MEMORANDUM

DEPARTMENT OF TRANSPORTATION

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COLORADO
Department of Transportation
Region 2

Project No. STA 067A-039
Project Code: 21254
SH 67 Cripple Creek to Westcreek

DATE: March 15, 2017

TO: All Holders of Plans for Project No. STA 067A-039

SUBJECT: Revision No. 1 (to be acknowledged in all bid proposals)

Bid Proposal:
Prospective bidders not using EBS must submit their bids on the revised schedule dated March 15, 2017 or the bid will be rejected. For EBS use the Amendment posted on the CDOT web site.

Project Special Provisions:

Sheet 1a:	Revised Index.
Sheet 5a:	Reflects 101 Working Days.
Sheet 10a:	Changed working times.
Sheet 14a:	Changed planing details.
Sheet 15a:	Changed RAP percentages.
Sheet 43a:	Corrected F.A. Quantity
Sheet 50Aa:	Added Revisions of Section 105 and 608 – Detectable Warnings
Sheets 50 B-La	Added Revision of Section 406

Plan Sheets:

Sheet 1a:	Title Sheet – Updated Revision Block & Project Description.
Sheet 3a:	Modified Typical Section
Sheet 4a:	Added General Note to Typical Section Safety Edge
Sheet 5a:	General Notes – Revised notes 1, 17, 20, 21, & 23
Sheets 6a-7a:	Summary of Approximate Quantities – Revised Quantities.
Sheet 9a – 13a, 17a:	Revised Roadway Quantities
Sheet 18a – Sheet 21a	Revised Road Approach Quantities
Sheet 23a:	Revised Guardrail Quantities and Notes
Sheet 24a:	Revised Guardrail Quantities and Notes
Sheet 25a:	Revised Details
Sheet 111Aa:	Added Tabulation of Planing

It is requested that you substitute the enclosed revisions in your copy of plan documents and destroy those sheets superseded by this transmittal.

The Department will open bids for this project on March 23, 2017. A new EBS file has been posted on the web to correspond to the revised bid opening date. Bidders using EBS must use the new file.

This revision is authorized by Dan Hunt, Resident Engineer.

xc: Duran, Printing Center
Bid Plans
Business Programs
Constr. Contracts
Cost Estimating

Central Files
D. Hunt, Resident Engineer

COLORADO
DEPARTMENT OF TRANSPORTATION
PROJECT SPECIAL PROVISIONS
SH 67 CRIPPLE CREEK TO WESTCREEK

The 2011 Standard Specifications for Road and Bridge Construction controls construction of this project. The following special provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans.

PROJECT SPECIAL PROVISIONS

COMMENCEMENT AND COMPLETION OF WORK (WORKING DATE)

The Contractor shall select the date that contract time begins for this project, subject to the following conditions:

~~A. The Contractor shall notify the Engineer, in writing, at least 30 days before the proposed beginning date. If the earlier date, as stated above, follows the award date by less than 30 days, the Contractor's written notice to the Engineer shall be at least l0 days before the proposed beginning date.~~

A. The Contractor shall commence work under the Contract on or before the 15th day following Contract execution or the 30th day following the date of award, whichever comes later, unless such time for the beginning the work is changed by the Chief Engineer in the "Notice to Proceeed." The Contractor shall complete all work within 101 WORKING DAYS in accordance with the "Notice to Proceeed."

B. The date that contract time begins shall be subject to the Region Transportation Director's approval. A different date may be authorized in writing by the Chief Engineer in the "Notice to Proceed."

If materials stockpiling begins before the beginning date, contract time will not be charged for the stockpiling effort. Stockpiling of materials before the beginning date is subject to the Engineer's approval. If such approval is given, stockpiled material will be paid for in accordance with Sections l09 and 626.

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CONSTRUCTION PROJECT CODE NO. 21254

REVISION OF SECTION 108 – PROSECUTION AND PROGRESS

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.03 shall include the following:

The Contractor's progress schedule shall be a Critical Path Method schedule.

Subsection 108.08 shall include the following:

1. Contractor will be restricted to working only during daylight hours from 15 minutes before sunrise to 15 minutes after sunset according to the table found at http://aa.usno.navy.mil/data/docs/RS_OneYear.php for Denver, CO for the current year unless otherwise approved by the Engineer

~~1. Contractor will be restricted to working only during daylight hours.~~

2. During the New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day holidays, the following provisions shall apply:

    a. Work will not be permitted on Friday before a holiday weekend nor the work day before and after holidays unless approved by the Engineer. The Contractor shall cease work on the project and have all personnel and machinery off the roadway and out of the project clear zone.
    b. Work will not be permitted Friday through Sunday on SH 67 from Cripple Creek to Divide unless approved by the Engineer. The Contractor shall cease work on the project and have all personnel and machinery off the roadway and out of the project clear zone.

