

CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

**Demonstration of RJSeal™
Guang Pu Xi Lu, Guangzhou,
GuangDong Province,
Peoples Republic of China**

December 2003



**TS² Consulting Inc.
Lamma, Hong Kong**

CROWN CAPITAL ENTERPRISE LIMITED

Demonstration of RJSeal Guang Pu Xi Lu, Guangzhou, Guangdong Province, Peoples Republic of China

December 2003

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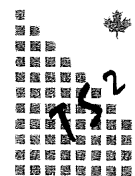
CROWN CAPITAL ENTERPRISE LIMITED

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Guang Pu Xi Lu, Guangzhou, Guangdong Province
Peoples Republic of China

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APPENDICES

<u>No.</u>	<u>Description</u>
A	RJSeal TM Descriptive Literature



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Demonstration of RJSeal™ Guang Pu Xi Lu, Guangzhou, Guangdong Province Peoples Republic of China

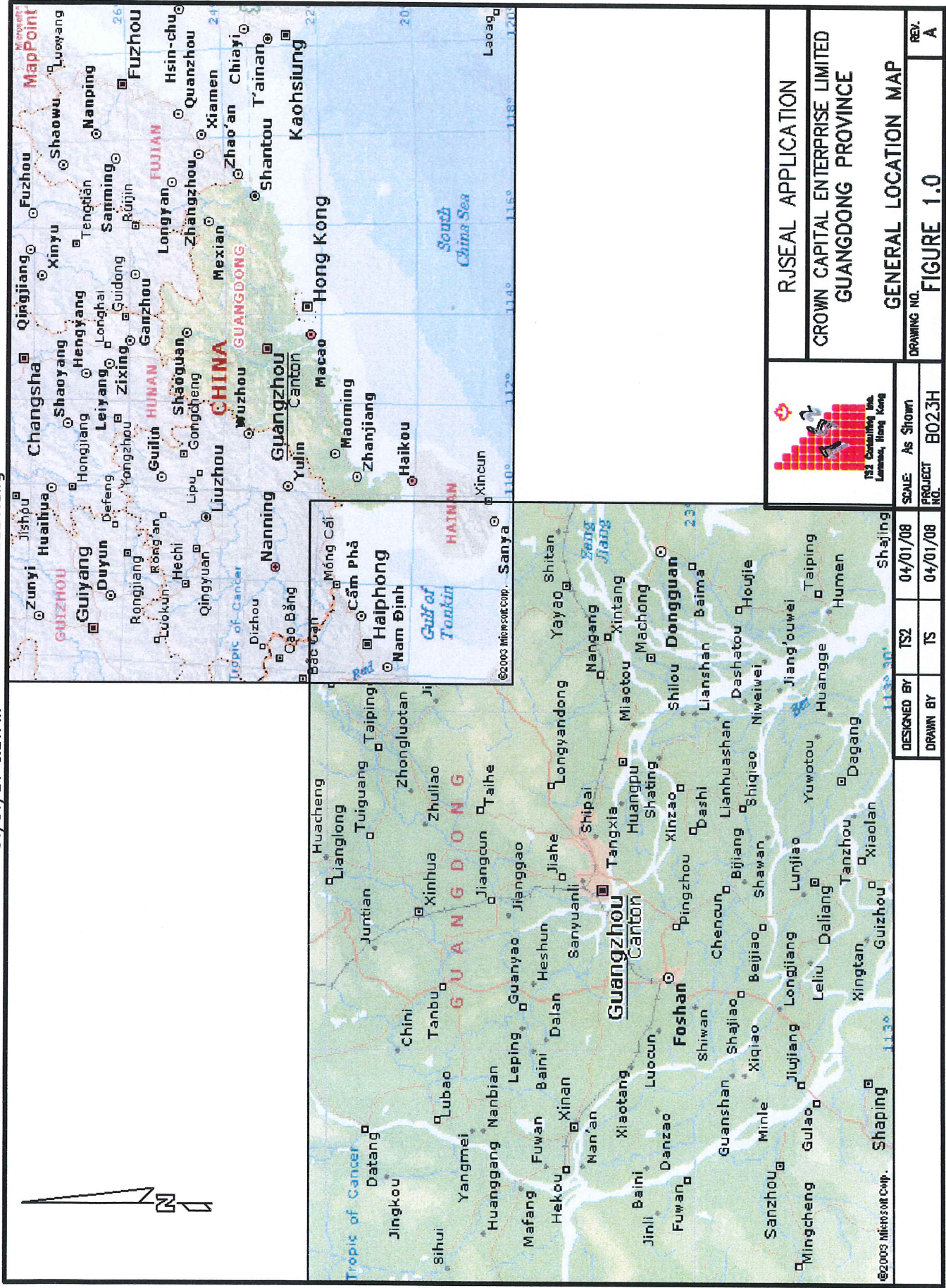
December 2003

1.0 INTRODUCTION

Crown Capital Enterprise Limited of Hong Kong entered into an arrangement with the Guangzhou Economic & Technological Development District, of Guangzhou, Guangdong Province, China in November 2003. This arrangement calls for the analysis of the performance of RJSeal™, a sealer/rejuvenator for asphalt pavement on roads within the jurisdiction of the Guangzhou Economic & Technological Development District.

The Guangzhou Economic & Technological Development District is located in the north-east sector of the City of Guangzhou in Guangdong Province, which is bordered by Fujian, Jiangxi, Hunan, and Guangxi Provinces. Guangzhou is the capital city of Guangdong province and is a major service center for the area and in recent years has seen a major growth in population, along with significant construction due to the transfer of manufacturing from Hong Kong to Guangzhou and special economic development zones like the neighbouring cities of Shenzhen and Zhuhai. Guangzhou lies in the Pearl River Delta and hosts HuangPu port, which is accessible to river going vessels of intra-coastal (10,000 tonnes) size, which has a major container terminal for the export trade. The present population of Guangzhou and its suburbs and surrounding area is estimated at approximately 10 million. See figure 1.0 for a map showing the location of Guangzhou in Guangdong Province. The majority of the area lies at 10 to 15 metres in elevation, although mountains to the north and east hold some peaks that exceed 1,000 metres. The regions' latitude (23 degrees north), mean that there are four seasons, with temperatures ranging from 45 Celsius in the long, hot summer to 5 Celsius in the short winter. The rainy season is primarily May thru August, but can extend into September.

