16 State House Station
Augusta, Maine 04333

MaineDOT

Transportation Research Division

Technical Report 15-11

Experimental Demonstration of Xypex Additive in Concrete to Improve Durability

Construction & First Interim Report, December, 2015

Transportation Research Division

Experimental Demonstration of Xypex C-500 Additive in Concrete to Improve Durability

Introduction

In 2012 the Maine Department of Transportation reconstructed the Stockton Springs Underpass Bridge #5760 on Church Street over US Route 1. The primary Contractor for this project was the Lane Construction Corporation of Cheshire, Connecticut.

The bridge consists of structural steel girders with a reinforced concrete deck system. Because of the steep profile grade an integral concrete wearing surface was used instead of the typical waterproofing membrane with hot mix asphalt pavement surface.

MaineDOT generally uses black bar as reinforcing steel in bridge decks. An opportunity arose on this project to supplement the concrete mix with a waterproofing additive in hope of providing a more durable and impermeable concrete deck.

On this project, the MaineDOT used an alkaline earth silicate cement admixture as an experimental feature to waterproof the concrete. Unlike many other concrete waterproofing solutions, XYPEX ADMIX C-500 is added to the concrete mix at the time of batching, so it becomes integral to the finished product and permanent. The active chemicals in XYPEX react with the moisture in fresh concrete and the by-products of cement hydration to generate a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete, thereby reducing the concrete permeability which in turn increases durability.

This report covers the experimental usage of the Xypex additive, including lab test results and analysis and field observations during construction and subsequent inspections.

Project Location

The Stockton Springs Underpass Bridge #5760 carries Church Street over US Route 1 in the town of Stockton Springs in Waldo County. The project number is BH-1510(800)X, WIN 15108.00 (see Figure 1).

Figure 1

Project Scope

This bridge consists of steel girders with a reinforced concrete deck. The deck includes an integral concrete wearing surface. For this project two classes of concrete are used. Class A is our workhorse concrete mix that is used in the substructures and the deck. The abutments are Class A concrete and the deck is the Class A concrete with Xypex additive. Class LP or Low Permeability mix is used in the concrete curbs, sidewalks, and endposts. The concrete mix designs are included in the Appendix to this report.

The project work plan includes testing to be completed by the University of New Hampshire and our Bangor Central Lab. Test results are reported in the Materials section of this report and in full detail in the Appendix.

Materials

The concrete mix selected uses a highly reactive aggregate in terms of alkali silica reactivity. Previous testing shows this can be mitigated by using slag to replace 50% cement. Therefore the Class A mix includes 320 lb./cu.yd of cement and 320 lb/cu.yd slag, grade 120. Based on manufacturer's

recommendation the Class A with Xypex mix contains the same amount of cement and slag plus 15 lb/cu.yd of Xypex. The Class LP mix contains 381 lb/ cu.yd of cement, 254 lb/cu.yds. slag and 25 lb/cu.yds. of silica fume.

The table below summarizes the concrete mix designs, targets and field sample testing.

Concrete Class	*Cement – lb/cu-yd*	*Targets*	*Field Sample Tests*
A	320 cement Type II 320 slab, grade 120	4350 psi 7.3% air 0.41 w/c 2400 coloumbs	6600 psi 7.3% air 0.40 w/c 1370 coloumbs
A with Xypex	320 cement Type II 320 slab, grade 120 15 Xypex	4350 psi 7.3% air 0.41 w/c 2400 coloumbs	6600 psi 7.3% air 0.41 w/c 1010 coloumbs
LP	381 cement Type II 254 Slag, grade 120 25 silica fume	5075 psi 7.3% air 0.39 w/c 2000 coloumbs	7290 psi 6.8% air 0.40 w/c 670 coloumbs

Figure 2

Chloride Content Testing

The chloride testing was conducted by the University of New Hampshire on samples collected in the field. Testing followed the standards of ASTM C 1152/C 1152M Test Method for Acid-Soluble Chloride in Mortar and Concrete. The chloride penetration data for 28 days of 3 percent calcium chloride ponding show that the Class A concrete with and without XYPEX is approximately equal however the Class LP mix appears to be more effective in reducing the penetration of chloride ions.

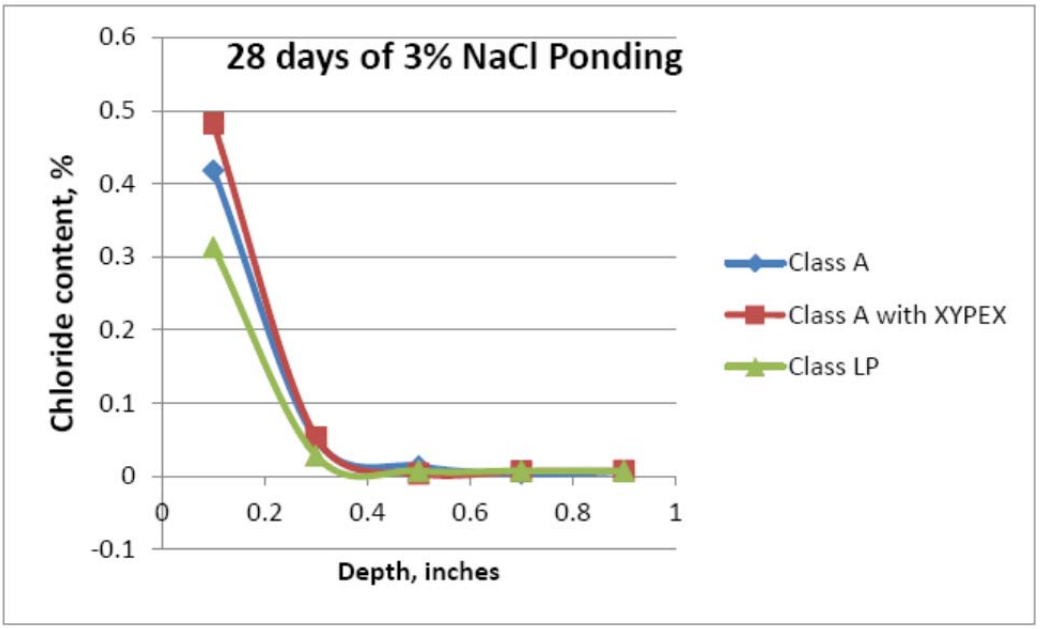


Figure 3

Sequence of construction/ class concrete placed and where.Construction

Sequence of construction/ class concrete placed and where: For abutments and wings, Class A concrete was used. Precast deck panels, approximately 3.5” thick, were used but not included in this evaluation. The deck with integral wearing surface was constructed with Class A with Xypex for the overall depth. The deck concrete also contained 50% slag as an Alkali-Silica Reactivity (℄) mitigation. Curb, sidewalk and endposts were constructed with Class LP concrete.

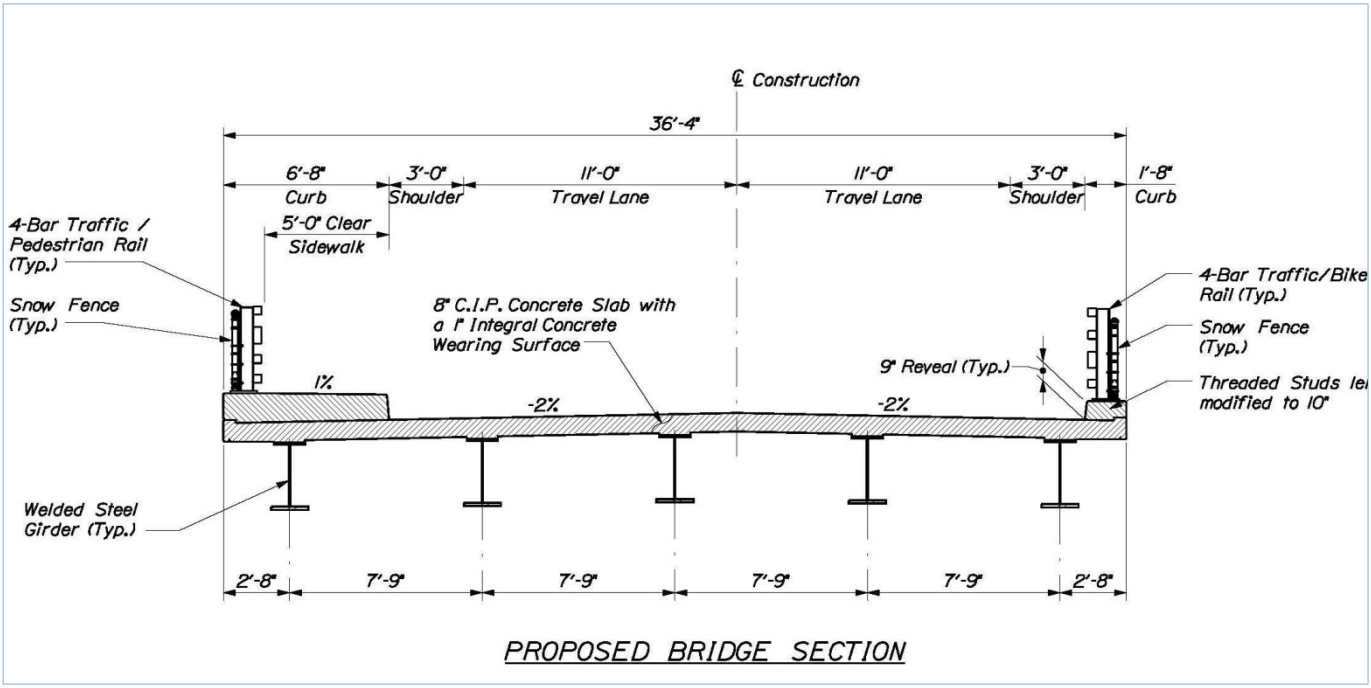


Figure 4

Workers reported finding the concrete with Xypex “sticky” and that the Bidwell finish floats had trouble with dragging. Workers had to spray the surface with Confilm after the Bidwell made its final pass. Confilm is a spray-on evaporation reducer manufactured by BASF.

Once the Confilm had dissipated, the workers could then bull float and groove the finished surface immediately. Without the use of Confilm, the surface was taking an initial set before the bull floating and grooving could be performed. This was demonstrated in the trial batch sample as shown in the picture below (Figure 6). It should be noted however, that these issues are not unique to the Xypex mix, and can be seen in LP mixes as well.

Upon completion of the deck work, the surface was sealed with a silane-based penetrating sealer.

Figure 5
Trial batch materials

Figure 6
Preparing the trial batch sample

Material Costs

The cost of the XYPEX admixture, C-500, for this experimental project was $4,000.00 which represented a discount of twenty-five percent from their regular selling price or a net cost of approximately $1.33 per square foot.

Evaluation Photos 10-7-2015

Longitudinal crack at north end of deck

Figure 7

Close up of previous image

Figure 8

Tined finish of wearing course

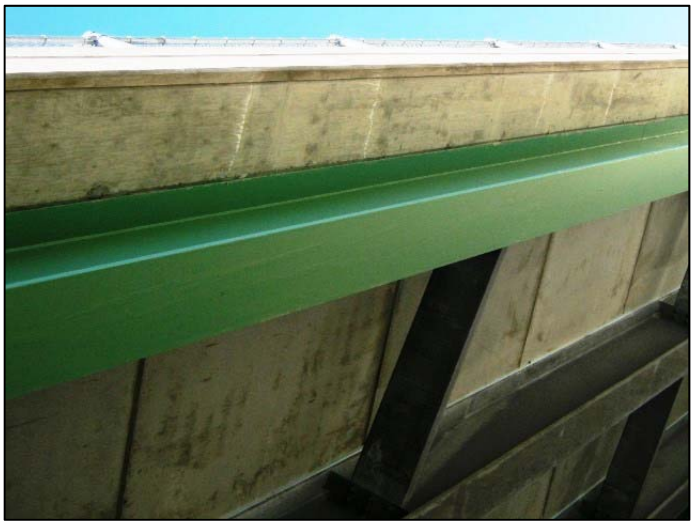
Figure 9

South end of deck, note cracking (bottom)

Figure 10

Galvanized girders under deck

Figure 11



Outermost exposed sides of galvanized girders painted green for aesthetics.

