

BENZIE COUNTY ROAD COMMISSION  
Hooker Road Timber Bridge

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06-15-18

**PROGRESS SCHEDULE:**

Begin all work after receiving notice of award of contract from the BCRC.

**The contract award is subject to approval from the Road Commission.**

The Contractor must submit a complete, detailed and signed MDOT Form 1130, Progress Schedule, to the Engineer within seven (7) calendar days after award and prior to starting work. The Progress Schedule must include, as a minimum, the controlling work items for the completion of the project, as well as the planned dates or work days that these work items will be the controlling operations.

The Owner anticipates that construction can begin no earlier than **October 1, 2018**. In no case shall any work be commenced prior to receipt of formal notice of award by the Department.

The entire project must be completed on or before the final project completion date of **November 14, 2018**.

Liquidated Damages shall be assessed in accordance with Section 108.10 of the 2012 Standard Specifications for Construction.

After award and prior to the start of the work, the Contractor must attend a preconstruction meeting with the Engineer and the Owner (Manistee County Road Commission) at the MCRC. The Engineer will arrange the day and time for the meeting.

BENZIE COUNTY ROAD COMMISSION

SPECIAL PROVISION  
FOR  
**STRUCTURE, TIMBER - INSTALL**

KPM:PJM

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08-06-18

**a. Description:**

Install a timber bridge as shown on the Engineer's plans and the Fabricator's plans. All Timber Bridge materials, including piles and hardware, will be supplied by the Benzie County Road Commission (BCRC) and delivered to the project site.

**b. Construction:**

Construction methods shall be in accordance with subsection 709.03 of the 2012 Standard Specifications for Construction. Drive nails and spikes with sufficient force to set the heads flush with surface of the wood, thus ensuring that the surface is free from deep and frequent hammer marks. Handle lumber and timber with sufficient care to avoid breaking through portions penetrated by the treatment, and thereby exposing untreated wood. Do not use chains, peavies, cant hooks, picaroons, timber dogs, pike poles and other pointed tools that would burr, blemish, penetrate or deform the contacted timber. Use only rope, rubber or fabric slings.

Secure ship lapped joints with drive spikes. Connect multiple panels with spreader beams and secure through the deck panels with bolts and locking hardware.

The supplier shall be responsible for assisting the contractor with construction of the structure.

**c. Measurement and Payment:**

The completed work as described will be paid for at the contract unit price for the following contract item (pay item)

**Pay Item**

**Unit**

Structure, Timber – Install

Lump Sum

Furnishing pile driving equipment, driven timber piles and treated timber test piles are not part of **Structure, Timber – Install** and will be paid for separately.

BENZIE COUNTY ROAD COMMISSION

SPECIAL PROVISION  
FOR  
SLOPE RESTORATION

KPM/PJM

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08-06-18

**a. Description:**

This work shall be done in accordance with the requirements of section 816 of the 2012 Edition of the Michigan Department of Transportation Standard Specifications for Construction, except as specified herein.

**b. Materials:**

The following materials shall meet the requirements of Section 917 of the 2012 Standard Specifications for Construction, and as shown below:

<u>Material</u>	<u>Application Rate</u>
Topsoil Surface	3 inches minimum
Seeding, Mixture TDS	220 #/Acre
Fertilizer, Chemical Nutrient, Cl A	176 #/Acre
High Velocity Mulch Blanket	(Must be from MDOT Qualified Products list)

**c. Construction Methods:**

Topsoil, seed, fertilizer and high velocity mulch blanket meeting the requirements of the 2012 MDOT Standard Specifications for Construction will be placed on disturbed areas, or other areas as directed by the engineer, beyond the roadway shoulder. Topsoil shall be furnished by the contractor but salvaged topsoil may be used as approved by engineer. Topsoil depth shall be not less than 3 inches. The Contractor is responsible for determining the amount of existing topsoil that can be salvaged.

**d. Measurement and Payment:**

The completed work shall be measured and paid for at the contract unit price for the following contract pay item and includes all materials, equipment and labor necessary to complete this item as described above.

**Pay Item**

**Unit**

Slope Restoration

Square Yard

Payment for **Slope Restoration** will be measured by area in square yard in place. All materials, labor and equipment required to install **Slope Restoration**, which includes Topsoil Surface, Furnished or Salvaged; Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and High Velocity Mulch Blanket will not be paid for separately but shall be included in the contract unit price bid for **Slope Restoration**.

**BENZIE COUNTY ROAD COMMISSION  
SPECIAL PROVISION  
FOR  
MAINTAINING TRAFFIC**

KPM/PJM

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06-15-18

**a. General.** Traffic will be maintained in accordance with the 2012 Standard Specifications for Construction, including any supplemental specifications, and as herein specified. All traffic control devices and their usage shall comply with the 2011 edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD).

The Benzie County Road Commission (BCRC) may perform maintenance work within or adjacent to the Construction Influence Area (CIA). BCRC will coordinate their operations to minimize the interference to the Contractor. No additional payment will be made to the Contractor for the joint use of the traffic control items.

**b. Construction Influence Area (CIA).** The CIA limits shall include the area within the right-of-way plus a distance in advance as required for the advanced construction signing and traffic control devices. The CIA shall extend down all intersecting roadways a distance of 550 feet.

**c. Traffic Restrictions.** All work shall be confined to daylight hours. No work shall be permitted on Sundays, holidays, holiday weekends, or during special events as defined by the Engineer. For all work not done under detour/roadway closure (or for maintaining local traffic), a minimum of one lane of traffic shall be maintained at all times.

Hooker Road will be closed adjacent to the Timber Bridge construction as directed by the engineer.

The Contractor shall provide 48 hour notice prior to implementation of the road closure.

**d. Traffic Control Devices.** All warning signs shall be 48" x 48" mounted at 5 ft minimum bottom height in uncurbed areas and 7 ft minimum bottom height in curbed or pedestrian areas. All construction signs left in place for a duration exceeding 14 days will be on driven posts as per WZD-100-A. Temporary Traffic Control Devices shall conform to WZD-125-E.

**e. Measurement and Payment.** The completed work for Maintaining Traffic including furnishing and placement of all materials, labor, and equipment, and will be measured and paid for at the contract unit price for the following contract items (pay items).

<u>Contract Item</u>	<u>Pay Unit</u>
Traffic Control.....	Lump Sum

Estimates of Maintaining Traffic Quantities

Sign, Type B, Temp, Prismatic Furn .....	52 Square Foot
Sign, Type B, Temp, Prismatic Oper .....	52 Square Foot
(Signs estimated as Two W-20-3 Road Closed Ahead and Two R-11-2 Road Closed signs)	
Barricade, Type III, High Intensity, Double Sided, Lighted Furn.....	4 Ea
Barricade, Type III, High Intensity, Double Sided, Lighted Oper.....	4 Ea
Minor Traf Devices .....	1 Lump Sum

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSERVATION PRACTICE STANDARD**  
**AQUATIC ORGANISM PASSAGE**

(Mi.)

**CODE 396**

**DEFINITION**

Modification or removal of barriers that restrict or impede movement of aquatic organisms.

**PURPOSE**

Improve or provide passage for aquatic organisms.

**CONDITIONS WHERE PRACTICE APPLIES**

All aquatic habitats where barriers impede passage of aquatic organisms.

**CRITERIA**

**Planning and Evaluation**

Evaluate sites for variations in stage and discharge, tidal influence, hydraulics, geomorphic impacts, sediment transport and continuity, and organic debris movement. Design passage features to account for the known range of variation resulting from this evaluation.

Mitigate undesirable channel plan or profile shifts resulting from the modification or removal of a passage barrier.

Plan and locate passage for compatibility with local site conditions and stream geomorphology, to the extent possible.

Avoid locating fishway entrances and exits in areas that will obstruct function, increase harassment or predation, or result in excessive operation and maintenance requirements.

**Design Requirements**

Design passage to accommodate present and reasonably anticipated changes in watershed conditions.

Design passage structures according to known swimming and leaping capabilities of target species or a similar species with comparable

swimming abilities. Utilize hydraulic computations to document how designs satisfy the physiological requirements of target organisms.

Design passage structures to mimic channel geometry and morphology referenced from an adjacent reach or analog stream when the swimming and leaping abilities of target species are unknown, or when a project will benefit multiple aquatic organisms.

At a minimum, design and evaluate passage structures for hydraulic performance and structural integrity at the bankfull and 25-year peak flow events.

Design passage features to minimize or avoid energy deficits, physical stress, and harm to migratory organisms.