In the immediate Guangzhou area, a sequence of sedimentary rocks predominates, although some metamorphic rocks also occur. Due to the rock cuts along the highways, numerous rock outcrop exposures are available. The asphalt in the area is manufactured from local materials, which is comprised of crushed and screened sandstone, diorite, phylites and granite, as well as washed gravels from the various rivers. The bitumen binder for the asphalt is sourced from various locations. Since Guangzhou is near HuangPu port on the Pearl River, which is navigable by intra-coastal sixe vessels, the possibility of bitumen being sourced from offshore is a distinct possibility so refineries in Singapore and the like should not be forgotten.



2.0 CO-OPERATIVE PROGRAM

The intent of the arrangement with the Guangzhou Economic & Technological Development District is to demonstrate RJSeal™ at different locations selected by their road maintenance division, which will subsequently allow analysis of the performance of RJSeal™ on a variety of asphalt surfaces. A demonstration was undertaken in the southern portion of the Economic & Technological Development District on December 15, 2003 on Guang Pu Xi Lu, a four-lane street. The demonstration strip was on the inside northbound lane. The portion of the Street treated was an asphalt pavement that was placed in 2001. No details are known about the subgrade, but inspection of the shoulder show a sandy-silty material. Knowing construction techniques in Streets in China in general, minimal gravel would be used for an immediate coarse base, beneath the pavement. At the demonstration site, inspection of the asphalt pavement generally showed that there was a significant amount of exposed aggregate and the bitumen was quite oxidized. Some linear and longitudinal cracks existed, but were typically in the 0.5 to 1.5 mm width range. Some potholes had been patched, which were probably attributable to softening of the sub-grade due to water penetration or possibly underground utility repairs.

3.0 RJSEAL™

RJSeal™ is a proprietary product that is supplied by Crown Capital Enterprise Limited of Wanchai, Hong Kong. RJSeal™ has been proven in numerous applications in North and South America to rejuvenate asphalt pavement at various stages of its life and economically extend the life of the pavement. RJSeal™ is a three component, asphalt sealer rejuvenator that is comprised of Coal Tar, Coal Tar Oils and Petroleum Solvents.

