INDIANA DEPARTMENT OF TRANSPORTATION

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Indianapolis, Indiana 46204

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Michael R. Pence, Governor
Brandye L. Hendrickson, Commissioner

AGENDA

June 18, 2015 Standards Committee Meeting

MEMORANDUM

June 3, 2015

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Agenda for the June 18, 2015 Standards Committee Meeting

A Standards Committee meeting is scheduled for 09:00 a.m. on June 18, 2015 in the N955 Bay Window Conference Room. Please enter meeting through the double doors directly in front of the conference room.

The following items are listed for consideration:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. Approval of the Minutes from the May 21, 2015 meeting

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

(No items on this agenda)

C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS PROPOSED ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

Item No. 01 (2016 SS)	Mr. Walker	pg 03
Recurring Special Provision:		
200-R-401	RECYCLED FOUNDRY SAND	
Item No. 02 (2016 SS)	Mr. Walker	pg 13
731.03(a)	Geotechnical Considerations	
Item No. 03 (2016 SS)	Mr. Walker	pg 17
Recurring Special Provision:		
203-R-XXX	*COMPACTION ACCEPTANCE WITH LWD*	
Item No. 04 (2016 SS)	Mr. Walker	pg 22
215-R-XXX	*CHEMICAL MODIFICATION OF SOILS*	
Item No. 05 (2016 SS)	Mr. Walker	pg 26
Recurring Special Provision:		
728-B-203	DRILLED SHAFT FOUNDATIONS	
Item No. 06 (2016 SS)	Mr. Walker	pg 49
Recurring Special Provision:		
901-R-XXX	*BLENDED CEMENTS*	
Item No. 07 (2016 SS)	Mr. Walker	pg 54
Recurring Special Provision:		
904-R-XXX	*AGGREGATES*	
Item No. 08 (2016 SS)	Mr. Walker	pg 61
Recurring Special Provision:		
500-R-XXX	*RECYCLED CONCRETE AGGREGATE*	

cc: Committee Members
FHWA
ICA

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The foundry sand Recurring Special Provision needs to be updated to the current requirements for DCP, moisture content, lift thickness, and compaction of borrow and B borrow. Additionally, when the RFS is used in embankment construction, the sideslopes of the RFS are required to be encased with 1.5 ft of non-RFS borrow materials.

PROPOSED SOLUTION: Revise 200-R-141

APPLICABLE STANDARD SPECIFICATIONS: N/A

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: 200-R-141

PAY ITEMS AFFECTED: N/A

IMPACT ANALYSIS (attach report):

Submitted By: Ron Walker for Geotechnical Services

Title: State Materials Engineer

Organization: Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: May 27, 2015

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? Yes
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? No

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS
200-R-401 RECYCLED FOUNDRY SAND

(Proposed changes shown highlighted gray

200-R-401 RECYCLED FOUNDRY SAND

(Revised XX-XX-15)

Description

Recycled foundry sand, RFS, consists of a mixture of residual materials used from ferrous or non-ferrous metal castings and natural sands. The Contractor shall have the option of incorporating RFS into applicable operations in accordance with 105.03.

Materials

RFS sources are to be selected from the Department's list of approved Foundry Sand Sources. RFS may be substituted for B borrow (211) or Borrow (203) upon the approval of the Department's Geotechnical Section.

The Contractor shall provide a copy of the Indiana Department of Environmental Management's, IDEM, waste classification certification for Type III or IV residual sands prior to use. The IDEM certification shall clearly identify the stockpiles with regard to their extent and geographical location.

The Contractor shall provide the Engineer with a type A certification in accordance with 916 for RFS prior to use of the materials. The type A certification shall consist of applicable laboratory tests results of gradation. Consultants on the Department's list of approved Geotechnical Consultants shall perform the testing of RFS materials.

RFS use is restricted to the following additional requirements:

1. RFS derived from Type III residual sand shall not be permitted within 100 ft, horizontally, of a stream, river, lake, reservoir, wetland or any other protected environmental resource area.
2. RFS derived from Type III or Type IV residual sand shall not be placed within 150 ft, horizontally, of a well, spring, or other ground source of potable water.
3. RFS shall not be permitted adjacent to metallic pipes, or other metallic structures.
4. RFS shall not be used as encasement material.
5. RFS shall not be used in MSE wall applications.

If RFS is used in embankment, excavation and replacement operations as a replacement for B borrow or borrow, the following additional restrictions will be required.

1. Borrow: RFS shall be in accordance with 203.
2. B borrow: RFS shall be in accordance with 211.

Construction Requirements

REVISION TO SPECIAL PROVISIONS

200-R-401 RECYCLED FOUNDRY SAND

RFS shall be transported in a manner that prevents the release of fugitive dust and loss of material. Adequate measures shall be taken during construction operations to control fugitive dust from RFS. RFS shall not be applied when wind conditions result in problems in adjacent areas or result in a hazard to traffic on any adjacent roadway. The spreading of RFS shall be limited to an amount that shall be encased within the same workday. If weather causes stoppage of work or exposes the RFS to washing or blowing, additional RFS may be spread when the work resumes. Spraying with water, limewater, or other sealing type sprays will be considered to be acceptable methods for dust control.

~~When RFS is used as borrow or B borrow, compaction of the materials shall be in accordance with 203.23. Compaction will be determined by dynamic cone penetrometer, *DCP*, *in accordance with ITM 509*. The moisture content shall be controlled within -3 and +2 percentage points of the optimum moisture content determined in accordance with AASHTO T 99. The DCP criteria will be determined from a test section using the DCP and a sand cone in accordance with AASHTO T 191. If compaction operations are deemed to be insufficient, the Contractor shall coordinate with the Department's Geotechnical Section, to develop and conduct alternative compaction procedures for the material. Nuclear density testing of RFS will not be allowed.~~

When RFS is used as borrow or B borrow, the lift thickness and compaction of the materials shall be in accordance with 203.23. The dynamic cone penetrometer, DCP, criteria will be determined by a test section in accordance with ITM 514. The DCP testing will be performed in accordance with ITM 509. The moisture content shall be controlled in accordance with 203.23. The test section shall be constructed in the presence of a representative of the Office of Geotechnical Services. When RFS is used as b borrow, the DCP criteria for the granular soils shall be used in accordance with 203.23. Nuclear density testing of RFS will not be allowed.

When RFS is used in embankment construction, the sideslopes of the RFS shall be encased with ~~1~~ *1.5* ft of non-RFS borrow materials. All RFS shall be encased with a minimum of 1 ft of non-RFS borrow materials prior to the completion of construction operations in a calendar year. The encasement materials shall be placed and compacted concurrently with the RFS lifts. Encasement materials not meeting the AASHTO M 145 Classifications of A-6 and A-7 shall be submitted to the Department's Geotechnical Section for approvals.

Method of Measurement

RFS applications will be measured in accordance to the respective uses for borrow or B borrow.

Basis of Payment

RFS will be paid for at the contract unit price in accordance with the respective uses for borrow or B borrow.

No payment will be made for the transportation, handling, or any special construction requirements such as alternative compaction means or encasement activities, when using RFS materials.

REVISION TO SPECIAL PROVISIONS

200-R-401 RECYCLED FOUNDRY SAND

The cost of the use of water, limewater, sprays, or other activities necessary for dust control, shall be included in the cost of the respective pay item.

The cost of geotechnical testing for the use of RFS materials shall be included in the cost of the respective pay item.

RECYCLED FOUNDRY SAND SOURCE APPROVAL CRITERIA

The following procedures covers the requirements for Foundry Sand source approvals or otherwise prescribed subject matter to be added, maintained and removed from a Department's approved list.

The procedures for approval may involve hazardous materials, operations, and equipment. These procedures do not purport to address all of the safety problems associated with the use of the product. The source's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

General Requirements

1. A source, requesting approval for addition to the Department's list, shall provide to the Office of Materials Management the following:

   (a) Name and location of source or manufacturer,
   (b) List of material and specification reference for the material that the approval is being requested,
   (c) Average monthly production of the material by size, type or grade,
   (d) Name, address, and telephone number of responsible contact person,
   (e) Facility layout or production process of the material,
   (f) Quality parameters of the material,
   (g) Raw material sampling and testing frequency,
   (h) Procedures for conforming materials which provides a positive linkage between the furnished materials and the quality control test data,
   (i) Procedures for non-conforming materials,
   (j) Procedures for marking and tracking materials,
   (k) Procedures for documentation maintenance,
   (l) Finished material sampling and testing frequency,
   (m) Procedures for reviewing and updating the source operations,
   (n) Testing laboratory quality system,
   (o) Names, titles and qualifications of sampling and testing personnel,
   (p) Location and telephone number of the laboratory testing office,
   (q) Sample management describing procedures for samples identification, maintenance of the samples prior to testing, sample retention and disposal of samples,

REVISION TO SPECIAL PROVISIONS

200-R-401 RECYCLED FOUNDRY SAND

(r) Testing report procedures,
(s) Methods used to identify improper test results and procedures followed when testing deficiencies occur,
(t) Statistical analysis of test results, and
(u) Maintenance of test records

The application shall be signed and dated by the source's or manufacturer's representative at the time the application is submitted for acceptance. The application shall be maintained to reflect the current status and revisions shall be provided to the Department in writing.

2. Testing may be required which will be performed outside the Department's laboratories. A recognized laboratory shall be the following:

(a) A State transportation agency testing laboratory,
(b) A testing laboratory regularly inspected by the AMRL, or
(c) A testing facility approved by the Department.

Approval Requirements

In addition to the general requirements, the source shall also submit the following to the Office of Materials Management.

(a) Name of Testing Facility
(b) Dates samples were obtained
(c) Dates samples were tested
(d) Test method used for IDEM classification
(e) Letter from IDEM indicating the waste classification of the materials
(f) Test results for TCLP and neutral leachate
(g) Stockpile sampling locations, including depths and available historical testing results
(h) Gradation test results
(i) Recycled Foundry Sand (RFS) Source Certification

The Recycled Foundry Sand (RFS) source certification is included as Attachment A. A new approval submission shall be required when re-sampling is required in accordance with 329 IAC 10-9-4(e) (2). (In accordance with 329 IAC 10-9-4 (e)(2) for foundry waste, re-sampling is conducted: at two-year intervals whenever the process changes or according to a schedule for re-sampling by the IDEM Commissioner based on variability noted in previous sampling and other factors affecting the predictability of waste characteristics.)

When metal concentration of the Type III residual sand exceeds 80% of the allowable limits within IDEM classification, an indemnification clause is required. The "Recycled Foundry Sand (RFS) Indemnification Clause" is included as Attachment B.

