

City of San Diego

Slurry Seal Group 2122

City of San Diego Project # K-21-2020-DBB-3



ISSA President's Award Nomination
VSS International, Inc.
West Sacramento, California, USA

ISSA Member Since 1963



Applicant Contact Information

VSS International, Inc.
3785 Channel Drive
West Sacramento, California 95691

Matt Ferguson
Vice President, Area Manager
(916) 373-1500 – Office
(916) 416-6130 - Cellular
Matthew.ferguson@slurry.com
www.slurry.com



Agency Contact Information

Edgar D. Puente, PE, QSD
Senior Civil Engineer
City of San Diego
Civic Center Plaza, San Diego, CA 92101
(619) 527-7527 – Office
E-mail: **EPuente@sandiego.gov**



Project Eligibility

- ❖ VSS International is a member in good standing with The International Slurry Surfacing Association.
- ❖ Project performed in late 2021 and accepted by the City of San Diego in early 2022 (approximately 24 months ago.) The one-year warranty period is complete with no known issues. Project was completed on time, and within the owner's budget.
- ❖ The project exhibits innovative rubber modified materials, equipment modifications and the use of a multi-layer system. Additionally, all pavement preservation techniques represented by ISSA were performed by VSS International, Inc.
- ❖ There were no safety related injuries or claims on this project.
- ❖ The City of San Diego is very satisfied with the performance, workmanship and aesthetic appearance of the project.



Owner Satisfaction

The City of
SAN DIEGO
Transportation Department
Street Division

Nov 6th, 2023

VSS International, Inc.
3785 Channel Dr
West Sacramento, CA 95691

To Whom It May Concern:

The City of San Diego is pleased to support VSS International's (VSSI) nomination for the ISSA 2023 President's Award. The San Diego Transportation Department is committed in providing a safe, sustainable, integrated, and efficient transportation system to enhance its economy and livability. One way we can meet this commitment is by preserving pavement on the City's major street and local street networks using a wide variety of methods.

Between March 2021 and March 2023, VSSI was awarded 4 contracts to slurry seal over 120 miles of major roads and residential streets citywide. VSSI's staff worked diligently with the City inspectors and engineers to ensure minimal disruptions to residents and continued access to businesses. The quality of their work transformed major roads that were in disrepair and more importantly extended the streets useful life saving taxpayer dollars.

VSS has shown professionalism and skill time and time again. The project is a reflection of their work. The City and the residents are pleased with the projects outcome.

Sincerely,

Edgar Puente

Edgar Puente, P.E.
Senior Civil Engineer



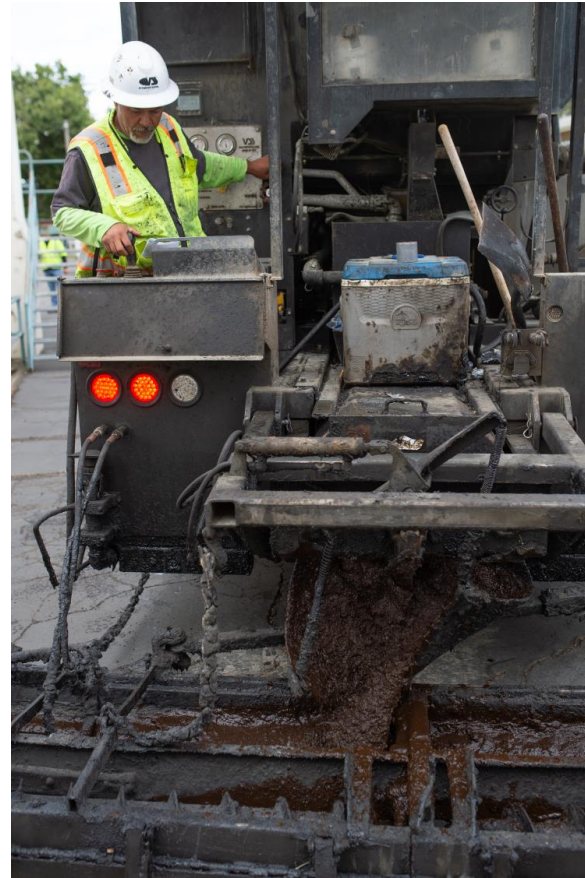
San Diego Facts

- ❖ San Diego is located in the southwest corner of California and serves as one of California's top tourists' destinations.
- ❖ San Diego is the seventh largest city in the country and one of the fastest growing regions in California.
- ❖ It is a city known for its idyllic climate and wide array of world class family attractions and beaches.

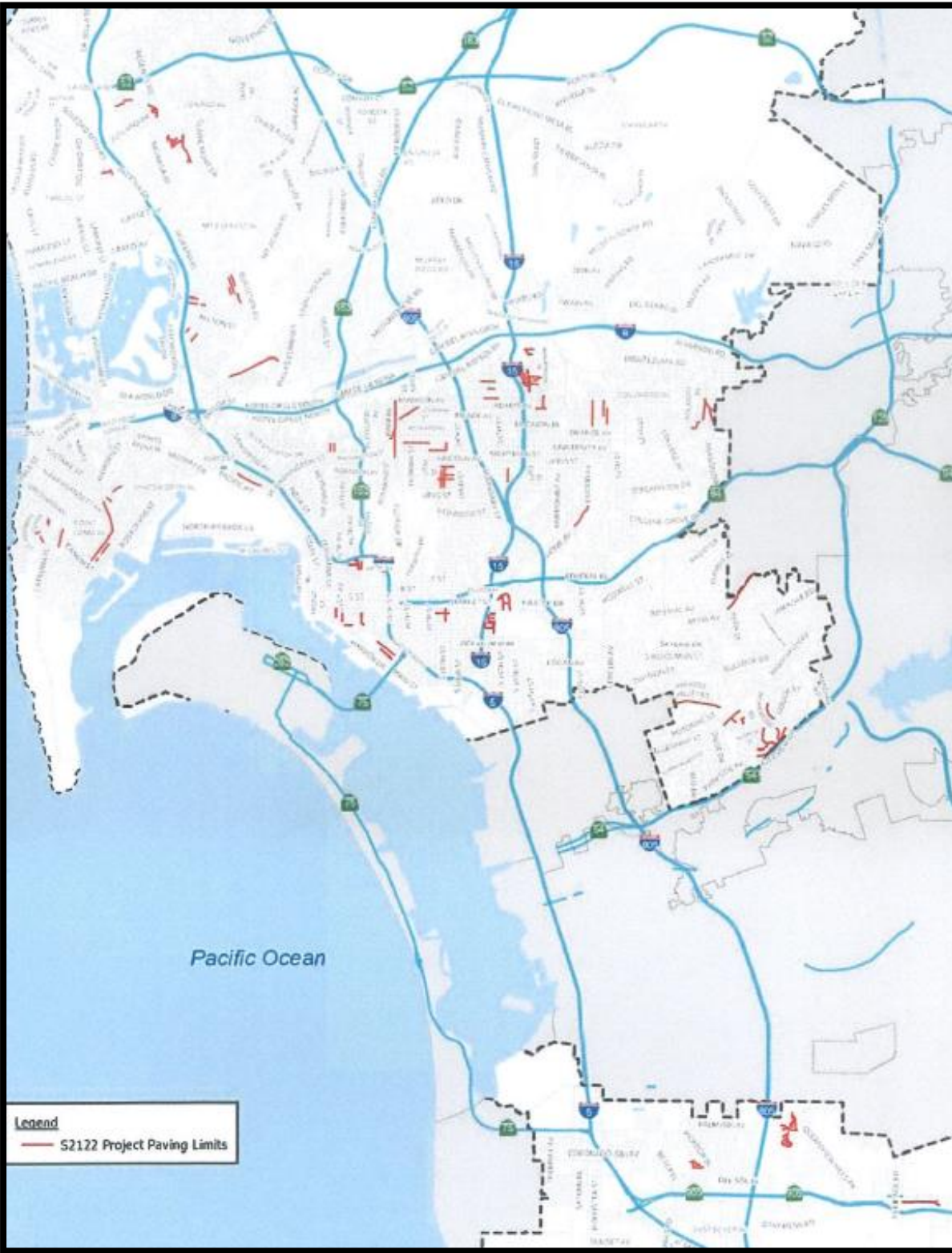


Project Background

- ❖ The City of San Diego currently maintains over 2,900 miles of streets and alleyways. The challenge of maintaining the city's streets and structures continues to grow as more and more visitors and residents move to the area.
- ❖ The city's roadways are in immediate need of millions of dollars in infrastructure rehabilitation due to heavy traffic demands and the growing population.
- ❖ In Fiscal Year 2021, the San Diego resurfacing program has improved the City's Pavement Condition Index (PCI) by allotting funds to slurry seal 155 miles of streets broken into multiple slurry seal projects which included Slurry Seal Group 2122



