



**COUNTY OF EL DORADO
DEPARTMENT OF TRANSPORTATION
INTEROFFICE MEMORANDUM**



Date: December 15, 2010

38

To: Board of Supervisors

From: Steve Kooyman

LATE DISTRIBUTION

Date 2:16 pm, Dec 16, 2010

Subject: Rubicon Trail Monitoring Plan

The County of El Dorado ("County"), Department of Transportation ("DOT") has completed the Monitoring Plan related to the DOT's Operations and Maintenance Plan for Phase I on the Rubicon Trail.

DOT's Ground Operations and Maintenance efforts have been divided into two sequential phases, and consequently the Monitoring Plan for the Rubicon Trail will have two phases. The Phase I Monitoring Plan, which was submitted to the California Regional Water Quality Control Board on September 30, 2010, is for the portion of the trail from Loon Lake and Wentworth Spring to Little Sluice. As noted in my presentation the small amount of usage that takes place during saturated soil conditions is on the portion of the trail covered by the Phase I monitoring plan. The Phase II Monitoring Plan will be completed as part of the Phase II Ground Operations and Maintenance Grant, in the 2011 season.

RECEIVED
BOARD OF SUPERVISORS
EL DORADO COUNTY
2:15 pm, Dec 16, 2010

COUNTY OF EL DORADO

DEPARTMENT OF TRANSPORTATION



MAINTENANCE DIVISION
2441 Headington Road
Placerville CA 95667
Phone: (530) 642-4909
Fax: (530) 642-9238

JAMES W. WARE, P.E.
Director of Transportation

Internet Web Site:
<http://edcgov.us>

MAIN OFFICE
2850 Fairlane Court
Placerville CA 95667
Phone: (530) 621-5900
Fax: (530) 626-0387



September 30, 2010

Wendy Wyels
California Regional Water Quality Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95760

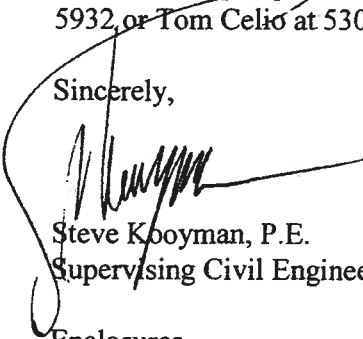
**RE: Cleanup and Abatement Order ("CAO") No. R5-2009-0030, Rubicon Trail 2010
Operations and Maintenance Plan – Monitoring Plan**

Dear Ms. Wyels:

The County of El Dorado ("County"), Department of Transportation ("DOT") has completed the Monitoring Plan related to the DOT's 2010 Operations and Maintenance Plan BMP activities for your review and comment pursuant to our meeting on September 9, 2010 between DOT/County staff and you and your staff.

The DOT appreciates the Water Board's time and effort on this item and looks forward to continuing our partnership as part of the CAO related work on the Rubicon Trail. Please contact me at 530-621-5932, or Tom Celio at 530-642-4905 if you have any questions.

Sincerely,



Steve Kooyman, P.E.
Supervising Civil Engineer

Enclosures

cc: Pamela Creedon, Central Valley Water Board
John Knight, Board of Supervisors, District I
Ray Nutting, Board of Supervisors, District II
Jack Sweeney, Board of Supervisors, District III
Ron Briggs, Board of Supervisors, District IV
Norma Santiago, Board of Supervisors, District V
Gayle Erbe-Hamlin, El Dorado County Chief Administrative Office
Ed Knapp, El Dorado County County Counsel
Jim Ware, El Dorado County Department of Transportation
Tom Celio, El Dorado County Department of Transportation
Diane Rubiaco, USDA ElDorado National Forest

10-1279.D.2

TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
1.1 BACKGROUND.....	1
1.2 PROJECT GOALS	1
1.3 PROJECT OBJECTIVES.....	1
1.4 PURPOSE OF MONITORING	2
1.5 MONITORING PLAN.....	2
1.6 SCOPE OF MONITORING PLAN.....	3
LOCATION MAP	4
2.0 METHODOLOGY.....	5
2.1 VARIABLE SELECTION.....	5
2.2 STATISTICAL DESIGN	6
2.3 DATA MANAGEMENT AND ACCEPTANCE CRITERIA	6
2.4 PHOTO FREQUENCY AND DURATION.....	6
2.5 EQUIPMENT AND METHODS.....	6
2.6 REPORTING	6
2.7 SCHEDULE / DELIVERABLES	7
DETAIL PHOTO MAPS	
DETAIL 1.....	8
DETAIL 2.....	9
DETAIL 3.....	10
DETAIL 4.....	11
DETAIL 5.....	12
APPENDIX A.....	13

1.0 Introduction

1.1 BACKGROUND

The County of El Dorado, Department of Transportation ("DOT"), is currently implementing various Best Management Practices ("BMP's") along the section of the Rubicon Trail from Wentworth Springs Campground to Little Sluice (Main Trail Route 1.0) and from the Loon Lake Kiosk to the Intersection of Wentworth Springs Rd. (Intertie Route 2.0) (see Figure A). These two segments of the Rubicon Trail have been further defined with the 2010 DOT Operations and Maintenance Plan and within the 2010 California State Parks Off-Highway Motor Vehicle Recreation Division ("OHMV") Grant, with a Project designation as Phase 1 Ground Operations. The various sedimentation problems and proposed BMP treatments along these two trail segments have been identified within the California Geologic Survey ("CGS") 2009 Rubicon Trail Assessment Report with additional DOT 2010 field assessment baseline updates in accordance with the Clean-up and Abatement Order ("CAO"), R5-2009-0030 issued by the State water Quality Control Board Central Valley Region ("SWQCBCVR") and the Grant Guidelines as part of the DOT's 2009 and 2010 OHMV Grants.