Figure 12

Inspection Notes 10-7-2015

Several longitudinal and transverse cracks were noted in the deck surface during the October 7, 2015 inspection. The cause of these cracks is unknown . It may be possible that they are appearing at girder locations and/or at edges of precast stay in place forms. It is also unkown if the Xypex is contributing to the cracking. The worst cracking noted was at the north end of the bridge, near the US Route 1 off ramp (see Figures 7 & 8).

There is some transverse micro-cracking in the sidewalk due to shrinkage (Class LP concrete as noted earlier). However, it wasn't highly visible.

Conclusions

Comments from MaineDOT's Concrete Quality Specialist regarding cracking:
These cracks seem pretty typical of the cracking we almost always get. This was a single span structure so the cracking is not a negative movement type or over a pier so that pretty much points to drying shrinkage type cracking. My guess is it's from high strength concrete placed in a single span with no joints constructed for stress relief or shrinkage cracking control. I guess the questions to ask now are, was it wet cured properly? Was curing started in a timely manner? Were there temperature issues with the concrete during the curing period? It would be easy to blame it on the slag, but I'm pretty sure we were having these types of issues back when everything was done with straight cement.

The Xypex additive likely had no adverse effect on the concrete mix per UNH's report. Test values for air content, water/cement ratio and strength were virtually the same as the untreated concrete. Also, salt ponding test values were very similar. The Xypex mix did not provide additional protection from salt penetration.

Rapid chloride permeability tests (AASHTO T-277) conducted at the Bangor lab did show some improvement with the Xypex mix. However T-277 does caution that tests should be correlated to salt ponding test results.

Field observations after three years show some signs of premature aging of the deck surface after only three years of service. The Transportation Research Division plans to follow up with an inspection and report in two year's time (2017).

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Special thanks to Richard E. Myers, P.E. and Guy Hews for their assistance with this test.

Appendices

Appendix A - Experimental Work Plan

Appendix B - UNH Final Testing Report for Stockton Springs Bridge Concrete

Appendix C - Bangor Lab Mix Designs

Appendix D - Bangor Lab Test Results

Appendix E – XYPEX Admix C-500 Tech Data Sheet

APPENDIX A

Stockton Springs PIN 15108
Work Plan for Experimental Use of Xypex Admixture 5/9/2012

The project specifies Class A, Class A with Xypex and Class LP concrete. The testing to be completed by MaineDOT is proposed below:

Concrete Mix	Compressive Strength	Rapid Chloride Permeability Testing	Air content
Class A	Minimum 3 sets of two cylinders	Minimum 3 sets of two cylinders	Minimum of 3
Class A w/Xypex	Minimum of 3 sets of two cylinders	Minimum 3 sets of two cylinders	Minimum of 3
Class LP	Minimum of 3 sets of two cylinders	Minimum 3 sets of two cylinders	Minimum of 3

The testing above is primarily from the project minimum Quality Acceptance requirements. There may be a need to collect a few additional "informational samples" in order to guarantee three samples from each class of concrete. MaineDOT's Bangor lab will complete this testing. The informational sample testing may cost an additional $500.

A trial batch is recommended prior to placing the Class A with Xypex. Air content and workability should be noted. Cylinders for compressive strength and rapid chloride permeability testing should be prepared.

In addition to the above mentioned testing salt ponding, shrinkage tests, petrographic analysis and alkali-silica reactivity is proposed as summarized in the attached proposal from the University of New Hampshire.

Use of the Xypex material in the proposed concrete slab as well as the associated typical and experimental testing will be handled as a Contract modification. It is expected that the Contractor will be responsible for purchasing the Xypex material. The manufacturer of Xypex has agreed to give the Department a 25% discount on the material which shall be conveyed to the Contractor. The total estimated cost of the Contract modification including materials and testing is shown below.

$4000 Xypex + $500 MaineDOT additional testing + $19,323 UNH testing = **$23,823**

After completion of all testing, a report will be prepared that documents all of the test results, construction, lessons learned and recommendations on further use of this type of admixture. This report will be completed by summer 2014.

The use of this admixture will be documented in our Bridge Management and Inspection System.

APPENDIX B

UNIVERSITY of NEW HAMPSHIRE

January 6, 2014

Dale Peabody
Transportation Research Engineer
Transportation Research Division Office of Safety, Training & Research Maine DOT
16 State House Station
Augusta, ME 04333

Re: Final Testing Report for Stockton Springs Bridge Concrete

Dear Mr. Peabody:

Please be advised we have completed the laboratory testing of the Stockton Springs, Maine Bridge project. The final report follows:

Alkali Silica Reaction Testing

Testing was conducted to determine if there was a potential for alkali silica reaction in the aggregate of the proposed concrete to be used for the Stockton Springs US 1 bridge project. Eleven buckets of the proposed materials were picked up at Freeport for the laboratory testing and transported to the laboratories of the University of New Hampshire. Laboratory evaluation consisted of ASTM 1260 testing of the Hughes Brothers fine and Lane Construction coarse aggregate without any mitigation and ASTM 1157 testing of both fine and coarse aggregate with mitigated mixes using Dragon Grade 120 slag. The effect of C-500 XYPEX with the mitigated mixes was also evaluated. Table 1 shows the mix identifications, their mix design components and ASR expansions at 14 and 28 days.

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The expansions are shown for the Lane coarse aggregate and Hughes fine aggregate in Figures 1 and 2 respectively. These data show the aggressiveness of the unmitigated aggregates. The mitigated mixes as well as the ones incorporating XYPEX are effectively mitigated at 14 days of expansion using Dragon slag at a 50 percent substitution. The XYPEX at a dosage rate of 15 pounds per cubic yard accentuates the expansion of the Hughes sand but not the Lane coarse aggregate however all pass the 14 day 0.10 percent expansion criteria. If the 28 day 0.1 percent criteria are ever specified by MEDOT it is recommended that the current mitigation strategy, when using the Lane aggregate, be revaluated.

Field Concrete Sample Preparation

Concrete samples were cast in the field to evaluate shrinkage and chloride ponding resistance on the three concretes utilized in the construction of the Stocking Springs Bridge. Specimens included shrinkage beams and concrete pads for chloride ponding testing. Molds were provided for the fabrication of the field samples. Resident Engineer Guy Hews fabricated all samples and initiated the wet burlap curing. The samples were field stripped and protected from drying during their transport to the UNH concrete laboratory. Laboratory curing simulated the wet burlap field curing for 7 days. Additional curing of 14 days and 28 days were evaluated to see the benefit of increased curing longer than the specified 7 day cure on shrinkage. This procedure was repeated for each of the three concretes used on the project, Class A, Class A with XYPEX, and Class LP.

Laboratory Concrete Samples

Additional laboratory mixes were made in the laboratory using the materials and admixtures obtained from Lane Construction for ASR testing. A Class A control and a Class A mix with Eclipse® Floor 200, a shrinkage reducing admixture, although not used on the Stocking Springs Bridge, were laboratory evaluated for comparison purposes.

Shrinkage Testing

The shrinkage testing followed ASTM 157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete modified for field concrete. Concrete prisms cast on site as well as laboratory prepared mixes as discussed above were evaluated for shrinkage. The concrete shrinkage specimens were cast in steel 3"x3"x11" studded molds. The three concretes placed in the field A, AX, and LP along with the two laboratory mixes, labeled as A and E were evaluated for shrinkage. All beams were cured a minimum of 7 days using wet burlap however to evaluate the potential benefit of continued curing additional specimens were cured for 14 days, and 28 days and for comparison a set was submerged in saturated lime water and never allowed to dry. After the specified curing period the samples were initially measured for length and weight and then stored under laboratory conditions of approximately 50 percent relative humidity. In order for the drying specimens to be evenly exposed to air, they were placed on small hardwood dowels to assure drying on all surfaces. Length change was measured to 0.0001 inches using an electronic dial gauge manufactured by Chicago Dial Indicators. All length measurements were normalized to a standard and recorded with sample weight onto a Microsoft Excel spreadsheet.

The shrinkage data for the field mixes are shown on Figures 3 through 5. One significant observation is that all mixes show approximately the same shrinkage as a function of time for a specific curing. The other observation is that there is a very significant improvement in shrinkage when the curing is increased from 7 to 14 to 28 days. The shrinkage of the 14 and 28 day cures are statistically reduced by about 10 and 15 percent less than the 7 day cured samples after 425 days of drying respectively.

The shrinkage data for the laboratory mixes are shown by Figures 6 and 7. These data show the laboratory Class A mix is approximately equivalent to the Field Class A mix. The special surfactant shrinkage admixture reduced the shrinkage by about 2/3 that of the Class A standard mix after 425 days of drying.

Salt Ponding Testing

Chloride penetration of the concrete pads was determined as per ASTM 1543, Standard Test Method for Determining the Penetration of Chloride Ion into Concrete by Ponding. The salt ponding samples were approximately 8"x8"x3.5"cast in forms made of plywood and 2x4 stock. Three samples from each of the three concretes were randomly selected and Plexiglass 1/16" sheet material was secured on the sides of the concrete pads with 3M 5200 Marine Sealant to act as a dam to hold the 3% Sodium Chloride solution on the top finished surface of the pads. The sides were sealed with the 5200 sealant however the bottom, cast against the plywood base was left unsealed.

Three percent Sodium Chloride solution was applied to the concrete pads after the sealant had cured. The samples were covered by a ceramic tile lid with a foam weather strip attached to prevent evaporation of water from the solution. After 28 days of ponding the samples were air dried and powder samples were obtained as a function of depth into the surface as described below.

Powder sampling

Powder samples of the concrete were obtained by using a 1.25 inch diamond dry cutting core barrel mounted on a drill press. Figures 8 through 10 show the drill press, the core barrel and the dial gauge respectively. The procedure was to set the concrete pad in place and then the barrel was lowered by the drill press lever until it rested on top of the concrete surface. The lever was restrained in place using a bungee cord. The electronic dial gauge, manufactured by Chicago Dial Indicator, was then set to zero. The lever was then pulled downward again in order to make sure that the barrel was in contact with the concrete surface, then the dial gauge was zeroed once more, and then the drilling began. The sample was drilled in independent intervals of 0.2 inches up to 1.0 inches. The powder was collected at the end of each interval by placing a metal cup over the cored hole, taping it to the concrete block, and then flipping the concrete block upside down. This was found to be the most efficient way of recovering the powder. Once the powder

had been collected, the concrete block was cleaned of all remaining powder by use of a strong vacuum cleaner. Then the entire procedure was repeated starting at the bottom of the hole. It is important to note that the core barrel was not turned on until it was properly placed at the desired layer to prevent any powder from upper layers or the surface from contaminating the powder of the layer being extracted.

Chloride Content Testing

The chloride testing followed the standards of ASTM C 1152/C 1152M Test Method for Acid-Soluble Chloride in Mortar and Concrete and specifically as per section 19. Chloride (*Reference Test Method*) of ASTM C 114, Standard Test Methods for Chemical Analysis of Hydraulic Cement.

The chloride penetration data after 28 days of 3 percent calcium chloride ponding is shown on Figure 11. The chloride test data were determined on powder samples taken every 0.2 inches (i.e. 0 to 0.2, 0.2 to 0.4, 0.4 to 0.6, 0.6 to 0.8 and 0.8 to 1.0) but were plotted at the middle of their actual depth (0.1, 0.3, 0.5, 0.7, and 0.9 inches respectively). These data show that the Class A concrete with and without XYPEX are approximately equal however the Class LP mix appears to be more effective in reducing the penetration of chloride ions. Chloride penetration has advanced to a depth of approximately 0.35 inches after 28 days of ponding.