3.1 PRIOR EXPERIENCE

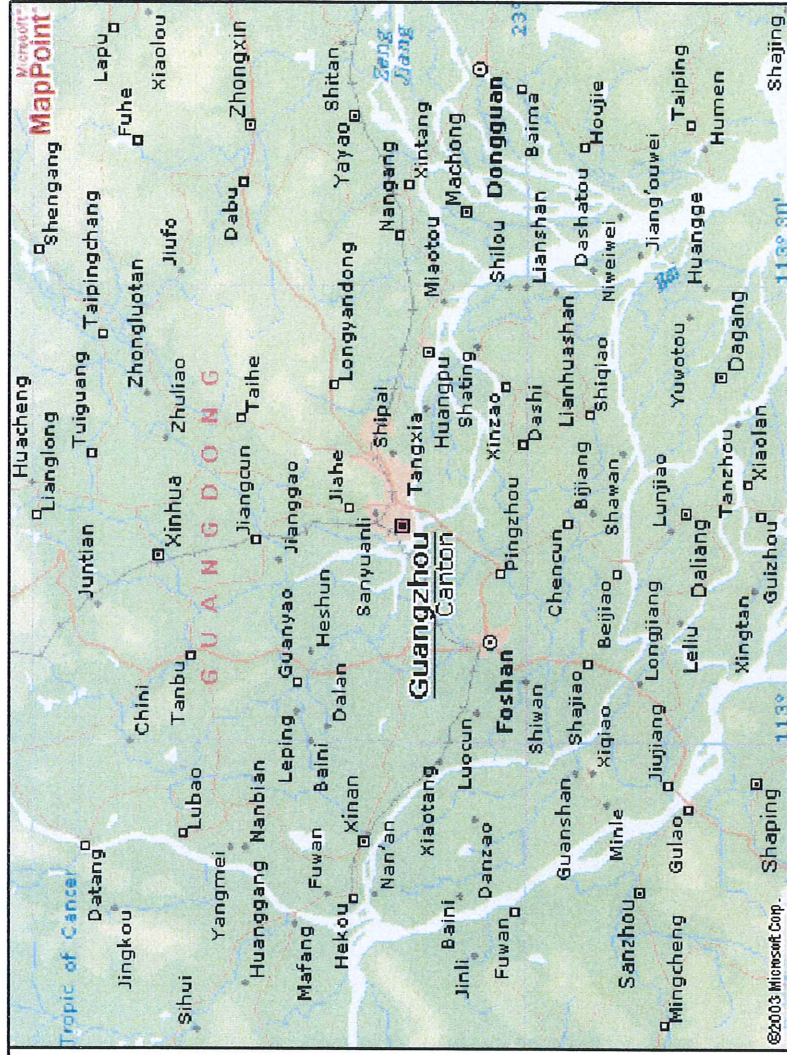
Refer to Appendix A for a copy of the brochure prepared by Crown Capital Enterprise Limited. This outlines the experience with RJSeal™ at various locations in China, North America and South America. Further information is available from Crown Capital Enterprise Limited. RJSeal™ has been used at numerous airports in North and South America, as well as highways in Alberta, Canada; Cearo State, Brazil and North Dakota and Texas, as well as other locations in the U.S.A. Since 2000, RJSeal™ has been demonstrated successfully at over thirty four (34) locations in China and fourteen (14) commercial-scale applications have taken place at various locations, including Shanghai and Kunming.

4.0 TEST PROGRAM

Since Guangdong Province is located in a tropical climate (Latitude: 23 degrees North) at a low altitude (10 to 15 metres), it's a demanding setting for asphalt, given the year round warm climate (extremes of 46 Celsius in summer and 5 Celsius in the winter) and intense exposure to ultraviolet radiation, all which contribute to the oxidation and breakdown of the asphalt binder.

The Guangzhou Economic & Technological Development District is located east of Guangzhou and is definitely interested in determining how to economically extend the life of the asphalt road surface. To this end, the Guangzhou Urban Services Department, which is responsible for road maintenance, has agreed to try RJSeal™ on Guang Pu Xi Lu. The arrangement led to selection of an appropriate location for the testing of RJSeal™. The demonstration section on the Guang Pu Xi Lu is located in the north-east sector of the City of Guangzhou. See figure 4.0, which follows, for a location of the general locale.