1.2 PROJECT GOALS

The main goal of the 2010 Operations and Maintenance Plan for the Phase 1 Rubicon Trail Ground Operations is to mitigate the existing sedimentation issues identified within the CGS Report with supplemental information from the DOT 2010 field assessments. The scope of the Monitoring Plan will assist the DOT in achieving this goal by gathering pertinent existing conditions baseline information to use in the BMP design as well as evaluating the effectiveness of the installed BMP's. The sedimentation problems that will be addressed, using specific BMP's, were defined within the 2009 CGS Report with added DOT 2010 field assessments as part of the OHMV Soil Conservation Plan guidelines. Each BMP treatment type has been further classified within the DOT's BMP Toolbox under the headings of Source Control (SC), Hydrologic Design (HD), and Treatment (T). The Rubicon Trail BMP toolbox is currently being developed in coordination with the Resource Conservation District ("RCD").

1.3 PROJECT OBJECTIVES

The Project objectives represent physical conditions that can be measured to assess the success of the Project in achieving the Project goal. The 2010 Operations and Maintenance Plan ("Project") will conform to the OHMV Soil Conservation Plan guidelines as well as all pertinent USFS guidelines. The purpose of the Project to improve water quality by the following objectives:

1. Removing sediment discharge from the road before it reaches a Type 1 water course (T)
2. Stabilizing eroding cut slopes (SC)
3. Stabilizing roadside drainages (SC)
4. Stabilizing and armoring the road (SC)
5. Directing Off-site drainage across the road (disconnecting the off-site drainage from the road) (HD)

Each of these Objectives can be further delineated into the BMP Types (i.e., for the Objective 1, a BMP Type that will satisfy this Objective is Rock-Lined Energy Dissipator). The DOT will be using the CGS GIS/database with additional DOT field data to track all installed BMP's. Each BMP will be defined by Class, General Name, and Type (e.g. Source Control, Slope Stabilization, and Rock Slope Protection)

1.4 PURPOSE OF MONITORING

The pre-Project monitoring efforts will allow for the evaluation and documentation of existing problem areas with the results of the monitoring being used by the DOT to evaluate and select design solutions as appropriate to the proper BMP Type. The BMPs will be installed to mitigate the associated existing sediment loads from the Rubicon Trail for this particular Project area. The pre-Project Monitoring will also allow for calibration of the hydrologic analysis as well as estimation of the sediment load in the storm water runoff.

The post-Project monitoring efforts will provide the DOT the necessary information to evaluate and document each type of BMP to determine the effectiveness in meeting the specific goal and objectives of the Project. Typically the post-Project monitoring duration is two years which provides the minimum annual variances to complete a BMP assessment. Additional post-Project monitoring efforts are typically chosen to develop a trend analysis for long term planning and scientific research. This Monitoring Plan will utilize the two year BMP effectiveness type of frequencies in order to comply with the OHMV Grant Guidelines and CAO requirements.

Another positive result of post-Project Monitoring is that the data allows the DOT to better determine ongoing annual trail maintenance requirements for the Rubicon Trail and determine maintenance needs for future DOT projects. This type of monitoring is designed for spring and fall BMP inventory assessments which will be on-going throughout the life of the trail improvements. This type of data can be used to build trends with respect to maintenance frequencies, which in turn will assist the DOT with routine maintenance prioritization and potential cost saving measures.

1.5 MONITORING PLAN

The purpose of this Monitoring Plan is to discuss the scope, variables, and methodology to be implemented as part of the Rubicon Trail Phase 1 Operations and Maintenance Plan BMP implementation in accordance with the CAO and OHV Grant requirements. The monitoring effort should establish baseline conditions prior to BMP installation activities (complimenting the 2009 CGS Report), maintenance activities during BMP installation, and two years of BMP evaluation. Results of the monitoring efforts will be presented in the below reports as outlined in the Schedule and Deliverables sections of this plan.

The main objectives of the Plan are:

- Provide photographic documentation of the implemented BMP's as well as record existing and post-Project conditions with respect to proposed improvements
- Evaluate the different BMP Types to control erosion and sediment loss (source control, hydrologic design, treatment)
- Provide visual observations of the site conditions within the Project limits during runoff to assist in hydrologic model calibration (spring runoff)
- Recommend improvements to the BMP design features for use on similar future Projects and to update the BMP Toolbox

Annual Monitoring Report

The Annual Monitoring Report will provide the methods of BMP evaluation to meet the Project objectives, the collected data, photo documentation, and the BMP effectiveness analysis for the first water year after the installation of the BMP's.

Final Monitoring Report

The Final Monitoring Report will provide the second year of collected data and update the BMP effectiveness analysis with a final table which identifies each BMP Type and the effectiveness rating related to controlling erosion and sedimentation on the Phase 1 portion of the Rubicon Trail.

