would be swept from the adjacent paved areas and tilling and seeding (RD-06) may be applied to areas that have been bladed/graded to help stabilize the shoulder material. Refer to G-07, G-12, and RD-06 for impacts associated with grading within the roadway prism, placing millings, and seeding, respectively.



R-29, Shoulder Widening

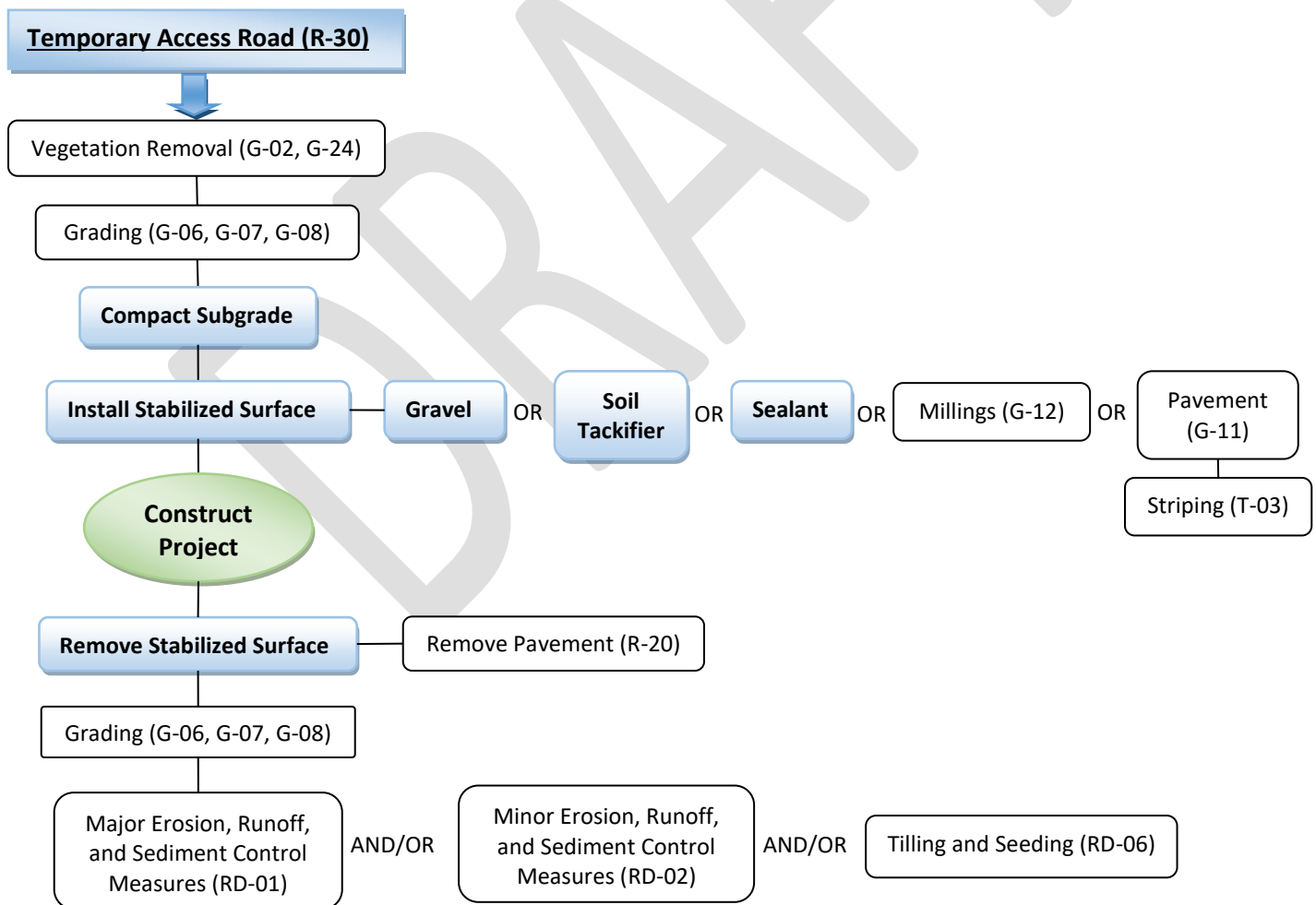
This activity includes the lateral extension of the shoulder beyond the existing shoulder footprint. Widening shoulders involves removing all vegetation within the proposed footprint of the new shoulder (G-02 and/or G-24) and adding fill material to achieve the desired shoulder elevation and configuration. The new shoulders would be graded (G-06, G-07), compacted, and then seeding (RD-06), gravel, and/or millings (G-12) would be applied to help stabilize the new shoulder.



