

APPENDIX 26 – SPECIAL PROVISIONS

Appendix 26.1: General Special Provisions

Appendix 26.2: Northwest Region Special Provisions

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APPENDIX 26.1 – GENERAL SPECIAL PROVISIONS

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1 **INTRODUCTION**

2 The following Special Provisions shall be used in conjunction with the 2010 Standard
3 Specifications for Road, Bridge, and Municipal Construction.

4
5 **SPECIAL PROVISIONS**

6
7 The following Special Provisions are made a part of this contract and supersede any
8 conflicting provisions of the 2010 Standard Specifications for Road, Bridge and Municipal
9 Construction, and the foregoing Amendments to the Standard Specifications.

10
11 Several types of Special Provisions are included in this contract; General, Region, Bridges
12 and Structures, and Project Specific. Special Provisions types are differentiated as follows:

13		
14	(date)	General Special Provision
15	(*****)	Notes a revision to a General Special Provision and also notes a Project Specific Special Provision.
16		
17		
18	(Regions ¹ date)	Region Special Provision
19	(BSP date)	Bridges and Structures Special Provision
20		

21 **General Special Provisions** are similar to Standard Specifications in that they typically
22 apply to many projects, usually in more than one Region. Usually, the only difference from
23 one project to another is the inclusion of variable project data, inserted as a “fill-in”.

24
25 **Region Special Provisions** are commonly applicable within the designated Region. Region
26 designations are as follows:

27		
28	<u>Regions¹</u>	
29	ER	Eastern Region
30	NCR	North Central Region
31	NWR	Northwest Region
32	OR	Olympic Region
33	SCR	South Central Region
34	SWR	Southwest Region
35		
36	WSF	Washington State Ferries Division
37		

38 **Bridges and Structures Special Provisions** are similar to Standard Specifications in that
39 they typically apply to many projects, usually in more than one Region. Usually, the only
40 difference from one project to another is the inclusion of variable project data, inserted as a
41 “fill-in”.

42
43 **Project Specific Special Provisions** normally appear only in the contract for which they
44 were developed.

**DIVISION 1
GENERAL REQUIREMENTS**

LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

State Taxes

The third paragraph of Section 1-07.2 is revised to read:

(June 27, 2011)

The Contracting Agency will release the Contract Bond only if the Contractor has obtained from the State Department of Revenue a certificate showing that all Contract-related taxes have been paid.

Section 1-07.2 is supplemented with the following:

(March 13, 1995)

The work on this contract is to be performed upon lands whose ownership obligates the Contractor to pay Sales tax. The provisions of Section 1-07.2(1) apply.

(March 13, 1995)

The work on this contract is to be performed upon lands whose ownership obligates the Contractor to collect State sales tax from the Contracting Agency. The provisions of Section 1-07.2(2) apply.

(March 13, 1995)

The work on this contract is to be performed upon lands whose ownership obligates the Contractor to pay State sales tax on portions of the project work and obligates the Contractor to collect State sales tax from the Contracting Agency on other portions of the project as follows:

1. The provisions of Section 1-07.2(1) apply to the following listed portions of the project:

*** \$\$1\$\$ ***

2. The provisions of Section 1-07.2(2) apply to all of the remaining portions of the project.

For bidding purposes the Contracting Agency has segregated the plan quantities which are affected by Section 1-07.2(1) from those quantities affected by Section 1-07.2(2). These approximate quantities are shown on the Summary of Quantities sheets; however, any tax payments shall be based on actual quantities used.

Sanitation

Health Hazards

Section 1-07.4(2) is revised to read:

(August 1, 2011)

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This project site is known to be occupied by transients and therefore contains biological hazards and associated physical hazards. These may include, but not be limited to violent and dangerous individuals, hypodermic needles, garbage, broken glass, human and animal excrement, drug paraphernalia, and other hazards.

The Contractor shall take precautions and perform any necessary Work required to provide and maintain a safe and healthful jobsite for all workers and the public for the duration of the project in accordance with all applicable laws and contract requirements.

The Contractor shall ensure that the public, including persons who may be non-English speaking or those who may not be able to recognize potential safety and health hazards within the project area, are not harmed by the Contractors activities.

Nothing required by this Specification shall operate as a waiver of the Contractor's responsibility for taking all steps necessary to ensure the safety of the public under Section 1-07.23 or responsibility for liability and damages under Section 1-07.14 or for any other responsibility under the Contract or as may be required by law.

Health and Safety Plan

The Contractor shall prepare a written Health and Safety Plan. The plan shall be prepared under the supervision of a certified industrial hygienist and shall incorporate all required County, State, and Federal health and safety provisions. The plan shall include requirements of the Federal Occupational Safety and Health Act of 1970 (OSHA), all amendments, and all other applicable health regulations.

Preparation of the Health and Safety Plan shall include an initial site assessment by the industrial hygienist. The plan shall break initial cleanup of the project into identifiable construction areas. The plan shall be submitted to the Project Engineer prior to commencing cleanup Work. At least one copy of the plan shall be posted at the work site while cleanup Work is in progress. The industrial hygienist shall perform one or more follow-up site assessments as needed to approve the site following completion of the initial site cleanup.

Public Notification

The Contractor shall furnish and install the "No Trespassing" signs shown in the Plans at locations staked by the Project Engineer at least 72 hours prior to performing site cleanup or any potentially hazardous Work (such as clearing or operating equipment).

At the same time that "No Trespassing" signs are posted, provide written notification of the following to the Project Engineer and to the chief law enforcement officer of the local governmental entity where the Work will occur:

1. The precise location of each area that is posted "No Trespassing";
2. The date and time that each site was posted "No Trespassing";
3. The date, time, description and duration of the Work to be performed at each site.

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At least 72 hours prior to performing site cleanup in Work areas containing encampments (such as tents, makeshift dwellings, sleeping sites, or accumulations of personal property that are not refuse), the Contractor shall post a notification at each encampment area. Each notice shall:

1. Be weather resistant, and written in both English and Spanish.
2. Be affixed to each dwelling or post mounted within 10-feet of each encampment;
3. State the Prime Contractor's company name as the entity that performed the cleanup as required by the Washington State Department of Transportation;
4. Provide the date that the notice is posted;
5. Provide date(s) and time(s) that cleanup will occur;
6. Provide the telephone number, business hours and physical address of the location where stored personal property may be claimed.
7. State that personal property will be stored for 70-days from the date of removal, and if unclaimed within that time, will be disposed of.

At the same time that notifications are posted at encampment areas, provide written notification of the schedule to perform site cleanup to the Project Engineer and to the following advocacy groups:

\$1\$\$

Acceptance of signs and notifications will be based on visual inspection that the sign and notifications meet these requirements.

Site Cleanup of Biological and Physical Hazards

An initial cleanup of the site, including all preparatory work required to make the worksite sanitary and safe in accordance with applicable laws and with the Contract, shall be completed to remove all individuals, encampments, and personal property from areas signed "No Trespassing", and to address all biological and associated physical hazards present on the project. Necessary worker training, on and off site preparations, and personal protective equipment shall be provided by the Contractor to complete this Work. If aggressive or violent individuals are encountered, the Contractor shall notify the local law enforcement agency to assist them in clearing the Work area.

Site cleanup of individual areas identified in the Health and Safety Plan shall be performed no more than 30 days in advance of performing other Work in each area.

The refuse generated by the site cleanup shall become the property of the Contractor and shall be removed from the project. Personal property shall be handled as required by this Specification and applicable laws.

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Removal, Storage and Return of Personal Property

Personal property may include radios, audio and video equipment, sleeping bags, tents, stoves and cooking utensils, lanterns, flashlights, bed rolls, tarps, foam, canvas, mats, blankets, pillows, medication, personal papers, photographs, books and other reading materials, luggage, backpacks or other storage containers, clothing, towels, shoes, toiletries and cosmetics, clocks and watches, and eye glasses. Personal property does not include building materials such as wood products, metal, or rigid plastic.

Personal property items that are not refuse, contaminated, illegal or hazardous shall be removed from the Work area and stored at a location near the project site for return to the property owner. Items shall be placed in large transparent plastic bags and stored in a manner that protects them from adverse weather and theft. Reasonable efforts shall be made to place all items from each encampment into a separate bag. Each bag shall be labeled with an inventory to include a brief description of the contents, a description of the location that it was removed from, and the date that it was removed from the Work area. The Contractor shall not open closed items of personal property unless, in its determination, it is necessary to do so to protect public safety.

The Contractor shall retain the property for 70-days.

If the name and contact information of the owner of a personal property item is identified on that item, then for a period of not less than 10-days after removing the property from the Work area, the Contractor shall attempt to notify the apparent owner of the property and make arrangements for the owner to claim the property.

The Contractor shall release the property to any individual who claims ownership provided they are able to establish ownership by identifying the property and its approximate location. The Contractor shall maintain a record of all property that is claimed. The record shall include a description of the property, the date claimed, and the name of the claimant.

If personal property is not claimed within 70-days of removal from the encampment, then the property shall become the property of the Contractor and shall be removed from the project.

Site Preservation

The Contractor shall preserve the site after initial cleanup of biological and physical hazards.

On a daily basis and prior to performing any Work in areas where pedestrians or encampments may be present, the Contractor shall verify that the Work area is cleared of all persons not associated with the project. Individuals may seek shelter in dumpsters, equipment, under blankets, or other places hidden from view. Individuals may be disabled, or under the influence of alcohol or drugs and it should not be assumed that loud construction noise will wake them.

If the worksite becomes unsanitary or unsafe due to new encampments or new biological and associated physical hazards after initial cleanup is completed,

1 then the Contractor shall perform additional site assessment, additional
2 notification and additional cleanup.
3
4 The Project Engineer may authorize additional site preservation measures.
5 The nature and frequency of these measures will be as agreed to by the
6 Project Engineer. Additional site preservation measures may include the use
7 of fencing, lighting, or security, provided it is approved in advance by the
8 Project Engineer. Work performed without Project Engineer authorization will
9 not be eligible for payment.
10
11 **Measurement**
12 No trespassing signs will be measured per each.
13
14 No specific unit of measurement shall apply to the Lump sum item for “Health and
15 Safety Plan”.
16
17 No specific unit of measurement will apply to the force account item of “FA-Site
18 Cleanup of Bio. And Physical Hazards”.
19
20 **Payment**
21 Payment will be made in accordance with Section 1-04.1, for the following bid
22 items:
23
24 “No Trespassing Sign”, per each.
25 The unit contract price per each “No Trespassing Sign” shall be full payment
26 for all Work required to furnish, install, maintain and remove the signs.
27
28 “Health and Safety Plan”, lump sum.
29
30 The lump sum unit contract price for “Health and Safety Plan” shall be full
31 payment for all Work associated with the preparation and implementation of
32 the Health and Safety Plan including the initial and follow up assessment(s) for
33 initial site cleanup, worker training and personal protective equipment, and
34 providing required notifications.
35
36 “FA-Site Cleanup of Bio. And Physical Hazards”, by force account as provided
37 in Section 1-09.6.
38
39 Removal and disposal of biological and physical hazards; removal of
40 individuals and encampments; removal, storage, and return of personal
41 property; disposal of unclaimed personal property; additional site assessment,
42 notifications, worker training and personal protective equipment required after
43 the initial site cleanup is completed; and site preservation Work authorized by
44 the Project Engineer will be paid for by force account in accordance with
45 Section 1-09.6.
46
47 For the purpose of providing a common proposal for all bidders, the
48 Contracting Agency has entered an amount for the item “FA-Site Cleanup of
49 Bio. And Physical Hazards” in the bid proposal to become a part of the total bid
50 by the Contractor.

1 **Environmental Regulations**

2
3 Section 1-07.5 is supplemented with the following:

4
5 **(September 20, 2010)**

6 **Environmental Commitments**

7 The following Provisions summarize the requirements, in addition to those required
8 elsewhere in the Contract, imposed upon the Contracting Agency by the various
9 documents referenced in the Special Provision PERMITS AND LICENSES. Throughout
10 the work, the Contractor shall comply with the following requirements:

11
12 (August 3, 2009)

13 A mixing zone is established within which the turbidity standard is waived during
14 actual in-water work. The mixing zone is established to only temporarily allow
15 exceeding the turbidity criteria (such as a few hours or days) and is not
16 authorization to exceed the turbidity standard for the entire duration of the
17 construction. The mixing zone shall not exceed *** \$\$1\$\$ *** feet downstream from
18 the construction area.

19
20 (August 3, 2009)

21 Heavy equipment working in wetlands or mudflats must be placed on mats or other
22 measures taken to minimize soil disturbance as approved by the Engineer.

23
24 (August 3, 2009)

25 Materials placed below OHW or MHHW may not consist of trash, debris, car
26 bodies, asphalt, or other potentially contaminating materials.

27
28 (August 3, 2009)

29 Any temporary fills placed *** \$\$1\$\$ *** must be removed in their entirety and the
30 affected areas returned to their preexisting elevation. (Choose from the following
31 list to be used for the fill-in information: "below OHW", "below MHHW", or "within
32 wetlands").

33
34 (August 3, 2009)

35 The Contractor shall notify the Engineer a minimum of *** \$\$1\$\$ *** calendar days
36 prior to commencing any work in environmentally sensitive areas, mitigation areas,
37 and wetland buffers. Installation of construction fencing is excluded from this notice
38 requirement. At the time of notification, the Contractor shall submit a work plan for
39 review and approval detailing how the work will be performed. Plan detail must be
40 sufficient to verify that work is in conformance with all contract provisions.

41
42 (August 3, 2009)

43 The intentional bypass of stormwater from all or any portion of a stormwater
44 treatment system is prohibited without the approval of the Engineer.

45
46 (August 3, 2009)

47 The Contractor shall dispose of all creosoted timber, creosote piling and associated
48 debris as shown in the Plans in accordance with current federal, state, and local
49 regulations and provisions, and following Best Management Practices. Disposal
50 shall be made in a landfill which meets the liner and leachate standards of the
51 Minimum Functional Standards, Chapter 173-304 WAC. The Contractor shall
52 provide receipts from the disposal facility to the Project Engineer. If the material is

1 transported to a transfer station, the Contractor shall obtain documentation
2 indicating that final disposal will comply with the standards referenced above.

3
4 (August 3, 2009)
5 No Contractor staging areas will be allowed within *** \$\$1\$\$ *** feet of any waters
6 of the State including wetlands.

7
8 **(August 3, 2009)**

9 **Payment**

10 All costs to comply with this special provision for the environmental commitments and
11 requirements are incidental to the contract and are the responsibility of the Contractor.
12 The Contractor shall include all related costs in the associated bid prices of the contract.

13
14 **Requirements For Nondiscrimination**

15
16 Section 1-07.11 is supplemented with the following:

17
18 (January 3, 2011)
19 Requirement For Affirmative Action to Ensure Equal Employment Opportunity
20 (Executive Order 11246)

- 21
22 1. The Contractor's attention is called to the Equal Opportunity Clause and the
23 Standard Federal Equal Employment Opportunity Construction Contract
24 Specifications set forth herein.
25
26 2. The goals and timetables for minority and female participation set by the Office of
27 Federal Contract Compliance Programs, expressed in percentage terms for the
28 Contractor's aggregate work force in each construction craft and in each trade on
29 all construction work in the covered area, are as follows:

30
31 Women - Statewide

<u>Timetable</u>	<u>Goal</u>
Until further notice	6.9%
<u>Minorities - by Standard Metropolitan Statistical Area (SMSA)</u>	
Spokane, WA:	
SMSA Counties:	
Spokane, WA	2.8
WA Spokane.	
Non-SMSA Counties	3.0
WA Adams; WA Asotin; WA Columbia; WA Ferry; WA Garfield; WA Lincoln, WA Pend Oreille; WA Stevens; WA Whitman.	
Richland, WA	
SMSA Counties:	
Richland Kennewick, WA	5.4
WA Benton; WA Franklin.	
Non-SMSA Counties	3.6
WA Walla Walla.	

1	Yakima, WA:	
2	SMSA Counties:	
3	Yakima, WA	9.7
4	WA Yakima.	
5	Non-SMSA Counties	7.2
6	WA Chelan; WA Douglas; WA Grant; WA Kittitas; WA Okanogan.	
7		
8	Seattle, WA:	
9	SMSA Counties:	
10	Seattle Everett, WA	7.2
11	WA King; WA Snohomish.	
12	Tacoma, WA	6.2
13	WA Pierce.	
14	Non-SMSA Counties	6.1
15	WA Clallam; WA Grays Harbor; WA Island; WA Jefferson; WA Kitsap;	
16	WA Lewis; WA Mason; WA Pacific; WA San Juan; WA Skagit; WA	
17	Thurston; WA Whatcom.	
18		
19	Portland, OR:	
20	SMSA Counties:	
21	Portland, OR-WA	4.5
22	WA Clark.	
23	Non-SMSA Counties	3.8
24	WA Cowlitz; WA Klickitat; WA Skamania; WA Wahkiakum.	

26 These goals are applicable to each nonexempt Contractor's total on-site
27 construction workforce, regardless of whether or not part of that workforce is
28 performing work on a Federal, or federally assisted project, contract, or subcontract
29 until further notice. Compliance with these goals and time tables is enforced by the
30 Office of Federal Contract compliance Programs.

31
32 The Contractor's compliance with the Executive Order and the regulations in 41
33 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity
34 Clause, specific affirmative action obligations required by the specifications set
35 forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority
36 and female employment and training must be substantially uniform throughout the
37 length of the contract, in each construction craft and in each trade, and the
38 Contractor shall make a good faith effort to employ minorities and women evenly on
39 each of its projects. The transfer of minority or female employees or trainees from
40 Contractor to Contractor or from project to project for the sole purpose of meeting
41 the Contractor's goal shall be a violation of the contract, the Executive Order and
42 the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured
43 against the total work hours performed.

- 44
45 3. The Contractor shall provide written notification to the Office of Federal Contract
46 Compliance Programs (OFCCP) within 10 working days of award of any
47 construction subcontract in excess of \$10,000 or more that are Federally funded, at
48 any tier for construction work under the contract resulting from this solicitation. The
49 notification shall list the name, address and telephone number of the
50 Subcontractor; employer identification number of the Subcontractor; estimated
51 dollar amount of the subcontract; estimated starting and completion dates of the

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subcontract; and the geographical area in which the contract is to be performed.
The notification shall be sent to:

District Director
U.S. Department of Labor
Office of Federal Contract Compliance Programs
Seattle District Office
1111 Third Avenue, Suite 745
Seattle, WA 98101-3212

Additional information may be found at the U.S. Department of Labor website:
<http://www.dol.gov/ofccp/TAguides/ctaguide.htm>

4. As used in this Notice, and in the contract resulting from this solicitation, the Covered Area is as designated herein.