1.6 SCOPE OF MONITORING PLAN

As part of the Rubicon Trail CAO and OHMV Grant the County proposes to conduct visual monitoring of vegetation, surface waters, and BMP's within the Rubicon Trail road alignment to monitor operation and maintenance progress, appropriate implementation of Best Management Practices (BMPs), and to assess the BMP effectiveness with respect to the sedimentation issues on the trail. Field parameters observed will be documented by photographic monitoring using a digital camera and GPS photo tracking device. Data, photos, and their related parameters will be compiled into an Annual Monitoring Report with Final Monitoring Report after two years of monitoring. Photos and other recorded information will be collected before, during, and after BMP implementation. The monitoring will include four distinct seasons:

- Fall – Fall Frontal
- Winter - Rain on snow event (trail accessibly dependent)
- Spring – snowmelt runoff event
- Summer – thunderstorm

Information will be organized into an Annual Monitoring Report (first year of monitoring) and Final Monitoring Report (second year of monitoring) to be delivered to the Water Board and OHV at the completion of monitoring activities, typically at the end of each water year (October) with one to two months for compilation and data analysis.

2.0 Methodology

2.1 VARIABLE SELECTION

Field parameters considered for monitoring include photographic, sedimentation, precipitation and trail counts.

2.1.1 Photo Monitoring

The DOT will conduct visual monitoring of vegetation, Type I and II water courses, existing sedimentation issues within the trail limits to determine appropriate selection of BMPs, and to better quantify the effects that the BMP's had on environmental resources in the area. BMP and revegetation improvements will be documented by the photographic monitoring pre-Project and after the BMP's have been implemented. Data, photos, and their related parameters will be compiled into an Annual and Final Monitoring Report to track BMP effectiveness related to the Project goals and objectives. Photos and other recorded information will be collected before, during, and after BMP implementation pursuant to the OHMV Grant funding guidelines and availability of funds during the following seasons:

- Fall
- Winter
- Spring
- Summer

Field observations associated with the monitoring may include:

Field 1	Field 2	Field 3	Field 4	Field 5	Field 6	Field 7	Field 8	Field 9
Point ID	Photo ID	GPS Coordinates	Description of Location	Purpose of the Photo	Date photo point was established	Date BMP's Installed	Number of Photo Points on Site	BMP Type

See APPENDIX A for examples of a Field Observation Form, database template to be used in the field for purposes of data entry and an example of the Photo Output that will be produced.

2.1.2 Sedimentation Monitoring

As part of this effort, the DOT proposes to include sedimentation capture quantification at the key BMP treatment types for sediment. This will be accomplished through field measurements during the spring/summer BMP assessments and the measurements placed within a database. With this hydrologic/sediment monitoring effort, the DOT intends to extrapolate information from the Phase 1 Operations and Maintenance Plan and apply it to the Phase 2 Operations and Maintenance plan development to assist in the overall BMP design efforts.

2.1.3 Precipitation Monitoring

The DOT will continue to collect data from surrounding available precipitation sites to calibrate the current Rubicon hydrologic model.

2.1.4 Trail Count monitoring

The DOT will be coordinating with the Rubicon Trail Foundation ("FTR") and Friends Of The Rubicon ("FOTR") for the next two years with respect to obtaining seasonal trail counts (i.e.

peak summer season) using trail surveys at main locations (Loon Lake Kiosk and Ellis Creek). The data will be compiled and be incorporated into the Annual and Final Monitoring Reports.

2.2 STATISTICAL DESIGN

Pre-Project photos will be compared to conditions during the 2010 O&M Plan Implementation and post-Project photos to document the pre-existing conditions and allow for a visual comparison of the Project mitigation measures at each monitoring site. Further analysis and query of the parameters may allow recommendations for improvements to the design of BMP's for maintenance upgrades and for future proposed BMP's within the Phase 2 Project area.

2.3 DATA MANAGEMENT AND ACCEPTANCE CRITERIA

During the first season of pre-Project data collection (spring 2010 to fall 2010), the DOT will evaluate photos and data at the identified monitoring locations. From this, a decision will then be made as to whether the sites selected for photo monitoring and data collection provide the appropriate level of detail for monitoring in the subsequent seasons. Depending on the results of this analysis, the availability of funding and necessity, the DOT may either increase or decrease the number of monitoring sites.

2.4 PHOTO FREQUENCY AND DURATION

Photo monitoring of the BMP treatments within the Rubicon Trail Phase 1 O&M area will be collected during the pre-Project effort to better determine existing conditions and help with BMP selection.

The County proposes to monitor during the following seasons:

- Fall – Rain
- Winter – rain on snow event
- Spring – snowmelt runoff event
- Summer – thunderstorm

Photo monitoring of the installed BMP's will continue for two years following the completion of the Phase 1 O&M work to assess the effectiveness of the BMP's in achieving the Project goal and objectives. However, the second year of the monitoring effort scope might be altered based on funding availability and the amount of supporting information gathered from the first year to determine the effectiveness.

2.5 EQUIPMENT AND METHODS

Monitoring sites will be based on areas that receive BMP's, areas of high sediment accumulation, and areas where revegetation/trail rehabilitation may occur. The Pre and Post-Project monitoring will be performed with a digital camera and these photos will be included in the Annual and Final Monitoring Reports. The DOT will also provide a sediment capture estimation at key BMP treatment locations (i.e. directly connected to a Type I water course) based on the annual spring BMP assessment.