Design passage features to minimize or avoid excessive delays during migration periods.

Provide adequate attraction flow into a passage facility across the full range of discharge during which target species will move.

Use trashracks on culverts or fishways only if required or necessary. Ensure that trashracks are self-cleaning and/or easily maintained.

Select construction materials that are non-toxic and resistant to degradation.

Plan construction logistics, methods, and sequencing to minimize adverse effects to aquatic organisms, riparian areas, and instream habitat.

**CONSIDERATIONS**

Develop or adopt a quantitative method to identify and evaluate passage barriers (see References). Information derived from this method can assist planning and budgeting activities.

Consider removing a passage barrier before installing or retrofitting a new facility or structure. Complete or partial barrier removal often provides better passage conditions, and is more economical than designing, constructing, operating, and maintaining many new passage structures.

Culverts or bottomless arches designed using the stream simulation approach (USFS 2008) that incorporate natural streambed substrates throughout their length are preferred over other culvert configurations for passage purposes. Natural streambeds provide numerous passage and habitat benefits to many life stage requirements for fish and other aquatic organisms compared to man-made surfaces.

Design and locate features to improve or provide passage for as many different aquatic species and age classes as possible.

Retain as much riparian and streambank vegetation as possible during project access and construction activities to maintain shade, riparian continuity, and sources of nutrient and structural inputs for aquatic ecosystems. Where appropriate, consider removing access roads or trails and restoring native vegetation representative of the site.

Replacing or removing an existing instream structure may trigger channel adjustments (e.g., aggradation and/or degradation) upstream and/or downstream of the work site. Install grade controls or other slope modifications to mitigate adverse physical or ecological consequences (see conservation practice standards Channel Stabilization – Code 584 and Grade Stabilization Structure – Code 410).

Analyze any potentially negative interactions, including hybridization, disease, competition, or predation, between target and aquatic nuisance species when passage is provided above a barrier. If serious consequences are likely, take steps to minimize adverse effects.

Consider the habitat requirements of other aquatic or terrestrial species that may be affected by a passage project. Some passage facilities may improve survival for terrestrial vertebrates by providing safe migration routes under roadways through the use of additional floodplain relief culverts.

Assess the amount of habitat upstream and downstream of a barrier to evaluate into

project feasibility, cost effectiveness, and/or potential for connecting fragmented habitats. Using a watershed approach whenever possible provides a framework for project planning.

Fish passage facilities are often associated with water diversions or intakes that may injure or kill aquatic species. Prevent fish entrainment or impingement, particularly of juveniles, into diversions, penstocks, or pumps by installing screens.

Passage projects can affect water management practices such as diversion, power generation, or storage. Strive to balance aquatic organism passage with other water management objectives.

Consider upstream and larger watershed issues that may affect passage. Common solutions may include maintaining or restoring adequate instream flow and/or other water quality parameters (e.g., temperature, dissolved oxygen).

Barrier removal, especially dams and road crossings, can significantly affect wetlands, flooding potential, existing infrastructure, and social and cultural practices and resources. Evaluate and address the full range of impacts when planning or designing barrier removal projects.

Floodplain and water development often alter historic river channel pattern and location. Consider bypassing a barrier by restoring streamflow to former, stable natural channels.

Passage facilities can assist population recovery and management. Consider local, state, or federal brood stock collection and species management initiatives when planning passage features.

Consider using self-regulating tidegates in marine environments. These structures can be adjusted to automatically regulate saltwater intrusion into estuaries, and often improve estuarine functions and passage conditions.

In the case of low-water crossings, water quality impacts from vehicular pollutants and erosion caused by tire action can be severe. Where possible, reroute roadways or install hardened instream crossings (see Stream Crossing, code 578).

**NRCS, NHCP**

**April 2011**

## PLANS AND SPECIFICATIONS

Provide site-specific plans for this practice. Plans will specify passage structure design, layout, and overall objectives, and include (at a minimum):

- Location map and plan view of site, description of design flows, and a short summary of operating criteria.
- Detailed construction drawings showing existing and planned site conditions including elevations, typical profiles, and cross-sections of planned structures.
- Construction specifications describing materials, logistics (including erosion control), and timing.
- Guidance for post-construction evaluation and monitoring to assess structural integrity and compliance with design criteria.

## OPERATION AND MAINTENANCE

Develop an operation and maintenance plan for all applications of this standard. Within the plan, provide for periodic inspection and corrective action should passage conditions become impaired because a structure is damaged or inoperable. At a minimum, operation and maintenance items should include:

- Specifying what entity is responsible for the daily operation and maintenance of a passage structure.
- Annual, seasonal, and/or daily operating activities necessary to ensure proper function of the structure
- Check passage structure at regular intervals to ensure it is operating within design criteria.
- Clean trashracks and debris collectors or remove debris accumulations regularly.
- Adjust gates, orifices, valves, or other control devices as needed to regulate flow and maintain a passage structure within operating criteria.
- Periodically check staff gages or other flow metering devices for accuracy.
- Annually inspect passage structures for structural integrity and disrepair.

- Inspect gate and valve seals for damage.
- Replace worn or broken stoplogs, baffles, fins, or other structural components.
- Remove sediment accumulations from within passage structure where applicable.

## REFERENCES

- [Aquatic Nuisance Species Information](#). 2006. (per Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 [16 U.S.C. 4701]).
- Bell, M.C. 1990. *Fisheries Handbook of Engineering Requirements and Biological Criteria*. United States Army Corps of Engineers, Fish Passage Development and Evaluation Program, Portland, OR. 290 p.
- Clay, C.H. 1995. *Design of Fishways and Other Fish Facilities*. Second Edition. CRC Press, Inc. Boca Raton, FL. 248 pp.
- Jungwirth, M., S. Schmutz, and S. Weiss, editors. 1998. *Fish Migration and Fish Bypasses*. Fishing News Books, Oxford, UK. 438 pp.
- NRCS. 2006. Fish passage and screening designs. Technical Supplement 14-N to NEH-654 – Stream Restoration Design Handbook.
- Taylor, R.N. and M. Love. 2003. [Fish passage evaluation at stream crossings](#). Part IX *in*: California Stream Habitat Restoration Manual, 3<sup>rd</sup> edition, 1998. Prepared by G. Flosi, S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. Sacramento, CA. 100 electronic pp.
- United States Forest Service (USFS). 2006. Low water crossings: Geomorphic, biological, and engineering design considerations. 0625 1808, SDTDC, San Dimas, CA.
- USFS. 2008. Stream Simulation: An ecological approach to providing passage for aquatic organisms at road-stream crossings. 0877 1801P, NTDP, San Dimas, CA.
- Washington Department of Fish and Wildlife (WDFW). 2000. [Fishway guidelines for Washington State](#). Olympia, WA. 57 pp.
- WDFW. 2000. [Fish passage barrier and surface water diversion screening and prioritization manual](#). WDFW Habitat Program, Environmental Restoration Division, Salmon

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Screening, Habitat Enhancement and  
Restoration Section, Olympia, WA. 158 pp.



## NATURAL RESOURCES CONSERVATION SERVICE

### CONSERVATION PRACTICE STANDARD

# STORMWATER RUNOFF CONTROL

(No. and Ac.)

## CODE 570

### DEFINITION

Controlling the quantity and quality of stormwater runoff.

### PURPOSE

To control stormwater runoff to achieve one or more of the following:

- Minimize erosion and sedimentation during and following construction activities.
- Reduce the quantity of stormwater leaving developing or developed sites.
- Improve the quality of stormwater leaving developing or developed sites.

### CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where stormwater runoff causes or may cause undesirable downstream flooding, sedimentation or channel degradation and/or degradation of surface or ground water quality if left untreated. This practice may apply both to sites undergoing development as well as remedial work on already developed sites.

### CRITERIA

#### General Criteria Applicable to All Purposes

Plan, design and construct stormwater runoff controls to comply with applicable federal, state, and local laws and regulations.

Develop a plan to reduce the impacts of stormwater runoff from the site based on an assessment of the downstream area. As applicable include in the plan practices or

management activities that will:

- Reduce onsite erosion.
- Reduce offsite impacts from sedimentation.
- Reduce the quantity of stormwater leaving the site to levels that will not adversely affect downstream receiving channels.
- Improve the quality of runoff leaving the site.
- Leave the site in a stable condition after construction.

**Vegetative Measures.** Where appropriate, stabilize all areas disturbed by construction with vegetation as soon as possible after construction. Refer to Conservation Practice Standard, (342) Critical Area Planting for the establishment of vegetation. If vegetation is not appropriate for the site, use other measures to stabilize the area.