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these specifications:
- a. Covered Area means the geographical area described in the solicitation from which this contract resulted;
 - b. Director means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. Employer Identification Number means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941;
 - d. Minority includes:
 - (1) Black, a person having origins in any of the Black Racial Groups of Africa.
 - (2) Hispanic, a fluent Spanish speaking, Spanish surnamed person of Mexican, Puerto Rican, Cuban, Central American, South American, or other Spanish origin.
 - (3) Asian or Pacific Islander, a person having origins in any of the original peoples of the Pacific rim or the Pacific Islands, the Hawaiian Islands and Samoa.
 - (4) American Indian or Alaskan Native, a person having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each

- 1 subcontract in excess of \$10,000 the provisions of these specifications and the
2 Notice which contains the applicable goals for minority and female participation and
3 which is set forth in the solicitations from which this contract resulted.
4
- 5 3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan
6 approved by the U.S. Department of Labor in the covered area either individually
7 or through an association, its affirmative action obligations on all work in the Plan
8 area (including goals and timetables) shall be in accordance with that Plan for
9 those trades which have unions participating in the Plan. Contractors must be able
10 to demonstrate their participation in and compliance with the provisions of any such
11 Hometown Plan. Each Contractor or Subcontractor participating in an approved
12 Plan is individually required to comply with its obligations under the EEO clause,
13 and to make a good faith effort to achieve each goal under the Plan in each trade in
14 which it has employees. The overall good faith performance by other Contractors
15 or Subcontractors toward a goal in an approved Plan does not excuse any covered
16 Contractor's or Subcontractor's failure to take good faith effort to achieve the Plan
17 goals and timetables.
18
- 19 4. The Contractor shall implement the specific affirmative action standards provided in
20 paragraphs 7a through 7p of this Special Provision. The goals set forth in the
21 solicitation from which this contract resulted are expressed as percentages of the
22 total hours of employment and training of minority and female utilization the
23 Contractor should reasonably be able to achieve in each construction trade in
24 which it has employees in the covered area. Covered construction contractors
25 performing construction work in geographical areas where they do not have a
26 Federal or federally assisted construction contract shall apply the minority and
27 female goals established for the geographical area where the work is being
28 performed. The Contractor is expected to make substantially uniform progress in
29 meeting its goals in each craft during the period specified.
30
- 31 5. Neither the provisions of any collective bargaining agreement, nor the failure by a
32 union with whom the Contractor has a collective bargaining agreement, to refer
33 either minorities or women shall excuse the Contractor's obligations under these
34 specifications, Executive Order 11246, or the regulations promulgated pursuant
35 thereto.
36
- 37 6. In order for the nonworking training hours of apprentices and trainees to be counted
38 in meeting the goals, such apprentices and trainees must be employed by the
39 Contractor during the training period, and the Contractor must have made a
40 commitment to employ the apprentices and trainees at the completion of their
41 training, subject to the availability of employment opportunities. Trainees must be
42 trained pursuant to training programs approved by the U.S. Department of Labor.
43
- 44 7. The Contractor shall take specific affirmative actions to ensure equal employment
45 opportunity. The evaluation of the Contractor's compliance with these
46 specifications shall be based upon its effort to achieve maximum results from its
47 action. The Contractor shall document these efforts fully, and shall implement
48 affirmative action steps at least as extensive as the following:
49
- 50 a. Ensure and maintain a working environment free of harassment,
51 intimidation, and coercion at all sites, and in all facilities at which the
52 Contractor's employees are assigned to work. The Contractor, where

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possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunity and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the U.S. Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc.,

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prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

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8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of the obligations under 7a through 7p of this Special Provision provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensure that the concrete benefits of the program are reflected in the Contractor's minority and female work-force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrate the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspensions, terminations and cancellations of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of this Special Provision, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the

1 government and to keep records. Records shall at least include, for each
2 employee, their name, address, telephone numbers, construction trade, union
3 affiliation if any, employee identification number when assigned, social security
4 number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer),
5 dates of changes in status, hours worked per week in the indicated trade, rate of
6 pay, and locations at which the work was performed. Records shall be maintained
7 in an easily understandable and retrievable form; however, to the degree that
8 existing records satisfy this requirement, the Contractors will not be required to
9 maintain separate records.

10
11 15. Nothing herein provided shall be construed as a limitation upon the application of
12 other laws which establish different standards of compliance or upon the
13 application of requirements for the hiring of local or other area residents (e.g., those
14 under the Public Works Employment Act of 1977 and the Community Development
15 Block Grant Program).

16
17 16. Additional assistance for Federal Construction Contractors on contracts
18 administered by Washington State Department of Transportation or by Local
19 Agencies may be found at:

20
21 Washington State Dept. of Transportation
22 Office of Equal Opportunity
23 PO Box 47314
24 310 Maple Park Ave. SE
25 Olympia WA
26 98504-7314
27 Ph: 360-705-7090
28 Fax: 360-705-6801
29 <http://www.wsdot.wa.gov/equalopportunity/default.htm>
30

31 **Contractor's Responsibility for Work**

32
33 ***Repair of Damage***

34
35 Section 1-07.13(4) is revised to read:
36
37 (August 6, 2001)
38 The Contractor shall promptly repair all damage to either temporary or permanent
39 work as directed by the Engineer. For damage qualifying for relief under Sections
40 1-07.13(1), 1-07.13(2) or 1-07.13(3), payment will be made in accordance with
41 Section 1-04.4. Payment will be limited to repair of damaged work only. No
42 payment will be made for delay or disruption of work.
43

44 **Protection And Restoration Of Property**

45
46 ***Vegetation Protection and Restoration***

47
48 Section 1-07.16(2) is supplemented with the following:
49
50 (August 2, 2010)
51 Vegetation and soil protection zones for trees shall extend out from the trunk to a
52 distance of 1 foot radius for each inch of trunk diameter at breast height.

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Vegetation and soil protection zones for shrubs shall extend out from the stems at ground level to twice the radius of the shrub.

Vegetation and soil protection zones for herbaceous vegetation shall extend to encompass the diameter of the plant as measured from the outer edge of the plant.

Archaeological And Historical Objects

Section 1-07.16(4) is supplemented with the following:

(December 6, 2004)

The project area potentially contains archaeological or historical objects that may have significance from a historical or scientific standpoint. To protect these objects from damage or destruction, the Contracting Agency, at its discretion and expense, may monitor the Contractor’s operations, conduct various site testing and perform recovery and removal of such objects when necessary.

The Contractor may be required to conduct its operations in a manner that will accommodate such activities, including the reserving of portions of the work area for site testing, exploratory operations and recovery and removal of such objects as directed by the Engineer. If such activities are performed by consultants retained by the Contracting Agency, the Contractor shall provide them adequate access to the project site.

Added work necessary to uncover, fence, dewater, or otherwise protect or assist in such testing, exploratory operations and salvaging of the objects as ordered by the Engineer shall be paid by force account as provided in Section 1-09.6. If the discovery and salvaging activities require the Engineer to suspend the Contractor’s work, any adjustment in time will be determined by the Engineer pursuant to Section 1-08.8.

To provide a common basis for all bidders, the Contracting Agency has entered an amount for the item “Archaeological and Historical Salvage” in the Proposal to become a part of the total bid by the Contractor.

Public Convenience and Safety

Construction Under Traffic

Section 1-07.23(1) is supplemented with the following:

(April 2, 2007)

Work Zone Clear Zone

The Work Zone Clear Zone (WZCZ) applies during working and nonworking hours. The WZCZ applies only to temporary roadside objects introduced by the Contractor’s operations and does not apply to preexisting conditions or permanent Work. Those work operations that are actively in progress shall be in accordance with adopted and approved Traffic Control Plans, and other contract requirements.

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During nonworking hours equipment or materials shall not be within the WZCZ unless they are protected by permanent guardrail or temporary concrete barrier. The use of temporary concrete barrier shall be permitted only if the Engineer approves the installation and location.

During actual hours of work, unless protected as described above, only materials absolutely necessary to construction shall be within the WZCZ and only construction vehicles absolutely necessary to construction shall be allowed within the WZCZ or allowed to stop or park on the shoulder of the roadway.

The Contractor's nonessential vehicles and employees private vehicles shall not be permitted to park within the WZCZ at any time unless protected as described above.

Deviation from the above requirements shall not occur unless the Contractor has requested the deviation in writing and the Engineer has provided written approval.

Minimum WZCZ distances are measured from the edge of traveled way and will be determined as follows:

Posted Speed	Distance From Traveled Way (Feet)
35 mph or less	10 *
40 mph	15
45 to 55 mph	20
60 mph or greater	30

* or 2-feet beyond the outside edge of sidewalk

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26

Minimum Work Zone Clear Zone Distance

(December 6, 2004)

The Contractor shall enter the highway only through legal movements from existing roads, streets and through other access points specifically allowed by the contract documents.

31
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(December 6, 2004)

The portion of Section 1-07.16(1) that prohibits the merging of construction vehicles with public traffic from an access gained through adjacent properties is rescinded, provided the Contractor's submittal is approved as required below.

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37

Access for Construction

The Contractor may enter and leave the traveled way, auxiliary lanes or shoulders at approved locations other than established legal movements. To obtain approval of such an access location, the Contractor shall submit a request to the Engineer. The Contractor's request shall be submitted to the Engineer at least 30 calendar days prior to the time the use of the access will be required. This submittal shall include a vicinity map indicating the interstate stationing at the centerline of the access, distances from the end of ramp tapers of existing interchanges and a traffic control plan conforming with the

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requirements specified in Section 1-10.2(2). The access shall meet the following requirements:

- Access to and from the worksite adjacent to a multi-lane facility will only be allowed to and from a closed lane.
- The merging point of construction vehicles and public traffic shall provide a Decision Sight Distance for the traveling public of 1,640 ft in urban areas and 1,360 ft in rural areas.
- In urban areas the access shall not be located within 3,280 ft of the end of a ramp taper, or the centerline of a road approach. In rural areas the access shall not be located within 2,720 ft of the end of a ramp taper or the centerline of a road approach.
- Median crossings within 1.5 miles of the access point shall not be used in conjunction with the access.
- No new median crossings shall be created for use in conjunction within 1.5 miles of the access point.
- Short-duration shoulder stops in the construction zone, utilizing light vehicles properly equipped with warning flashers, will be allowed without a lane closure.
- When in use the access location shall have traffic control in place as per Section 1-10. Unauthorized use of the access from adjacent property is to be prohibited by the use of signing and/or flaggers as conditions warrant.
- The continuity of the existing drainage system shall be maintained through the access site.
- Air borne particulates created as a result of using the access shall be effectively controlled.
- The access location shall not adversely affect wetlands or other sensitive areas.

At the completion of the project, the Contractor shall restore the area of the access site to its original, pre-contract, condition. Any damage to the traveled way, shoulders, auxiliary lanes, side slopes or other items caused by the access shall be repaired. All work to comply with this provision or to build, maintain, provide erosion control, control airborne particulates, ensure that drainage continues through the access site, provide traffic control when necessary, remove the temporary access and restore the surrounding area when no longer required for use are the responsibility of the Contractor. The Contractor shall include all related costs in the bid prices of the contract.

1 **PROSECUTION AND PROGRESS**

2

3 **Subcontracting**

4

5 ***Subcontract Completion and Return of Retainage Withheld***

6

7 Section 1-08.1(1) is revised to read:

8

9 (June 27, 2011)

10 The following procedures shall apply to all subcontracts entered into as a part of
11 this Contract:

12

13 **Requirements**

14

15 1. The Prime Contractor or Subcontractor shall make payment to the
16 Subcontractor not later than ten (10) days after receipt of payment from
17 the Contracting Agency for work satisfactorily completed by the
18 Subcontractor, to the extent of each Subcontractor's interest therein.

19

20 2. Prompt and full payment of retainage from the Prime Contractor to the
21 Subcontractor shall be made within 30 days after Subcontractor's Work is
22 satisfactorily completed.

23

24 3. For purposes of this Section, a Subcontractor's work is satisfactorily
25 completed when all task and requirements of the Subcontract have been
26 accomplished and including any required documentation and material
27 testing .

28

29 4. Failure by a Prime Contractor or Subcontractor to comply with these
30 requirements may result in one or more of the following:

31

32 a. Withholding of payments until the Prime Contractor or Subcontractor
33 complies

34

35 b. Failure to comply shall be reflected in the Prime Contractor's
36 Performance Evaluation

37

38 c. Cancellation, Termination, or Suspension of the Contract, in whole or
39 in part

40

41 d. Other sanctions as provided by the subcontractor or by law under
42 applicable prompt pay statutes.

43

44 **Conditions**

45 This clause does not create a contractual relationship between the Contracting
46 Agency and any Subcontractor as stated in Section 1-08.1. Also, it is not
47 intended to bestow upon any Subcontractor, the status of a third-party
48 beneficiary to the Contract between the Contracting Agency and the
49 Contractor.

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Payment

The Contractor will be solely responsible for any additional costs involved in paying retainage to the Subcontractors. Those costs shall be incidental to the respective Bid Items.

Progress Schedule

Section 1-08.3(2) is supplemented with the following:

**(January 3, 2011)
Type C Progress Schedule**

Type C Progress Schedules shall conform to all of the requirements of Section 1-08.3(2)B and this Section.

The Contractor shall submit five printed copies of a preliminary Type C Progress Schedule no later than the first working day as defined in Section 1-08.5. The preliminary schedule shall comply with all of these requirements and the requirements of Section 1-08.3(1), except that it may be limited to only those activities occurring within the first 60 working days of the project.

The Contractor shall submit five printed copies of a Type C Progress Schedule no later than 60 calendar days after the date the contract is executed. The Engineer may allow an additional 30 calendar days for schedule submittal if the Contractor is able to demonstrate that they are unable to determine resource availability, and such lack of information prevents the Contractor from preparing a reasonable schedule.

Each time that a preliminary schedule, Progress Schedule, or Schedule Update is submitted, the Contractor shall provide the Engineer with an electronic copy of that schedule. Regardless of the type of software used, the schedule data provided to the Engineer shall be saved on a CD-ROM in Primavera Project Manager Enterprise Version, P6 6.0 or later version.

Type C Progress Schedules shall display at least the following additional information:

1. A time scaled logic diagram.
2. Activities for traffic detours and closures.
3. Milestones for required delivery of State furnished materials, if any.
4. Activities for State furnished traffic control resources, if any.
5. Activities for fabrication of materials longer than 120 calendar days lead time.
6. Fixed constraints shall be identified on the activity listing, supplemented with a written narrative describing why the constraint exists.

If requested by the Engineer, the Contractor shall supplement the Progress Schedule with written explanations for each lead and lag time used, and a written narrative describing the assumed production rates and planned resource allocations to support the activity durations provided in the schedule.

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Schedule Updates

Section 1-08.3(3) is revised to read:

(December 1, 2008)
The Contractor shall submit five printed copies of a Type C Schedule Update to the Engineer by the first business day of each month, or some other mutually agreed upon submittal time.

In addition to the other requirements of this Section, Schedule Updates shall reflect at least the following information:

1. The actual duration and sequence of as-constructed work activities, including changed work.
2. Approved time extensions.
3. Any construction delays or other conditions that affect the progress of the work.
4. Any modifications to the as-planned sequence or duration of remaining activities, supplemented with a written narrative describing each change and the reason for the change.
5. The physical completion of all remaining work in the remaining contract time.
6. Progress on partially completed activities shall be indicated using percent complete.

Activity numbers on Schedule Updates shall be the same as the Progress Schedule, with the exception of deleted or added activities.

Unresolved requests for time extensions shall be reflected in the Schedule Update by assuming no time extension will be granted, and by showing the effects to follow-on activities necessary to physically complete the project within the currently authorized time for completion.

Measurement

Section 1-08.3(4) is revised to read:

(December 1, 2008)
No specific unit of measurement shall apply to the lump sum item for Type C Progress Schedule.

Schedule Updates will be measured per each.

Payment

Section 1-08.3(5) is revised to read:

1 (December 1, 2008)
2 Payment will be made in accordance with Section 1-04.1, for the following bid item
3 when it is included in the proposal:

4
5 "Type C Progress Schedule", lump sum.

6
7 The Lump Sum price for "Type C Progress Schedule" shall be full payment for
8 all costs for furnishing the Type C Progress Schedule and preliminary Type C
9 Progress Schedule.

10
11 "Schedule Update", per each.
12 The unit Contract price per each "Schedule Update" shall be full payment for
13 all costs required to complete the work specified in Section 1-08.3(3).

14
15 All costs for providing Weekly Look-Ahead Schedules are considered
16 incidental to the contract and are to be included with other bid items.

17
18 **Payment For Material On Hand**

19
20 The last paragraph of Section 1-09.8 is revised to read:

21
22 (August 3, 2009)
23 The Contracting Agency will not pay for material on hand when the invoice cost is less
24 than \$2,000. As materials are used in the work, credits equaling the partial payments
25 for them will be taken on future estimates. Each month, no later than the estimate due
26 date, the Contractor shall submit a letter to the Project Engineer that clearly states: 1)
27 the amount originally paid on the invoice (or other record of production cost) for the
28 items on hand, 2) the dollar amount of the material incorporated into each of the various
29 work items for the month, and 3) the amount that should be retained in material on hand
30 items. If work is performed on the items and the Contractor does not submit a letter, all
31 of the previous material on hand payment will be deducted on the estimate. Partial
32 payment for materials on hand shall not constitute acceptance. Any material will be
33 rejected if found to be faulty even if partial payment for it has been made.

34
35 **Disputes and Claims**

36
37 Section 1-09.11 is revised to read:

38
39 (August 2, 2010)
40 When protests occur during a Contract, the Contractor shall pursue resolution through
41 the Project Engineer. The Contractor shall follow the procedures outlined in Section 1-
42 04.5.

43
44 If the negotiations using the procedures outlined in Section 1-04.5 fail to provide
45 satisfactory resolution of protests, then either party, Engineer or Contractor, may refer
46 the dispute to the Disputes Review Board.

47
48 ***Disputes Review Board***

49
50 Section 1-09.11(1) is deleted and replaced with the following:

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52 (August 2, 2010)

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In order to assist in the resolution of disputes arising out of the work of this project, the Contract provides for the establishment of a Disputes Review Board (DRB), hereinafter called the "Board." The Board is created as part of the disputes resolution process to be utilized when normal Contracting Agency-Contractor dispute resolution is unsuccessful and prior to the filing of a Section 1-09.11(2) claim.

The Board will consider disputes referred to it and furnish recommendations to the Contracting Agency and Contractor to assist in the resolution of the differences between them. The purpose of the Board response to such issues is to provide nonbinding findings and recommendations designed to expose the disputing parties to an independent view of the dispute.

The Board members will be trained in disputes resolution or have experience in disputes resolution, and be knowledgeable in the type of construction involved in the Project and shall discharge their responsibilities impartially and independently considering the facts and conditions related to the matters under consideration and the provisions of the Contract.

Disputes Review Board Membership

Section 1-09.11(1)A is deleted and replaced with the following:

(April 4, 2011)

The Board shall consist of one member selected by the Contracting Agency and one member selected by the Contractor, with these two members to select the third member. The first two members shall be mutually acceptable to both the Contracting Agency and the Contractor. If one or both of the two members selected are not acceptable to the Contracting Agency or Contractor, another selection shall be made.

The Contracting Agency and Contractor shall each select a member and negotiate an agreement, separate and apart from this contract, with their respective Board member within the first 60 calendar days after execution of the contract.

The agreements with these two Board members shall contain language imposing the "Scope of Work" and "Suggested Administrative Procedures" included in the Appendix to these Special Provisions. These negotiated agreements shall also include clauses that require the respective selected members to immediately pursue selection of a third member. The goal is to obtain a third Board member who will complement the first two by furnishing a needed expertise, which will facilitate the Board's operations.

The Contracting Agency has entered into "standby" agreements with a number of potential third members. The qualifications of these potential members have been reviewed and deemed acceptable by both the State of Washington Department of Transportation and the Associated General Contractors of Washington. The names of these potential members will be provided to the first two members for consideration. If a selection can be made from the standby list, then the Board may be immediately seated with the execution of a task order under the corresponding standby agreement. Should the first two

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members decide to select a third member not on the list of standby candidates, then the selected person will be accepted to the Board after he or she executes a standby agreement (Third Party Member Disputes Review Board Consultant Agreement). The acceptable format for this agreement and all accompanying exhibits may be obtained by contacting WSDOT Consulting Services at <http://www.wsdot.wa.gov/Business/Consulting/Agreements/DisputesReview> or may be obtained from the Project Engineer. The fee for the third member shall be included in a task order, issued by the Project Engineer, after the third member standby agreement is fully executed.

In the event of an impasse in selection of the third member, either the Contracting Agency or the Contractor or both may appeal to the Thurston County Superior Court for selection of a third member by the court from a list or lists submitted to the court by the Contracting Agency and/or the Contractor. An impasse shall be considered to have been reached if the two members appointed by the Contracting Agency and the Contractor to the Board have been unable to appoint the third member in a period of 60 calendar days after the approval of the last of such two members.

In case a member of the Board needs to be replaced, the replacement member will be appointed in the same manner as the replaced member was appointed. The appointment of a replacement Board member will begin promptly upon determination of the need for replacement and shall be completed within 30 calendar days.

Service of a Board member may be terminated at any time with not less than 30 calendar days notice as follows:

1. The Contracting Agency may terminate service of the Contracting Agency appointed member.
2. The Contractor may terminate service of the Contractor appointed member.
3. The third member's services may be terminated by agreement of the other two members.
4. By resignation of the member.

Termination of a member will be followed by appointment of a substitute as specified above.

No member shall have a financial interest in the Contract, except for payments for services on the Board. The Contracting Agency-selected member and the Contractor-selected member shall not have been employed by the party who selected them within a period of 1-year; except that, service as a member of other Disputes Review Boards on other contracts will not preclude a member from serving on the Board for this Contract.