Figure 12 shows the chloride penetration after 263 days of salt water ponding. The trend of these data are similar to the earlier 28 days of ponding in that there appears to be no benefit of the XYPEX admixture in reducing penetration of chloride. The depth of chloride penetration for the Class A and Class A with XYPEX has increased throughout all tested depths. The approximate depth where it significantly changes is approximately 0.5 inches. The Class LP mix appears to be significantly better than the other two mixes. It does not change slope significantly until at a depth of approximately 0.4 inches.

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Air Void Analysis

An air voids analysis as per the standards of ASTM C 457 Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete. Samples obtained from the ponding pad specimens made in the field were tested as per Procedure B "Modified Point-Count Method". Sections were cut from the ponding pads using a diamond edged concrete saw. Once cut, the samples were polished to a grit size of 15 μm. After polishing, each specimen was evaluated under a stereographic microscope. The results are presented in Table 2. The air contents, specific surfaces, and spacing factors strongly suggest these concretes are expected to be resistant to freezing and thawing.

Summary and Conclusions

Based on the data obtained during this study it appears there is no detrimental effect of using of using XYPEX at the recommended dosage. The ASR testing was not significantly effected, shrinkage up to 425 days and the ability to entrain air for a viable air void system was equivalent to the Class A control mix. The use of XYPEX to decrease the penetration of chloride from ponding of 3% salt solution could not be shown to be any different than a Class A mix. Overall the Class LP mix outperformed the Class A and the Class A with XYPEX mixes in penetration of chloride.

Respectfully submitted,

David Gress

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Table 1 Mix identification, mix design components and ASR expansion data at 14 and 28 days.

Mix	Aggregate	ASR Mitigating Admixture				Expansion, %	
		Lithium	Fly ash	Slag	XYPEX	14 day	28 day
H1	Hughes Sand					0.540	0.859
H2	Hughes Sand			X		0.038	0.105
H3	Hughes Sand			X	X	0.066	0.137
L1	Lane Coarse					0.489	0.804
L2	Lane Coarse			X		0.032	0.063
L3	Lane Coarse			X	X	0.033	0.062

Table 2 Air void analysis of field concrete mixes

Concrete	Air content, %	Specific surface, in^{-1}	Spacing factor, in
Class A	4.9	595	0.0067
Class A with XYPEX	7.3	688	0.0058
Class LP	8.5	933	0.0042