**Safety.** Detention ponds and other areas where water is detained or flows swiftly, can present hazards to the public. Where necessary, include appropriate safety features to warn of potential dangers or deter entry to hazardous areas such as fences, gates and warning signs.

**Additional Criteria for the Reduction of Water Quantity.** Design stormwater control systems to control flow from the area of concern to rates and volumes that will not cause degradation of downstream areas due to erosion or sedimentation. Acceptable peak rates are dependent upon the capacity and stability of the receiving channel. Local regulations may specify acceptable discharge rates for different storm frequencies.

Runoff is controlled by slowing the release of runoff from the site. This can be accomplished by onsite storage, increasing infiltration onsite, lengthening the flow path of runoff or a

combination of these methods.

All runoff control methods must include provisions to safely bypass runoff in excess of the design storm.

**Additional Criteria for the Improvement of Water Quality.** Runoff from developing areas can be contaminated with a variety of substances including sediment, oils, chemicals and trash. Runoff control systems must include provisions to reduce contaminants in the runoff leaving the site. This can include vegetated filtration areas and other biofilters, trash guards and settling areas that are readily accessible for cleanout. For runoff that is known to be contaminated with substances that may be particularly harmful to the water supply or fish and wildlife, additional measures may be necessary.

**Additional Criteria for Erosion and Sediment Control.** Control erosion on the site by limiting the amount and length of time that bare soil is exposed to precipitation. This can be accomplished by staging construction and only removing vegetation from a portion of the site at a time, revegetating areas incrementally during construction or using temporary seeding and mulching to stabilize areas until permanent vegetation can be established. Structural erosion control practices can also be installed to reduce the flow length and velocity of runoff to limit erosion.

When erosion cannot be stopped at the source, sediment laden runoff must be filtered or detained to allow sediment particles to settle out to acceptable levels before runoff is released from the site. This can be accomplished by sediment traps, sediment basins and other structures designed to detain or filter runoff. Refer to Conservation Practice Standard, (350) Sediment Basin for design requirements for sediment basins.

## CONSIDERATIONS

Research has shown that the first runoff from a site is often the most contaminated. After this initial flush, less pollutants are available for removal and dilution lessens the impact. Consequently treatment of this "first flush" of runoff is often sufficient to address the water quality concern. The exact amount of runoff to treat varies depending upon the surface and level of contamination. Determine the amount

of runoff to treat based on appropriate research or experience.

Stormwater control practices can affect downstream hydrology. While this is the point of most stormwater control systems the effect of changing the peak rate and volume of runoff should be considered on downstream areas. The effect of a single project should also be considered in context with other projects in the watershed to determine the cumulative effect. Generally peak rates of runoff should be kept at or below pre-development rates of runoff from the site for the 2 year 24 hour storm. For already developed areas consider reducing the peak flow from the current developed condition.

Design stormwater control practices to fit into the visual landscape as well as to function for runoff control. Since stormwater control practices are generally installed in public spaces, consider how the space will be used and the visual impact the practices will have.

If properly designed, stormwater control practices can be beneficial to wildlife. When possible use native vegetation to provide food and habitat for wildlife and pollinators. Since most stormwater control practices are in aquatic environments, they can inhibit the movements of aquatic organisms. When designing these structures include provisions for the safe passage of aquatic organisms that may inhabit the site.

To be most effective, stormwater control should include a system of practices working together. This might include detention along with infiltration areas and the maintenance of natural, undisturbed areas. However, it could also include managing the development of the site to limit the disturbed area, ensuring that revegetation occurs in a timely manner and controlling where heavy equipment is allowed to travel on a site.

Large storms can quickly fill stormwater runoff practices with sediment that must be removed in order for the practices to function correctly. Consequently these practices should be designed for easy access and maintenance.

Since stormwater control practices are often installed in urban and public spaces, vandalism may be a problem. Consider using practices that cannot be easily vandalized such as grouting rock in place and installing barriers and locks where appropriate.

## PLANS AND SPECIFICATIONS

Prepare plans and specifications for stormwater runoff control systems that describe the requirements for applying the practice according to this standard. As a minimum the plans and specifications shall include:

1. A plan view showing the extent of the practice.
2. Where appropriate, cross-sections and/or profiles showing elevations and distances.
3. Where appropriate, plans for structural details.
4. Where appropriate, seeding requirements.
5. Construction specifications that describe in writing site specific installation requirements for the stormwater runoff control systems.

## OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the operator. The minimum requirements to be addressed in the operation and maintenance plan are:

1. Periodic inspections, especially immediately following significant rainfall events.
2. Prompt repair or replacement of damaged components especially surfaces that are subjected to wear or erosion.
3. Regular inspection of settling basins, trash guards and other practices to collect and remove accumulated sediment and debris.
4. Where vegetation is specified, periodic mowing, fertilization and control of vegetation.

## REFERENCES

- Bannerman, Roger, and E. Considine, 2003. Rain Gardens: A How-to Manual for Homeowners. University of Wisconsin Extension Publication GWQ037 or Wisconsin Department of Natural Resources Publication PUB-WT-776 2003. Madison, WI
- U. S. Environmental Protection Agency. 2007. Developing Your Stormwater Pollution Prevention Plan. Washington, DC
- United States Environmental Protection Agency. 1999. Stormwater Technology Fact Sheet: Bioretention. Publ. EPA-832-F-99-012. Office of Water, Washington, D.C.



**Natural Resources Conservation Service  
CONSERVATION PRACTICE STANDARD**

**Critical Area Planting**

**Code 342**

**(Ac)**

**DEFINITION**

Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical, or biological conditions that prevent the establishment of vegetation with normal seeding/planting methods.

**PURPOSE**

- Stabilize areas with existing or expected high rates of soil erosion by wind or water.
- Stabilize stream and channel banks, pond and other shorelines, earthen features of structural conservation practices.
- Stabilize areas such as sand dunes and riparian areas.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to highly disturbed areas such as—

- Active or abandoned mined lands.
- Urban restoration sites.
- Construction areas.
- Conservation practice construction sites.
- Areas needing stabilization before or after natural disasters such as floods, hurricanes, tornados, and wildfires.
- Eroded banks of natural channels, banks of newly constructed channels, and lake shorelines.
- Other areas degraded by human activities or natural events.

**CRITERIA**

**General Criteria Applicable to All Purposes**

**Site preparation.** Conduct a site investigation to identify any physical, chemical, or biological conditions that could affect the successful establishment of vegetation.

Clear areas to be planted of unwanted materials and smooth or shape, if needed, to meet planting purpose(s).

Prepare a suitable seedbed for all seeded species. Rip compacted layers and re-firm the soil prior to seedbed preparation, as needed.

As site conditions dictate, when grading slopes, stockpile topsoil to be redistributed over area to be planted.

**Species selection.** Select species for seeding or planting that are suited to local site conditions and intended uses, and common to the site or location.

Selected species will have the capacity to achieve adequate density and vigor to stabilize the site within an appropriate period.

**Establishment of vegetation.** Plant seeds using the method or methods best suited to site and soil conditions.

Limit sod placement to areas that can naturally supply needed moisture or sites that can be irrigated during the establishment period. Place and anchor sod using techniques to ensure that it remains in place until established.

Specify species, rates of seeding or planting, legume inoculation, minimum quality of planting stock (e.g., pure live seed (PLS) or stem caliper), method of seedbed preparation, and method of establishment before application. Use only viable, high-quality seed or planting stock.

Seed or plant at a time and in a manner that best ensures establishment and growth of the selected species.

Plant during approved times for the species to be used.

Apply soil amendments (e.g., lime, fertilizer, compost) according to the requirements in the local Field Office Technical Guide.

Mulch or otherwise stabilize (e.g., polyacrylamide (PAM)) plantings as necessary to ensure successful establishment.

**Additional Criteria to Stabilize Stream and Channel Banks, Pond and Other Shorelines, Earthen Features of Structural Conservation Practices**

**Bank and channel slopes.** Shape channel side slopes so that they are stable and allow establishment and maintenance of desired vegetation.

A combination of vegetative and structural measures may be necessary on slopes steeper than 3:1 to ensure adequate stability.

**Species selection.** Plant material used for this purpose must—

- Be adapted to the hydrologic zone into which they will be planted.
- Be adapted and proven in the regions in which they will be used.
- Be compatible with existing vegetation in the area.
- Protect the channel banks but not restrict channel capacity.