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Compensation for the Board members, and the expenses of operation of the Board, shall be shared by the Contracting Agency and Contractor in accordance with the following:

1. The Contracting Agency will compensate directly the wages and travel expense for its selected member.
2. The Contractor shall compensate directly the wages and travel expense for its selected member.
3. The Contracting Agency and Contractor shall share equally in the third member's wages and travel expense, and all of the operating expenses of the Board. These equally shared expenses shall be billed to and paid by the Contracting Agency. The Contractor's share will be deducted from monies due or coming due the Contractor.
4. The Contracting Agency, through the Engineer, will provide administrative services, such as conference facilities and secretarial services, to the Board and the Contracting Agency will bear the costs for this service.

The Contracting Agency and Contractor shall indemnify and hold harmless the Board Members from and against all claims, damages, losses and expenses, including but not limited to attorney's fees arising out of and resulting from the actions and recommendations of the Board.

Disputes Review Board Procedures

Section 1-09.11(1)B is deleted and replaced with the following:

(August 2, 2010)
The Board, the Contracting Agency, and the Contractor shall develop by agreement the Board's rules of operation and procedures to be followed for the Project. The Agreement shall include the frequency of the Board's visits to the Project and its interactions with the Contracting Agency and the Contractor to keep abreast of the construction development and potential disputes.

In developing the Agreement, the parties shall take into consideration their respective duties and responsibilities set forth in the "Scope of Work" section of their agreements, which is included in the Appendix of these Special Provisions.

The parties may also consider the "Suggested Administrative Procedures" for the Board's operation included in their agreements, which is included in the Appendix of these Special Provisions. These Procedures express, in general terms, the policy for the creation and operation of the Board and are intended to supplement the Special Provisions to the extent that no conflict with such provisions is created.

No dispute shall be referred to the Board unless the Contractor has complied with the procedures of Section 1-04.5. If the dispute is not resolved by the

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procedures outlined in 1-04.5, then the Board will consider the matter in dispute and provide recommendations concerning:

1. The interpretation of the Contract.
2. Entitlement to additional compensation or time for performance
3. Other subjects mutually agreed by the Contracting Agency and Contractor to be a Board issue.

Procedure for Consideration of Disputes

1. Once a protest has been denied as described in Section 1-04.5, the Board members will be contacted and advised of the existence of the dispute. A hearing will be scheduled to be conducted at the next regular project visit or at such other time, as agreed to by the parties.
2. The Contractor and the Contracting Agency shall each be afforded an opportunity to be heard by the Board and to offer evidence. Either party furnishing any written evidence or documentation to the Board must furnish copies of such information to the other party a minimum of 15 calendar days prior to the date the Board sets to convene the hearing for the dispute. Either party shall produce such additional evidence as the Board may deem necessary to an understanding and determination of the dispute and furnish copies to the other party.
3. After the hearing is concluded, the Board shall meet in private and reach a conclusion supported by two or more members. Its findings and recommendations, together with its reasons shall then be submitted as a written report to both parties. The recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute. The Contract shall be interpreted and construed in accordance with the laws of the State of Washington. The Board shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member may prepare a minority report.
4. Within 30 calendar days of receiving the Board recommendations, both the Contracting Agency and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. Although both parties should place weight upon the Board recommendations, the recommendations are not binding.

In the event the Board's recommendations do not lead to resolution of the dispute, all Board records and written recommendations, including any minority reports, will be admissible as evidence in any subsequent litigation.

If the Board's assistance does not lead to resolution of the dispute, the Contractor must file a claim according to Section 1-09.11(2) before seeking any form of judicial relief.

TEMPORARY TRAFFIC CONTROL

1 **Traffic Control Management**

2
3 **General**

4
5 Section 1-10.2(1) is supplemented with the following:

6
7 (December 1, 2008)

8 Only training with WSDOT TCS card and WSDOT training curriculum is recognized
9 in the State of Washington. The Traffic Control Supervisor shall be certified by one
10 of the following:

11
12 The Northwest Laborers-Employers Training Trust
13 27055 Ohio Ave.
14 Kingston, WA 98346
15 (360) 297-3035

16
17 Evergreen Safety Council
18 401 Pontius Ave. N.
19 Seattle, WA 98109
20 1-800-521-0778 or
21 (206) 382-4090

22
23 The American Traffic Safety Services Association
24 15 Riverside Parkway, Suite 100
25 Fredericksburg, Virginia 22406-1022
26 Training Dept. Toll Free (877) 642-4637
27 Phone: (540) 368-1701

28
29 **DIVISION 2**
30 **EARTHWORK**

31
32
33 **REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

34
35 **Construction Requirements**

36
37 Section 2-02.3 is supplemented with the following:

38
39 **(August 1, 2005)**

40 ***Removal and Disposal of Hazardous Material***

41 Hazardous material is suspected to exist on this project. Approximate limits of
42 contamination are identified in the Plans. The site history, prior studies and/or test
43 results indicate a potential for encountering *** \$\$1\$\$ ***.

44
45 Copies of the environmental reports are available for review at the Engineer's office. All
46 necessary permits for this work will be furnished by the Contracting Agency. The
47 Contractor is responsible for all work, records, and reports required to perform the work
48 described in this section. The Contracting Agency will perform all testing of suspected
49 hazardous or contaminated material.
50

1 The Contractor shall notify the Engineer 10 working days prior to beginning work in the
2 area identified in the Plans as contaminated. The Contractor shall notify the Engineer
3 immediately if contamination is discovered in areas other than those identified in the
4 Plans, or is suspected through observations such as an oily sheen or discolored soils
5 that may or may not emit strong chemical odors.
6

7 ***Contaminated Soil and Hazardous Material***

8 The Engineer will determine the limits of excavation required. All material that is
9 designated by the Engineer to be removed shall be handled and stored in a manner that
10 prevents the spread of contamination to adjacent soil or water. Separate stockpiles
11 shall be maintained for known hazardous or contaminated material and for suspected
12 hazardous or contaminated material. The Contractor shall transport hazardous or
13 contaminated material and dispose of it at a permitted facility. The Contractor shall
14 provide the Engineer with a copy of the shipping manifest or bill of lading indicating the
15 amount of material hauled to disposal, and bearing the disposal site operator's
16 confirmation for receipt of the material.
17

18 ***Contaminated Water***

19 All water that is removed from the areas of contamination, including free water that
20 leaches from contaminated soil stockpiles or water that is suspected of being
21 contaminated, shall be collected, handled and stored in a manner that prevents the
22 spread of contamination to adjacent soil or water. The Contractor shall transport
23 contaminated water and dispose of it at a permitted facility. The Contractor shall
24 provide the Engineer with a copy of the shipping manifest or bill of lading indicating the
25 amount of material hauled to disposal, and bearing the disposal site operator's
26 confirmation for receipt of the material.
27

28 ***(September 30, 1996)***

29 ***Asbestos Handling And Disposal***

30 Prior to and during, the performance of any contract work, the Contractor shall verify
31 that no asbestos containing materials are involved or will be disturbed. When asbestos
32 is encountered, the Contractor shall be responsible for obtaining all permits from, and
33 provide notification to, the Washington State Department of Labor and Industries, the
34 U.S. EPA, the local air pollution control agency, and other permitting and regulatory
35 agencies with jurisdiction over the work involving asbestos as the law requires.
36

37 Prior to commencing asbestos related work, the Contractor shall provide the Engineer
38 with written verification of approvals and notifications that have been given and/or
39 obtained from the required jurisdictional agencies, and the Contractor's schedule for all
40 work involving asbestos removal. The schedule shall include the sequencing and
41 scheduling of asbestos related work, and coordination with subcontractors. The
42 Contractor shall notify the Engineer when all approvals have been received and
43 notifications have been made, as required by the agencies involved.
44

45 The Contractor shall ensure the safety of all workers, visitors to the site, and the general
46 public in accordance with all applicable laws, rules, and regulations.
47

48 The Contractor shall designate a Washington State Certified Asbestos Supervisor (CAS)
49 to personally supervise the asbestos removal and to ensure that the handling and
50 removal of asbestos is accomplished by certified asbestos workers, pursuant to
51 Washington State Department of Labor and Industries standards. The Contractor shall
52 ensure that the removal and disposal of asbestos meets the requirements of EPA

1 regulations 40 CFR Part 61, local health department regulations, and all other
2 applicable regulations.

3
4 **(September 30, 1996)**
5 ***Asbestos Handling And Disposal***
6 Prior to performance of any contract work, the Contractor shall obtain all permits from,
7 and provide notification to, the Washington State Department of Labor and Industries,
8 the U.S. EPA, the local air pollution control agency, and other permitting and regulatory
9 agencies with jurisdiction over the work involving asbestos as the law requires.

10
11 Prior to commencing asbestos related work, the Contractor shall provide the Engineer
12 with written verification of approvals and notifications that have been given and/or
13 obtained from the required jurisdictional agencies, and the Contractor's schedule for all
14 work involving asbestos removal. The schedule shall include the sequencing and
15 scheduling of asbestos related work, and coordination with subcontractors. The
16 Contractor shall notify the Engineer when all approvals have been received and
17 notifications have been made, as required by the agencies involved.

18
19 The Contractor shall ensure the safety of all workers, visitors to the site, and the general
20 public in accordance with all applicable laws, rules, and regulations.

21
22 The Contractor shall designate a Washington State Certified Asbestos Supervisor (CAS)
23 to personally supervise the asbestos removal and to ensure that the handling and
24 removal of asbestos is accomplished by certified asbestos workers, pursuant to
25 Washington State Department of Labor and Industries standards. The Contractor shall
26 ensure that the removal and disposal of asbestos meets the requirements of EPA
27 regulation 40 CFR Part 61, local health department regulations, and all other applicable
28 regulations.

29
30 **ILLUMINATION, TRAFFIC SIGNAL SYSTEMS, AND ELECTRICAL**

31
32 **Materials**

33
34 Section 8-20.2 is supplemented with the following:

35
36 **Construction Requirements**

37
38 ***Signal Systems***

39
40 Section 8-20.3(14) is supplemented with the following:

41
42 **(January 3, 2011)**
43 **Uninterruptible Power Supply (UPS)**

44 The UPS system shall provide traffic signal system battery backup power in the
45 event of loss or failure of normal utility power. The UPS system shall be constructed
46 for full on line configuration (line interactive type), providing automatic voltage
47 regulation and power conditioning when under normal utility power. The transfer
48 from utility power to battery power and vice versa shall not interfere with the normal
49 operation of the connected traffic signal controller including conflict monitor and any
50 other peripheral devices within the traffic controller assembly.
51

1 The completely assembled UPS system, including enclosure, shall be obtained by
2 the Contractor from the following manufacturer:

3
4 Alpha Technologies, Inc.
5 3767 Alpha Way
6 Bellingham, WA 98226
7 Phone: 360 647 2360
8 Email: alpha@alpha.com
9 <http://www.alpha.com>

10
11 The UPS system shall include the following equipment:

12
13 **Type 332 Cabinet**

14 The enclosure cabinet shall be a CALTRANS approved Type 332 cabinet with
15 the following:

16
17 Items 2, 4 and 5 of the first paragraph of Section 9-29.13(7)E shall be
18 provided with the cabinet. Green construction cores shall be installed for
19 each cabinet core lock.

20
21 The cabinet shall be provided with a breaker panel with two 15 amp, 120
22 volt, single pole breakers, one each for the fan and the lights.

23
24 Item M of Section 9-29.13(7)C shall be provided with the cabinet.

25
26 Construction shall be of 0.125-inch sheet aluminum (5052 alloy), with mill
27 finish. The aluminum shall not be anodized and the exterior shall not be
28 painted.

29
30 A thermostatically controlled cooling fan, with a minimum CFM of three
31 times the cabinet volume shall be installed at the top of the cabinet.

32
33 Three battery shelves shall be furnished. Each shelf shall be capable of
34 supporting two Alpha (220 GOLD-HP) batteries. A minimum of two and
35 one half inches of side clearance and six inches of overhead clearance is
36 required for each battery.

37
38 A minimum of 12 inches of clearance shall be maintained between the
39 bottom rack and the bottom of the cabinet.

40
41 **Generator Transfer Switch and Enclosure**

42 The UPS Type 332 cabinet shall include a transfer switch enclosure of identical
43 materials, dimensions and installation methods as the police panel type
44 enclosure identified in the first paragraph of Section 9-29.13(7)E except that
45 the enclosure door shall include a spring loaded construction core lock capable
46 of accepting a Best 6-pin CX series core. The core lock shall be installed with a
47 green construction core. Upon contract completion, two master keys for the
48 construction core shall be delivered to the Engineer. The transfer switch
49 enclosure shall be installed at the same location normally occupied by the
50 police panel enclosure.
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The transfer switch enclosure shall contain the following generator transfer switch equipment:

One NEMA L5-30P Flanged Inlet generator connector

One Utility power "ON" indicator light. The indicator light shall be labeled "Utility".

One generator power "ON" indicator light. The indicator light shall be labeled "Generator".

Two 30 amp, 120 volt, single pole, single phase, circuit breakers. One circuit breaker shall be labeled "Generator" and the other circuit breaker shall be labeled "Utility". Both labels shall be engraved phenolic name plates.

The enclosure shall include a mechanical lock out feature that prevents the Utility circuit breaker and the Generator circuit breaker from being in the ON position at the same time. The circuit breakers shall be capable of being independently switched.

The conductors from the generator transfer switch enclosure to the rack mounted automatic transfer switch shall be enclosed in nylon mesh sleeve.

The enclosure door shall be labeled with the letters "GTS".

UPS Internal Components

The following equipment shall be furnished and mounted to the EIA rack.

Alpha - #017-201-31 Controller Power Module - FXM 2000 w/SNMP module

Alpha - # 020-168-25 Automatic Transfer Switch (UATS)

Alpha – # 740-755-21 Surge Suppressor Assembly, 120/240VAC

Alpha – # 740-748-23 Receptacle Plate Assembly

The following equipment shall be installed on the battery shelves:

Alpha - # 220 GOLD-HP GXL Battery (Four batteries shall be provided)

Alpha - #012-306-21 Alpha Guard Battery Management System

Alpha - #740-648-27 Battery Cable kit

Maintenance and Operations Manual(s)

Two Maintenance and Operations Manuals from Alpha Technologies shall be provided for each cabinet.

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UPS Cabinet Acceptance Testing

The UPS cabinet shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, all notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following three separate stages:

- a. Delivery and Assembly
- b. Demonstration and Documentation
- c. Performance Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

Stage 1 Delivery and Assembly

Prior to delivery of the UPS cabinet to the State Materials Laboratory, all components and equipment, including the batteries shall be fully installed in the cabinet and the cabinet operations shall be successfully tested by the Contractor's representative.

After the cabinet has been successfully tested, the batteries shall be removed from the cabinet and the cabinet and batteries shall be delivered, independently, to the State Materials Laboratory. Upon delivery to the State Materials Laboratory, the batteries shall be reinstalled in the cabinet and the cabinet shall be made fully operational by the Contractor's representative.

All components for the complete UPS system, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

The Contractor shall provide labor, equipment, and materials necessary to assemble all UPS equipment, including battery installation, and make ready for demonstration.

Stage 2 Documentation and Demonstration

Documentation

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All documentation shall be furnished with the UPS equipment prior to the start of testing. The documents to be supplied shall consist of the following:

- a. A complete set of documents which shall include:
 - 1. Serial numbers when applicable.
 - 2. Wiring diagrams for all equipment furnished. One set per cabinet.
 - 3. Complete operations and maintenance manuals. Two sets per cabinet.
- b. A description of the functions and the capabilities of individual components and of the overall UPS system.

Demonstration

The Contractor shall provide the following:

- a. A presentation on how to operate the system
- b. A complete and thorough demonstration to show that all components of the UPS system are in good condition and operating properly.

The demonstration shall be performed by the Contractor's representative in the presence of State Materials personnel.

Stage 3 Unit Performance Test

The unit performance test will be conducted by State Personnel to determine if each and every UPS cabinet assembly performs correctly.

The performance test shall include the testing of the following specifications:

- Battery Discharge Rate
- Battery Recharge Rate
- Power Transfer Rate

Test results shall be within the manufacturers recommended values in order for the tests to be considered successful.

Equipment Failure or Rejection

All component or system failures shall be documented. This documentation shall provide the following information:

- a. A detailed description of the failure.
- b. The steps undertaken to correct the failure.
- c. A list of parts that were replaced, if any.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory, by the contractor and delivered to sites as designated elsewhere in this contract.

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UPS Cabinet Field Testing

After installation, the Contractor shall field test the UPS system to ensure the system operates in accordance with plans, specifications and manufacturer's instructions. The test shall ensure that that all components are operational within manufacturer's tolerances. The Contractor shall provide a testing procedure to the Engineer for approval. The testing procedure shall provide for operational testing of the following:

- UPS Power Module
- Surge Suppressor
- Automatic Transfer Switch
- Generator Power Transfer Switch

The field test shall demonstrate the loss of utility power and the switch over to battery power without interference with the normal operation of the connected traffic signal controller including conflict monitor and any other peripheral devices within the traffic controller assembly.

Signal Controllers

Section 8-20.3(14)A is supplemented with the following:

(August 2, 2010)

Testing

All signal control equipment shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, the following:

All notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following four separate stages:

- a. Delivery and Assembly
- b. Demonstration and Documentation
- c. Performance Test
- d. Operational Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

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Stage 1 Delivery Assembly

All components for the complete traffic control systems, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

Equipment and prerequisites necessary to complete this stage shall include:

- a. Detection Simulator:
The detection simulator shall provide at least one detector per phase and variable traffic volumes. One simulator shall be required for every two controllers tested.
- b. Communications Network:
Locations, specified for coordinating communications equipment and cable, shall be completely wired to provide an operational communications system between all local and master controllers.

The Contractor shall provide labor, equipment, and materials necessary to assemble all control equipment complete and ready for demonstration. Materials and equipment used for this stage that are not required for field installation shall remain the property of the Contractor. Failure to complete this stage within ten working days will result in rejection of the entire system.

Stage 2 Demonstration and Documentation

This stage shall be completed within seven working days following the completion of Stage 1. Failure to do so shall result in rejection of the entire shipment.

All documentation shall be furnished with the control equipment prior to the start of testing. If corrections to any document are deemed necessary by the State, the Contractor shall submit this updated version prior to the final approval by the State Materials Laboratory. The documents to be supplied shall consist of or provide the following:

- a. A Complete accounting of all the control and test equipment required.
- b. A complete set of documents which shall include:
 - 1. Serial numbers when applicable.
 - 2. Written certification that equipment of the same make and model has been tested according to NEMA Environmental Standards and Test Procedures, and has met or exceeded these standards. The certificate shall include equipment model number and where, when,

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and by whom the tests were conducted. This certificate shall accompany each shipment of controllers.

3. Reproducible mylar wiring diagrams and two blue-tone prints for each controller and cabinet supplied. The sheet size shall be 24 inches by 36 inches.
 4. Wiring diagrams for all auxiliary equipment furnished. One set per cabinet.
 5. Complete operations and maintenance manuals including complete and correct software listing and flow charts. One set of operations and maintenance manuals per cabinet; at least four but no more than ten. Five sets of software listings and flow charts.
 6. Complete operations and maintenance manuals for all auxiliary equipment. One set per cabinet.
- c. A description of the functions and the capabilities of individual components and of the overall control system.
 - d. A presentation on how to operate the system.
 - e. A complete and thorough demonstration to show that all components of the control system are in good condition and operating properly, and proof that the controller and cabinet are functioning correctly.
 - f. Detailed instructions for installing and operating the controller(s), including explanations on the use of all features of the controller(s).
 - g. The operational and maintenance manuals for each traffic signal controller supplied including as a minimum, but not to be limited to the following:
 1. Detailed instructions for maintaining all hardware components, controller, and auxiliary equipment.
 2. A complete parts list detailing all manufacturer's identification codes.
 3. Detailed wiring diagrams and schematics indicating voltage levels and pictorial description, part name, and location for all hardware components, controller, and auxiliary equipment.

The demonstration shall include the following:

- a. Phasing per plans and all phase timing.

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- b. Detection including any special detector functions.
- c. Conflict Monitor and Load Switches.
- d. Special Coordination including communication equipment.

