Portside Site, Hamilton - Recorded Short-Term Statistical Noise Levels

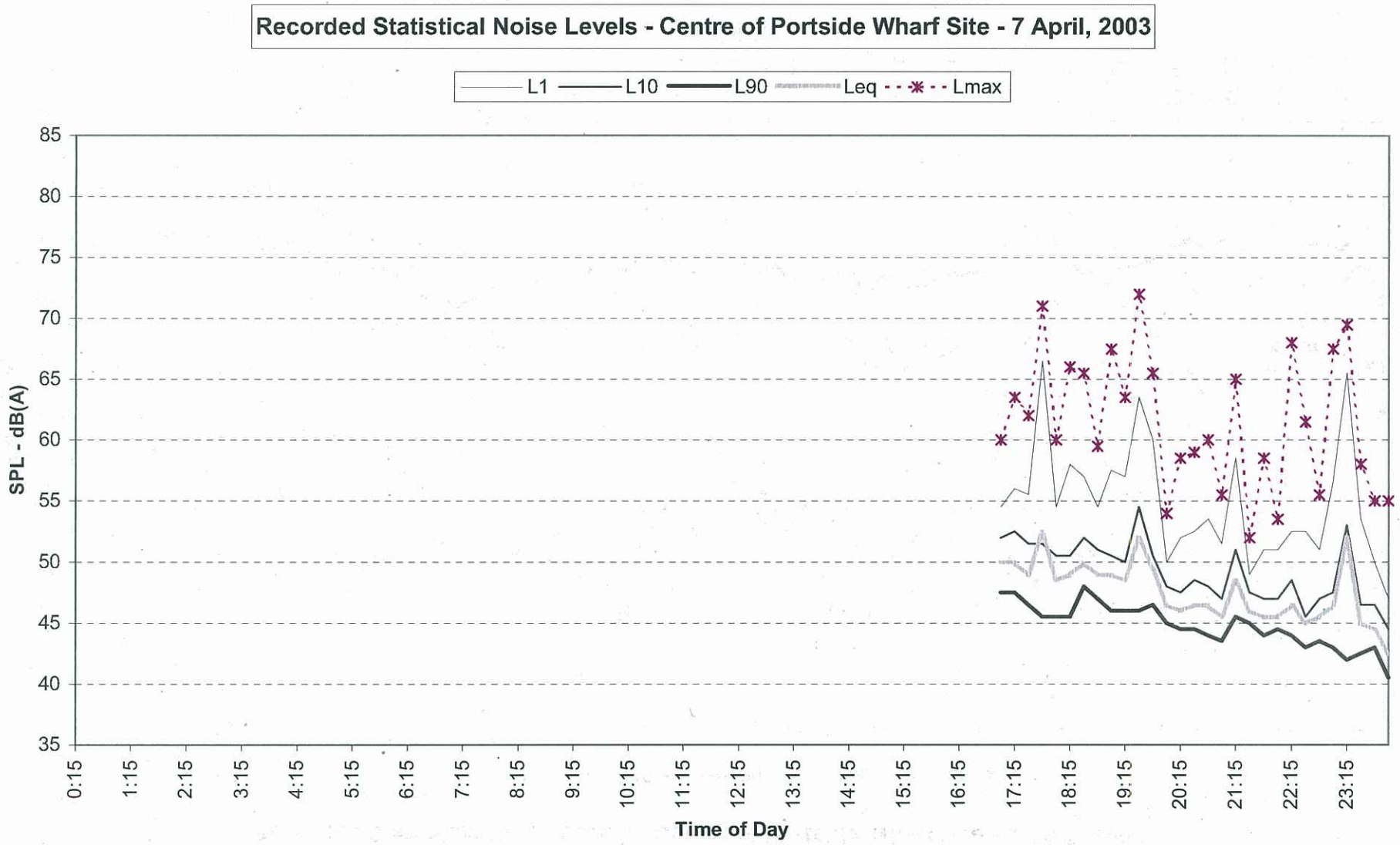
P&O Noise Levels

Noise Source	*Locn*	*Level*	*Notes*
Loading Bang		65.3	dB(A) at 300m
Loading Bang		68.2	dB(A)
Loading Bang		63.4	dB(A) at 250m
Forklift		63.0	dB(A) at 250m
'Alblasgracht' at Hamilton 1 Leaving Port	1	73.0	dB(A) at 75m for 6 minutes
Alarm		61.1	dB(A) at 250m
Cranes		62.0	dB(A) at 225m
Reversing Beeper		63.0	dB(A) at 200m
Horn		61.7	dB(A) at 200m
Loading Bang		58.4	dB(A) at 250m
Loading Bang		58.3	dB(A) at 250m
Loading Bang		58.2	dB(A) at 250m
Cranes		60.0	dB(A) at 200m
P&O Trucks		60.0	dB(A) at 200m
Reversing Beeper		60.0	dB(A) at 200m
Loading Bang		57.6	dB(A) at 250m
Loading Bang		57.2	dB(A) at 250m
Loading Bang		55.8	dB(A) at 250m
Loading Bang		55.5	dB(A) at 250m
Chain Rattle		60.0	dB(A) at 130m
Loading Bang		54.2	dB(A) at 250m
Forklift	8	59.5	dB(A) at 130m
Reversing Beeper		54.5	dB(A) at 200m
'Alblasgracht' Generator		60.0	dB(A) at 85m
'Alblasgracht' Generator		61.0	dB(A) at 75m
Reversing Beeper		54.6	dB(A) at 150m
'Parkgracht' at Hamilton 1 Berthing under tug power	2	61.0	dB(A) at 70m for 5 minutes
Container Forklift		52.5	dB(A) at 150m
Forklift		63.6	dB(A) at 30m
Forklift		52.5	dB(A) at 100m
'Parkgracht' Generator		54.5	dB(A) at 75m
Forklift		52.5	dB(A) at 50m