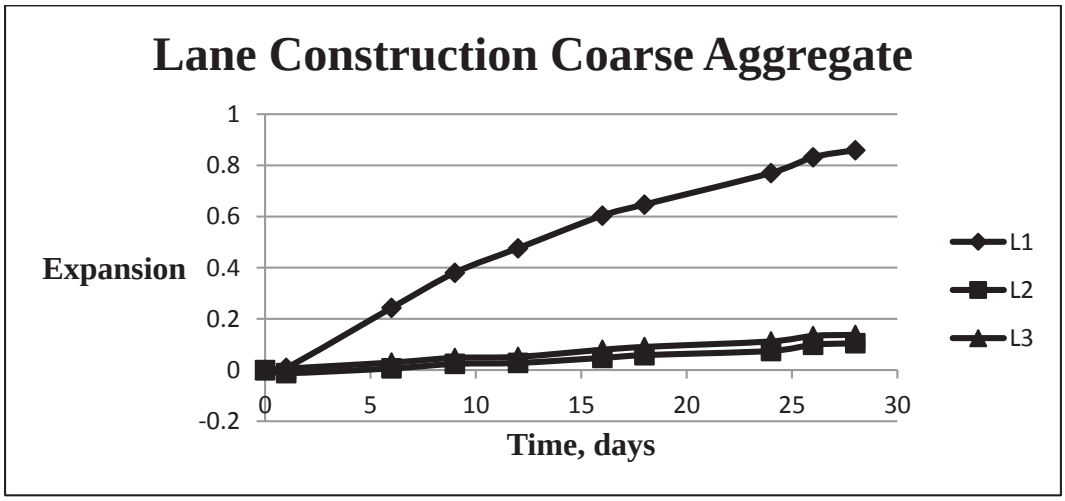

Figure 1 Expansion data for Lane Construction Coarse Aggregate

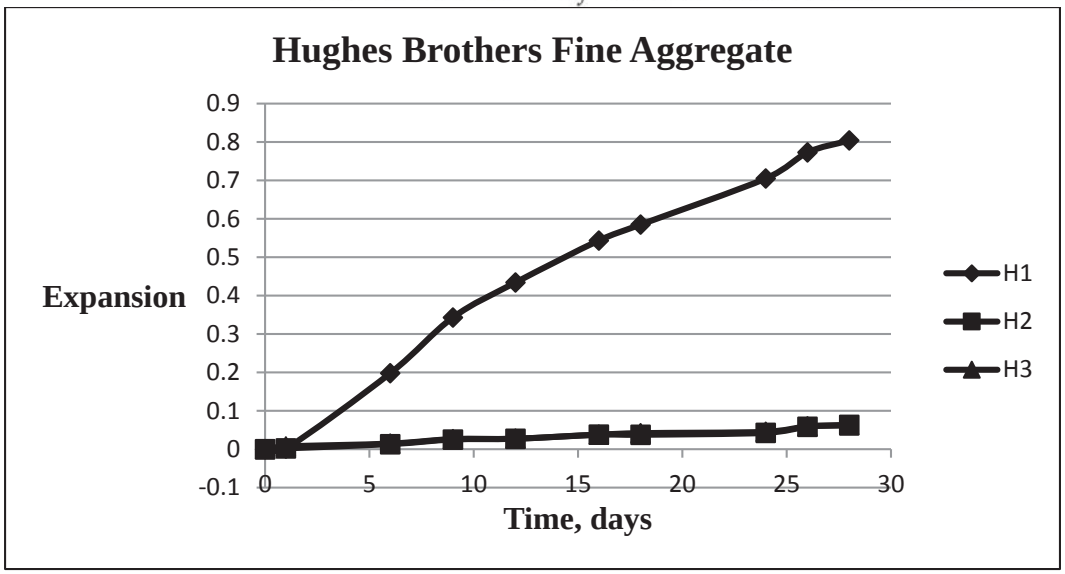

Figure 2 Expansion data for Hughes Brothers Fine Aggregate

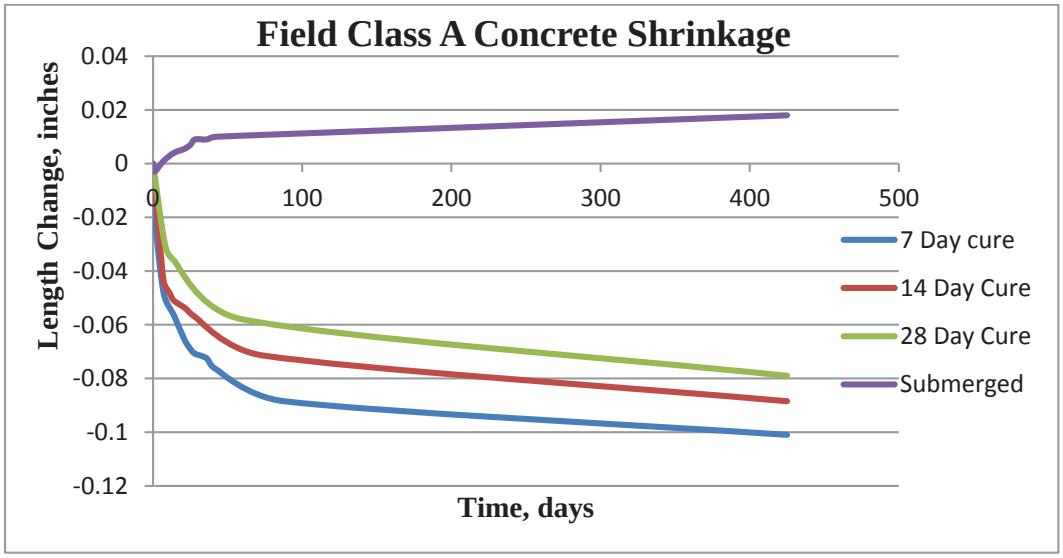

Figure 3 Field Class A concrete shrinkage

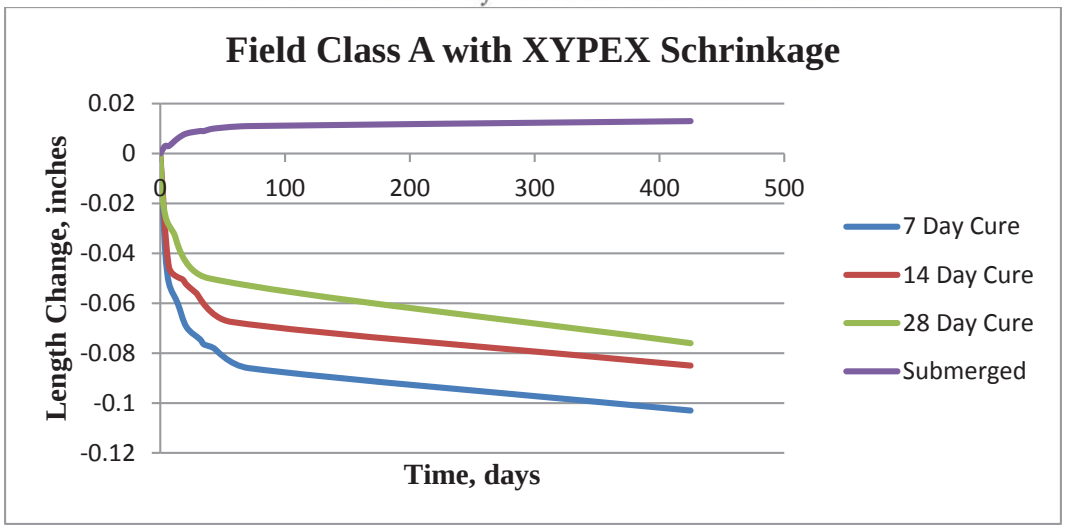

Figure 4 Field Class A with XYPEX shrinkage

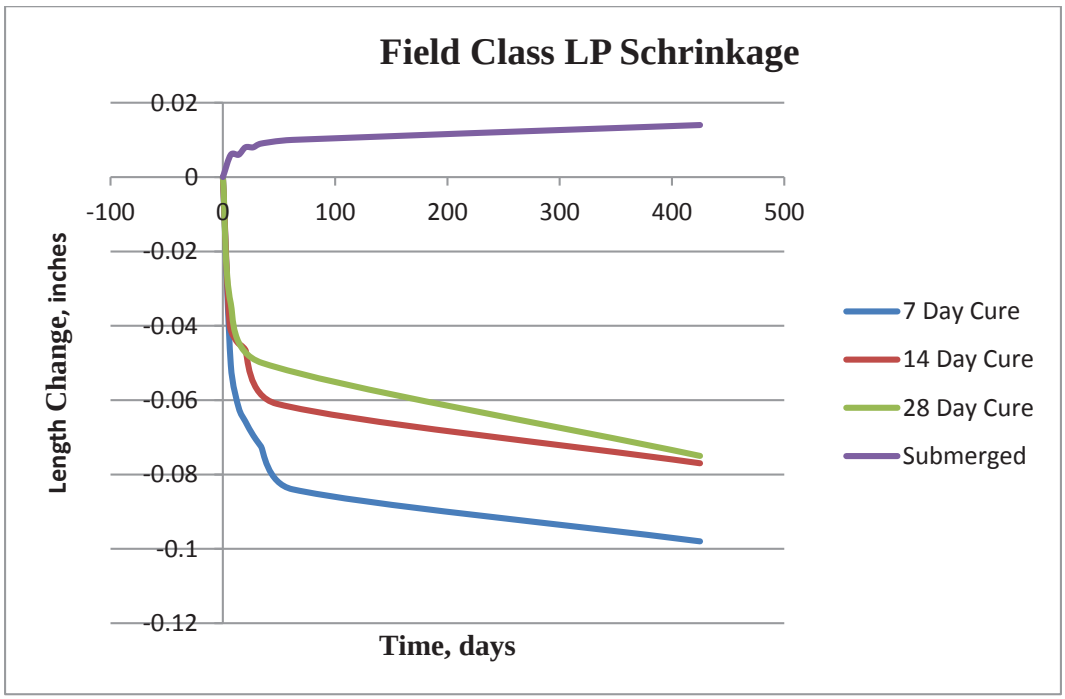

Figure 5 Field Class LP shrinkage

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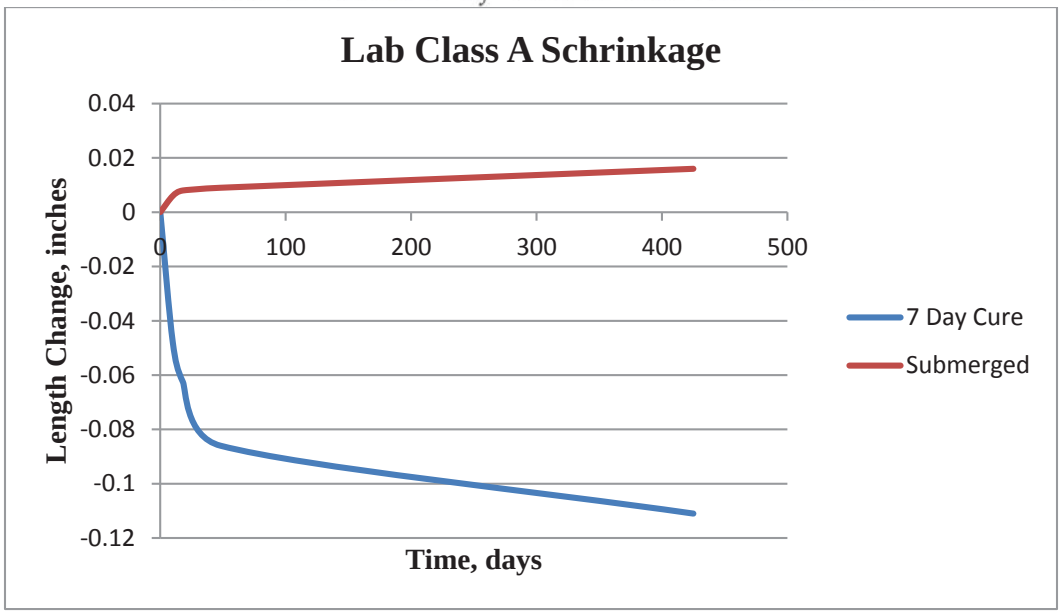

Figure 6 Lab Class A shrinkage

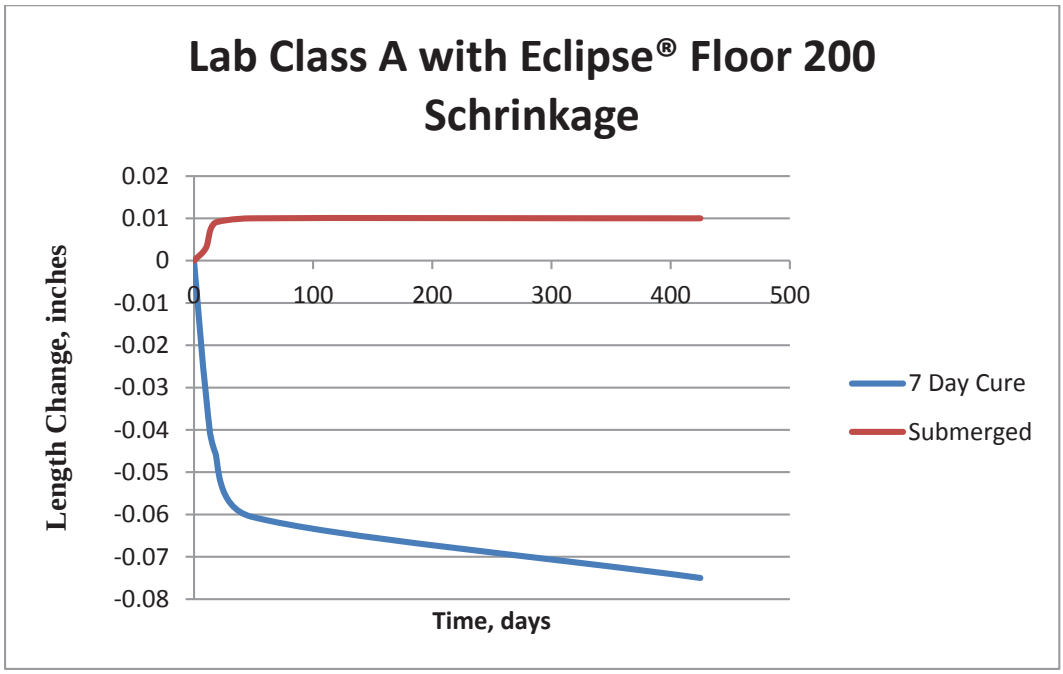

Figure 7 Lab Class A with Eclipse® Floor 200 shrinkage

Figure 8 Drill press used to create powder samples

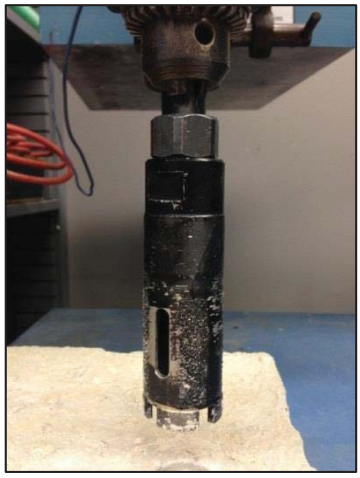

Figure 9 1 ¼ dry core barrel

Figure 10 Electronic dial gauge

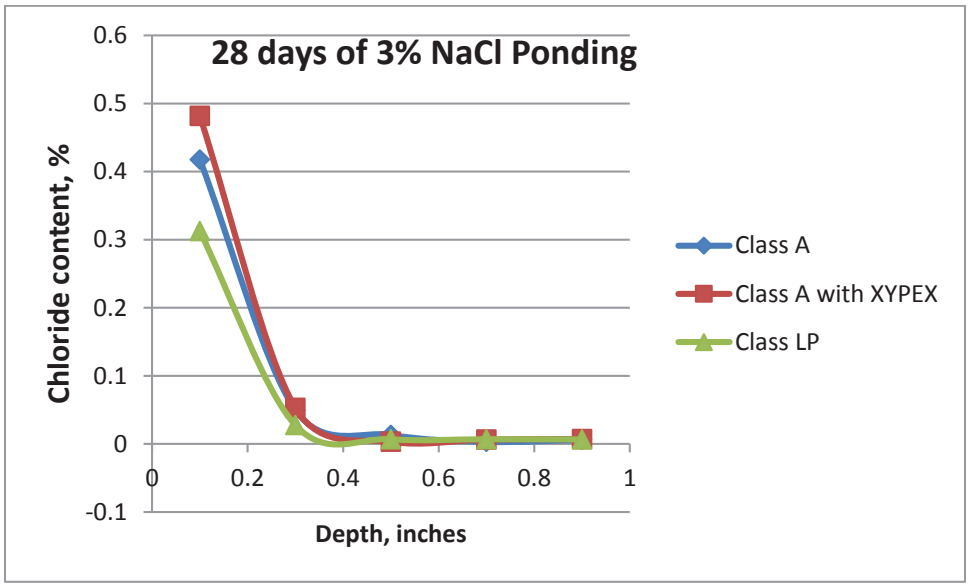

Figure 11 Chloride penetration of the field mixes after 28 days of ponding

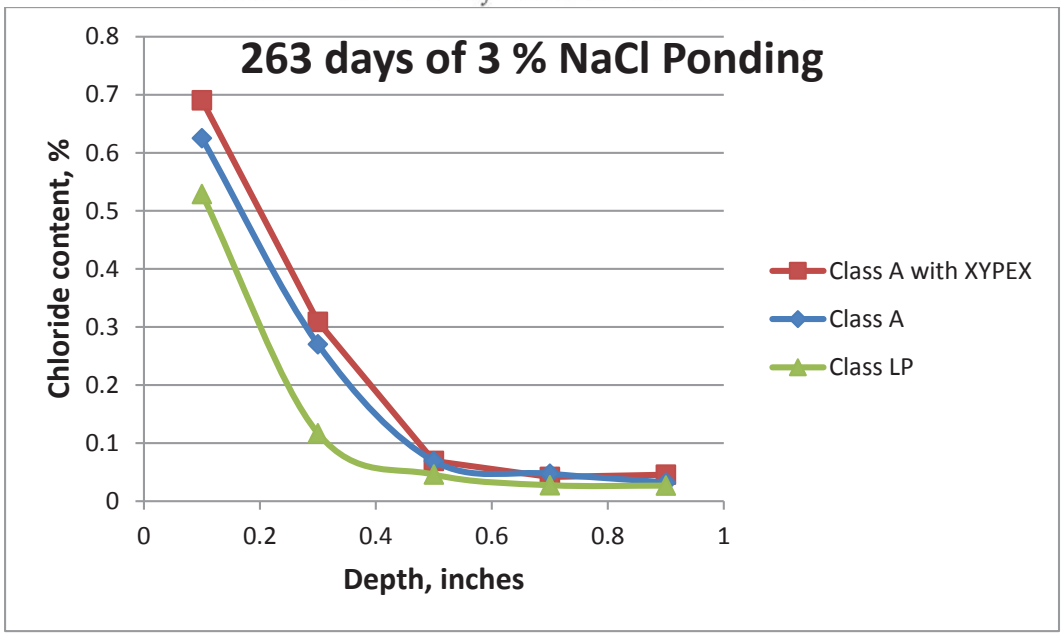

Figure 12 Chloride penetration of the field mixes after 263 days of ponding

APPENDIX C

MaineDOT

PCC DESIGN

Design No.
SUBA-12-1-A

PCC-CLASS A - PCC GRADING A

Plant/Location: **SUNRISE - BANGOR**

WIN/Town: **016784.20 - BANGOR, HERMON, HAMPDEN,** WIN/Town: **015108.00 - STOCKTON SPRINGS**
WIN/Town: WIN/Town:
WIN/Town: WIN/Town:

Submitter: **NADEAU, NORRIS** Telephone: **866-2194** Date Submitted: **8/5/2011**

Bridge Name:

COARSE AGGREGATE DATA

Size	Sampled Date	Original Source/Owner
PCC LEDGE-3/8 IN.	4/19/2012	ODLIN RD QUARRY (HERMON QUARRY) - BANGOR - LANE CONSTRUCTION CORP
PCC LEDGE-3/4 IN.	4/19/2012	ODLIN RD QUARRY (HERMON QUARRY) - BANGOR - LANE CONSTRUCTION CORP

Size	Bulk Specific Gravity, SSD	Absorption, %	ASR, Initial %	ASR, w/Pozz., %	Elongation, %
PCC LEDGE-3/8 IN.	2.71	0.65	0.550		8
PCC LEDGE-3/4 IN.	2.72	0.36			4
				Elongation, %	4
		ASR Specification	0.10%, max.	Specification	

Coarse Stockpile Gradation (Percentages Passing Sieve Sizes)

% Used	2" 50.0 mm	1 1/2" 37.5 mm	1" 25.0 mm	3/4" 19.0 mm	1/2" 12.5 mm	3/8" 9.5 mm	No. 4 4.75 mm	No. 8 2.36 mm	No. 16 1.18 mm	No. 50 .300 mm	No. 200 .075 mm
10	100	100	100	100	100	99	62	30			1.3
90	100	100	100	97	27	4	1	1			0.4
Resultant	100	100	100	97	34	14	7	4			0.5
Upper/Lower Spec.		100%	95 to 100%		25 to 60%		0 to 10%	0 to 5%			1.5%, max.