Maintaining Approval

Test reports shall be generated in accordance with specification requirements for the material and submitted monthly to the Office of Materials Management. If the material is not produced by the source in a given month, the monthly submittal shall state:

REVISION TO SPECIAL PROVISIONS

200-R-401 RECYCLED FOUNDRY SAND

"No _____ was manufactured during _____."
Material month/year

Samples of material may be obtained randomly for verification at the source or at the point of incorporation into the work in accordance with 106.02.

The source shall provide written notification of any changes, revisions or updates of their operations, source name or address, contact person or product name to the Office of Materials Management.

To maintain approval, a summary of new stockpile test results for the acceptance analysis shall be submitted monthly indicating testing every 2,000 t. Tested and approved RFS stockpiles shall be properly signed for easy identification. If no new stockpiles are created in a given month, a letter indicating, "no new RFS stockpiles for month/year were created" shall be submitted to the Office of Materials Management.

Removal From Approved List

A source will be removed from the approved list for the following, but not limited to, reasons:

(a) Test failures determined by Department verification sampling,
(b) Monthly test reports not provided for three consecutive months,
(c) Test reports generated by the source which indicate non-compliance with specification requirements, or
(d) Performance of the product no longer meets the intended purpose.

REVISION TO SPECIAL PROVISIONS

200-R-401 RECYCLED FOUNDRY SAND

Attachment A

RECYCLED FOUNDRY SAND (RFS) SOURCE CERTIFICATION

This is to certify recycled foundry sand (RFS) stockpiles geographically located as follows:

RFS _____

_____

RFS was produced by the _____ _____ Company located in _____ (City), and _____ (State) and was shipped for use on Indiana Department of Transportation projects is Type _____ (III or IV) material according to the IDEM's restricted waste criteria. If any metal concentration exceeds 80% of the allowable limits for a Type III material the foundry shall provide the Department with an acceptable indemnification clause. The _____ RFS source also agree that processes and stockpiles associated with the production of such RFS may be inspected and sampled at regular intervals by properly identified representatives of the Department or a duly assigned representative.

_____(Date of Signing)_____ (RFS Producer)

_____ (Title)

_____ (Signature)

State of _____ SS: County of _____

Subscribed and sworn to before me by _____

of the firm of _____ this _____ day of _____ 20__

_____ Notary Public

My Commission Expires: _____

This certification has been reviewed and approved by:

_____ _____
(INDOT Representative) Date

REVISION TO SPECIAL PROVISIONS

200-R-401 RECYCLED FOUNDRY SAND

Attachment B

RECYCLED FOUNDRY SAND (RFS) INDEMNIFICATION CLAUSE

_____ RFS producer shall indemnify, defend, exculpate, and hold harmless the State of Indiana, its officials, and employees from any liability of the State of Indiana for loss, damage, injury, or other casualty of whatever kind or to whomever caused, arising out of or resulting from a violation of the federal or Indiana Occupational Safety and Health Acts (OSHA), the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or any other environmental law, regulation, ordinance, order or decree (collectively referred to hereinafter as "Environmental Laws"), as a result of the supply, testing, and application of residual sand or other materials supplied under this Contract by _____ source, whether due in whole or in part of the negligent acts or omissions of: (1) _____ Foundry, its agents, officers, or employees, or other persons engaged in the performance of the contract; or (2) the joint negligence of them and the State Of Indiana, its officials, agents, or employees.

This contract shall include, but not be limited to, indemnification from: (1) any environmental contamination liability due to the supply, testing, and application of residual sand in road base, embankments, or other projects designated by the Department as agreed to by the parties, and (2) any liability for the clean up or removal of residual sand, or materials incorporating such sand, pursuant to any Environmental Law.

The RFS producer also agrees to defend any such action on behalf of the State of Indiana, to pay all reasonable expenses and attorneys fees for such defense, and shall have the right to settle all such claims. Provided, however, that no liability shall arise for any such fees or expenses incurred prior to the time that _____ Foundry shall have first received actual and timely written notice of any claim against the State which is covered by this Indemnification Agreement. If timely written notice of any claim hereunder is not received by _____ Foundry, and _____ Foundry is thereby prejudiced in its ability to defend or indemnify, then to the extent of such prejudice, this Indemnification Agreement shall be void.

This Indemnification Agreement does not create any rights in any third party, and is solely for the benefit of the State of Indiana and its agents, officials, and employees.

COMMENTS AND ACTION

200-R-401 RECYCLED FOUNDRY SAND

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: SECTION 201 Recurring Special Provision affected: 200-R-401 RECYCLED FOUNDRY SAND Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The coefficient of uniformity, cu, of the reinforced backfill for all designs using the ribbed steel strips curve from AASHTO LRFD Bridge Design Specifications requires an input value of 4.0 for the design. This does not mean that the aggregate is required to meet a minimum value of 4.0. Geotechnical labs have interpreted this as an aggregate requirement and they have indicated to the Aggregate Industry that a minimum value of 4.0 is required for all aggregates submitted for this use. Aggregates are accepted by many other parameters such as pH, organic content, permeability, chlorides, sulfates, resistivity, and internal friction angle φ.

PROPOSED SOLUTION: Remove the cu requirement

APPLICABLE STANDARD SPECIFICATIONS: 731

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

IMPACT ANALYSIS (attach report):

Submitted By: Ron Walker for Geotechnical Services

Title: State Materials Engineer

Organization: Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: May 27, 2015

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? Yes
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? Yes

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? No

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO STANDARD SPECIFICATIONS

SECTION 731 - MECHANICALLY STABILIZED EARTH RETAINING WALLS
731.03(a) GEOTECHNICAL CONSIDERATIONS

The Standard Specifications are revised as follows:

SECTION 731, BEGIN LINE 104, DELETE AS FOLLOWS:

~~The coefficient of uniformity, cu, of the reinforced backfill for all designs using the ribbed steel strips curve from AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1 shall be 4.0.~~

COMMENTS AND ACTION

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: SECTION 731, pg 706. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: A Recurring Special Provision is needed for Compaction Acceptance with Light Weight Deflectometers, LWD, testing. We have successfully used the LWD Unique Special Provision for several years and this specification needs to be made into a RSP.

PROPOSED SOLUTION: Develop a RSP for use of the LWD

APPLICABLE STANDARD SPECIFICATIONS: 203.24.1

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: Develop a new RSP

PAY ITEMS AFFECTED: N/A

IMPACT ANALYSIS (attach report):

Submitted By: Ron Walker for Geotechnical Services

Title: State Materials Engineer

Organization: Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: May 28, 2015

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? Yes
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? No

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 203-R-XXX COMPACTION ACCEPTANCE WITH LWD

203-R-XXX COMPACTION ACCEPTANCE WITH LWD

(Adopted xx-xx-xx)

The Standard Specifications are revised as follows:

SECTION 203, AFTER LINE 971, INSERT AS FOLLOWS:

203.24. 1 Compaction Acceptance with LWD

The compaction of chemically modified soils and coarse aggregates will be determined by light weight deflectometer, LWD, testing in accordance with ITM 508. The moisture content will be determined in accordance with AASHTO T 255 or ITM 506. The compaction procedures shall be in accordance with 203.23, 215, 301, 302, and 303.

The maximum allowable deflection will be determined from a test section or will be specified. Acceptance testing with a LWD will be in accordance with ITM 508. The optimum moisture content and gradation will be determined by performing AASHTO T 99 Method C, AASHTO T 11, and AASHTO T 27 on representative samples of the aggregates.

The moisture content of the aggregate shall be within -3 percentage points of the optimum moisture content and the optimum moisture content prior to placement. Water shall be added only to the stockpiles. The frequency of the moisture content test for aggregates will be one test for each day of aggregate placement.

The maximum allowable deflection for chemically modified soils and aggregate over chemically modified soils shall be in accordance with the following:

Material Type	*Maximum Allowable Deflection, mm*
Lime Modified Soil	*0.30*
Cement Modified Soil	*0.27*
Aggregates over Lime Modified Soil	*0.30*
Aggregates over Cement Modified Soil	*0.27*

TABLE 1

Test sections shall be constructed in accordance with ITM 514 in the presence of a representative of the Office of Geotechnical Services for other materials not included in Table 1 to determine the maximum allowable deflection.

Acceptance of the compaction of chemically modified soils or aggregates will be determined by averaging three LWD tests obtained at a random station determined in accordance with ITM 802. The location of the three tests will be at 2 ft from each edge of the construction area and at 1/2 of the width of the construction area. The average deflection shall be equal to or less than the maximum allowable deflection allowed in Table 1 or determined by the test section. The frequency of the LWD testing will be three

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 203-R-XXX COMPACTION ACCEPTANCE WITH LWD

tests for each 800 t for compacted aggregate and three tests for each 1,400 cu yd of chemically modified soil.

If the average deflection is not equal to or less than the maximum allowable deflection for aggregates, a sample of the aggregate shall be obtained in accordance with AASHTO T 2 and a moisture content test shall be performed in accordance with AASHTO T 255 to determine if the moisture content is within the acceptable limits. If the moisture content is not within the acceptable limits, additional LWD tests may be taken at the same locations after 24 h if the moisture content is within the acceptable limits at the time of testing. The aggregate will be accepted if the LWD tests are equal to or less than the maximum allowable deflection.

COMMENTS AND ACTION

203-R-XXX COMPACTION ACCEPTANCE WITH LWD

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: SECTION 203 pg 167. Recurring Special Provision affected: PROPOSED NEW Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Section 215 for Chemical Modification of Soils needs to be revised to include an option for using the LWD for determination of the compaction.

PROPOSED SOLUTION: Add the option of using the LWD for determination of the compaction of chemically modified soils and reference the new specification Section designated in the RSP for LWD compaction.

APPLICABLE STANDARD SPECIFICATIONS: 215.09

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: RSP for LWD

PAY ITEMS AFFECTED: N/A

IMPACT ANALYSIS (attach report): N/A

Submitted By: Ron Walker for Geotechnical Services

Title: State Materials Engineer

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: 5/28/15

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? Yes
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? No

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: N/A

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 215-R-XXX CHEMICAL MODIFICATION OF SOILS

215-R-XXX CHEMICAL MODIFICATION OF SOILS

(Adopted 06-18-15)

The Standard Specifications are revised as follows:

SECTION 215, BEGIN LINE 95, INSERT AS FOLLOWS:

215.09 Compaction

Compaction of the mixture shall begin as soon as practicable after mixing and shall be in accordance with 203 or 207.03 as applicable. Compaction after mixing shall be as follows:

(a) For portland cement modified soils, mixing shall be completed within 1 h of portland cement placement and grading and final compaction shall be completed within 3 h after mixing.