Scrap Metal Loading		63.0	dB(A) at 50m

ATTACHMENT 3

Datalogger Noise Traces


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 7 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
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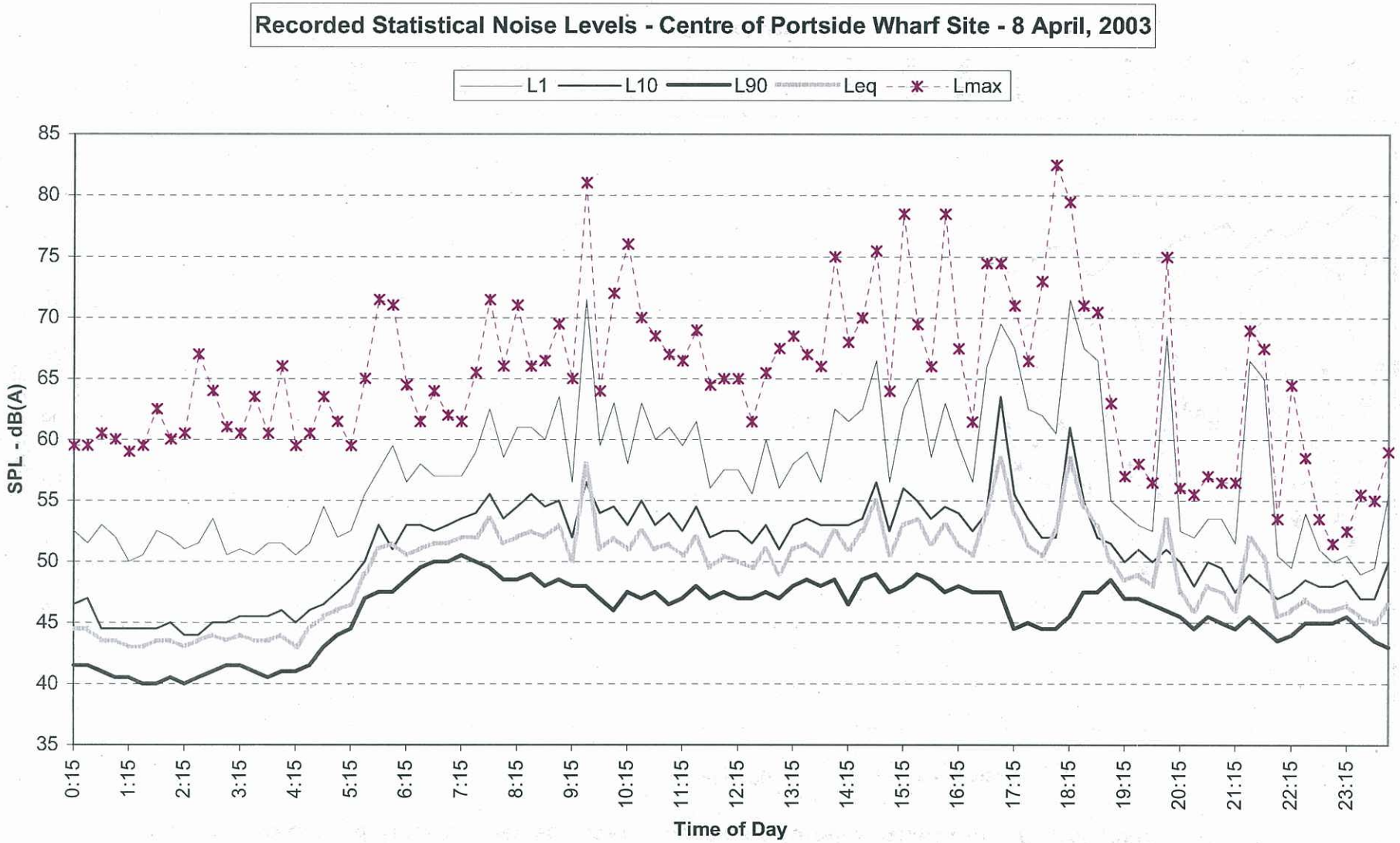
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 8 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
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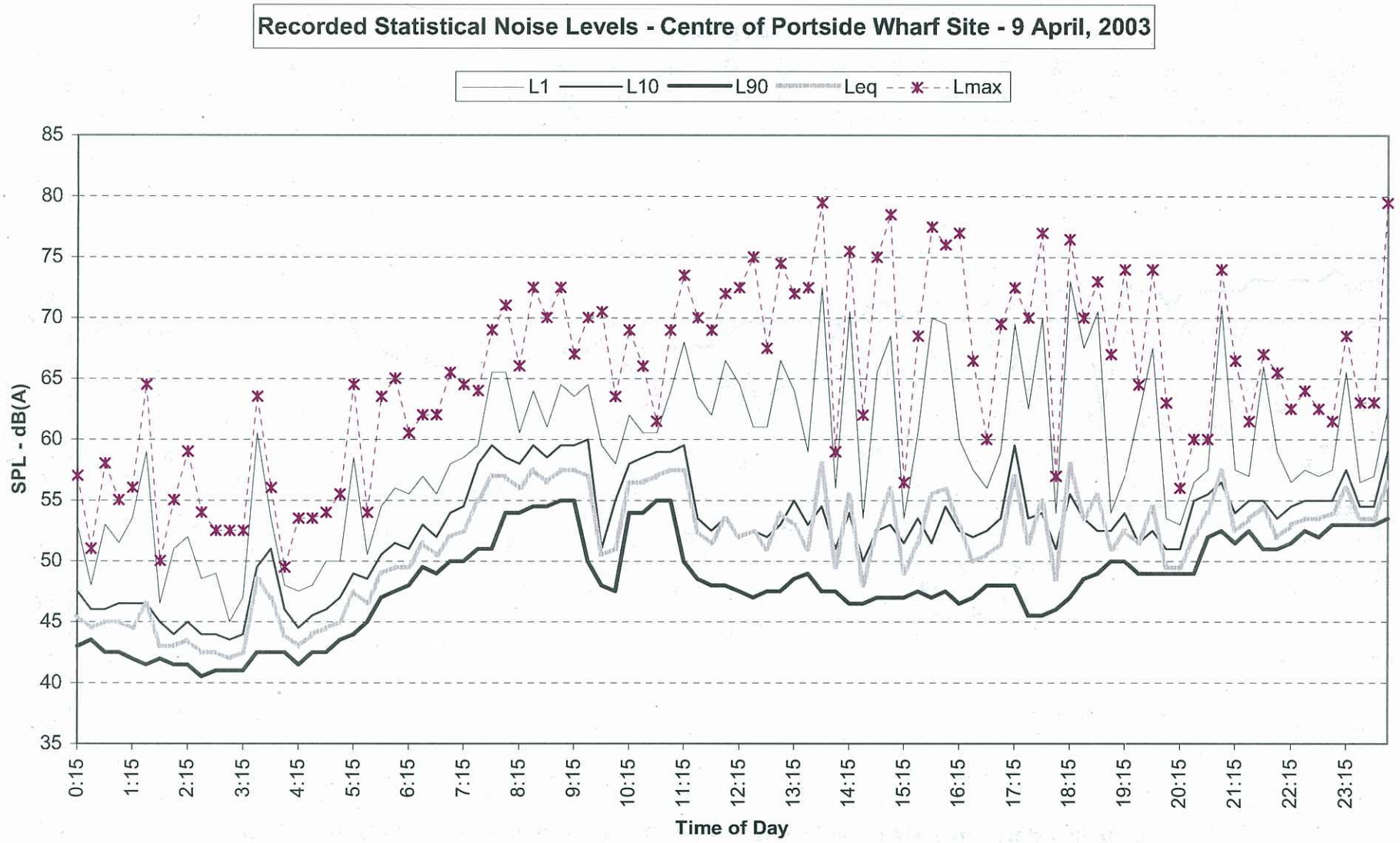
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 9 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
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9:15
10:15
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14:15
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16:15
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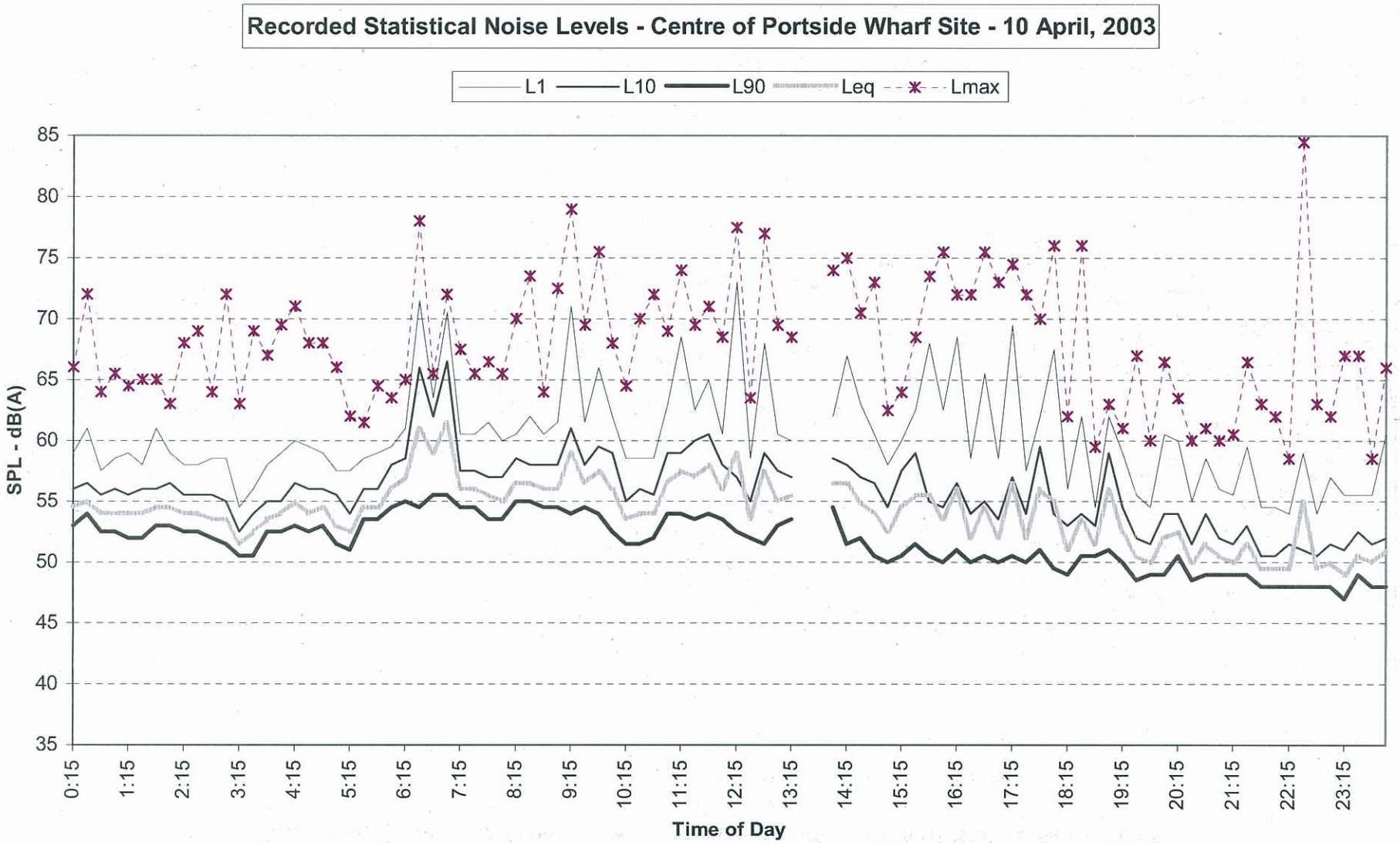
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 10 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
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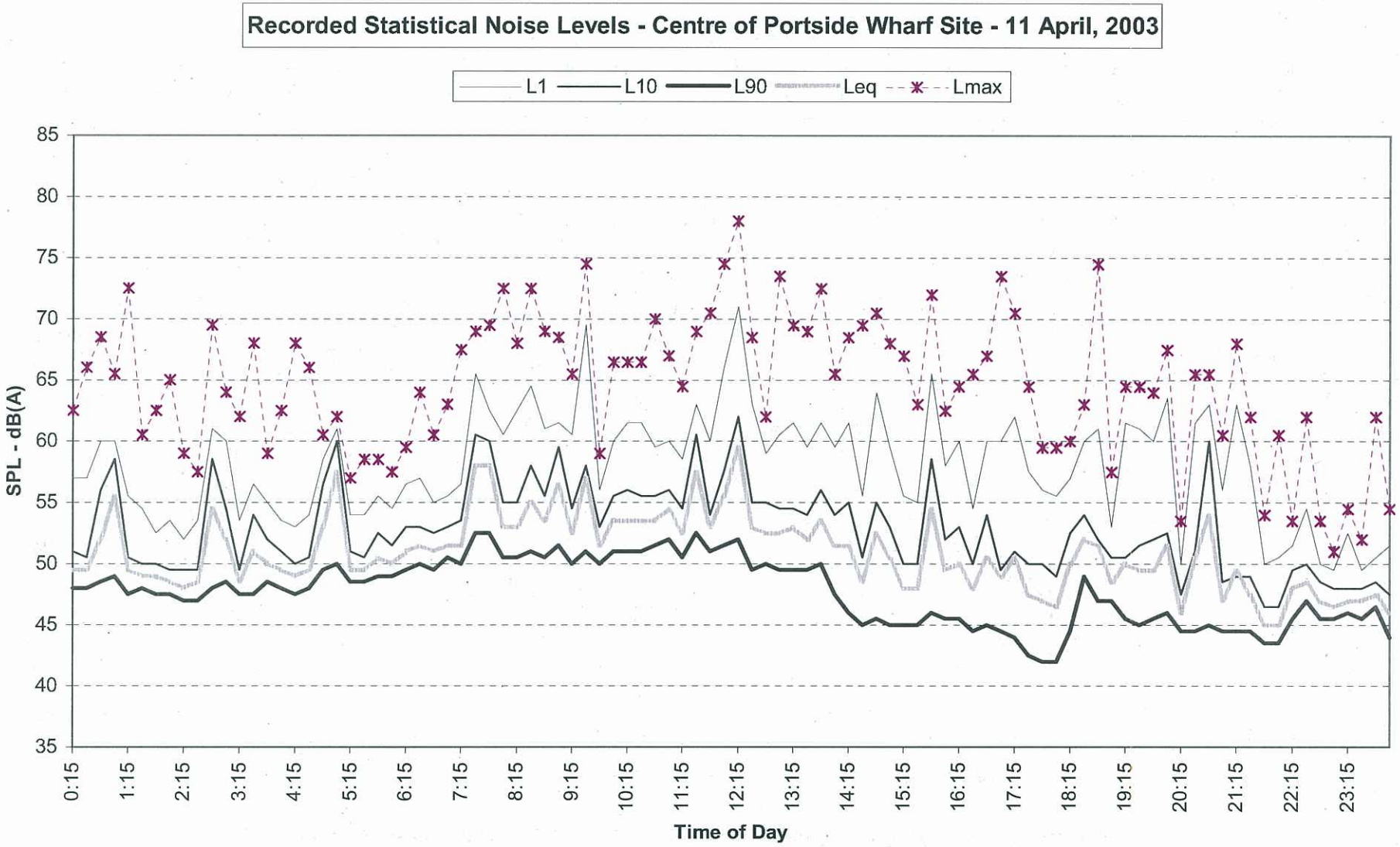
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 11 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
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11:15
12:15
13:15
14:15
15:15
16:15
