

START

ENGINEERING CHANGE NOTICE

Page 1 of 12

1. ECN ~~121852~~  
 Proj. ECN B-714-20

2. ECN Category (mark one) Supplemental <input checked="" type="checkbox"/> Direct Revision <input type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Supersedure <input type="checkbox"/> Discovery <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. G. L. Koci/KEH/TCPC/3 6-6049		4. Date 12/18/89
	5. Project Title/No./Work Order No. B714, Grout Vault Pair (218-E-16-102 to 105)	6. Bldg./Sys./Fac. No. 218-E-16-102, 103, 104, 105	7. Impact Level 2
	8. Document Number Affected (include rev. and sheet no.) See Block 12	9. Related ECN No(s). See Block 12	10. Related PO No. N/A

11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input type="checkbox"/> No (NA Blks. 11b, 11c, 11d) UNKNOWN	11b. Work Package Doc. No. UNKNOWN	11c. Complete Installation Work _____ Cog. Engineer Signature & Date	11d. Complete Restoration (Temp. ECN only) _____ Cog. Engineer Signature & Date
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12. Description of Change

a) AFFECTED ECN's  
 ECN B-714-9

b) Specification B 714-C2, Rev. 0 (V-B 714C2-003, Rev. 0)  
 Add new Section 02147 diffusion break to table of contents and Division 2. (Page 4-12)

c) Change specification sections 01300 and 01400 per the following Page 3

Cont. on Page 3

13a. Justification (mark one) Criteria Change <input checked="" type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> As-Found <input type="checkbox"/> Facilitate Const. <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input type="checkbox"/>	13b. Justification Details New Diffusion Break Ref: WHC LOI 8955536, S. R. Briggs to N. M. Hutchins. WHC LOI 8956689, S. R. Briggs to N. M. Hutchins. Chen-Northern Diffusion Break Report, November 8, 1989.
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14. Distribution (include name, MSIN, and no. of copies)	
<b>KEH DISTRIBUTION</b> Engrg Doc Cntl TCPC/5-8-D Const Doc Cntl 2910E/200E  A.E. Young 30-05 Project Files R1-28 Station 10 A3-87 L. Garza A3-90  DOE A.G. Lassila AS-18	<b>WHC DISTRIBUTION</b> S. R. Briggs (PE) R3-43 O. A. Halverson R3-09 J. R. McGee S1-54 D. E. Palmer R3-43 W. J. Powell R1-48 J. E. Vanbeek R3-27 D. P. Wodrich R1-48 Project Pages A5-18 DOE Lassila AS-18

RELEASE STAMP

**OFFICIAL RELEASE 48**  
 BY WHC  
 DATE JAN 18 1990

Station #4

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# ENGINEERING CHANGE NOTICE

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1. ECN (use no. from pg. 1)