3. The Contractor may work on weekends or holidays if previously arranged with and approved by the Engineer.

4. The Contractor may make emergency repairs, and provide proper protection of the work and for the traveling public at any time.

REVISION OF SECTION 202 – REMOVAL OF ASPHALT MAT (PLANING)

~~All milled surfaces to be overlaid with HMA shall be covered with new asphalt within ♦ working days. All areas on this project that are not overlaid within the specified working days will be assessed a lane rental fee of ▲ per occurrence for each day or fraction thereof and any required surface repairs shall be paid for by the Contractor.~~

All planing shall be completed full width and parallel to the travel lanes before resurfacing commences unless otherwise directed by the Engineer.

All material generated by the planing operation shall become the property of the Contractor unless otherwise noted in the Contract.

Add subsection 202.091 immediately following subsection 202.09 as follows:

202.091 Equipment

Each planer shall conform to the following:

The planer shall have sufficient power, traction and stability to maintain an accurate depth of cut. The propulsion and guidance system of the planer shall be maintained in such condition that the planer may be operated to straight and true lines.

The planer shall be capable of operating with automatic grade controls (contact or non-contact) on both sides of the machine using a 30 foot averaging system or other approved grade control systems. The use of such controls shall be described in the Contractor's QCP.

The planer shall be capable of picking up the removed material in a single operation. A self-loading conveyor shall be an integral part of the planer. Windrows will not be allowed.

Subsection 202.12 shall include the following:

Macrotexture testing, macrotexture corrective actions, planers, brooms and all other work necessary to complete the item will not be measured and paid for separately, but shall be included in the work.

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REVISION OF SECTION 202 – RECLAIMED ASPHALT PAVEMENT MILLINGS

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.09 shall include the following:

The Contractor shall take possession of ~~80%~~30% of the Reclaimed Asphalt Pavement (RAP) millings removed from the existing asphalt mat on this project. CDOT will retain approximately ~~20~~70% of RAP millings from the project. All remaining RAP millings, if any, may be used in the project as allowed in the Contract or as approved by the Engineer. Otherwise, they shall become the property of the Contractor and shall be disposed at his expense outside the project limits.

Subsection 202.12 shall include the following:

Unless otherwise specified in the Contract, the disposal and hauling of the RAP millings to other locations or its use on the project or at other locations will not be measured and paid for separately, but shall be included in the work.

FORCE ACCOUNT ITEMS – DESCRIPTION

This special provision contains the Department's estimate for force account items included in the Contract. The estimated amounts marked with an asterisk will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

BASIS OF PAYMENT

Payment will be made in accordance with subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at $5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

Force Account Item	Quantity	Estimated Amount
F/A Minor Contract Revisions	F.A.	$ 150,000*
F/A Partnering	F.A.	$ 5,000
F/A Roadway Smoothness Incentive	F.A.	$ 150,000
F/A Fuel Cost Adjustment	F.A.	$ 55,000
F/A On the Job Trainee	F.A	$ 3,840
F/A Quality Incentive Payment	F.A.	$ 85,000
F/A AC Cost Adjustment	F.A.	$ 150,000
F/A Erosion Control	F.A.	$ 10,000

REVISION OF SECTIONS 105 AND 608
DETECTABLE WARNINGS

Sections 105 and 608 of the Standard Specifications is hereby revised for this project as follows:

Subsection 105.03 shall include the following:

When corrective work is required for curb ramps, the Contractor shall submit a method statement in writing outlining the work to be performed. Corrective work for curb ramps shall not be performed until written approval has been received from the Engineer. All corrective work for curb ramps shall be at the Contractor's expense.

Subsection 608.01 shall include the following:

This work includes the installation of detectable warnings on concrete curb ramps and at grade crossings as shown on the plans.

Subsection 608.02 shall include the following:

Detectable warnings on curb ramps shall be truncated domes of the dimensions shown on the plans. Domes shall be prefabricated by the manufacturer as a pattern on embeddable surface plates.

Plates shall meet all Americans with Disabilities Act (ADA) requirements for truncated domes, and when installed, shall be capable of producing the pattern of domes shown on the plans.

Plates used shall be one of the products approved for use as detectable warnings listed on CDOT's Approved Products List.

The domes and their underlying surface shall have a discernible contrast of color from the adjacent surface. The contrasting colors shall not be black and white.