This demonstration shall be performed by the Contractor in the presence of State Materials personnel. The Contractor shall supply any item not accounted for within five working days of the accounting. Controllers and cabinets that remain incomplete five working days after notification shall be rejected and returned freight collect to the Contractor.

Stage 3 Unit Performance Test

A minimum of ten working days shall be allowed for one or two cabinet assemblies and five working days for each additional assembly.

The unit performance test will be conducted by State Personnel to determine if each and every controller cabinet assembly complies with NEMA Environmental Standards as stated in NEMA publication No. TS 1-1976, Part 2.

Any unit submitted, whose failure has been corrected, shall be retested from the beginning of this stage.

Stage 4 Operational Test

All control and auxiliary equipment shall operate without failure for a minimum of ten consecutive days. If an isolated controller is specified, it shall operate as an isolated controller. If a coordinated system is specified, it shall operate as a total coordinated system with the master and all local controllers operating in all coordinated modes.

If any failure occurs during this stage, all equipment for this stage shall be restarted following completion of repairs.

Equipment Failure Or Rejection

Equipment failures shall be defined as set forth in NEMA Publication No. TS 1-1976. Failure of load switches, detector amplifiers, and conflict monitors shall not result in rejection of the controller or cabinet. However, the Contractor shall stock, as replacements, approximately 30 percent more than the total for these three items. All excess material shall remain the property of the Contractor following completion of all tests.

If a failure occurs during Stages 3 or 4, repairs shall be made and completed within ten working days following notification of the malfunction. The Contractor shall have the option of making onsite repairs or repair them at a site selected by the Contractor. Failure to complete repairs within the allotted time shall result in rejection of the controller or cabinet assembly under test.

A total of two failures will be allowed from the start of Stage 3 to the end of Stage 4. If three failures occur during this time period, the equipment will be rejected. New equipment of different serial numbers submitted as

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replacement shall be received by the Materials Laboratory for testing under Stage 3 within ten working days following notification of rejection. Failure to meet this requirement within the allotted time will result in rejection of the entire system. Software errors will be considered as failures and, if not corrected within ten working days, the entire system will be subject to rejection. Following rejection of any equipment, the Contractor shall be responsible for all costs incurred. This shall include but not be limited to all shipping costs.

When the traffic control program is supplied by the State, the Contractor shall prove that any failures are, in fact, caused by that program and not the hardware.

All component or system failures, except load switches and detector amplifiers, shall be documented. This documentation shall be submitted prior to commencing the test or stage in which the failure was found and shall provide the following information:

- a. A detailed description of the failure.
- b. The steps undertaken to correct the failure.
- c. A list of parts that were replaced, if any.

Upon completion of the tests, the equipment will be visually inspected. If material changes are observed which adversely affect the life of the equipment, the cause and conditions shall be noted. The Contractor will immediately be given notice to correct these conditions. If not repaired within ten working days of notification, the equipment will be subject to rejection. A final accounting shall be made of all equipment prior to approval.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory and delivered to sites as designated elsewhere in this contract.

Guarantees
Guarantees and warranties shall be in accordance with Section 1-05.10.

**DIVISION 9
MATERIALS**

**STANDARD PLANS
August 1, 2011**

The State of Washington Standard Plans for Road, Bridge and Municipal Construction M21-01 transmitted under Publications Transmittal No. PT 09-013, effective August 1, 2011 is made a part of this contract.

1 The Standard Plans are revised as follows:
2
3 B-10.20 and B10.40
4 Substitute “step” in lieu of “handhold” on plan
5
6 C-14a
7 SECTION B, callout – 1½” PVC CONDUIT (TYP.) is revised to read: 1¼” PVC
8 CONDUIT (TYP.) callout (mark) 8 #9 ~ 36” (TYP.) is revised to read: callout (mark) 8 #8
9 ~ 36” (TYP.) EPOXY BAR EXPANSION JOINT DETAIL, callout (mark) W #9 (epoxy
10 coated symbol) ~ 36” (TYP.) is revised to read: callout (mark) 8 #8 (epoxy coated
11 symbol) ~ 36” (TYP.)
12
13 C-23.60
14 Note 4. For anchor post assembly details, see Standard Plan C-1b. Use detail on this
15 plan for wood breakaway post. (No block on this post)
16
17 Is revised as follows:
18
19 Note 4. For anchor post assembly details, refer to standard plan C-1b for Sim.
20 Installation, with the exception of using the wood breakaway post detail, this plan. (No
21 block on this post). Typical for both steel or wood guardrail runs.
22
23 G-24.40
24 Existing callout - CORNER BOLT (TYP.)
25 New callout - CORNER BOLT OR SHOULDER BOLT (TYP.)
26
27 J-1f
28 Note 2, reference to J-7d is revised to J-15.15
29 References to J-9a (3 instances) are revised to J-60.05
30
31 J-3b
32 Sheet 2 of 2, Plan View of Service Cabinet, Boxed Note, “SEE STANDARD PLAN J-
33 6C...” is revised to read: “SEE STANDARD PLAN J-10.10...”
34 Sheet 2 of 2, Plan View of Service Cabinet Notes, references to Std. Plan J-9a are
35 revised to J-60.05 (3 instances).
36
37 J-7c
38 Note 3, reference to J-7d is revised to J-15.15
39
40 J-16b
41 Key Note 1, reference to J-16a is revised to J-40.36
42
43 J-16c
44 Key Note 1, reference to J-16a is revised to J-40.36
45
46 J-20.10
47 Sheet 2, 2-Way Mounting Angle Detail,
48 Dimension 1.625” is revised to 1.8125”
49 Dimension 2.375” is revised to 2.1875”
50
51 J-75.40

1 Monotube Sign Structure, elevation, callout – EQUIPMENT GROUNDING
 2 CONDUCTOR ~ SIZE PER NEC. MINIMUM SIZE # 8
 3 Is revised to read; EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC
 4 minimum size # 4 AWG
 5 Detail C, callout– EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL
 6 REINFORCING BAR, SIZE PER NEC MIN. SIZE # 8
 7 Is revised to read; EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL
 8 REINFORCING BAR, SIZE PER NEC minimum size # 4 AWG
 9

10 J-75.45
 11 elevation, callout – EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC.
 12 MINIMUM SIZE # 8
 13

14 Is revised to read:
 15
 16 EQUIPMENT GROUNDING CONDUCTOR ~ SIZE PER NEC minimum size # 4 AWG
 17
 18 Detail D, callout– EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL
 19 REINFORCING BAR, SIZE PER NEC. MIN. SIZE # 8
 20

21 Is revised to read:
 22
 23 EQUIPMENT GROUNDING CONDUCTOR ~ CLAMP TO STEEL REINFORCING BAR,
 24 SIZE PER NEC minimum size # 4 AWG
 25

26 K-80.30
 27 In the NARROW BASE, END view, the reference to Std. Plan C-8e is revised to Std.
 28 Plan K-80.35
 29

30 The following are the Standard Plan numbers applicable at the time this project was
 31 advertised. The date shown with each plan number is the publication approval date shown
 32 in the lower right-hand corner of that plan. Standard Plans showing different dates shall not
 33 be used in this contract.
 34

A-10.10-00.....8/07/07	A-30.35-00.....10/12/07	A-50.20-01.....9/22/09
A-10.20-00.....10/05/07	A-40.00-00.....8/11/09	A-50.30-00.....11/17/08
A-10.30-00.....10/05/07	A-40.10- 02.....6/2/11	A-50.40-00.....11/17/08
A-20.10-00.....8/31/07	A-40.15-00.....8/11/09	A-60.10-01.....10/14/09
A-30.10-00.....11/08/07	A-40.20-00.....9/20/07	A-60.20- 02.....6/2/11
A-30.15-00.....11/08/07	A-40.50- 01.....6/2/11	A-60.30-00.....11/08/07
A-30.30-01.....6/16/11	A-50.10-00.....11/17/08	A-60.40-00.....8/31/07
B-5.20-01.....6/16/11	B-30.50-00.....6/01/06	B-75.20-01.....6/10/08
B-5.40-01.....6/16/11	B-30.70-02.....6/16/11	B-75.50-01.....6/10/08
B-5.60-01.....6/16/11	B-30.80-00.....6/08/06	B-75.60-00.....6/08/06
B-10.20-00.....6/01/06	B-30.90-01.....9/20/07	B-80.20-00.....6/08/06
B-10.40-00.....6/01/06	B-35.20-00.....6/08/06	B-80.40-00.....6/01/06
B-10.60-00.....6/08/06	B-35.40-00.....6/08/06	B-82.20-00.....6/01/06
B-15.20-00.....6/01/06	B-40.20-00.....6/01/06	B-85.10-01.....6/10/08

B-15.40-00.....6/01/06	B-40.40-01.....6/16/10	B-85.20-00.....6/01/06
B-15.60-00.....6/01/06	B-45.20-00.....6/01/06	B-85.30-00.....6/01/06
B-20.20-01.....11/21/06	B-45.40-00.....6/01/06	B-85.40-00.....6/08/06
B-20.40-02.....6/10/08	B-50.20-00.....6/01/06	B-85.50-01.....6/10/08
B-20.60-02.....6/10/08	B-55.20-00.....6/01/06	B-90.10-00.....6/08/06
B-25.20-00.....6/08/06	B-60.20-00.....6/08/06	B-90.20-00.....6/08/06
B-25.60-00.....6/01/06	B-60.40-00.....6/01/06	B-90.30-00.....6/08/06
B-30.10-00.....6/08/06	B-65.20-00.....6/01/06	B-90.40-00.....6/08/06
B-30.20-01.....11/21/06	B-65.40-00.....6/01/06	B-90.50-00.....6/08/06
B-30.30-00.....6/01/06	B-70.20-00.....6/01/06	B-95.20-01.....2/03/09
B-30.40-00.....6/01/06	B-70.60-00.....6/01/06	B-95.40-00.....6/08/06

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C-1.....6/16/11	C-6.....5/30/97	C-16b.....6/3/10
C-1a.....10/14/09	C-6a.....10/14/09	C-20.14-01.....10/14/09
C-1b.....6/16/11	C-6c.....1/06/00	C-20.15-00.....10/14/09
C-1c.....5/30/97	C-6d.....5/30/97	C-20.18-00.....10/14/09
C-1d.....10/31/03	C-6f.....7/25/97	C-20.19-00.....10/14/09
C-2.....1/06/00	C-7.....6/16/11	C-20.40-02.....6/16/11
C-2a.....6/21/06	C-7a.....6/16/11	C-20.42-02.....6/16/11
C-2b.....6/21/06	C-8.....2/10/09	C-20.45.00.....6/16/11
C-2c.....6/21/06	C-8a.....7/25/97	C-22.14-02.....6/16/11
C-2d.....6/21/06	C-8b.....6/27/11	C-22.16-02.....6/16/11
C-2e.....6/21/06	C-8e.....2/21/07	C-22.40-02.....6/16/10
C-2f.....3/14/97	C-8f.....6/30/04	C-22.45.00.....6/16/11
C-2g.....7/27/01	C-10.....6/3/10	C-23.60-01.....10/14/09
C-2h.....3/28/97	C-13.....7/3/08	C-25.18-02.....6/16/11
C-2i.....3/28/97	C-13a.....7/3/08	C-25.20-04.....10/14/09
C-2j.....6/12/98	C-13b.....7/3/08	C-25.22-03.....10/14/09
C-2k.....7/27/01	C-13c.....7/3/08	C-25.26-01.....10/14/09
C-2n.....7/27/01	C-14a.....7/3/08	C-25.80-01.....7/3/08
C-2o.....7/13/01	C-14b.....7/26/02	C-28.40-01.....6/16/11
C-2p.....10/31/03	C-14c.....7/3/08	C-40.14-01.....6/3/10
C-3.....6/27/11	C-14d.....7/3/08	C-40.16-01.....6/3/10
C-3a.....10/04/05	C-14e.....7/3/08	C-40.18-01.....10/14/09
C-3b.....6/27/11	C-14h.....2/10/09	C-85.14-00.....6/16/11
C-3c.....6/21/06	C-14i.....2/10/09	C-85.15-00.....6/16/11
C-4b.....6/08/06	C-14j.....12/02/03	C-85.16-00.....6/16/11
C-4b.....6/08/06	C-14k.....2/10/09	C-85.18-00.....6/16/11
C-4e.....2/20/03	C-15a.....7/3/08	C-85.20-00.....6/16/11
C-4f.....6/16/11	C-15b.....7/3/08	C-90.10-00.....7/3/08
C-5.....6/16/11	C-16a.....6/3/10	

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D-2.02-00.....11/10/05	D-2.46-00.....11/10/05	D-3.15-00.....6/16/11
D-2.04-00.....11/10/05	D-2.48-00.....11/10/05	D-3.16-00.....6/16/11
D-2.06-01.....1/06/09	D-2.60-00.....11/10/05	D-3.17-00.....6/16/11
D-2.08-00.....11/10/05	D-2.62-00.....11/10/05	D-3b.....6/30/04
D-2.10-00.....11/10/05	D-2.64-01.....1/06/09	D-3c.....6/30/04
D-2.12-00.....11/10/05	D-2.66-00.....11/10/05	D-4.....12/11/98
D-2.14-00.....11/10/05	D-2.68-00.....11/10/05	D-6.....6/19/98
D-2.16-00.....11/10/05	D-2.78-00.....11/10/05	D-10.10-01.....12/02/08
D-2.18-00.....11/10/05	D-2.80-00.....11/10/05	D-10.15-01.....12/02/08
D-2.20-00.....11/10/05	D-2.82-00.....11/10/05	D-10.20-00.....7/8/08

	D-2.30-00.....11/10/05	D-2.84-00.....11/10/05	D-10.25-00.....7/8/08
	D-2.32-00.....11/10/05	D-2.86-00.....11/10/05	D-10.30-00.....7/8/08
	D-2.34-01.....1/06/09	D-2.88-00.....11/10/05	D-10.35-00.....7/8/08
	D-2.36-02.....1/06/09	D-2.92-00.....11/10/05	D-10.40-01.....12/02/08
	D-2.38-00.....11/10/05	D-3.....6/2/11	D-10.45-01.....12/02/08
	D-2.40-00.....11/10/05	D-3.10-00.....6/16/10	D-15.10-01.....12/02/08
	D-2.42-00.....11/10/05	D-2.46-00.....11/10/05	D-15.20-02.....6/2/11
	D-2.44-00.....11/10/05	D-3.11-00.....6/16/10	D-15.30-01.....12/02/08
1	E-1.....2/21/07	E-4.....8/27/03	
	E-2.....5/29/98	E-4a.....8/27/03	
2	F-10.12-02.....6/16/11	F-80.10-01.....6/3/10	F-40.14-01.....6/3/10
	F-10.16-00.....12/20/06	F-10.62-01.....9/05/07	F-40.15-01.....6/3/10
	F-10.18-00.....6/27/11	F-10.64-02.....7/3/08	F-40.16-01.....6/3/10
	F-10.40-01.....7/3/08	F-30.10-01.....6/3/10	F-45.10-00.....6/3/10
	F-10.42-00.....1/23/07	F-40.12-01.....6/3/10	
3	G-10.10-00.....9/20/07	G-24.60-01.....6/16/11	G-70.20-01.....6/27/11
	G-20.10-00.....9/20/07	G-25.10-02.....6/27/11	G-70.30-01.....6/27/11
	G-22.10-01.....7/3/08	G-30.10-01.....6/16/11	G-90.10-01.....5/11/11
	G-24.10-00.....11/08/07	G-50.10-00.....11/08/07	G-90.20-01.....6/27/11
	G-24.20-00.....11/08/07	G-60.10-01.....6/27/11	G-90.30-01.....6/2/11
	G-24.30-00.....11/08/07	G-60.20-01.....6/27/11	G-90.40-01.....10/14/09
	G-24.40-01.....12/02/08	G-60.30-01.....6/27/11	G-95.10-01.....6/2/11
	G-24.50-00.....11/08/07	G-70.10-01.....6/27/11	G-95.20-02.....6/2/11
			G-95.30-02.....6/2/11
4	H-10.10-00.....7/3/08	H-32.10-00.....9/20/07	H-70.10-00.....9/05/07
	H-10.15-00.....7/3/08	H-60.10-01.....7/3/08	H-70.20-00.....9/05/07
	H-30.10-00.....10/12/07	H-60.20-01.....7/3/08	H-70.30-01.....11/17/08
5	I-10.10-01.....8/11/09	I-30.40-00.....10/12/07	I-50.20-00.....8/31/07
	I-30.10-01.....8/11/09	I-30.50-00.....11/14/07	I-60.10-00.....8/31/07
	I-30.15-00.....8/11/09	I-40.10-00.....9/20/07	I-60.20-00.....8/31/07
	I-30.20-00.....9/20/07	I-40.20-00.....9/20/07	I-80.10-01.....8/11/09
	I-30.30-00.....9/20/07	I-50.10-00.....9/20/07	
6	J-1f.....6/23/00	J-21.20-00.....10/14/09	J-40.30-02.....5/11/11
	J-3.....8/01/97	J-22.15-00.....10/14/09	J-40.36-00.....6/3/10
	J-3b.....3/04/05	J-22.16-01.....6/3/10	J-40.37-00.....6/3/10
	J-3c.....6/24/02	J-26.10-01.....6/27/11	J-40.38-00.....6/16/11
	J-3d.....11/05/03	J-26.15-00.....6/16/10	J-50.10-00.....6/3/11
	J-7c.....6/19/98	J-28.10-01.....5/11/11	J-50.11-00.....6/3/11
	J-10.....7/18/97	J-28.22-00.....8/07/07	J-50.12-00.....6/3/11
	J-10.10-01.....5/11/11	J-28.24-00.....8/07/07	J-50.15-00.....6/3/11
	J-12.....2/10/09	J-28.26-01.....12/02/08	J-50.16-00.....6/3/11
	J-15.15-00.....6/16/10	J-28.30-02.....6/27/11	J-50.20-00.....6/3/11
	J-16b.....2/10/09	J-28.40-01.....10/14/09	J-50.25-00.....6/3/11
	J-16c.....2/10/09	J-28.42-00.....8/07/07	J-50.30-00.....6/3/11

	J-20.10-00.....10/14/09	J-28.45-01.....6/27/11	J-60.05-00.....6/16/11
	J-20.15-00.....10/14/09	J-28.50-02.....6/2/11	J-60.13-00.....6/16/10
	J-20.16-00.....10/14/09	J-28.60-01.....6/2/11	J-60.14-00.....6/16/10
	J-20.20-00.....10/14/09	J-28.70-01.....5/11/11	J-75.10-01.....5/11/11
	J-20.26-00.....10/14/09	J-29.10-00.....6/27/11	J-75.20-00.....2/10/09
	J-21.10-02.....6/27/11	J-29.15-00.....6/27/11	J-75.30-01.....5/11/11
	J-21.15-00.....10/14/09	J-29.16-00.....6/27/11	J-75.40-00.....10/14/09
	J-21.16-00.....10/14/09	J-40.10-02.....5/11/11	J-75.45-00.....10/14/09
	J-21.17-00.....10/14/09	J-40.20-02.....5/11/11	J-90.10-01.....6/27/11
			J-90.20-01.....6/27/11
1	K-10.20-01.....10/12/07	K-26.40-01.....10/12/07	K-40.60-00.....2/15/07
	K-10.40-00.....2/15/07	K-30.20-00.....2/15/07	K-40.80-00.....2/15/07
	K-20.20-01.....10/12/07	K-30.40-01.....10/12/07	K-55.20-00.....2/15/07
	K-20.40-00.....2/15/07	K-32.20-00.....2/15/07	K-60.20-02.....7/3/08
	K-20.60-00.....2/15/07	K-32.40-00.....2/15/07	K-60.40-00.....2/15/07
	K-22.20-01.....10/12/07	K-32.60-00.....2/15/07	K-70.20-00.....2/15/07
	K-24.20-00.....2/15/07	K-32.80-00.....2/15/07	K-80.10-00.....2/21/07
	K-24.40-01.....10/12/07	K-34.20-00.....2/15/07	K-80.20-00.....12/20/06
	K-24.60-00.....2/15/07	K-36.20-00.....2/15/07	K-80.30-00.....2/21/07
	K-24.80-01.....10/12/07	K-40.20-00.....2/15/07	K-80.35-00.....2/21/07
	K-26.20-00.....2/15/07	K-40.40-00.....2/15/07	K-80.37-00.....2/21/07
2	L-10.10-01.....6/16/11	L-40.10-01.....6/16/11	L-70.10-01.....5/21/08
	L-20.10-01.....6/16/11	L-40.15-01.....6/16/11	L-70.20-01.....5/21/08
	L-30.10-01.....6/16/11	L-40.20-01.....6/16/11	
3	M-1.20-02.....6/3/11	M-9.60-00.....2/10/09	M-40.10-02.....5/11/11
	M-1.40-02.....6/3/11	M-11.10-01.....1/30/07	M-40.20-00.....10/12/07
	M-1.60-02.....6/3/11	M-15.10-01.....2/06/07	M-40.30-00.....9/20/07
	M-1.80-03.....6/3/11	M-17.10-02.....7/3/08	M-40.40-00.....9/20/07
	M-2.20-02.....6/3/11	M-20.10-02.....6/3/11	M-40.50-00.....9/20/07
	M-3.10-03.....6/3/11	M-20.20-01.....1/30/07	M-40.60-00.....9/20/07
	M-3.20-02.....6/3/11	M-20.30-02.....10/14/09	M-60.10-01.....6/3/11
	M-3.30-03.....6/3/11	M-20.40-02.....6/3/11	M-60.20-02.....6/27/11
	M-3.40-03.....6/3/11	M-20.50-02.....6/3/11	M-65.10-02.....5/11/11
	M-3.50-02.....6/3/11	M-24.20-01.....5/31/06	M-80.10-01.....6/3/11
	M-5.10-02.....6/3/11	M-24.40-01.....5/31/06	M-80.20-00.....6/10/08
	M-7.50-01.....1/30/07	M-24.50-00.....6/16/11	M-80.30-00.....6/10/08
	M-9.50-01.....1/30/07	M-24.60-03.....5/11/11	
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APPENDIX 26.2 – NORTHWEST REGION SPECIAL PROVISIONS