(b) Fly ash modified soils shall be compacted within 4 h.

(c) Lime modified soils shall be compacted within 24 h.

Acceptance of chemically modified soils will be determined by measuring the compaction with a Dynamic Cone Penetrometer, DCP, in accordance with ITM 509 *or with a Light Weight Deflectometer, LWD, in accordance with 203.24.1.* Testing of the chemically modified soils will begin 24 hours after compaction.

For measuring the compaction with a DCP, three random test locations will be determined in accordance with ITM 802 for each 1,500 lft of chemically modified soil for each 2-lane pavement section. The average of the blow counts obtained at the three random locations will be the DCP blow count representing the 1,500 lft section. Blow counts of 15 and above will be used to determine the average for the top 6 in. of a 14 in. lift. Blow counts of 14 and above will be used to determine the average for the bottom 8 in. of a 14 in. lift. Blow counts of 18 and above will be used to determine the average for the 8 in. lift. Locations with test results less than the specified minimum blow counts will be retested and shall be reworked if the minimum blow count is not obtained.

The chemically modified soil lift shall meet the following requirements for compaction:

(a) The average DCP blow count shall not be less than 17 for the top 6 in. of a 14 in. lift.

(b) The average DCP blow count shall not be less than 16 for the bottom 8 in. of a 14 in. lift.

(c) The average DCP blow count shall not be less than 20 for an 8 in. lift.

COMMENTS AND ACTION

215-R-XXX CHEMICAL MODIFICATION OF SOILS

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: SECTION 215 pg 224-225. Recurring Special Provision affected: PROPOSED NEW. Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The Drilled Shaft foundations Recurring Special Provision needs to be updated to the current practice to allow type B or D chemical admixtures that are a component of an admixture system and identified as hydration stabilizers on the Approved List. These admixtures may have a dosage rate as recommended by the admixture manufacturer.

PROPOSED SOLUTION: Revise 728-B-203 to allow the use of type B or type D chemical admixtures

APPLICABLE STANDARD SPECIFICATIONS: N/A

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: 728-B-203

PAY ITEMS AFFECTED: N/A

IMPACT ANALYSIS (attach report):

Submitted By: Ron Walker for Geotechnical Services

Title: State Materials Engineer

Organization: Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: May 27, 2015

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? Yes
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? No

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

(Proposed changes shown highlighted gray

728-B-203 DRILLED SHAFT FOUNDATIONS

(Revised xx-xx-15)

The Standard Specifications are revised as follows:

SECTION 728, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 728 - ~~BLANK~~*DRILLED SHAFT FOUNDATIONS*

728.01 Description

This work shall consist of the construction of reinforced concrete drilled shaft foundations, 5.0 ft or smaller in outside diameter, in accordance with 105.03.

MATERIALS

728.02 Materials

Materials shall be in accordance with the following:

Admixtures for Use in Concrete.....912.03*
Cement Grout.....707.09
Coarse Aggregate
For exposed concrete, Class A or Higher,
Size No. 8 or No. 9.....904
For non-exposed concrete, Class B or Higher,
Size No. 8 or No. 9.....904
Fine Aggregate, Size No. 23.....904
Fly Ash.....901.02
Ground Granulated Blast Furnace Slag.....901.03
*Portland Cement, type I, II, IP, or IS**.....901.01(b)*
Reinforcing Bars.....910.01
Water.....913.01

* *Except as modified herein*

** *Air- entraining cement shall not be used. This includes type IA, IIA, IIIA, IP-A, IS-A. If type IP cement is used, the pozzolan in the blended cement shall not be class C fly ash.*

If indicated on the plans, casings shall be in accordance with either ASTM A 252, grade 2 or ASTM A 36. Otherwise, casings shall be steel, smooth, clean, watertight, and of adequate strength to resist construction stresses. The outside diameter of casing shall not be less than the specified diameter of the drilled shaft unless otherwise shown on the plans. Casing diameters shall be within the American Pipe Institute's tolerances for regular steel pipe. The Contractor may request to provide a casing larger in diameter than that specified.

Slurry shall be either a polymer or mineral, using sodium bentonite or attapulgite. Slurry shall have a grain size that will remain in suspension with sufficient viscosity and

gel characteristics to transport excavated material and shall be capable of maintaining the stability of the drilled shaft excavation to allow proper concrete placement.

728.03 Drilled Shaft Concrete Mix Design

The mix design for the drilled shaft concrete shall be determined based on the design compressive strength, f'c, and the requirements stated in Appendix X1 of ASTM C 94, as well as the following conditions:

(a) The target water/cementitious ratio for the mix design shall not exceed 0.450.

(b) The design total cementitious content shall be set such that it is no less than 650 lbs and not more than 800 lbs. Fly ash or GGBFS as outlined below shall be used in combination with portland cement.

1. If class F fly ash is used, the fly ash content for a mix design shall be a minimum of 25% and shall not exceed 30% of the total cementitious, by weight. Class F fly ash shall not be used in conjunction with blended cement or ground granulated blast furnace slag, GGBFS.

2. If class C fly ash is used, the fly ash content for a mix design shall be a minimum of 35% and shall not exceed 40% of the total cementitious, by weight. Class C fly ash shall not be used in conjunction with blended cement or ground granulated blast furnace slag, GGBFS.

3. If GGBFS is used, the GGBFS content for a mix design shall be a minimum of 35% and shall not exceed 45% of the total cementitious, by weight. GGBFS shall not be used in conjunction with blended cement or fly ash.

(c) The drilled shaft concrete shall be air entrained. The target air content for the mix design shall be set at 6.5% air or 1.755 cu ft/cu yd of concrete.

(d) The target fine aggregate content shall be set such that it is no less than 35%, but not more than 50% of the total weight of the aggregate in each cubic yard. Aggregate proportions shall be based on material in the saturated surface dry condition.

The air content shall be 6.5% ± 2.0 by volume at the time of acceptance. Air content shall be determined in accordance with 505.

The temperature of the concrete at time of placement shall not exceed 80° F. The concrete temperature shall be controlled by one of the pre-cooling methods described in ACI 207.4R and as approved by the Engineer.

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

Drilled shaft concrete mix shall remain workable until the entire placement operation is complete and any temporary casings have been removed from the excavation. When the dry construction method is used, the concrete shall have a slump of 6 in. to 9 in. When the wet construction method or casing construction method is used, the concrete shall have a slump of 7 in. to 10 in. The concrete shall maintain a slump within the ranges specified herein until the entire placement operation is complete. One of the following admixtures shall be used to achieve and maintain the required slump:

(a) type F admixture,

(b) type G admixture,

(c) high range water reducing admixture system, or

(d) high range water reducing retarding admixture system.

~~*A rheology-modifying admixture meeting the requirements of type S chemical admixture in accordance with ASTM C 494 may be used if approved by the Engineer and admixture manufacturer.*~~ *Type B or D chemical admixtures that are a component of an admixture system and are identified as hydration stabilizers on the Department's Approved Material List may be used at a higher dosage rate than stated on the approved list. Dosage of hydration stabilizers shall be based on the manufacturer's recommendation. Chemical admixtures* ~~*type B,*~~ *type C, and type E will only be* ~~*permitted*~~ *allowed with prior written permission. The concrete shall not be retempered with additional amounts of chemical admixtures type F or type G after the initial mixing has been completed. A rheology-modifying admixture meeting the requirements of type S chemical admixture in accordance with ASTM C 494 may be used if approved by the Engineer and the admixture manufacturer.*

A concrete mix design, CMD, shall be prepared for the drilled shaft based on the requirements as specified herein and shall be verified by a trial batch. The CMD shall be submitted to the Engineer for verification at least seven days prior to the trial batch demonstration. The CMD submittal shall include the following:

(a) list of all ingredients
(b) source of all materials
(c) gradation of the aggregates
(d) absorption of the aggregates
(e) SSD bulk specific gravity of the aggregates
(f) specific gravity of pozzolan
(g) batch weights
(h) names of all admixtures
(i) range of admixture dosage rates as recommended by the manufacturer

728.04 Trial Batch

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

An American Concrete Institute certified concrete field testing technician, grade 1, hereinafter referred to as the Contractor's certified technician, shall be on site to direct and perform all sampling and testing.

A trial batch shall be produced and tested by the Contractor's certified technician and the Department's qualified technician to verify that the CMD meets the concrete mix criteria. The trial batch shall be of sufficient quantity to allow the Contractor and the Engineer to perform all required tests from the same batch. Concrete shall be batched, mixed, and delivered in accordance with 702.06, 702.07, and 702.09. The Engineer will test the trial batch and provide the Contractor with the results. Trial batch concrete shall not be used for more than one test, except the concrete used for the unit weight may be used to conduct the air content test. In order for the trial batch concrete to be considered acceptable, the air content will measure at least 6.5%. After mixing, the concrete shall be agitated for a time period to simulate delivery, not to exceed 45 minutes.

The Contractor shall cast four 6 in. diameter by 12 in. cylinders for compressive strength determination. Two of the cylinders shall be tested at an age of 7 days and two cylinders tested at an age of 28 days. Compressive strength shall be reported as the average of the two cylinders tested at the appropriate age.

The Department will cast four 6 in. diameter by 12 in. cylinders. Two of the cylinders will be tested at an age of 7 days and two cylinders tested at an age of 28 days. Compressive strength will be reported as the average of the two cylinders tested at the appropriate age. Additional cylinders may be cast and tested at another age. Average compressive strength test results by the Department, which achieve the minimum compressive strength requirement at an earlier age, will be considered as validating the compressive strength requirement for the CMD; however, compressive strength at 28 days is still required. The 28-day compressive strength shall meet or exceed the requirements of ASTM C 94, Appendix X1, unless otherwise approved by the Engineer.

The Department's test results will be used to validate CMD compliance with the required concrete properties.

All molds, facilities, and materials necessary to prepare and initially cure cylinders shall be provided.

Gradations will be determined to validate the fine and coarse aggregates used.

The Department's qualified technician will measure the concrete properties and verify compliance to the Contractor's results within the following tolerances.

CONCRETE PROPERTIES AND ALLOWABLE TOLERANCES BETWEEN RESULTS

Concrete Property	*Tolerance between results*
Aggregate Correction Factor	*±0.1 percentage point*
Air Content	*±0.5 percentage points*

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

Slump	*±1.0 in.*
Temperature	*±1.9°F*
28-day Compressive Strength	*±8.5%*
Unit Weight	*±1.9 lb/cu ft*
Water/Cementitious ratio	*±0.015*

All test results not within the tolerance are to be investigated by the Department and the Contractor as to the cause and determine corrective actions required to resolve the discrepancy. The relative yield shall be determined by both the Department and the Contractor and compared to the theoretical value for relative yield in the following table based on the measured air content. A relative yield that is more than ±0.005 from the theoretical is not cause for rejection, but will be investigated for cause and possible corrective action.