Prior to the start of work, the Contractor shall submit appropriate documentation from the manufacturer verifying that the contrast has been met, along with a sample plate, to the Engineer for approval.

Subsection 608.03 shall include the following:

(g) *Detectable Warnings for curbs ramps.*

1. Plates. Prior to installation of the plates, concrete conforming to subsection 608.02 shall be installed and consolidated as a base for the plates. The concrete shall be placed to a thickness that will allow the base surface of the plates to be at the same elevation as the adjacent concrete or asphalt. The plates shall be embedded into the plastic concrete in accordance with the manufacturer's specifications.

Subsection 608.05 shall include the following:

Detectable warnings on curb ramps, plates, and all other work and materials necessary for fabrication, transport, and installation will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 307, 406 AND 702
COLD BITUMINOUS PAVEMENT (RECYCLE)

Sections 307 and 406 of the Standard Specifications are hereby revised for this project as follows:

Subsection 307.01 shall include the following:

Lime for Cold Bituminous Pavement (Recycle). This work consists of producing and furnishing lime slurry for incorporation into the Section 406 item Cold Bituminous Pavement (Recycle). The Region Materials Engineer may elect to eliminate the requirement for lime. This decision will be made after the mix design is established and submitted, and may involve the deletion of the item.

Subsection 307.02 shall include the following:

Materials for lime slurry for use in Cold Bituminous Pavement (Recycle) shall conform to the following:

Lime: The lime shall conform to the requirements of ASTM C 977 for quicklime, and shall be the product of a high-calcium limestone as defined by ASTM C 51. Certificates of material compliance for the lime shall be submitted to the Engineer. The lime will be sampled and tested in accordance with the CDOT Field Materials Manual.

Slurry: The lime slurry shall be a uniform and pumpable suspension of solids in water.

Water: Water used for the lime slurry shall conform to the requirements of subsection 712.01.

Subsection 307.04 shall include the following:

Production and transportation of the lime slurry for Cold Bituminous Pavement (Recycle) shall conform to the following:

Slurry Production Equipment: The lime slurry shall be produced with a batching tank. The batching tank shall have mechanical agitation to thoroughly mix and react the quicklime with water and to keep the slurry homogeneous and prevent settlement. The tank shall have a calibrated water meter for proper control of the amount of water. The tank shall be vented for steam to escape and shall have a thermometer to determine the temperature of the slurry. The tank shall have a manhole at the top for observation and monitoring of the slurry production process.

Slurry Production: Quicklime shall be added to the required amount of water to provide a uniform lime slurry having a "dry solids content" of not less than 30% by weight. Prior to loading of the tank truck or trailer, the lime slurry in the batch or holding tank shall be thoroughly mixed. The time of mixing shall be sufficient to assure good slaking of the quicklime. For each batch of slurry, the date and time of production, amount of both quicklime and water used, and lime solids content shall be recorded by the Contractor and reported to the Engineer.

Slurry Transport: The lime slurry shall be transported to the cold recycle operation in a tank truck or trailer having mechanical agitation to maintain a homogeneous slurry and prevent settlement. While transporting or transferring the slurry to the cold in-place recycling equipment, the slurry shall be continuously mixed.

Subsection 307.13, after the first sentence, shall include the following:

Quicklime incorporated into the Section 406 item, Cold Bituminous Pavement (Recycle), will be measured by the equivalent number of tons of Hydrated Lime, dry basis, to the nearest 0.01 ton, as calculated within this subsection.

REVISION OF SECTION 307, 406 AND 702
COLD BITUMINOUS PAVEMENT (RECYCLE)

Subsection 307.13, after the first sentence, shall include the following:

Quicklime incorporated into the Section 406 item, Cold Bituminous Pavement (Recycle), will be measured by the equivalent number of tons of Hydrated Lime, dry basis, to the nearest 0.01 ton, as calculated within this subsection.

Subsection 307.13 shall include the following:

An invoice for each load of quicklime delivered to the project shall be provided to the Engineer.

Payment for lime used in the Cold Bituminous Pavement (Recycle) operation will be full compensation for all work and materials required to complete the item, including mobilization of all processing and mixing equipment required in the paving train.

Section 406 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 406.02 and replace with the following:

406.02 The finished bituminous pavement shall be a homogeneous layer composed of in place bituminous pavement, 1.5 percent lime slurry, and asphalt recycling agent as determined by the mix design. The application rates of the additives shall be synchronized with the machine to provide uniform application.

(1) **Mix Design.** Prior to starting Cold In-place Recycling operations, the Contractor shall furnish the Engineer with a proposed mix design and target values following the procedures of CPL 5111 with the project specific modifications and requirements as outlined within this revision.