**Establishment of vegetation.** Specify species, planting rates, spacing, methods and dates of planting based on local planting guides or technical notes.

Identify and protect desirable existing vegetation during practice installation.

Use a combination of vegetative and structural practices with living and inert material when flow velocities, soils, and bank stability preclude stabilization by vegetative establishment alone. Use Conservation Practice Standard (CPS) Streambank Stabilization (Code 580) for the structural measures.

Control existing vegetation on a site that will compete with species to be established vegetatively (e.g., bare-root, containerized, ball-and-burlap, potted) to ensure successful establishment of the planted species.

Plant streambank stabilization vegetation in accordance with the NRCS Engineering Field Handbook Part 650, Chapter 16, "Streambank and Shoreline Protection," and Chapter 18, "Soil Bioengineering for Upland Slope Protection & Erosion Reduction."

**Site protection and access control.** Restrict access to planted areas until fully established.

**Additional Criteria to Stabilize Areas Such As Sand Dunes and Riparian Areas**

Plants for sand dunes and coastal sites must be able to survive being buried by blowing sand, sand blasting, salt spray, salt water flooding, drought, heat, and low nutrient supply.

Include sand trapping devices such as sand fences or brush matting in the revegetation/stabilization plans where applicable.

**CONSIDERATIONS**

Species or diverse mixes that are adapted to the site and have multiple benefits should be considered. Native species may be used when appropriate for the site.

To benefit pollinators and other wildlife, flowering shrubs and wildflowers with resilient root systems and good soil-holding capacity also should be considered for incorporation as a small percentage of a larger grass-dominated planting. Where appropriate consider a diverse mixture of forbs to support pollinator habitat.

Planning and installation of other CPSs such as Diversion (Code 362), Obstruction Removal (Code 500), Subsurface Drain (Code 606), Underground Outlet (Code 620), or Anionic Polyacrylamide Application (Code 450) may be necessary to prepare the area or ensure vegetative establishment.

Areas of vegetation established with this practice can create habitat for various type of wildlife. Maintenance activities, such as mowing or spraying, can have detrimental effects on certain species. Perform management activities at the times and in a manner that causes the least disruption to wildlife.

**PLANS AND SPECIFICATIONS**

Prepare plans and specifications for each field or management unit according to the criteria and operation and maintenance sections of this standard. Record practice specifications using approved Implementation Requirements document.

Address the following elements in the plan, as applicable, to meet the intended purpose(s):

- Practice purpose(s)
- Site preparation
- Topsoil requirements
- Fertilizer application
- Seedbed/planting area preparation
- Timing and method of seeding/planting
- Selection of species
- Seed/plant source
- Seed analysis/pure live seed (PLS)
- Seeding rate/plant spacing
- Mulching, PAM, or other stabilizing materials
- Supplemental water needed for establishment
- Protection of plantings
- Describe successful establishment (e.g., minimum percent ground/canopy cover, percent survival, stand density)

## **OPERATION AND MAINTENANCE**

- Control access to the area to ensure the site remains stable.
- Protect plantings shall be protected from pests (e.g., weeds, insects, diseases, livestock, or wildlife) as necessary to ensure long-term survival.
- Inspections, reseeding or replanting, and fertilization may be needed to ensure that this practice functions as intended throughout its expected life.
- Observe establishment progress and success at regular intervals until the practice has met the criteria for successful establishment and implementation.
- Description of successful establishment (e.g., minimum percent ground/canopy cover, percent survival, stand density).

## **REFERENCES**

Federal Interagency Stream Restoration Working Group. 1998. Stream corridor restoration: principles, processes, and practices. USDA NRCS National Engineering Handbook, Part 653.

USDA NRCS. 2007. National Engineering Handbook, Part 654. Stream restoration guide.

USDA NRCS. 2015. The PLANTS Database (<http://plants.usda.gov>, 8 December 2015). National Plant Data Team, Greensboro, NC.



**Natural Resources Conservation Service  
CONSERVATION PRACTICE STANDARD**

**MULCHING**

**Code 484**

**(Ac)**

**DEFINITION**

Applying plant residues or other suitable materials to the land surface.

**PURPOSE**

This practice is applied to achieve the following purpose(s):

- Improve the efficiency of moisture management
- Reduce irrigation energy used in farming/ranching practices and field operations
- Improve the efficient use of irrigation water
- Prevent excessive bank erosion from water conveyance channels
- Reduce concentrated flow erosion
- Reduce sheet, rill, & wind erosion
- Improve plant productivity and health
- Maintain or increase organic matter content
- Reduce emissions of particulate matter

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all lands where mulches are needed.

**CRITERIA**

**General Criteria Applicable to All Purposes**

The selection of mulching materials will depend primarily on the purpose(s) for the mulch application, site conditions, and the material's availability. The mulch materials may consist of natural or artificial materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period.

Prepare the soil surface to achieve its desired purpose prior to mulching.

Apply the mulch material evenly. Use tackifiers, emulsions, pinning, netting, crimping or other methods of anchoring, if needed, to hold the mulch in place for specified periods.

In cases where furrow erosion may occur due to concentrated flows from mulches (e.g., plastic mulches on beds), take appropriate measures to protect the furrows and the furrow outlets.

Apply manufactured mulches according to the manufacturer's specifications.



Remove synthetic mulches from the field prior to the next crop. Do not incorporate (e.g., disk) synthetic mulches into the soil.

When mulching with wood products such as wood chips, bark, or shavings or other wood materials, apply a minimum 2-inch thickness of particles that will remain in place during heavy rainfall or strong wind events, or both if applicable.

The minimum size of mulching material consisting of gravel or other inorganic mulching is 0.75 inches and applied to a minimum depth of 2 inches.

When mulching with cereal grain straw or grass hay, apply at a rate to achieve a minimum 70-percent ground cover. Determine the mulch rate using the current erosion prediction technology for the intended purpose.

Do not apply plant-based mulch materials with a carbon (C) to nitrogen (N) ratio less than 20:1 to watercourses.

**Additional Criteria to Improve the Efficiency of Moisture Management, to Reduce Irrigation Energy Used in Farming/Ranching Practices and Field Operations or to Improve the Efficient Use of Irrigation Water**

Apply mulch materials to cover at least 90 percent of the soil surface to reduce potential evaporation.

Fine-textured mulches (e.g., rice hulls) that allow less oxygen penetration than coarser materials should not be thicker than 2 inches.

**Additional Criteria to Improve Plant Productivity and Health**

When establishing vegetative cover, apply mulch at a rate that achieves a minimum of 70-percent ground cover to provide protection from erosion and runoff and yet allow adequate light and air penetration to the seedbed to ensure proper germination and emergence.

**Additional Criteria to Maintain or Increase Organic Matter Content**

Use plant-based mulching materials of suitable quantity and quality to add organic matter, provide food and shelter for soil biota, and protect the soil surface from raindrop impact and crusting, while allowing for adequate soil aeration.

An evaluation of the system using the current approved soil conditioning index (SCI) procedure results in zero or higher.

**CONSIDERATIONS**

Evaluate the effects of mulching on evaporation, infiltration, and runoff. Mulch material may affect microbial activity in the soil surface, increase infiltration, and decrease runoff, erosion, and evaporation. The temperature of the surface runoff may also be lowered.

Mulch materials with low permeability may adversely affect the water needs of plants.

Avoid excessively thick or tightly packed mulches that can result in soggy, anaerobic conditions at the soil surface during wet weather; or prevent rainfall or overhead irrigation from reaching the soil during times of moisture deficit

Organic materials with C:N ratios of less than 20:1 will release nitrate-nitrogen that could cause water quality impairments.

Finely divided plant residues (e.g., sawdust) and those rich in soluble carbohydrates (e.g., fresh green-chopped sorghum-sudangrass, corn, or other grasses) that have a C:N ratio greater than 30 can tie up

soil N and necessitate supplemental N applications on crops. Coarser materials such as grain straw and chipped brush usually do not reduce crop-available soil N levels unless and until they are incorporated into the soil by tillage or cultivation.

Mulching may also provide habitat for beneficial organisms and provide pest suppression.

In attempting to provide habitat for ground beetles, spiders, and other predators of weed seeds and crop pests, use mulch of sufficient ground cover and suitable thickness and texture for the target species. Avoid excessively thick or tightly packed mulches, which can interfere with the movement of ground beetles and other beneficial organisms, and may increase the incidence of crop pests and diseases. Consider mulching crops only if the selected mulching materials, and rates of application do not contribute to pest problems.