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Section 1-01.2(2) is supplemented with the following:

(NWR ITS February 23, 2009)

bps	Bits Per Second of Serial Data
CCTV	Closed Circuit Television
CC	Camera Cabinet
CPU	Central Processing Unit
CWDM	Course Wave Division Multiplex
dB	Decibel
dBm	Decibel referenced to 1 milliwatt
DS	Data Station
DS-1	Digital Signal Level 1 (1.544 Mbits/s)
DS-3	Digital Signal Level 3 (44.736 Mbits/s)
ES	Electronic Surveillance
EPROM	Electrically Programmable Read-Only Memory
FM	Frequency Modulation
HAR	Highway Advisory Radio
HARS	Highway Advisory Radio Sign
HART	Highway Advisory Radio Transmitter
ITS	Intelligent Transportation System
Kbps	Thousands of Bits Per Second of Serial Data
LASER	Light Amplification by Stimulated Emission of Radiation
LED	Light Emitting Diode
Mbps	Millions of Bits Per Second of Serial Data
MMFO	Multimode Fiber Optics
MUX	Multiplexer
nm	Nanometer (10 ⁻⁹ meter)
OC-1	Optical Carrier Level 1 (50.84 Mbits/s)
OC-48	Optical Carrier Level 48 (2.44 Gbits/s)
OFNR	Optical Fiber Nonconductive Riser
OSP	Outside Plant
OTDR	Optical Time Domain Reflectometer
PTZ	Pan, Tilt, Zoom (for camera control)
RGB	Red, Green, Blue video signals
RMU	Rack Mounting Unit (1.75 inches)
SC&DI	Surveillance, Control and Driver Information
SMFO	Singlemode fiber optics
SONET	Synchronous Optical Network
STS-1	Synchronous Transport Signal Level 1 (electrical 50.84 Mbits/s)
T1	See DS-1
T3	See DS-3
TC	Terminal Cabinet
TMS	Traffic Management System
TSMC	Traffic Systems Management Center
TWP	Twisted Wire Pair
UPS	Uninterruptible Power Supply
VMS	Variable Message Sign
WSTA	Weather Station
ZIF	Zero-Insertion Force

Section 1-05 is supplemented with the following:

(NWR January 24, 2005)

Staging Area

Within the project limits are sites that the Contractor may wish to use as staging areas. The Contractor shall submit a Staging Plan to the Engineer for approval a minimum of 10 working days prior to use. This plan shall indicate, as a minimum, the following:

1. Secondary containment, if needed
2. Fencing required
3. Grading
4. Parking areas for Contractor's employees and agents
5. Structures
6. Temporary water pollution/erosion control measures

The area to be used shall be staked by the Contractor for approval by the Engineer.

The use of a site within the Right-of-Way is a privilege granted to the Contractor upon request. It is not a right under this contract. Ownership and control of the site shall remain with the State and the Contractor shall vacate the site within *** \$\$1\$\$ *** working days following written notice by the Engineer to vacate.

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(.....)
The Contractor shall not access the worksite from adjacent properties without approval of the Engineer. The Contractor shall submit a work plan to the Engineer for written approval a minimum of ten working days prior to accessing the project site from adjacent properties. The work plan shall be in accordance with the requirements of the work plan as specified in the Special Provision **Leaving the Paved Roadway**.

The fourth sentence of the third paragraph of Section 1-07.16(2) is revised to read:

Section 1-07.16(2) is supplemented with the following:

(NWR March 6, 2000)
Construction vehicles using a closed traffic lane shall travel only in the normal direction of traffic flow unless expressly allowed in an approved traffic control plan. Construction vehicles shall be equipped with flashing or rotating amber lights.

Work over an open lane of traffic will not be allowed, unless a plan for the protection of the traveling public from debris falling onto the traveled way is approved by the Engineer. This protection shall remain in place during construction and meet minimum vertical clearance for the highway.

Controlled Access

No special access or egress will be allowed the Contractor other than normal legal movements or as shown in the Plans.

(NWR March 18, 2002)

Roadside Restoration

The Contractor shall restore, repair or correct all portions of the roadside or adjacent landscapes that were unavoidably damaged due to the performance or installation of the specified work. Unavoidable damage shall be determined only by the Engineer.

All materials utilized shall be in accordance with Sections 9-14 and 9-15 and other applicable sections of the Standard Specifications or Special Provisions, whichever may apply.

All work shall be performed in accordance with Sections 8-02 and 8-03 and other applicable sections of the Standard Specifications.

The Contractor shall review the work with the Engineer and receive approval to proceed prior to commencing roadside restoration work.

Section 2-01.4 is supplemented with the following:

Measurement

(NWR January 3, 2011)
No unit of measurement shall apply to the lump sum price for selective clearing, grubbing, and pruning, or any combination thereof.

Plant Materials

Responsibility During Construction

Section 8-02.3(1) is supplemented with the following:

(NWR June 5, 2000)
For all planting areas, the Contractor shall perform work in a manner that minimizes displacement and compaction of the existing soil. Work will be stopped if, in the opinion of the Engineer, construction method, soil moisture content or other condition will result in displacement of the existing soil horizon (such as ruts over 3 inches deep), or compaction of the soil. The Contractor will not be allowed to resume work until conditions improve or an alternate method of construction is approved by the Engineer.

Roadside Work Plan

Section 8-02.3(2) is supplemented with the following:

(NWR January 17, 2006)
The Contractor shall include the additional following items in a separate section of the Roadside Work Plan:

- 1. Order and timing of work.
- 2. Access routes to construction areas.
- 3. Equipment to be used to accomplish the work.
- 4. Locations of staging areas.
- 5. Special techniques to minimize soil displacement and compaction by construction activities.
- 6. Proposed timing of all construction activities relating to work outside the roadway.

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- (NWR June 5, 2000)
- 7. Contingency timing of construction if it becomes necessary to wait for proper site conditions to perform the required work.
- 8. Contingency plan for storage of plant material to wait for proper site conditions.
- 9. Supplemental measures needed for survival of plants installed outside of the normal planting period.

Section 8-20.1 is supplemented with the following:

(NWR ITS February 11, 2002)
Communication Cables And Interfaces

This work shall consist of furnishing, installing and testing all materials and equipment necessary to complete in place the communication cable and interface system and, when specified, the modification of such an existing system.

(NWR November 13, 1996)
Manufacturer's data for materials proposed for use in the contract which require approval shall be submitted in one complete package.

(NWR ITS September 26, 2005)
Approval of Material

When submitting material lists for approval, the Contractor shall identify all revisions or changes to manufacturer names, component names, and model numbers listed in these Special Provisions. The Contractor shall also include a brief justification for the revision or change.

(NWR April 19, 1995)
Pole base to light source distances (H1) for lighting standards with pre-approved plans shall be as noted in the Plans.

(NWR April 19, 1995)
Pole base to light source distances (H1) for lighting standards with pre-approved plans will be determined or verified by the Engineer at the request of the Contractor prior to fabrication.

(NWR April 19, 1995)
Pole base to light source distances (H1) for lighting standards without pre-approved plans will be furnished by the Engineer as part of the final approved shop drawings, prior to fabrication.

(NWR June 6, 1996)
If traffic signal standards, strain pole standards, or combination traffic signal and lighting standards are proposed, final verified dimensions including pole base to signal mast arm connection point, pole base to light source distances (H1), mast arm length, offset distances to mast arm mounted appurtenances, and orientations of pole mounted appurtenances will be furnished by the Engineer as part of the final approved shop drawings prior to fabrication.

Final ground and roadway cross sections at the locations of the standards shall be submitted for approval along with the shop drawings.

Rigid Metal Conduit Fittings and Appurtenances

Section 9-29.1(2) is supplemented with the following:

(August 10, 2009)
Conduit Coatings
Electroplated couplings are not allowed.

(NWR March 4, 2009)
Surface Mounting Conduit Attachment Components
Channel supports and all fastening hardware components shall be Type 304 stainless steel. Conduit clamps shall be one piece, two bolt units with lock washers.

Conduit, Innerduct, and Outerduct

(NWR July 18, 2005)
Preformed Loops
Preformed detector loops shall be factory assembled. Homeruns shall be pre-wired and shall be an integral part of the loop assembly. The loop configurations and homerun lengths shall be assembled for the specific application shown in the Plans.

All materials used to protect the wire in the preformed loop shall have properties that shall withstand the temperature and pressure of paving applications without melting or cracking.

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The loop and homerun shall be constructed using synthetic cord reinforced hydraulic flex hose. Hose for the loop and homerun shall each be one piece. The only allowable joints or splices in the hose shall be where the homeruns connect to the loops.

Hose tee connections shall be high temperature synthetic rubber. The tee shall be of proper size to attach directly to the hose to minimize glue joints. The tee shall have the same flex properties as the hose.

The number of turns in the loop shall be as shown in the Plans. Homerun wire pairs shall be twisted a minimum of two turns per foot. No wire splices shall be allowed in the preformed detector loop assembly. The direction of the twist shall be identified as CW for clockwise and CCW for counter clockwise twist. The loops shall be available to order from the manufacturer with both twist directions available.

The loop and homeruns shall be filled and sealed with a flexible sealant. The sealant, when set up, shall not soften at 180 degrees Fahrenheit, nor get brittle at minus 20 degrees Fahrenheit.

All preformed detector loops shall carry a manufacturer's warranty stating that the loops will be free from defects in materials and workmanship for a service period of ten (10) years from the date of purchase.

Fiber Optic Cable

Section 9-29.3(1) is supplemented with the following:

(NWR October 31, 2005)

Communication Cables And Interfaces

The Contractor shall provide manufacturer's certification that the submitted cable shall comply with the Rural Utilities Service (RUS) Specification 1755.900 as currently amended and with the requirements set forth in this Special Provision. Any deviations from these specifications shall be conspicuously noted in the Contractor's submittal.

Each cable shall contain the total number of optical fibers as specified in the Plans. For all cables with a strand count greater than 36, the fibers shall be placed in loose buffer tubes in groups of 12. For all other cables, the fibers shall be placed in loose buffer tubes in groups of 6.

The fiber optic cable outer jacket shall be marked with the manufacturer's name, the year of manufacture, the words OPTICAL CABLE and sequential meter marks. The markings shall be repeated every one meter. The actual length of the cable shall be within +/- 0.1% of the length marking. The marking shall be in contrasting color to the jacket. The marking shall be 2.5mm in height and shall be permanent and weatherproof.

Cable shall be of loose tube design. The tubes shall be surrounded by dry moisture blocking filling compound or tape. The tubes may be filled with dry moisture blocking powder surrounding the fibers.

The cable shall be constructed with the following components:

1. A dielectric central strength member
2. Buffer tubes containing optical fibers
3. Aramid (Kevlar) yarn
4. Outer MDPE jacket

The Contractor shall provide all materials required for the installation and splicing of the specified communications cables, power cables and associated interface devices.

The Contractor shall provide an unconditional warranty on all installed cable for a period of one (1) year.

At the request of the Engineer, the Contractor shall submit a 3-foot sample cable section to the Engineer for approval for each type of cable to be provided.

Singlemode Optical Fibers

Section 9-29.3(1)A is supplemented with the following:

(NWR ITS October 31, 2005)

Communication Cables And Interfaces

Optical fiber shall meet the requirements of ITU G652 and specifically meet ITU G652.D Attributes. The fibers shall support the transmission of wavelengths for Coarse Wavelength Division Multiplexing (CWDM) as defined in ITU G694.2.

(February ITS 11, 2002)

Communication Cables And Interfaces

Multimode Optical Fibers

All multimode optical fiber cable shall be of a loose tube buffer design and of industry standard construction for underground conduit installations as well as of an all dielectric construction.

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Each optical fiber shall be fabricated from 100 K PSI glass and shall meet this specification.

The multimode fibers shall have a nominal core diameter of 62.5 microns, with no variation greater than 3 microns. The non circularity of the core surface shall be less than 6 percent. Core non circularity is defined as the difference between the longest and shortest chords each passing through the center of the core and connecting on the core/cladding interface, divided by the average core diameter. Optical fiber dimensions shall be in compliance with the methods for measuring as established in EIA-STD, 455-176.

The multimode cladding shall have a nominal outside diameter of 125 microns with no variation greater than 3 microns. Non circularity of the cladding surface shall be less than 4 percent. Cladding non circularity is defined as the difference between the longest and shortest chords, each passing through the center of the cladding and connecting points on the outer cladding surface, divided by the average diameter of the cladding surface.

The concentricity error for multimode optical fibers shall be less than 6 percent, where the error is the distance between the core and cladding centers divided by the average core diameter.

The coated multimode optical fibers shall have a nominal outside diameter of 250 microns, with no variation greater than 15 microns and a minimum coating thickness of 50 microns.

Fibers shall contain no factory splices.

The maximum attenuation of each 62.5/125 multimode fiber at the temperature range of -40°C. to +70°C. shall be no greater than 1.00 dB/km at 1310 nm nominal. The information transmission capacity (bandwidth) for each multimode optical fiber shall be 500 MHz-km. The attenuation shall be measured on a completed reel length of cable then normalized to a length of 1 km. The measurement method shall be in accordance with the manufacturer's recommended procedure.

All fibers shall be free from imperfections and inclusions that would prevent them from meeting the transmission and mechanical requirements of this specification. Anomalies shall not exceed 0.20 dB.

The maximum dispersion at 68°F. shall be 2.6 ps/nm-km over the range of 1225 to 1330 nm.

The cutoff wavelength shall be 1200 nm nominal, and shall have no variation greater than 70 microns.

Optical Performance

The optical performance shall meet the requirements of the specifications.

Contractor shall warrant that the installed cable shall provide an absolute maximum attenuation of no greater than 3.0 dB/km at 850 nm nominal and 1.0 dB at 1300 nm nominal for each 62.5/125 multimode fiber at the temperature range of -40°C. to +70°C. The attenuation of multimode fibers shall be determined by EIA-STD-455-46.

The information transmission capacity (bandwidth) of each multimode optical fiber shall be 500 MHz_km. The information capacity of each fiber shall be measured in the time domain environment and the result shall be expressed in terms of 3 dB (optical power) frequency. The method to determine the pulse distortion shall be EIA,-STD-455-51.

Electrical Conductors and Cable

Section 9-29.3(2) is supplemented with the following:

Twisted Pair (TWP) Copper Cable

Section 9-29.3(2) is supplemented with the following:

(NWR October 5, 2009)

Video Detection Cable

Coaxial cable or combination (composite/Siamese) cable for video detection shall be RG59/U with a manufacturer's rating of 600 Volts (Non UL - manufacturer's voltage rating of the insulation is acceptable). Combination cable shall be in accordance with the video detection system manufacturer's recommendations for the length of cable required.

(NWR ITS September 26, 2005)

Communication Cables And Interfaces

The twisted pair cable outer jacket shall be marked with the manufacturer's name, the year of manufacture, and sequential meter marks. The markings shall be repeated every one meter. The actual length of the

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cable shall be within +/- 0.1% of the length marking. The marking shall be in contrasting color to the jacket. The marking shall be 2.5mm in height and shall be permanent and weatherproof.

(NWR October 5, 2009)
Video Detection Cable

Coaxial cable or combination (composite/Siamese) cable for video detection shall be RG59/U with a manufacturer's rating of 600 Volts (Non UL - manufacturer's voltage rating of the insulation is acceptable). Combination cable shall be in accordance with the video detection system manufacturer's recommendations for the length of cable required.

Detector Loop Wire

Section 9-29.3(2)F is revised to read as follows:

(NWR October 5, 2009)

Detector loop wire shall use 14 AWG stranded copper conductors, and shall conform to IMSA Specification 51-7, with cross-linked polyethylene (XLPE) insulation encased in a polyethylene outer jacket (PE tube).

Twisted Pair Communications Cable

Section 9-29.3(2)I is supplemented with the following:

(NWR August 10, 2009)

Aerial Communication Cable

Aerial communication cable shall meet REA specification PE-38 and shall be 22 gauge. The number of cable pairs shall be as shown in the Plans.

Conductors, Cable

Section 9-29.3 is supplemented with the following:

(NWR ITS April 10, 2006)

Communication Cables And Interfaces
Quality Assurance

All materials described in this section shall meet or exceed the applicable provisions of the following documents:

1. CFR Title 7, Section 1755.900, RUS Specification for Filled Fiber Optic Cables
2. ANSI, C8.47-1983, American National Standard for Polyolefin-insulated Thermoplastic Jacketed Communication Cables
3. TIA/EIA-455-28-C, Method for Measuring Tensile Failure Point of Optical Waveguide Fibers
4. TIA/EIA-455-34-A, Interconnection Device Insertion Loss Test
5. TIA/EIA-455-95-A, Absolute Optical Power Test for Optical Fibers and Cables
6. EIA-598-B, Color Standard for Optical Fibers

(NWR ITS August 10, 2009)

Preterminated Patch Panel

A wiring diagram shall be supplied with each patch panel. The wiring diagram shall identify each fiber terminated in the distribution panel using the fiber optic cable labeling method as specified later in these provisions. The wiring diagram shall be placed in a plastic sheet protector next to the distribution panel.

The Contractor shall provide, install and connect preterminated patch panels as shown in the Plans. The panels shall be manufactured by ADC Telecommunications, Inc. Outside plant cable meeting ITU G652.D and G694.2 shall be utilized for the stubs on all preterminated patch panels and the Contractor shall confirm with the manufacturer that the length of each stub is sufficient for the needs at each location. All openings in the patch panels shall be plugged by the manufacturer. Connections shall be LC\UPC type and shall be terminated by the manufacturer.

1. Equipment Model Numbers (for use in cabinets):

Description	Part Numbers (Both parts are required)
12-Port Preterminated Patch Panel	ADC12LCUXXMCD00, and FL2-ACC0071
24-Port Preterminated Patch Panel	ADC24LCUXXMCD00, and FL2-ACC0072

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48-Port Preterminated Patch Panel	FL2-T2804JXXX-CD00, and FL2-ACC0072
72-Port Preterminated Patch Panel	ADC72LCUXXXMCC00, and FL2-ACC0074
96-Port Preterminated Patch Panel	ADC96LCUXXXMCC00, and FL2-ACC0075

Equipment Model Numbers (For concrete or underground Hubs):

Description	Part Numbers (Both parts are required)
48-Port Preterminated Patch Panel	FL2-T2804JXXX-DB00, and FL2-ACC0072
72-Port Preterminated Patch Panel	ADC72LCUXXXMDU00, and FL2-ACC0074
96-Port Preterminated Patch Panel	ADC96LCUXXXMDU00, and FL2-ACC0075

Note: The stub length for each panel shall be determined by the Contractor for each location and shall include 50 feet of slack in the cable vault.