Project Locations



Product Locations

GREEN – TYPE 1 SLURRY ONLY

BLUE – 3 LAYER (TYPE 3, TYPE 2, TYPE 1
Bike Lanes)

RED – TYPE 2 SLURRY ONLY

PURPLE – TYPE 1 OVER TYPE 2



Typical Product Descriptions

9/28/2021



Typical Plan Sheet

The City of
SAN DIEGO Transportation & Storm Water
Slurry Seal Group 2122

SENIOR ENGINEER
Joshua Lahmann
619-527-7509

PROJECT MANAGER
Aida Vance
619-527-8074

PROJECT ENGINEER
Corrin Allred
619-527-7515

RESIDENT ENGINEER
Natalia Torres
619-527-8044

COMMUNITY NAME: Downtown 2



S2122 Resurfacing Limits Schools

IO: 21004868
IO: 21004910

EXPORT DATE: 4/13/2021
Page 10 of 38

0 0.03 0.05 0.1 Miles

SanGIS



Key Contract Information

- ❖ **Contract Value Total: \$4,210,120.00**
- ❖ Project Funding provided by California State Gas Tax (Senate Bill 1)
- ❖ Contract Time Total: 110 working days
- ❖ Working Hours: 8:30 AM until 3:30 PM
- ❖ Warranty Period: 1 Year
- ❖ Maintenance of Traffic per Caltrans Standard Specifications



Project Street Selection Criteria

- ❖ Streets within the City of San Diego are selected for slurry sealing using a Pavement Management System and street selection is based on the following criteria:
 - ❖ Overall Condition Index (OCI)
 - ❖ Maintenance History
 - ❖ Proximity to Emergency Facility/School/Tourist Attraction
 - ❖ Mayor/Council Input
 - ❖ Coordination with other construction projects
 - ❖ Input from Public comment and concerns

Project Scope

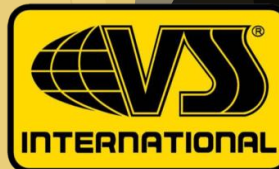
- ❖ The project consisted of placement of rubber polymer modified slurry seal (RPMS) on various roadways throughout San Diego totaling 1,380,162 square yards.
 - ❖ 465,000 SY of Type I slurry seal placed over Type II slurry seal for a multi-layer application on various streets.
 - ❖ 140,000 SY of Type II slurry seal placed over Type III slurry seal for a multi-layer application on various streets.
 - ❖ 121,180 SY of Type I slurry seal placed on Bike lanes and other select streets.
 - ❖ 52,000 SY of stand-alone Type II slurry seal placed on various streets.
 - ❖ Various preparatory work required prior to application of slurry seal

Key Project Challenges

- ❖ Project/Public Safety
- ❖ Traffic Control – Major roads and intersections
- ❖ Mix Design Innovation & Materials Selection
- ❖ Logistics, Planning & Communication of work scattered over a vast geographical region
- ❖ Protection of Environmentally Sensitive Areas
- ❖ Scale & Coordination of Preparatory Work

Complex Project Locations

- ❖ This project included slurry sealing high volume streets nearby San Diego landmarks including:
 - ❖ Petco Park (San Diego Padres Stadium)
 - ❖ University of San Diego Campus
 - ❖ Gaslamp Quarter (Downtown San Diego)
- ❖ The popularity of these locations with residents and tourists alike required coordination with event venues and special traffic control considerations and needed to be executed flawlessly to avoid any major traffic congestion



Project Summary

Work Performed by VSS International

- ❖ VSS International completed over 1,380,162 square yards of Rubber Polymer Modified slurry seal (RPMS) for the project. Total aggregate supplied equaled 7,100 tons and the total emulsion supplied for the project equaled 1,040 tons
- ❖ The total Type I Slurry Seal aggregate placed equaled 2,350 tons supplied by CDG Materials in Riverside, CA and 400 tons of PMCQS-1H slurry seal emulsion provided by Ergon Asphalt & Emulsions
- ❖ The total Type II Slurry Seal aggregate placed equaled 3,440 tons supplied by Superior Ready-Mix Concrete and over 500 tons of PMCQS-1H slurry seal emulsion provided by Ergon Asphalt & Emulsions.
- ❖ The total Type III Slurry Seal aggregate placed equaled 1,300 tons provided by Chandler Aggregates, Inc and 150 tons of PMCQS-1H supplied by Ergon Asphalt & Emulsions.



Project Summary

Work Performed by VSS' Subcontractors

- ❖ Work Performed by VSS Subcontractors prior to and after slurry seal placement includes:

Scope of Work	Company that performed the Scope
Removal of humps, mill and pave, dig outs, base repairs	Quality Construction & Engineering
Thermoplastic Striping Removal and Installment	Statewide Stripe
Utility Adjustments	EBS
Detector Loops Placement	Southwest Signal
Quality Control	Twining

Special Consideration: Innovative System & Materials

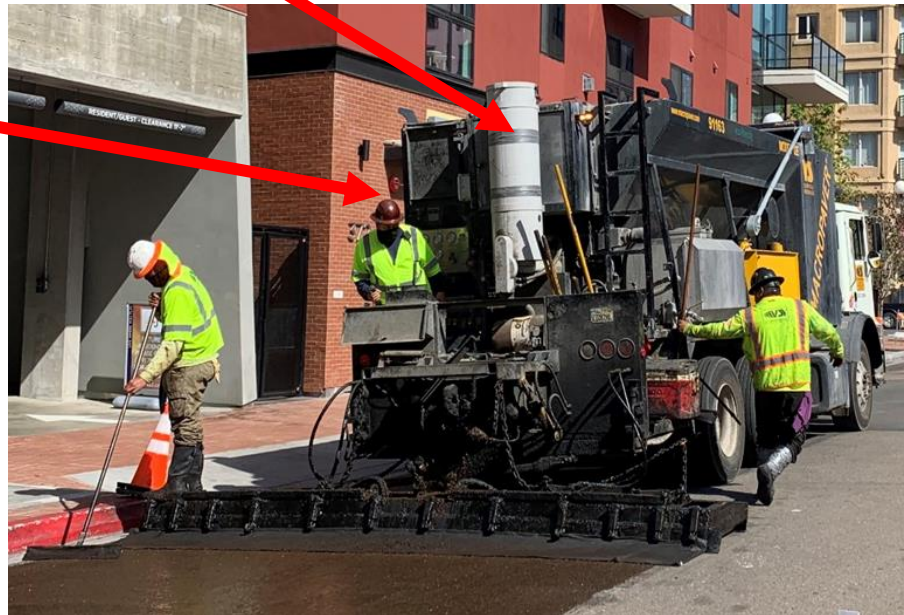
- ❖ This project was innovative in that it integrated multi-layered pavement preservation systems enhanced with additives.
- ❖ The multi-layered system combined several preservation solutions to improve the condition of the City's highly distressed road surfaces.
- ❖ The project combined the use of Type I, Type II and Type III rubber polymer modified slurry seals.
- ❖ The system combined the fine aggregate, polymer modified slurry seal emulsion, finely ground tire rubber and carbon black.
- ❖ The rubber materials used on this project were resourced by grinding up and recycling old tires.