R-30, Temporary Access Road

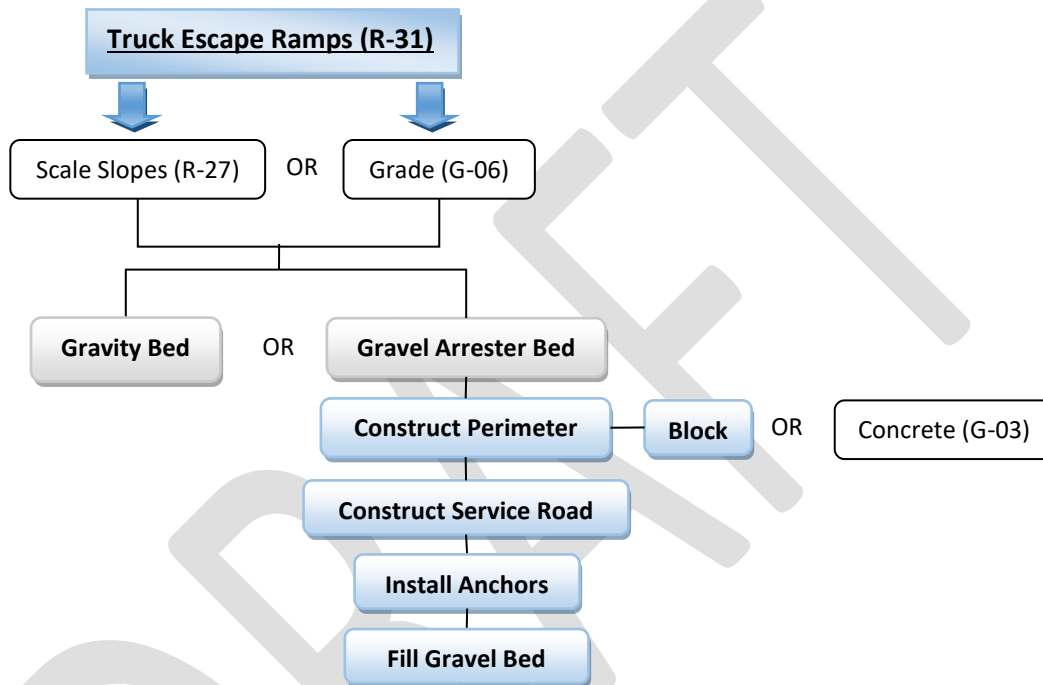
This activity includes constructing temporary access roads or median detour crossovers. Temporary access roads, including haul roads, are used by personnel, vehicles, and equipment to haul materials and provide access to the construction footprint from the existing roadway for the duration of a project. They are often left as bare ground and watered regularly during construction, or they may be constructed with materials that provide a more stabilized surface. Median detour crossovers utilize the existing median for traffic control during the construction of a project and involve shifting one direction of traffic onto the opposing travel lanes to circumvent the construction. Since the median detour crossovers are typically used by the traveling public they are often constructed with a stabilized surface such as gravel, soil tackifiers, sealant, millings (G-12) or temporary pavement.

To install temporary access roads and median detour crossovers, the footprint would be cleared of vegetation (G-02 and/or G-24), graded (G-06, G-07, or G-08), and compacted. Fill material may be required to achieve the desired grade and compaction. If a stabilized surface is being applied, then gravel, soil tackifiers, sealant, millings (G-12) or temporary pavement may be laid down. Next, striping (T-03) or temporary signage (T-05) may be installed on the median detour crossovers and adjacent roadways to assist in shifting traffic. Once construction is complete, temporary access roads are typically removed and their footprint graded, stabilized (RD-01, RD-02, and/or RD-06), and restored to the previous condition to the maximum extent practicable. Whereas, crossovers may be obliterated and removed (R-20) or remain in place for future use.