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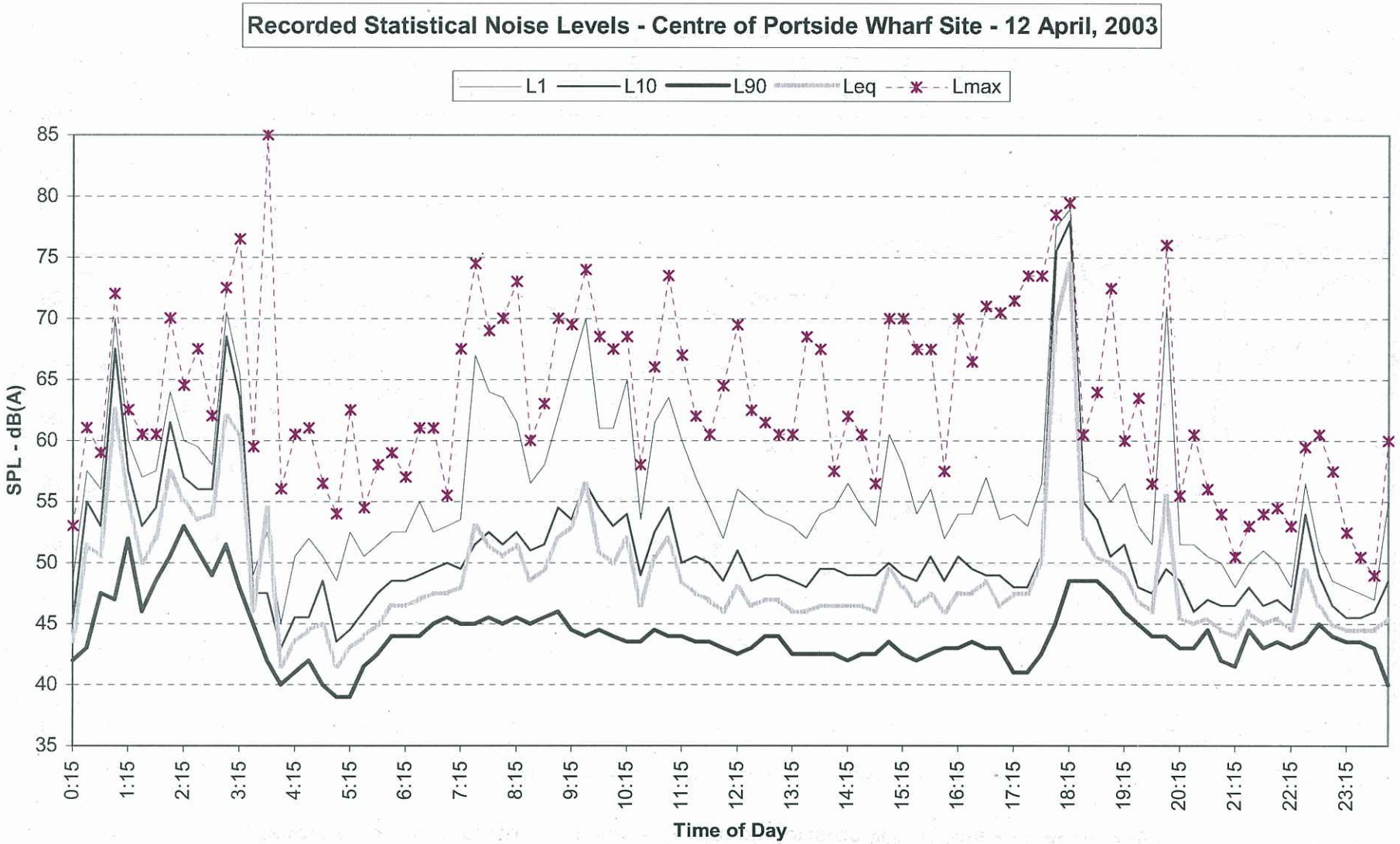
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 12 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
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9:15
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11:15
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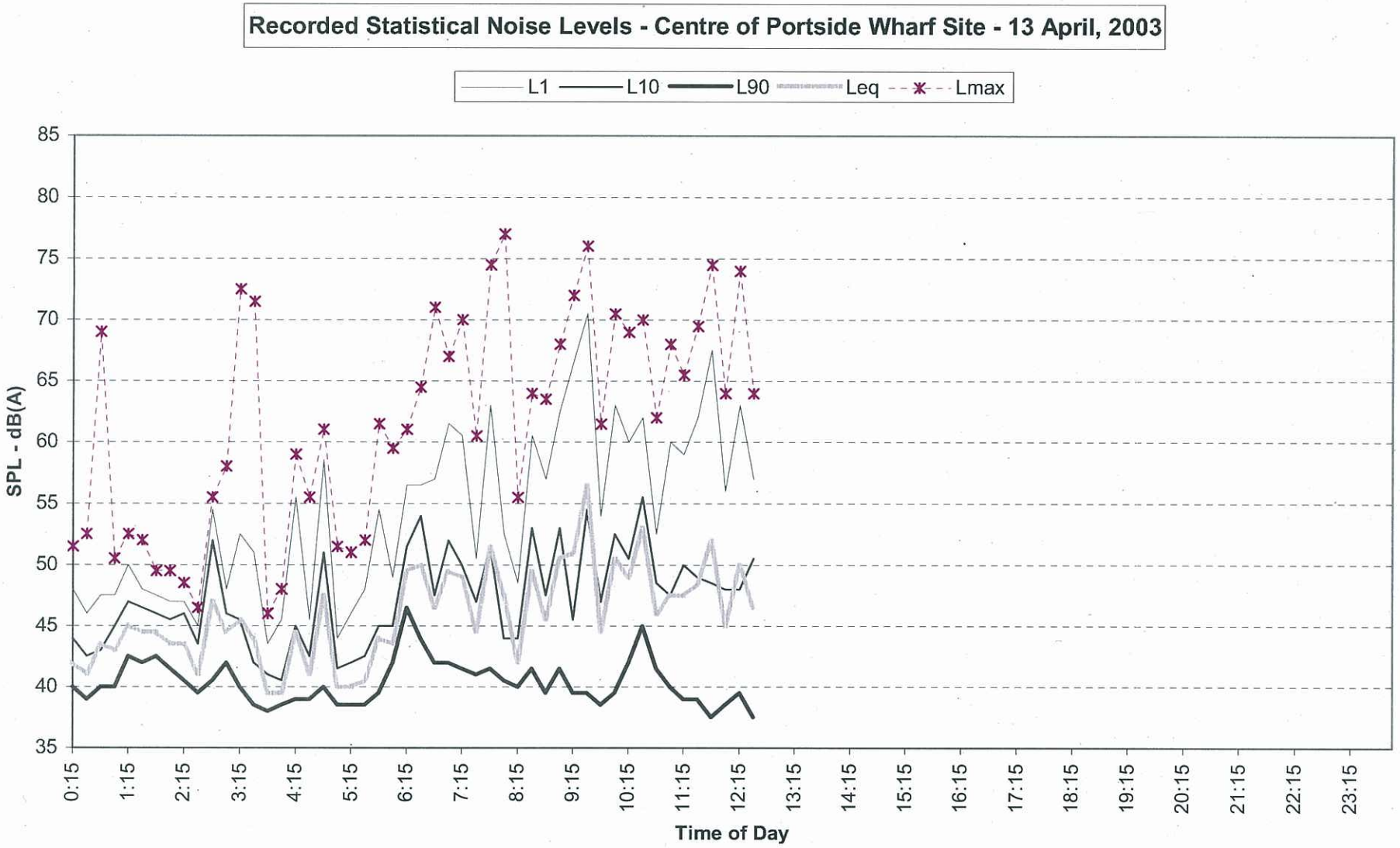
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Centre of Portside Wharf Site - 13 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
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14:15
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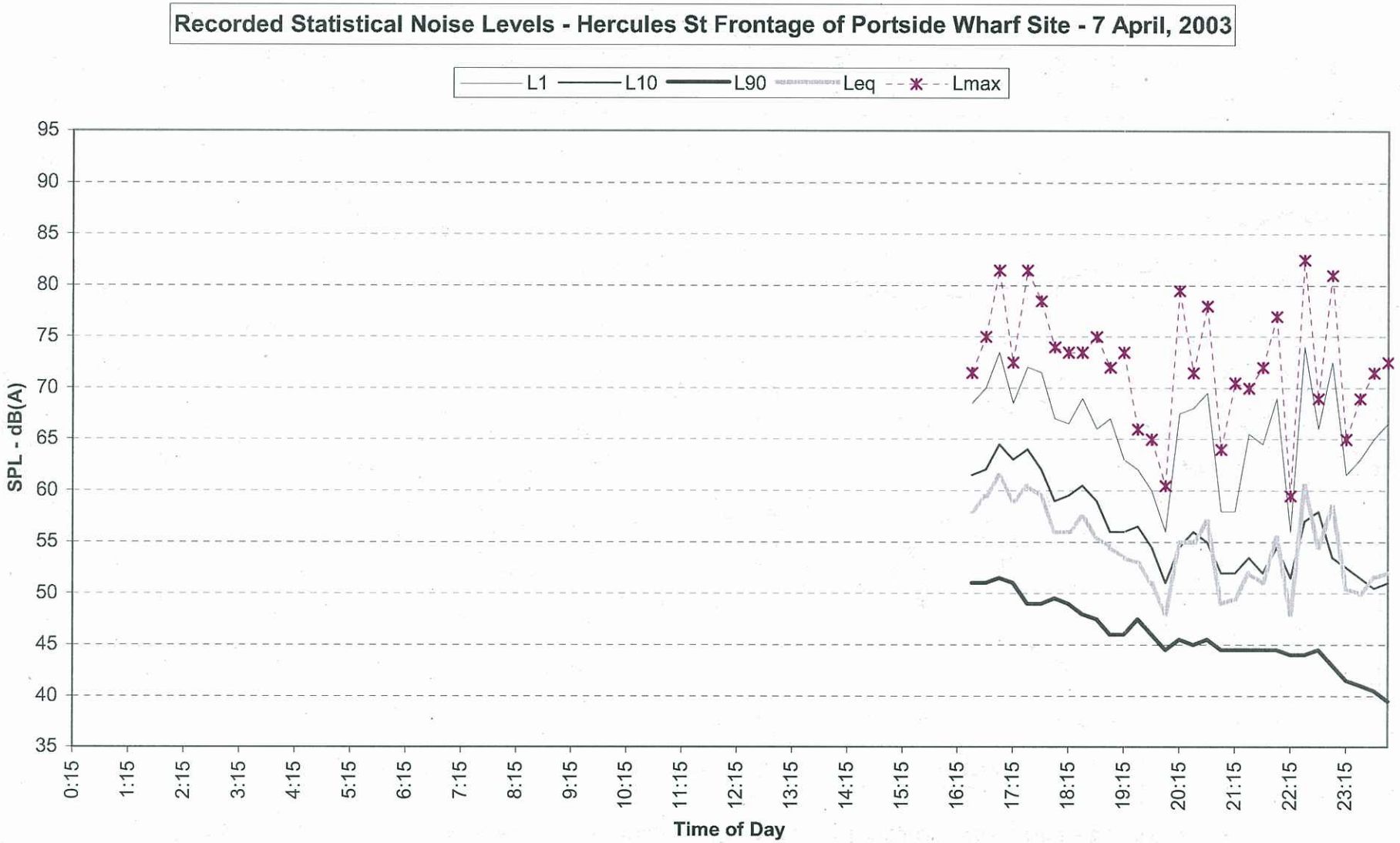
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 7 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
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11:15
12:15
13:15
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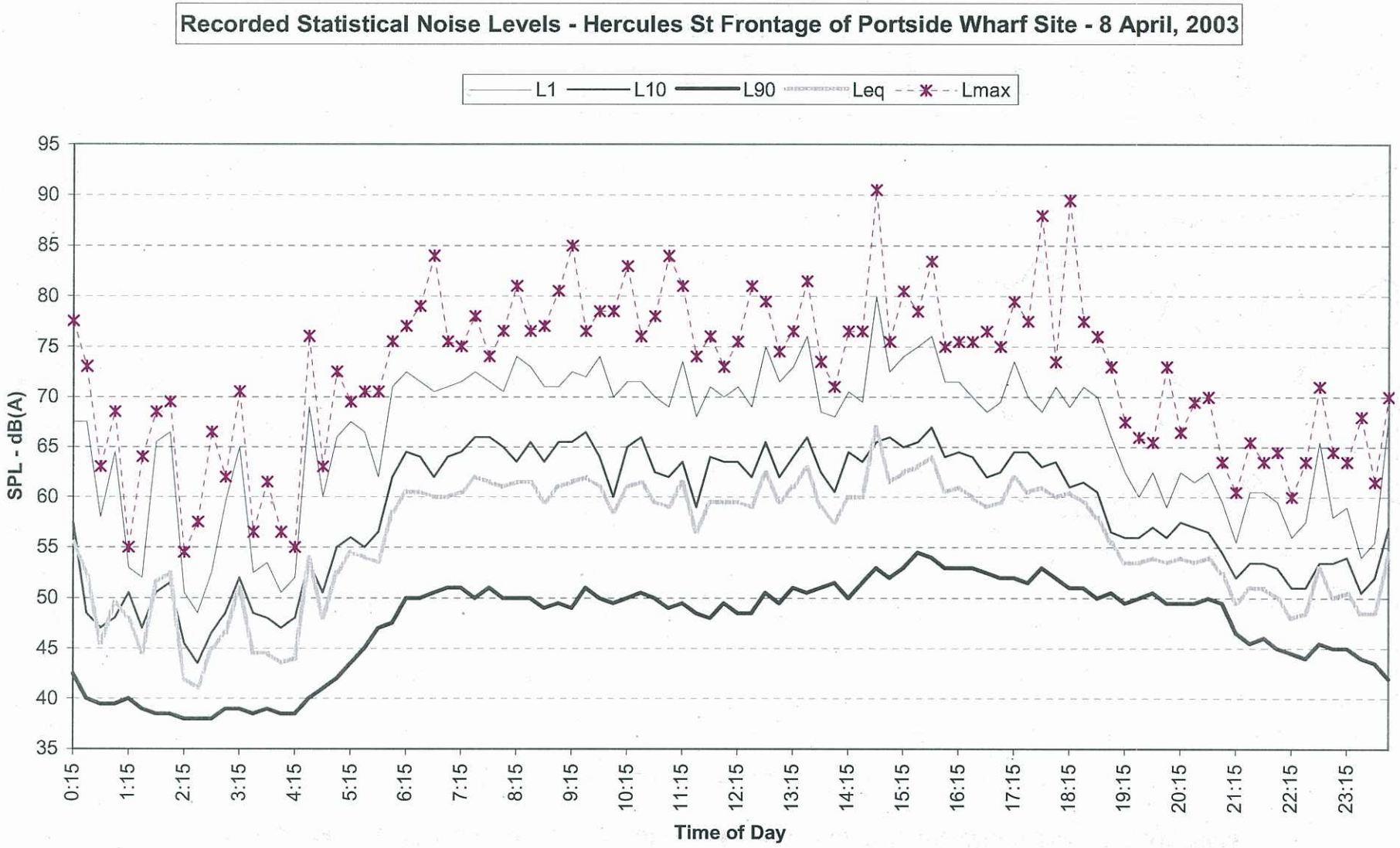
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 8 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
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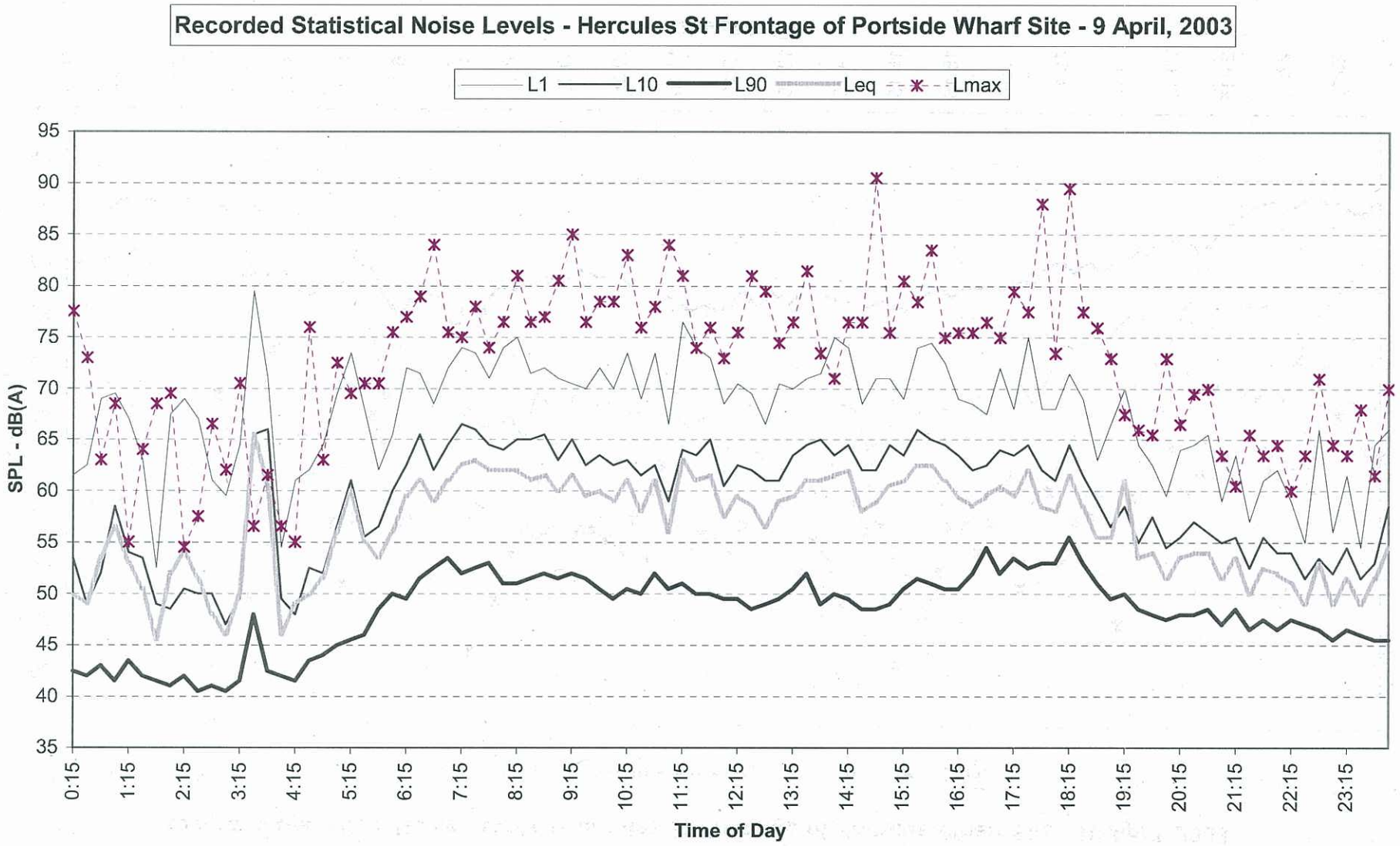
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 9 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