Demo Loc'n



		RUSEAL APPLICATION	
		CROWN CAPITAL ENTERPRISE LIMITED	
		DETAILED LOCATION MAP	
SCALE:	NTS	DRAWING NO.	FIGURE 4.0
PROJECT NO.	B023E	REV.	A

The demonstration section on Guang Pu Xi Lu was selected by the Urban Services Department, who are responsible for road and highway maintenance in the GuangZhou Economic and Technological Development District. The section chosen for the demonstration is geographically located as follows:

Table 4.1		Location of Demo Site	
Location	System	Northing	Easting
West End	Geographic (deg, min)	23 ⁰ 09.700'	113 ⁰ 25.094'
	Universal Transverse Mercator Grid (49Q)(metres)	2563481	0747581
East End	Geographic (deg, min)	23 ⁰ 09.717'	113 ⁰ 25.240'
	Universal Transverse Mercator Grid (49Q)(metres)	2563517	0747829

Work commenced on the demonstration section at 10:15 am on December 15, on a cool morning, where the temperature reached 17 Celsius. A test strip, 250 metres long, composed of asphalt pavement on the inside eastbound lane of Guang Pu Xi Lu. The test section is located on a straight section with a no appreciable gradient. There is a slight camber to the road which causes water to run off toward the shoulder, rather than puddle on the road. The asphalt surface on the section treated, was reputedly 2 years old (2001 vintage). No significant oil spills were observed, just the occasional drop of transmission oil, crankcase oil or hydraulic fluid. The surface was not appreciably worn, with no noticeable rutting due to traffic wear. There were some longitudinal and linear cracks, usually in the 0.5 to 1.5 mm width. The oxidation of the bitumen extended to a depth of several millimetres. The entire portion of the treated street on a compacted silty-clay, sub-grade

On December 15, five segments (panels) were marked off, in 50 metre lengths. The width of this northbound lanes is 3.75 metres between the painted lane center dividing line and the curb lane (outside lane) which had a small shoulder portion. The RJSeal™ was applied to each of the panels, using paint rollers and plastic pails.

Details of the application are summarized in the table that follows:

Table 4.2				Details on RJSeal™ Demonstration Section on Guang Pu Xi Lu						
Work Schedule	Work Time (hrs)	No. of Panels	Test Length (m)	Total Area m ²	RJSeal™ Applied			Application Rate		
					US gals	Litres	Kgs	US Gal /yd ²	m ² /Litre	m ² /Kg
10:15-11:30	1.25	5	250	938	53	200	208	0.047	4.69	4.51

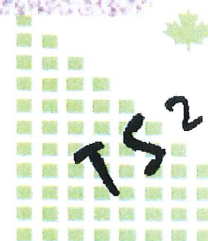
Ambient temperatures at the time of the application were in the 17 degree Celsius range, with humidity in the 35% range. The application ceased at 11:30 am and the lane remained closed until 4:00 pm on December 15, when

it was re-opened for traffic. Photos showing the test application of RJSeal™ follow in figures 4.1, and 4.2 and on the following pages.

The site was visited on March 3, 2004 around 2:00 pm and a difference was readily perceived between the RJSeal™ treated section and the adjoining untreated portion. A screwdriver was used to dig two small holes in the asphalt pavement, to a depth of 3 centimetres, some 20 metres east of the start point (west end) of the demonstration (test) section, to determine the penetration of the RJSeal™. This was three months after the application of RJSeal™ and at these two locations the newly rejuvenated surface was evident, by the black resilient surface layer, which was now approximately 4 millimetre thick. Below that depth, the grey, oxidized layer of asphalt was evident. See figure 4.3 for details on the road on the inspection.



Figure 4.1 Typical Application Procedure for RJSeal.