R-31, Truck Escape Ramps

Truck escape ramps provide a safe exit for trucks along steep, downhill highway systems as an emergency measure and may include gravity ramps or gravel arrester beds. The construction of truck escape ramps involves placing fill material or cutting slopes (R-27 or G-06) to the desired length, elevation and grade to accommodate and effectively slow trucks to a stop that may not have adequate control while traveling downhill. Gravity ramps are sloped for trucks to experience an uphill grade that naturally stops the truck. Gravel arrester beds are generally level and require a perimeter, such as block or concrete (G-03), to be constructed around the escape ramp and contain small, round pieces of gravel. In order for trucks to get out of a gravel arrester bed, assistance from a tow truck is commonly required; thus, a service road and anchors are typically installed adjacent to the perimeter of the gravel arrester bed.



R-32, Inspection and Minor Repair- Roadway Group

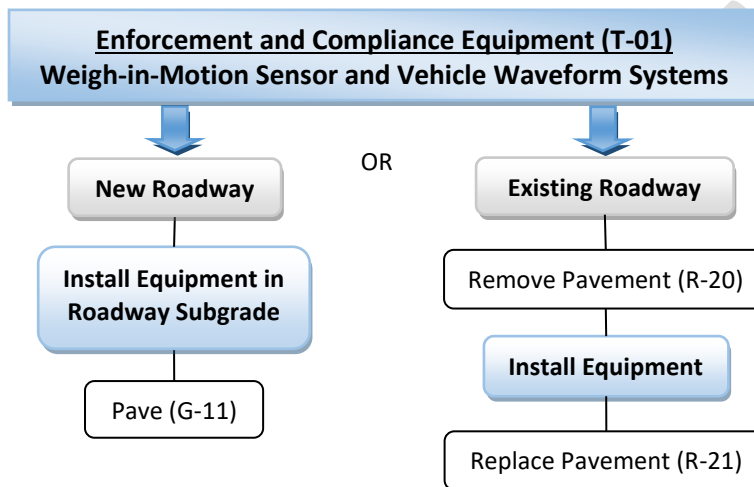
This activity includes performing inspections and minor repairs to catch basins, storm drains, light wells, cattle guards, concrete barriers, curb and gutters, embankment downdrains and slope drains, rockfall mitigation, roundabouts, sidewalks, driveways and truck escape ramps. Inspecting these features may be completed on-foot or require off-road vehicle use (G-14). This activity does not include off-road vehicle use. Impacts associated with off-road vehicle use are covered under G-14. This activity may result in minimal ground disturbance which is not to exceed 30-feet from the feature requiring repair. Minor repairs on the following features are covered under separate activities:

- Bank stabilization (R-02)
- Channelization (R-06)
- Culverts (R-11)
- Fencing (R-16)
- Guardrail (R-18 or R-19)
- Rest Areas (R-22 or R-23)
- Shoulders (R-28)
- Impermeable Surfaces (R-24)

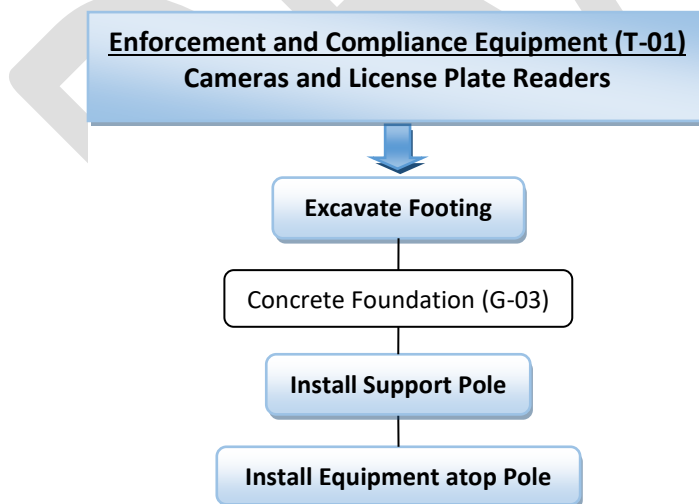
Traffic Group Activities (T)

T-01, Enforcement and Compliance Division Equipment

Enforcement and compliance division equipment includes identifier systems such as weigh-in-motion, cameras, license plate readers, and vehicle waveforms. Equipment such as weigh-in-motion sensors and vehicle waveform systems must be installed beneath the travel lanes of a roadway. If this equipment is being installed along new travel lanes, the equipment is installed in the roadway subgrade and paved over (G-11). If an existing roadway is present, the existing pavement is removed (R-20), the equipment is installed, and then the pavement would be replaced (R-21).