THEORETICAL EFFECT OF AIR CONTENT ON RELATIVE YIELD
(@ 6.5% Target Air Content)

Air Content	*Theoretical Relative Yield*	*Air Content*	*Theoretical Relative Yield*	*Air Content*	*Theoretical Relative Yield*
3.0 (fail)	*0.965*	*5.7*	*0.992*	*8.4*	*1.019*
3.1 (fail)	*0.966*	*5.8*	*0.993*	*8.5*	*1.020*
3.2 (fail)	*0.967*	*5.9*	*0.994*	*8.6 (fail)*	*1.021*
3.3 (fail)	*0.968*	*6.0*	*0.995*	*8.7 (fail)*	*1.022*
3.4 (fail)	*0.969*	*6.1*	*0.996*	*8.8 (fail)*	*1.023*
3.5 (fail)	*0.970*	*6.2*	*0.997*	*8.9 (fail)*	*1.024*
3.6 (fail)	*0.971*	*6.3*	*0.998*	*9.0 (fail)*	*1.025*
3.7 (fail)	*0.972*	*6.4*	*0.999*	*9.1 (fail)*	*1.026*
3.8 (fail)	*0.973*	*6.5*	*1.000*	*9.2 (fail)*	*1.027*
3.9 (fail)	*0.974*	*6.6*	*1.001*	*9.3 (fail)*	*1.028*
4.0 (fail)	*0.975*	*6.7*	*1.002*	*9.4 (fail)*	*1.029*
4.1 (fail)	*0.976*	*6.8*	*1.003*	*9.5 (fail)*	*1.030*
4.2 (fail)	*0.977*	*6.9*	*1.004*	*9.6 (fail)*	*1.031*
4.3 (fail)	*0.978*	*7.0*	*1.005*	*9.7 (fail)*	*1.032*
4.4 (fail)	*0.979*	*7.1*	*1.006*	*9.8 (fail)*	*1.033*
4.5	*0.980*	*7.2*	*1.007*	*9.9 (fail)*	*1.034*
4.6	*0.981*	*7.3*	*1.008*	*10.0 (fail)*	*1.035*
4.7	*0.982*	*7.4*	*1.009*	*10.1 (fail)*	*1.036*
4.8	*0.983*	*7.5*	*1.010*	*10.2 (fail)*	*1.037*

4.9	*0.984*	*7.6*	*1.011*	*10.3 (fail)*	*1.038*
5.0	*0.985*	*7.7*	*1.012*	*10.4 (fail)*	*1.039*
5.1	*0.986*	*7.8*	*1.013*	*10.5 (fail)*	*1.040*
5.2	*0.987*	*7.9*	*1.014*	*10.6 (fail)*	*1.041*
5.3	*0.988*	*8.0*	*1.015*	*10.7 (fail)*	*1.042*
5.4	*0.989*	*8.1*	*1.016*	*10.8 (fail)*	*1.043*
5.5	*0.990*	*8.2*	*1.017*	*10.9 (fail)*	*1.044*
5.6	*0.991*	*8.3*	*1.018*	*11.0 (fail)*	*1.045*

CMD's, which have had a successful trial batch demonstration for another drilled shaft on a separate contract may be submitted for the Engineer's approval. The results from Department and Contractor testing of the concrete properties listed above from the trial batch concrete shall be included in the submittal. If the Engineer approves the use of the submitted CMD, verification of the tolerances shall be made during the first day of production by tests conducted by the Contractor's certified technician and the Department's qualified technician. The results of the tests from the first day of concrete production shall be within the concrete property tolerances listed above.

Except for adjustments to compensate for routine aggregate moisture fluctuations, changes in target aggregate SSD batch weights shall be documented and submitted to the Engineer for approval, prior to implementing. A maximum adjustment of ±3 percentage points of fine to total aggregate ratio by volume will be permitted. Changes to the admixture dosages will be permitted.

A new CMD shall be prepared and successfully demonstrated by trial batch for any change in material, cementitious content or target water/cementitious ratio.

CONSTRUCTION REQUIREMENTS

728.05 Quality Control Testing

The Contractor shall perform all quality control testing including, but not limited to, slurry testing and plastic and hardened concrete testing. The Contractor shall provide copies of all quality control test reports to the Engineer no later than five business days after the tests are completed. If the Contractor fails to submit test reports within the timeframe allowed, the Engineer may withhold progress estimates until the reports are provided.

728.06 Blank

728.07 Submittals

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

A minimum of 45 days prior to the start of drilled shaft construction, the Contractor shall submit a QCP in accordance with ITM 803 detailing the plan for construction of the drilled shafts. The QCP shall at a minimum include the following:

(a) The name of the contractor that will perform the drilled shaft construction.

(b) A list of equipment to be used including, but not limited to cranes, drills, augers, bailing buckets, final cleaning equipment, de-sanding equipment, slurry pumps, core sampling equipment, tremies, concrete pumps, and temporary casings.

(c) A list of proposed materials and suppliers including, but not limited to concrete, reinforcement bars, permanent casings and slurry.

(d) A detailed description of the proposed sequence of construction through the project, at each structure and at each bent and pier of each structure.

(e) A detailed explanation of methods and procedures for construction including, but not limited to the following:

1. *The method of construction proposed for each drilled shaft.*
2. *The procedures for ensuring correct horizontal and vertical alignment of each drilled shaft.*
3. *The procedures for removing or excavating through subsurface obstructions, whether natural or man-made.*
4. *The procedures for advancing casing, as applicable.*
5. *The details regarding the lengths, sizes and locations of the temporary casings and details regarding the methods to install and extract the temporary casing as applicable.*
6. *The methods of mixing, circulating and de-sanding slurry. A copy of the slurry manufacturer's recommendations shall be included.*
7. *The names and qualifications of technicians that will perform slurry testing.*
8. *The names and qualifications of the certified technicians.*
9. *The procedures for dewatering and cleaning drilled shaft excavations.*
10. *The methods for placing and supporting reinforcement bars in the correct locations.*
11. *The materials and methods for installing, protecting and grouting crosshole sonic logging testing access tubes.*
12. *The procedures for concrete placement.*
13. *The procedures and materials for pressure grouting voids when using permanent casing.*
14. *Detailed procedures for how construction problems will be addressed.*

REVISION TO SPECIAL PROVISIONS
728-B-203 DRILLED SHAFT FOUNDATIONS

Drilled shaft construction shall not begin until the QCP is approved in writing by the Engineer.

728.08 Preconstruction Meeting

The Contractor shall hold a pre-construction meeting with the Engineer after approval of the QCP and a minimum of 14 days prior to construction. The pre-construction meeting shall include at a minimum representatives of the Contractor, the subcontractor performing the drilled shaft construction, the Engineer, the design consultant, the geotechnical consultant drilled shaft inspector, and the Office of Geotechnical Services.

728.09 Equipment

Drilling and excavation equipment shall be capable of producing a drilled shaft that is a minimum of 20% of the planned drilled shaft length below the tip elevations shown in the plans. Blasting will not be permitted for drilled shaft excavation unless approved in writing by the Engineer.

Drop chutes for concrete placement shall consist of a smooth tube of one piece construction with an attached hopper.

Tremies shall consist of a watertight tube of sufficient length, diameter, and wall thickness to discharge concrete at the base of the drilled shaft excavation without bending, crimping or impeding the flow of concrete. The inside diameter of the tremie shall be a minimum of 10 in. The discharge end of the tremie shall be constructed to permit the free radial flow of concrete during placement operations. The inside and outside surfaces of the tremie shall be clean and smooth.

Concrete pumps shall be capable of maintaining a continuous flow of concrete from beginning to completion of a drilled shaft pour. Pump lines shall have a minimum 4 in. diameter and shall be constructed with watertight joints.

728.10 Construction Methods

The Contractor shall use the construction methods specified in the contract for each drilled shaft. If more than one method is specified or no method is specified for a drilled shaft, the Contractor may choose the method suitable for the drilled shaft. Construction methods shall be one of the following:

(a) Dry Construction Method

The dry construction method shall consist of drilling the excavation, removing accumulated water and loose material from the excavation, and placing concrete and reinforcement in a relatively dry excavation.

The dry construction method shall only be used in locations where conditions are such that the rate of groundwater infiltration into the excavation does not exceed 12 in. per hour. The maximum depth of water shall not exceed 2 in. prior to concrete pour. The

sides and bottom of the excavation shall remain stable without any caving, sloughing, or swelling, and the full depth of the excavation may be visually inspected prior to placing concrete.

(b) Wet Construction Method

The wet construction method shall consist of drilling the excavation, cleaning the excavation by muck bucket and air lifting, and placing concrete in a manner to displace water and slurry up and out of the excavation as concrete is placed.

The wet construction method shall be used where conditions are not suitable for the dry construction method. To prevent caving, sloughing, or swelling of the excavation during drilling, slurry shall be added to the excavation prior to encountering groundwater.

(c) Casing Construction Method

The casing construction method shall consist of placing either a temporary or permanent casing in accordance with the following:

1. Temporary Casing Method

The temporary casing method shall consist of drilling the shaft excavation in accordance with the dry or wet construction method, placing a casing to maintain the excavation, and then withdrawing the casing during placement of the concrete.

2. Permanent Casing Method

The permanent casing method shall consist of driving, vibrating, or drilling a casing to a specified depth prior to excavation of the drilled shaft. Material inside the casing is then excavated and concrete placed in accordance with the dry or wet construction method.

728.11 Construction

The Contractor shall maintain a construction log for each drilled shaft. The log shall include the following as a minimum:

1. *The drilled shaft number.*
2. *The method of construction.*
3. *A description and approximate top and bottom elevation of each soil or rock material encountered during excavation.*
4. *The rate of groundwater infiltration.*
5. *The depth of water in the excavation just prior to concrete placement.*
6. *The type of slurry, as applicable.*
7. *The results of all slurry testing, as applicable.*
8. *The methods used to clean and check the excavation prior to concrete placement.*
9. *The method of concrete placement.*

10. *The results of all plastic concrete testing including temperature readings.*
11. *The number of concrete cylinders made for compressive strength testing.*
12. *Time of completion of excavation cleaning.*
13. *Time of installation of reinforcing steel.*
14. *Time that concrete placement begins and ends.*
15. *The rate of concrete placement and the total time required to place concrete.*
16. *The method of temporary casing removal, as applicable.*
17. *A record of the head of concrete before and during removal of temporary casing, as applicable.*
18. *The total volume of concrete placed versus theoretical volume of concrete required.*
19. *A description of all equipment and materials used.*
20. *A record of any problems encountered including possible soil and water inclusion, possible voids, and possible drilled shaft or casing collapse.*

A drilled shaft excavation shall not be left unfilled overnight unless cased to full depth.