2. Manufacturer Information:

ADC Telecommunications, Inc.
P.O. Box 1101
Minneapolis, MN 55440-1101.
Telephone: (800) 366-3891

Fiber Management Tray

The Contractor shall provide and install one fiber management tray for each preterminated patch panel installed.

1. Equipment Model Numbers:

Description	Part Number
Fiber Management Tray	FMT-DBS000000-A00B

2. Manufacturer Information:

ADC Telecommunications, Inc.
P.O. Box 1101
Minneapolis, MN 55440-1101.
Telephone: (800) 366-3891

(NWR ITS October 16, 2006)

Fiber Optic Connector

Unless otherwise noted in the Plans, all fiber optic connectors used on this project shall meet the following:

- All shall be FC/UPC (55dB) in accordance with Telcordia 6R-326
- All shall be factory-connectorized

(NWR ITS February 11, 2002)

Fiber Optic Cable Lubricant

Fiber optic cable lubricant shall be as follows:

- Compatible with the cable jacket
- Non-combustible
- Water-based leaving little or no residue

(NWR ITS February 11, 2002)

Fiber Optic Splice Closure

All fiber optic splice closures shall be re-enterable and reusable and be designed for use on fiber optic cables in an underground, submerged environment. All splice closures shall be rated for 1310 and 1550 nanometer wavelengths. Splice closures shall contain a valve to allow pressurization of the housing.

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Communication Cables And Interfaces

(NWR ITS February 11, 2002)

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

(NWR ITS October 16, 2006)

Video, Voice, & Data Distribution And Transmission System Cabling

The Contractor shall provide and install all required equipment interconnection cabling to include T1 cables, data cables, RG-59/U video coaxial cables, power cables, ancillary cables, and connectors as recommended by the equipment vendor at the cabinet locations and at the TMC. Conductors shall be of all copper construction.

The Contractor shall provide and install fiber optic patch cords between the fiber optic distribution panels and the equipment specified herein where singlemode fiber optic cable is utilized as the transmission medium.

(NWR ITS February 23, 2009)

Video, Voice & Data Distribution Equipment

Video, voice, and data distribution equipment shall be manufactured by Optelecom, Inc.

1. Equipment Model Numbers:

Digital Video Transmitter (stand-alone)	9225DT/SM-FC
Digital Video Receiver	9221DR/SM-FC
Drop/Insert Data Modem	9522A-LD-FC
Network Interface Card	9942A
Network Interface Software	9900-NMS
Hub Chassis	9002
Cabinet Chassis	9003-2
Power Supply (for Hub Chassis)	9030B
AC/DC Adapter (for Cabinet Chassis)	9010PS
AC/DC Adapter (for 9225DT)	9014PS

2. Manufacturer Information:

Optelecom Inc.
12920 Cloverleaf Center Dr.
Germantown, MD 20874
Telephone: (301) 444-2200

(NWR ITS April 10, 2006)

Ethernet Switch

Ethernet switch and power unit shall be manufactured by GarrettCom, Inc. and installed in accordance with the Plans.

1. Equipment Model Numbers:

Magnum mP62
Managed Hardened Switch
PSX-A Power unit for 120 VAC
Singlemode with SC fiber optic connectors (20km sgl-m SC)

2. Manufacturer:

GarrettCom, Inc.
213 Hammond Ave.
Fremont, CA 94539, USA
Tel: (510) 438-9071
Fax: (510) 438-9072

(NWR ITS February 23, 2009)

Ethernet Switch

Ethernet switches shall be manufactured by RuggedCom, Inc. and installed in each cabinet and Communication Hub as shown in the Plans.

1. Equipment Model Numbers:

Unmanaged Switch	
Rugged Switch	RMC40-HI-L2L2
Managed Switch	
8 port Rugged Switch	RS900-HI-D-L2-L2-00

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9 port Rugged Switch

RS900-HI-D-L2-L2-L2

2. Manufacturer:

RuggedCom, Inc.
64 Jardin Drive Unit #3G
Concord, Ontario, Canada L4K3P3
Tel: (905) 760-7799 Fax: (905) 760-9909
Toll Free: (888) 264-0006

Variable Message Sign (VMS)
(NWR ITS February 23, 2009)

The sign display and control cabinet shall be supplied by one of the following vendors:

Skyline Products, Inc.
2903 Delta Drive
Colorado Springs, CO 80910
Tel: (800) 759-9046, ext. 1000
Fax: (719) 392-7107
Email: trafficsystems@skylineproducts.com

Mark IV IDS Mississauga (Mark IV Industries Ltd. – Head Office)
6030 Ambler Dr.
Mississauga, Ontario, Canada L4W 2P1
Tel: (905) 624-3020
Fax: (905) 238-3141
Email: sales@fpelectronics.com

Daktronics, Inc.
331 32nd Ave,
P.O. Box 5128
Brookings, SD 57006-5128
Tel: (800) DAKTRONICS
Fax: (605) 697-4300
Email: sales@daktronics.com

Sign Display

The sign display shall be a continuous matrix of pixels, 27 pixels high and 105 pixels wide. Each pixel shall be made from a grouping of amber light emitting diodes and contain no moving parts. The matrix of pixels shall be capable of displaying a message of 3 lines of text, 18 characters long. The sign display and other associated VMS components shall permit a test message using all 2,835 pixels, running at the maximum brightness and 100 percent duty.

VMS Sign Beacon

Three flashing beacons shall be installed on top of the sign housing. The beacons shall be as specified in Section 9-29.21. The 12 inch lamps shall be LED type, amber in color and meet the applicable portions of Section 9-29.16(2)A.

The beacons shall be aluminum and consist of single section, 12 inch traffic signal heads with cadet visor, square doors, and amber display. The center beacon shall flash alternatively to the two outside beacons.

Controllers for flashing beacons shall be as specified in Section 9-29.15, with aluminum sheet metal cabinets. The sign controller shall operate the beacons as commanded by the NTCIP communications protocol.

Sign Housing

The VMS housing shall provide walk-in service access for all LED display modules, electronics, power supplies, environmental control equipment, air filters, wiring, and other internal VMS components. The internal size of the housing shall be a minimum of 75 inches high. The access doors shall be a minimum of 2 feet wide by 75 inches high.

Each access door shall be mounted to an integral frame, which bolts to the VMS housing frame using stainless steel hardware. A continuous vertical stainless steel hinge shall be used to support the door. In the closed position the door shall latch to the frame with a three-point draw-roller mechanism. The latching mechanism shall include a handle and release lever inside the VMS housing so that a person with no tools or keys cannot become trapped inside the housing. The door frame shall be flanged on all sides so that it sheds water. The door shall close around the flanged frame and shall compress against the one-piece closed-cell neoprene gasket that adheres to the door frame. Doors shall contain a stop to retain the door in the fully open (90 degree) position. The doors shall have a three-point latch and two-position stop assembly with spring loaded construction core lock capable of accepting a Best Lock Company 6-pin CX series core. The Contractor shall supply green construction

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cores. Upon contract substantial completion, the Contractor shall deliver two master keys and one core removal key to the Engineer.

The nominal external dimensions of the sign shall not exceed 25 feet in width, 8 feet in height, and 4.25 feet in depth. The VMS back and side housing walls shall be vertical. The front VMS wall shall be built at an angle of 3 degrees toward the viewing motorists. Display modules shall be parallel to the front VMS wall, so that use of the LED viewing cone is optimized. The dead load of the housing and contents shall not exceed 3750 lbs.

VMS housing exterior sheet material shall be aluminum alloy number 5052-H34, and shall have a minimum thickness of 0.125 inches. Exterior sheet seams shall be continuously welded and waterproof. VMS housing structural frame members (I-beams, C-channels, Zee-extrusions, and bar stock) shall be aluminum alloy number 6061-T6.

The minimum distance from the interior rear wall of the VMS housing to the closest display components shall be 36 inches. This free space shall be maintained across the entire interior of the sign housing, with the exception of structural members. Structural members shall be designed and positioned so as to not be an obstruction to free movement of maintenance technicians throughout the interior of the housing. Circuit boards/display components shall be protected from accidental contact by maintenance personnel.

VMS housings shall be constructed to present a clean, neat appearance, and the equipment located within shall be protected from rain, snow, dirt, and corrosion. Sign housing floors shall contain small weep holes for draining water that accumulates due to condensation. Weep holes shall be fabricated in a manner which prevents the entrance of insects.

The front of the LED display matrix shall be completely covered with polycarbonate sheeting that is weather tight, ultraviolet (UV) light protected, non-glare, and which has a minimum thickness of 0.17 inches. To achieve maximum display contrast and legibility, the outside of the polycarbonate sign face shall be fully covered with a mask, which is formed from aluminum sheeting. The mask shall have a minimum thickness of 0.09 inches and shall contain a circular opening for each pixel. The openings shall not hinder the 15° LED viewing angle. All exposed metal on the VMS front face, which is visible to viewing motorists, shall be coated with black Kynar 500 resin or an equivalent oven-fired fluoropolymer-based coating having a minimum outdoor service life of 20 years. This shall include the aluminum face mask, the aluminum border outside the LED display matrix, and all the mounting and assembly hardware.

The VMS housing shall include a minimum of two (2) NEMA 20-R, 120 VAC duplex electrical outlets, with ground-fault circuit interrupters. One duplex outlet shall be located at each end of the inside of the VMS housing.

The VMS housing shall contain one (1) 4 foot, 40-watt fluorescent lamp for every 5 feet of VMS housing length. Lamps shall be evenly spaced across the inside roof of the VMS housing, so they can provide uniform light distribution for night time maintenance purposes. Fluorescent light assemblies shall be covered with a protective wire cage. Fluorescent light ballasts shall be rated for operation at 0°F. The fluorescent light circuit shall be controlled by a manual timer switch having an adjustable on time of two (2) hours.

All VMS equipment, components, modular assemblies and other materials located within the VMS housing shall be removable, transportable, and capable of being installed by a single technician utilizing a one-person aerial lift truck. VMS structural members are not included in this requirement.

Ribbon cable shall be protected at all points of physical contact where it touches metallic frameworks. Either the ribbon cable or the frame, or both, shall be wrapped with a protective covering where the cable touches the framework, to prevent cable insulation rub-through from road induced vibration in the sign framework.

The interior VMS environment shall be monitored and controlled by the sign controller. Environmental control shall be designed to maintain the internal VMS temperature at or below +140°F when the outdoor ambient temperature is at or below +115°F. The VMS environmental control system shall consist of four primary subsystems as follows:

Internal Temperature Sensors - The VMS shall contain two internally-mounted temperature sensors which are equipped with external thermocouples and which the sign controller continuously monitors. This temperature information shall be used by the sign controller to determine when to activate and deactivate the environmental control systems described herein. Sensors shall be located on opposite ends of the upper 1/3 of the LED display matrix, and their external thermocouples shall be attached to and make contact with an LED pixel circuit board.

The thermocouple and LED board shall be easily detached, in the event that one of the units requires removal and replacement. Sensors shall be capable of measuring temperatures from -40 to +185°F. The sign controller shall automatically shut down the LED display whenever one or both sensors indicate that LED board temperature has exceeded +140°F. The sign controller shall automatically restart the LED display whenever the suspect temperature falls below +130°F. Both shutdown and re-start temperature thresholds shall be user-programmable. Sensor temperatures and VMS shutdown/re-start events shall be reportable to the VMS Central Software.

Housing Cooling System - The VMS housing shall contain a positive pressure cooling system which circulates outside air into the VMS housing whenever LED board temperature exceeds a user-programmable threshold. This

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system shall consist of enough ventilation fans as needed to exchange the internal VMS housing air volume at a minimum rate of 3.8 times per minute. Fans shall be the ball-bearing type.

There shall be one filtered air intake fan for each intake port. Intake fans shall be located in a line across the lower rear wall of the VMS housing. Intake fans shall contain a removable filter which shall remove airborne particles measuring 5 microns in diameter and larger.

Exhaust vents shall be placed in a line across the upper rear wall of the VMS housing and shall allow air out of the cabinet.

On the VMS housing rear exterior wall, all air intake ports and exhaust vents shall be covered on their top, front, and sides by an aluminum shroud fabricated from 0.090 inch aluminum sheeting. Shrouds shall be securely fastened to the VMS housing, and all shroud-to-housing interfaces shall be thoroughly gasketed to prevent water from entering the VMS. All air filters and fans shall be removable from inside the VMS housing.

The sign controller shall initially be programmed to activate the VMS housing cooling system whenever the LED board temperature exceeds +100°F and will turn the cooling system off whenever LED board temperature falls below +95°F.

The VMS housing cooling system shall be controllable by an adjustable timer that will turn fans off after the set time has expired. The timer shall be adjustable to at least four (4) hours, and it shall be located just inside the VMS housing door, within easy reach of a maintenance technician standing outside the VMS doorway.

LED Display Cooling System - The VMS shall contain an LED display cooling system, which directs air across the LED display modules whenever LED board temperature exceeds a user-programmable threshold. This system shall be comprised of fan-forced air directed vertically across the back side of the entire LED display matrix. The air source shall consist of multiple ball-bearing fans. The sign controller shall initially be programmed to activate the LED cooling fan system whenever LED board temperature exceeds +110°F and shall deactivate the system whenever LED board temperature falls below +105°F. Cooling fans shall be located so as not to hinder removal of LED display modules and driver boards.

Front Face Panel Defog/Defrost System - The VMS shall contain a defog/defrost system which circulates warm, fan-forced air across the inside of the polycarbonate front face whenever LED board temperature falls below a user-programmable threshold. The air source shall consist of multiple ball-bearing fans that provide uniform airflow across the polycarbonate face panel.

The sign controller shall initially be programmed to activate the defog/defrost system whenever LED board temperature falls below +40°F and shall deactivate the defog/defrost system whenever LED board temperature exceeds +105°F. A 100-watt pencil-style heating element shall be mounted in front of each defog/defrost fan and shall serve to warm the air directed across the VMS face. Heating elements shall be on only when the defog/defrost fans are on.

Sign Mounting Hardware

A VMS, sign structure, foundation, and a maintenance walkway are included in the construction. The sign housing shall be provided with all necessary hardware including sign mounting beams, vertical and horizontal brackets, maintenance walkways, and all related hardware to install the VMS.

The walkway shall be level with the bottom edge of the VMS. All mounting hardware shall conform to the G series Standard Plans, the Standard Specifications and the Plans. All nuts used in the mounting hardware shall be self-locking nuts with nylon inserts. VMS's shall be attached or mounted to sign structures by means of positive connections - defined as through-bolted connections. The use of clips or clamps to accomplish the attachment or mounting of such signs and assemblies is prohibited.

The VMS housing, structural framing, face covering, and mounting members shall be designed to withstand a wind velocity of 100 mph with a 30 percent gust factor and shall otherwise comply with the latest requirements of AASHTO's Standard Specifications for *Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

**(NWR ITS September 26, 2005)
Ground-mounted VMS Field Cabinet**

The field cabinet shall contain the equipment shown in the Plans. The cabinet shall have the same external dimensions and appearance of Model 334 cabinets as specified in Chapter 12 of FHWA IP-78-16. The cabinet shall contain the main power feed from the 120/240v transformer.

1. Cabinets shall be fabricated of 0.125 inches sheet aluminum, 5052 alloy, with mill finish, in accordance with Section 9-29.13(7)D, Item number 1. Painted or anodized aluminum is not allowed.
2. Cabinet doors shall have a three-point latch and two-position stop assembly with spring-loaded construction core lock capable of accepting a Best Lock Company 6-pin CX series core. The Contractor shall supply green construction cores with two master keys and one core removal key per lock. The Contractor shall deliver the keys to the Engineer.

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3. The cabinet shall be equipped with an electric strip heater and a ventilation fan. The strip heater shall be rated at 100 watts and 120 VAC and be shielded in a manner that prevents damage to nearby electrical cables. The ventilation fan shall be mounted in the top of the cabinet, be equipped with a screened guard, and exhaust at least 10 CFM.

The fan and strip heater shall be controlled by a high-low adjustable thermostat, which can be set to ensure the cabinet interior temperature remains between 60°F and 120°F.

4. Two shatterproof fluorescent interior cabinet lights with self-starting ballast shall be furnished, one fixture mounted on the rear rack near the top and the second mounted at the top of the front rack. Door switches shall automatically turn on both lights when either door is opened.
5. The cabinet shall be provided with two 15 amp, 120 VAC duplex receptacles. One of the receptacles is for a laptop and/or tools and shall be GFCI-protected. The second receptacle is for communications equipment and shall not be GFCI-protected.
6. The cabinet shall be provided with three (3) circuit breakers. One circuit breaker shall be rated at least 20 amps and shall operate the heater, ventilation fan, receptacles, and lamps. The second circuit breaker shall be two-pole and control the power to the VMS defog/defrost heater elements. The third circuit breaker shall operate all other sign equipment. The second and third circuit breakers shall be rated in accordance with the NEC. Separate terminal strips shall be provided for each circuit breaker and an unfused terminal for the neutral side of the power supply line.
7. The cabinet shall contain one VMS sign controller as specified under **VMS Sign Controller**. The cabinet shall be provided with two serial communication ports.

One communication port shall be used to connect a laptop to the controller. The interface shall be wired as a 9-pin, EIA-232 DCE port. The port shall connect to a laptop computer using a straight-through 9-pin cable. One cable shall be supplied for each VMS installed in this contract.

The second communication port is for remote control of the sign from the central computer. The interface shall be wired as a 25-pin, EIA-232 DTE port. This port connects to a communication interface (modem) specified elsewhere in this contract. A cable shall be supplied to connect the VMS communication port to the modem port (the modem port may be a non-standard pin-out and require a custom-made cable).

A reset button shall be provided in the cabinet that, when pressed, resets the VMS controller and all other VMS electronics.
8. A pullout shelf shall be provided in the cabinet to facilitate a laptop during local testing and control of the VMS.
9. Noise and voltage spike protection shall be provided in the cabinet as stated in the Transient Current Protection section of the Contract Provisions.
10. The conductor within the cabinet and the sign shall meet the requirements of Section 9-29.24. The conductors for communication shall be a minimum of 22 gauge.

(NWR ITS September 26, 2005)

Control System

The VMS control system shall include all excavation, backfill, conduit, wiring, and all hardware associated with providing power and communication between the local control cabinet and the sign. It shall also include writing, providing, and installing all software and any needed hardware to ensure the VMS is fully compatible with and completely capable of being operated by the Contracting Agency's existing Digital VAX computer system, while requiring no additional software or software modifications to be installed in the Contracting Agency's VAX.

Circuit Boards

The manufacturer's submittal shall include a schematic diagram for each type of circuit board used in the sign display and control system. Each circuit board used in the VMS display and control system shall conform to the following:

1. The printed circuit board through-hole for each LED cathode lead shall be connected to a large copper trace pad having a minimum surface area of 0.04 square inch. The trace pads shall dissipate heat from the LEDs and shall be present on both the front and rear sides of the LED pixel board.
2. All exposed metal (except connectors) shall be protected from water and humidity exposure by a thorough application of acrylic conformal coating. Bench level repairs to individual devices, including discrete LED replacement and conformal coating repairs, shall be possible.
3. Printed circuit laminate shall be FR-4 fiberglass, having a minimum thickness of 1/16 inch. The circuit board traces shall be copper. Through-holes shall also be plated with copper.

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4. All cables attaching to circuit boards shall be held in place by locking latch connectors that firmly hold the cables in place.

Display LEDs

LEDs used in the VMS display shall be from one LED manufacturer and of one part number. LEDs shall conform to the following minimum requirements:

1. LEDs shall be un-tinted, non-diffused, high-output, solid state lamps utilizing Indium Gallium Aluminum Phosphide (InGaAlP) technology. The LED manufacturer shall be Toshiba or Hewlett-Packard.
2. The discrete LEDs size shall be T 1-3/4. LED package style shall be the through-hole flush-mount type, and all LEDs shall be soldered with the base of their lens mounted within 0.010 inches of the printed circuit board.
3. LEDs shall emit amber light, having a peak wavelength of 590 ± 5 nanometers. The half-life rating shall be 100,000 hours. Rated brightness per LED shall be a minimum of three (3) candelas.
4. LEDs shall be pre-sorted by the LED manufacturer for luminous intensity and color. LEDs used shall be obtained from a one-bin luminous intensity sort. A bin is defined such that when all LEDs from a given bin are driven with an identical forward current, the dimmest LED shall emit no less than half the luminous intensity of the brightest LED in the bin.
5. Operating temperature range shall be -22 to +185° F, and storage temperature range shall be -40 to +248° F.
6. Minimum half-power viewing angle shall be 15°. Half-power viewing angle is defined such that, at a given distance from the LED, luminous intensity measured at any point at an angle of 7.5° from the LEDs center axis shall be no less than half the luminous intensity measured directly on the LEDs center axis.
7. The discrete LED manufacturer's data sheet showing compliance with this Special Provision, and 10 samples, shall be provided with the VMS manufacturer's submittal.