Equipment such as cameras and license plate readers are installed on the roadway shoulder atop a support pole. Installation of a support pole involves a footing drilled or excavated to the necessary depth to support the pole, a concrete foundation being formed and poured over the footing (G-03), and finally the installation of the pole on the foundation, and equipment atop the pole.

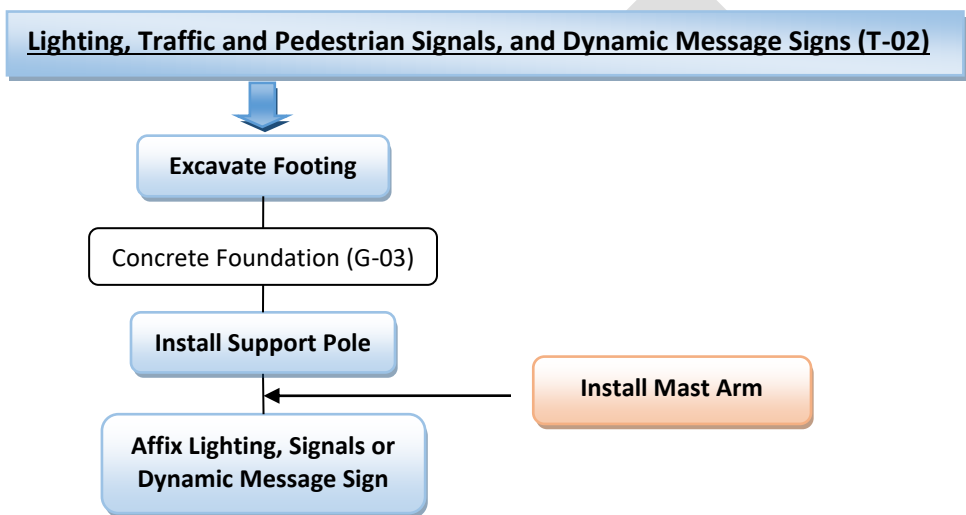


Traffic loop counters are often installed in conjunction with enforcement and compliance division equipment (T-06). Equipment that requires a power source may include installation or extension of underground utility conduit (U-01), and the installation of a pull box and/or controller cabinet in the right-of-way near the equipment (U-03). Installation of new signs (G15, G-16, or G-17), variable message signs (T-02), and new guardrail (R-18) may also be required with this activity. Refer to T-06, U-01, U-03, G-15 through G-17, T-02,

and R-18 for impacts associated with traffic loop counters, installing or extending underground utility conduit, pull boxes and controller cabinets, new signs, variable message signs, and new guardrail, respectively.

T-02, Lighting, Traffic and Pedestrian Signals, and Dynamic Message Signs

This activity includes the installation of new lighting, traffic and pedestrian signals, and/or dynamic message signs along a roadway including the poles and mast arms. Lighting, signals, or dynamic message signs may be affixed directly to a support pole or installed on a mast arm atop a support pole. Installation of a support pole involves drilling or excavating a footing to the necessary depth to support the pole, constructing a concrete foundation (G-03), and installing the pole atop the foundation. The installation or extension of underground utility conduit (U-01) and pull boxes and/or controller cabinets in the right-of-way (U-03) may be required with this activity. Refer to U-01 and U-03 for impacts associated with installing or extending underground utility conduit, and pull boxes and controller cabinets, respectively.



T-03, Pavement Striping, Paint, Tape, and Markers

Striping, paint, tape, and markers are applied to paved areas including new pavement, existing pavement, or temporarily paved areas to provide driver information and guidance to the road user. Striping includes traffic lines such as center lines, lane lines, no passing stripes, gore stripes and roadway edge stripes. Striping may be applied as paint by a truck with a pressurized paint spraying system; or as thermoplastic reflectorized material such as extruded methyl methacrylate materials and 3M polymer pavement marking tapes which are extruded or rolled into a shallow groove ground into the pavement surface. Other painted or taped markings may include crosswalks, turn lanes, railroad crossings, pavement messages, construction/maintenance detour markings and parking lots.

Pavement markers also called reflectors, may be temporary or permanent, and can be raised or recessed along the roadway. They are typically colored and include a lens or sheeting that enhances their visibility by retroreflecting automotive headlights. Pavement markers are installed by gluing the markers directly onto the pavement, or within the recessed grooves in the pavement.