2.6 REPORTING

The objective, methods and results of the Rubicon Trail Monitoring Plan will be compiled into an Annual Monitoring Report at the completion of the first year investigation. The post-Project monitoring program will continue throughout the implementation of the 2010 O&M Plan and based on the results of the first year monitoring effort, methods and techniques may be adjusted

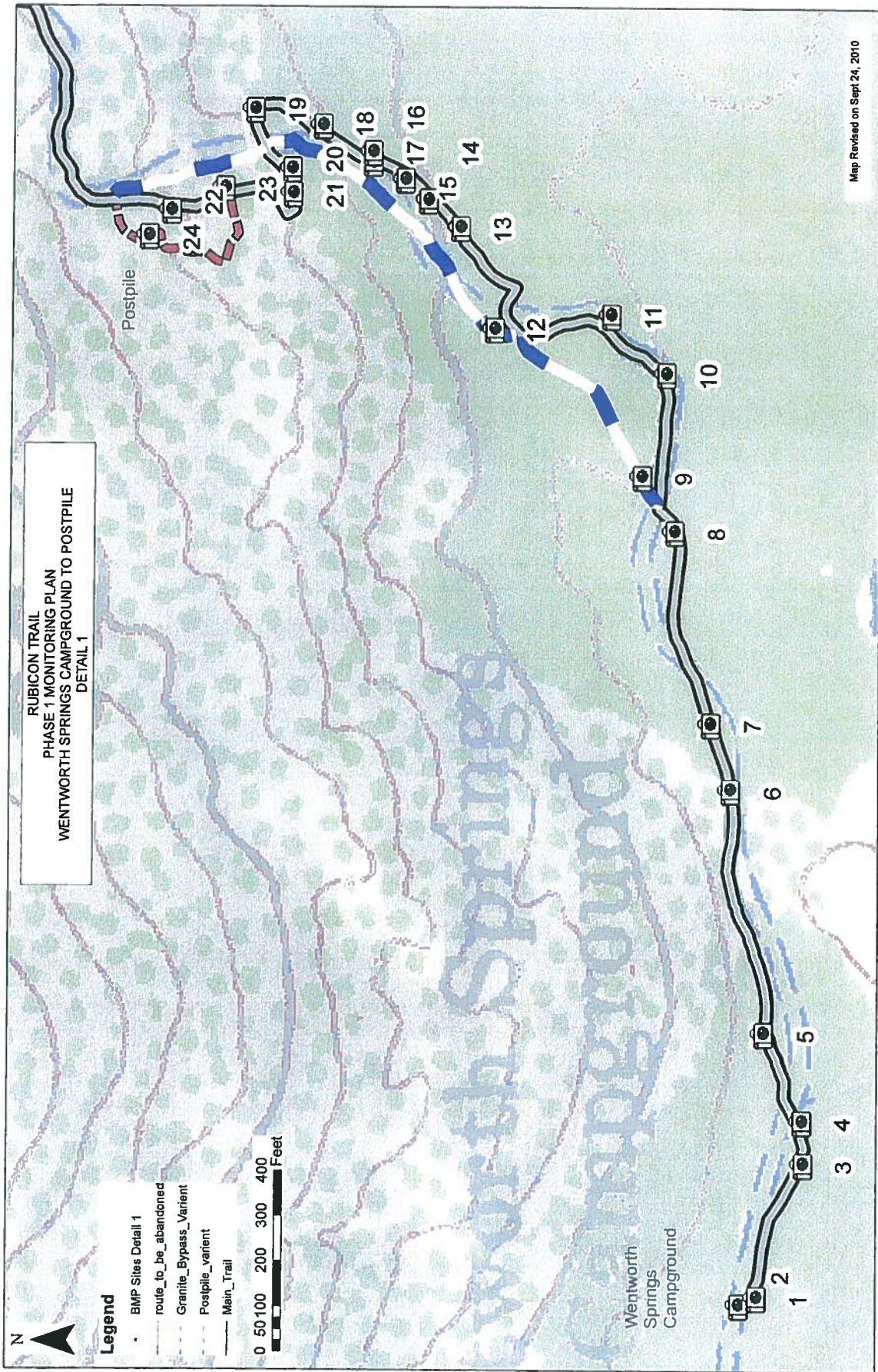
to assure that the findings of the monitoring efforts satisfy the goal and objectives of the Project and ultimately the sedimentation goal within the CAO.