During the period when weed seed predation is desired and predators are most active, avoid pesticide applications or pesticide exposures that could adversely affect weed seed consumers.

Low permeability mulches (e.g., plastic) may increase concentrated flow and erosion on the nonmulched areas.

Light-reflecting mulches such as white or aluminized plastic film or bright straw can repel some pests.

Consider potential beneficial or detrimental effects of mulching materials on the biotic community surrounding the crop, including beneficial soil micro- and macro-organisms, as well as plant pathogens and plant pests. These effects are specific to site, mulch, and crop, and may include enhanced soil microbial activity, increased or reduced levels of crop diseases, and toxic (allelopathic) activity against the crop, weeds, or other beneficial or pest organisms.

Keep mulch 3 to 6 inches away from plant stems and crowns to prevent disease and pest problems. Additional weed control may be needed around the plant base area.

Deep mulch provides nesting habitat for ground-burrowing rodents that can chew extensively on tree trunks and tree roots. Light mulch applied after the first cold weather may prevent rodents from nesting.

Some mulch material may adversely affect aquatic environments through changes in water chemistry or as waterborne debris. Consider placing mulch in locations that minimize these risks.

Consider potential effects of soil physical, chemical, and biological properties. Refer to soil survey data as a preliminary planning tool for assessment of areas. Consult a resource soil scientist or the Web Soil Survey at: <http://websoilsurvey.nrcs.usda.gov/app/> to obtain soil properties and qualities information.

For all organic or transitioning to organic operations, follow all National Organic Program rules.

## **PLANS AND SPECIFICATIONS**

Prepare specifications for each site and purpose on the implementation requirements document. Documentation must include—

- Purpose of the mulch.
- Type of mulch material used.
- Percent cover or thickness of mulch material, as applicable.
- Timing of application.
- Site preparation.
- Listing of netting, tackifiers, or method of anchoring.
- Operation and maintenance.

**OPERATION AND MAINTENANCE**

Periodically inspect the mulched areas and reinstall mulch or repair as needed to accomplish the intended purpose.

Evaluate the effectiveness of the mulch (application, amount of cover provided, durability, etc.) and adjust the management or type of mulch to better meet the intended purpose(s).

Remove or incorporate mulch materials to be consistent with the intended purpose and site conditions.

Do not operate equipment near the mulched site that would compromise the intended purpose of the mulch.

Prevent or repair any fire damage to the mulch material.

Properly collect and dispose of synthetic mulch material after intended use.

Monitor and control undesirable weeds in mulched areas.

**REFERENCES**

Agriculture and Agri-Food Canada. 2000. Plastic mulches for commercial vegetable production. Canada-Saskatchewan Irrigation Diversification Centre. Outlook, Saskatchewan.

Flanagan, D.C., Nearing, M.A. USDA-Water Erosion Prediction Project, Hillslope Profile and Watershed Model Documentation, NSERL Report #10, July 1995.

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, Coordinators. 1997. Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703.

Shaffer, M.J., and W.E. Larson (ed.). 1987. NTRM, a soil-crop simulation model for nitrogen, tillage and crop residue management. USDA Conserv. Res. Rep. 34-1. USDA-ARS.

Toy, T.J., and G.R. Foster. (Ed.) 1998. Guidelines for the use of the Revised Universal Soil Loss Equation (RUSLE) Version 1.06 on mined lands, construction sites, and reclaimed lands. USDI, OSMR.

USDA, NRCS. 2011. National Agronomy Manual. 190-V, 4th Ed. Washington, D.C.



## NOTICE OF AUTHORIZATION

**Permit Number: WRP011736 v. 1**

**Date Issued: May 30, 2018**

**Site Name: 10-Hooker Road over North Branch Platte-Benzie County Road Commission**

**Expiration Date: May 30, 2023**

The Michigan Department of Environmental Quality, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; specifically:

- Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- Part 301, Inland Lakes and Streams.
- Part 303, Wetlands Protection.
- Part 315, Dam Safety.
- Part 323, Shorelands Protection and Management.
- Part 325, Great Lakes Submerged Lands.
- Part 353, Sand Dunes Protection and Management.

**Authorized activity:**

**Remove the existing 20-foot long by 4-foot span by 4-foot rise corrugated metal culvert with concrete headwall and construct a 26-foot long by 24-foot span by 10.2-foot rise timber bridge with wingwalls. For slope protection, place 1.0-cubic yard of riprap waterward and 3.0-cubic yards of riprap landward of the ordinary high water mark.**

To be conducted at property located in: Benzie County, Waterbody: North Branch of Platte River Section 29, Town 27N, Range 14W, Platte Township

Permittee:  
Matthew Skeels  
Benzie County Road Commission  
11318 Main Street  
P.O. Box 68  
Honor, MI 49640

Issued By:

A handwritten signature in black ink that reads "Luke F. Golden".

Luke Golden  
Cadillac District Office  
Water Resources Division  
989-370-1569

*This notice must be displayed at the site of work.  
Laminating this notice or utilizing sheet protectors is recommended.  
Please refer to the above permit number with any questions or concerns.*



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION PERMIT

Issued To:

Matthew Skeels
Benzie County Road Commission
11318 Main Street
P.O. Box 68
Honor, MI 49640

Permit No: WRP011736 v.1
Submission No.: HND-HSRJ-HN2MZ
Site Name: 10-Hooker Road over North Branch Platte-Benzie County Road Comm.
Issued: May 30, 2018
Revised:
Expires: May 30, 2023

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ), Water Resources Division (WRD), under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

- Part 301, Inland Lakes and Streams
Part 303, Wetlands Protection
Part 315, Dam Safety
Part 31, Water Resources Protection (Floodplain Regulatory Authority)
Part 323, Shorelands Protection and Management
Part 325, Great Lakes Submerged Lands
Part 353, Sand Dunes Protection and Management

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Authorized Activity:

Remove the existing 20-foot long by 4-foot span by 4-foot rise corrugated metal culvert with concrete headwall and construct a 26-foot long by 24-foot span by 10.2-foot rise timber bridge with wingwalls. For slope protection, place 1.0-cubic yard of riprap waterward and 3.0-cubic yards of riprap landward of the ordinary high water mark.

Waterbody Affected: North Branch of Platte River
Property Location: Benzie County, Platte Township, Town/Range/Section 27N14W29
Property Tax No. 11-029-008-10

Authority granted by this permit is subject to the following limitations:

- A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.

- G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
- H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
- I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit by completing and forwarding the attached preaddressed postcard to the office addressed thereon.
- J. This permit shall not be assigned or transferred without the written approval of the MDEQ.
- K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
- L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
- M. In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
- N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
- O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
- P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
- Q. This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all of the above information may be provided to the MDEQ. The MDEQ will review the request and, if approved, will provide written notification to the new owner.
- R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
- S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).
- U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
- V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
- W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
- X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.
- Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:
  - 1. All work shall be completed in accordance with plans attached and kept on file at the MDEQ's WRD, Transportation Review Unit.



2. Authority granted by this permit does not waive compliance requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA. Any discharge of sediment into waters of the state and/or off the road right-of-way is a violation of this permit, Part 91, and Part 31, Water Resources Protection, of the NREPA. A violation of these parts subjects the permittee to potential fines and penalties.
3. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.
4. The permittee is responsible for acquiring all necessary easements or rights-of-way before commencing any work authorized by this permit. All construction operations relating to or part of this project shall be confined to the existing right-of-way limits or other acquired easements.
5. Temporary soil erosion and sedimentation control measures shall be installed before or upon commencement of the earth change and shall be maintained daily. Temporary soil erosion and sedimentation control measures shall be maintained until permanent soil erosion and sedimentation control measures are in place and the area is stabilized. Permanent soil erosion and sedimentation control measures for all slopes, channels, ditches, or any disturbed area shall be installed within five (5) calendar days after final grading or the final earth change has been completed.
6. All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.
7. All raw earth within 100 feet of a lake, stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets in accordance with the following dates: September 20<sup>th</sup> for the Upper Peninsula, October 1<sup>st</sup> for the Lower Peninsula north of US-10, and October 10<sup>th</sup> for the Lower Peninsula south of US-10.
8. This permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.
9. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period beginning at the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.
10. All slurry resulting from any dewatering operation shall be discharged through a filter bag or pumped to a sump located away from wetlands and surface waters and allowed to filter through natural upland vegetation, gravel filters, or other engineered devices for a sufficient distance and/or period of time necessary to remove sediment or suspended particles. The discharge of slurry water resulting from the hydrodemolition of concrete is not allowed to enter a lake, stream, or wetland.
11. All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed on upland (non-wetland, non-floodplain or non-bottomland), prepared for stabilization, and revegetated and reseeded with native Michigan species appropriate to the site and mulched in such a manner so as to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain.