T-04, Repair or Replace (within existing footprint) Permanent Signage

Repairing or replacing permanent signage may include replacing broken letters, border, copy background, rivets and bolts, damaged aluminum panels, bent posts, and other structural members of the signage, as required. This may also include cleaning the signs and their bases. Ground disturbance associated with this activity is typically limited to vehicles and personnel accessing the damaged signs to complete the repairs.

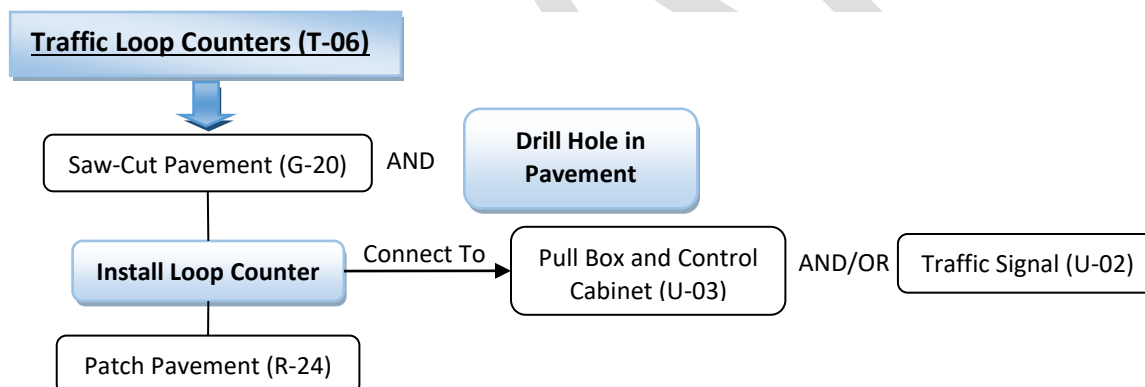
Off-road vehicle use is not covered under this activity; refer to G-14 for impacts associated with off-road vehicle use.

T-05, Install and Remove Temporary Signage on Spring-Loaded Stands

Temporary signage is utilized during the construction of a project for traffic control. Installing temporary signage may involve using signs mounted on spring-loaded stands, driving anchors into the ground (G-15 or G-16), or embedding sign post anchors (G-17). This activity does not cover the manual, mechanical, or embedded installation of sign posts into the ground surface for temporary signs. For impacts associated with driving anchors or embedding sign posts for temporary signs, refer to G-15, G-16, or G-17. Installing signs mounted on spring-loaded stands would involve driving a truck within the shoulder area and setting the stand within the recovery area per the requirements of the project. Removing temporary signage would include driving a truck within the shoulder area and picking up spring-loaded signs.

T-06, Traffic Loop Counters

Installation of a traffic loop counter includes the sensor in the roadway pavement, and the associated connections to a pull box, control cabinet, and/or traffic signal. The loop (i.e. traffic sensor or detector) is installed in the roadway pavement by cutting a small groove into the pavement (G-20) according to the specified parameters of the anticipated loop counter and drilling a hole into the edge of pavement to connect the loop counter to a pull box, control cabinet (U-03), and/or traffic signal (U-02). These connections may require installation or extension of underground utility conduit (U-01). Refer to U-01 for impacts associated with the installation or extension of underground utility conduit. Once the loop counter is installed in the roadway, the grooves and drilled hole in the pavement are sealed (R-24).



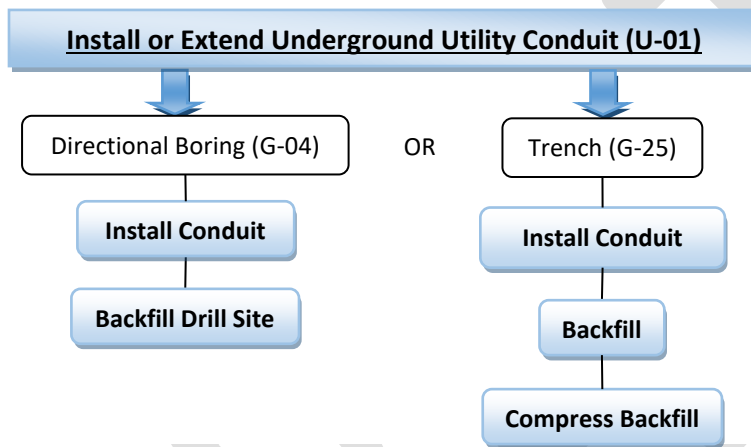
T-07, Inspection and Minor Repair- Traffic Group

This activity includes performing inspections and minor repairs on enforcement and compliance division equipment; lighting, traffic and pedestrian signals, and dynamic message signs; striping, paint, tape, and markers; and traffic loop counters. No new ground disturbance would be generated from inspecting or repairing these features because they occur on existing paved surfaces. Inspections and repairs to permanent signage is covered under T-05.