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4:15
5:15
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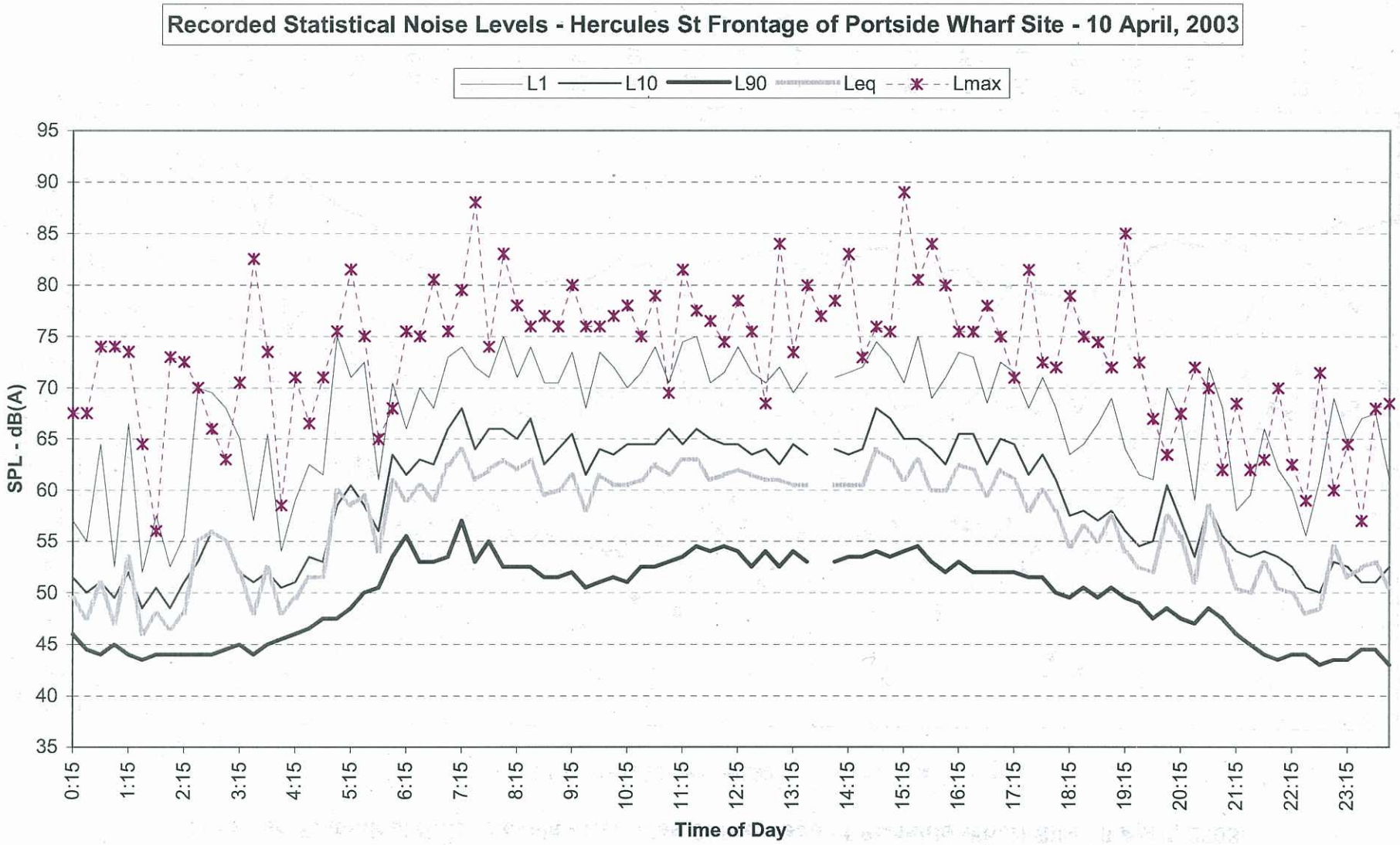
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 10 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
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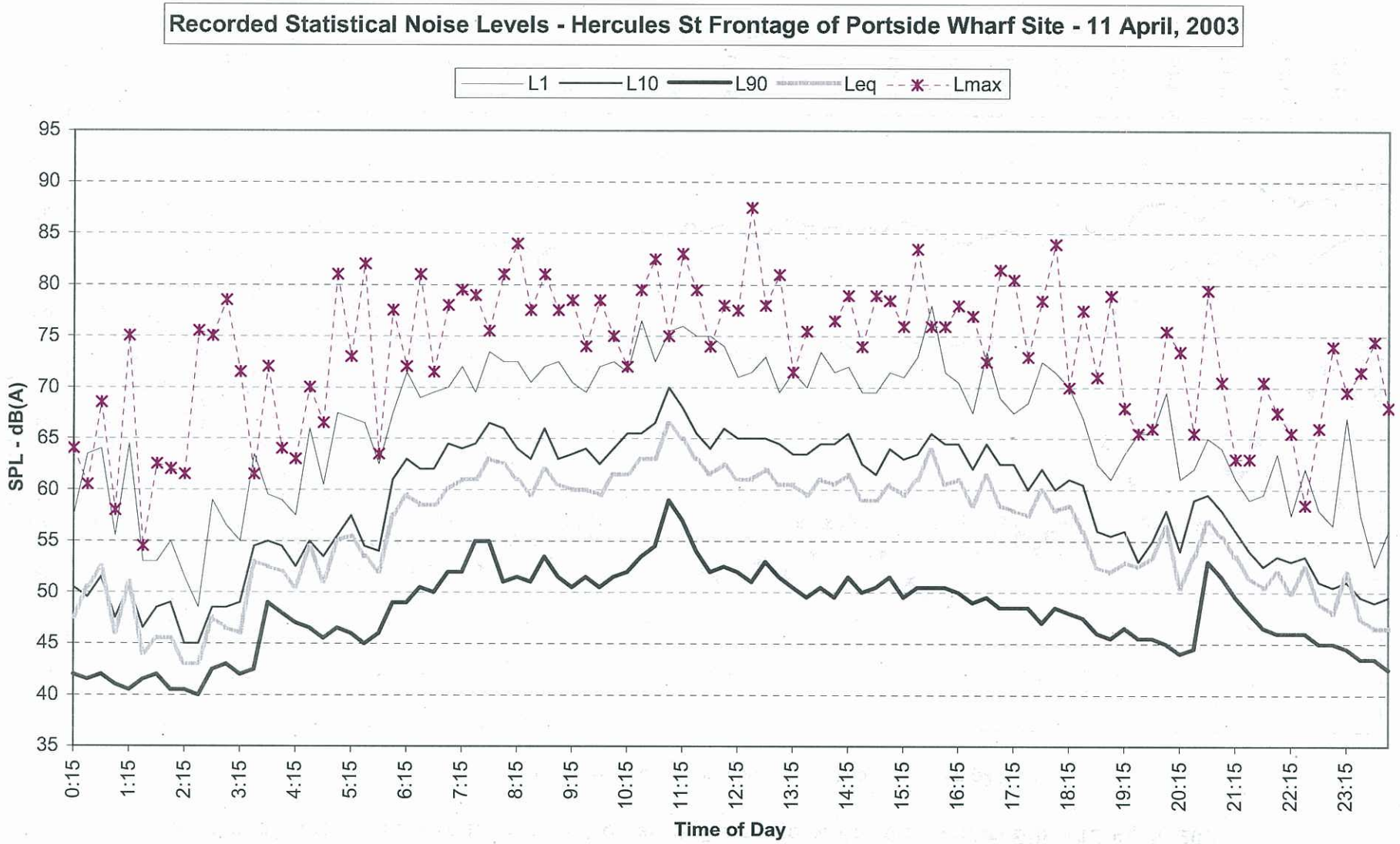
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 11 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
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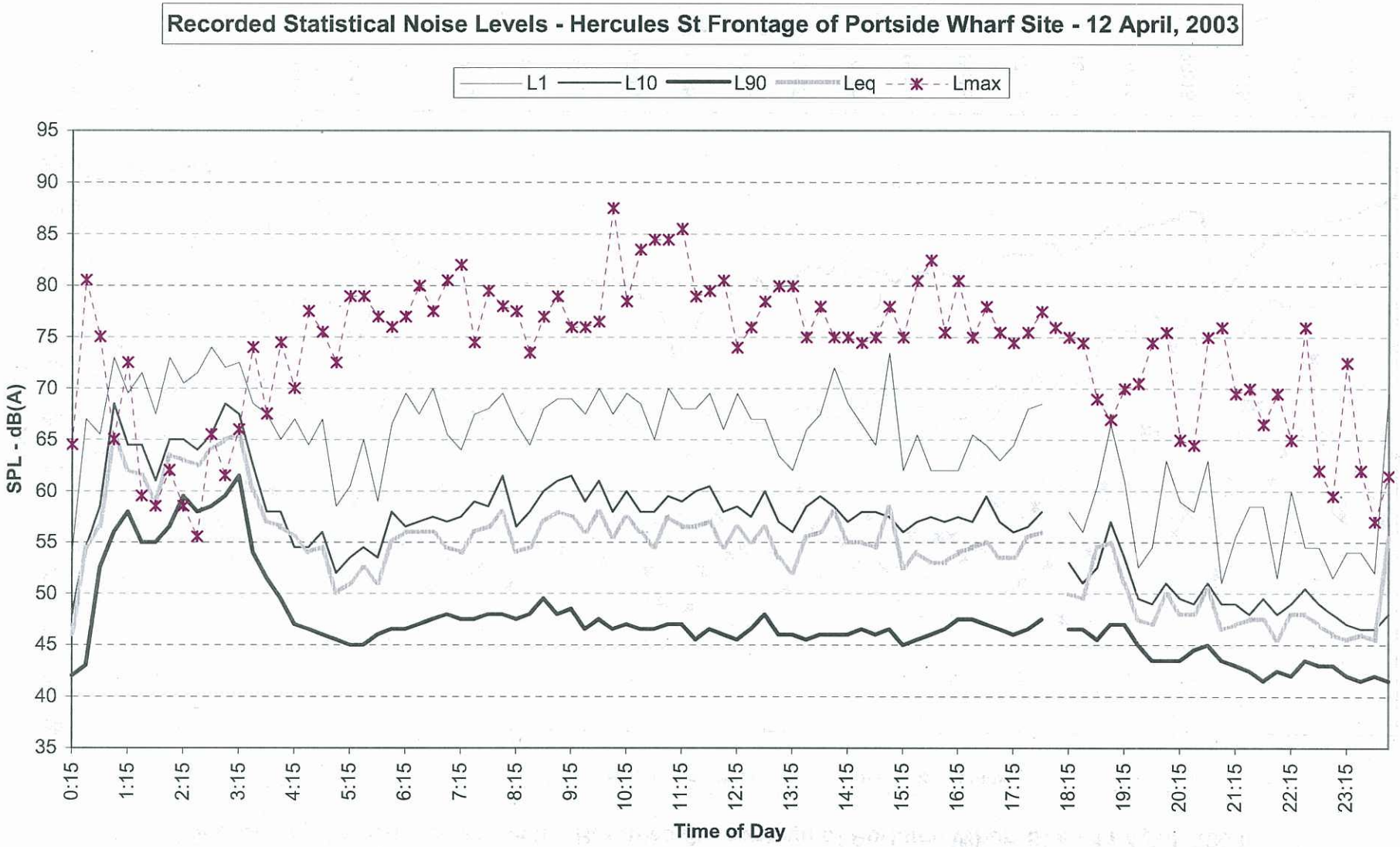
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 12 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
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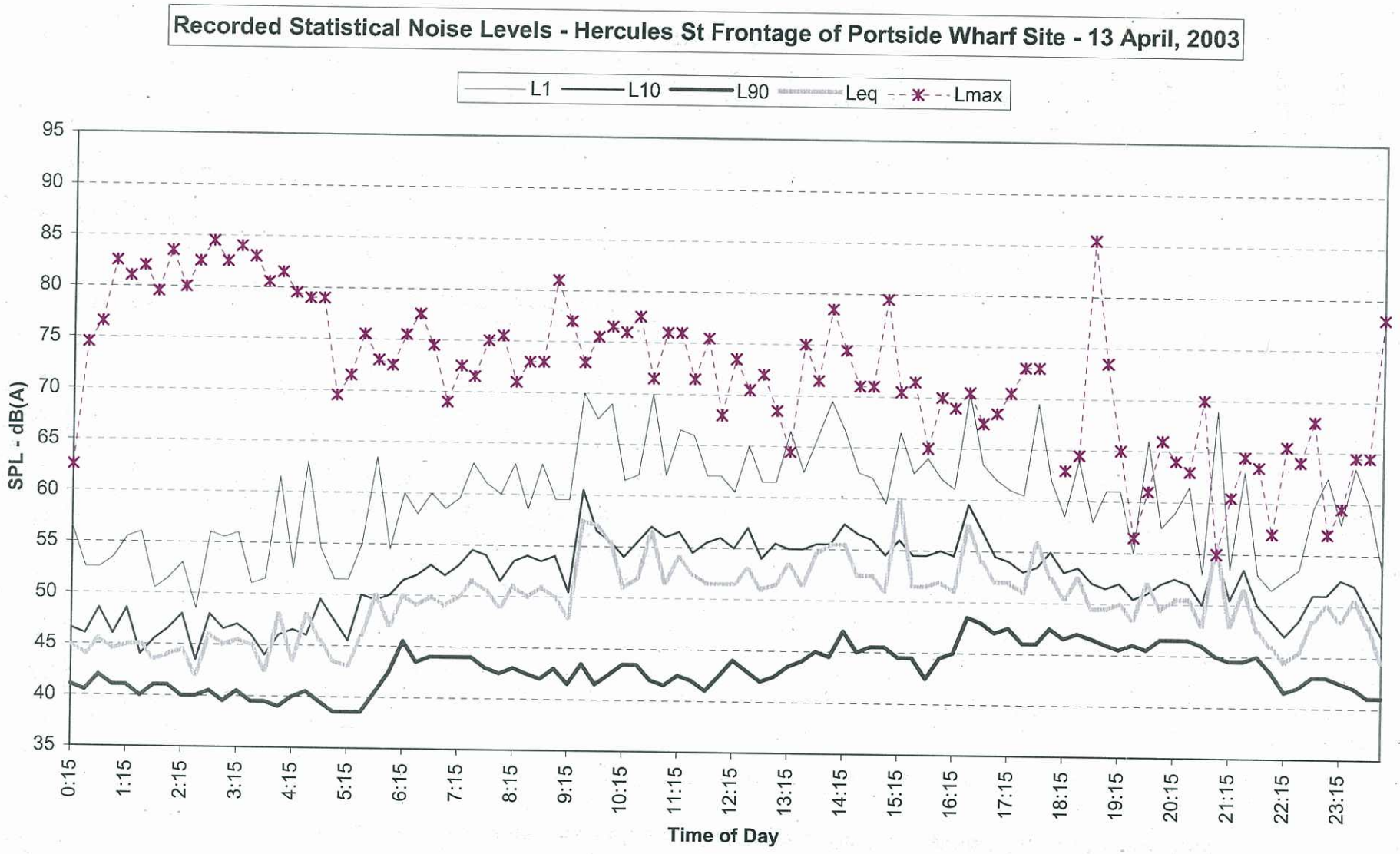
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 13 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
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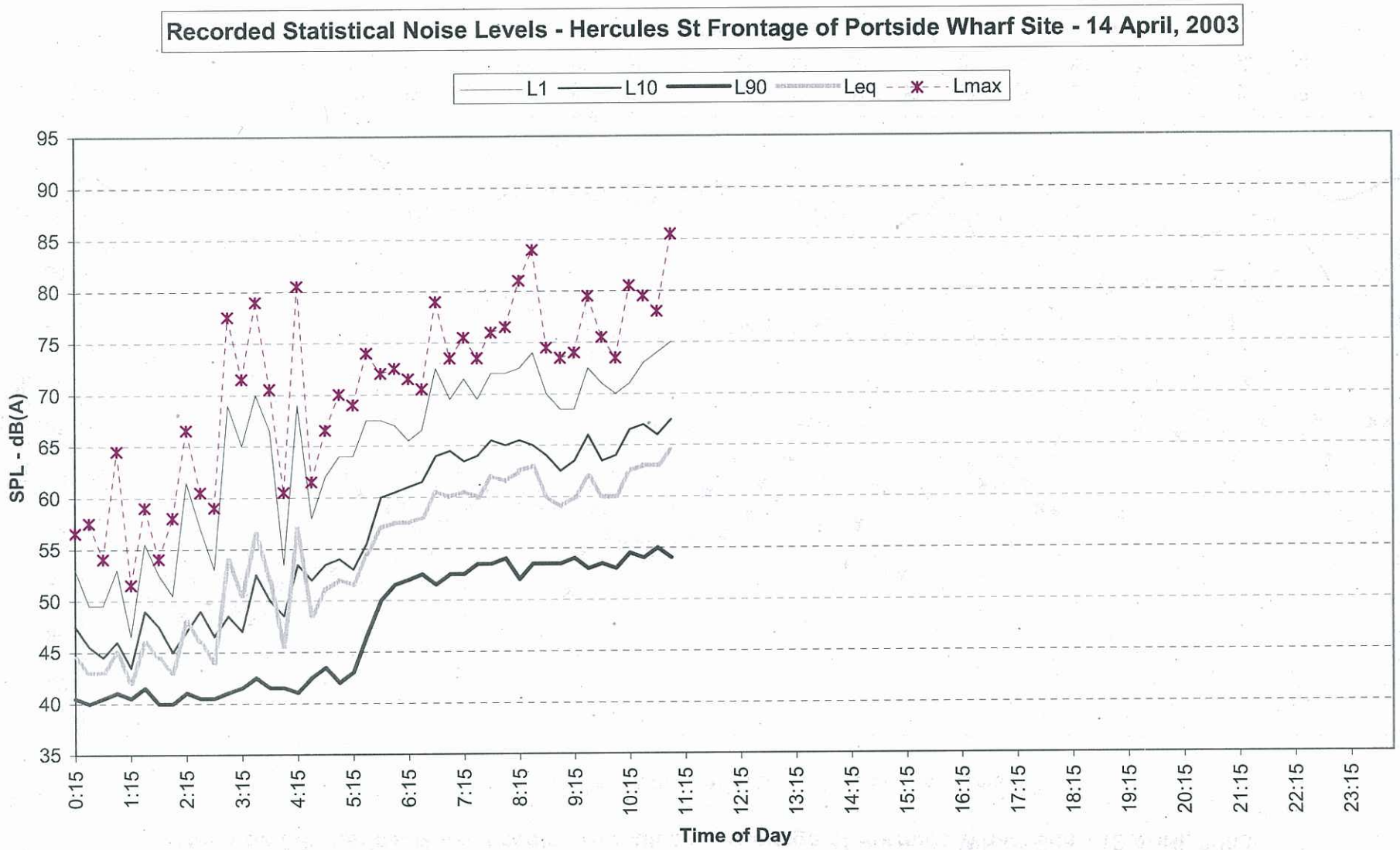
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels - Hercules St Frontage of Portside Wharf Site - 14 April, 2003
L1
L10
L90
Leq
Lmax
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
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16:15
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19:15
20:15
21:15
22:15
23:15
Time of Day