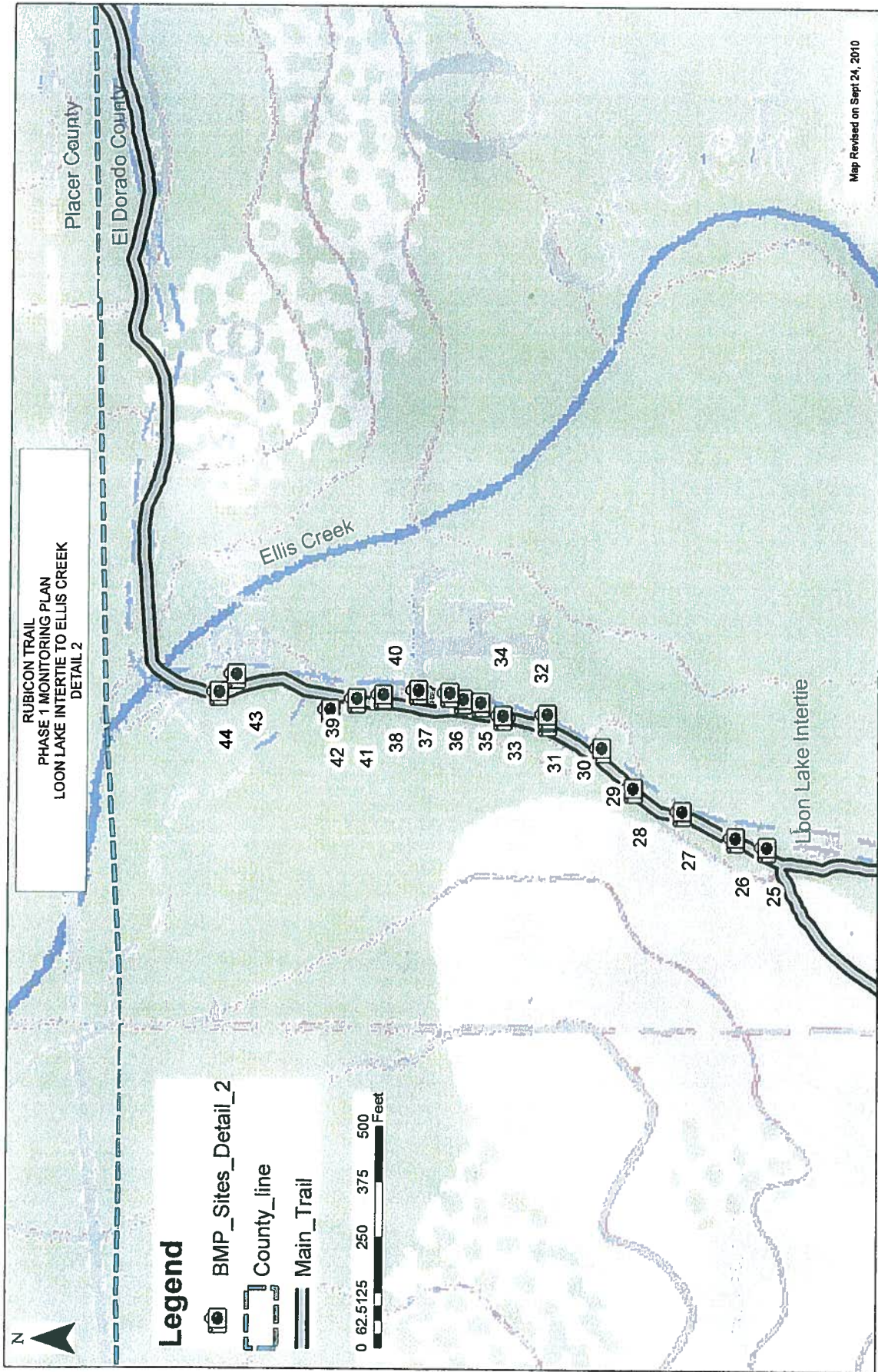
2.7 SCHEDULE / DELIVERABLES

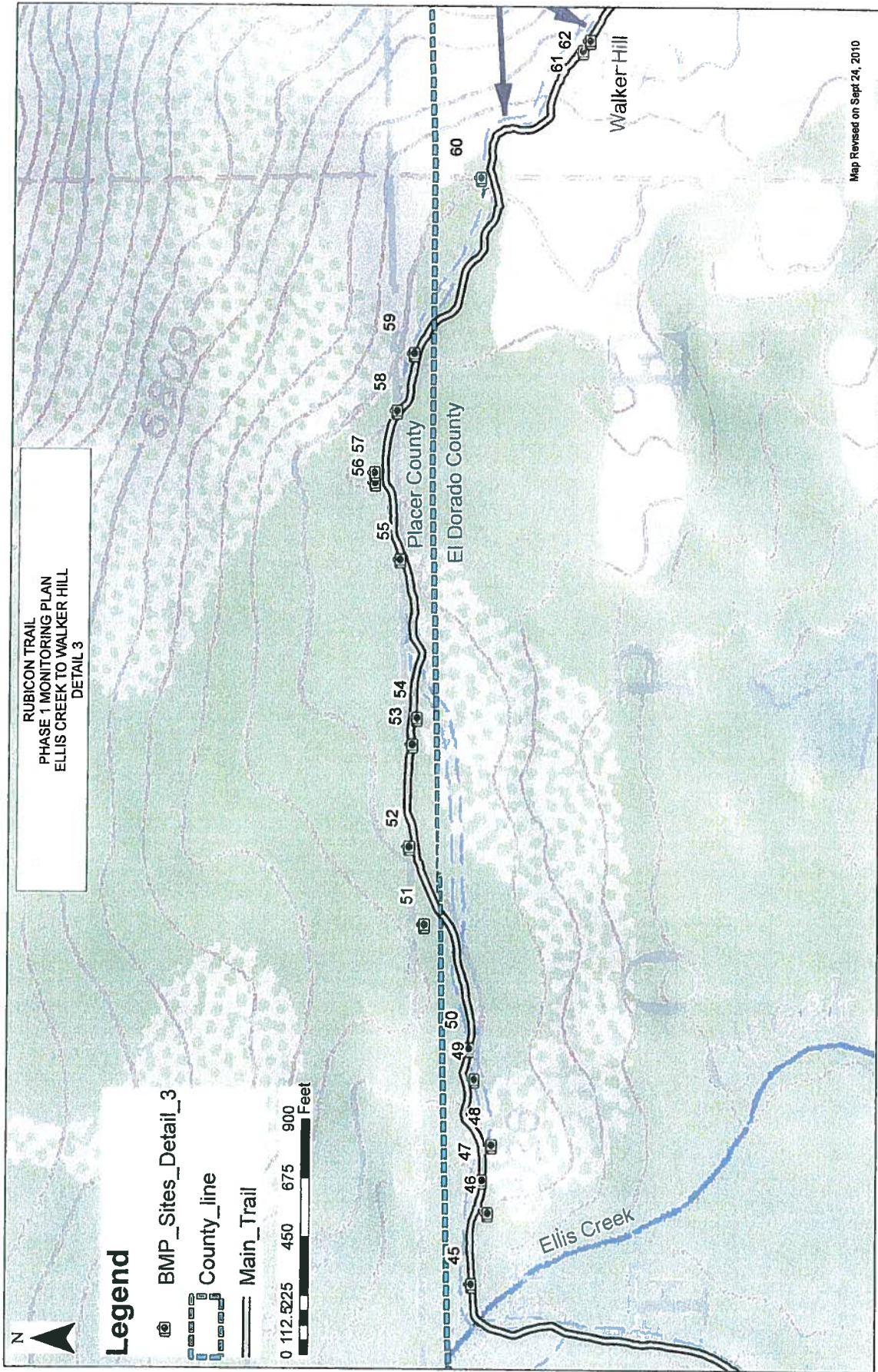
See Table 2 below for the Project monitoring schedule, which assumes the time frame for maintenance activities includes summer 2010. Monitoring will continue over the course of the 2010 Operations and Maintenance Plan implementation for the Phase 1 Rubicon Trail Ground Operations, post-Project monitoring will begin in the winter 2010 and continue through summer/fall 2011. The second year, if required, will begin in the fall of 2011 through the summer/fall of 2012.