(a) Exploratory Rock Cores, Soil Borings, and Proof Testing

The Contractor shall obtain soil samples and exploratory rock cores within the footprint of each drilled shaft prior to the start of production drilling to determine the character of the material throughout the entire drilled shaft length and to a depth directly below the complete shaft excavation. Soil borings and exploratory rock cores shall extend a minimum of 15 ft below the planned tip elevation of the drilled shaft or three times the diameter of the rock socket, whichever is greater, or as directed by the Engineer. Soil samples and exploratory rock cores shall be obtained by an approved Geotechnical Consultant and complete boring logs shall be prepared and submitted by the geotechnical consultant.

Soil samples shall be taken within soils at a maximum spacing of 5 ft, or as otherwise directed by the Engineer, using the standard penetration test method with the soil samples extracted with a split-barrel sampler or with undisturbed sample excavation.

Exploratory rock cores shall be NX-size. The exploratory rock coring operation shall include observing such indicators as speed of drilling under given drill pressure, dropping or clogging of the drill bit and loss of drill water, if used. The Engineer will observe exploratory rock coring and will inspect cores to determine if the material is suitable for the planned depth and size of drilled shaft. Additional exploratory rock cores shall be obtained as directed by the Engineer. The core hole shall be grouted upon completion of coring. The exploratory rock cores shall be extracted with a core barrel. Cores shall be measured, visually identified, and described on the Contractor's field log

within 24 hours after the exploration is completed. The Engineer will inspect the cores and determine the final depth of required excavation based on evaluation of the material's suitability.

(b) Casing

All subsurface casing shall be considered temporary unless specified as permanent casing in the contract.

If the Contractor elects to remove a casing and substitute a longer or larger diameter casing through caving soils, the excavation shall be stabilized either with slurry or by backfilling before the new casing is installed.

If the dry construction method is used and casing is not placed during excavation, the Contractor shall take appropriate measures to prevent deterioration of the excavation. If the excavation has deteriorated, the Contractor shall over-ream the excavation prior to placement of concrete and reinforcement. Over-reaming shall be by methods approved by the Engineer.

If the temporary casing method is used, the casing shall be advanced with the drilling until a nearly impervious ground formation is reached. The casing shall be seated in the formation and excavation shall continue until the required tip elevation is reached. Dependent on the rate of groundwater infiltration, construction shall proceed in accordance with either the dry or wet construction method. The temporary casing shall be withdrawn during placement of the concrete and while the concrete is still in a plastic state. The casing shall be withdrawn at a slow, uniform rate in a direction parallel to the axis of the drilled shaft. The casing shall not be rotated, reinserted, driven, or vibrated during withdrawal unless prior approval is granted by the Engineer. The rate of concrete placement and rate of casing withdrawal shall be such that the concrete displaces all loose materials, water and slurry up and out of the excavation without mixing with or displacing the concrete. At a minimum, a 5 ft head of concrete shall be maintained above either the highest hydrostatic water level or slurry, whichever is higher, as the casing is withdrawn.

Temporary casing which becomes bound and cannot be practically removed will constitute a defect in the drilled shaft. The Contractor shall submit a proposed method to remediate the defect to the Engineer for approval. The submittal shall include design drawings and calculations stamped by a professional engineer.

When temporary casing is used and the drilled shaft extends above ground or through a body of water, the portion of the drilled shaft above the existing ground or above the bottom of the body of water may be formed with a removable casing. Removable casings may be removed when the following conditions are met:

1. *The concrete has cured for a minimum of 72 hours.*

2. *The concrete attains a compressive strength of at least 2,500 psi, as determined from 6 in. diameter by 12 in. concrete cylinder breaks.*

3. *The drilled shaft concrete is not exposed to moving water for seven days.*

If the permanent casing method is used, the casing shall be driven, vibrated, or advanced by drilling to the specified tip elevation. If the casing cannot be driven to the full depth of the excavation, the Contractor may either excavate material within the embedded portion of the casing or drill a pilot hole ahead of the casing until the casing reaches the specified depth. If a pilot hole is drilled, it shall be centered in the drilled shaft and shall be no larger than one-half the diameter of the drilled shaft. The Contractor shall not over-ream the excavation to the outside diameter of the casing. Permanent casing shall be continuous between the elevations shown on the plans. Any length of permanent casing installed below the shaft cutoff elevation, shall remain in place. Temporary casing shall not be used instead of, or in addition to, permanent casing. After the permanent casing is placed, all loose materials and water shall be removed. Reinforcement shall be placed and the casing shall be filled with concrete. All voids between the casing and the soil surrounding the casing shall be pressured grouted with cement grout.

(c) Slurry

When slurry is used during drilled shaft excavation, the Contractor shall perform testing to determine the density, viscosity, and pH of the slurry. A minimum of four sets of tests shall be made during the first eight hours of slurry use. If the first four sets of tests indicate consistent, acceptable results, the testing frequency may be decreased to one set of tests for every four hours of slurry use. Tests shall be performed when the slurry temperature is above 40°F. Test results shall be within the ranges shown below:

SLURRY PROPERTIES

Property	*Test Method*	*Required Range*
Density, pcf	*Density Balance*	*64.3 - 69.1*
Viscosity, seconds/quart	*Marsh Cone*	*28 - 45*
pH	*pH paper or meter*	*8 - 11*

The Contractor shall perform sand content testing in accordance with the American Petroleum Institute. The sand content shall not exceed 4% by volume at any point in the excavation when slurry is used.

Prior to placing concrete in a drilled shaft excavation with slurry, the Contractor shall obtain slurry samples from the base of the excavation and at intervals of 10 ft along the length of the excavation. The samples shall be tested and two consecutive samples shall have acceptable results for density, viscosity, pH, and sand content before concrete is placed in the drilled shaft excavation. If test results are not acceptable, the Contractor shall take corrective action to bring the slurry in to compliance with the requirements.

The Contractor shall ensure that heavily contaminated slurry suspension, which could impair the free flow of concrete, has not accumulated in the bottom of the shaft.

The level of slurry in a drilled shaft excavation shall be maintained at a level sufficient to prevent caving of the hole, but not less than 4 ft above the highest expected piezometric pressure head along the depth of the shaft. In the event of a sudden significant loss of slurry in the excavation, the construction of that drilled shaft shall be stopped until either a method to stop slurry loss or an alternate construction procedure has been approved by the Engineer.

728.12 Excavation Inspection

The Contractor shall provide all necessary equipment for checking the dimensions, alignment, and cleanliness of the drilled shaft excavation. The dimensions and alignment shall be determined by the Contractor under the direction of the Engineer. Final drilled shaft depths shall be measured with a suitable weighted tape or other approved method after final cleaning.

The bottom of the drilled shaft excavation shall be clean such that a minimum of 50% of the base surface of each drilled shaft has less than 1/2 in. of loose material at the time of concrete placement. The maximum depth of loose material at any location on the base surface of the drilled shaft excavation shall not exceed 1 1/2 in. The Contractor shall remove any loose material adhering to the vertical sides of the bedrock socket. Acceptability of the excavation for cleanliness will be determined by the Engineer by means of visual inspection and sounding for dry excavations and by measuring and sounding with a weighted tape or by other methods deemed appropriate by the Engineer for wet excavations. For dry excavations, the maximum depth of water shall not exceed 2 in. at the time of concrete placement and the rate of groundwater flow into the excavation shall not exceed 12 in. per hour.

728.13 Construction Tolerances

Drilled shafts shall meet the following construction tolerances:

- *(a) Drilled shafts shall be within 3 in. horizontally of the location shown in the plans.*
- *(b) The top of drilled shafts shall be within plus 1 in. and minus 3 in. of the elevation shown in the plans.*
- *(c) The alignment of vertical drilled shafts shall not vary from plumb by more than 1/4 in. per ft of depth.*
- *(d) The alignment of battered drilled shafts shall not vary by more than 1/2 in. per ft of depth from the specified batter rate.*
- *(e) After placement of concrete, the top of reinforcing bars shall be within plus 6 in. and minus 3 in. of the location shown in the plans.*
- *(f) Excavation equipment and methods shall be such that the completed drilled shaft will have a planar bottom. The cutting edges of excavation*

equipment shall be normal to the vertical axis of the drilled shaft within a tolerance of 3/8 in. per ft of diameter.

728.14 Reinforcing Bar Cage Construction and Placement

Reinforcement shall be fastened and placed in accordance with 703. Approved non-corrosive spacing devices shall be installed to hold the reinforcement at least 3 in. from the sides of the drilled shaft excavation along its entire height and concentrically centered within the drilled shaft. At a minimum, spacers shall be placed within 1 ft of the bottom of the drilled shafts and at intervals not exceeding 10 ft along the height of the drilled shaft. Approved bottom supports shall be installed to hold reinforcement the required dimension above the bottom of the drilled shaft. Concrete shall be placed immediately after placing reinforcement in the drilled shaft excavation. If concrete is not placed immediately after placing reinforcement, the Contractor shall remove the reinforcement to allow the Engineer to verify the integrity of the drilled shaft excavation and to ensure loose material has been removed.

Prior to placement of concrete, the Contractor shall determine and record the elevation of the bottom of the drilled shaft excavation and provide a copy of the record to the Engineer.

728.15 Concrete Production and Placement

The concrete used in the drilled shaft shall be in accordance with 728.03 and 728.04. Concrete temperature shall be measured in accordance with AASHTO T 309.

Concrete placement shall be in accordance with the applicable portions of 702, except as modified herein.

Concrete shall not be placed in a drilled shaft excavation without approval from the Engineer. Concrete placement shall be made by one continuous pour from the bottom to the top of the drilled shaft. The elapsed time from batching of the first load of concrete to the completion of concrete placement shall not exceed two hours. At no time during construction shall the slump loss result in a slump below the minimum specified. The Contractor may submit a request for approval by the Engineer for a longer placement time provided the concrete mix maintains the minimum specified slump requirements over the longer placement time as demonstrated by a trial batch and results of slump loss testing from a trial batch.

Concrete shall be placed by means of a chute, tremie or a concrete pump. Placement of concrete by a chute shall only be for the dry construction method in excavations where the maximum depth of water does not exceed 2 in.