ATTACHMENT 4

SoundPLAN Validation Model

Signs and symbols

- Road axis
- Emission line
- Surface
- Bridge
- Wall
- Point receiver

Hamilton 06-128
Portside Wharf

Year 2003 Model Layout

Validation Point Location
Ground Level

Hamilton Portside Wharf
Validation Model

Project description

Project title:	Portside Wharf Development - Hamilton
Engineer:	Travis Carberry
Customer:	
Description:	

Run description

Calculation:	Single Point Sound
Title:	2003 Validation
Run file:	Portside.runx
Result number:	10
Calculation start:	1/05/2008 9:18:59 AM
Calculation end:	1/05/2008 9:19:00 AM
Calculation time:	00:00:094 [m:s:ms]
No. of points:	1
No. of calculated points:	1
Kernel version:	18/03/2008 (RKernel7.dll)

Run parameters

Reflection order	3
Maximal reflection distance to receiver	200 m
Maximal reflection distance to source	50 m
Search radius	5000 m
Weighting:	dB(A)
Tolerance:	0.001 dB

Standards:

Roads:	Calculation of Road Traffic Noise (UK)
Emission according to:	CRTN
Assessment:	CRTN L10

Reflection of "own" facade is suppressed

Geometry data

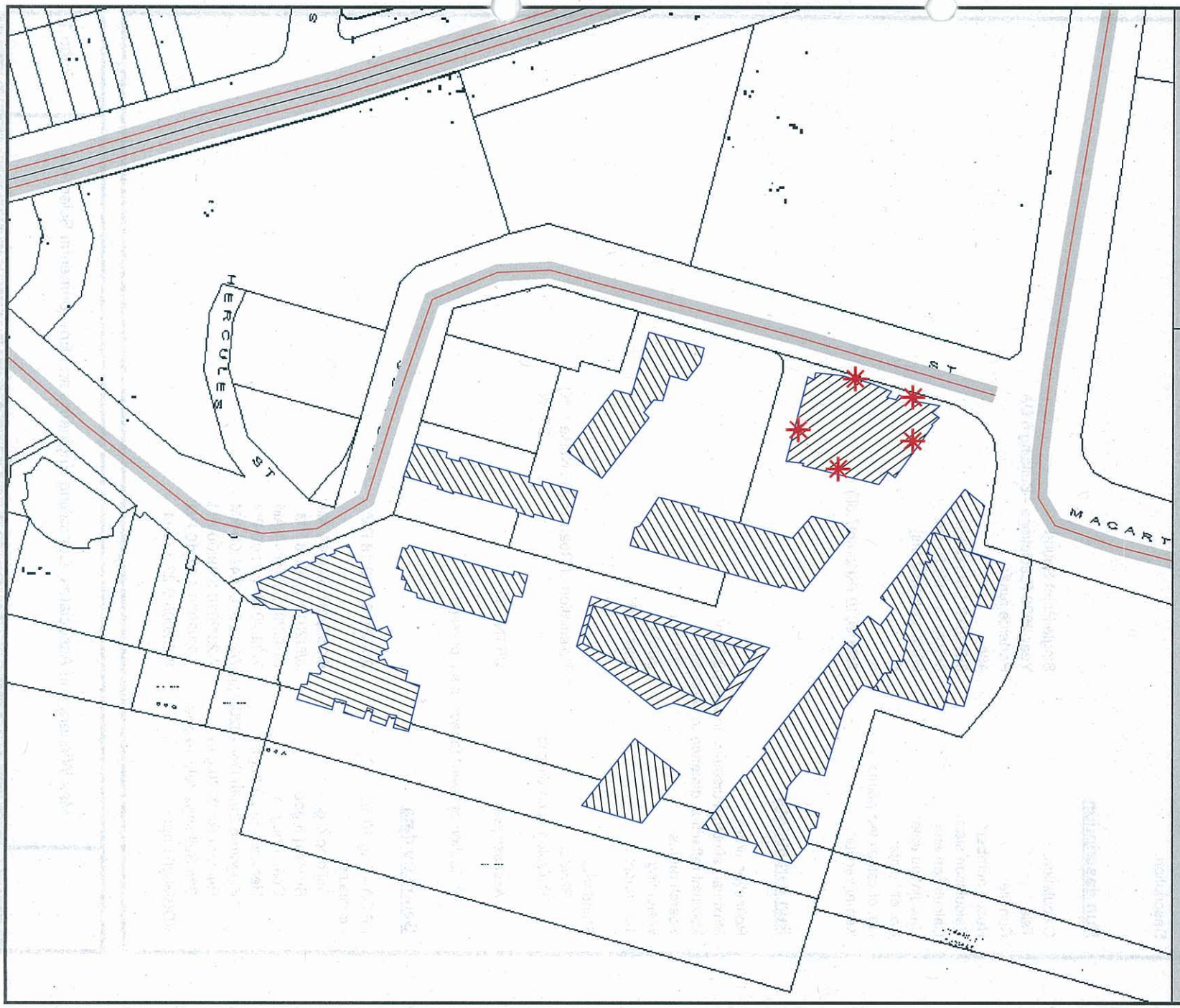
RDGM0001.dgm	8/2/2006 9:29:32 AM
Validation.sit	8/2/2006 4:08:42 PM
- contains:	
Contours.geo	6/26/2007 9:40:44 AM
Datalogger.geo	8/2/2006 4:08:42 PM
Hercules St 2003.geo	8/2/2006 4:03:28 PM
Kingsford Smith Drv 2003.geo	8/2/2006 3:15:38 PM
Remora Rd 2003.geo	8/2/2006 4:03:28 PM

Hamilton Portside Wharf
Validation Model

Receiver	Usage	Floor	Dir	L10(18h) dB(A)	
Datalogger	WA	EG		61.1	

ATTACHMENT 5

Year 2020 SoundPLAN Modelling



Signs and symbols

- Road axis
- Emission line
- Surface
- Bridge
- Wall
- Main building
- Point receiver
- Geometry bitmap

Hamilton 10-088
Portside Wharf
Building 6 DA

Year 2020 Model Layout

Building Receiver Locations
Levels 1-14

Portside Wharf Development - Hamilton - Year 2020 Predictions - Building 6 DA

Project description

Project title:	Portside Wharf Development - Hamilton
Engineer:	Travis Carberry
Customer:	
Description:	