FINE AGGREGATE DATA

Size	Sampled Date	Original Source/Owner
PCC-CONCRETE SAND	4/19/2012	HUGHES BROS PIT - WINTERPORT - HUGHES BROS

Bulk Sp. Grav., SSD	Absorption, %	Organic Impurities
2.60	1.27	-I
	2.30%, max.	-I to III

Fine Stockpile Gradation (Percentages Passing Sieve Sizes)

	3/8" 9.5 mm	No. 4 4.75 mm	No. 8 2.36 mm	No. 16 1.18 mm	No. 30 0.600 mm	No. 50 0.300 mm	No. 100 0.150 mm	No. 200 0.075 mm	Fineness Modulus	Base FM
Initial Results	100	99	96	66	45	24	9	3.7	2.61	2.61
Updated Results										2.75
Upper/Lower Spec.	100%	95 to 100%	80 to 100%	50 to 85%	25 to 60%	10 to 30%	2 to 10%	0 to 5.0%	2.26 to 3.14	2.26 to 3.14

Size	Batch Wt, SSD, lb/yd³
PCC LEDGE-3/8 IN.	170
PCC LEDGE-3/4 IN.	1530
PCC-CONCRETE SAND	1213

PCC DESIGN

Design No.
SUBA-12-1-A

PCC-CLASS A

	Target	Specification		Target	Specification
Fine Aggregate, %:	**42**		Slump, in:	**8.0**	
Water Content by Volume, gal:	**31.40**		Spread, in.:		
Concrete Unit Wt, lbs/ft³:	**141.3**		W/C Ratio:	**0.41**	**0.43, max.**
Strength, psi [MPa]:	**4,350 [30]**	**4,350 psi [30 MPa], min.**	Temp., °F [°C]:	**85 [30]**	**85°F [30°C], max.**
Coulomb:	**2400**	**2,400 coulombs, max.**	Air Content, %:	**7.3**	**6.0% to 8.5%**

Product Name	Manufacturer/Location	Wt, lb/yd³	Specification
PORTLAND CEMENT-TYPE II	CIMENT QUEBEC, INC - SAINT-BASILE, QC	320	635 lb/yd³, max.
SLAG, GRADE 120, DRAGON	DRAGON PRODUCTS CO - THOMASTON	320	

Total Cementitious	640	660 lb/yd³, max.
Fly Ash, %		30%, max.
Slag, %	50	50%, max.
Silica, %		

Description	Manufacturer	Admixture Usage	Dosage, oz/yd³
ADVA 140-ADMIXTURE	W R GRACE & CO	H.R.W.R.	76.8
DARATARD 17-ADMIXTURE	W R GRACE & CO	RETARDER	13
DAREX II AEA-ADMIXTURE	W R GRACE & CO	AIR-ENTRAINING	5.8

MAINE DOT USE ONLY

Status: **APPROVED**

COMMENTS:

Authorized by: **REDMOND, MICHAEL J** Authorized Date: **8/24/2011** Re-Issued Date: **6/13/2012**

MaineDOT

PCC DESIGN

Design No.
SUBA-12-1-AXYP

PCC-CLASS A - PCC GRADING A

Plant/Location: **SUNRISE - BANGOR**

WIN/Town: **015108.00 - STOCKTON SPRINGS** WIN/Town:

WIN/Town: WIN/Town:

WIN/Town: WIN/Town:

Submitter: **NADEAU, NORRIS** Telephone: **866-2194** Date Submitted: **8/5/2011**

Bridge Name:

COARSE AGGREGATE DATA

Size	Sampled Date	Original Source/Owner
PCC LEDGE-3/8 IN.	4/19/2012	ODLIN RD QUARRY (HERMON QUARRY) - BANGOR - LANE CONSTRUCTION CORP
PCC LEDGE-3/4 IN.	4/19/2012	ODLIN RD QUARRY (HERMON QUARRY) - BANGOR - LANE CONSTRUCTION CORP

Size	Bulk Specific Gravity, SSD	Absorption, %	ASR, Initial %	ASR, w/Pozz., %	Elongation, %
PCC LEDGE-3/8 IN.	2.71	0.65	0.550		8
PCC LEDGE-3/4 IN.	2.72	0.36			4
				Elongation, %	4
		ASR Specification	0.10%, max.	Specification	

Coarse Stockpile Gradation (Percentages Passing Sieve Sizes)

% Used	2" 50.0 mm	1 1/2" 37.5 mm	1" 25.0 mm	3/4" 19.0 mm	1/2" 12.5 mm	3/8" 9.5 mm	No. 4 4.75 mm	No. 8 2.36 mm	No. 16 1.18 mm	No. 50 .300 mm	No. 200 .075 mm
10	100	100	100	100	100	99	62	30			1.3
90	100	100	100	97	27	4	1	1			0.4
Resultant	100	100	100	97	34	14	7	4			0.5
Upper/Lower Spec.		100%	95 to 100%		25 to 60%		0 to 10%	0 to 5%			1.5%, max.

FINE AGGREGATE DATA

Size	Sampled Date	Original Source/Owner
PCC-CONCRETE SAND	4/19/2012	HUGHES BROS PIT - WINTERPORT - HUGHES BROS

Bulk Sp. Grav., SSD	Absorption, %	Organic Impurities
2.60	1.27	-I
	2.30%, max.	-I to III

Fine Stockpile Gradation (Percentages Passing Sieve Sizes)

	3/8" 9.5 mm	No. 4 4.75 mm	No. 8 2.36 mm	No. 16 1.18 mm	No. 30 0.600 mm	No. 50 0.300 mm	No. 100 0.150 mm	No. 200 0.075 mm	Fineness Modulus	Base FM
Initial Results	100	99	96	66	45	24	9	3.7	2.61	2.61
Updated Results										2.75
Upper/Lower Spec.	100%	95 to 100%	80 to 100%	50 to 85%	25 to 60%	10 to 30%	2 to 10%	0 to 5.0%	2.26 to 3.14	2.26 to 3.14

Size	Batch Wt, SSD, lb/yd³
PCC LEDGE-3/8 IN.	170
PCC LEDGE-3/4 IN.	1530
PCC-CONCRETE SAND	1195

PCC DESIGN

Design No.
SUBA-12-1-AXYP

PCC-CLASS A

	Target	Specification		Target	Specification
Fine Aggregate, %:	**42**		Slump, in:	**8.0**	
Water Content by Volume, gal:	**31.40**		Spread, in.:		
Concrete Unit Wt, lbs/ft³:	**141.5**		W/C Ratio:	**0.41**	**0.43, max.**
Strength, psi [MPa]:	**4,350 [30]**	**4,350 psi [30 MPa], min.**	Temp., °F [°C]:	**85 [30]**	**85°F [30°C], max.**
Coulomb:	**2400**	**2,400 coulombs, max.**	Air Content, %:	**7.3**	**6.0% to 8.5%**

Product Name	Manufacturer/Location	Wt, lb/yd³	Specification
PORTLAND CEMENT-TYPE II	CIMENT QUEBEC, INC - SAINT-BASILE, QC	320	635 lb/yd³, max.
SLAG, GRADE 120, DRAGON	DRAGON PRODUCTS CO - THOMASTON	320	
XYPEX ADMIX C-500-WATERPROOFER CEMENT	XYPEX CHEMICAL CORPORATION - RICHMOND, BC	15	

Total Cementitious	655	660 lb/yd³, max.
Fly Ash, %		30%, max.
Slag, %	49	50%, max.
Silica, %		

Description	Manufacturer	Admixture Usage	Dosage, oz/yd³
ADVA 140-ADMIXTURE	W R GRACE & CO	H.R.W.R.	78.6
DARATARD 17-ADMIXTURE	W R GRACE & CO	RETARDER	19.7
DAREX II AEA-ADMIXTURE	W R GRACE & CO	AIR-ENTRAINING	5.9
RECOVER-ADMIXTURE	W R GRACE & CO	HYDRATION STABILIZER	19.7

MAINE DOT USE ONLY

Status: **APPROVED**

COMMENTS:

Contains Xypex C-500 Waterproofing Admixture

Authorized by: **REDMOND, MICHAEL J** Authorized Date: **6/14/2012** Re-Issued Date:

APPENDIX D

Portland Cement Concrete Test Results

SUNRISE - BANGOR

WIN/Town	Design	Sampled	Type	Item	Method	Ref No.	Slump	Air	Temp.	W/C Ratio	Strength 1	Strength 2	Avg. Str.	Age	Avg. Coul
015108.00 - Stockton S	SUBA-12-1-A	7/20/2012	A	502.219	(METHOD A)	272134		7.6	75	0.41	6768	6836	6800	56	1178
	SUBA-12-1-A	8/14/2012	A	502.219	(METHOD A)	272135		8.4	82	0.39	5749	5659	5700	57	1466
	SUBA-12-1-A	8/17/2012	A	502.219	(METHOD A)	272136		6	83.7	0.39	7264	7344	7300	56	1459
	SUBA-12-1-AXY	9/27/2012	A	502.26	(METHOD A)	272140		8.4	69	0.41	6859	6915	6890	61	1132
	SUBA-12-1-AXY	9/27/2012	A	502.26	(METHOD A)	272138		7.2	68	0.41	6876	6835	6860	61	1041
	SUBA-12-1-AXY	9/27/2012	A	502.26	(METHOD A)	272139		7.7	68	0.41	6476	6615	6550	61	1067
	SUBA-12-1-AXY	6/11/2012	A	502.26	OTHER	272133		6.6	76	0.41	5208	5126	5170	57	900
	SUBA-12-1-AXY	6/11/2012	A	502.26	OTHER	272133		6.6	76	0.41	7685	7384	7530	57	900
	SUBA-12-2-LP	10/4/2012	LP	636.40	(METHOD C)	272141		6.3	62	0.41	7841	7666	7750	56	656
	SUBA-12-2-LP	10/9/2012	LP	636.40	(METHOD C)	272142		8	64	0.39	6522	6680	6600	56	809
	SUBA-12-2-LP	10/10/2012	LP	502.49	(METHOD C)	272143		6.2	56	0.4	7306	7749	7530	56	552
016784.20 - Bangor,Her	SUBA-12-2-LP	6/18/2012	LP	606.901	(METHOD C)	275956	7	5.5	71	0.39	6916	6602	6760	57	706
	SUBA-12-2-LP	6/19/2012	LP	606.901	(METHOD C)	275957	7	7.1	69	0.39	6319	6513	6420	56	729
	SUBA-12-2-LP	7/5/2012	LP	606.901	(METHOD C)	275959	7	7	82	0.41	5149	5185	5170	56	1024
	SUBA-12-2-LP	7/10/2012	LP	606.901	(METHOD C)	275960	5.5	8.1	81	0.41	5143	5355	5250	58	816
019020.00 - Bangor	SUBA-12-2-LP	9/6/2012	LP	502.341	(METHOD C)	276358	3	5.3	83.4	0.41	6714	6833	6770	56	771
019304.00 - Milo	SUBA-12-2-LP	10/1/2012	LP	502.44	(METHOD A)	275478		7.5	73	0.38	6372	6509	6440	58	578
	SUBA-12-2-LP	10/1/2012	LP	502.44	(METHOD A)	275477		7.3	73	0.38	5476	5251	5360	58	792
	SUBA-12-2-LP	10/1/2012	LP	502.44	(METHOD A)	275476		7.3	71	0.38	6239	5793	6020	56	710
019432.00 - Brewer	SUBA-12-2-LP	7/24/2012	LP	626.34	(METHOD C)	276353		4.5	83.1	0.41	7529	7725	7630	56	650
019435.00 - Brewer	SUBA-12-2-LP	8/3/2012	LP	626.34	(METHOD C)	276357	3	6.9	80	0.4	6721	6375	6550	61	862