Concrete placed by chute shall fall directly to the base of the drilled shaft without contacting either the reinforcement or sides of the drilled shaft excavation. The drop chute shall be supported so that the free fall of the concrete measured from the bottom of the chute is no more than 60 ft. If concrete placement causes the drilled shaft excavation

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

to cave or slough, or if the concrete strikes the rebar cage or sidewall, the Contractor shall reduce the height of free fall or reduce the rate of concrete flow into the excavation. If concrete placement cannot be satisfactorily accomplished by chute, the Contractor shall use either a tremie or concrete pump to accomplish the pour.

Placement of concrete under water or slurry by tremie shall not begin until the tremie is in place at the base of the drilled shaft. Valves, bottom plates, or plugs shall be used only if concrete discharge can begin within a distance of one-half times the diameter of the tremie from the base. Plugs shall be removed from the drilled shaft excavation or be of a material approved by the Engineer, which if left in place will not cause a defect in the drilled shaft. The tremie discharge end shall remain at least 10 ft below the head of the plastic concrete at all times after the first 10 ft of concrete is placed. The flow of concrete shall be continuous and the concrete in the tremie shall be maintained at a positive pressure differential at all times to prevent water or slurry intrusion into the drilled shaft concrete.

Placement of concrete under water or slurry by concrete pump shall not begin until the pump discharge opening is in place at the base of the drilled shaft. A plug or similar device shall be used to separate the concrete from the fluid in the drilled shaft excavation until pumping begins. The plug shall either be removed from the drilled shaft excavation or be of a material approved by the Engineer which will not cause a defect in the drilled shaft if left in place.

The Contractor shall pump an adequate quantity of grout, mortar, or concrete without coarse aggregate through the pump system and lines ahead of the drilled shaft concrete to lubricate the pumping system. Material used for lubrication shall not be allowed to remain in the drilled shaft, but shall be discharged ahead of the drilled shaft concrete up and out of the drilled shaft excavation. The lubrication process shall not be repeated during the remainder of the pour. The pump shall be operated so that a continuous stream of concrete without air pockets is delivered into the excavation. The discharge opening shall remain at least 10 ft below the head of the plastic concrete at all times after the first 10 ft of concrete is placed. When lifting the pump line during concrete placement, the Contractor may temporarily reduce the line pressure until the opening has been repositioned at a higher level in the excavation. The rate of concrete placement shall be controlled to prevent displacement of the reinforcement. When the concrete reaches the top of the drilled shaft excavation, all laitance shall be removed.

If at any time during the concrete pour, the tremie or pump discharge opening is removed from the plastic concrete column and discharges concrete above the rising concrete head, the shaft shall be considered defective. In such case, the Contractor shall remove the reinforcement and concrete, clean the excavation, and complete any other remedial actions as directed by the Engineer.

Concrete in the drilled shaft shall not be vibrated, except that in dry excavations, the concrete in the top 10 ft of the shaft shall be vibrated.

Concrete placement shall continue after the drilled shaft excavation is full and quality concrete is evident at the top of the shaft. Any laitance or contaminated concrete shall be displaced or removed.

The Contractor shall maintain a concrete volume as a function of depth chart for all concrete placed under slurry. Minimum depth measurements shall be taken after every load of concrete placed by tremie and after every 3 ft if pumped.

728.16 Acceptance

The Engineer will perform all quality assurance testing and acceptance testing.

(a) Drilled Shaft Concrete

Acceptance of drilled shaft concrete will be determined on the basis of tests performed by the Department. Concrete and any necessary labor to conduct sampling shall be furnished as required by the Department. During concrete placement at each drilled shaft, testing for slump, unit weight, relative yield, and air content will be conducted on the first load of the day and once every 30 cu yds. Slump, slump retention, and air content shall be in accordance with 728.03. The relative yield should not exceed 0.010 more than the theoretical value shown in the THEORETICAL EFFECT OF AIR CONTENT ON RELATIVE YIELD table in 728.04, based on the measured air content. If this occurs, the process and material will be reviewed through an increase in testing frequency to check results, establish trends, or validate impact of corrective actions.

During the concrete placement at each drilled shaft, two cylinders will be cast for compressive strength at a frequency of once every 60 cu yds. If plastic concrete properties of high air content, high slump, or high relative yield indicate a cause for concern, additional pairs of cylinders will be cast for compressive strength. Initial curing of cylinders shall be completed by submerging the cylinders in water saturated with calcium hydroxide at a temperature range of between 60 to 80°F for no less than 16 hours and no more than 48 hours. Each cylinder will be tested for 28-day compressive strength and the paired values averaged to determine the sample result. Concrete placed in the drilled shafts shall have a 28-day compressive strength that meets or exceeds the compressive strength shown in the plans.

If at any time a construction method fails, in the opinion of the Engineer, to produce the desired final results, the Contractor shall stop construction of drilled shafts and submit a proposed remedy and alternate method for approval to the Engineer.

(b) Slurry

The Contractor shall provide copies of all slurry test reports, signed by the testing technician, to the Engineer. The Contractor shall receive written approval from the Engineer indicating that the slurry is acceptable prior to placing concrete in the drilled shaft.

(c) Drilled Shaft

Completed drilled shafts will be tested for acceptance by the Engineer using crosshole sonic logging, CSL, and impulse response spectrum, IRS, test methods. The Contractor shall provide all equipment, labor, and material required by the Engineer to perform CSL and IRS testing. CSL and IRS testing will be performed no sooner than five business days after placement of concrete in the drilled shaft.

The Contractor shall provide access for the Engineer to the top of each drilled shaft for CSL and IRS testing. Access shall include a stable work platform for the test operators and equipment close to the head of each shaft, and be large enough to accommodate two operators with a standard surveyor's tripod and a small bench or table.

1. CSL Testing

Unless otherwise specified, the Contractor shall provide and install access tubes for CSL testing in all drilled shafts. The Contractor shall at a minimum provide the following for CSL testing:

a. *Schedule 40, 1 1/2 in. I.D. mild steel tubes for each drilled shaft. The bottom of each tube shall be sealed watertight with a threaded end-cap. Any coupling of tubing required to make up the required lengths shall be made using threaded sleeve couplers, sealed watertight. The tubing shall be round and regular in section, with a clean interior surface, free of defects or obstructions that would prevent the passage of a 1 1/4 in. diameter probe through the tube. The exterior surfaces shall be free of dirt, oil, grease, heavy rust scale, or other contaminants which may inhibit formation of a good mechanical bond with the drilled shaft concrete. The use of used or recycled tubing or slightly rusted tubing is acceptable provided that it meets the requirements herein.*

b. *Clean, potable water sufficient to fill the access tubes completely.*

c. *Cement grout sufficient to fill the access tubes on completion of testing.*

d. *Grout mixing equipment and operator.*

e. *Grout pumping equipment and operator. The pump shall have a 1.0 in. tremie pipe capable of reaching the bottom of the access tubes.*

f. *Hosepipe, pump, or other means of placing clean water in the access tubes prior to testing, and for topping off the tubes during testing.*

The Contractor shall install access tubes for CSL testing as follows:

a. *A minimum of four tubes or one tube per foot of drilled shaft diameter, whichever is greater, shall be installed at approximately equidistant points around the interior of the reinforcement. Tubes shall be installed parallel to each other and securely attached to the reinforcement to prevent excessive movement during handling, installation, and placement of concrete. The diameter used when figuring the number of tubes shall be the largest diameter of the shaft and shall be rounded up to the next 1 ft. increment.*

b. *The bottoms of each tube shall be set a minimum of 3 in. and not more than 6 in. above the bottom of the drilled shaft. Tubes shall not be placed in contact with the bottom of the drilled shaft excavation. The top of each tube shall extend 3 ft to 6 ft above the planned top of the drilled shaft. If the top of the drilled shaft will be below grade or water, tubes shall extend 3 ft to 6 ft above grade or water level, or other reasonable access level if cofferdams or casings are used.*

c. *Reinforcement shall be handled and installed to prevent kinking or permanent bending of the access tubes or displacement of the tubes from the required position. Access tubes shall be parallel, undamaged, and securely fixed at the time of concrete placement.*

d. *Prior to placing concrete, the Contractor shall determine and record the bottom elevation of at least one of the access tubes and provide the record to the Engineer.*

e. *Prior to placing concrete, access tubes shall be completely filled with potable water and the top of the tubes sealed with watertight fittings. Anti-freeze shall be added to the water in cold weather to prevent freezing.*

f. *Upon acceptance of the drilled shaft by the Engineer, the Contractor shall remove the water from the CSL access tubes and completely fill the tubes with cement grout.*

2. IRS Testing

The Contractor shall prepare a minimum of two areas on the top of each completed drilled shaft for IRS testing. The areas shall be prepared using chipping hammers or other hand tools not weighing more than 15 lb. Each prepared area shall be a minimum of 3 in. in diameter, shall be within ± 1 in. of the level of surrounding concrete, shall be clean, sound, level, and free of standing water and all foreign or loose materials. Chipping hammers shall not be heavier than 15 lb. At least one area shall be

in the center of the drilled shaft and at least one area shall be a minimum of 18 in. from the center of the drilled shaft, but shall not be outside of the reinforcement of the drilled shaft.

The Engineer will make a preliminary interpretation of the IRS test results on site. If anomalous responses are recorded, or the data indicates a low modulus or contaminated concrete near the top of the drilled shaft, the Contractor shall prepare a new test area near the perimeter of the shaft, at a minimum of 60° rotation from the first test location.

The Engineer will provide copies of all CSL and IRS test results to the Contractor.

The Engineer will evaluate the results of CSL and IRS testing and notify the Contractor in writing if the drilled shaft is accepted or rejected.

If a drilled shaft is rejected, the Engineer may require excavation or coring in order to allow for further assessment of the drilled shaft. If coring is required, the Contractor shall obtain full depth cores from the drilled shaft at locations determined by the Engineer. An accurate log of the coring shall be kept. The cores and coring log shall be submitted to the Engineer for testing and inspection. The Contractor may provide calculations or other test results to the Engineer to support the acceptability of the drilled shaft.

The Engineer will evaluate cores and any additional information provided and will notify the Contractor in writing of the final determination of whether the drilled shaft is accepted or rejected. If a drilled shaft is rejected, the Contractor shall submit a plan to the Engineer for approval to either repair or replace the defective drilled shaft. The Contractor shall not continue construction on a drilled shaft until authorized in writing by the Engineer.

728.17 Method of Measurement

Drilled shafts will be measured by the linear foot for the diameter of drilled shaft specified. The length of drilled shaft will be the difference between the top of drilled shaft elevation and the actual tip elevation of the drilled shaft.