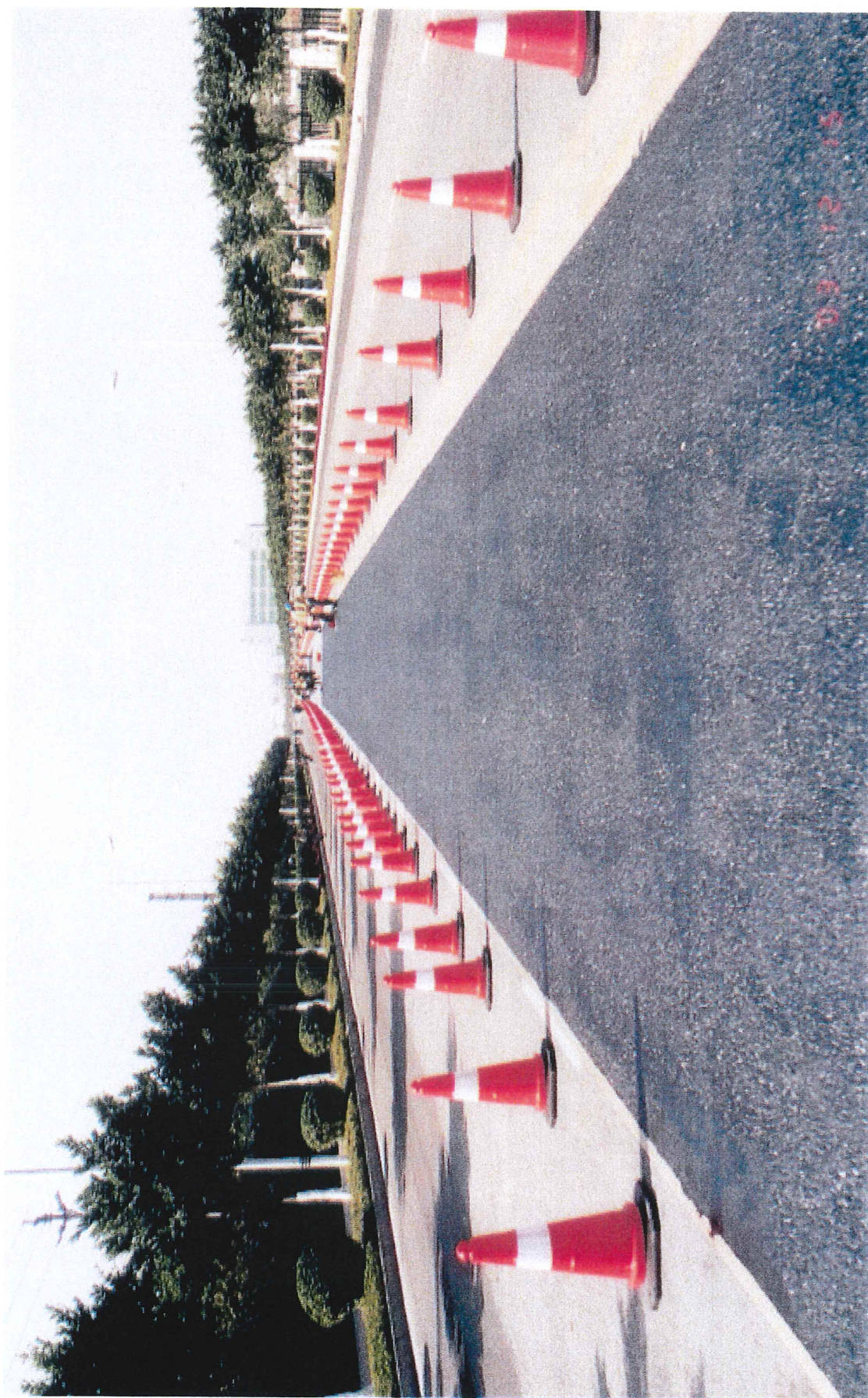


Figure 4.2 Finished RJSeal Surface.

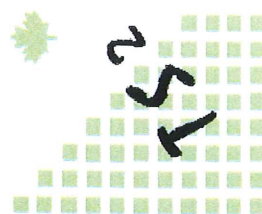
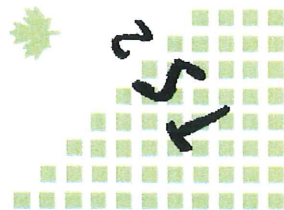




Figure 4.3 Inspection of RJSeal Surface
after Application



4.1 RJSeal™ Testing

To date the comparison of the asphalt treated with RJSeal™ has been compared on a subjective basis over a very short period at the test site on the Guang Pu Xi Lu.