**B-714-20**

**15. Design Verification Required**

Yes  
 No

**16. Cost Impact**

**ENGINEERING**

Additional  \$ 100,000<sup>00</sup>  
Savings  \$ \_\_\_\_\_

**CONSTRUCTION**

Additional  \$ ~~\_\_\_\_\_~~  
Savings  \$ \_\_\_\_\_

**17. Schedule Impact (days)**

Improvement  \_\_\_\_\_  
Delay  30

**18. Change Impact Review:** Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

<p>SDD/DD <input type="checkbox"/></p> <p>Functional Design Criteria <input type="checkbox"/></p> <p>Operating Specification <input type="checkbox"/></p> <p>Criticality Specification <input type="checkbox"/></p> <p>Conceptual Design Report <input type="checkbox"/></p> <p>Equipment Spec. <input type="checkbox"/></p> <p>Const. Spec. <input type="checkbox"/></p> <p>Procurement Spec. <input type="checkbox"/></p> <p>Vendor Information <input type="checkbox"/></p> <p>OM Manual <input type="checkbox"/></p> <p>FSAR/SAR <input type="checkbox"/></p> <p>Safety Equipment List <input type="checkbox"/></p> <p>Radiation Work Permit <input type="checkbox"/></p> <p>Environmental Impact Statement <input type="checkbox"/></p> <p>Environmental Report <input type="checkbox"/></p> <p>Environmental Permit <input checked="" type="checkbox"/></p>	<p>Seismic/Stress Analysis <input type="checkbox"/></p> <p>Stress/Design Report <input type="checkbox"/></p> <p>Interface Control Drawing <input type="checkbox"/></p> <p>Calibration Procedure <input type="checkbox"/></p> <p>Installation Procedure <input type="checkbox"/></p> <p>Maintenance Procedure <input type="checkbox"/></p> <p>Engineering Procedure <input type="checkbox"/></p> <p>Operating Instruction <input type="checkbox"/></p> <p>Operating Procedure <input type="checkbox"/></p> <p>Operational Safety Requirement <input type="checkbox"/></p> <p>IEFD Drawing <input type="checkbox"/></p> <p>Cell Arrangement Drawing <input type="checkbox"/></p> <p>Essential Material Specification <input type="checkbox"/></p> <p>Fac. Proc. Samp. Schedule <input type="checkbox"/></p> <p>Inspection Plan <input type="checkbox"/></p> <p>Inventory Adjustment Request <input type="checkbox"/></p>	<p>Tank Calibration Manual <input type="checkbox"/></p> <p>Health Physics Procedure <input type="checkbox"/></p> <p>Spares Multiple Unit Listing <input type="checkbox"/></p> <p>Test Procedures/Specification <input type="checkbox"/></p> <p>Component Index <input type="checkbox"/></p> <p>ASME Coded Item <input type="checkbox"/></p> <p>Human Factor Consideration <input type="checkbox"/></p> <p>Computer Software <input type="checkbox"/></p> <p>Electric Circuit Schedule <input type="checkbox"/></p> <p>ICRS Procedure <input type="checkbox"/></p> <p>Process Control Manual/Plan <input type="checkbox"/></p> <p>Process Flow Chart <input type="checkbox"/></p> <p>Purchase Requisition <input type="checkbox"/></p> <p>_____ <input type="checkbox"/></p> <p>_____ <input type="checkbox"/></p> <p>_____ <input type="checkbox"/></p>
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**19. Other Affected Documents:** (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
_____	_____	_____
_____	_____	_____
_____	_____	_____

**20. Approvals**

Signature	Date
<b>OPERATIONS AND ENGINEERING</b>	
Ops/Project Engineer <u>LR Bunge</u>	<u>1/3/90</u>
Ops/Project Engr. Mgr. <u>J E Van Breda</u>	<u>1/4/90</u>
QA <u>Jack Boncher</u>	<u>1/3/90</u>
Safety <u>Olaf Halverson</u>	<u>1/3/90</u>
Security _____	_____
Proj. Prog./Dept. Mgr. _____	_____
Def. React. Div. _____	_____
Chem. Proc. Div. _____	_____
Def. Wst. Mgmt. Div. _____	_____
Adv. React. Dev. Div. _____	_____
Proj. Dept. _____	_____
Environ. Div. _____	_____
IRM Dept. _____	_____
Facility Rep. (Ops) _____	_____
Other <u>WJ Powell</u>	<u>1/3/90</u>
<u>ERS for G. W. Hyatt; PNC</u>	<u>1/4/90</u>
<u>per Johnson</u>	_____

Signature	Date
<b>ARCHITECT-ENGINEER</b>	
PE <u>[Signature]</u>	<u>1-3-90</u>
QA <u>[Signature]</u>	<u>12-29-89</u>
Safety <u>[Signature]</u>	<u>12-29-89</u>
Design <u>[Signature]</u>	<u>12-22-89</u>
ENV <u>[Signature]</u>	<u>12-29-89</u>

**DEPARTMENT OF ENERGY**  
See C.R. B-714-6

**ADDITIONAL**

_____	_____
_____	_____
_____	_____
_____	_____

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## 1) Section 01300, 1.3 schedule of submittals

Add the following:

Diffusion Break

02147/1.2.1	Laboratory Reports	10	Before Delivery	---
02147/1.2.2	Handling Procedure	10	Before Delivery	---
02147/1.2.3	Placing Procedure	10	Before Delivery	---
02147/1.2.4	Compacting Procedure	10	Before Delivery	---
02147/1.2.5	Log of Break Placement	10	-----	7 Days after Placement

2) Section 01400, Article 1.7, Sitework  
(Affected ECN 8-714-9, Page 6)

Add the following under sitework:

Diffusion Break

## Off-Site\*

- H All mixing of aggregate with hydrated lime.
- H All asphalt coating of aggregate for diffusion break for the following areas:
  - a) Under concrete basin
  - b) Adjacent to vault/basin walls
  - c) Miscellaneous areas

## On-Site \*

- H All compaction demonstration
- H All placement of diffusion break

SECTION 02147  
DIFFUSION BREAK

PART 1 - GENERAL

1.1 REFERENCES

1.1.1 Reference Standards and Specifications: The following standards and specifications, including documents referenced therein, form part of this Section to extent designated herein.