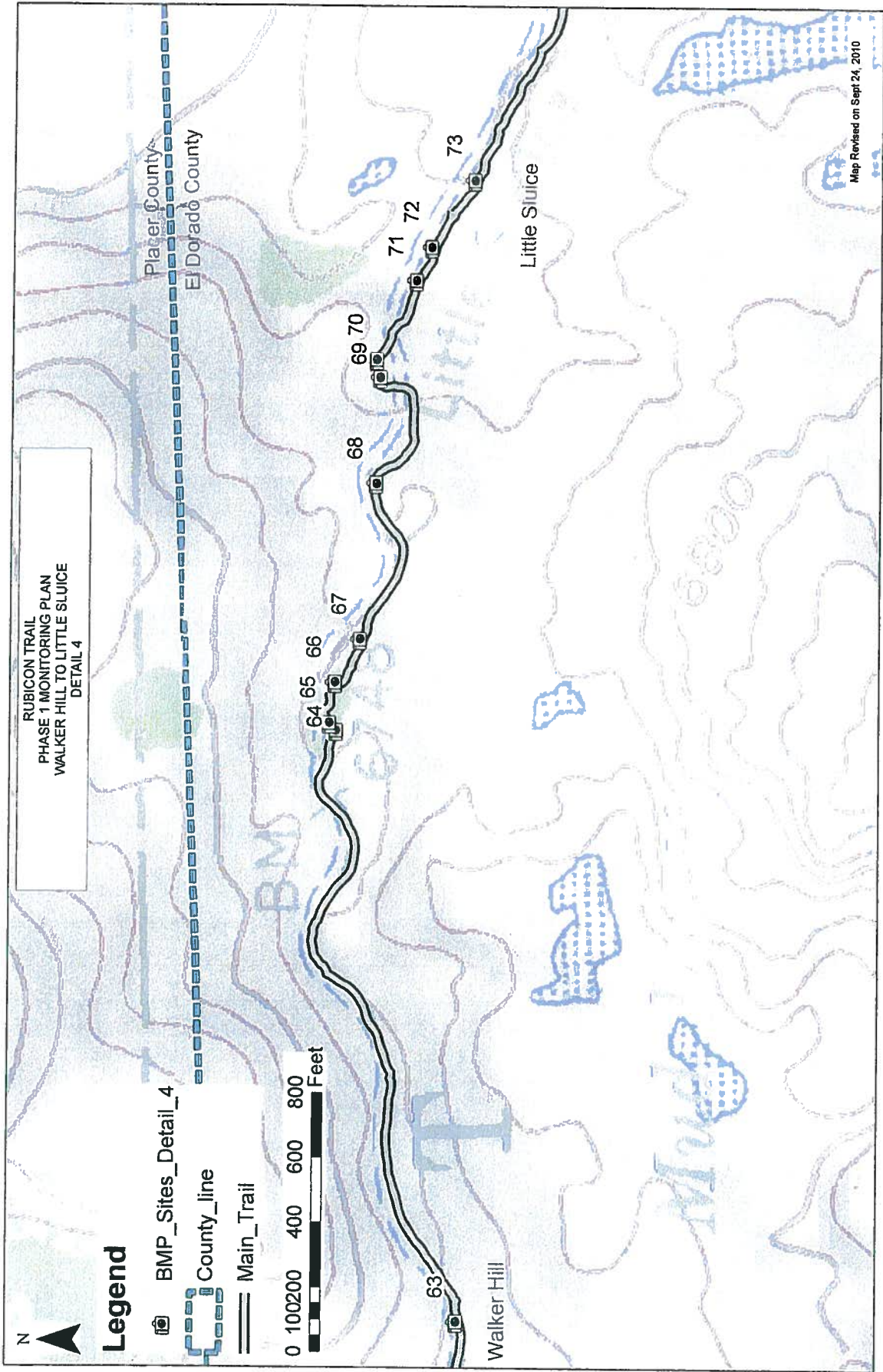
TABLE 2 – SCHEDULE

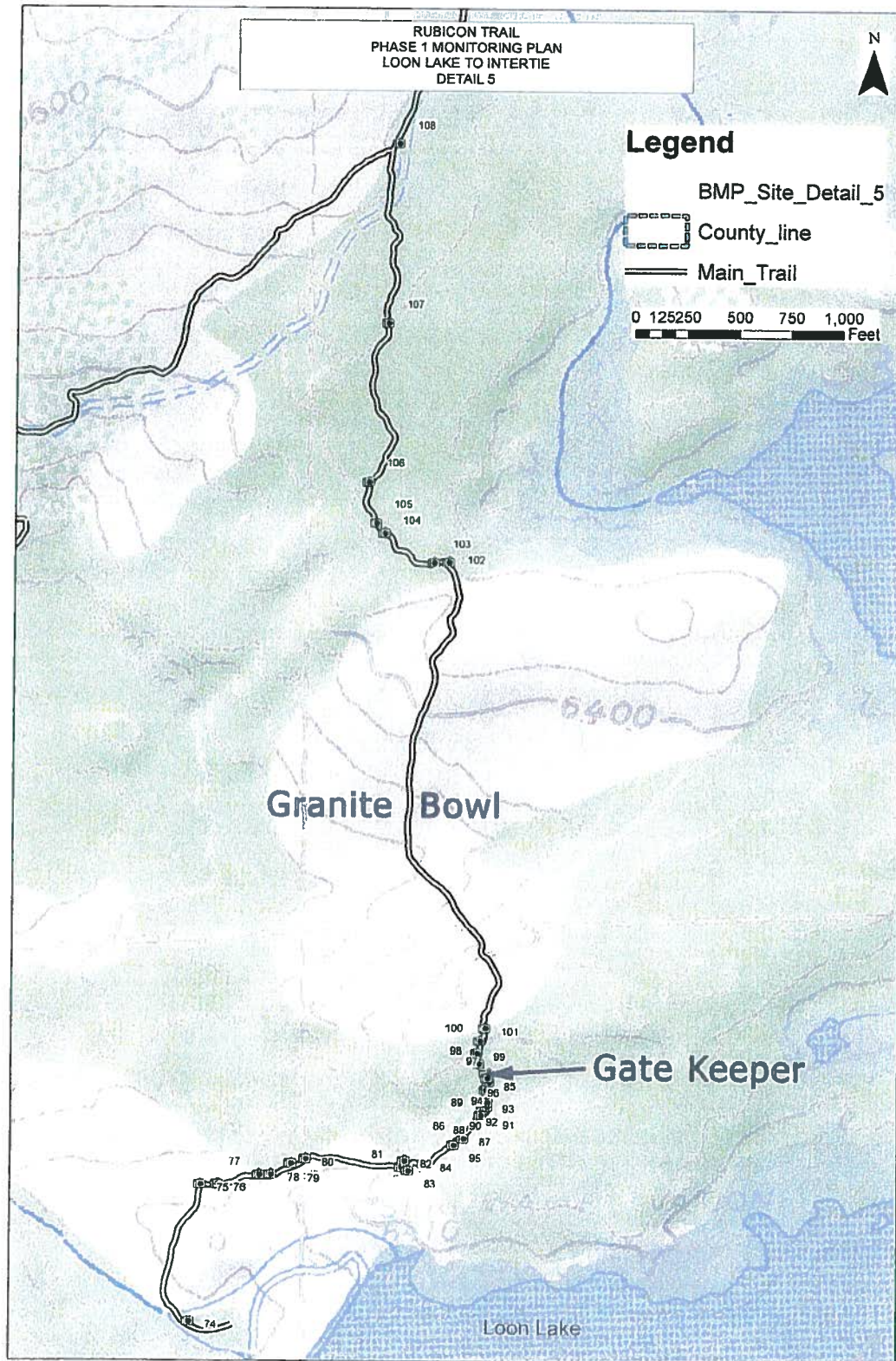
PHASE/TASK	ESTIMATED COMPLETION DATE
Scoping	
Conceptual Development	October 2010
Planning	
Preliminary Monitoring Plan	October 2010
Agency Review	November 2010
Final Monitoring Plan	November 2010
Annual Monitoring Report	November 2011
Final Monitoring Report	December 2012











APPENDIX A
FIELD OBSERVATION FORM EXAMPLE

Project Name: Rubicon Trail 2010 Ground Operations Phase 1

Photo Point #: --

BMP Type: --

BMP Installation Date: --

GPS Coordinates: --

Date Photo Points were Established: --

Number of Photo Points on Site: --

Location Description: --

Purpose of Photo: BMP effectiveness

Additional Comments:

Detailed/Close-up Map Showing Photo Point Location	Larger Scale/Broad-view Map Showing Photo Point Location
--	--