Exploratory cores for drilled shafts will be measured by the linear foot of core.

Permanent casing will be measured by the linear foot for the outside diameter of casing placed.

Reinforcing bars, concrete, slurry, and other incidental items will not be measured.

728.18 Basis of Payment

REVISION TO SPECIAL PROVISIONS

728-B-203 DRILLED SHAFT FOUNDATIONS

Drilled shafts will be paid for at the contract unit price per linear foot of the diameter of drilled shaft specified. If, after inspecting exploratory rock cores, the Engineer determines that the final depth of the excavation needs to be extended further into rock, a contract adjustment for the cost of this additional excavation in rock will be developed in accordance with 104.02 or 104.03 and 109.05.

Exploratory cores for drilled shafts will be paid for at the contract unit price per linear foot.

Permanent casing for drilled shafts will be paid for at the contract unit price for the outside diameter placed.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Drilled Shaft, _____ diameter	*LFT*
Drilled Shaft, Exploratory Core	*LFT*
Drilled Shaft, Permanent Casing	*LFT*

All costs required for the construction of drilled shafts, including, but not limited to labor, equipment, and materials, excavation, cleaning and dewatering, temporary casing, reinforcement, trial batches, thermal control plan and its implementation, all required reports, quality control plans and logs, and all other incidentals shall be included in the cost of the drilled shaft.

The cost of reinforcing bars, concrete, slurry, and other incidentals necessary to construct a drilled shaft in accordance with this specification shall be included in the cost of the drilled shaft pay item.

All equipment, labor, materials, and costs for the testing of the drilled shaft and quality control testing and reports shall be included in the cost of the drilled shaft.

Rejected drilled shafts shall be repaired or replaced, as approved by the Engineer, with no additional payment.

COMMENTS AND ACTION

728-B-203 DRILLED SHAFT FOUNDATIONS

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: NONE Recurring Special Provision affected: 728-B-203 DRILLED SHAFT FOUNDATIONS Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Changes to AASHTO M 240 provided requirements for Type IL blended cement (i.e. Portland-Limestone blended cement). The cement contains limestone dust content in the range of 5% to 15%, by mass of blended cement. Additional research was deemed necessary before INDOT adopted the use of limestone in cement. Since the Type IL is a blended cement and INDOT has additional restrictions for the use of blended cement in pavement and structural concrete, additional considerations were required to whether those restrictions to use of Type IS, IP, IP-A, and ISA would continue to be applied to Type IL blended cement. Also type ISM is no longer an acceptable grade in accordance with AASHTO M 240 and should be removed from the specifications.

PROPOSED SOLUTION: Research was conducted under SPR-3611 to better evaluate the blended limestone cement which has been added to AASHTO M 240. Additional research by TRB has established that Type I Portland cement containing up to 10% limestone dust have demonstrated further improvements to concrete through the additional use of pozzolans (fly ash and GGBFS). Studies by Holcim Cement shows that Type IL blended cement combined with a pozzolan would benefit concrete performance. Prof. Weiss of Purdue University has been consulted on this topic and he concurs that blended cement be used without additional INDOT restrictions of adding fly ash or ggbfs pozzolans by the concrete producer, which would otherwise restrict its use. Concrete containing Type IL blended cement and a plant added pozzolan is expected to result in as good or even superior performance when compared to combining a pozzolan with a conventional Type I cement.

Remove type ISM from the specifications.

APPLICABLE STANDARD SPECIFICATIONS: 901.01(b)1., 501.05, 502.04(a), 502.04(b) and 702.05

APPLICABLE STANDARD DRAWINGS: NA
APPLICABLE DESIGN MANUAL SECTION: NA
APPLICABLE SECTION OF GIFE: NA
APPLICABLE RECURRING SPECIAL PROVISIONS: NA

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: NA

IMPACT ANALYSIS (attach report): yes
Submitted By: Ron Walker
Title: State Materials Engineer
Organization: INDOT
Phone Number: 317-610-7251 x 204
Date: 5/27/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? Yes, indirectly 501.05, 502.04(a) and 702.05

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? No
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? Yes
- Design process? No

Will this change provide the contractor more flexibility? Yes

Will this proposal provide clarification for the Contractor and field personnel? No

Can this item improve/reduce the number of potential change orders? No

Is this proposal needed for compliance with:

- Federal or State regulations? No
- AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 901-R-XXX BLENDED CEMENTS

(Proposed changes shown highlighted gray

901-R-XXX BLENDED CEMENTS

(Adopted xx-xx-15)

The Standard Specifications are revised as follows:

SECTION 501, BEGIN LINE 146, DELETE AND INSERT AS FOLLOWS:

Fly ash or GGBFS used as an additive, or blended portland cements may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year. If type IP, type IP-A, type IS or type IS-A cements are to be used, the minimum portland cement content shall be increased to 500 lbs/cu yd. The use of fly ash or GGBFS as an additive will not be allowed when blended ~~portland~~ cement~~s~~ *types IP, IP-A, IS, or ISA* are used.

SECTION 502, BEGIN LINE 85, DELETE AND INSERT AS FOLLOWS:

Flyash or GGBFS used as an additive, or blended portland cements may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year. If type IP, type IP-A, type IS or type IS-A cements are to be used, the portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or GGBFS as an additive will not be allowed when blended ~~portland~~ cement~~s~~ *types IP, IP-A, IS, or ISA* are used.

SECTION 502, BEGIN LINE 102, INSERT AS FOLLOWS:

Minimum portland cement content (type*s* I, *IL* or III).....564 lbs/cu yd
Maximum fly ash addition .....10% of cement content
Minimum water/cementitious ratio (type*s* I *or IL*) 0.42

SECTION 702, BEGIN LINE 82, INSERT AS FOLLOWS:

Fly ash from an approved source may be used as a partial replacement for portland cement. The substitution of fly ash for portland cement will not be allowed in conjunction with the use of blended portland cement or ground granulated blast furnace slag *or blended cement types IP, IP-A, IS, or ISA*. Mix designs will be based on using a maximum 20% cement reduction with a minimum 1.25:1 ash-to-cement replacement ratio by weight.

Ground granulated blast furnace slag from an approved source may be used as a partial replacement for portland cement. The substitution of ground granulated blast furnace slag for portland cement will not be allowed in conjunction with the use of blended ~~portland~~ cement *types IP, IP-A, IS, or ISA* or fly ash. Mix designs will be based on using a maximum 30% cement substitution with a 1:1 slag-to-cement ratio, by weight.

SECTION 901, BEGIN LINE 22, INSERT AS FOLLOWS:

(b) Portland Cement

Portland cement shall conform to the requirements of the following cited

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 901-R-XXX BLENDED CEMENTS

specifications except as noted.

1. Requirements

Cement	**Specifications**
Air-Entraining Portland Blast-Furnace Slag Cement	AASHTO M 240, Type ISA
Air-Entraining Portland Cement	AASHTO M 85, Type IA or IIIA
Air-Entraining Portland-Pozzolan Cement	AASHTO M 240, Type IP-A
Portland Blast-Furnace Slag Cement	AASHTO M 240, Type IS
Portland Cement	AASHTO M 85, Type I, II, or III
Portland-Limestone Cement	*AASHTO M 240, Type IL*
Portland-Pozzolan Cement	AASHTO M 240, Type IP
~~Slag Modified Portland Cement~~	~~AASHTO M 240, Type ISM~~

COMMENTS AND ACTION

901-R-XXX BLENDED CEMENTS

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: 501.05 pg 337; 502.04 pg 354; 702.05 pg 519; 901.01 pg 836; Recurring Special Provision affected: PROPOSED NEW Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: A Recurring Special Provision is needed to address several aggregate specification items related to aggregates for structure backfill, seal coats, and friction resistance as follows:

1. Clarification of the testing requirements for aggregates allowed in Type 3 structure backfill to assist Aggregate Producers in testing these materials is needed. Depending on the type and size of aggregate, not all tests for retaining walls are required.
2. Seal coat (SC) aggregates have successfully been used for several years in seal coat cover aggregate applications and placing these aggregates in the specifications is needed. These size aggregates have already been incorporated into the Certified Aggregate Producer Program.
3. The JTRP study on "Maximizing the Use of Local Aggregates" has successfully been completed and incorporating the findings into the specifications is needed. The purpose of the study was to verify that a small percentage of any coarse aggregate could be added to a high ESAL HMA mixture without affecting the friction resistance because of eventual differential wear of the aggregates. A test section on I-265 verified after 2½ years of friction testing that the friction resistance was not affected by adding 20% of a highly polishing aggregate.

PROPOSED SOLUTION:

1. Revise 211.03.1(c) to clarify aggregate requirements for structural backfill aggregates.
2. Revise 404.04 and 904.03(e) to include SC aggregates
3. Revise 904.03(d)1 to allow any stone or gravel coarse aggregate to be added up to a limiting percentage for high ESAL category HMA surface mixtures.

APPLICABLE STANDARD SPECIFICATIONS: 211.03.1(c), 404.04, 904.03 (e), and 904.03(d)1

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: Develop a new RSP

PAY ITEMS AFFECTED: N/A

IMPACT ANALYSIS (attach report):

Submitted By: Ron Walker

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

Title: State Materials Engineer

Organization: Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: May 30, 2015

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

SPECIFICATION REVISION

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? No
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this item improve safety:

- For motorists? Yes
- For construction workers? Yes

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? Yes
- Design process? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? No

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 904-R-XXX AGGREGATES

(Proposed changes shown highlighted gray

904-R-XXX AGGREGATES

(Adopted xx-xx-15)

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 111, INSERT AS FOLLOWS:

(c) Type 3

Structure backfill in accordance with 904.05, except only nominal size aggregates 1 in., 1/2 in., No. 4 or No. 30, and coarse aggregate No. 5, No. 8, No. 9, No. 11, or No. 12 shall be stone. ACBF meeting the size requirements for coarse aggregate No. 5 or No. 8 may also be used.

A type A certification in accordance with 916 for the additional structure-backfill testing described below shall be furnished to the Engineer prior to use. An approved geotechnical laboratory shall be used to perform the tests.

Structure backfill for all retaining walls shall be in accordance with the following criteria:

PROPERTY	CRITERIA	TEST METHOD
pH *(Note 1)*	5 < pH < 10	AASHTO T 289
Organic Content *(Note 2)*	1% max.	AASHTO T 267
Permeability, min. *(Note 3)*	30 ft/day	AASHTO T 215

Note 1: One pH test is required for each bench of stone, each source of air cooled blast furnace slag, and each source of gravel.
Note 2: One organic content test is required for each source of gravel.
Note 3: One permeability test is required for the smallest aggregate size from each source. Sizes No.5, No.8, and No.9 do not require a permeability test.