1.1.1.1 American Society for Testing and Materials (ASTM)

- C 136-84a Standard Method for Sieve Analysis of Fine and Coarse Aggregates
- C 207-79 (1988) Standard Specification for Hydrated Lime for Masonry Purposes
- C 294-86 Standard Descriptive Nomenclature for Constituents of Natural Mineral Aggregates
- C 295-85 Standard Practice for Petrographic Examination of Aggregates for Concrete
- D 242-85 Standard Specification for Mineral Filler for Bituminous Paving Mixtures
- D 1664-80 (1985) Standard Test Method for Coating and Stripping of Bitumen-Aggregate Mixtures
- D 3381-83 Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction

1.1.1.2 Washington State Department of Transportation (WSDOT)

- M41-10-88 Standard Specification for Road, Bridge, and Municipal Construction
- M46-01-88 Materials Branch Laboratory Manual

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1.2 SUBMITTALS: Refer to Section 01300 for submittal procedures.

1.2.1 Laboratory Reports: Submit reports from independent laboratory showing following.

1.2.1.1 Proposed aggregate source will produce gravel classified as igneous or metamorphic rock in accordance with ASTM C 294. Examine aggregate in accordance with ASTM C 295.

1.2.1.2 Aggregate meets the requirements of Paragraph 2.1.1.

1.2.1.3 Liquid asphalt meeting the requirements of Paragraph 2.1.2 with submittal required for each delivered load.

1.2.1.4 Anti-stripping additive meeting the requirements of Paragraph 2.1.3.

1.2.2 Handling Procedure: Submit proposed procedure defining methods used for delivering, storing, and handling to ensure requirements of Paragraphs 1.3.1 and 3.3.1 are met.

1.2.3 Placing Procedure: Submit proposed procedure defining methods used during placing and spreading to ensure requirements of Paragraph 3.3.1 are met. Include type and size of equipment used.

1.2.4 Compacting Procedures: Submit proposed procedures for compacting, including type and size of equipment. Include separate procedures for placement under concrete basin and adjacent to walls.

1.2.5 Log for Diffusion Break Placement: Submit log delineating approximate placed location and limits of each load including lift thickness. Traceability shall be tied to each batched or trucked unit of mix as delivered to Site and noted on log.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Diffusion Break Aggregate

1.3.1.1 Construct stockpiles in accordance with WSDOT M41-10, Section 3-02.2(6).

1.3.1.2 Remove aggregate from stockpiles in accordance with WSDOT M41-10, Section 3-02.2(7).

1.3.1.3 Mix and age aggregate, 48 hours minimum, in stockpile after treatment with anti-stripping additive in accordance with Article 2.2. Treated aggregate mixtures stored over 21 days after treatment will be examined by KEH for retreatment before use in diffusion break mix.

1.3.1.4 Handling equipment shall meet the requirements of Paragraph 3.3.1.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Aggregate: Composed of crushed stone or gravel aggregates classified in ASTM C 294 as either igneous or metamorphic rocks, and meeting following requirements.

2.1.1.1 Aggregate production: In accordance with WSDOT M41-10, Section 3-01.

2.1.1.2 Grading in accordance with ASTM C 136.

a. Amounts finer than each laboratory sieve (square-openings), weight percent.

Nominal Square Opening Sieve Size	Percent
5/8 in.	100
1/2 in.	90 to 100
3/8 in.	85 to 95
No. 4	65 to 75
No. 16	36 to 42
No. 30	27 to 33
No. 50	17 to 21
No. 200	4.5 to 6.5

b. Deleterious materials: Particles of specific gravity less than 1.95, maximum 1 percent by weight.

c. Limits for fractured faces by percent weight: Minimum of 2 fractured faces on 85 percent and at least 1 fractured face on 90 percent of material retained on No. 10 and above sieves, as determined by WSDOT M46-01 Test Method No. 103.

2.1.2 Asphalt: Meeting the requirements of ASTM D 3381, Grade AR-6000.

2.1.3 Anti-Stripping Additive

2.1.3.1 Meet the requirements of WSDOT M41-10, Section 9-02.4 except percent of additive and requirement for use will be determined by KEH, based on temperature and pH modified ASTM D 1664 for each aggregate source.

2.1.3.2 Meet the requirements of ASTM D 242 for physical requirements, sampling, and testing.

2.1.3.3 Hydrated lime meeting chemical composition of ASTM C 207, Type N or S.

## 2.2 MIXES

### 2.2.1 Proportions

2.2.1.1 Size, grade, and quantity of materials, when proportioned and mixed shall produce mixture meeting following requirements.

a. Asphalt: 7.5 percent, plus or minus 0.5 percent by weight of total asphalt mixture.

b. Anti-stripping additive: 3 percent, plus or minus 0.25 percent by weight of total dry aggregate mixture. Aggregate coating after mixing and aging in stockpile and before mixing with asphalt shall be adequate to meet the requirements of subparagraph 2.2.2.4.

### 2.2.2 Mixing

2.2.2.1 Asphalt mixing plants: Meet the requirements of WSDOT M41-10, Section 5-04.3(1). Collect and reintroduce lime driven from aggregate during drying and heating in batch plant into product at mixing unit.