Utility Group Activities (U)

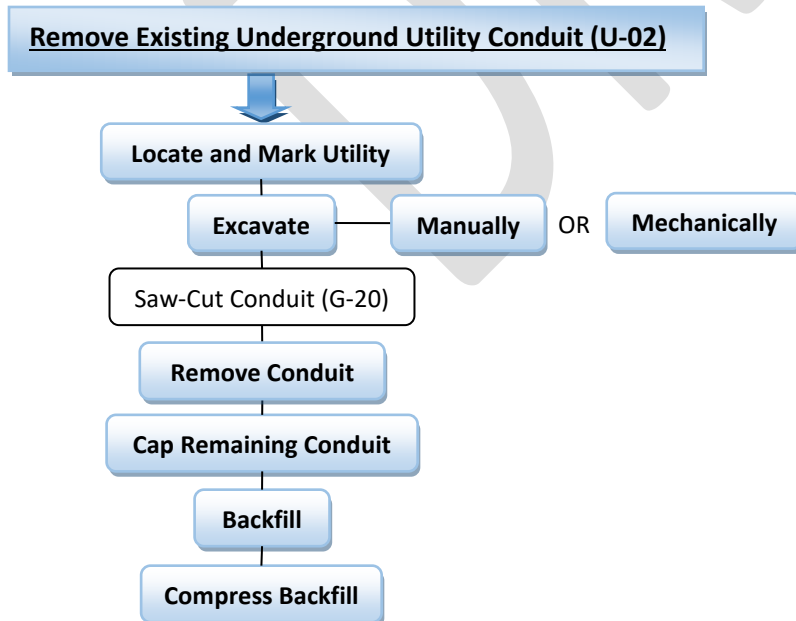
U-01, Install or Extend Underground Utility Conduit

Underground utility conduit is comprised of non-metallic conduit, pipe or duct which houses underground utility lines including, electrical, fiber optic and communications. Installation or extension of underground utility conduit can be completed via directional boring (G-04) or trenching (G-25). Once the hole or trench is drilled or dug to the desired diameter and required depth of the conduit, the conduit is slipped into the bored hole or placed into the trench. For directional boring, the initial drill site may be backfilled and compressed, but overall the surface impacts are limited to the diameter of the drill and depending on the required utility connections, no backfill or surface restoration may be required. Trenching does require backfill after the conduit is installed or extended. Backfilled material is typically compressed as necessary to support the final surface condition. This activity may require off-road vehicle use; refer to G-14 for associated impacts



U-02, Remove Existing Underground Utility Conduit

To remove existing underground utility conduit such as non-metallic conduit, pipe or duct which houses underground utility lines including, electrical, fiber optic and communications, the buried utility is first located

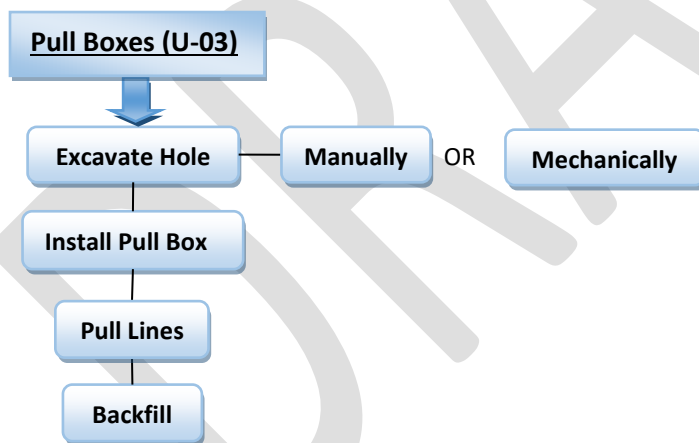


and marked. Depending on the depth and length of the utility conduit to be removed, the conduit may be exposed by manual excavation with a shovel or mechanically with an excavator, backhoe, or bobcat, or air-vacuum or hydro-vacuum (G-09) excavator. Once the utility conduit is exposed, saw-cutting (G-20) may be required to reduce the conduit length into manageable sections, or remove a portion of the conduit. After the desired utility is removed any conduit that remains in the ground would be capped, and the excavated area would be backfilled. Backfilled material is typically compressed as necessary to support the final surface condition