Special Consideration: Equipment Modifications

- ❖ Special modification of VSS' Macropavers was required to achieve the project's material specifications. A special barrel was added to store and distribute crumb rubber into the pugmill and a tank was added for injection of carbon black materials,

Barrel for Crumb Rubber

Carbon Black Tank



Project Raw Materials Suppliers

Aggregate Suppliers:

- ❖ Type I Slurry Seal aggregate (2,350 tons) supplied by CDG Materials in Riverside, CA
- ❖ Type II Slurry Seal aggregate (3,440 tons) supplied by Superior Ready-Mix Concrete in El Cajon, CA
- ❖ Type III Slurry Seal aggregate (1,300 tons) provided by Chandler Aggregates, Inc in Corona, CA

Emulsion Supplier:

- ❖ PMCQS-1H slurry seal emulsion (1,100 tons) provided by Ergon Asphalt & Emulsions facility in Fontana, CA

Crumb Rubber Supplier:

- ❖ Crumb Rubber Manufacturers (CRM) of California

Carbon Black Supplier:

- ❖ Alvar, Incorporated of Texas

Note: All Type 1 Portland Cement purchased from local vendors in the San Diego area.



Innovative Type 1 Mix Design



LABORATORY REPORT NUMBER S21-271-443b
PREPARED FOR:

Ergon Asphalt & Emulsions

Fontana, CA

Attn: Todd Vargason

Re: Slurry surfacing mix design for:

RPMS CDG/Quality Type I vs PMCQS-1h
With 2% latex polymer

10/12/2021

"Slurry Surfacing consists of asphalt emulsion, aggregate, additive and cement. Slurry Surfacing systems are affected by ingredients, equipment, application and construction practices. We make no warranties, express or implied, about the Slurry Surfacing system. The mix design is based upon aggregate and emulsion supplied to us at the time of the formulation of the mix design. By accepting mix design, you expressly acknowledge our limitation of liability and agree to assist us in limiting such liability, if any."

Test results, opinions, or interpretations are based on the material supplied by the client. This report is for the exclusive use of the client to which it is addressed. No reproduction or facsimile in any form should be made without the client's written permission. Paragon Technical Services, Inc. assumes no responsibility and makes no warranty express or implied as to the material or the products or processes containing this material.

Paragon Technical Services, Inc. 390 Carrier Blvd. Richland, MS 39218
Phone 601.932.8365 Toll Free 866.636.2176 Fax 601.932.8466
E-mail info@ptsilab.com www.ptsilab.com 8.1.2006



Ergon Asphalt & Emulsions - Fontana

PTSI Project Number: S21-271-443b

I Purpose: The purpose of this report is to record the laboratory procedures used to evaluate the suitability of materials tested for making Slurry surfacing that meets the required specifications for mixing, breaking, curing, and endurance. The test methods and results obtained are discussed using the best mixture(s) as determined in the laboratory.

II Materials: individual identifications and analysis. All test results are compared to applicable specifications such as: American Society for Testing and Materials (ASTM), International Slurry Surfacing Association (ISSA), American Association of State Highway Transportation Officials (AASHTO), or as required by state or federal specifications.

A. Aggregate - PTSI sample number 21-1689 as supplied by: Ergon A&E
Identified as (name): CDG/Quality Type I.

1. Aggregate Gradation.	Cal Trans	Green Book	
<u>Sieve Size</u>	<u>Spec.</u>	<u>Spec.</u>	<u>% Passing</u>
3/8"	100	100	100
#4	100	100	100
#8	90-100	90-100	100
#16	65-90	65-90	84
#30	40-65	40-60	60
#50		25-42	38
#100		15-30	21
#200	10-20	10-20	11.0

Test	Method	Spec	CT	GB	Result
2. Sand Equivalent	ASTM D2419		45 Min.	55 min	55
3. Methylene Blue	ISSA		----	----	5ml
4. Methylene Blue Factor Alpha Labs			----	----	55
5. Percent Crushed Faces ASTM D-5821					100%

B. Asphalt Emulsion - identified as asphalt emulsion sample number: 21-1621e and submitted to meet the requirements for PMCQS-1h grade emulsion, as supplied by:
Ergon Asphalt & Emulsions, Fontana, CA

Test	Method	Specification	Results
1. Viscosity			40.36
2. Residual Asphalt.	ASTM D244	60 min.	62.8
3. Storage Stability (1 Day)			0.31%
4. Sieve			0.00%
5. Penetration (77f), dmm			61.3
6. Ductility, (77f),			1350

C. Mineral Filler - identified as Type II/V (Laboratory ID Number - 20-0350), and supplied by the client as Portland Cement, meeting the requirements of AASHTO M-85.

D. Carbon Black - identified as a carbon black solution, and meeting the requirements of RPMS specification section 10-7.2.6. PTSI Sample number ADA4c-345.

E. Ground Tire Rubber - identified as GTR, meeting the requirements of RPMS specification section 10-7.2.4. PTSI sample number ADA1b-7858.

Test results, opinions, or interpretations are based on the material supplied by the client. This report is for the exclusive use of the client to which it is addressed. No reproduction or facsimile in any form should be made without the client's written permission. Paragon Technical Services, Inc. assumes no responsibility and makes no warranty express or implied as to the material or the products or processes containing this material.

Paragon Technical Services, Inc. 390 Carrier Blvd. Richland, MS 39218
Phone 601.932.8365 Toll Free 866.636.2176 Fax 601.932.8466
E-mail info@ptsilab.com www.ptsilab.com 8.1.2006

All slurry seal materials had to be engineered to set and cure quickly under damp, coastal conditions. All streets & traffic lanes had to be open to by 5 pm. No exceptions.



Innovative Type 1 Mix Design



paragon
technical services, inc.

Ergon Asphalt & Emulsions - Fontana

PTSi Project Number: S21-271-443b

III Field Simulation Tests.

A Wet Track Abrasion Test, One-Hour Soak, ASTM D3910, ISSA TB 100.

Set	% Cement	% GTR	% H ₂ O	% Emulsion	Loss, g/ft ²	2018 Greenbook Specification	Loss, g/m ²	CALTRANS Specification
1	0.5	5.0	13	13	81.4	50 Max	875.9	810 Max
2	0.5	5.0	10	16	26.7	50 Max	287.3	810 Max
3	0.5	5.0	7	19	24.5	50 Max	263.7	810 Max

* % GTR is added as a percent by volume of asphalt

B Monolayer Loaded Wheel Test, ISSA TB 109 (Fine Sand Adhesion)

Set	% Cement	% GTR	H ₂ O	Emulsion, %	Gain, g/ft ²	Specification
1	0.5	5.0	13	13	Na	50 Maximum
2	0.5	5.0	10	16	15.1	50 Max
3	0.5	5.0	7	19	21.0	50 Max

* % GTR is added as a percent by volume of asphalt

IV Discussion.

Standard trial mixes, 30 and 60 minute cohesions with 0/#4 aggregate gradation were performed to determine mixing and setting characteristics. The effects of 0 to 3% Portland Cement on cohesion values determined filler requirements to be 0.5% to 1.0% Portland Cement to produce appropriate strength gain. Aluminum Sulfate solution was found to be an effective mix time extender.

Based on cumulative test results and field experience, the optimum asphalt emulsion content of 18.5% at 62.8% AC residue the optimum asphalt cement content is 11.62% by weight of the dry aggregate.

V Job Mix Recommendation

Aggregate	100 %	
Asphalt Emulsion	18.5 ± 1.0 %	of weight of dry aggregate
Water	5 to 14%*	of weight of dry aggregate
Cement	0.5% to 0.75%	of weight of dry aggregate
Additive	**	of weight of dry aggregate
GTR	5.0%	By Volume of Asphalt
Carbon Black	1.70%	Of Weight of Emulsion

* As needed for good mix consistency.

** As needed for break control. Aluminum Sulfate Solution (38% solids)

VI Mix Characteristics at Job Mix Recommendation (Approximates, based on laboratory conditions. Actual may vary with job conditions.)