2.2.2.2 Remove aggregates from stockpiles to ensure minimum segregation when being moved to plant for processing into final mixture. Treat aggregates with anti-stripping additive in accordance with subparagraph 2.2.2.4 and store in accordance with subparagraph 1.3.1.3 before introduction to mixing process.

2.2.2.3 Heat aggregates to minimum of 250 F and maximum of 350 F.

2.2.2.4 Anti-stripping additive: Lime treatment to meet 95 percent minimum coverage determined by visual examination. Mix lime, water, and aggregate thoroughly in pugmill or other approved mechanical mixer with lime specified in subparagraph 2.2.1.1b and water as 5 percent, plus or minus 0.5 percent, moisture by aggregate weight.

2.2.2.5 Quantity of asphalt material shall not be reduced by quantity of anti-stripping additive.

2.2.2.6 Heat AR6000 asphalt to minimum 275 F and maximum 375 F. Heat to avoid local overheating and provide continuous supply of material to mixer.

2.2.2.7 Asphalt wet mixing time: Sufficient to produce 95 percent coated particles determined by WSDOT M46-01, Test Method No. 714.

2.2.2.8 Mix temperature: Not exceed 340 F at batch plant.

2.2.2.9 Mix temperature: Not less than 260 F at rear of laydown machine during placing.

2.2.2.10 Asphalt from each specific source or supplier shall not be blended or mixed with other asphalt sources or suppliers.

c. Bolt-on extensions over 1 foot in length on either side of paver shall have same equipment as rest of paver. Hydraulic extenders without screeds, augers, and vibration shall not be used except in irregular shaped and minor areas.

3.3.2.2 Hand placement or other approved methods of placing diffusion break shall be in manner to minimize segregation of material and ravelling of surface. Segregated rocks on surface shall be collected and discarded from surface.

### 3.4 FIELD QUALITY CONTROL

3.4.1 Verify placement and compaction of diffusion break as specified in Paragraph 3.3.2 and subparagraph 3.3.1.1.

3.4.2 Sampling and testing of aggregate and diffusion break will be performed by KEH. Rolling and compaction requirements will be controlled based on subparagraph 3.3.1.9. Patching or repair materials shall be supplied by Contractor.

3.4.3 KEH will examine equipment referenced in subparagraph 3.3.1.4 for cleanliness.

3.4.4 Samples: KEH will collect minimum 1 representative aggregate sample from stockpiled material before each day or partial days production of diffusion break material to determine residual lime content.

### SOIL COMPACTION PROCEDURE

Project Number	Project Title	Date
Contract Number	Procedure Number	Location of Demonstration
<b>REQUIREMENTS</b>		<b>EQUIPMENT DEMONSTRATED</b>
Applicable Spec /Dwg	Type	
Compaction Required	%	Manufacturer
Maximum Lift Size	Model	

**LABORATORY SOIL TEST RESULTS**

Non-granular Materials (WSDOT Test Method No 509)    
  Granular Materials (WSDOT Test Method No 606-A)    
  In-Situ  
 Maximum Density \_\_\_\_\_ Moisture % \_\_\_\_\_    
  Density Chart Attached    
 Density \_\_\_\_\_

**COMPACTION DEMONSTRATION TEST RESULTS**

Formula for Percent Compaction:  $\frac{\text{dry density}}{\text{max density}} \times 100 = \text{Percent Compaction}$

No of Passes	Depth of Lift	Percent Moisture	Lbs/ft <sup>3</sup> Dry	Maximum Density	Percent Compaction	Accept	Reject

Observations or Comments

TEST METHOD USED FOR DEMONSTRATION    
 Nuclear Gage (ASTM D2922 & D3017)    
 Other \_\_\_\_\_

Contractor Representative		Date
Engineer/Constructor Inspector		Date

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## INSTRUCTIONS

This Soil Compaction Procedure form, when approved by the Engineer/Constructor Inspector, documents witnessing and verifying the compaction procedure.

Section A is the responsibility of the Construction Contractor. It is to be completed at the time of backfill compaction demonstration and presented to the Engineer/Constructor Inspector.

Section B is completed by the Engineer/Constructor Inspector. Data entered is obtained from the agency or individual that performed testing.

Section C is completed by the Engineer/Constructor Inspector as the demonstration is performed. Using the applicable formula, the percent compaction achieved is determined and entered. Acceptance is based on the results as compared with the compaction percent required in Section A.

Section D is signed and dated by the Construction Contractor Representative acknowledging responsibility for this procedure and compliance thereto for applicable backfill operations. Section D is signed and dated by the Engineer/Constructor Inspector to signify witnessing and verification.

KEH-0382.00R (03/89)

END OF SECTION