Contact the CDOT Region Materials Engineer for any cold recycle testing, preliminary field materials data, or existing pavement materials that may be available to the Contractor. The Contractor shall base the mix design on samples obtained by the Contractor in the presence of the Engineer, and shall include all elements listed in Table 406-1. The Region Materials Engineer will provide a Form #43 that sets the production targets based on the Contractor's mix design. The Contractor shall submit any proposed changes to the mix design in writing, and a new Form #43 will be provided.

If after work has begun, the mixture properties do not correlate with the plan mix design, work shall be suspended until proper corrective actions or adjustments can be made. This may include but not be limited to changing the production rates, amount or type of recycling agent, or other additives. The Contractor shall submit proposed corrective actions or adjustments in writing for approval by the Engineer. The Contractor shall allow a minimum of two working days for the Engineer to approve the changes. The Contractor shall not resume work without the approval of the Engineer.

Note that a minimum of 54 lab design gyratory specimens will be required - 9 specimens (61.0mm to 66.0mm tall) at each of three emulsion contents for both coarse and fine gradation mix designs. Each emulsion content requires six specimens for Moisture Susceptibility Testing (Lottman) and three specimens for Hveem Stability Testing. This does not include specimens needed for Raveling, Indirect Tensile and other tests required.

If required on the project per Table 406-1, for each mix design also prepare four 6" diameter Hamburg Wheel test samples for each emulsion optimum content.

REVISION OF SECTION 307, 406 AND 702
COLD BITUMINOUS PAVEMENT (RECYCLE)

If required on the project per Table 406-1, for each mix design also prepare two 6" diameter disk shape compact test specimens (130 mm to 160 mm tall) for each emulsion optimum content. Each specimen will be cut to generate 2 specimens with a height of 50 mm.

Approximately 250 pounds of additional pavement material will be required for Hamburg and Fracture Energy testing, if required.

(a) Sampling and Processing for Mix Design

The Contractor shall obtain random core samples as required by CPL 5111. If cores show significant differences in various areas within the length of the project, such as different type or thickness of layers between cores, then separate mix designs shall be performed for each of these pavement segments. The gradation shall be determined by CP 31 (dried at no greater than 40 degrees C). The Contractor's mix design shall be based on a blend of the crushed material using the medium gradation and either the fine or coarse gradations established in CPL 5111.

(b) Recycling Agent

The recycling agent shall meet the requirements of the Revision of Section 702, Recycling Agents, Asphalt Emulsion, CSS (Special).

(c) Lime Slurry

This project will require the addition of 1.5 percent Hydrated Lime for all mix designs. The Lime shall be quicklime slurry and be added in to the mix design in accordance with CPL 5111.

(d) Thermal Cracking

Indirect Tensile Testing (IDT) specification temperature shall be determined using latest FHWA LTPPBind software using the weather stations most representative to the project. The required temperature for the specification is the coldest temperature at the depth of the top of the cold recycled pavement layer in the finished pavement structure. Use 98 percent reliability. Mix design IDT temperature requirement for each project location shall be approved by the Region Materials Engineer prior to mix design testing. The Contractor shall perform Indirect Tensile Testing (IDT) as follows:

Perform IDT according to AASHTO T322 for CBP Design Specimens, with the following exceptions:

(1) Specimens using the medium gradation shall be 6 inches (150 mm) in diameter and at least 5.5 inches (115 mm) in height and compacted to air voids +/- 1 percent of design air voids at the design emulsion content. A trial specimen is suggested for this. Test specimens shall be cured at 60ºC no less than 48 hours and no more than 72 hours. Check specimen mass every 2 hours after 48-hour cure to verify compliance of no more than 0.05% change in mass in 2 hours. After curing, two specimens shall be cut from each compacted specimen to 2 inches (50 mm) in height. Perform bulk specific gravity after cutting.
(2) A minimum of two specimens at each temperature are required to be tested at the specified temperature, 10 ºC above the specified temperature, and 10 ºC below the specified temperature.
(3) The tensile strength test shall be performed on each specimen directly after the tensile creep test and at the same temperature as the creep test.
(4) The environmental chamber must be capable of maintaining a temperatures down to –40 ºC.
(5) The critical cracking temperature is defined as the intersection of the calculated pavement thermal stress curve (derived from the creep data) and the tensile strength line (the line connecting the results of the average tensile strength at the two temperatures).