***Testing prior to 12/3/2002 were measured and tested in SI Units, after that date was measured and tested in US Customary.**

#Error

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272134	69342	PCC-CLASS A	ACCEPT (METHOD A)	502.219

Sampler: **HEWS, GUY F** Sampled: **7/20/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-A
Lot No.: 1 Sublot No.: 1
Sublot Size, yd³ 40
Member/Structure ABUTMENT
Addt'l Info: South abut footing
Represents 9.5 of 32 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	8.47	5.8
ADVA 140-ADMIXTURE	94.7	76.8
DARATARD 17-ADMIXTURE	13.05	13

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	75	85°F [30°C], max.
Air Content, %	7.6	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	85880	c	5	6768	4.03	12.76	87225	a	5	6836	6800

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	1165	M	1192	LOW	1178

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	24.2	22.7	25.8
Avg. of 24	24	Chloride Ion Penetrability	LOW
56	20.9	20.0	21.8
Avg. of 24	21	Chloride Ion Penetrability	MODERATE

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **9/25/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272135	57677	PCC-CLASS A	ACCEPT (METHOD A)	502.219

Sampler: **THOMPSON, CANDACE C** Sampled: **8/14/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-A
Lot No.: 1 Sublot No.: 2
Sublot Size, yd³ 40
Member/Structure ABUTMENT 2
Addt'l Info: footing
Represents 19 of 38 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	9	5.8
ADVA 140-ADMIXTURE	51.3	76.8
DARATARD 17-ADMIXTURE	12.9	13

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.39	0.43, max.
Temp. °F	82	85°F [30°C], max.
Air Content, %	8.4	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	72960	a	35	5749	4.02	12.69	71810	a	35	5659	5700

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
57	T	1441	M	1491	LOW	1466

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	19.2	19.6	19.0
Avg. of 24	19	Chloride Ion Penetrability	MODERATE
57	26.4	27.2	26.3
Avg. of 24	27	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in missing placement location.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **10/17/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272136	57710	PCC-CLASS A	ACCEPT (METHOD A)	502.219

Sampler: **THOMPSON, CANDACE C** Sampled: **8/17/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-A
Lot No.: 1 Sublot No.: 3
Sublot Size, yd³ 40
Member/Structure ABUTMENT 2
Addt'l Info: Stem wall
Represents 2 of 12 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	9.17	5.8
ADVA 140-ADMIXTURE	51.5	76.8
DARATARD 17-ADMIXTURE	13	13

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.39	0.43, max.
Temp. °F	83.7	85°F [30°C], max.
Air Content, %	6	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	92180	a	40	7264	4.02	12.69	93195	a	40	7344	7300

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	1453	M	1465	LOW	1459

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	17.3	17.3	18.5
Avg. of 24	18	Chloride Ion Penetrability	MODERATE
56	28.0	27.9	30.0
Avg. of 24	29	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in missing placement location.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **10/12/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272140	57865	PCC-CLASS A	ACCEPT (METHOD A)	502.26

Sampler: **HEWS, GUY F** Sampled: **9/27/2012** Design No.: **SUBA-12-1-AXYP**

Plant/Location: **SUNRISE - BANGOR** Lot No.: **1** Sublot No.: **6**

WIN/Town: **015108.00 - STOCKTON SPRINGS** Sublot Size, yd³ **29**

Contractor: **LANE CONSTRUCTION CORP. (THE)** Member/Structure **OTHER**

Resident: **HEWS, GUY** Addt'l Info: **deck placement south 1/3**

Bridge No/Name: Represents **60** of **87** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	44	5.9
ADVA 140-ADMIXTURE	52.5	78.6
RECOVER-ADMIXTURE	19.7	19.7

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	69	85°F [30°C], max.
Air Content, %	8.4	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	87035	a	15	6859	4.02	12.69	87755	a	15	6915	6890

Test Comments: Avg. Strength, MPa

Meets Specification? YES Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
61	T	1171	M	1093	LOW	1132

Meets Spec? YES Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	24.9	24.8	24.5
Avg. of 24	25	Chloride Ion Penetrability	LOW
61	30.3	30.3	29.8
Avg. of 24	30	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:

Final report. Sublot has been changed due to duplicate sublot. I changed it from sublot 3 to 6.The sample tag was sent in missing actual w/c ratio.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **11/28/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272138	27859	PCC-CLASS A	ACCEPT (METHOD A)	502.26

Sampler: **THOMPSON, CANDACE C** Sampled: **9/27/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-AXYP
Lot No.: 1 Sublot No.: 4
Sublot Size, yd³ 29
Member/Structure OTHER
Addt'l Info: deck placement south 1/3
Represents 5 of 87 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	49	5.9
ADVA 140-ADMIXTURE	54.5	78.6
RECOVER-ADMIXTURE	19.7	19.7
#Error	-1	#Error

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	68	85°F [30°C], max.
Air Content, %	7.2	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	87260	a	10	6876	4.02	12.69	86735	a	10	6835	6860

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
61	T	1077	M	1005	LOW	1041

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	25.9	25.6	23.5
Avg. of 24	25	Chloride Ion Penetrability	LOW
61	32.6	31.8	29.1
Avg. of 24	31	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. Sublot has been changed due to duplicate sublot. I changed it from sublot 1 to 4.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **11/28/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272143	57941	PCC-CLASS LP	ACCEPT (METHOD C)	502.49

Sampler: **HEWS, GUY F** Sampled: **10/10/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **SUBA-12-2-LP**
Lot No.: **1** Sublot No.: **3**
Sublot Size, yd³ **15**
Member/Structure **SIDEWALK**
Addt'l Info: **and curb**
Represents **6** of **26** yd³

Field Admixtures Used Total (plant + jobsite)

Admixture	oz/yd³	Design oz/yd³
DAREX II AEA-ADMIXTURE	8.5	7.9
ADVA 140-ADMIXTURE	100	79.2
DARATARD 17-ADMIXTURE	0	13
RECOVER-ADMIXTURE	19.76	19.2

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.40	0.41, max.
Temp. °F	56	85°F [30°C], max.
Air Content, %	6.2	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	92710	a	10	7306	4.02	12.69	98330	c	10	7749	7530

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 5,075 psi [35 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	554	M	551	VERY LOW	552

Meets Spec? YES
Specification 2,000 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	30.0	29.5	30.6
Avg. of 24	30	Chloride Ion Penetrability	LOW
56	54.1	54.0	54.5
Avg. of 24	54	Chloride Ion Penetrability	VERY LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in missing item number.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **12/14/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272142	57935	PCC-CLASS LP	ACCEPT (METHOD C)	636.40

Sampler: **HEWS, GUY F** Sampled: **10/9/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-2-LP
Lot No.: 1 Sublot No.: 2
Sublot Size, yd³ 15
Member/Structure OTHER
Addt'l Info: South Upper Coping
Represents 3.5 of 7 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	8.57	7.9
ADVA 140-ADMIXTURE	120.28	79.2
DARATARD 17-ADMIXTURE	0	13
RECOVER-ADMIXTURE	19.85	19.2

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.39	0.41, max.
Temp. °F	64	85°F [30°C], max.
Air Content, %	8	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	82765	a	10	6522	4.02	12.69	84775	a	10	6680	6600

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 5,075 psi [35 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	858	M	760	VERY LOW	809

Meets Spec? YES
Specification 2,000 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	22.3	21.9	22.6
Avg. of 24	22	Chloride Ion Penetrability	LOW
56	46.8	43.8	45.4
Avg. of 24	45	Chloride Ion Penetrability	VERY LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **12/11/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272141	57891	PCC-CLASS LP	ACCEPT (METHOD C)	636.40

Sampler: **HEWS, GUY F** Sampled: **10/4/2012** Design No.: **SUBA-12-2-LP**

Plant/Location: **SUNRISE - BANGOR** Lot No.: **1** Sublot No.: **1**

WIN/Town: **015108.00 - STOCKTON SPRINGS** Sublot Size, yd³ **15**

Contractor: **LANE CONSTRUCTION CORP. (THE)** Member/Structure **OTHER**

Resident: **HEWS, GUY** Addt'l Info: **North Upper Coping**

Bridge No/Name: Represents **7** of **8** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	52	7.9
ADVA 140-ADMIXTURE	54.5	79.2
DARATARD 17-ADMIXTURE	0	13
RECOVER-ADMIXTURE	19.8	19.2

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.41, max.
Temp. °F	62	85°F [30°C], max.
Air Content, %	6.3	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.03	12.76	100050	c	10	7841	4.02	12.69	97280	c	10	7666	7750

Test Comments: Avg. Strength, MPa

Meets Specification? YES Specification 5,075 psi [35 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	679	M	633	VERY LOW	656

Meets Spec? YES Specification 2,000 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	29.0	31.3	30.4
Avg. of 24	30	Chloride Ion Penetrability	LOW
56	48.0	52.7	51.6
Avg. of 24	51	Chloride Ion Penetrability	VERY LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:

Final report. Need test results for special work order.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **12/10/2012**

Paper Copy: Structure File *Electronic Copy: Resident ; Redmond, Michael*

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272138	27859	PCC-CLASS A	ACCEPT (METHOD A)	502.26

Sampler: **THOMPSON, CANDACE C** Sampled: **9/27/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-AXYP
Lot No.: 1 Sublot No.: 4
Sublot Size, yd³ 29
Member/Structure OTHER
Addt'l Info: deck placement south 1/3
Represents 5 of 87 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	49	5.9
ADVA 140-ADMIXTURE	54.5	78.6
RECOVER-ADMIXTURE	19.7	19.7
#Error	-1	#Error

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	68	85°F [30°C], max.
Air Content, %	7.2	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	87260	a	10	6876	4.02	12.69	86735	a	10	6835	6860

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
61	T	1077	M	1005	LOW	1041

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	25.9	25.6	23.5
Avg. of 24	25	Chloride Ion Penetrability	LOW
61	32.6	31.8	29.1
Avg. of 24	31	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. Sublot has been changed due to duplicate sublot. I changed it from sublot 1 to 4.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **11/28/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272139	57862	PCC-CLASS A	ACCEPT (METHOD A)	502.26

Sampler: **THOMPSON, CANDACE C** Sampled: **9/27/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **SUBA-12-1-AXYP**
Lot No.: **1** Sublot No.: **5**
Sublot Size, yd³ **29**
Member/Structure **OTHER**
Addt'l Info: **deck placement south 1/3**
Represents **29** of **87** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	53	5.9
ADVA 140-ADMIXTURE	54.5	78.6
RECOVER-ADMIXTURE	19.7	19.7

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	68	85°F [30°C], max.
Air Content, %	7.7	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	82185	a	15	6476	4.02	12.69	83940	c	15	6615	6550

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
61	T	1136	M	998	LOW	1067

Meets Spec? YES Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	25.6	27.6	26.6
Avg. of 24	27	Chloride Ion Penetrability	LOW
61	33.0	35.2	34.3
Avg. of 24	34	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. Sublot has been changed due to duplicate sublot. I changed it from sublot 2 to 5.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **11/28/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272140	57865	PCC-CLASS A	ACCEPT (METHOD A)	502.26

Sampler: **HEWS, GUY F** Sampled: **9/27/2012** Design No.: **SUBA-12-1-AXYP**

Plant/Location: **SUNRISE - BANGOR** Lot No.: **1** Sublot No.: **6**

WIN/Town: **015108.00 - STOCKTON SPRINGS** Sublot Size, yd³ **29**

Contractor: **LANE CONSTRUCTION CORP. (THE)** Member/Structure **OTHER**

Resident: **HEWS, GUY** Addt'l Info: **deck placement south 1/3**

Bridge No/Name: Represents **60** of **87** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	44	5.9
ADVA 140-ADMIXTURE	52.5	78.6
RECOVER-ADMIXTURE	19.7	19.7