12. During removal or repair of the existing structure, every precaution shall be taken to prevent debris from entering any watercourse. Any debris reaching the watercourse during the removal and/or reconstruction of the structure shall be immediately retrieved from the water. All material shall be disposed of in an acceptable manner consistent with local, state, and federal regulations.
13. The use of explosives for removal of the structure over the waterbody, including any abutments or piers, is strictly prohibited.
14. Prior to the removal of the existing structures, cofferdams of steel sheet piling, gravel bags, clean stone, coarse aggregate, concrete or other acceptable barriers shall be installed to isolate all construction activity from the water. The barriers shall be maintained in good working order throughout the duration of the project. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site.
15. All cofferdam and temporary steel sheet pile shall then be removed in its entirety, unless specifically shown to be left in plan on the accepted plans. Cofferdam and sheet pile that is left in place shall be cut off at the elevation shown on the plans and shall be a minimum of one foot below the stream bottom.
16. The road fill side slopes shall not be steeper than 1-on-2 (1 vertical to 2 horizontal) except where headwalls of reinforced concrete, mortar masonry, dry masonry, or other acceptable methods are used.
17. Road fill side slopes terminating in the stream and any raw streambanks resulting from the construction, shall be stabilized with temporary measures in accordance with appropriate Best Management Practices based on site conditions, and if necessary, may be riprapped extending above the ordinary high water mark, before or upon commencement of the permitted activity. Temporary stabilization measures shall be maintained until permanent measures are in place.
18. All other road fill slopes, ditches, and other raw areas draining directly to the stream may be protected with riprap, sod and/or seed and mulch as may be necessary to provide effective erosion protection. The placement of riprap shall be limited to the minimum necessary to ensure proper stabilization of the side slopes and fill in the immediate vicinity of the structure.
19. If the project, or any portion of the project, is stopped and lies incomplete for any length of time (other than that encountered in a normal work week) every precaution shall be taken to protect the incomplete work from erosion, including the placement of temporary gravel bag riprap, temporary seeding and mulching, or other acceptable temporary protection.
20. No work shall be done in the stream during periods of above-normal flows except as necessary to prevent erosion.
21. Unless specifically stated under the "Permitted Activity" of this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the waterbody are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
- 22. Stormwater shall not directly discharge to the stream.**
- 23. Prior to the start of construction, all adjacent non-work wetland areas shall be protected by properly trenched sedimentation barrier to prevent sediment from entering the wetland. Orange construction fencing shall be installed as needed to prohibit construction personnel and equipment from entering or performing work in these areas. Fence shall be maintained daily throughout the construction process. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site,**



**the sedimentation barrier shall then be removed in its entirety and the area restored to its original configuration and cover.**

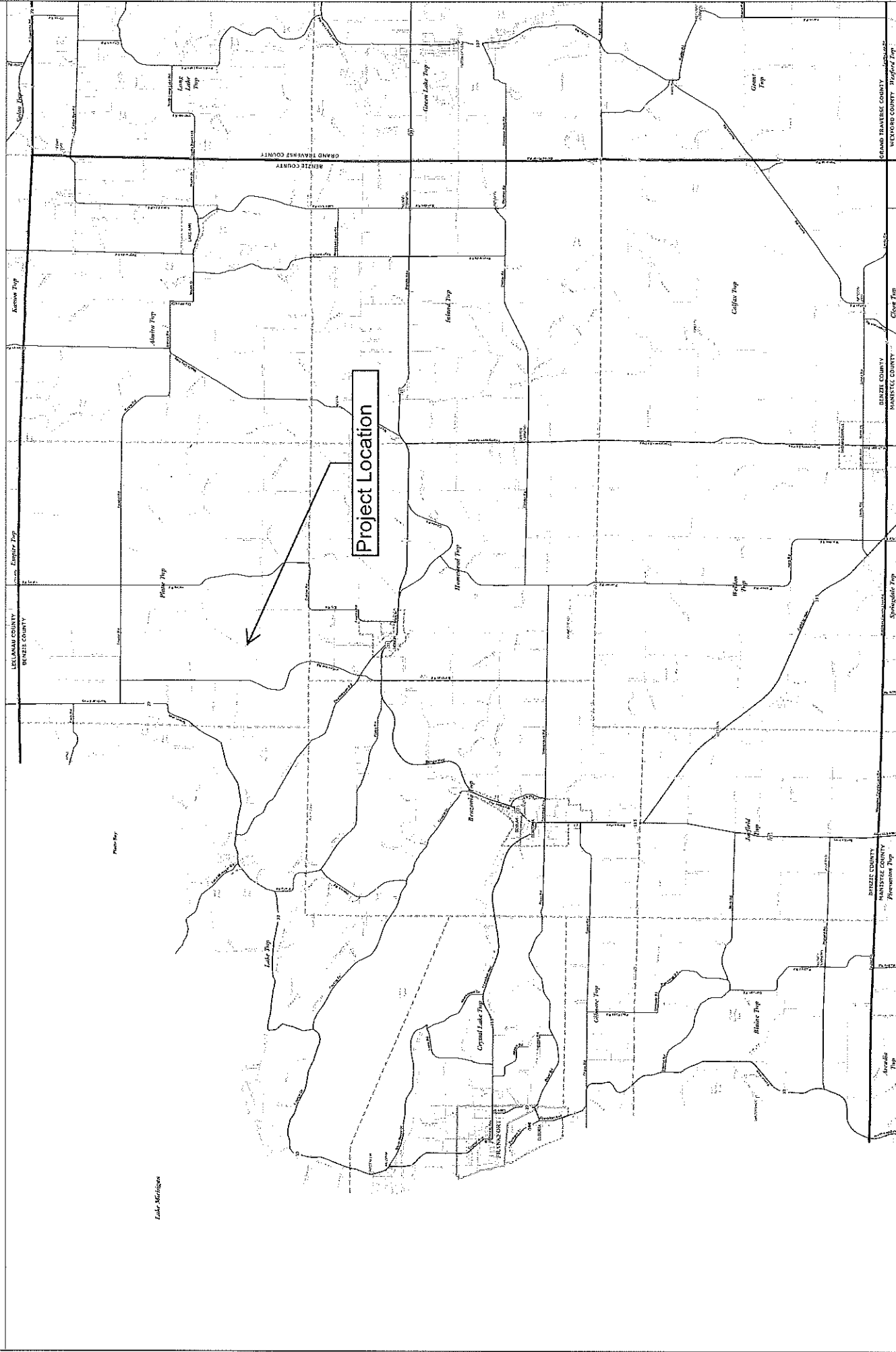
24. To avoid disturbance of Northern long-eared bat, which is federally listed as a threatened species, or Indiana bat, which is federally listed as an endangered species, any tree larger than 3 inches in diameter shall not be cut between April 1 and September 30 of any year.
25. **No work or dredging within the water authorized by this permit is allowed from March 16 to May 31 due to critical spawning, migration, and/or recreational use periods.**
26. Monkey Flower has been known to occur within the area which is listed as a Federally Endangered Species. Coordination with USFWS may be needed prior to commencement of work.