(f) Mixture Fracture Energy (when required in Table 406-1)

Perform Fracture Energy according to ASTM D 7313 and as follows:

(1) Use a gyratory compactor (AASHTO T 312) to fabricate specimens 150 mm in diameter and 130 to 160 mm in height and 30 gyrations.
(2) Dry specimens to constant weight at 60° C from 48 to 72 hours.
(3) Cut two 50 mm specimens from each compacted specimen.
(4) Determine bulk specific gravity of 50 mm specimens (AASHTO T 166).
(5) Measure the fracture energy at Tc in degrees C which is the temperature determined using LTPPBind 3.1 for the single station closest to the project location for the CBP Mid Layer Depth and 98% Reliability
(6) Report the CBP mixture fracture energy according to ASTM D7313 based on the average of at least 4 replicates.

(e) Raveling – Raveling Test (Standard Test Method for Raveling Test of Cold Mixed Bituminous Emulsion Samples ASTM D7196-06) will be a requirement of this mix design.

(f) Emulsion Content Selection

The properties of the specimens at design emulsion content shall be consistent with guidelines in CPL 5111 and shall meet the properties in Table 406-1. Target emulsion content may be adjusted by the Region Materials Engineer to optimize workability and design performance.

(g) Report

The report shall contain the following minimum information: Asphalt Content of the recycled pavement, target gradation of the recycled pavement, recommended water content range as a percentage of dry recycled pavement, optimum emulsion content as a percentage of dry recycled pavement, density corresponding to optimum emulsion content, air void level, absorbed water, Hveem stability, TSR with 1.5 percent lime at recommended moisture and emulsion contents, and thermal cracking initiation temperature and percent raveling. Include the emulsion designation and weight per gallon, company name, plant location, residue content, and residue penetration.

(h) Mixture Design Criteria

The proposed mix design, conforming to CDOT Procedures, shall be submitted to the Engineer for approval, and the Contractor shall allow 14 working days for approval prior to scheduling work on the recycling operation.

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REVISION OF SECTION 307, 406 AND 702
COLD BITUMINOUS PAVEMENT (RECYCLE)

TABLE 406-1

TEST	TEST PROCEDURE	MIX DESIGN REQUIREMENTS
Asphalt Content	CPL 5120	Report for Existing RAP at design.
Sieve Analysis	CP 31	100% Passing 1.5" Sieve – Report Target Gradations in Mix design.
Max. Sp. Gr. of Mix	CP 51	Report
Hveem Stability	CPL 5106 (25°C) as modified in CPL 5111	Report
Bulk Specific Gravity	CP 44 (AASHTO T-166)	Report
Air Voids	CPL 5115 (30 Gyrations)	8%-16% - Report Mix design target
Lottman Test	CPL 5109 as modified in CPL 5111 (30 Gyrations)	60% TSR for mix design with 1.5% Lime
Indirect Tensile Test	Modified Procedure Item (d) Above	–ºC as determined for project location. See (d) above
Raveling Test	ASTM D7196-06 (10°C and 50% humidity)	2% max.
Hamburg Wheel test on Medium and Coarse gradation	CPL 5112 (test at 50□C using 6" diameter 30-gyration compacted samples cured for 48 hours at 60□C)	5,000 passes min. with rut depth less than 12.5 mm
Tc, ºC, LTPPBind 3.1 for the single station closest to the project location	Report Tc, ºC	Determine Tc for the CBP Mid Layer Depth and 98% Reliability
Fracture Energy, J/m2, ASTM D 7313, at Tc, Medium Gradation and Corresponding Optimum Emulsion Content	CBP Mixture Design Requirement For Cracking Resistance (test 6" diameter 30-gyration compacted samples cured for 48 hours at 60□C)	125 Minimum
Fracture Energy, J/m2, ASTM D 7313, at Tc, Coarse Gradation and Corresponding Optimum Emulsion Content		

Sampling, processing, testing, and any other materials, items, or labor required for the creation of the mix design and report shall not be paid for separately, but shall be included in the work. The Contractor shall supply traffic control for the sampling in accordance with Section 630 of the specifications. Traffic control for sampling will not be paid for separately, but shall be included in the work. The Contractor shall notify the Engineer a minimum of one week prior to the sampling to allow a CDOT representative to be on site for the sampling. MHT's for the sampling operation are required to be approved by the Engineer prior to use. The Contractor shall patch core holes immediately using a method approved by the Engineer.