Run description

Calculation:	Single Point Sound
Title:	Year 2020 Predictions - Building 6 DA
Run file:	Portside.runx
Result number:	400
Calculation start:	8/5/2010 1:50:19 PM
Calculation end:	8/5/2010 1:50:20 PM
Calculation time:	00:00:858 [m:s:ms]
No. of points:	5
No. of calculated points:	5
Kernel version:	7/23/2010 (RKernel7.dll)

Run parameters

Reflection order	1
Maximal reflection distance to receiv	200 m
Maximal reflection distance to sourc	50 m
Search radius	5000 m
Weighting:	dB(A)
Tolerance:	0.001 dB

Standards:

Roads:	Calculation of Road Traffic Noise (UK)
Emission according to:	CRTN
Assessment:	CRTN L10

Reflection of "own" facade is suppressed

Geometry data

B6 DA - Aug 10.sit	8/5/2010 1:49:18 PM
- contains:	
Building 4.geo	6/26/2007 9:40:44 AM
Building 6.geo	8/5/2010 1:49:18 PM
Contours.geo	6/26/2007 9:40:44 AM
Hercules St 2020.geo	7/23/2010 3:49:00 PM
Kingsford Smith Drv 2020(1).ge	7/23/2010 3:49:00 PM
Remora Rd 2020.geo	7/23/2010 3:49:00 PM
Site Buildings July 10.geo	7/23/2010 4:07:10 PM
RDGM0001.dgm	8/2/2006 9:29:32 AM

Portside Wharf Development - Hamilton
Assessed receiver levels - Year 2020 Predictions - Building 6 DA

21

Name	Usage	Floor	Dir	L10(18h) dB(A)	
Building 6 East	WA	1. Floor	E	60.4	
		2. Floor		61.6	
		3. Floor		61.8	
		4. Floor		61.8	
		5. Floor		61.7	
		6. Floor		61.7	
		7. Floor		61.5	
		8. Floor		61.4	
		9. Floor		61.3	
		10. Floor		61.2	
		11. Floor		61.2	
		12. Floor		61.8	
Building 6 North	WA	1. Floor	N	69.5	
		2. Floor		69.4	
		3. Floor		69.3	
		4. Floor		69.2	
		5. Floor		69.2	
		6. Floor		69.1	
		7. Floor		69.1	
		8. Floor		69.1	
		9. Floor		69.1	
		10. Floor		69.1	
		11. Floor		69.1	
		12. Floor		69.2	
Building 6 Podium Units	WA	1. Floor	N	69.8	
		2. Floor		69.8	
Building 6 South	WA	1. Floor	S	39.8	
		2. Floor		39.9	
		3. Floor		40.3	
		4. Floor		41.3	
		5. Floor		43.9	
		6. Floor		47.2	
		7. Floor		49.0	
		8. Floor		50.2	
		9. Floor		51.2	
		10. Floor		52.1	
		11. Floor		53.3	
		12. Floor		56.4	
Building 6 West	WA	1. Floor	W	63.5	
		2. Floor		64.1	
		3. Floor		64.4	

Portside Wharf Development - Hamilton
Assessed receiver levels - Year 2020 Predictions - Building 6 DA

Name	Usage	Floor	Dir	L10(18h) dB(A)	
		4. Floor		64.6	
		5. Floor		64.8	
		6. Floor		65.0	
		7. Floor		65.1	
		8. Floor		65.3	
		9. Floor		65.4	
		10. Floor		65.5	
		11. Floor		65.7	
		12. Floor		66.1	

BORNHORST + WARD CONSULTING ENGINEERS

BORNHORST + WARD
CONSULTING ENGINEERS
CIVIL AND STRUCTURAL

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 12/10/10

ENGINEERING REPORT

FOR THE PROPOSED
PORTSIDE WHARF – BUILDING 6

LOCATED AT
36 HERCULES STREET
HAMILTON

PREPARED FOR
CITIMARK PROPERTIES PTY LTD
BY BORNHORST & WARD PTY LTD

AUGUST 2010

Bornhorst & Ward Project No. **10211**

If you have any queries regarding this report please contact Kris Rensch.

Revision	Date	Description	Author	Rev.	App.
C	Aug 2010	Issue to ULDA – Architectural Amended	KR	NR	NR
B	Aug 2010	Issue to ULDA – Architectural Amended	KR	NR	NR
A	Aug 2010	Issue to ULDA	KR	NR	NR
Draft	July 2010	Draft Issue	KR	NR	NR

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LIST OF TABLES

1. INTRODUCTION

Bornhorst and Ward has been commissioned to investigate and report on the Civil Engineering and Servicing requirements pertaining to the proposed Portside Wharf – Building 6, located at 36 Harbour Road, Hamilton. The location of the proposed site is indicated in Figure 5, Appendix A.

The Engineering requirements for this proposal shall be in accordance with Brisbane City Council Subdivision and Development Guidelines and the Brisbane City Council City Plan. This report outlines the preliminary design methodology and calculations in support of a Development Application and should be read in conjunction with other documents issued by the consultant team.

2. SITE CHARACTERISTICS

2.1 LOCATION

The proposed site is located on the northern side of the Portside Wharf Cruise Port Terminal development, adjacent to Hercules Street. The site is bound by the existing Portside development on the eastern and southern boundaries, the existing DPI property on the western boundary and Hercules Street on the northern boundary. This is indicated in the figure below.

Street Address:	36 Hercules Street, Hamilton
RP Description:	Lot 907 SP 169072

Figure 1: Orientation Plan (www.nearmap.com)

2.2 LANDUSE

2.2.1 EXISTING

The site is currently vacant, and has been excavated to form a temporary carpark adjoining the existing Portside development. Access to the site is via a ramp grading down from Hercules Street. The majority of the site is covered with impervious areas, however there is a mulched eathworks batter transitioning from the Hercules Street level of approximately RL 3.0m to the carpark level of RL 1.0m.

2.2.2 PROPOSED

The proposal detailed in this report is for the construction of Building 6, a 15 level residential building consisting of 208 units, surrounding podium area, single basement level and retail / commercial uses on the ground floor. The site area is approximately 0.267Ha. The proposed site layout is shown on the Cottee Parker architectural drawings, attached in Appendix A.

2.3 TOPOGRAPHY & SITE DRAINAGE

In existing conditions prior to surrounding development works, the site was relatively flat with levels around RL 3.0m. As a result of the previous development, excavation has occurred to form a low set temporary carparking area adjoining the existing Portside carparks, at approximately RL1.0. Surface water is currently collected by two field inlets within the site and directed though the existing Portside drainage system, where it is then discharged to the Brisbane River.

3. SITE DATA

3.1 SOURCES OF INFORMATION

In order to collate existing information for the site and immediate environment, the relevant Council and governing authorities were contacted to determine whether any of the following documents, relevant to the area immediately adjacent to the development, exist:

Waterway Management Plans	- NIL
Catchment Management Plans	- NIL
Stormwater Management Plans	- SKM Site Based Stormwater Management Plan (August 2003)
	- Bornhorst and Ward Master Plan 2 (December 2006)
Flood Studies	- NIL
Infrastructure Charges Plans	- NIL

4. EXISTING AND PROPOSED CIVIL WORKS AND INFRASTRUCTURE

4.1 STORMWATER

There is existing stormwater infrastructure within the road reserves fronting the development site, and within the site itself. These are summarised as follows, and illustrated in the figure below:

- There are a number of gully pits and 600mm diameter stormwater lines within Hercules Street, close to the development site. This infrastructure then discharges to a twin 1200mm diameter stormwater

line within Hercules Street and Remora Road. Stormwater is then discharged to the Brisbane River via a 2100 x 2700mm box culvert.

- There are a number of field inlets and 150mm diameter stormwater lines within the existing carpark on the site. These drain into pipework within the existing Portside development, where stormwater is then pumped through to the outlet into the Brisbane River.

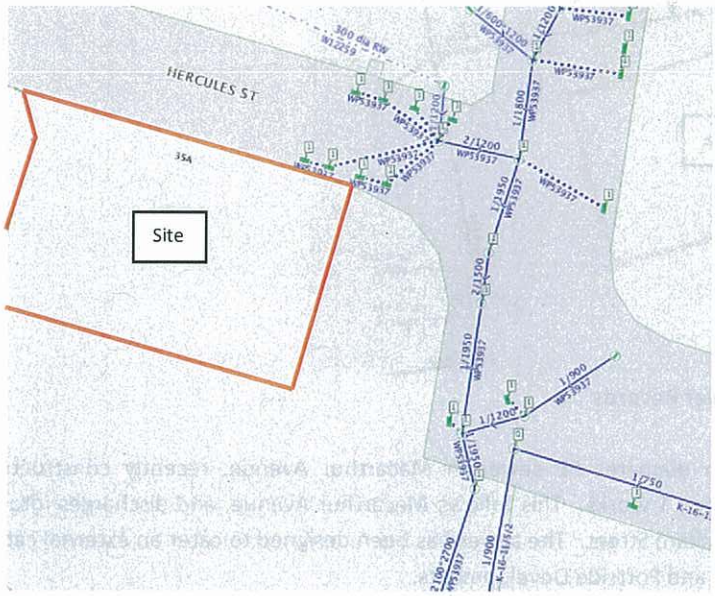


Figure 2: BCC Bimap Stormwater Records.

It is proposed that a stormwater connection is made to the existing gully pit within Herucles Street fronting the development site (Refer drawing SKC010 attached in Appendix A). As the development proposal will not increase the rate in runoff from the site, it is anticipated that this existing infrastructure has sufficient capacity. All hydraulic drainage from podium areas and basement can be directed to this location. This will form the legal point of discharge for the site.

Another option has been considered for connection into the existing stormwater drainage within the carpark area. This would not be desirable, as it will require permission from the adjoining property owner.

Refer to Section 5.0, "Stormwater Management Plan" for further details.

4.2 EXTERNAL SEWER

The existing sewer infrastructure and options for sewer connection are discussed in the following sections.

4.2.1 EXISTING INFRASTRUCTURE

From previous discussions with Queensland Urban Utilities (formerly Brisbane Water), it is understood that the existing sewer infrastructure in the area is nearing capacity. Directly fronting the site, there is an existing 225mm diameter sewer in Hercules Street. This line follows Hercules Street and connects into the existing 300mm diameter sewer in Remora Road. This is indicated in the figure below:

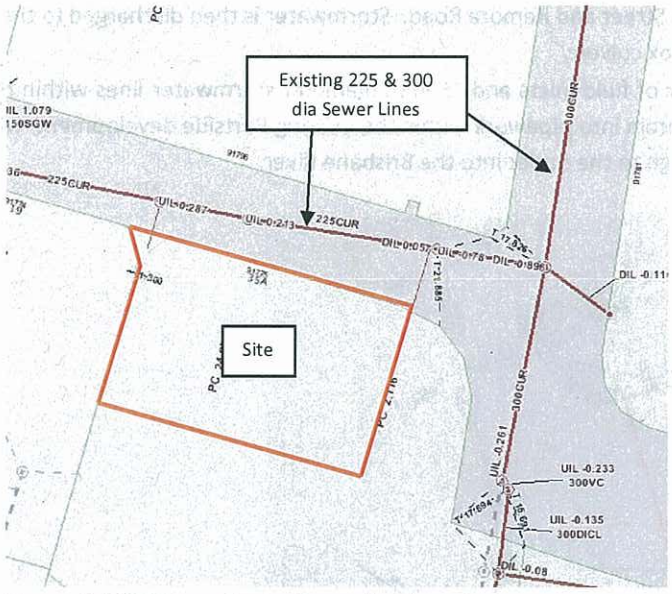


Figure 3: BCC Bimap Sewer Records

There is also a 400mm diameter PE sewer in Macarthur Avenue, recently constructed as part of the Northshore Hamilton Stage 1 works. This follows Macarthur Avenue, and discharges into the existing pump station at the end of Barcham Street. The sewer has been designed to cater an external catchment, consisting of the Hamilton Harbour and Portside Developments.

The Hamilton Harbour development will discharge directly to the S1 sewer in Kingsford Smith Drive, hence leaving additional spare capacity in the Northshore Sewer. This line is however limited by the capacity of the exiting pump station near Barcham Street. Queensland Urban Utilities has advised that there is spare capacity of approximately 1000 EP within the pump station. Preliminary designs have been completed for construction of a trunk sewer from the Macarthur Avenue line, connecting directly to the Violet Street Sewer Pump Station, however the construction timing of this is currently unknown.

4.2.2 SEWER LOADING

A preliminary calculation of sewer loading for the development has been calculated at 7.3L/s (under Peak Wet Weather Flow) in Table 1 below. Calculations have been based on the Brisbane City Council Sewerage Standards and the Water Services Australia Sewerage Code.

Table 1: Sewer Flow Calculations

Area Classification	Units	EP Loading / unit	Total EP
Residential	208 units	2.5 EP / unit	520.0
Retail / Commercial	440m^2 NLA	152 EP/Ha	6.7
		PWWF (1200L/EP/day)	7.3 L/s

4.2.3 SEWER CONNECTION OPTIONS

Options for the development's sewer connection have been identified as follows. The preliminary location of sewer options is shown on the Services Plan SKC010 attached in Appendix A.

- Option 1
  The preferred option is for connection into the existing 225mm diameter sewer directly fronting the site. This is dependant on a capacity assessment and permission from Queensland Urban Utilities. This option has been discussed with Queensland Urban Utilities and is currently under review.