Mixture Properties at Job Mix Formula

Property	ISSA TB - No	Result	Specification	Pass/Fail
Mix Time, seconds	TB 113	300	180 min	Pass
30 min Cohesion, kg-cm	TB 139	12	12 min	Pass
60 min Cohesion, kg-cm	TB 139	20	20 min	Pass
Consistency, cm	TB 106	2.8	2.0 min	Pass
Wet Stripping, %	TB 114	90+	70 min	Pass
Compatibility	TB 115	PASS	--	Pass

If questions should arise concerning the contents of the report, please contact Paragon Technical Services at (601) 932 - 8365.

Reviewed and submitted by:

[Signature]

Mike Hemsley Jr

Paragon Technical Services

Test results, opinions, or interpretations are based on the material supplied by the client. This report is for the exclusive use of the client to which it is addressed. No reproduction or facsimile in any form should be made without the client's written permission. Paragon Technical Services, Inc. assumes no responsibility and makes no warranty express or implied as to the material or the products or processes containing this material.

Paragon Technical Services, Inc. 390 Carrier Blvd. Richland, MS 39218
Phone 601.932.8365 Toll Free 866.636.2176 Fax 601.932.8466
E-mail info@ptsilab.com www.ptsilab.com 8.1.2006



paragon
technical services, inc.

Ergon Asphalt & Emulsions - Fontana

PTSi Project Number: S21-271-443b

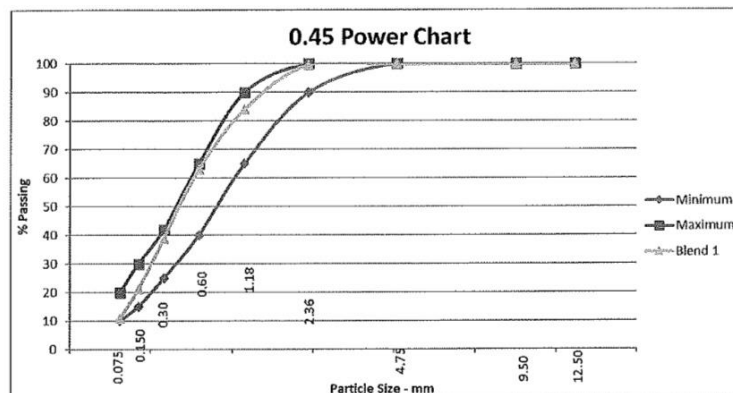


Figure 1: Aggregate Gradation, Percent Passing

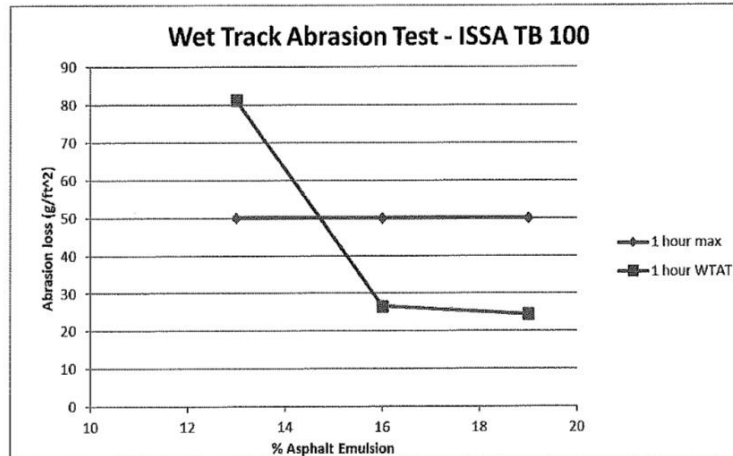


Figure 2: Wet Track Abrasion, Mass Loss

Test results, opinions, or interpretations are based on the material supplied by the client. This use of the client to which it is addressed. No reproduction or facsimile in any form should be made without the client's written permission. Paragon Technical Services, Inc. assumes no responsibility and makes no warranty express or implied as to the material or the products or processes containing this material.

Paragon Technical Services, Inc. 390 Carrier Blvd. Richland, MS 39218
Phone 601.932.8365 Toll Free 866.636.2176 Fax 601.932.8466
E-mail info@ptsilab.com www.ptsilab.com 8.1.2006



Type 2 & Type 3 Mix Designs



paragon
technical services, inc.
Ergon Asphalt & Emulsions - Fontana

PTSi Project Number: S21-243-385

III Field Simulation Tests.

A Wet Track Abrasion Test, One-Hour Soak, ASTM D3910, ISSA TB 100.

Set	% Cement	% GTR	% H ₂ O	% Emulsion	Loss, g/ft ²	2018 Greenbook Specification	Loss, g/ft ²	CALTRANS Specification
1	0.5	5.0	11	12	44.7	60 Max	481.3	810 Max
2	0.5	5.0	8	15	13.3	60 Max	143.5	810 Max
3	0.5	5.0	5	18	13.8	60 Max	149.1	810 Max

* % GTR is added as a percent by volume of asphalt

B Monolayer Loaded Wheel Test, ISSA TB 109 (Fine Sand Adhesion)

Set	% Cement	% GTR	H ₂ O	Emulsion, %	Gain, g/ft ²	Specification
1	0.5	5.0	11	12	26.9	50 Maximum
2	0.5	5.0	8	15	34.8	50 Max
3	0.5	5.0	5	18	29.3	50 Max

* % GTR is added as a percent by volume of asphalt

IV Discussion.

Standard trial mixes, 30 and 60 minute cohesions with 0/#4 aggregate gradation were performed to determine mixing and setting characteristics. The effects of 0 to 3% Portland Cement on cohesion values determined filler requirements to be 0.5% to 0.75% Portland Cement to produce appropriate strength gain. Aluminum Sulfate solution was found to be an effective mix time extender. Based on cumulative test results and field experience, the optimum asphalt emulsion content of 15.0% at 62.8% AC residue is selected. At 62.8% AC residue the optimum asphalt cement content is 9.42% by weight of the dry aggregate.

V Job Mix Recommendation

Aggregate	100 %	
Asphalt Emulsion	15.0 ± 0.5 %	of weight of dry aggregate
Water	3 to 13%*	of weight of dry aggregate
Cement	0.5% to 0.75%	of weight of dry aggregate
Additive	**	of weight of dry aggregate
GTR	5.0%	By Volume of Asphalt
Carbon Black	1.70%	Of Weight of Emulsion

* As needed for good mix consistency.

** As needed for break control. Aluminum Sulfate Solution (38% solids)

VI Mix Characteristics at Job Mix Recommendation (Approximates, based on laboratory conditions. Actual may vary with job conditions.)

Mixture Properties at Job Mix Formula

Property	ISSA TB - No	Result	Specification	Pass/Fail
Mix Time, seconds	TB 113	300	180 min	Pass
30 min Cohesion, kg-cm	TB 139	12	12 min	Pass
60 min Cohesion, kg-cm	TB 139	20	20 min	Pass
Consistency, cm	TB 106	2.8	2.0 min	Pass
Wet Stripping, %	TB 114	90 +	70 min	Pass
Compatibility	TB 115	PASS	-	Pass

If questions should arise concerning the contents of the report, please contact Paragon Technical Services at (601) 932 - 8365.

Reviewed and submitted by:

[Signature]

Mike Hemsley Jr

Paragon Technical Services

Test results, opinions, or interpretations are based on the material supplied by the client. This report is for the exclusive use of the client to which it is addressed. No reproduction or facsimile in any form should be made without the client's written permission. Paragon Technical Services, Inc. assumes no responsibility and makes no warranty express or implied as to the material or the products or processes containing this material.

Paragon Technical Services, Inc. 390 Carrier Blvd. Richland, MS 39218
Phone 601.932.8365 Toll Free 866.636.2176 Fax 601.932.8466
E-mail info@ptsilab.com www.ptsilab.com 8.1.2006



paragon
technical services, inc.
Ergon Asphalt & Emulsions - Fontana

PTSi Project Number: S21-144-249

III Field Simulation Tests.