Issued By: \_\_\_\_\_

  
Luke Golden  
Cadillac District Office  
Water Resources Division  
989-370-1569

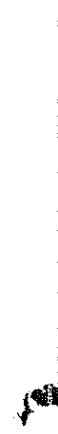
cc: Platte Township Clerk  
Benzie County Drain Commissioner  
Benzie County CEA  
Patrick Middleton, KPM Engineering

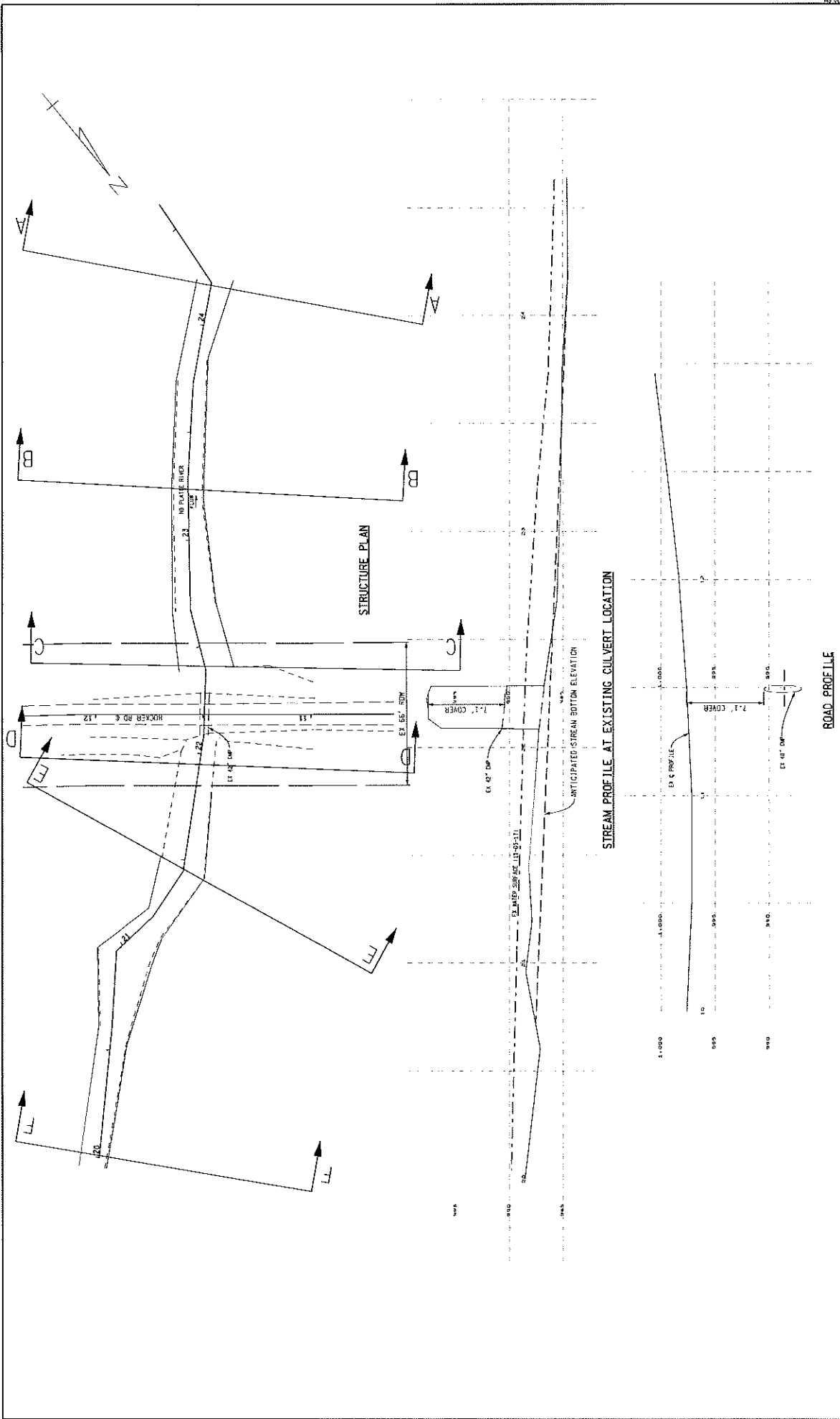
# BENZIE COUNTY



Legend			
	City		Railroad
	Village		Freeway
	Census Designated Place		Highway
	Unincorporated Place		Primary Road
	Township		Local Road
	County		Water Feature
	State		River Stream or Drain

Source: 2008 US Census Bureau, Michigan Geographic Framework, ©2008





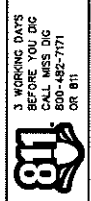
<p>3 WORKING DAYS BEFORE YOU DIG CALL 888 DIG OR 811</p>	<p>Conservation Resource Alliance</p>	<p><b>BENZIE</b> County Road Commission</p>	<p>KPM ENGINEERING Civil Engineering Professionals</p>	<p>DATE</p> <p>2/22/2018</p>	<p>TOWNSHIP</p> <p>PLATIE</p>	<p>PROJECT NO.</p> <p>HOOKER ROAD OVER RIB PLATIE</p>	<p>SHEET NO.</p> <p>5</p>
				<p>EXISTING STREAM INFORMATION</p>			

STREAM CROSS SECTIONS

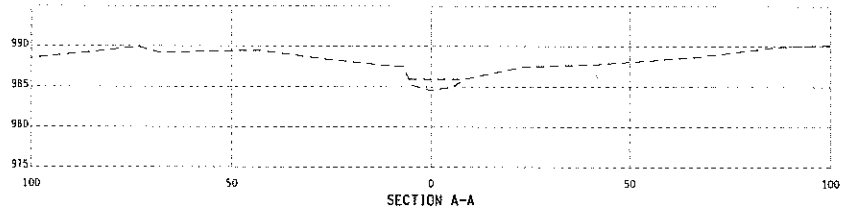
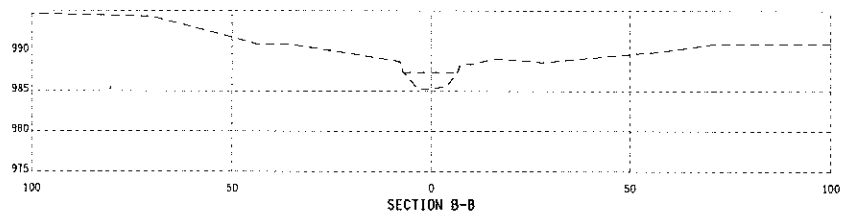
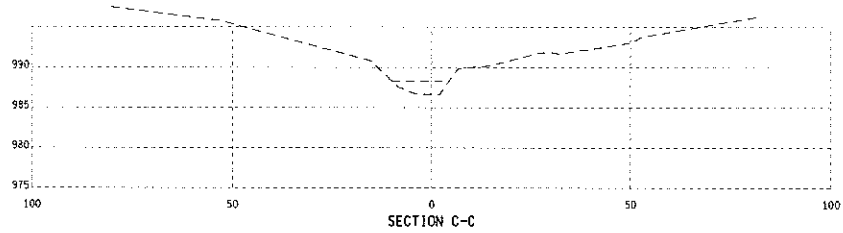
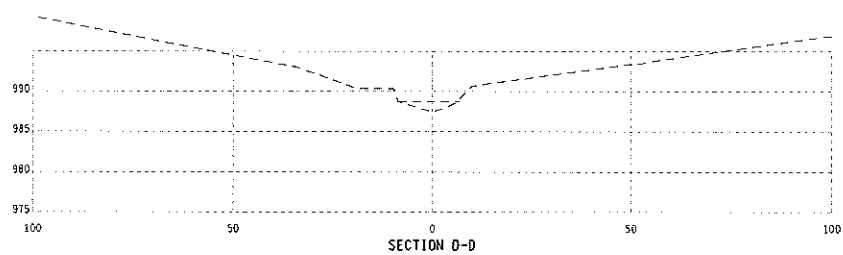
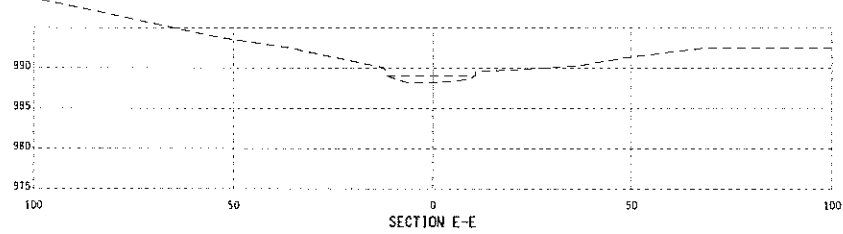
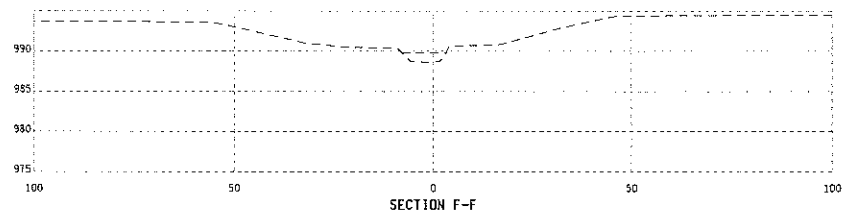
TOWNSHIP PLATTE