The gradation shall be ~~run~~*performed* on the material used in the permeability test. Testing for permeability shall be performed on the sample of the material compacted to 95% in accordance with AASHTO T 99, Method C or D. All of the tests listed above shall be ~~run~~*performed* a minimum of once every 12 months per source. ~~The Office of Materials Management will evaluate the material from each source and determine the appropriate tests to be performed.~~

SECTION 404, BEGIN LINE 21, INSERT AS FOLLOWS:

404.04 Cover Aggregate

Aggregate shall be in accordance with the following requirements. When slag is used as an alternate to natural aggregate, adjustments will be made in accordance with 904.01, to compensate for differences in specific gravity.

Coarse Aggregates*, Class B or Higher
Size No. 8, 9, 11, *SC 11*, ~~or~~ 12, *SC 12*, *or SC 16*.....904

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 904-R-XXX AGGREGATES

Fine Aggregate, Size No. 23 or 24.....904

* *Seal coat (SC) aggregates shall be steel furnace slag, dolomite, or polish resistant aggregates in accordance with 904.*

The types of seal coats shall be as follows:

Type (see Note 1)	Application	Cover Aggregate Size No. and Course	Rates of Application per sq yd	
			Aggregate, lb	Asphalt Material, Gal. at 60°F
1 or 1P (see Note 2)	Single	23, 24	12 - 15	0.12 - 0.16
2 or 2P	Single	12, *SC 12*, *SC 16*	14 - 17	0.29 - 0.33
3 or 3P	Single	11, *SC 11*	16 - 20	0.36 - 0.40
4 or 4P	Single	9	28 - 32	0.63 - 0.68
5 or 5P	Double	Top: 12, *SC 12*, *SC 16*	16 - 19	0.33 - 0.37
		Bottom: 11, *SC 11*	16 - 20	0.36 - 0.40
6 or 6P	Double	Top: 11, *SC 11*	18 - 22	0.41 - 0.46
		Bottom: 9	28 - 32	0.63 - 0.68
7 or 7P	Double	Top: 11, *SC 11*	18 - 22	0.41 - 0.46
		Bottom: 8	28 - 32	0.63 - 0.68

Note 1 – AE-90S shall be used for type P seal coats.
Note 2 – HFRS-2 shall not be used with type 1 seal coat.

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 904-R-XXX AGGREGATES

SECTION 904, BEGIN LINE 241, INSERT AS FOLLOWS:

(d) Surface Aggregate Requirements

The surface mixture aggregates selection shall be based on the ESAL category as follows.

1. HMA Coarse Aggregate

Coarse Aggregate Type	Traffic ESALs		
	< 3,000,000 *ESAL Categories 1 & 2*	< 10,000,000 *ESAL Category 3*	≥ 10,000,000 *ESAL Categories 4 & 5*
Air-Cooled Blast Furnace Slag	Yes	Yes	Yes
Steel Furnace Slag	Yes	Yes	Yes
Sandstone	Yes	Yes	Yes
Crushed Dolomite	Yes	Yes	(Note*s* 1 *& 2*)
Polish Resistant Aggregates	Yes	Yes	(Note*s* 1 *& 2*)
Crushed Stone	Yes	(Note 2)	(Note*s* 2 *&3*)
Gravel	Yes	(Note 2)	(Note*s* 2 *&3*)

Note 1. Polish resistant aggregates or crushed dolomite may be used when blended with ACBF or sandstone but cannot exceed 50% of the coarse aggregate by weight or cannot exceed 40% of the coarse aggregate by weight when blended with steel furnace slag. *When also blended with crushed stone or gravel, the combined aggregates cannot exceed 50% of the coarse aggregate by weight when blended with ACBF or sandstone or cannot exceed 40% of the coarse aggregate by weight when blended with steel furnace slag.*

Note 2. ~~Crushed stone or gravel~~*Aggregates* in accordance with ITM 221 may be used.

Note 3. Crushed stone or gravel may be used when blended with ACBF or sandstone but cannot exceed 20% of the coarse aggregate by weight or cannot exceed 15% of the coarse aggregate by weight when blended with steel furnace slag.

SECTION 904, BEGIN LINE 250, INSERT AS FOLLOWS:

(e) Sizes of Coarse Aggregates

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 904-R-XXX AGGREGATES

Sieve Sizes	COARSE AGGREGATE SIZES (PERCENT PASSING)										
		COARSE GRADED								DENSE GRADED	
	2	5	8	9	11, *SC 11* [5]	12, *SC 12* [5]	*SC 16*[5]	43[1]	91	53[1]	73[1]
4 in. (100 mm)											
3 1/2 in. (90 mm)											
2 1/2 in. (63 mm)	100										
2 in. (50 mm)	80-100										
1 1/2 in. (37.5 mm)		100						100		100	
1 in. (25 mm)	0-25	85-98	100					70-90	100	80-100	100
3/4 in. (19 mm)	0-10	60-85	75-95	100				50-70		70-90	90-100
1/2 in. (12.5 mm)	0-7	30-60	40-70	60-85	100	100	*100*	35-50		55-80	60-90
3/8 in. (9.5 mm)		15-45	20-50	30-60	75-95	95-100	*94-100*				
No. 4 (4.75 mm)		0-15	0-15	0-15	10-30	50-80	*15-45*	20-40		35-60	35-60
No. 8 (2.36 mm)		0-10	0-10	0-10	0-10	0-35		15-35		25-50	
No. 16 (1.18 mm)							*0-4*				
No. 30 (600 µm)						0-4		5-20		12-30	12-30
No. 200 (75 µm)[2]								0-6.0		5.0-10.0[4]	5.0-12.0
Decant (PCC)[3]		0-1.5	0-1.5	0-1.5	0-1.5	0-1.5			0-1.5		
Decant (Non-PCC)	0-2.5	0-2.5	0-3.0	0-2.5	0-2.5	0-2.0			0-2.5		
Decant (SC)					*0-1.5*	*0-1.5*	*0-1.5*				

Notes: 1. The liquid limit shall not exceed 25 (35 if slag) and the plasticity index shall not exceed 5. The liquid limit shall be determined in accordance with AASHTO T 89 and the plasticity index in accordance with AASHTO T 90.
2. Includes the total amount passing the No. 200 (75 µm) sieve as determined by AASHTO T 11 and T 27.
3. Decant may be 0-2.5 for stone and slag.
4. When slag is used for separation layers as defined in 302.01, the total amount passing the No. 200 (75 µm) sieve shall be 10.0 to 12.0.
5. Seal coat (SC) aggregates shall be 85% one face and 80% two face crushed. The Flakiness Index in accordance with ITM 224 shall be a maximum of 25%.

COMMENTS AND ACTION

904-R-XXX AGGREGATES

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: 211.03 pg 211 and 212; 904 pg 878 and 879. Recurring Special Provision affected: PROPOSED NEW Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The JTRP study entitled "Using Recycled Concrete as Aggregate in Concrete Pavements to Reduce Material Costs" has successfully been completed and results from the study need to be implemented. Results indicated that up to 30% recycled concrete aggregate (RCA) may be added in the concrete mix without fly ash and up to 50% RCA may be added with fly ash without reducing the quality of the concrete mix. Testing of the RCA for AP status will be done by the Hydraulic Fracture Test device which was recently implemented from another research study.

PROPOSED SOLUTION: Add specifications to 501 and 502 to allow recycled concrete aggregate to be added to concrete

APPLICABLE STANDARD SPECIFICATIONS: 501.03, 501.05, 502.02, 502 04

APPLICABLE STANDARD DRAWINGS: NA

APPLICABLE DESIGN MANUAL SECTION: NA

APPLICABLE SECTION OF GIFE: NA

APPLICABLE RECURRING SPECIAL PROVISIONS: RSP to be added

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: NA

IMPACT ANALYSIS (attach report):

Submitted By: Ron Walker

Title: State Materials Engineer

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: 5/30/15

Mr. Walker
Date: 6/18/15

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No
Will approval of this item affect the Approved Materials List? No
Will this proposal improve:

- Construction costs? Yes
- Construction time? No
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No
Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? Yes
- Design process? No

Will this change provide the contractor more flexibility? Yes

Will this proposal provide clarification for the Contractor and field personnel? No

Can this item improve/reduce the number of potential change orders? No

Is this proposal needed for compliance with:

- Federal or State regulations? No
- AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 500-R-XXX RECYCLED CONCRETE AGGREGATE

(Proposed changes shown highlighted gray
500-R-XXX RECYCLED CONCRETE AGGREGATE

(Adopted xx-xx-15)

The Standard Specifications are revised as follows:

SECTION 501, BEGIN LINE 23, INSERT AS FOLLOWS:

501.03 Materials

Materials shall be in accordance with the following:

Admixtures	912.03
Coarse Aggregate, Class AP, Size No. 8*	904
Fine Aggregate, Size No. 23*	904
Fly Ash	901.02
Ground Granulated Blast Furnace Slag	901.03
Portland Cement	901.01(b)
Rapid Setting Patch Materials	901.07
Water	913.01

* Or gradation as identified in the QCP. *Recycled concrete aggregate ,RCA, in accordance with ITM 223 may be used.*

SECTION 501, AFTER LINE 156, INSERT AS FOLLOWS:

Recycled concrete aggregate, RCA, may be added up to 30% of the coarse aggregate by weight when no fly ash is used as an additive in the concrete mix and up to 50% of the coarse aggregate by weight when fly ash is used as an additive in the concrete mix.

SECTION 502, BEGIN LINE 9, INSERT AS FOLLOWS:

502.02 Materials

Materials shall be in accordance with the following:

Admixtures	912.03
Coarse Aggregate, Class AP, Size No. 8*	904
Fine Aggregate, Size No. 23	904
Fly Ash	901.02
Ground Granulated Blast Furnace Slag	901.03
Portland Cement	901.01(b)
Rapid Setting Patch Materials	901.07
Water	913.01

* *Recycled concrete aggregate (RCA) in accordance with ITM 223 may be used.*

SECTION 502, AFTER LINE 61, INSERT AS FOLLOWS:

Recycled concrete aggregate, RCA, may be added up to 30% of the coarse aggregate by weight when no fly ash is used as an additive in the concrete mix and up to 50% of the coarse aggregate by weight when fly ash is used as an additive in the concrete mix.

COMMENTS AND ACTION

500-R-XXX RECYCLED CONCRETE AGGREGATE

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: 501.03 pg 334; 502.02 pg 352. Recurring Special Provision affected: PROPOSED NEW Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update