A Wet Track Abrasion Test, One-Hour Soak, ASTM D3910, ISSA TB 100.

Set	% Sulfate/ % Cement	% GTR	% H ₂ O	% Emulsion	Loss, g/ft ²	Greenbook 2018 Specs	Loss, g/ft ²	CALTRANS Specification
1	0.5/0.5	5.0	15	11	62.1	60 Max	668.0	810 Max
2	0.5/0.5	5.0	12	14	36.0	60 Max	387.2	810 Max
3	0.5/0.5	5.0	9	17	29.7	60 Max	319.3	810 Max

* % GTR is added as a percent by volume of asphalt

B Monolayer Loaded Wheel Test, ISSA TB 109 (Fine Sand Adhesion)

Set	% Sulfate/ % Cement	% GTR	H ₂ O	Emulsion, %	Gain, g/ft ²	Specification
1	0.5/0.5	5.0	15	11	8.1	50 Maximum
2	0.5/0.5	5.0	12	14	27.5	50 Max
3	0.5/0.5	5.0	9	17	41.3	50 Max

* % GTR is added as a percent by volume of asphalt

IV Discussion.

Standard trial mixes, 30 and 60 minute cohesions with 0/#4 aggregate gradation were performed to determine mixing and setting characteristics. The effects of 0 to 3% Portland Cement and 0 to 1% sulfate on cohesion values determined filler requirements to be 0.5% sulfate and 0.5% cement to produce an appropriate mixture. Aluminum Sulfate solution was found to be an effective mix time extender, while cement addition sped up the set and cure. Based on cumulative test results and field experience, the optimum asphalt emulsion content of 13.5% at 62.8% AC residue is selected. At 62.8% AC residue the optimum asphalt cement content is 8.48% by weight of the dry aggregate.

V Job Mix Recommendation

Aggregate	100 %	
Asphalt Emulsion	13.5 ± 0.5 %	of weight of dry aggregate
Water	8 to 18%*	of weight of dry aggregate
Cement	0.5% to 0.75% **	of weight of dry aggregate
Additive	0.5%+0.25%**	of weight of dry aggregate
GTR	5.0%	By Volume of Asphalt
Carbon Black	1.70%	Of Weight of Emulsion

* As needed for good mix consistency.

** As needed for mix time and break control.

VI Mix Characteristics at Job Mix Recommendation (Approximates, based on laboratory conditions. Actual may vary with job conditions.)

Mixture Properties at Job Mix Formula

Property	ISSA TB - No	Result	Specification	Pass/Fail
Mix Time, seconds	TB 113	300	180 min	Pass
30 min Cohesion, kg-cm	TB 139	12	12 min	Pass
60 min Cohesion, kg-cm	TB 139	20	20 min	Pass
Consistency, cm	TB 106	2.7	2.0 min	Pass
Wet Stripping, %	TB 114	90 +	70 min	Pass
Compatibility	TB 115	PASS	-	Pass

If questions should arise concerning the contents of the report, please contact Paragon Technical Services at (601) 932 - 8365.

Reviewed and submitted by:

[Signature]

Mike Hemsley Jr

Paragon Technical Services

Test results, opinions, or interpretations are based on the material supplied by the client. This report is for the exclusive use of the client to which it is addressed. No reproduction or facsimile in any form should be made without the client's written permission. Paragon Technical Services, Inc. assumes no responsibility and makes no warranty express or implied as to the material or the products or processes containing this material.

Paragon Technical Services, Inc. 390 Carrier Blvd. Richland, MS 39218
Phone 601.932.8365 Toll Free 866.636.2176 Fax 601.932.8466
E-mail info@ptsilab.com www.ptsilab.com 8.1.2006



Machine Calibrations

Aggregate Calibration

****Minimum 100 counts of the Rock Belt counter per Sample (3 Samples Per Gate Setting)****

Unit #: 91154 Date: 1/6/2022

Contract #: 21-083 Rock: Type I
CDG Materials

GATE SETTING (Inches)	Full Weight LBS	Empty Weight LBS	Net Weight LBS (= Full - Empty)	No. of Counts	LBS per Count
3					
Sample 1	66,700	61,780	4,920	100	49.20
Sample 2	61,780	56,800	4,980	100	49.80
Sample 3	56,800	51,840	4,960	100	49.60
Average Agg. Lbs./Count	49.63				
		Moisture Factor	1.02		Dry Agg. Lbs./Count 49.56

GATE SETTING (Inches)	Full Weight LBS	Empty Weight LBS	Net Weight LBS (= Full - Empty)	No. of Counts	LBS per Count
4					
Sample 1	69,340	62,560	6,780	100	67.80
Sample 2	62,560	55,900	6,660	100	66.60
Sample 3	55,900	49,280	6,620	100	66.20
Average Agg. Lbs./Count	66.87				
		Moisture Factor	1.02		Dry Agg. Lbs./Count 65.56

GATE SETTING (Inches)	Full Weight LBS	Empty Weight LBS	Net Weight LBS (= Full - Empty)	No. of Counts	LBS per Count
5					
Sample 1	59,820	51,220	8,600	100	86.00
Sample 2	51,230	42,660	8,570	100	85.70
Sample 3	67,260	58,700	8,560	100	85.60
Average Agg. Lbs./Count	85.77				
		Moisture Factor	1.029		Dry Agg. Lbs./Count 83.35

*** Data must be entered in the Full Weight, Empty Weight, and No of Counts Columns. No additional data is needed. ***
 *** Gate Settings and the Moisture Factor Must be Adjusted per Calibration. ***
 *** Moisture Factor = Percentage of Moisture + 1 ***
 *** DON'T FORGET TO ENTER YOUR DATE & EQUIPMENT # ***



Emulsion Calibration

****Minimum 100 counts of the Rock Belt counter per sample****

Emulsion	Full Weight LBS	Empty Weight LBS	Net Weight LBS (= Full - Empty)	No. of Counts	LBS per Count
Sample 1	49,100	47,600	1,500	100	15.00
Sample 2	47,600	46,100	1,500	100	15.00
Sample 3	46,100	44,600	1,500	100	15.00
Average Lbs / Count of Fines					15.00

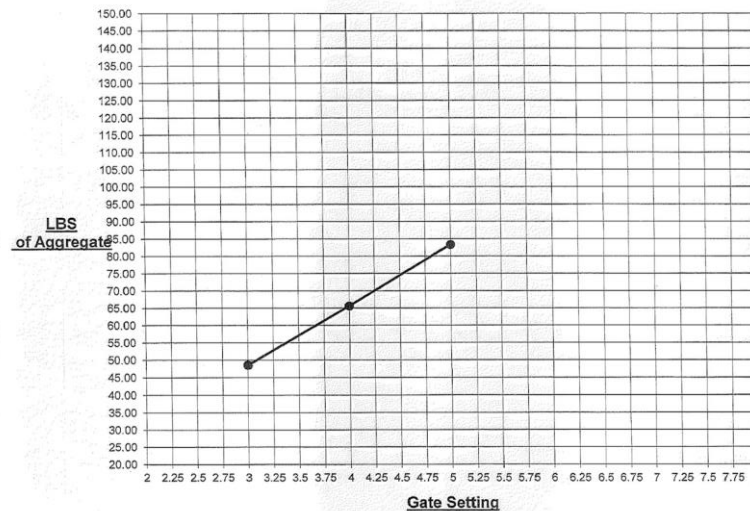
*** Data must be entered in the Full Weight, Empty Weight, and No of Counts Columns. No additional data is needed. ***
 *** DON'T FORGET YOUR DATE OR EQUIPMENT # ***

Cement / Fines Calibration

****Minimum 10 counts of the Fines Feeder counter per Sample****

Cement / Fines	Full Weight LBS	Empty Weight LBS	Net Weight LBS (= Full - Empty)	No. of Counts	LBS per Count
Sample 1				100	
Sample 2				100	
Sample 3				100	
Average Lbs / Count of Fines					

*** Data must be entered in the Full Weight, Empty Weight, and No of Counts Columns. No additional data is needed. ***
 *** DON'T FORGET YOUR DATE OR EQUIPMENT # ***



Calibrations shown above are typical of all calibrations performed. Project required 9 different calibrations in 2021 and again in 2022. All calibrations required the stamp of a professional engineer after equipment utilized on this project was calibrated in the presence of City personnel per specification.