Testing equipment will be brought to the site for comparison on a more disciplined, objective basis in the future, and to this end, the following tests will be undertaken.

- Water Dissipation
- Water Penetration
- Fuel Resistance Comparison
- Viscosity/Ductility Testing

4.2 Water Dissipation

An “Outflow Meter” manufactured in the U.S.A. by Humble Equipment Company of Ruston, Louisiana and sold under the trademark “Outflow Meter” (see figure 4.5) was used to measure the asphalt pavement’s capability to dissipate water, as concern has been expressed about hydroplaning on the RJSeal™ treated surface, versus the untreated surface. The Outflow Meter gives readings in seconds for the dissipation of a known quantity of water. It is suggested that any readings between 3 and 10 seconds are satisfactory results for an asphalt surface, if hydroplaning is to be minimized.

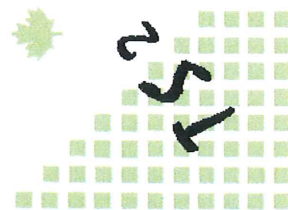
Initial readings were taken with this aforesaid Outflow Meter at two locations, when the site was revisited in March 2004. The results are shown in the table that follows:

Table 4.5		Outflow Meter Readings		
Test	Location relative to the curb	Location relative to start of demo sect'n	Before RJSeal™ (secs)	After RejuvSeal™ (secs)
One	5.9 m north	20 m east	4*	n/a
Two	6.1 m north	20 m east	n/a	7*

*** These readings are acceptable from a skid resistance viewpoint.**



Figure 4.4
Humble Equipment Co. Outflow Meter



4.3 Water Penetration Comparison

Water Penetration Comparison were undertaken on several sections of the untreated and RJSeal™ treated sections in close proximity to the Outflow meter tests on March 3, 2004. The results are shown in the following table.

Table 4.6		Water Penetration Meter Readings		
Test	Location relative to the curb	Location relative to start of demo sect'n	Before RJSeal™ (ml)	After RejuvSeal™ (ml)
One	5.9 m north	20 m east	0*	n/a
Two	6.1 m north	20 m east	n/a	0*

4.4 Fuel Resistance Comparison

Fuel Resistance Comparison will be undertaken on several sections of the untreated and RJSeal™ treated sections in close proximity to the Outflow meter tests in the near future. This comparison will consist of pouring about a cupful of diesel fuel onto the road surface and then later checking the penetration of the fuel. If the fuel readily penetrated the asphalt pavement surface, then resistance to this form of chemical attack was presumed to be lower than if the fuel pooled on the surface of the asphalt pavement and slowly evaporated.

4.5 Viscosity/Ductility Testing

This aspect of the testing is beyond the capabilities of the field equipment available to both Crown Capital Enterprise Limited and RJSeal™ personnel and as such, external assistance has been sought from outside experts in the field of Asphalt Testing.

5.0 Test Completion Schedule

The team of technicians from the Hong Kong office will be dispatched to undertake further testing on the trial section in the near future. The projected completion of this testing is scheduled as shown in the following chart.

ID	Task Name	Duration	Start	Quarter			1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			1st Qua	
				Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
1	Travel to GuangZhou and inspect Guang Pu Xi Lu	1d	Tue 11/25/03																	
2	Hiatus	13d	Wed 11/26/03																	
3	Application of RJSeal to Guang Pu Xi Lu	1d	Mon 12/15/03																	
4	Inspection of Demo Section	1d	Tue 12/16/03																	
5	Hiatus	23d	Wed 12/17/03																	
6	Inspection of Demo Section	1d	Mon 1/19/04																	
7	Prepare draft report on RJSeal Demo	7d	Tue 1/20/04																	
8	Hiatus	14d	Thu 1/29/04																	
9	Laboratory Testing of core samples	20d	Wed 2/18/04																	
10	Hiatus	10d	Wed 3/17/04																	
11	Prepare final report	4d	Wed 3/31/04																	
12	Submit final report	1d	Tue 4/6/04																	