LED Modules

The VMS shall be constructed with multiple display circuit boards, each of which contains no less than five (5), but no more than forty-five (45) pixels. Each pixel, which is defined as the smallest programmable portion of a display matrix, shall consist of a cluster of closely spaced discrete LEDs (strings of LEDs) and shall conform to the following requirements:

1. The distance from the center of one pixel to the center of all adjacent pixels, both horizontally and vertically, shall be 66.0 millimeters.
2. Each LED string shall be in series with its own current limiting resistor. Current limiting resistors shall be rated to limit LED string forward current to 30 milliamperes whenever a forward voltage is applied.
3. Each pixel shall contain a minimum two (2) string of LEDs. Each LED string shall contain a minimum six (6) LEDs.
4. The failure of an LED string shall not cause a change in the forward current of any other LED string, nor shall it cause the failure of any other LED string. Similarly, the failure of any LED pixel shall not cause the failure of any other pixel in the VMS.
5. Each LED pixel shall emit a minimum luminous intensity of 40 candelas when driven with a forward current of 20 milliamperes DC per LED string. An independent laboratory that utilizes equipment and procedures traceable to N.I.S.T. standards shall certify LED pixel intensity. The independent laboratory's certification report shall be provided with the VMS manufacturer's submittal. This report shall contain the laboratory name, address, and contact information. The report shall also contain a description of the test procedure and test equipment used, test personnel name(s), pixel intensity test results, date(s) the VMS manufacturer's LED pixel samples were tested, and the VMS manufacturer's name.
6. Discrete LEDs shall be mounted perpendicular to their PC boards. Any variations in discrete LED color and intensity shall be thoroughly dispersed throughout the entire display, thereby creating a uniform visual appearance of both color and intensity.
7. The sign controller shall be able to measure the forward current of each LED pixel and determine if the pixel is operating normally. This information shall be stored in a read-only NTCIP object.

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LED Output Control

The LEDs shall be driven using Pulse Width Modulation (PWM) of a nominal 30 milliampere forward current, where pulse width is used to achieve the programmed LED intensity level for a given ambient lighting condition.

The current pulse shall be modulated from a 10-millisecond period, and pulse amplitude shall not be allowed to exceed 30 milliamperes per LED string. An illustration of the PWM drive current waveforms, which are used to achieve minimum and maximum LED intensity, shall also be provided with the VMS manufacturer's submittal.

LED Intensity Control System

The VMS shall be equipped with an LED intensity control system. The control shall support both manual and automatic control. LED intensity control shall consist of three (3) photo-sensors and associated circuitry. VMS controller analysis of these ambient light measurements shall automatically determine which of sixteen pre-programmed LED intensity levels will provide the best VMS legibility for the given ambient light condition. The LED intensity control system shall not cause flickering of the LED display.

The LED intensity control system shall conform to the following minimum requirements:

1. The VMS controller shall contain a read-write NTCIP object that adjusts the maximum usable intensity threshold, the Maximum Pulse Width Modulation (MPWM). This number is a percentage of the absolute maximum possible intensity. At the time of VMS delivery, MPWM shall be set to 67%. The LED intensity control system shall be designed such that a MPWM value of 100% delivers a time-average current of 30 milliamperes, and the MPWM value of 67% delivers a time-average current of 20 milliamperes.
2. Automatic intensity control shall select one of sixteen LED intensity levels based on the sensed ambient light. The threshold points for each intensity levels shall be user programmable. LED intensity levels shall be available in 1% increments and in a range of 1% to 100% of maximum display intensity.

LED Display Driver Circuit Boards

The VMS shall contain 9x5 LED display modules, which are constructed as follows:

1. LED pixel circuit boards shall be mounted to the back of an aluminum panel to form a 9 pixel high by 5 pixel wide LED display module. The pixel board(s) shall be mounted to the aluminum panel with durable, non-corrosive fasteners, and their removal from the panel shall not require use of tools.
2. One electronic driver circuit board shall be provided for each 9 high by 5 wide (9x5) LED pixel module and shall individually control all 45 pixels on that module.
3. Failure of a 9x5 driver board shall not cause the failure of any other 9x5 LED display module.
4. The LED display shall have a minimum refresh rate of 100 frames per second. The VMS manufacturer's submittal shall provide calculations that prove that the display conforms to this requirement.
5. The aluminum module panel shall have a minimum thickness of 1.5 millimeters, and it shall contain a circular opening for each LED pixel. The openings shall be sized so they do not block any portion of the 15° LED viewing cone.
6. The front side of the aluminum module panel, which faces the viewing motorists, shall be primed and coated with flat black paint.
7. Display modules and all of their components shall be easily replaceable from inside the VMS housing. Display modules shall mount securely to a support frame located inside the sign housing using durable, non-corrosive hardware. Module removal and replacement shall be accomplished with the use of simple hand tools or no tools.
8. All display module electrical connections shall be the quick-disconnect locking connector type. Removal of a 9x5 display module from the VMS, or a pixel board or driver board from its display module, shall not require a soldering operation.

Power Supplies

The LED display matrix shall be powered by regulated switching DC power supplies that operate from 120 VAC input power and have an output of 24 volts DC or less. Power supplies shall be wired in a redundant parallel configuration that uses multiple supplies per display. The supplies shall have a "current sharing" capability, that allows them to provide equal amounts of current to their portion of the LED display. Power supplies shall be rated such that if one supply fails, the remaining supplies will be able to operate their portion of the display under full load conditions (all pixels on at maximum drive current) while in an ambient temperature of +140° F.

Power supplies shall operate within a minimum input voltage range of +90 to +135 volts AC. Power supply output at an ambient temperature of +140° F shall be no less than 65% of its room temperature (+70° F) output. Power

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supply efficiency shall be a minimum of 74%. Power supplies shall have a minimum power factor rating of 0.95. Power supplies shall be short circuit protected. Under short circuit conditions, the DC side of the power supply shall be powered down. The power supplies shall reset automatically after 5 seconds of AC power off. Power supplies shall be protected by a minimum overload allowance of 105%. Inputs to power supplies shall be fused or circuit breaker protected. A failed power supply shall not interfere with the other operating power supplies.

The VMS sign controller shall be capable of monitoring the operational status ("normal" or "failed") of each individual power supply by reading a diagnostic signal located on the supply's DC output.

A copy of the power supply manufacturer's data sheet and its UL product card shall be provided with the VMS manufacturer's submittal.

The VMS manufacturer's submittal shall contain calculations demonstrating that the power supplies are rated for the criteria in this Special Provision. These calculations shall account for power supply output de-rating at a temperature of +140° F.

Transient Current Protection

VMS and sign controller signal and power inputs shall be protected from electrical spikes and transients.

AC power for all equipment shall be protected at the load center inside the field cabinet. A parallel-connection surge suppresser, rated for a minimum surge of 10 kJ, shall be connected to the load center in a manner that protects the load center and the equipment it feeds.

AC power for control equipment, such as the field controller and modem, shall be further protected by the use of a series-connected surge suppresser capable of passing 15 Amps of current. This device shall be UL 1149 recognized.

EIA 232/485 communication ports in the sign controller shall be protected by avalanche diodes rated for 11.5 Volts at 10 Amps and 14 Volts at 70 Amps. The diodes shall be and connected between each signal line and ground.

Digital input and output lines from the VMS to the control equipment shall be protected at the control equipment by optically isolated input and output modules, or optically-isolated solid state relays. Inputs shall include, but shall not be limited to the VMS regulated power supply diagnostics and the AC power failure alarm. Outputs shall include, but shall not be limited the cooling fan and defog/defrost fan control.

VMS Sign Controller

Each VMS shall include an associated sign controller, which shall be installed in the field cabinet. The sign controller hardware and software shall support all VMS communication, control, and diagnostic features as listed herein.

Memory

Sign controllers shall have both permanent and semi-permanent memory. Permanent memory shall be EE-PROM integrated circuits and shall contain the executable sign controller software. Semi-permanent memory shall be RAM integrated circuits with a battery backup that retains the data in memory for a minimum of one year following a power failure. Semi-permanent memory shall contain the library of messages, the message display schedule and programmable operating parameters. Each message shall have the capability to be defined and stored as a three-page message.

Power Interruptions

Contents of the sign controller's memory shall be preserved by battery backup during AC power interruptions and the controller shall automatically resume operation once AC power is restored. Upon recovering from a power interruption, the sign controller shall display the message identified by the Power Recovery Message parameter. The sign controller shall report to the central computer that it has recovered from a power interruption.

(NWR ITS February 11, 2002)

Sign Controller Software

The sign controller shall cause the desired message to be displayed on the VMS. The sign shall display alphanumeric character fonts. The sign controller shall provide a default value for each NTCIP object supported.

Message Selection

The central computer or laptop computer shall cause the sign controller to implement a message selected from those stored in controller memory, or a new message entered via the communication port.

The sign controller shall incorporate CRC checks to verify MULTI strings. The sign shall not display a message unless the MessageActivationCode CRC matches the MessageCRC.

A message shall remain displayed on the sign until either a command to change the current message or a command to blank the display is received. A command to display a message shall not succeed if the activation priority is less than the run time priority of the message currently displayed.

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Data Transmission Requirements

Each sign controller shall contain two communication ports. Each communication port shall be labeled (“Local” or “Central”) and shall be set to 9600 baud at the factory. Each port shall operate independently at baud rates of 1200, 2400, 9600, and 19,200 bits per second. The user shall select the baud rate for each port via a DIP switch.

Communication

The sign controller hardware and software shall communicate with the central computer in a polled multi-drop operation. In the polled multi-drop operation, several sign controllers shall share the same communication channel, with each controller assigned a unique ID number. Controller ID numbers shall conform to the NTCIP requirements for address numbers. A sign controller shall only reply to messages labeled with its ID. In polled multi-drop mode, sign controllers never initiate communication, but merely transmit their responses to messages from the central computer.

A laptop computer connected to the sign controller’s local communication port shall have the same control and diagnostic capabilities as the central computer. However, local laptop control capability shall be limited to the VMS which is directly connected to that sign controller.

NTCIP Requirements

The sign controller software shall comply with the National Transportation Communications for ITS Protocol (NTCIP) documents and all related errata sheets published before July 1, 1999 and as referenced herein.

The sign controller software shall support the following standards:

1. NTCIP 1101, *Simple Transportation Management Framework (STMF)*, Conformance Level 1 (Simple Network Management Protocol (SNMP))
2. NTCIP 2001, *Class B Profile*. All serial ports on the device shall support communications according to these standards.
3. NTCIP 2101, *SP-PMPP/RS232 Point-to-Multi-Point Protocol (PMPP)*
4. NTCIP 2201, *NTCIP TP-Null Transport Profile Null (TP-NULL)*

The sign controller software shall implement all mandatory objects of all mandatory conformance groups as defined in NTCIP 1201, *Global Object Definitions*, and NTCIP 1203, *Object Definitions for Dynamic Message Signs*. Software shall implement the following conformance groups:

NTCIP 1203, Object Definitions for DMS

1. VMS Sign Configuration
2. MULTI Configuration
3. Default Message Control
4. Pixel Service Control
5. MULTI Error Control
6. Sign Status
7. Status Error
8. Pixel Error Status
9. Lamp Error Status
10. Fan Error Status
11. Power Status
12. Temperature Status

The software shall implement the following optional objects:

NTCIP 1203, Object Definitions for DMS

1. dmsMessageBeacon
2. dmsMessagePixelService
3. dmsCommunicationsLossMessage
4. dmsPowerLossMessage
5. dmsTimeCommLoss
6. dmsMultiOtherErrorDescription
7. dmsStatDoorOpen
8. fanFailures
9. fanTestActivation
10. lineVolts
11. tempMaxSignHousing

Objects required by these specifications shall support all values within its standardized range. The standardized range is defined by a size, range, or enumerated listing indicated in the object’s SYNTAX

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field and/or through descriptive text in the object's description field. The following list indicates the modified object requirements for these objects.

Object Name	Object ID	Minimum Requirements
Number of Fonts	numFonts	9
Maximum Characters per Font	maxFontCharacters	255
Default Background Color	defaultBackgroundColor	0
Default Foreground Color	defaultForegroundColor	9
Default Justification Line	defaultJustificationLine	2, 3, and 4
Default Justification Page	defaultJustificationPage	2, 3, and 4
Number of Permanent Msgs.	DmsNumPermanentMsg.	2
Maximum No. Changeable Msg.	DmsMaxChangeableMsg.	8
Maximum Number Volatile Msg. *	dmsMaxVolatileMsg.	8
Control Mode	dmsControlMode	2, 4, and 5

* Changeable messages in excess of the minimum requirement are considered to meet the specification for an equivalent number of Volatile messages.

The first permanent message shall be used to blank the sign display. The second permanent message shall be the diagnostic message.

Sign controller software shall implement the following tags (opening and closing where defined) of the Mark-Up Language for Transportation Information (MULTI) as defined in NTCIP 1203:

1. Flash
2. Font
3. Justification Line
4. Justification Page
5. Moving Text
6. New Line
7. New Page
8. Page Time

Documentation

Software shall be supplied with all documentation on 1.44Mb IBM-compatible diskette(s). ASCII versions of the following Management Information Base (MIB) files in Abstract Syntax Notation 1 (ASN.1) format shall be provided on CD-ROM:

1. The official MIB Module referenced by the device functionality.
2. A manufacturer-specific version of the official MIB Module with the non-standardized range indicated in the SYNTAX field. The filename shall match the official MIB Module, with the extension "spc".
3. A MIB Module of all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and the supported ranges indicated in the SYNTAX field.

Control Software

This work shall consist of furnishing Variable Message Sign (VMS) control software. The control software shall be a 32-bit application, designed to operate on Microsoft® Windows NT™, 98™, or 2000™ operating system. The control software shall provide for command and control of the following functions:

VMS Control

Software shall retrieve, display, update and download/upload the following functional parameters to the local sign controller in response to user-initiated instructions. The sign controller shall not perform pixel service tests when VMS are displaying messages. Software shall perform the following operations in conjunction with its monitoring and logging functions:

- Display a message
- Blank the current message
- Change message priority
- Pixel service, lamp and fan tests
- Set time and date in the sign controller
- Retrieve sign controller ID, type, and manufacturer

Communications

Communications between the control software and sign controller shall be NTCIP compliant, as indicated in the Special Provision for Variable Message Sign System.

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The control software shall verify all communications for errors. If a response from a sign controller contains a communication error, or if there is no response, the Control Software shall re-establish communications.

Data Collection

The control software shall retrieve errors detected, message number currently being displayed, and current message priority. Using different commands, the software shall retrieve message MULTI strings, a map of defective pixels, the time and date, the event schedule, and configuration parameters.

Message Library

The control software shall store messages and transfer messages to a sign for storage and/or display. When a user desires to send a message to a sign, the control software shall offer as choices only those messages compatible with the sign in question. The control software shall allow message names of up to 25 characters in length. If the selected name already exists, the software shall notify the user and give the option of replacing the existing message or selecting another name.

The control software shall display all character fonts supported by the Variable Message Sign System. Messages shall be displayed on the computer monitor in exactly the same format (font, text centering and justification) as on the Variable Message Sign.

Software Duplication Rights

The Department shall have the right to duplicate the Variable Message Sign Control Software as needed for use in controlling signs under its jurisdiction.

Documentation

The Contractor shall furnish five (5) copies of the Control Software user manuals to the Engineer. In addition, three (3) sets of the software, installation program, instructions and user manual shall be furnished on CD ROM or diskettes to the Engineer.

**(NWR October 4, 2004)
Traffic Data Accumulation And Ramp Metering System**

Permanent Traffic Recorder Station

Description

The work shall consist of installing a controller cabinet, induction loop detectors, foundation, Contracting Agency supplied piezometer axle sensors for permanent traffic recorder (PTR) station, and all associated equipment.

Materials

The cabinet shall be as shown in the Plans and as specified in the subsection **Transformers and Cabinets** of this specification.

Equipment inside the PTR cabinet will be provided and installed by others.

Construction Requirements

The Contractor shall notify the Engineer two weeks prior to beginning work on or near a permanent traffic recorder (PTR) station and installing piezometer axle sensor.

PTR Contact:

Travel Data Supervisor
OSC Transportation Data Office
Telephone: (360) 570-2373

The Contractor shall cut loops in accordance with ITS special provisions and details.

The Contractor shall install the piezometer in the final lift of asphalt.

The Contractor shall provide and install one covered terminal block and terminate the power cable from transformer on this terminal block.

The Contractor shall coil six feet of each 2C(SH) loop wire in the PTR cabinet for future termination. Each loop wire shall be labeled as shown on the Plans.

Section 8-20.3(1) is supplemented with the following:

**(NWR ITS October 10, 2005)
Existing System Disruption and Restoration**

The Contractor shall use every precaution to ensure that no contract work causes disruptions to the existing systems, except those disruptions that are planned and approved in advance, as defined herein.

Existing systems include, but are not limited to, the following:

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- A. All ITS field devices, such as ramp meter, data collection, and CCTV systems, within the project construction limits.
- B. Fiber optic and TWP data and video communication systems on *** \$\$1\$\$ ***.

Planned Disruptions

Contract work may require disruptions to existing systems, circuits, and equipment. The Contractor shall schedule the work and predetermine the affected system(s), extent, start time, and duration of planned disruptions. Planned disruptions shall be scheduled between the hours of 8 P.M. and 4 A.M. If traffic control is required for this work, the Contractor shall also adhere to the allowable closure hours listed in the Special Provisions. Failure of the Contractor to restore disrupted systems and equipment prior to 4 A.M will constitute an unplanned disruption, and the "Restoration Procedure" below will apply.

Requirements

Twenty-one calendar days prior to planned disruptions of any existing system, circuit, or equipment, the Contractor shall submit to the Engineer for approval a written Disruption Request. Each Disruption Request shall include the system(s) to be affected, the disruption start date and time, and the estimated duration required. The Contractor shall submit a separate, numbered Disruption Request for each planned disruption. Disruption Request approval or rejection will be returned to the Contractor in writing by the Engineer at least seven calendar days prior to the proposed start of the disruption. The Engineer may reject a requested time or duration and verbally recommend an alternate time or duration agreeable to both the Contractor and the Contracting Agency.

Restoration Procedure

Any unplanned disruptions determined by the Engineer to be caused by the actions of the Contractor or the Contractor's representative(s) shall be corrected by the Contractor at no additional cost to the Contracting Agency.

Upon the occurrence of an unplanned disruption and subsequent notification by the Engineer, the Contractor shall immediately stop all other ITS work in progress, in accordance with Section 1-08.6, and shall expend all efforts to restore the disrupted system(s) or correct the problem causing the disruption. The Contractor will not be granted an extension of time for delays caused by the repair of disrupted systems. Unplanned disruptions shall result in the assessment of liquidated damages in accordance with the subsection **Liquidated Damages** of the Special Provision **PROSECUTION AND PROGRESS**.

Section 8-20.3(11) is supplemented with the following:

(NWR August 5, 1996)

Communication Cable Acceptance Testing

Communications cable acceptance testing shall be performed for each pair of conductors. Acceptance testing shall commence only after all communication cable is installed, and all splices have been completed, with the exception of the splices connecting the new cable to existing cable. If any test fails, repairs shall be made by the Contractor and the entire test series shall be repeated.

Three tests shall be performed on each cable installation. All tests shall be conducted in the presence of the Engineer. The Contractor shall provide the necessary test equipment, perform the tests, and document the results. When the tests are completed, whether successful or not, the test result documentation shall be provided to the Engineer. All tests shall be conducted on all pairs in the communication cable to each cable drop point. Seven calendar days notice shall be given by the Contractor prior to performing any of the tests.