Special Consideration: Environmental Sustainability

- ❖ The City of San Diego's use of these pavement preservation techniques provided a major positive environmental impact on the local communities by reducing the use of raw materials required vs. more conventional treatments.
- ❖ When comparing the treatments placed on these 1.4 million square yards to a 1.5" Hot Mix Asphalt overlay, you will quickly see that the environmental impact is staggering.
- ❖ Per the Roadresource.org Green Calculator, it is estimated that the San Diego project reduced greenhouse gas emissions by 92 percent compared to conventional mill and fill overlay alternatives.
- ❖ That's the equivalent of removing approximately 1,500 passenger vehicles from U.S. roadways for an entire year.



Project Sustainability

Real Numbers

- ❖ A 1.5" Mill & Fill Hot Mix alternative would require 118,150 Tons of materials while the slurry seal application only required 8,400 tons of material. That's a 93% reduction in materials used.
- ❖ Of the 8,400 tons of slurry seal material, approximately 7,200 tons were aggregate and the other 1,100 tons was asphalt emulsion whereas the hot mix alternative would require 5,900 tons of binder
- ❖ The use of the specified pavement preservation treatments saved local quantities over 100,000 tons of virgin aggregate materials plus savings of additional asphalt binder. It also kept approximately 6,200 large truckloads of aggregate, RAP, and liquid asphalt off of local city streets.
- ❖ All pavement preservation products were placed at ambient temperature, so they required far less energy and time to produce, transport and place than the manufacturing, transport and placement of the alternative of the alternative hot mix treatment.

Cost & Green Calculator:

Cost & Green Calculator

Compare cost savings and environmental impact by treatment

An approach to pavement management that applies a robust toolbox of pavement preservation and recycling treatments will save time, money, and reduce environmental impact over the long-term.

Use this calculator to see average data comparing the cost and environmental savings of preservation and recycling techniques, compared to conventional reconstruction, mill and fill, or thin overlays.

Please note that these estimates are approximate and should not be used for emissions inventory or formal carbon footprinting exercises or project cost estimates.

How to use this Tool

 yd

CONVENTIONAL APPROACH

TREATMENT:	▼ Minor Mill & Fill
UNIT COST:	9.80
LIFE EXTENSION:	11.0
SQUARE YARDS:	1380162

Total Cost: **\$13,525,588**
Equivalent Annualized Cost: **0.89**

 yd

PRESERVATION & RECYCLING APPROACH

TREATMENT:	▼ Micro Surfacing- Double Lift
UNIT COST:	3.92
LIFE EXTENSION:	8.0
SQUARE YARDS:	1380162

Total Cost: **\$5,410,235**
Equivalent Annualized Cost: **0.49**

Source: roadresource.org



Roadresource.org:

By choosing a preservation & recycling approach...

COST SAVINGS

\$8,115,353

60% LESS THAN MINOR MILL & FILL

ENVIRONMENTAL SAVINGS ?

REDUCE GREENHOUSE GAS EMISSIONS
BY 92%

That's the green equivalent of removing **1,426 passenger vehicles** from US roadways for a year!

Source: roadresource.org



Special Consideration: Traffic Control

- ❖ The working hours were between 8:30 am and 3:30 pm. The working hours for the Downtown area were between 9 am and a 3 pm. The high traffic volume traveled on the project streets and the time restrictions meant that the micro surfacing phase had to move flawlessly to allow enough time for material cure and to avoid any traffic congestions.
- ❖ Since most streets were wide enough, VSS used the approach of closing outside lanes and working on sealing them while keeping the inside lanes open for two-way traffic. The outside lanes would then be open once material has cured enough and inside lanes would be closed pushing traffic to the outside lanes. This approach worked greatly as it allowed for a smooth flow of traffic.
- ❖ When road width did not allow for outside lanes/inside lanes approach, the proper traffic signage would be placed to restrict traffic to one-way allowing traffic to use only one direction of the street. After material is placed and cured sufficiently, the traffic would then be flipped to seal the remaining width.

Special Consideration: Traffic Control

- ❖ When road width did not allow for outside lanes/inside lanes approach, the proper traffic signage would be placed to restrict traffic to one-way allowing traffic to use only one direction of the street. After material is placed and cured sufficiently, the traffic would then be flipped to seal the remaining width.
- ❖ These approaches were applied by a traffic control crew that consisted of qualified traffic control technicians. VSS International, Inc., also partnered with San Diego Police Department by working with a number of dispatched officers in the field to ensure the flow of traffic at the major intersections.

Special Considerations

Public Notification

- ❖ VSS International, Inc., also partnered with San Diego Police Department by working with a number of dispatched officers in the field to ensure the proper and timely notification of all residents impacted by the work.
- ❖ Documentation of all public notification and posting of “No Parking” signs had to be registered with the SDPD at least 72 hours in advance of the work so that required towing could be accomplished on schedule day of work if needed.
- ❖ VSS made every effort to not have to tow vehicles and create any inconvenience for the City's residents.



Special Consideration: Advance Public Notification



CONSTRUCTION NOTICE: **PLEASE READ CAREFULLY**

CITY OF SAN DIEGO SLURRY SEAL GROUP 2122

The City of San Diego has contracted with VSS International, Inc. to perform maintenance on certain streets in your neighborhood. Over the next several weeks VSS International, Inc. will complete a preventative maintenance effort that will address pavement cracks and add slurry seal to help preserve streets near your address. Please accept our apology for any inconveniences this work may cause. Your patience and cooperation will help to get this work completed safely and with minimal interruption of your daily activities.

Work will be performed between the hours of **7:00 AM and 5:00 PM**. The general order of work will include:

- No Parking signs will be displayed 72 hours in advance of the work
 - Asphalt repair, Crack Seal, Weed abatement, Street Sweeping
 - Placement of Slurry Seal; typically 7-14 days following pavement repairs
- Occasionally, two coats of slurry seal are applied on two different dates

How will your neighborhood be impacted?

Before 7 a.m. on the day of the slurry seal work, residential streets may be completely closed to all vehicles. That makes it important to plan ahead for parking on a street nearby or for leaving home before 7 a.m. that day. It is also important to help keep the street dry before the work begins. Please turn off any sprinklers or other irrigation systems the night before.

When possible, some streets will be slurry sealed in stages to allow for limited access while the work is underway. It is important to obey the traffic control and "No Parking" warnings and to stay off the slurry seal until the street is reopened for traffic – normally by 5 p.m. the same day. **Cars parked in violation will be TOWED.**



What can I expect once the work is completed?

Slurry seal has a light brown color when it is first applied to the street. It changes color to black after a few hours of exposure to sunlight and heat. That change is important and helps confirm that the newly sealed street is ready for vehicle traffic. *Again, it is important to protect new slurry seal work by staying off the street until traffic control and parking restrictions are removed by work crews.*

Slurry seal can appear rough-at-the-edges when first applied and may even show some tire tracks or minor gouges once vehicles are allowed back on to the recently sealed streets. These marks will disappear as more traffic travels across the street and as the sealant continues to dry over time.

Please note: Slurry seal is used to protect streets in generally good condition from further deterioration and does not return streets to "as new" condition. Slurry seal helps to extend a street's life by three to five years. Complete replacements are limited to those streets that are in very poor condition.

What about trash pickup on the day of the work?

If the day of the planned slurry seal work falls on the same day as your trash collection, please bring your trash bins out early. Work crews will coordinate with the trash hauler to ensure your trash is collected prior to street closure for that day.

What about regular street sweeping?

Regular street sweeping will be suspended during the slurry seal work to allow the new coating to properly set. The entire street sweeping route will be suspended allowing you to park on nearby streets normally affected by "no-parking" restrictions associated with those routes.