PHOTO OUTPUT FORM
PHOTO POINT #

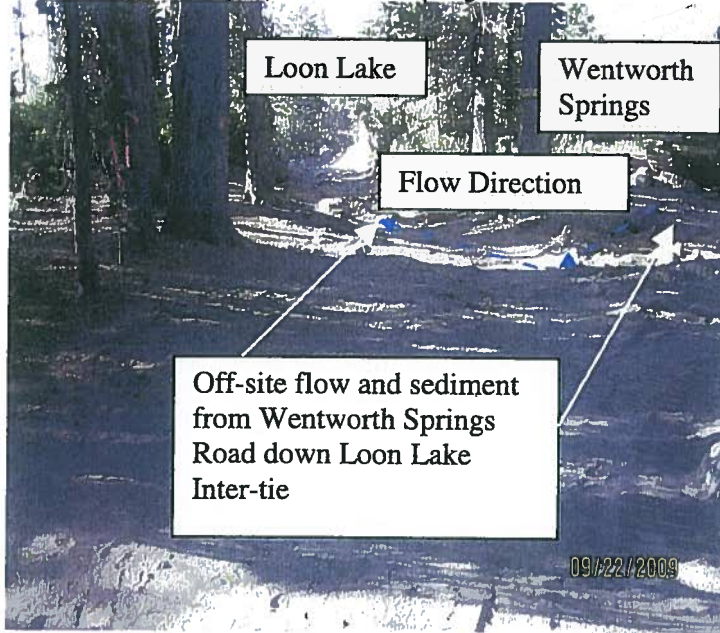
Pre-Project Photo		During Construction Photo	
Pre-Construction	Date	During Construction	Date
Site description etc.		Site Description etc.	

Post-Construction Photo Fall 2006		Post-Construction Photo Spring 2007	
Post-Construction	Date	Post-Construction	Date
Site description etc.		Site Description etc.	

PHOTO OUTPUT EXAMPLE

Photo Point # 25/108 – Station 71+94

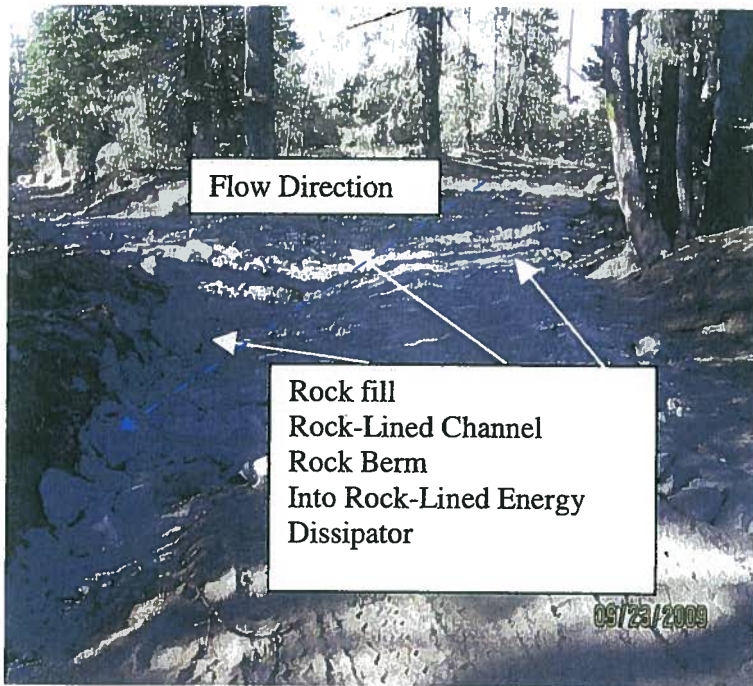
Rubicon Trail Route (1.0) Wentworth Springs Road and Loon Lake Inter-Tie Intersection looking southeast.



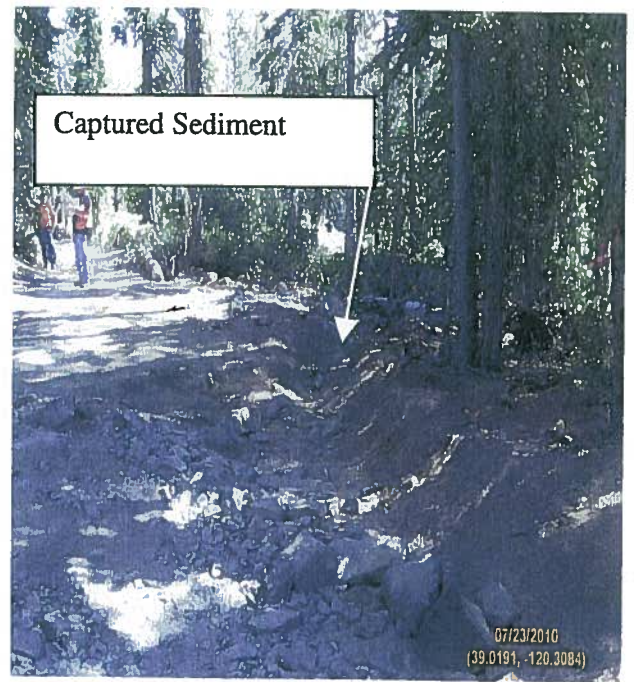
Pre-BMP Implementation
September 2009



Post-BMP Implementation
Spring 2010



Post-BMP Implementation
September 2009



Post-BMP Implementation
Summer 2010