For each arterial all testing shall be conducted from the same cable drop point.

Continuity Test:

The continuity test shall be made on each conductor as well as the cable shield. Each conductor and/or shield shall show a resistance of not more than 20 ohms per 1,000 feet of conductor. The resistance of each conductor shall be recorded.

Insulation Test:

The insulation test shall be measured on each insulated conductor with all other conductors in the cable (including cable shield) grounded. The measurement shall be made with a DC potential of not less than 60% and not more than 90% of the insulation rating for 1 minute. Insulation resistance shall exceed 5,000 megohm-miles. The insulation resistance of each conductor shall be recorded.

Frequency Response and Noise Test:

The frequency response and noise tests shall be performed on each pair of conductors. All tests shall be made using transmission test instruments designed especially for use on data circuits. Two such instruments are required; one for use at the designated testing location and the other for use at each cable drop location.

The test sets shall be subject to approval by the Engineer prior to the start of the tests.

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The first test shall measure frequency response from the test location to each cable drop. A tone of 0 dBm shall be applied to the transmitting end and the signal level shall be measured at the receiving end. The cable pair being tested shall be isolated from ground and terminated in 600 ohms at both test locations. A 10,000 ohm resistor shall terminate the same pair at all other cable drop locations. The test shall be performed at frequencies of 300, 500, 700, 1,004, 1,500, 2,300 and 3,000 Hz. The received tone shall be:

Greater than minus 16 dBm at 1,004 Hz.

2 dB gain to 8 dB loss with respect to the level at 1,004 Hz over the frequency range of 500 to 2,500 Hz.

2 dB gain to 12 dB loss with respect to the level at 1,004 Hz over the frequency ranges of 300 to 500 Hz and 2,500 to 3,000 Hz.

The second test shall measure circuit or background noise. The cable pair being tested shall be terminated the same as in the previous test. A C-message filter in the test set shall restrict the spectrum to the range normally used for voice-grade data circuits. The noise level shall be at least 13 dB below the lowest signal level measured in the first test.

All test data shall be recorded in an approved format. Cables which fail the tests shall be repaired or replaced as directed by the Engineer.

(NWR August 10, 2009)

UPS Cabinet Acceptance Testing

The UPS cabinet shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, all notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following three separate stages:

- a. Delivery and Assembly
- b. Demonstration and Documentation
- c. Performance Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

Stage 1 Delivery and Assembly

Prior to delivery of the UPS cabinet to the State Materials Laboratory, all components and equipment, including the batteries shall be fully installed in the cabinet and the cabinet operations shall be successfully tested by the Contractor's representative.

After the cabinet has been successfully tested, the batteries shall be removed from the cabinet and the cabinet and batteries shall be delivered, independently, to the State Materials Laboratory. Upon delivery to the State Materials Laboratory, the batteries shall be reinstalled in the cabinet and the cabinet shall be made fully operational by the Contractor's representative.

All components for the complete UPS system, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

The Contractor shall provide labor, equipment, and materials necessary to assemble all UPS equipment, including battery installation, and make ready for demonstration.

Stage 2 Documentation and Demonstration

Documentation

All documentation shall be furnished with the UPS equipment prior to the start of testing. The documents to be supplied shall consist of the following:

- a. A complete set of documents which shall include:
 - 1. Serial numbers when applicable.

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2. Wiring diagrams for all equipment furnished. One set per cabinet.

3. Complete operations and maintenance manuals. Two sets per cabinet.

b. A description of the functions and the capabilities of individual components and of the overall UPS system.

Demonstration

The Contractor shall provide the following:

a. A presentation on how to operate the system.

b. A complete and thorough demonstration to show that all components of the UPS system are in good condition and operating properly.

The demonstration shall be performed by the Contractor's representative in the presence of State Materials personnel

Stage 3 Unit Performance Test

The unit performance test will be conducted by State Personnel to determine if each and every UPS cabinet assembly performs correctly.

The performance test shall include the testing of the following specifications:

- Battery Discharge Rate
- Battery Recharge Rate
- Power Transfer Rate

Test results shall be within the manufacturers recommended values in order for the tests to be considered successful.

Equipment Failure or Rejection

All component or system failures shall be documented. This documentation shall provide the following information:

- a. A detailed description of the failure.
- b. The steps undertaken to correct the failure.
- c. A list of parts that were replaced, if any.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory, by the contractor and delivered to sites as designated elsewhere in this contract.

UPS Cabinet Field Testing

After installation, the Contractor shall field test the UPS system to ensure the system operates in accordance with plans, specifications and manufacturer's instructions. The test shall ensure that that all components are operational within manufacturer's tolerances. The Contractor shall provide a testing procedure to the Engineer for approval. The testing procedure shall provide for operational testing of the following:

- UPS Power Module
- Surge Suppressor
- Automatic Transfer Switch
- Generator Power Transfer Switch

The field test shall demonstrate the loss of utility power and the switch over to battery power with out interference with the normal operation of the connected traffic signal controller including conflict monitor and any other peripheral devices within the traffic controller assembly.

(NWR August 16, 2010)

Round Loops

Round loops shall be constructed in accordance with the following requirements:

- 1. Loop conductor and lead in cable shall conform to these Special Provisions.

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2. Round sawcuts shall be six feet in diameter and shall be constructed using equipment designed for cutting round loops. The equipment shall use a concave, diamond-segmented blade. The sawcuts shall be normal to the pavement surface and shall be a minimum of 0.25 inches wide. The sawcut depth shall be a minimum of 2 5/8 inches and a maximum of three inches measured at any point along the perimeter, except on bridge decks. Other methods of constructing the round sawcut, such as anchoring a router or flat blade saw, will not be allowed.
3. The bottom of the sawcut shall be smooth. No edges created by differences in sawcut depths will be allowed.
4. All sawcut corners shall be rounded to a minimum 1.5 inch radius.
5. All sawcuts shall be cleaned with a 1000 psi high pressure washer as certified by the manufacturer's label on the machine or as measured by an in line pressure gauge. Wash water and slurry shall be vacuumed out and the sawcut shall be blown dry with compressed air. Disposal of the wash water and slurry shall comply with the requirements of Section 1-07.5(3) and the Special Provision **LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC**.
6. Loops shall be installed after paving the final lift of roadway surfacing material.
7. The conductor shall be installed one turn on top of the previous turn. All turns shall be installed in a clockwise direction. The conductors shall be secured to prevent floating with 2-inch lengths of high temperature foam backer rod sized for a snug fit. The backer rod shall be spaced at 2-foot intervals around the perimeter of the sawcut and at corners.
8. Installation of the sealant shall completely encapsulate the loop conductors. A minimum of one inch of sealant shall be provided between the top of the conductors and the top of the sawcut. The top of the sealant shall be flush to 1/8 inch below the top of the sawcut.
9. Use of kerosene solvent is prohibited.

(NWR October 16, 2006)

Preformed Loops

Where indicated in the Plans, detector loops shall be preformed.

Preformed detector loops and homeruns located in bridge roadway slabs shall be supported at a depth of 1 to 1-1/2 inches below the finished grade and one inch minimum above the top layer of steel reinforcing bars. Preformed detector loops and homeruns shall be supported by metal or plastic chair supports conforming to Section 6-02.3(24)C. The loops shall be supported every 12 inches at a minimum. Loops and homeruns shall be tie wrapped and anchored so that they remain at a depth 1 to 1-1/2 inches below the finished grade and one inch minimum above the top layer of steel reinforcing bars.

Preformed detector loops and homeruns located in cement concrete pavement, outside of bridge roadway slabs, shall be supported at a depth of four to six inches below the finished grade with plastic chair supports meeting the requirements of Section 6-02.3(24)C. The loops shall be supported every 12 inches at a minimum. Loops and homeruns shall be tie wrapped and anchored with epoxy coated rebar stakes so that they remain at a depth four to six inches below the finished grade. Epoxy coated rebar stakes shall be driven a minimum of four inches into the subgrade.

Preformed detector loops and homeruns located in hot mix asphalt shall be installed after all grinding and prior to paving the final lift of asphalt.

1. Round sawcuts shall be six feet in diameter and shall be constructed using equipment designed for cutting round loops. The equipment shall use a concave, diamond-segmented blade. The sawcut shall be normal to the pavement surface and shall be a minimum of 0.1 inches wider than the preformed detector loop. The sawcut depth shall be a minimum of one inch and a maximum of two inches measured at any point along the perimeter, except on bridge decks. Other methods of constructing the round sawcut, such as anchoring a router or flat blade saw, will not be allowed.
2. The bottom of the sawcut shall be smooth. No edges created by differences in sawcut depths will be allowed.
3. All sawcut corners shall be rounded to a minimum 1.5 inch radius.
4. All sawcuts shall be cleaned with a 1000 psi high pressure washer as certified by the manufacturer's label on the machine or as measured by an in line pressure gauge. Wash water and slurry shall be vacuumed out and the sawcut shall be blown dry with compressed air. Disposal of the wash water and slurry shall comply with the requirements of Section 1-07.5(3) and the Special Provision **LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC**.

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5. The preformed detector loops shall be secured to prevent floating with 2-inch lengths of high temperature foam backer rod sized for a snug fit. The backer rod shall be spaced at 2-foot intervals around the perimeter of the sawcut and at corners.
6. Installation of the sealant shall completely encapsulate the preformed detector loops. A minimum of 1/2 inch of sealant shall be provided between the top of the preformed detector loop and the top of the sawcut. The top of the sealant shall be flush to 1/8 inch below the top of the sawcut.
7. Use of kerosene solvent is prohibited.

The loop manufacturer shall mark the wire ends clearly with start and finish.

A minimum of six inches of hose assembly and two feet of slack homerun wire with the hose removed shall be coiled in the junction box.

Each successive preformed detector loop shall be installed with the homeruns twisted in alternating directions.

(NWR October 5, 2009)
Existing Traffic Loops

The Contractor shall notify the Area Traffic Engineer through the Engineer a minimum of five working days in advance of pavement removal or grinding in areas with existing loops.

If the Engineer suspects that damage to any loop, not identified in the Plans as being replaced, may have resulted from Contractor's operations or is not operating adequately, the Engineer may order the Contractor to perform the field tests specified in Section 8 20.3(14)D. The test results shall be recorded and submitted to the Engineer. Loops that fail any of these tests shall be replaced.

Loops that fail the tests, as described above, and are replaced shall be installed in accordance with current WSDOT design standards and Standard Plans, as determined by the Engineer.

If traffic signal loops that fail the tests, as described above, are not replaced and operational within 48 hours, the Contractor shall install and maintain interim video detection until the replacement loops are operational. The type of interim video detection furnished shall be approved by the Engineer prior to installation.

(NWR February 22, 2005)

In Section 8-20.3(14)C, Items 2 and 11 and the last two sentences of Item 4 are deleted.

(NWR February 22, 2005)
Induction Loop Vehicle Detectors

In Section 8-20.3(14)C, Items 2 and 11 and the last two sentences of Item 4 are deleted.

Section 8-20.3(14)D is supplemented with the following:

(NWR October 5, 2009)
Induction Loop Tests

Test A and Test D are revised as follows:

Test A – The DC resistance between the 2 lead-in cable wires, including the loop, shall be measured by a volt ohmmeter. The resistance shall not exceed 5-ohms or lower the Q of the circuit below 5 where Q is equal to the “Inductive Impedance @ 50 kHz” divided by “Resistance”.

Test D - An inductance test shall be made to determine the inductance level of each inductance loop. The Contractor shall record the inductance level of each inductance loop installed on the project and shall furnish the findings to the Engineer. An induction level, as measured from the controller cabinet, below 50-microhenries is considered a failure.

(NWR October 5, 2009)
Preformed Loop Tests

Where preformed loops are installed under cement concrete pavement, testing of the induction loop and lead-in cable shall be done immediately prior to laying the concrete. Tests A, C and D shall be repeated after the placement of the cement concrete pavement.

(NWR April 14, 2003)
Wire Labels

At each junction box, all illumination wires, power supply wires, and communication cable shall be labeled with a PVC marking sleeve. For illumination and power supply circuits the sleeve shall bear the circuit number. For communication cable the sleeve shall be marked “Comm.”.

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(NWR March 13, 1995)

Wire Splices

All splices shall be made in the presence of the Engineer.

Section 8-20.3 is supplemented with the following:

Communication Conduit System

(NWR ITS February 11, 2002)

Submittals

Within a minimum of 30 calendar days prior to anticipated construction, the Contractor shall provide all documentation pertaining to the materials and method of execution proposed to satisfy the requirements of this section. The Engineer's approval is required prior to the committing of any materials or the commencement of any work.

The Engineer will either approve or disapprove each submitted item within 30 calendar days of submittal subject to the completeness of the Contractor's submittal. Actual elapsed time for the Engineer's review is dependent upon the completeness and appropriateness of the documentation being submitted. Any deficiencies in the Contractor's submittals shall require additional time for approval. Any delays caused by such deficiencies shall not be grounds for extension of project consideration dates. The Contractor shall anticipate review intervals and schedule submittals accordingly to ensure project progress in accordance with Section 1-08.3.

The Engineer's approval of any submitted documentation shall in no way relieve the Contractor from compliance with the safety and performance requirements as specified herein.

Submittals required by this item shall include, but not be limited to, the following:

1. A material staging plan, should the Contractor propose State owned property as a staging area.
2. Manufacturer's complete specifications for all communication system cables and, associated electronics and hardware components.
3. Manufacturer's complete specifications for twisted-pair cable splice enclosures.
4. A detailed fiber optic and twisted-pair cable installation procedure including the following:
 - a. Fiber optic cable cutting lengths reflecting the cable order and reel allocations.
 - b. Cable pulling plan which shall state the exact operational procedures to be utilized and which identifies the physical locations for equipment placement, proposed equipment setup at each location, pulling tension on all cables for each pull, staffing, and the pulling methodology for each type of cable.
 - c. Exact splice points as provided for herein.
 - d. Workforce proposed for all equipment, safety, and manual assist operations
5. Factory test data sheets for each reel of cable delivered.

(NWR ITS February 11, 2002)

Cable Installation - General

The Contractor shall determine a suitable cable installation method to ensure that all cable installation requirements shall be met in all conduit sections. All work shall be carried out in accordance and consistent with the highest standards of quality and craftsmanship in the communication industry with regard to the electrical and mechanical integrity of the connections; the finished appearance of the installation; as well as the accuracy and completeness of the documentation.

The Contractor shall make a physical survey of the project site for the purpose of establishing the exact cable routing and cutting lengths prior to the commencement of any fiber optic work or committing any fiber optic materials. Splicing is only allowed for the programmed connection of reels and as shown in the Plans to connect a lateral fiber optic cable to the mainline distribution fiber optic cable. The Contractor shall submit a cable routing plan that shows the locations of all splices. All splice locations other than those shown in the Plans must be approved by the Engineer.

All work areas shall be clean and orderly at the completion of work and at times required by the Engineer during the progress of work.

(NWR ITS October 21, 2003)

Fiber Optic Cable Installation

Fiber optic cables shall be installed in continuous lengths without intermediate splices throughout the project, except at the location(s) specified in the Plans, or as approved in writing by the Engineer.

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The Contractor shall comply with the cable manufacturer's specifications and recommended procedures including, but not limited to the following:

1. Installation.
2. Proper attachment to the cable strength elements for pulling during installation.
3. Bi-directional pulling.
4. Cable tensile limitations and the tension monitoring procedure.
5. Cable bending radius limitations.

The Contractor shall protect the loops from tangling or kinking. At no time during the length of the project shall the cable's minimum bending radius specification be violated.

To accommodate long, continuous installation lengths, bi-directional pulling of the fiber optic cable shall be permitted.

In all cable vaults, pull boxes, and at all splice locations cable slack of 50 feet shall be left by the Contractor, unless otherwise specified in the Plans. The 50 feet length of fiber optic cable shall be coiled and secured with tie wraps to racking hardware or as specified in the Plans.

Installation shall involve the placement of fiber optic cables in a specified inner duct as defined in the Plans. The Contractor shall ensure that inner ducts are secured to prevent movement during the cable installation process.

The pulling eye/sheath termination hardware on the fiber optic cables shall not be pulled over any sheave blocks.

When power equipment is used to install fiber optic cabling, the pulling speed shall not exceed 100 feet per minute. The pulling tension limitation for fiber optic cables shall not be exceeded under any circumstances.

Large diameter wheels, pulling sheaves, and cable guides shall be used to maintain the appropriate bending radius. Tension monitoring shall be accomplished using commercial dynamometers or load-cell instruments.

Patch cords placed between pad mounted cabinets shall be protected by plastic spiral wrapping or flexible plastic duct. Spiral wrap or flexible plastic duct shall cover the entire length of the patch cord(s) to within 12 inches of end. The spiral wrap shall be installed before the patch cords are pulled into the conduit(s) and be rated for use in electrical installations.

Fiber optic cable lubricant shall be used to reduce pulling tensions for the installation of each fiber optic cable.

(NWR ITS October 16, 2006)

Fiber Optic Cable Splicing

Field splices shall be located as shown in the plans. No additional splices will be allowed without the approval of the Engineer.

All fusion splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Cable preparation, closure installation and splicing shall be accomplished in accordance with accepted and approved industry standards.

Upon completion of the splicing operation, all waste material shall be deposited in suitable containers for fiber optic disposal, removed from the job site, and disposed of in an environmentally acceptable manner.

The Contractor shall use the fusion method for fiber optic splicing. Acceptable fusion splicing techniques are:

- Local Injections and Detection
- Profile Alignment System

The Contractor shall seal all cables where the cable jacket is removed. The cable shall be sealed per the cable manufacturer's recommendation with an approved blocking material.

The Contractor shall seal all buffer tubes with an approved blocking material to prevent migration of gel into splice trays.

All splices shall be contained in splice trays utilizing strain relief, such as heat shrink wraps, as recommended by the splice tray manufacturer.

(NWR ITS October 4, 2004)

Fiber Optic Splice Closure

All below ground splices shall be contained in waterproof splice closures. Splices shall utilize two half shells bolted together with stainless steel bolts and be fitted with a neoprene gasket. Selected splices shall not require a re-entry kit. Upon sealing the splice closure, the Contractor shall show that the closure maintains 10 psi of pressure for a 24-hour period.

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(NWR ITS February 11, 2002)

Fiber Optic Cable Labeling

Permanent cable labels shall be used to identify fibers and patch cords at each termination point. The cable labels shall consist of white colored heat shrink wraps with identification based on the schematic shown on the ITS detail sheets.

(NWR ITS February 11, 2002)

Cable Racking in Pull Boxes and Cable Vaults

The Contractor shall rack the cable in vertical figure eight loops, which shall permit pulling slack from the vaults without introducing twist to the cable.

Cables shall be secured in racked positions with nylon ties. Identification or warning tags shall be securely attached to the cables in at least two locations in each pull box or cable vault.

All coiled cable shall be protected to prevent damage to the cable and fibers. Racking shall include securing cables to brackets (racking hardware) that extend from the side walls of the pull box.

All racking hardware shall be stainless steel.

(NWR ITS October 16, 2006)

As-Built Records

The Contractor shall provide the Engineer with a cable route diagram for all installed fiber optic and twisted pair cables. The diagram shall show the actual cable routes and "meter marks" where each cable enters and exits pull boxes, cable vaults, junction boxes, splices and termination points. The Contractor shall record these points during cable installation. The diagram shall also include all ITS device locations as well as the location and quantity of slack cable. The cable route diagram shall be submitted to the Engineer as part of the Fiber Cable Testing documentation.

(NWR ITS April 12, 2004)

Video, Voice, & Data Distribution And Transmission Systems

The Contractor shall provide and install the following:

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Documentation

Documentation for each system element shall consist of the manufacturer's name and model number, serial number when available, materials and operating specifications, wiring schematic and parts list, owners manuals, factory service manuals, and procedures for factory testing and system acceptance testing specified elsewhere herein. The Contractor shall submit three copies of the documentation specified above prior to the installation of the cable or components described in the submittal. In addition, the Contractor shall submit three copies of an overall system wiring schematic and termination chart for the installed TMS elements (operation and maintenance manuals). All documentation for each individual element shall be neatly bound in such a way that the information is secured together and is totally legible without removing the information from the binding. This documentation shall be in addition to any other data, shop drawings, etc. required to be submitted as specified in these Special Provisions.