When will street striping and markings be restored?

Any striping or markings covered over by the slurry seal effort will be restored within a few weeks following the work. Some temporary markers or signs may be installed to help with traffic control until the striping is restored.

Contact Information:

For any questions related to the slurry seal work planned in your neighborhood, please contact the Project Manager at **VSS International, Inc. at 916-373-1500**. You may also submit questions or requests for additional services via the City's *Get It Done* system at <https://www.sandiego.gov/get-it-done>.

Special Consideration: 72 Hour Public Notification

Este proyecto está financiado por la Recaudación
de Impuestos de Gas del Estado (SB1)



VSS INTERNATIONAL, INC.

ATENCIÓN

Mortero Asfáltico en Varias Calles

NO MANEJAR O ESTACIONARSE

7:00 A.M. a 5:00 P.M.

DISCULPE EL INCONVENIENTE

Esta calle está programada para recibir 2 aplicaciones de mortero asfáltico. La primera capa será con piedra grande seguida de una segunda capa de piedra más chica para una superficie más lisa. Las Capas de Mortero Asfáltico se harán en diferentes días.

Su calle tendrá que cerrarse a TODO EL TRÁFICO el

Para que podamos mejorar su superficie.

Debido a que el estacionamiento en la calle estará prohibido en esta fecha, POR FAVOR ESTACIONE SU CARRO EN UNA CALLE ADYACENTE NO SEÑALIZADA antes de la hora indicada para que no se vea privado(a) de su uso.

LOS CARROS ESTACIONADOS SERÁN REMOLCADOS A CARGO DEL PROPIETARIO

No se permitirá que se operen vehículos en su calle hasta que la calle se seque. El mortero asfáltico es pegajoso y se adherirá a sus llantas si mancha sobre él antes de que se haya secado por completo. Por favor observe todos los letreros del área de construcción.

Por favor no permita que corra el agua en la alcantarilla durante el trabajo en la calle. Esto ayudará a que se seque el mortero. Si su basura está programada para ser recogida en esta fecha, favor de dejarla afuera antes de las 6:00 a.m. Se proporcionará acceso para manejar y a los negocios en las calles principales.

BAJO CONDICIONES DE CLIMA NORMALES su calle generalmente estará de nuevo en servicio a las 5:00 p.m. Sin embargo retrasos y problemas de construcción imprevistos podrían afectar el tiempo de terminación. El trabajo no realizado por clima húmedo o circunstancias imprevistas se volverá a programar y se le notificará a usted.

Debido al número de calles programadas, no podemos decirle el tiempo exacto en que su terminará su calle. Entendemos el inconveniente causado al limitarle el acceso a su calle. Por favor entienda que la inconveniencia causada ahorita es poca comparada con lo que se requerirá después si no se aplica esta protección.

GRACIAS POR SU COOPERACION

VSS INTERNATIONAL, INC.
916-373-1500

This project is funded by State Gas Tax Revenue (SB1)



VSS INTERNATIONAL, INC.

NOTICE

Slurry Seal Of Various Streets

NO PARKING OR DRIVING

7:00 A.M. - 5:00 P.M.

SORRY FOR THE INCONVENIENCE

This street is scheduled to receive 2 applications of Slurry Seal. First coat will be a larger rock, followed by a 2nd coat of a smaller rock for a smoother surface. Slurry Coats will be done on separate days.

Your street will have to be closed to ALL TRAFFIC on

So that we may improve its surface.

Since parking on the street will be prohibited on this date, PLEASE PARK YOUR CAR ON AN ADJACENT, NON-POSTED STREET before the above time so you will not be deprived of its use.

PARKED CARS WILL BE TOWED AT OWNER'S EXPENSE

Operation of vehicles will not be permitted on your street until the surface dries. Slurry seal is sticky and will adhere to your tires if you drive on it before it has dried completely. Please observe all construction area signs.

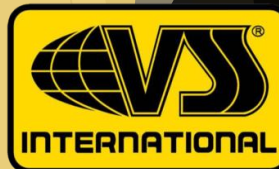
Please do not permit water to run in the gutter during street work. This will help the slurry to dry. If your trash is scheduled for pick up on this date, please have it out by 6:00 a.m. On major thorough-fare, driving and business access will be provided.

UNDER NORMAL WEATHER CONDITIONS your street should generally be back in service by 5:00 p.m. However, construction delays and unforeseen problems could affect the completion time. Work not done because of wet weather or unforeseen circumstances will be rescheduled and you will be notified.

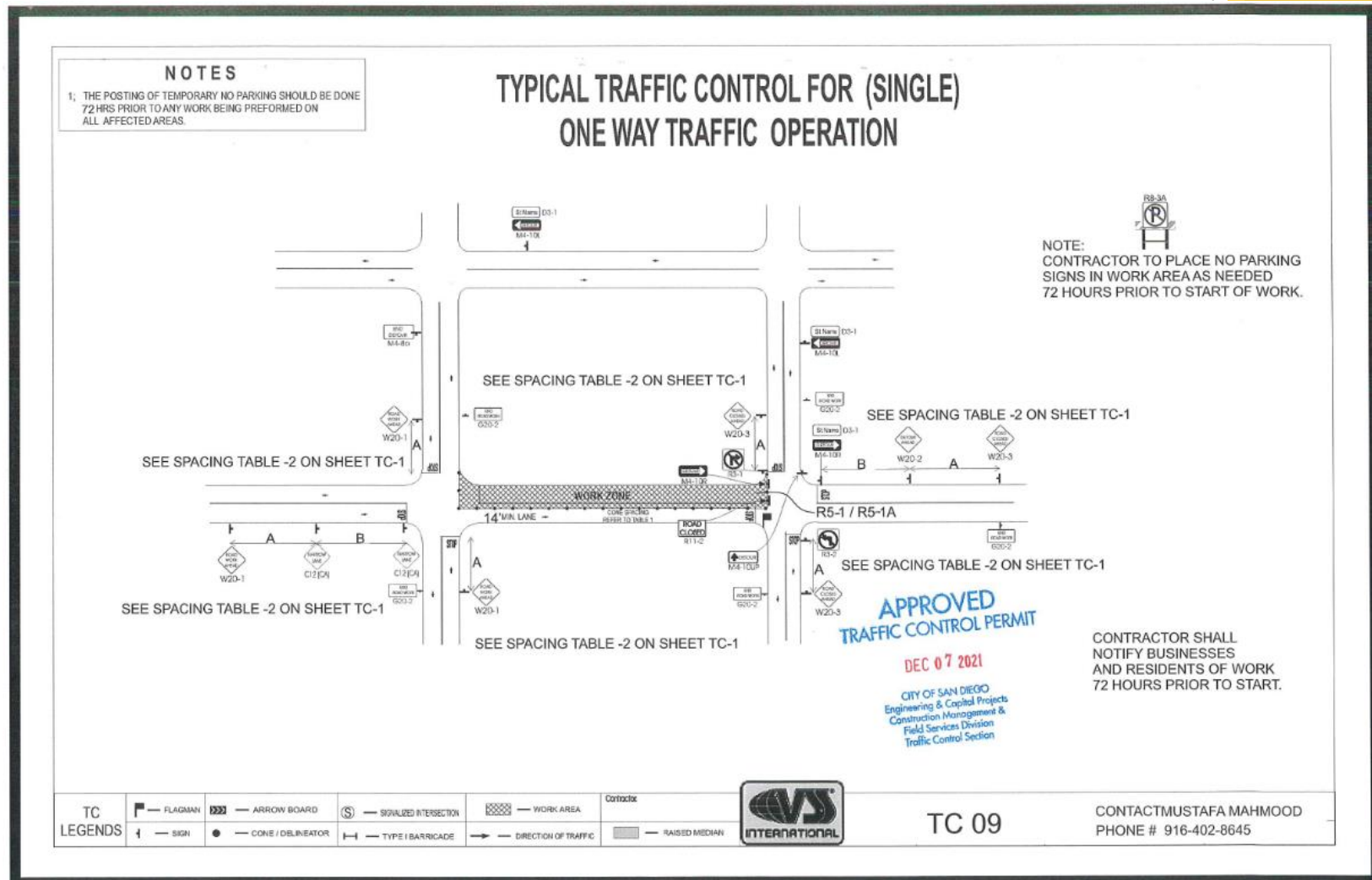
Due to the number of streets scheduled, we cannot tell you the exact time your street will be done. We realize the inconvenience caused by limited access to your street. Please understand that the inconvenience caused at this time is very small compared to what would later be required if this protection were not applied.