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REVISION OF SECTION 307, 406 AND 702
COLD BITUMINOUS PAVEMENT (RECYCLE)

Delete subsection 406.05 and replace with the following:

406.05 Mixing. The Contractor shall ensure there is a representative experienced in cold bituminous recycling with solventless emulsion present on the project for the first three days of cold recycle work at a minimum and during recycling operations until an acceptable production sequence is established, or as determined by the Engineer. This individual may be a representative of the emulsion supplier, the cold recycle mixture designer, a private consultant or recycling contractor's staff as necessary to ensure for documented experience with solventless emulsion cold bituminous recycling. This individual must have past experience with cold bituminous recycle with solventless emulsion on the basis of the support of at least three projects previously constructed in the United States. Representative name, qualifications, and previous experience, shall be provided to the Engineer for approval 5 working days before the recycle work commences. Any changes to the chemistry or blend of the recycling agent or to mixture proportions beyond the allowed tolerances during production shall be disclosed by this representative and submitted in writing by the Contractor as a change in mix design.

When commencing recycling operations, the recycling agent shall be applied to the pulverized material at the initial rate as established by CDOT Form #43 from the approved mix design submitted by the Contractor. The application rate of the recycling agent shall be guided by the mix design and may be varied as required by existing pavement conditions. An allowable tolerance of plus or minus 0.2 percent of the emulsion design target rate shall be maintained at all times. The emulsion target will be documented by the Department on a Form #43 for each design that is accepted. Changes in amount of water, emulsion or other additives will be considered a change to the mix design. Changes in emulsion formulation will be considered a change in mix design.

An amount of lime slurry equivalent to a minimum of 1.5% hydrated lime, based on the weight of the dry Cold Bituminous Pavement (Recycle) shall be added to the pulverized mixture for the limits indicated on the plans. The slurry shall be added to the pulverized material by use of a metering device which is capable of accurately measuring the amount of slurry being added to within $\pm$ 0.2 percent by weight. This metering device shall be calibrated to and controlled by the weigh belt for the pulverized material being recycled. The slurry shall be added to the milled material by a spray bar located within the milling chamber of the milling equipment.

The Contractor shall:

A. Arrange for supervisory personnel of the contractor crew, testing laboratory, Contractors Quality Control representative, emulsion supplier and Engineer, to meet a minimum of two weeks prior to beginning the CBP process to discuss methods of accomplishing all phases of the work.
    1. Be prepared to discuss with the Department, the following:
        a. Provide the department with a list of all equipment to be used in the CBP process, for their approval.
        b. Names of the contractor's CBP personnel on the project.
        c. Names and experience of the contractor's representative who will perform the field QC tests for the Department's approval.
        d. Step-by-step CBP process
        e. Prepare contingency plans based on weather related issues.
        f. Compaction and establishment of target density.
        g. Field emulsion adjustments.
        h. Release to traffic considerations.

2. Provide the names of their CBP construction management team, who will act for them during the CBP portion of the project and monitor the Contractors Quality Control.
3. Provide a copy of the medium/coarse or fine gradation table as part of the Contractors furnished CBP mix design for use in directing field adjustments during production.

The Contractor may add water to the pulverized material to facilitate uniform mixing with the recycling agent. Water may be added prior to or concurrently with the recycling agent, provided that this water does not adversely affect the recycling agent. The amount of water added in production should be identified as part of the initial design rate. The exact application rate of water added will be determined and may be varied as required by existing pavement conditions. The amount of water added in the recycle process shall be documented daily and deviations of greater than plus or minus 1 percent from the initial design target shall be submitted to the Engineer.

The Contractor shall, on a daily basis, provide to the Engineer the following information:

1. Date and production day number.
2. Direction of operation, location of start and finish for the production day.
3. Start time of work and finish time of work.
4. Air temperature at start of production and every two hours thereafter.
5. Gradation of material before addition of recycling agent, note location.
6. Depth of recycling (check and record at least every two hours)
7. Record rolling pattern and maximum wet density achieved for every rolling pattern throughout the day, note locations for each rolling pattern
8. Record production of the following mid-day and end of day at a minimum:
   a. Tons of recycled asphalt pavement processed
   b. Quantity of emulsion used in process (calculate percentage)
   c. Quantity of lime used in process (calculate percentage)
   d. Quantity of additional water used in process (if any) (calculate percentage)
9. Record any challenges encountered and breakdowns of equipment.
10. Attach windrow and finished mat moisture report

The Contractor shall calibrate the equipment after mobilization to the project site and before beginning the recycling process. The Contractor shall provide certified platform scales at the calibration site. A copy of the certification shall be provided to the Engineer prior to calibration. The Department will observe the calibration and will approve if the calibration standards are met. The Contractor shall record the results of the calibration and provide it to the Engineer prior to beginning recycling operations. The calibration shall include the following items. Any changes in recycling equipment will require re-calibration.