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	69	85°F [30°C], max.
Air Content, %	8.4	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	87035	a	15	6859	4.02	12.69	87755	a	15	6915	6890

Test Comments: Avg. Strength, MPa

Meets Specification? YES Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
61	T	1171	M	1093	LOW	1132

Meets Spec? YES Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	24.9	24.8	24.5
Avg. of 24	25	Chloride Ion Penetrability	LOW
61	30.3	30.3	29.8
Avg. of 24	30	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:

Final report. Sublot has been changed due to duplicate sublot. I changed it from sublot 3 to 6.The sample tag was sent in missing actual w/c ratio.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **11/28/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
251544	08282012	PCC-CLASS P (535 SECTION)	VERIFICATION	

Sampler: **COLBURN III, WILLIAM L** Sampled: **8/28/2012**
Plant/Location: **OLDCASTLE PRECAST - AUBURN**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **OCAB-12-5-5000**
Lot No.: Sublot No.:
Sublot Size, yd³
Member/Structure **PRECAST DECK PANELS**
Addt'l Info: **Panels A5, A6, and B17-B24**
Represents **7.4** of **7.4** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
MB AE 90-ADMIXTURE	22.6	7
GLENIUM 3400 NV-ADMIXTURE	76	50
RHEOCRETE CNI-ADMIXTURE	703.9	704

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in	25	22 to 28 in.
W/C Ratio	0.33	0.40, max.
Temp. °F	83	95°F [35°C], max.
Air Content, %	7.2	5.5% to 7.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
56	4.02	12.69	118510	a	50	9339	4.02	12.69	117195	a	50	9235	9290

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 5,000 [34] psi [MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
121	T	705	M	722	VERY LOW	714

Meets Spec? YES
Specification 2400 columbs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	9.6	10.0	10.0
Avg. of 24	10	Chloride Ion Penetrability	HIGH
121	46.4	47.8	48.8
Avg. of 24	48	Chloride Ion Penetrability	VERY LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. Send results to Roland Cote.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **1/4/2013**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael; Cote, Roland

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
251541	08242012	PCC-CLASS P (535 SECTION)	VERIFICATION	

Sampler: **COLBURN III, WILLIAM L** Sampled: **8/24/2012**
Plant/Location: **OLDCASTLE PRECAST - AUBURN**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **OCAB-12-5-5000**
Lot No.: Sublot No.:
Sublot Size, yd³
Member/Structure **PRECAST DECK PANELS**
Addt'l Info: **panels A1,A2 and B1-B8**
Represents **7.3** of **7.3** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
MB AE 90-ADMIXTURE	20.4	7
GLENIUM 3400 NV-ADMIXTURE	76	50
RHEOCRETE CNI-ADMIXTURE	704	704

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in	25	22 to 28 in.
W/C Ratio	0.34	0.40, max.
Temp. °F	83	95°F [35°C], max.
Air Content, %	6.5	5.5% to 7.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
56	4.02	12.69	125270	a	50	9872	4.02	12.69	111145	a	50	8758	9320

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 5,000 [34] psi [MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
125	T	542	M	582	VERY LOW	562

Meets Spec? YES
Specification 2400 columbs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	10.3	10.1	10.6
Avg. of 24	10	Chloride Ion Penetrability	HIGH
125	50.3	48.2	50.8
Avg. of 24	50	Chloride Ion Penetrability	VERY LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **1/4/2013**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael; Cote, Roland

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272136	57710	PCC-CLASS A	ACCEPT (METHOD A)	502.219

Sampler: **THOMPSON, CANDACE C** Sampled: **8/17/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-A
Lot No.: 1 Sublot No.: 3
Sublot Size, yd³ 40
Member/Structure ABUTMENT 2
Addt'l Info: Stem wall
Represents 2 of 12 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	9.17	5.8
ADVA 140-ADMIXTURE	51.5	76.8
DARATARD 17-ADMIXTURE	13	13

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.39	0.43, max.
Temp. °F	83.7	85°F [30°C], max.
Air Content, %	6	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	92180	a	40	7264	4.02	12.69	93195	a	40	7344	7300

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	1453	M	1465	LOW	1459

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	17.3	17.3	18.5
Avg. of 24	18	Chloride Ion Penetrability	MODERATE
56	28.0	27.9	30.0
Avg. of 24	29	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in missing placement location.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **10/12/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272135	57677	PCC-CLASS A	ACCEPT (METHOD A)	502.219

Sampler: **THOMPSON, CANDACE C** Sampled: **8/14/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-A
Lot No.: 1 Sublot No.: 2
Sublot Size, yd³ 40
Member/Structure ABUTMENT 2
Addt'l Info: footing
Represents 19 of 38 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	9	5.8
ADVA 140-ADMIXTURE	51.3	76.8
DARATARD 17-ADMIXTURE	12.9	13

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.39	0.43, max.
Temp. °F	82	85°F [30°C], max.
Air Content, %	8.4	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	72960	a	35	5749	4.02	12.69	71810	a	35	5659	5700

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
57	T	1441	M	1491	LOW	1466

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	19.2	19.6	19.0
Avg. of 24	19	Chloride Ion Penetrability	MODERATE
57	26.4	27.2	26.3
Avg. of 24	27	Chloride Ion Penetrability	LOW

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in missing placement location.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **10/17/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272134	69342	PCC-CLASS A	ACCEPT (METHOD A)	502.219

Sampler: **HEWS, GUY F** Sampled: **7/20/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: SUBA-12-1-A
Lot No.: 1 Sublot No.: 1
Sublot Size, yd³ 40
Member/Structure ABUTMENT
Addt'l Info: South abut footing
Represents 9.5 of 32 yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	8.47	5.8
ADVA 140-ADMIXTURE	94.7	76.8
DARATARD 17-ADMIXTURE	13.05	13

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	75	85°F [30°C], max.
Air Content, %	7.6	6.0% to 8.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
28	4.02	12.69	85880	c	5	6768	4.03	12.76	87225	a	5	6836	6800

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 4,350 psi [30 MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
56	T	1165	M	1192	LOW	1178

Meets Spec? YES
Specification 2,400 coulombs, max.

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8
28	24.2	22.7	25.8
Avg. of 24	24	Chloride Ion Penetrability	LOW
56	20.9	20.0	21.8
Avg. of 24	21	Chloride Ion Penetrability	MODERATE

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **9/25/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
251303	28025719	PCC-CLASS P (700 SECTION)	VERIFICATION	

Sampler: **UNKNOWN AT THIS TIME** Sampled: **6/25/2012**
Plant/Location: **DAILEY PRECAST - SHAFTSBURY, VT**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **WDSV-12-1-5000**
Lot No.: Sublot No.:
Sublot Size, yd³
Member/Structure
Addt'l Info:
Represents of **8.4** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
MB AE 90-ADMIXTURE	8.4	8
GLENIUM 3400 NV-ADMIXTURE	90.3	91
RHEOCRETE CNI-ADMIXTURE	384	384

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in	25.5	22 to 28 in.
W/C Ratio	0.35	0.40, max.
Temp. °F	78	85°F [30°C], max.
Air Content, %	5.9	5.5% to 7.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
56	4.02	12.69	109705	a	15	8645	4.01	12.63	106545	a	20	8436	8540

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 5,000 [34] psi [MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in with the wrong item number. The samplers employer is unknown. The sample tag was sent in missing amount the sample represents.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **8/21/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael; Cote, Roland

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
251302	28025666	PCC-CLASS P (700 SECTION)	VERIFICATION	

Sampler: **LEMORRIS, LINDA** Sampled: **6/19/2012**
Plant/Location: **DAILEY PRECAST - SHAFTSBURY, VT**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **WDSV-12-1-5000**
Lot No.: Sublot No.:
Sublot Size, yd³
Member/Structure **WINGWALL**
Addt'l Info: **abutment and retaining wall as well**
Represents **1** of **6.8** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
MB AE 90-ADMIXTURE	8	8
GLENIUM 3400 NV-ADMIXTURE	91	91
RHEOCRETE CNI-ADMIXTURE	384	384

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in	25.5	22 to 28 in.
W/C Ratio	0.37	0.40, max.
Temp. °F	80	85°F [30°C], max.
Air Content, %	5.7	5.5% to 7.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
56	4.02	12.69	110455	a	10	8704	4.02	12.69	109985	a	10	8667	8690

Test Comments:
Avg. Strength, MPa
Meets Specification? YES
Specification 5,000 [34] psi [MPa], min.

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Final report. The sample tag was sent in missing the correct design number and placement location.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **8/17/2012**

Paper Copy: Structure File Electronic Copy: Resident ; Redmond, Michael; Cote, Roland

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
251301	28025572	PCC-CLASS P (700 SECTION)	VERIFICATION	

Sampler: **LEMORRIS, LINDA** Sampled: **6/12/2012** Design No.: **WDSV-12-1-5000**

Plant/Location: **DAILEY PRECAST - SHAFTSBURY, VT** Lot No.: Sublot No.:

WIN/Town: **015108.00 - STOCKTON SPRINGS** Sublot Size, yd³

Contractor: **LANE CONSTRUCTION CORP. (THE)** Member/Structure **OTHER**

Resident: **HEWS, GUY** Addt'l Info: **4x4 mini slab fo observation**

Bridge No/Name: Represents **1** of **7.25** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
MB AE 90-ADMIXTURE	10.1	8
GLENIUM 3400 NV-ADMIXTURE	69.8	91
RHEOCRETE CNI-ADMIXTURE	380	384

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in	22.5	22 to 28 in.
W/C Ratio	0.35	0.40, max.
Temp. °F	70	85°F [30°C], max.
Air Content, %	7	5.5% to 7.5%
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
7	4.02	12.69	81925	a	30	6456							**6456
Test Comments:	cylinder oval									Avg. Strength, MPa			
56	4.00	12.57	108220	c	20	8609	4.02	12.69	107170	a	25	8445	8530
Test Comments:	Cylinders oval									Avg. Strength, MPa			

Meets Specification? YES Specification **5,000 [34] psi [MPa], min.**

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:

Final report. Three out of the four cylinders were oval. Test one at 7 days and two at 56 days. The sample tag was sent in missing placement location, item number, lot and sublot number, sublot size as well as being sent in as the wrong sample type.

Sample Meets All Requirements? YES

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **8/7/2012**

Paper Copy: Structure File *Electronic Copy: Resident ; Redmond, Michael; Cote, Roland*

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272133	70199	PCC-CLASS A	OTHER	502.26

Sampler: **HEWS, GUY F** Sampled: **6/11/2012** Design No.: **SUBA-12-1-AXYP**

Plant/Location: **SUNRISE - BANGOR** Lot No.: Sublot No.:

WIN/Town: **015108.00 - STOCKTON SPRINGS** Sublot Size, yd³

Contractor: **LANE CONSTRUCTION CORP. (THE)** Member/Structure **OTHER**

Resident: **HEWS, GUY** Addt'l Info: **trial batch**

Bridge No/Name: Represents **2** of **4** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	6	5.9
ADVA 140-ADMIXTURE	78.25	78.6
RECOVER-ADMIXTURE	19.75	19.7

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	76	
Air Content, %	6.6	
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Specimen 1 Area, in²	Specimen 1 Load, lb	Specimen 1 Break Type	Specimen 1 Fract., %	Specimen 1 Strength, psi	Specimen 2 Avg. Dia., in	Specimen 2 Area, in²	Specimen 2 Load, lb	Specimen 2 Break Type	Specimen 2 Fract., %	Specimen 2 Strength, psi	Avg. Strength, psi
7	4.01	12.63	65775	c	10	5208	4.00	12.57	64435	c	5	5126	5170
Test Comments:										Avg. Strength, MPa			
28	4.00	12.57	96605	c	5	7685	4.01	12.63	93260	c	10	7384	7530
Test Comments:										Avg. Strength, MPa			
Meets Specification?			N/A			Specification							

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb
The reported coulomb value includes a 0.879 correction for a 4-in. diameter specimen.						
57	T	935	M	866	VERY LOW	900
Meets Spec?		N/A	Specification			

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:

Final report. Send results to Guy Hews. Break 2 at 7 and 28 days. 15 lbs of xypex per cubic yd.