- Option 2
  The second option is to connect to the existing Macarthur Avenue sewer by extending a new 150mm diameter sewer along Hercules Street and Remora Road. The total length of new sewer is approximately 200m. Cost sharing of this option between surrounding developers is also a possibility.

  As discussed in previous sections this existing Northshore line has been designed with sufficient capacity for this catchment, but is however limited by the capacity of the existing downstream pump station, until such time that the trunk infrastructure connecting sewer to the Violet Street Pump Station is constructed.

- Option 3
  The third option is for extension of a new 150mm diameter sewer line within Hercules Street and Remora Road which connects into the S1 sewer in Kingsford Smith Drive. This would involve construction of approximately 150m of sewer. Construction difficulties in terms of traffic management within Kingsford Smith Drive may arise.

Discussions with Queensland Urban Utilities regarding these options have commenced. Preliminary advice has also been received from QUU, indicating that based on their assessment the sewer connection to the existing Hercules Street sewer is allowable (Option 1). This is currently being reviewed by QUU, who have advised that a formal letter will be issued shortly. Once received, this will be forwarded to the ULDA for information.

4.3 INTERNAL SEWER

Design of the sewer internal to the site will be completed by the Hydraulic Engineer. Any internal pumps required to service basement areas will remain the property of the development and not be handed over to council.

4.4 WATER

There is an existing 150mm diameter potable water main within Hercules Street, along the full frontage of the site. There are also two existing 100mm diameter water connections to the site from the existing water main. It is the developer's intention to utilise these water connections as required (Refer drawing SKC010 attached in Appendix A). Flow and pressure tests will be required to determine suitability of this existing connections and main.

Figure 4: BCC Bimap Water Records

Permission is being sought from Queensland Urban Utilities for the water connection. Preliminary advice has been received, indicating that based on their assessment, water connection to the existing 150mm diameter water main in Hercules Street will be allowable. This is currently being reviewed by QUU with a formal letter being issued shortly. Once received, this will be forwarded to the ULDA for information.

4.5 NON CIVIL SERVICES

Non civil services including telecommunications and electricity will be required for the development. There are existing telecommunications services along the Hercules Street site frontage. Overhead power is also present within Hercules Street. The capacity of the existing services on Hercules Street will require assessment by associated consultants.

4.6 EARTHWORKS

Minor earthworks will be required for excavation of the basement level. The majority of the site has been lowered to the existing Portside basement level, hence minor regrading of this area will be required to remove existing batters and ramps. All earthworks will be undertaken in accordance with Brisbane City Council Subdivision and Development Guidelines.

4.7 SITE FLOODING & OVERLAND FLOW

A BCC Floodwise Report has been obtained for the site. The highest defined flood level is RL2.5m AHD as a result of a Storm Tide. Prior to earthworks, the site was approximately RL3.0m. As the Ground Level for the development will be constructed at RL4.7m AHD, with residential areas being above this, the development will not be affected by flooding, and have freeboard, to the highest defined flood level, exceeding 2.2m. Existing levels within Hercules Street, surrounding the site access are in excess of RL3.0m, therefore sufficient freeboard is provided to the basement access.

4.8 EROSION AND SEDIMENT CONTROL PLAN (ESCP)

A comprehensive Erosion and Sediment Control Plan including a construction process will be prepared for this development during the detailed design phase. The ESCP designs will be in accordance with the Institution of Engineers reference material and Brisbane City Council's Guidelines.

4.9 ASSET HANDOVER

It is the intention of the applicant that the stormwater quantity and quality controls detailed in this document, will not be handed over to Council as part of the development's stormwater infrastructure.

5. STORMWATER MANAGEMENT PLAN

5.1 STORMWATER OBJECTIVES

Under the Brisbane City Council Land Use Development Guidelines, several design elements were identified in relation to stormwater management issues. Brisbane City Council must be satisfied that:

- The proposed development can be drained;
- The stormwater management system can follow the features and functions of the natural drainage system;
- The volume, timing velocity and pollutant load of stormwater has no adverse effect on any surrounding properties or receiving waters; and
- Suitable provision is made in the design layout to accommodate for major drainage.

5.2 CATCHMENT DESCRIPTION

5.2.1 EXISTING AND PROPOSED

Prior to excavation, the site was relatively flat with levels around RL3.0m. Surface water discharged to Hercules Street. Since the construction of the existing Portside Wharf development, stormwater is discharged into stormwater drains provided as part of the previous stages, and connects through the existing basement levels. The site in its current state and prior to surrounding development has and had significant amounts of impervious area.

Under development conditions, all stormwater drainage within the site will consist of hydraulics drainage. As site discharges are relatively low it is expected that all flows are collected by the hydraulics system, with little or no overland flow during major storm events.

5.3 LEGAL POINT OF DISCHARGE

The existing point of discharge from the site is the Brisbane River, located towards the south of the development. The legal point of discharge for the development is the existing pipework within Hercules Street. This is discussed further in Section 4.1 above.

5.4 OPPORTUNITIES AND CONSTRAINTS

5.4.1 SITE OPPORTUNITIES

The major opportunities identified for the site with respect to the application of stormwater quality and quantity controls are:

- The use of rainwater tanks to capture roofwater runoff for re-use within the internal plumbing of the buildings.

5.4.2 SITE CONSTRAINTS

The major constraints identified for the site with respect to the application of stormwater quality and quantity controls are:

- High density developments change the runoff characteristics of the development. An increase in impervious area can result in an increased amount of runoff.
- The size of the development site restricts the space available for use in stormwater management.

6. STORMWATER QUANTITY

6.1 STORMWATER DRAINAGE METHODOLOGY

Modelling of stormwater runoff quantity has been considered for the existing case and operational phase of the development. In order to assess the existing and predicted future (operational phase) discharge rates from the development site, calculations have been conducted based on the Rational Method, according to the methods specified in the Queensland Urban Drainage Manual and Brisbane City Council's Subdivision and Development Guidelines.

Calculations have been undertaken to determine the undeveloped and developed peak run-off rates with the Best Management Practices (BMPs) incorporated into the site layout for stormwater quantity control.

6.2 PEAK FLOW CALCULATIONS

The Rational Method as outlined in the Queensland Urban Drainage Manual was used to determine the peak flow rate corresponding to the minor and major storm events for this development. The fraction impervious for the existing and developed conditions have been estimated based on a review of aerial photography and the proposed development layout. The lower fraction impervious in the developed conditions can be attributed to the landscaping area on the Podium level.

Brisbane City Council Subdivision and Development Guidelines, Table B2.1, "Design Standards for Major/Minor Drainage Systems" was used to identify the design storm events for this development as:

Minor -	1 in 10 year ARI
Major -	1 in 50 year ARI
Major (overland flow) -	1 in 100 year ARI

Flow rates were calculated at the point of discharge from the site for the existing and developed phases of the development. Detailed calculations can be reviewed in Appendix B.

Table 2: Pre & Post Development Peak Flow Calculations

	Parameter	Existing	Proposed
Catchment Details	Area (Ha)	0.267	0.267
	Fraction Impervious	90%	80%
	Coefficient of Runoff (C10)	0.88	0.86
	Time of Concentration (min)	5.0	5.0
	10 year Rainfall Intensity (mm/hr)	215	215
	50 year Rainfall Intensity (mm/hr)	292	292
	100 year Rainfall Intensity (mm/hr)	327	327
Discharge	**1 in 10 year ARI (m^3/s)**	**0.140**	**0.137**
	1 in 50 year ARI (m^3/s)	**0.217**	**0.214**
	1 in 100 year ARI (m^3/s)	**0.242**	**0.242**

As indicated within the table above, the discharge rates from the proposed development are similar to the existing conditions. As landscaping is incorporated in the development plan, the runoff rates for the Q10 and Q50 storm events is slightly lower, hence no stormwater quantity controls are proposed. Due to the close proximity of the site to the Brisbane River, stormwater will be discharged as quickly as possible. The development will however incorporate an 80kL rainwater tank. This has been assumed full for the above calculations.

7. STORMWATER QUALITY

7.1 WATER QUALITY

All references to water quality objectives and design requirements within this report have been based on Brisbane City Council Standards and in particular Brisbane City Council Subdivision and Development Guidelines Part C – Water Quality Management Guidelines.

The Brisbane City Council Subdivision and Development Guidelines, Part C – Water Quality Management Guidelines, specifies that the level of stormwater treatment is determined by the development falling into either the 'high' or 'low' risk categories. For a development to be classified as 'high risk' it must fall within one of the following categories as specified in Section 3.1.1 of the above guidelines:

- Development located in a waterway corridor, Brisbane River corridor, or wetland area;
- Multi-unit dwellings or commercial uses with an impermeable surface area (not including roof area) in excess of $2500m^2$;
- Subdivision where greater than 6 lots are involved
- Industrial activities that are not impact assessable (under Council's City Plan) and have at least $1000m^2$ in uncovered storage / working space;
- Industrial activities that are impact assessable (under Council's City Plan);
- Uncovered car parks with at least 100 spaces;
- Developments which discharge stormwater or wastewater to an area deemed by Council to have significant environmental value.

From a review of these categories, we believe that the development can be classified as 'low risk' for Water Quality as the site is not located in a waterway corridor, Brisbane River corridor or wetland area. Also, the majority of the site consists of roof areas, hence the uncovered impervious areas within the site will be less than the 2500m^2 trigger for 'high risk' developments. As the development has been classified as 'low risk' Best Management Practices will be applied.

7.2 SITE CHARACTERISTICS AND IMPACTS

The proposed development is such that the majority of the site is covered with roof area. It is hence expected that the generation of pollutants would be low. Best management practices will be applied to mitigate the pollutant discharge from the site.

7.3 PROPOSED TREATMENT TRAIN

It is proposed to install a GPT in the basement area for treatment of stormwater prior to discharge. We expect that this would be of the Ecosol RSF4000 range which allows trapping of oils and grease. The location of this is to be determined by the Hydraulic Engineer during the detailed design phase.

The development proposal also includes an 80kL rainwater tank, to be located within the basement area. This will provide storage for rainwater to be reused within the site.

7.4 WATER QUALITY MONITORING PROGRAM

As this development discharges stormwater into the existing drainage system using stormwater quality Best Management Practices, no proposal for water quality monitoring has been made. The measures proposed for water quality and water quantity treatment are reasonably well understood and demonstrated in Brisbane. It is hence anticipated that they are acceptable here.

8. SUMMARY

From the investigations conducted, it has been shown that the proposed development located within the Portside Wharf Precinct can be constructed and serviced in accordance with Brisbane City Council requirements, the Queensland Urban Drainage Manual and widely accepted engineering principals.

The Stormwater Management Plan has demonstrated that adequate treatment of stormwater quantity and quality is possible under the proposed plan. Sufficient consideration of stormwater controls has been made to demonstrate the viability of the proposed development.

9. REFERENCES

1) Draft Australian Runoff Quality (IEAust 2003).

2) Brisbane City Council (1999) – Draft Design Guidelines for Stormwater Quality Improvement Devices.

3) Brisbane City Council (2000) Brisbane City Council's Water Quality Management Guidelines.

4) Brisbane City Council (2000) Guidelines on Identifying and Applying Water Quality Objectives in Brisbane City.

5) Brisbane City Council (2000) – Guidelines for Sediment Basin design, Construction and Maintenance

6) Brisbane City Council - Draft WSRD Guidelines (2003)

7) Brisbane City Council - Draft Design Guidelines for Stormwater Quality Improvement Devices (1999)

8) Brisbane City Council (October 2003) Guidelines for Pollutant Export Modelling in Brisbane – Version 7.

9) Water Quality management Guidelines, Part C of Brisbane City Council (2000) Subdivision and Development Guidelines

10) Queensland Urban Drainage Manual.

11) Model for Urban Stormwater Improvement Conceptualisation User Manual Version 1.00. (CRC-CH 2002).

12) A Bibliography of Urban Stormwater Quality (Duncan 1995)

13) Soil Erosion and Sediment Control Guidelines for Queensland Construction Sites (1996). The Queensland Division of the Institution of Engineers, Australia.