Aggregate Weigh Belt

1. Calibrate the aggregate weight belt at 3 different speeds (lowest, medium and highest speeds of anticipated operation).
2. At least 10 tons shall be used for the aggregate tests.
3. Calibrate the aggregate feed so the masses shown on the console indicators are within 1% of the actual mass as weighed on the certified platform scales.
4. Verify the difference in the 3 runs is within 1% of each other.
5. Display must have readings showing the speed of the belt and the tons per hour of the material.

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REVISION OF SECTION 307, 406 AND 702
COLD BITUMINOUS PAVEMENT (RECYCLE)

Emulsion Metering Device

1. Introduce the emulsion into the mixer through a positive displacement metering device.
2. Equip the metering device with a ready means of varying the emulsion delivery rate.
3. Calibrate the feed at 3 different speeds using the percentage set in the approved mix design so the masses or gallons shown on the indicators are within 0.5% of the actual mass as weighed on the certified platform scales.

Lime Slurry Metering Device

1. Introduce the lime slurry into the mill head using a Mass Flow Coriolis effect type meter.
2. Equip the metering device with a ready means of varying the lime slurry delivery rate.
3. Calibrate the lime slurry feed at 3 different speeds using the percentage set in the approved mix design so the masses or gallons shown on the indicators are within 5% of the actual mass as weighed on the certified platform scales.

Delete Subsection 406.06 and replace with the following:

406.06 Spreading and Placement. Recycling and placing recycled material shall be at a rate sufficient to provide continuous operation of the paving machine. If paving operations result in being excessively behind or in excessive stopping of the paving machine, as determined by the Engineer, recycling operations shall be suspended. Recycling may resume when the Contractor can synchronize the rate of recycling with the capacity of the paving machine.

If segregation occurs during or after placement with a paving machine, the Contractor shall make changes in methods, equipment, or operations to eliminate the segregation. Segregated areas may require rework, as determined by the Engineer. Rework shall be at the expense of the Contractor.

Final longitudinal joint locations in the recycled pavement shall be offset 6 to 12 inches from the center of the pavement and from the outside edge of travel lanes. Longitudinal joints in the CBP layer shall not cross the centerline, lane line, or edge line unless approved by the Engineer. Where present, centerline crown shall be maintained at all times. Joints in unapproved locations shall reworked at the Contractor's expense.

Delete Subsection 406.07 and replace with the following:

406.07 Compaction and Finishing. After the recycled material has been spread, traffic, including the Contractor's equipment shall not be allowed on the recycled material until it starts its initial break as determined by the Engineer. However, if precipitation is imminent, compaction may proceed to seal the surface from additional moisture.

Rollers shall not be started or stopped on uncompacted recycled material. Rolling shall be accomplished so that starting and stopping will be on previously compacted cold recycled pavement or existing pavement.

Any type of rolling that results in cracking, movement, or other types of pavement distress shall be discontinued until the problem is resolved.

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COLD BITUMINOUS PAVEMENT (RECYCLE)

Initial rolling shall be performed with pneumatic tire rollers, each with 30 ton minimum weight. Initial rolling shall begin no more than 30 minutes after material placement and shall be continued until no additional displacement is observed. Final rolling to eliminate pneumatic tire marks shall be performed by steel wheel rollers. During compaction, static mode shall be used unless vibratory mode is approved by the Engineer. If vibratory mode is used, vibration shall be at low amplitudes to prevent cracking or checking of the material. Final rolling shall be completed no more than two hours after paving is completed, unless otherwise approved by the Engineer.

Subject to the above requirements, the Contractor shall determine what methods and procedures are to be used for the compaction operation to achieve the required density. The Contractor shall document these procedures on the first day of production in a Roller Pass Study. The Contractor shall record the following information and a copy of this data shall be furnished to the Engineer.

1) Type, size, amplitude, frequency, and speed of each roller.
2) Tire pressure for rubber tire rollers, and if the pass for vibratory rollers is vibratory or static.
3) Ambient and Surface temperature that rolling is being started and completed.
4) Production rates of the recycle train at time of compaction.
5) Sequence and distance from recycle train for each roller, and number of passes of each roller to obtain specified density.
6) Quality Control Testing for Density shall be at a minimum of 1 test per 1000 feet in this initial roller pass study section.

The recycled material shall be compacted to a minimum of 100 percent of the density of a laboratory specimen compacted in accordance with CP 53. The sample of material for testing shall be taken immediately prior to breakdown compaction. Samples to be used for acceptance testing shall be taken by the Contractor or his representative. An authorized representative of the CDOT shall be present during the sampling and will take immediate possession of all samples obtained. CDOT will determine the sampling method and locations of the samples. Acceptance testing will be conducted in accordance with the CDOT Field Materials Manual. For areas of retest, the initial target density will be determined by the original data established with CP 53 for the material taken immediately prior to breakdown compaction.