Sample Meets All Requirements? N/A

AUTHORIZATION AND DISTRIBUTION

Reported by: **HARADON, ROBERT S** Date Reported: **8/8/2012**

Paper Copy: Structure File *Electronic Copy: Resident ; Redmond, Michael*

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

PORTLAND CEMENT CONCRETE TEST REPORT
Central Laboratory

SAMPLE INFORMATION AND FIELD RESULTS

Reference No.	Ticket No.	Sample Description	Sample Type	Item
272133	70199	PCC-CLASS A	OTHER	502.26

Sampler: **HEWS, GUY F** Sampled: **6/11/2012**
Plant/Location: **SUNRISE - BANGOR**
WIN/Town: **015108.00 - STOCKTON SPRINGS**
Contractor: **LANE CONSTRUCTION CORP. (THE)**
Resident: **HEWS, GUY**
Bridge No/Name:

Design No.: **SUBA-12-1-AXYP**
Lot No.: Sublot No.:
Sublot Size, yd³
Member/Structure **OTHER**
Addt'l Info: **trial batch**
Represents **2** of **4** yd³

Field Admixtures Used Total (plant + jobsite)		Design
Admixture	oz/yd³	oz/yd³
DAREX II AEA-ADMIXTURE	6	5.9
ADVA 140-ADMIXTURE	78.25	78.6
RECOVER-ADMIXTURE	19.75	19.7

Concrete Field Test Data (T 119, T 152, T 309)

Test	Result	Specification
Slump, in		
Spread, in		
W/C Ratio	0.41	0.43, max.
Temp. °F	76	
Air Content, %	6.6	
Meets Specification?		YES

LABORATORY TEST RESULTS

Concrete Cylinder Compressive Strength (T 22)

Age at Break, Days	Specimen 1 Avg. Dia., in	Area, in²	Load, lb	Break Type	Fract., %	Strength, psi	Specimen 2 Avg. Dia., in	Area, in²	Load, lb	Break Type	Fract., %	Strength, psi	Avg. Strength, psi
7	4.01	12.63	65775	c	10	5208	4.00	12.57	64435	c	5	5126	5170
Test Comments:										Avg. Strength, MPa			
28	4.00	12.57	96605	c	5	7685	4.01	12.63	93260	c	10	7384	7530
Test Comments:										Avg. Strength, MPa			

Meets Specification? N/A Specification

Rapid Chloride Permeability (T 277)

Age Tested, Days	Specimen 1 Loc.	Specimen 1 Coulomb	Specimen 2 Loc.	Specimen 2 Coulomb	Chloride Ion Penetrability	Avg. Coulomb

Surface Resistivity (T XXX-10), KOhm-cm)

Age Tested, Days	Specimen 1 Avg. of 8	Specimen 2 Avg. of 8	Specimen 3 Avg. of 8

***This result not used in payfactor calculation because no assignable cause could be determined for the outlier.**
****Value based on a single result.**
*****ADMIXTURES LISTED IN RED FONT HAVE NOT BEEN APPROVED FOR USE.**

Comments:
Preliminary report of compressive strength only. Send results to Guy Hews. Break 2 at 7 and 28 days. 15 lbs of xypex per cubic yd.

Sample Meets All Requirements? N/A

AUTHORIZATION AND DISTRIBUTION

Reported by: **GODIN, JASON G** Date Reported: **7/9/2012**

APPENDIX E

ADMIX C-500

07160 | CEMENTITIOUS CRYSTALLINE

Concrete Waterproofing

Description

Xypex is a unique chemical treatment for the waterproofing, protection and improvement of concrete. XYPEX ADMIX C-500 is added to the concrete mix at the time of batching. Xypex Admix C-500 consists of Portland cement, very fine treated silica sand and various active, proprietary chemicals. These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete. Thus the concrete becomes permanently sealed against the penetration of water or liquids from any direction. The concrete is also protected from deterioration due to harsh environmental conditions.

Xypex Admix C-Series

The Admix C-Series has been specially formulated to meet varying project and temperature conditions. **Xypex Admix C-500** is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Admix C-500 will have minimal or no effect on setting time. **Xypex Admix C-1000** is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. **Xypex Admix C-2000** is designed for projects where extended retardation is required due to high ambient temperatures or long ready-mix delivery times. See Setting Time and Strength for more details. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

Recommended for:

- Reservoirs
- Sewage and Water Treatment Plants
- Secondary Containment Structures
- Tunnels and Subway Systems
- Underground Vaults
- Foundations
- Parking Structures
- Swimming Pools
- Precast Components

Advantages

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal static hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic
- Less costly to apply than most other methods
- Permanent
- Added to the concrete at time of batching and therefore is not subject to climatic restraints
- Increases flexibility in construction scheduling

Packaging

Xypex Admix C-500 is available in 50 lb. (22.7 kg) bags and in cartons containing 10 lb. (4.5 kg), 12 lb. (5.5 kg), and 15 lb. (6.8 kg) soluble bags. For specific projects, contact the manufacturer for availability of custom sized packaging.

Storage

Xypex products must be stored dry at a minimum temperature of 45ºF (7ºC). Shelf life is one year when stored under proper conditions.

Dosage Rates

Xypex Admix C-500:
2% - 3% by weight of cement

Xypex Admix C-500 NF (No Fines Grade):
1% - 1.5% by weight of cement

NOTE: Under certain conditions, the dosage rate for No Fines Grade may be as low as 0.8% depending on the quantity and type of total cementitious materials. The maximum use level is 2% by weight of cement for potable water applications.

Consult with Xypex's Technical Services Department for assistance in determining the appropriate dosage rate and for further information regarding enhanced chemical resistance, optimum concrete performance, or meeting the specific requirements and conditions of your project.

Test Data

PERMEABILITY

U.S. Army Corps of Engineers CRD C48-73, "Permeability of Concrete", Aviles Engineering Corp., Houston, USA

Two concrete samples containing Xypex Admix at 3% and 5% respectively, and an untreated control sample

were tested for water permeability. Both the treated and untreated samples were subjected to a pressure of 150 psi (350 ft. water head). Results showed moisture and permeated water throughout the untreated sample after 24 hours. However, the Xypex Admix samples showed no leakage, and water penetration of only 1.5 mm after 120 hours (5 days).

U.S. Army Corps of Engineers CRD C48-73, "Permeability of Concrete", Setsco Services, Pte Ltd., Singapore

Six Xypex Admix-treated and six untreated concrete samples were tested for water permeability. Pressure was gradually increased over five days and then maintained at 7 bars (224 ft. water head) for 10 days. While the six reference samples showed water leakage beginning on the fifth day and increasing throughout the test period, the Xypex Admix samples showed no water leakage at any time during the test.

DIN 1048, "Water Impermeability of Concrete", DICTU S.A., Dept. of Engineering and Construction Mgt., Santiago, Chile

Concrete samples 120 mm thick containing Xypex Admix were tested with the same size reference samples for water impermeability. Samples were subjected to hydrostatic pressure for 28 days. Water totally permeated the untreated samples but no water penetration was detected in any of the Xypex Admix-treated samples.

COMPRESSIVE STRENGTH

ASTM C 39, "Compressive Strength of Cylindrical Concrete Specimens", HBT Agra, Vancouver, Canada

Concrete samples containing Xypex Admix at various dosage rates (1%, 2% and 5%) were tested against an untreated concrete control sample. Compressive strength test results after 28 days indicated a significant strength increase in the samples incorporating Xypex Admix. The compressive strength increase varied between 5% and 20% (depending on the Xypex Admix dosage rate) over that of the reference sample.

ASTM C 39, "Compressive Strength of Cylindrical Concrete Specimens", Kleinfelder Laboratories, San Francisco, USA

At 28 days, the compressive strength test of the concrete containing Xypex Admix measured 7160 psi as compared to the reference sample at 6460 psi (a 10% increase).

CHEMICAL RESISTANCE

JIS, "Chemical Durability Test", Japanese Utility Company, In-house Test Report, Tokyo, Japan

Concrete samples containing Xypex Admix were tested against five samples containing other admixtures and against a control sample, to determine resistance to corrosion and deterioration caused by contact with aggressive chemicals. All samples were soaked in a 5% sulfuric acid solution at 20ºC for six months. Various evaluations and measurements were assessed every month during the test period, including: photographic comparisons, relative dynamic modulus of elasticity, percentage change in length, weight and flexural rigidity. Although the Xypex Admix sample was subjected to acid conditions well outside its published range, the results confirmed Xypex with the best performance among the seven samples tested.

"Sulfuric Acid Resistance Test", Aviles Engineering Corporation, Houston, USA

Concrete samples containing Xypex Admix at different dosage rates (3%, 5% and 7%) were tested against untreated control samples for sulfuric acid resistance. After immersion in the sulfuric acid, each sample was tested for weight loss on a daily basis until a weight loss of 50% or a definite response trend was obtained. The percentage weight loss of the samples containing Xypex Admix tested significantly lower than the control samples.

"Sulphate Resistance Test", Taywood Engineering Ltd., Perth, Australia

Xypex Admix-treated concrete samples were immersed in an ammonium-sulphate solution and tested for "resistance in a harsh environment". The performance of the Xypex crystalline technology was compared with five other concretes, including one containing a sulphate-resistant cement. Each of the test samples was cured for seven days and then placed in an ammonium-sulphate solution (132 g/litre) for 180 days. The rate of corrosion was determined by measuring weight loss, and length change was noted on a weekly basis. The Xypex crystalline technology substantially improved concrete performance as compared to the reference concrete and tested very similar to the sulphate-resistant concrete. The Xypex Admix-treated samples also provided the highest level of protection as measured by change in length.

FREEZE/THAW DURABILITY

ASTM C 666, "Freeze/Thaw Durability", Independent Laboratory, Cleveland, USA

After 300 freeze/thaw cycles, the Xypex Admix-treated samples indicated 94% relative durability.

POTABLE WATER EXPOSURE

NSF 61, "Drinking Water System Component-Health Effects", NSF International, Ann Arbor, USA

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

Directions for Use

Xypex Admix C-500 must be added to the concrete at the time of batching. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment:

1. **READY MIX PLANT - DRY BATCH OPERATION** Add Xypex Admix in powder form to the drum of the ready-mix truck. Drive the ready-mix truck under the batch plant and add the balance of the materials in accordance with standard concrete batching practices. Mix materials for a minimum of 5 minutes to ensure that the Xypex Admix has been thoroughly dispersed throughout the concrete.

2. **READY MIX PLANT - CENTRAL MIX OPERATION** Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb./6.75 - 9 kg of powder mixed with 3 U.S. gallons/ 13.6 litres of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the Admix slurry into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.

3. **PRECAST BATCH PLANT** Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

NOTE:

i. It is important to obtain a homogeneous mixture of Xypex Admix with the concrete. Therefore, do not add dry Admix powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur.

ii. Concrete containing the Xypex Admix does not preclude the requirement for design of crack control, construction joint detailing and measures for repairing defects in concrete (i.e. honeycombing, tie holes, cracks beyond specified limits).

For further information regarding the proper use of Xypex Admix for a specific project, consult with a Xypex technical services representative.

Setting Time and Strength

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Xypex Admix C-500 is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Xypex Admix C-500 will have minimal or no effect on setting time. Concrete containing the Xypex Admix C-500 may develop higher early and ultimate strengths than plain concrete particularly where fly ash and slag are used. Trial mixes should be carried out under project conditions to determine the setting time and strength of the concrete dosed with Xypex Admix C-500. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

Limitations

When incorporating Xypex Admix, the temperature of the concrete mix should be above 40ºF (4ºC).

Technical Services

For more instructions, alternative installation methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.

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