APPENDIX A

FIGURES AND DRAWINGS

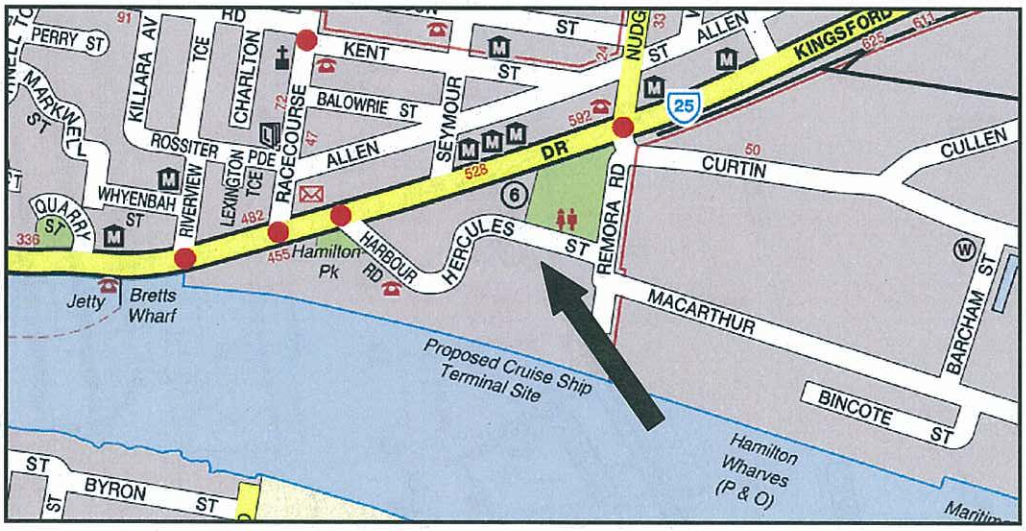
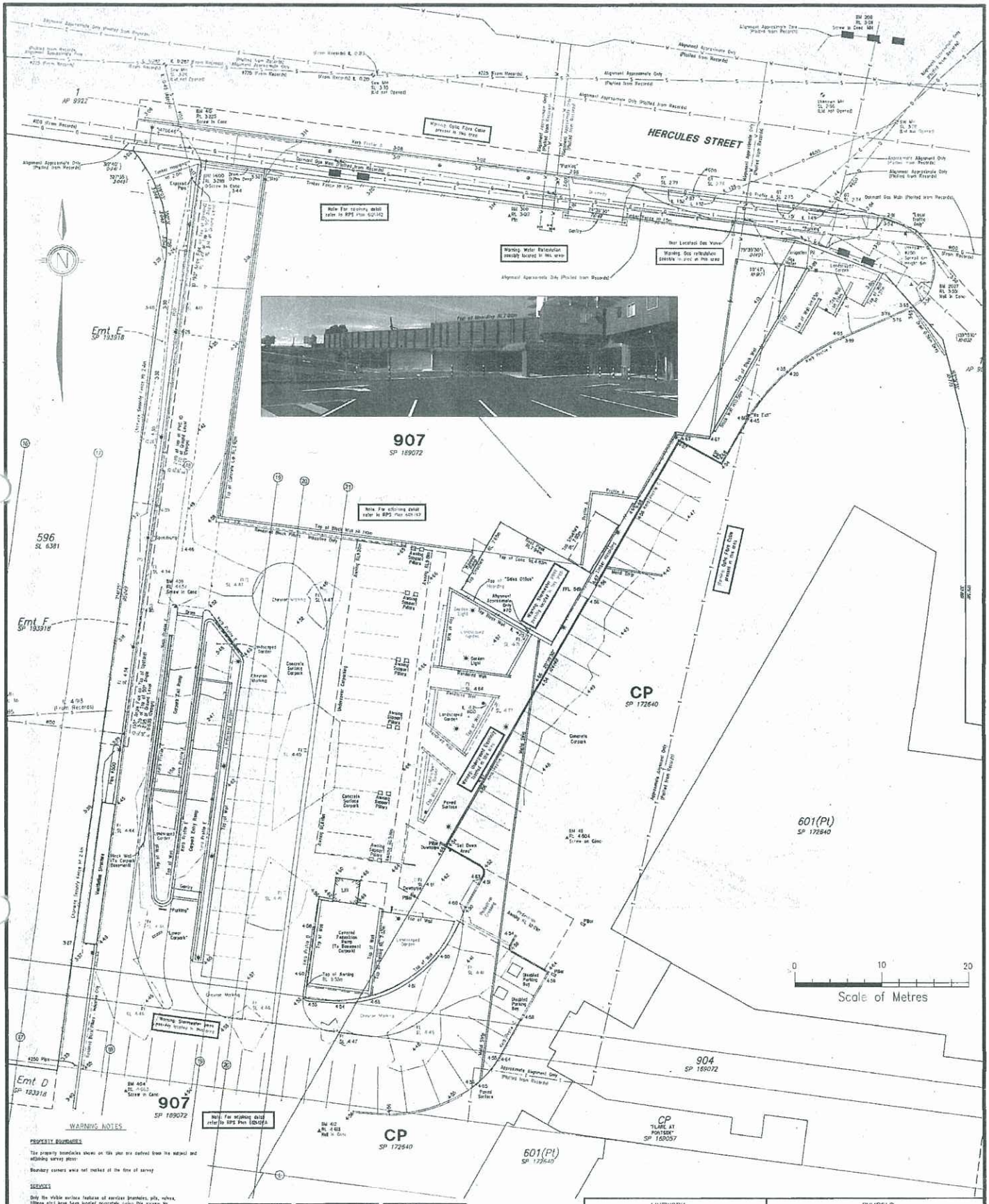


Figure 5: Locality Map

UBD Map:Brisbane UBD, Map 240 – C1



WARNING NOTES

PROPERTY BOUNDARIES

The property boundaries shown on this plan are derived from the subject and adjoining survey plans.

Boundary corners were not marked at the time of survey.

SERVICES

Only the visible surface features of service (manholes, pits, valves, fittings etc) have been located accurately during this survey. Underground service alignments or underground features have been shown on this plan. If existing underground service positions are critical for design or construction purposes, the service location must be accurately determined by pot holing or verification on site by the relevant service authority prior to commencement of design or construction.

The position of service alignments shown on this plan must not be relied upon when designing services or buildings that will be constructed in close proximity to them. If existing service positions are critical for design or construction purposes, the service location must be accurately determined by pot holing or verification on site by the relevant service authority prior to commencement of design or construction.

In accordance with the Workplace Health and Safety Act, manholes have not been entered to obtain invert levels. The invert levels shown are derived from approximate field measurements and existing records.

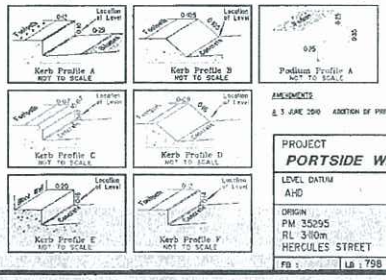
The shown depicting services are symbolic representations, and what they are accurately positioned, they are not to scale.

CONTOURS

Contour interval is 0.5m.

SURROUNDING DETAIL

For further detail surrounding the area shown on this plan, refer to RPS Plan 623-142 and RPS Plan 623-120 (Amendment A).



AMENDMENTS

A 3 JUNE 2010 ADDITION OF PRIVATE SEWER LINE

LINEWORK

SYMBOLS

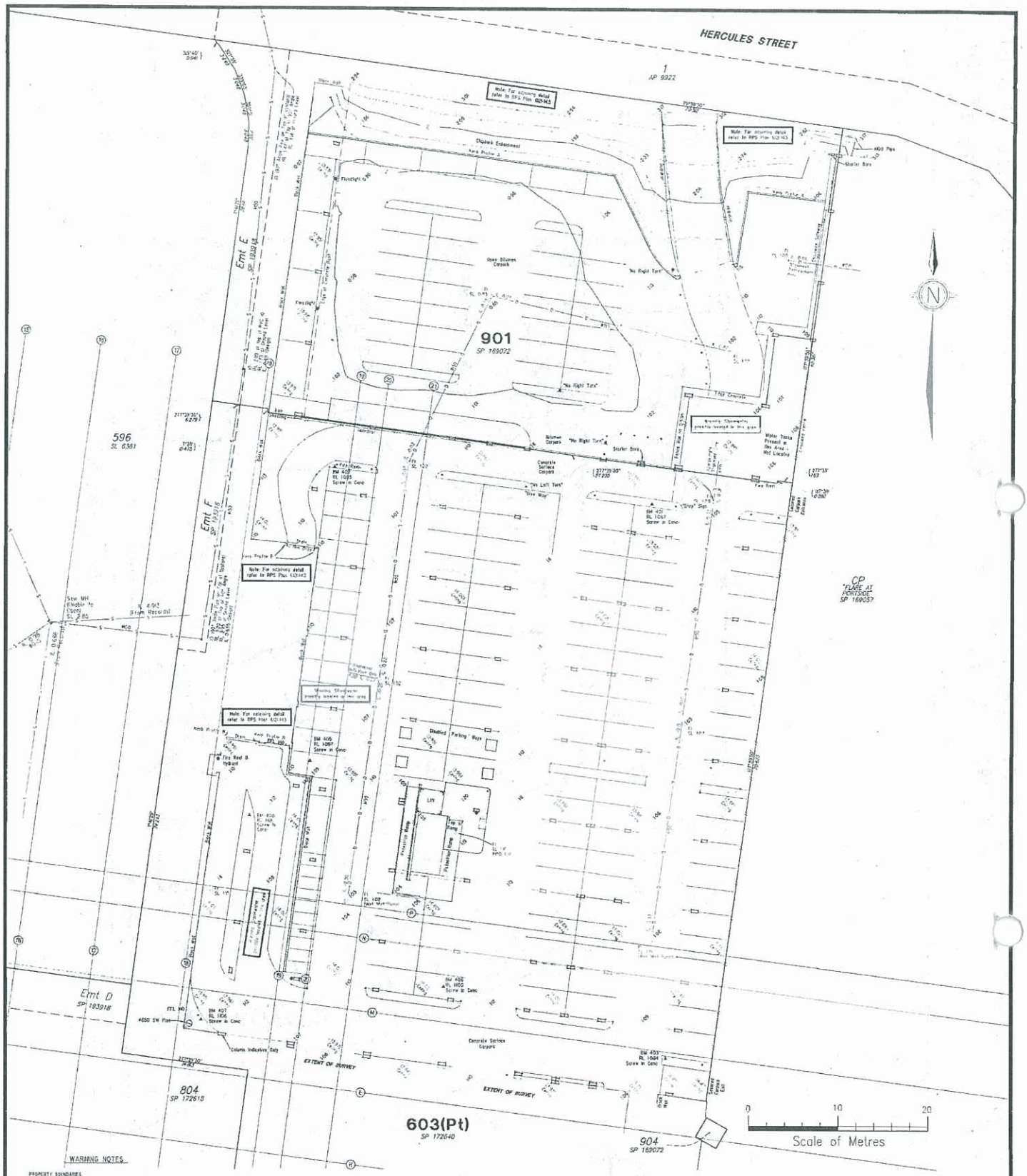
PROJECT	PORTSIDE WHARF	CLIENT	CITIMARK PROPERTIES
LEVEL DATUM	AHD	SCALE	1:200
ORIGIN	PM 35095 RL 3.180m HERCULES STREET	Date	16/06/2008
		Surveyed	AVL
		Comp by	AVL
FB :	LB : 798	DWG.	6121 BEPODIUM DET

PODIUM LEVEL
PROPOSED BUILDING 6
CONTOUR & DETAIL SURVEY

Parish	TOOMBUL	Job Ref	
Local Authority	BRISBANE CITY COUNCIL		623-89/86

RPS
RPS Australia East Pty Ltd
ACN 140 292 762
ABN 44 140 292 762
243 Ann Street
PO Box 1559
Fortitude Valley QLD 4006
T +61 7 3237 8899
F +61 7 3237 8633
W rpsgroup.com.au

Reference 6121-143 | Rev A



WARNING NOTES

PROPERTY BOUNDARIES

The property boundaries shown on this plan are derived from the subject and adjoining survey plans. For clarity the site boundaries shown represent the boundaries at Basement level only.

Boundary corners were not marked at the time of survey.

SERVICES

Only the visible surface features of services (manholes, pits, valves, fittings etc) have been located accurately during this survey. No underground service alignments or underground features have been shown on this plan. If adjoining underground service positions are critical for design or construction purposes, the service location must be accurately determined by potholing or verification on site by the relevant service authority prior to commencement of design or construction.

The position of service alignments shown on this plan must not be relied upon when designing services or buildings that will be constructed in close proximity to them. If adjoining service positions are critical for design or construction purposes, the service location must be accurately determined by pot holing or verification on site by the relevant service authority prior to commencement of design or construction.

In accordance with the Workplace Health and Safety Act, manholes have not been entered to obtain invert levels. The invert levels shown are derived from approximate field measurements and existing records.

The shapes depicting services are symbols, representations, and what they are accurately portrayed. They are not to scale.

CONTOURS

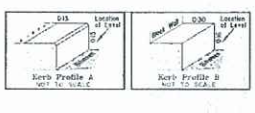
Contour Interval is 0.5m

SURROUNDING DETAIL

For further detail surrounding the area shown on this plan, refer to RPS Plan 6121143

AMENDMENTS

A 3 JUNE 2010 ADDITION OF PRIVATE SEWER LINE



LINEWORK

SYMBOLS

PROJECT	PORTSIDE WHARF	CLIENT	CITIMARK PROPERTIES
LEVEL DATUM	AHD	SCALE	1:200
ORIGIN	PM 35295 RL 3.140m HERCULES STREET	Date.	13/06/2008
		Surveyed.	AVL
		Comp by.	AVL
FB :	LB : 798	DWG.	6121 B6BASE DET

BASEMENT LEVEL
PROPOSED BUILDING 6
CONTOUR & DETAIL SURVEY

Parish: TOOMBUL
Local Authority: BRISBANE CITY COUNCIL
Job Ref: 6021B9/B6

RPS

RPS Australia East Pty Ltd
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ABN 34 140 292 733

743 Ann Street
PO Box 1559
Fortitude Valley Qld 4006

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F +61 7 3237 8833
W rpsgroup.com.au

Reference: 6121-142
Rev: A