THANKS FOR YOUR COOPERATION

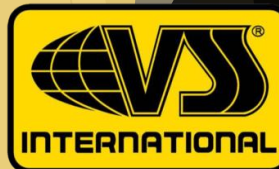
VSS INTERNATIONAL, INC.
916-373-1500



Traffic Control Plans

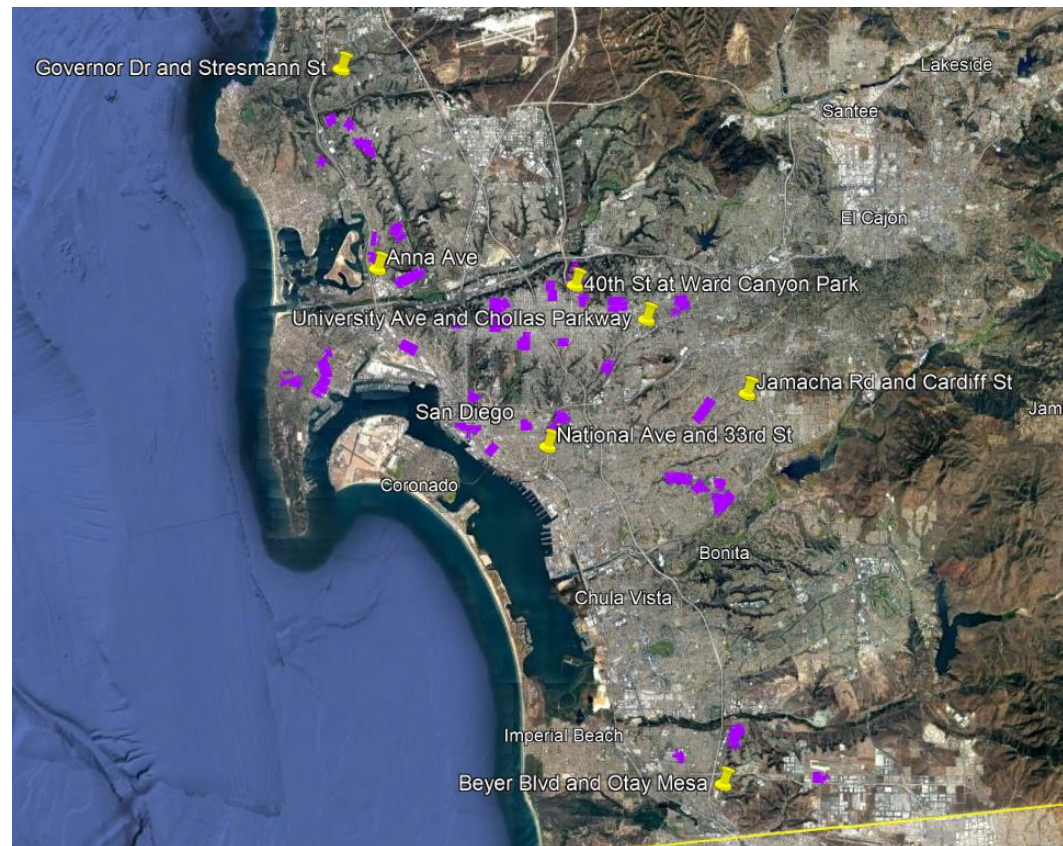


Note: Entire Traffic Control Plan submitted was approximately 35 pages.



Special Consideration: Logistics & Staging Areas

- ❖ The material used in the slurry seal mix were imported and stored at the several staging areas located around the City.
- ❖ The process of finding the staging areas was challenging as almost every empty lot in the City is being developed for a residential or a commercial project.
- ❖ VSS International utilized a total of 7 staging areas located strategically around the City to serve the different construction activities.



Special Consideration: Safety and Environment

- ❖ To ensure the safety of the construction team as well as the traveling traffic, the slurry seal operation started every day with a safety meeting delivered by the project superintendent covering various safety topics and going over areas of improvements.
- ❖ A preparation crew work on protecting all drainage inlets to avoid any environmental contamination risks to the stormwater system. This work was done in accordance with the Water Pollution Control Plan and the Best Management Practices Plan submitted by VSS International, Inc., and approved by the City of San Diego.
- ❖ After the successful application of the slurry seal each day, temporary pavement markers were installed to provide temporary delineation for traveling traffic and to ensure safety of public. The streets were then cat tracked in a timely manner.

Protecting the Environment

- ❖ **Environment Protection** – VSS installed drainage protection on approximately 100+ drainage inlets. All exposed drains along the 30 miles of curb line were protected with approved materials to prevent the potential of any hazardous construction related debris from finding its way into the drainage system, some of which flows directly into the nearby Pacific Ocean.
- ❖ **Compliance & Inspection** - As part of the City's specifications and quality control, this project required a very detailed Water Pollution Control Plan. The plan required weekly inspections at all drain inlet coverings to ensure that drains were not compromised at any point during the construction process.



Before Construction



During Construction



During Construction



During Construction



Upon Completion



Upon Completion



Upon Completion



Upon Completion



Two Years Later

November 2023



VSS Construction Team



- ❖ Jeff Roberts, General Manager
- ❖ Matt Ferguson, Construction Manager
- ❖ Jon James, Operations Manager
- ❖ Roman Benedyuk, Safety Manager
- ❖ Mustafa Mahmood, Project Manager
- ❖ Jimmy Blackmon, Project Superintendent
- ❖ Will Cross, Chief Estimator
- ❖ Nicholas Corcoran, Lead Estimator

Keys to Success

- ❖ VSS International's experienced personnel rose to meet every challenge, every shift and created a favorable legacy for future low bidders to follow by finishing ahead of time, under budget and with no safety related issues resulting in an extremely satisfied client.
- ❖ There were no lost shifts due to equipment downtime or other issues. This project was executed flawlessly as planned.
- ❖ Excellent communication with all involved, and superior field supervision led to the project's success.
- ❖ Routine meetings between the City of San Diego and the contracting team to discuss expectations and progress toward project milestones.



Conclusion



San Diego Slurry Seal Group 2122 is worthy of 2024 ISSA President's Award for Excellence:

- ❖ Meets and exceeds criteria for the 2024 President's Award for Excellence. The owner is extremely satisfied with the project.
- ❖ Utilized innovation in the multi-layered design & application of polymer and rubber modified pavement preservation materials and methods on a tremendous scale
- ❖ Achieved tremendous sustainability & environmental savings to the community.
 - ❖ Reduced greenhouse gas emissions by approximately 92%
 - ❖ Conserved significant amounts of energy & natural resources
- ❖ Saved the agency and local taxpayers approximately \$8.1 Million dollars in hard costs.
- ❖ Required an exemplary level of professionalism and discipline for project success.
- ❖ Exhibited unmatched appearance and aesthetic value.
- ❖ Safety protocols to keep workers safe resulted in zero accidents.

Thank You for your consideration!



Project Recognition

San Diego Slurry Seal Group 2122:

- ❖ Recognized by the Western Regional Association for Pavement Preservation as the recipient of the 2022 Excellence in Contracting Award.
- ❖ Project recognized for work performed to the highest industry standards for quality and construction management.



Project Recognition

San Diego Slurry Seal Group 2122:

- ❖ Featured in the Summer 2023 edition of Pavement Preservation Journal.
- ❖ Article featured the environmental sustainability at the core of San Diego's Pavement Preservation Program.



*Thank You for Your
Consideration!*



*Safely Maintaining America's Roadways
Since 1919*