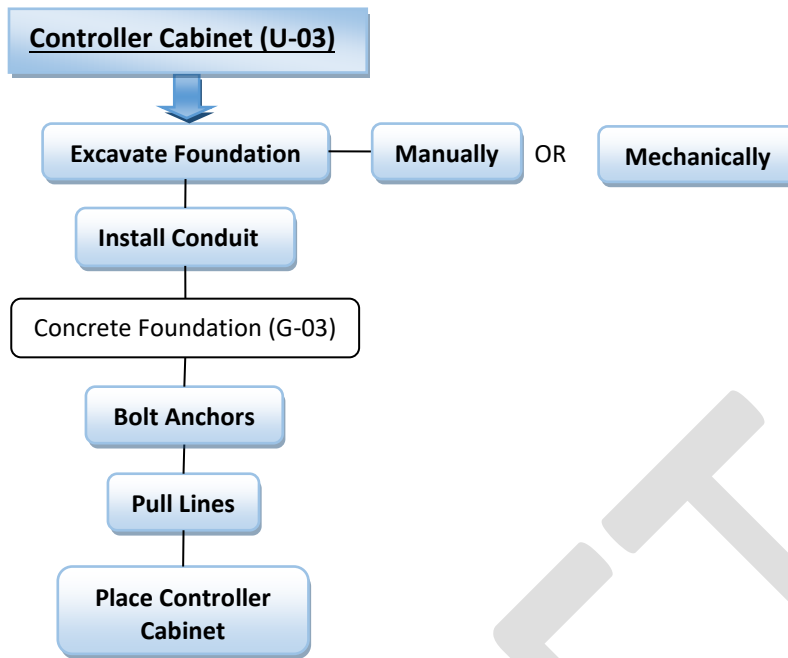
U-03, Pull Boxes and Controller Cabinets

Pull boxes are junction boxes placed in long underground conduit runs to pull-in electrical, fiber optic and communication lines from the conduit. Controller cabinets are used to control and operate electrical-operated features such as traffic and pedestrian signals, and dynamic message signs. This activity includes the installation of pull boxes; pulling utility lines, such as electrical, fiber optic, and/or communication lines through conduit; and installing controller cabinets.

Pull boxes are installed to the same depth as the underground conduit that enters the box. Installing pull boxes involves excavating a hole manually or mechanically to the dimensions of the pull box. Pull boxes may be completely recessed and level with the ground surface elevation, or they may be partially buried. Pull boxes are comprised of various prefabricated materials, such as concrete, plastic, or galvanized steel. Once the pull box is installed it is used as an access point to pull the electrical, fiber optic, and/or communication lines to the intended feature requiring connection. Pulling the lines is typically done with reel mounted to a truck or trailer and will require off-road vehicle access at both the pull box and feature being connected to. Refer to G-14 for impacts associated with off-road vehicle access.



Controller cabinets are typically installed on top of concrete foundations above the ground surface. Although the cabinet is located above the ground surface, the concrete foundation extends beneath the ground surface to accommodate conduit. To install a controller cabinet, the extent of the concrete foundation is first excavated manually or mechanically and conduit is pulled into the footprint of the concrete foundation from a nearby pull box or installed independently for future use. Once the conduit is in place, concrete is poured around the conduit (G-03) and anchors are bolted into the foundation after the concrete has set. Electrical, fiber optic, and/or communication lines are then pulled through the conduit. Once the appropriate lines are pulled into the conduit, the controller cabinet is placed on top of the concrete foundation.



U-04, Inspection and Minor Repair- Utility Group

This activity includes performing inspections and repairs on conduit, pull boxes, and controller cabinets. This activity may result in minimal ground disturbance which is not to exceed 30-feet from the feature requiring repair. Inspecting these features may be completed on-foot or require off-road vehicle use (G-14). This activity does not include off-road vehicle use. Impacts associated with off-road vehicle use are covered under G-14.