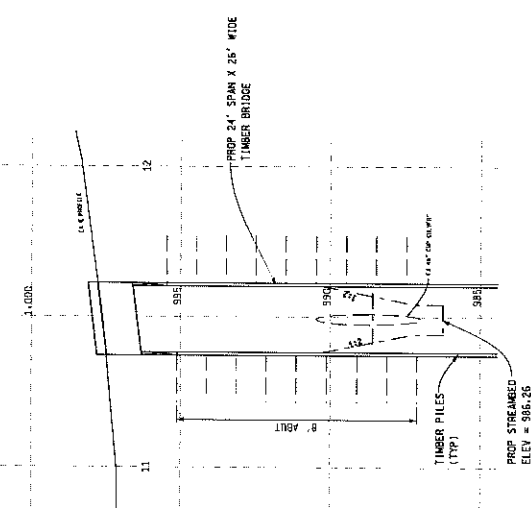
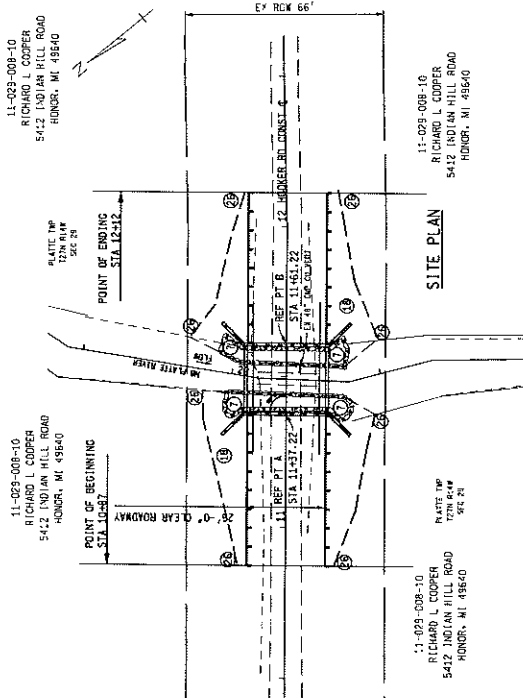
DATE 2/22/2018

HOOKER ROAD OVER RD PLATTE



3 WORKING DAYS BEFORE YOU DIG 800-482-7171 OR 811





<b>ADT</b> LESS THAN 100	<b>EXISTING STRUCTURE</b> 40" CMP 20' LONG	<b>PROPOSED STRUCTURE</b> 24' SPAN X 26' WIDE TIMBER BRIDGE
<b>BENCHMARKS</b> BM #1 SET SPALVE W/ROCK STATIONING: 10+71 ELEV: 1088.44		
<b>CONTROL POINTS</b>		

- SOIL EROSION AND SEDIMENTATION CONTROL ITEMS**
- ① HEAVY RIPRAP W/GEOTEXTILE LINER
  - ② FILTER BAG
  - ③ SILT FENCE

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING CULVERT, MAINTAINING TRAFFIC, CONSTRUCTION OF THE PROPOSED BRIDGE AND APPROACHES, SLOPE RESTORATION, RIPRAP SCOUR PROTECTION AND RMA PAVING.

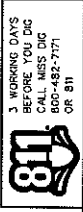
MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE. IF DEBRIS FALLS INTO THE WATERWAY, IT SHALL BE REMOVED WITHIN 24 HOURS SINCE OBSTRUCTION OF THE WATERWAY BOTTOM MAY BE AS HARMFUL AS THE DEBRIS ITSELF. THE PREVENTIVE MEASURES MUST BE EFFECTIVE.

WATER LEVEL IS SUBJECT TO CHANGE. THE MRCR IS RESPONSIBLE FOR MAKING A DETERMINATION OF WATER LEVELS THAT MAY EXIST DURING CONSTRUCTION. IMMEDIATELY AFTER CONSTRUCTION OF AN ABUTMENT IS COMPLETED, SLOPE PROTECTION AND SEEDING OR SODDING SHALL BE PLACED ON THE ADJACENT SLOPES.

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, 1974, THE MRCR SHALL OBTAIN 1-800-482-7177 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE MRCR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

APPROPRIATE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO EARTH-DISTURBING ACTIVITIES. PLACE THESE ESTABLISHMENT ITEMS AS SOON AS POSSIBLE ON POTENTIAL ERODIBLE SLOPES AS DIRECTED BY THE ENGINEER. CRITICAL DITCH GRADES SHALL BE PROTECTED WITH EITHER SOD OR SEED/MULCH OR MULCH BLANKET AS DIRECTED BY THE ENGINEER.

PLAN ELEVATIONS AND COORDINATES ARE BASED ON A LOCAL DATUM.



**Conservation Resource Alliance**

**BENZIE**  
County Road Commission

**KPM ENGINEERING**  
CONSULTANTS

DATE  
2/22/2018

TOWNSHIP  
PLATTE

PLAN OF SITE  
HOOKER ROAD OVER  
RB PLATTE

SHEET NO.  
2

SUMMARY OF HYDRAULIC ANALYSIS			
FLOOD DATA	EXISTING		PROPOSED
	DISCHARGE (CFS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE
2 YEAR	23	985.25	987.44
10 YEAR	18	985.15	987.34
100 YEAR	18	987.15	989.08
* INCLUDES AN ESTIMATED 18 CFS OF ADDITIONAL BASE FLOW			

THE DESIGN OF THIS STRUCTURE IS BASED ON 1.2 TIMES THE CURRENT AND MAINTAINING STREAM FLOW DURING BRIDGE CONSTRUCTION TO THE ENGINEER. THE PLAN MUST BE APPROVED BY THE ENGINEER PRIOR TO PERFORMING ANY CULVERT RELATED WORK.

WITHOUT THE PREVENTATIVE MEASURES SHOWN ON THESE PLANS, THERE IS A POSSIBILITY THAT STREAM BED SCOUR MAY OCCUR. THE ESTIMATED TOTAL SCOUR DEPTH IS CALCULATED TO BE 4.3 FEET AT ABUTMENTS. THESE DEPTHS ARE BASED ON A 100 YEAR RUN OFF EVENT.

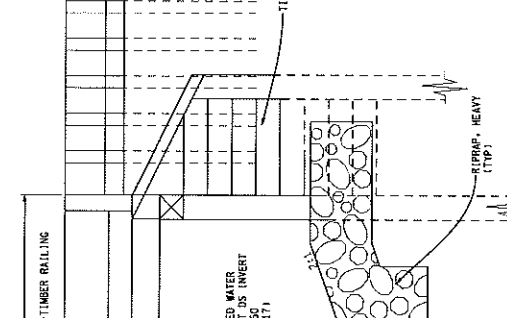
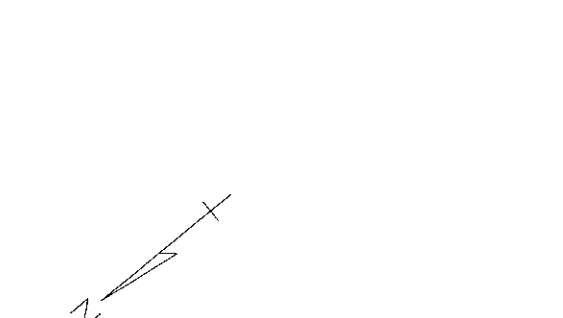
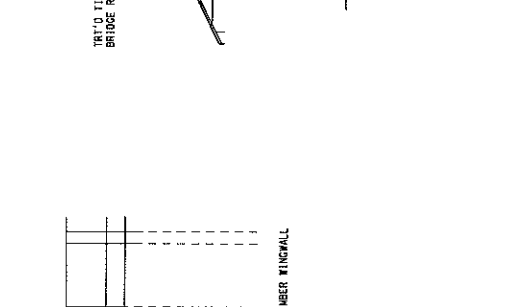
THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION PLAN FOR DEMARKING AND MAINTAINING STREAM FLOW DURING BRIDGE CONSTRUCTION TO THE ENGINEER. THE PLAN MUST BE APPROVED BY THE ENGINEER PRIOR TO PERFORMING ANY CULVERT RELATED WORK.

THE WATER SURFACE AND/OR ENERGY GRADE ELEVATIONS SHOWN ON THIS HYDRAULIC TABLE ARE TO BE USED FOR COMPARISON PURPOSES ONLY AND ARE NOT TO BE USED FOR ESTABLISHING A REGULATORY FLOODPLAIN.

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3 WORKING DAYS BEFORE NO. 20'S CALL MASS DIG 800-482-7171 OR 811

**BENZIE**  
County Road Commission

**KPM ENGINEERING**  
INC. (INCORPORATED IN MASSACHUSETTS)

DATE \$DATE\$

PLAN OF STRUCTURE

SHEET NO. 4