Task

Progress

Milestone

Summary

Rolled Up Task

Rolled Up Milestone

Rolled Up Progress

Project: Guang Pu Xi Lu Sched

Date: Sat 2/28/04

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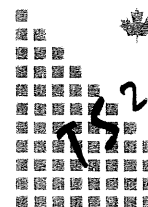
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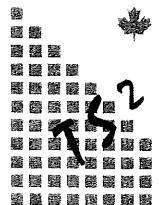
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Appendix A

RJSeal™ Descriptive Literature



**TS² Consulting Inc.
Lamma, Hong Kong**

TS² CONSULTING INC. <

(British Virgin Islands Incorporated) website: <http://ts2.stormloader.com>

Hong Kong

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January 20, 2004

Crown Capital Enterprise Limited
B5, Centre Point Building
181 – 185 Gloucester Road,
Wanchai, Hong Kong.
Attn: Charence Chiang
General Manager

Dear Charence

Re: Demonstration of RJSeal™ on Guang Pu Xi Lu, Guangzhou.

This is the final report on the demonstration of RJSeal™ on the Guang Pu Xi Lu, in the Guangzhou High Tech Zone, immediately west of the city of Guangzhou, Guangdong Province. This demonstration was undertaken on December 15, 2003 and encompassed one segment, some 250 metres long, on the northbound inside lane (adjoining the outside lane) of this four lane, city street. The principal interest of Guangzhou High Tech Zone road maintenance department was fixation of the surface stone pebbles that are now loosely held by the bitumen, restoration of the asphalt pavement's ductility, as well as an improvement of the resistance to water penetration. Initial indications are that these requirements have been readily met.

Yours Sincerely

Anthony G. Speed, P.Eng. (Ontario, Canada)

Crown Capital Enterprise Limited.
 RejuvaSeal Demo
 Guang Pu Xi Lu, GuangZhou
 Demo Date 15-Dec-03
 Prepared by Ekman Tang
 Updated by A.G. Speed
 Updated 25-Jan-04

Assumptions

Panel Length 50.0 Metres
 Panel Width 3.75 Metres
 Panel Area 187.5 Sq Metres

Conversion Factors

US Gallon= 3.78 Litres
 Sq Metre= 10.76 Sq Feet
 Sq Metre= 1.20 Sq Yds
 One Litre 1.04 kgs

Crew Consist
 Labours 10
 Supervisor 1
 Total 11

Weather Conditions

Temperature 17 Celsius
 Humidity 32%
 Sunny

Rd surface Temp 17 Celsius

Work Schedule	Work Time (hrs)	No. of Panels	Test Length (m)	Total Area m ²	Total Area yd ²	RejuvaSeal Applied			Application Rate				11 Man Crew	
						US gals	litres	kilograms	USGal /yd ²	Litres/m ²	m ² /Litre	m ² /Kg	m ² /man hr	yd ² /man hr
am/pm														
10.15-11.30	1.25	5	250.0	938	1,121	53	200	208	0.047	0.21	4.69	4.51	68.2	81.5
Totals	1.25	5	250.0	938	1,121	53	200	208	0.047	0.21	4.69	4.51	68.2	81.5

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6.0 Qualifications

STATEMENT OF QUALIFICATIONS

I, Anthony G. Speed of Hong Kong in the Special Administrative Region of China, DO HEREBY CERTIFY.

- I. THAT I am a Consulting Engineer, with offices at 2/F, 81 Po Wah Yuen, Lamma Island, Hong Kong
- II. THAT I am a 1968 graduate of the University of Saskatchewan, Canada with a Bachelor of Science Degree in Mining Engineering.
- III. THAT I am currently registered and in good standing as a Professional Engineer with the Association of Professional Engineers of Ontario, and New Brunswick, Canada
- IV. THAT my 30 years of continuous experience in mining, major civil engineering works (earth moving, highway and mining construction) has exposed me to a broad knowledge of mining and heavy civil engineering construction and allowed considerable familiarization with road construction and asphalt pavement.
- V. THAT this report is based on my visit on November 25, 2003 to Guangzhou, Guangdong Province to view the test location and facts as reported to me by Ekman Tang, of Crown Capital Enterprise Limited, the supervisor for the actual demonstration application, on December 15, 2003

Dated at Hong Kong, this _____ day of January, 2004



Anthony G. Speed, P.Eng. (Ontario and New Brunswick, Canada)