Contractor process control testing shall be performed on the Cold Bituminous Pavement (Recycle) at the following minimum frequencies:

Table 406-2
Schedule for Process Control Testing

Element	Frequency
In-place Density	1/2,500 square yards
Gradation	1/10,000 square yards
Hveem Stability	1/20,000 square yards

Each area shall meet the required density prior to being opened to traffic, based on CDOT Quality Assurance test results. If the area tested fails to meet the required density and must be opened to traffic to comply with working time or maximum delay time requirements, the area shall be reworked the following working day, until it attains 100 percent compaction. Unless otherwise approved by the Engineer, the Contractor shall not be allowed to proceed with additional recycling the following working day until the previous day's recycled material meets

density requirements. Rework shall include full four inch recycling. Re-rolling is not an acceptable alternative. Rework, including traffic control and all other equipment, materials, and labor necessary to complete the work, shall be at the expense of the Contractor.

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Placement of the hot mix asphalt overlay or other final surfacing shown in the plans shall not proceed before the cold recycled pavement has been allowed to cure for a minimum of ten calendar days. In addition, at unstable locations or other locations determined by the Engineer, overlay of the cold recycled surface shall not proceed until the moisture content of the recycled material is 3.0% or less, as determined by the Engineer in in accordance with CP 57.

Damage to the cold recycled pavement shall be repaired at the Contractor's expense, using a method approved by the Engineer, prior to the overlay.

Subsection 406.08 shall include the following:

The recycle train shall have an independent source of water to properly disperse emulsion in accordance with manufacturer's recommendations. This source of water shall be independent of the lime slurry. This source of water will require a positive displacement pump with a flow capacity of up to 5% that is interlocked with the weight of measurement of the pulverized material. All water sources shall be equipped with calibrated flow meters. The Contractor shall supply positive means for calibrating the weight measurement and water-metering device.

Delete Subsection 406.10.

Delete Subsection 406.11 and replace with the following:

406.11 Smoothness. The longitudinal surface smoothness of the roadway prior to and after cold recycling shall be tested by the Contractor in accordance with the Revision of Section 105 – Hot Mix Asphalt Pavement Smoothness.

Delete Subsection 406.12 and replace with the following:

METHOD OF MEASUREMENT

406.12 In-place cold recycled pavement will be measured by the square yard of paved surface actually recycled to the required depth, complete in place, and accepted.

Delete Subsection 406.13 and replace with the following:

BASIS OF PAYMENT

406.13 The accepted quantity of completed in-place recycled pavement will be paid for at the contract unit price per square yard.

Payment will be made under:

Pay Item	**Pay Unit**
Cold Bituminous Pavement (Recycle)	Square Yard

Overlaps of preceding recycling operation will not be measured and paid for separately, but shall be included in the work.

Repair of cold recycled pavement will not be paid for separately, but shall be included in the work.

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Asphalt Recycling Agent will be measured and paid for in accordance with Section 411.

Lime Slurry will be measured and paid for in accordance with Section 307.

Water will not be paid for separately, but shall be included in the work.

Contractor Process Control testing on the Cold Bituminous Pavement (Recycle) will not be paid for separately, but shall be included in the work.

Section 702 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 702.05 and replace with the following:

702.05 Recycling Agents. Asphalt recycling agents shall conform to physical and chemical requirements of Table 702-9:

Table 702-9
ASPHALT EMULSION (CSS) (SPECIAL)

Test on Emulsion	Test Method	Minimum	Maximum
Residue from distillation, %	ASTM D244[1]	63.0	
Oil distillate by distillation, %	ASTM D244[1]		1.0
Sieve Test, %	ASTM D244[1]		0.3
Penetration (TBD[2]), 25°C, dmm	ASTM D5[3]	-25%	+25%

[1] Modified ASTM D244 procedure – distillation temperature of 177°C with a 20 minute hold. The ASTM D244 vacuum distillation procedure may be substituted once the maximum oil distillate is satisfied.
[2] TBD – to be determined by the Contractor's CBP design prior to emulsion manufacture for project. Penetration range will be determined on the design requirements for the project and will be submitted to the Region Materials Engineer for approval prior to project start.
[3] Modified ASTM D5 Procedure – The Penetration test for this material will be conducted under a dry condition with no water used on the surface of the emulsion residue.