DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix G — Noise and Vibration Assessment

SSD-9914

Prepared by Acoustic Logic

For NSW Department of Education

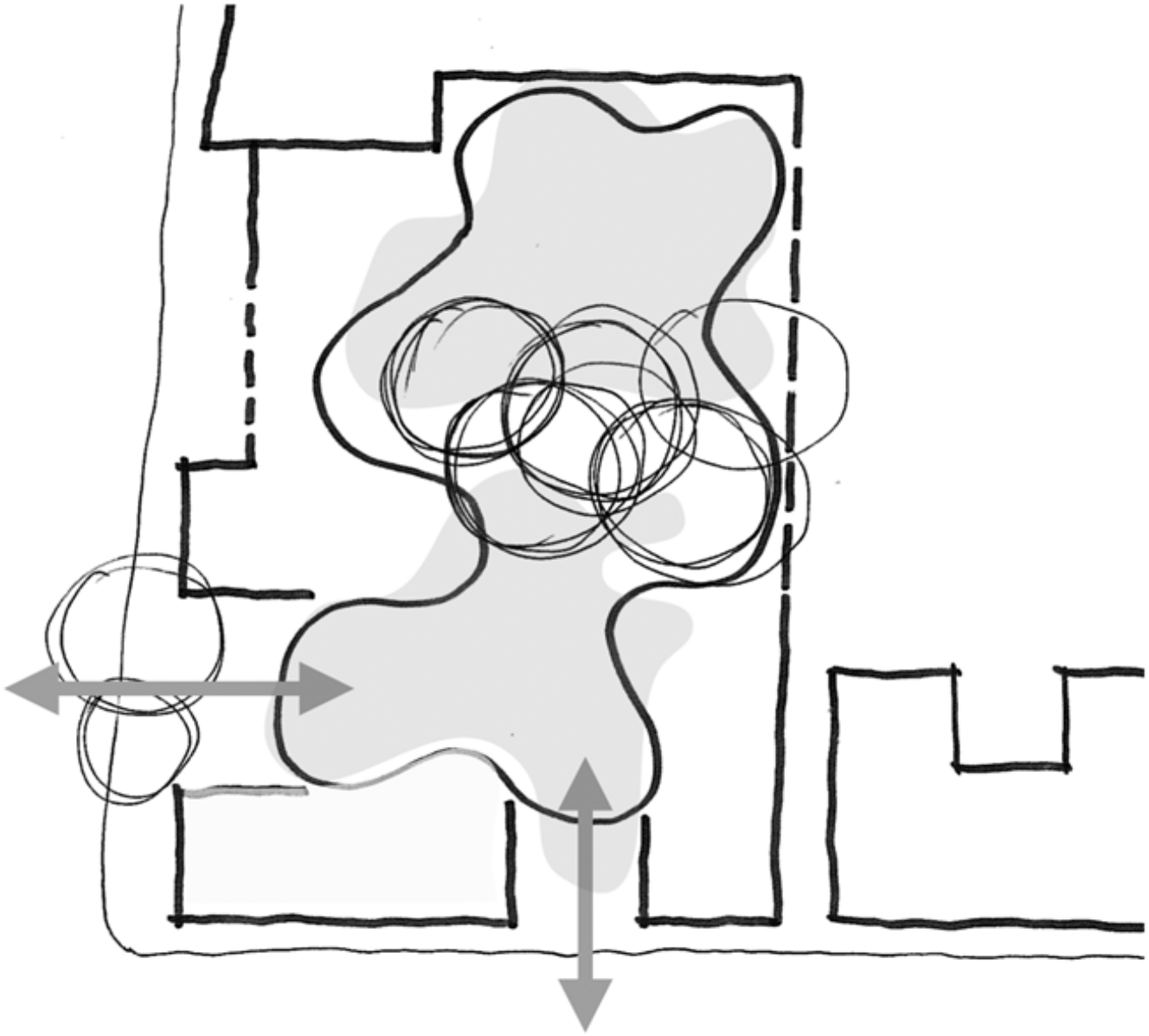

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TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic Consultancy (ALC) have been engaged to conduct an acoustic assessment of potential noise impacts associated with the redevelopment of the existing school grounds at Darlington Public School, located at 417 Abercrombie Street, Darlington.

This report has been prepared to assess the potential acoustic impacts of the development. In this report, we will:

- Identify nearby noise sensitive receivers and operational noise sources with the potential to adversely impact the nearby development.
- Identify relevant noise emission criteria applicable to the development.
- If necessary, determine building and/or management controls necessary to mitigate potential noise impacts.
- Provide a preliminary review of construction noise and vibration impacts from the proposed development.

ALC have utilised the following documents and regulations in the assessment of noise associated with the development:

- Secretary's Environmental Assessment Requirements (SEARs) for SSD – 9914;
- NSW EPA Noise Policy for Industry (NPfI) 2017;
- NSW DECC Interim Construction Noise Guideline 2009;
- Assessing Vibration: A Technical Guideline 2006; and
- Development Near Rail Corridors and Busy Roads – Interim Guideline Department of Planning 2008.

This assessment has been conducted using FJMT's Architectural Drawing for 70% Schematic Design, Revision A, Date: 01/04/2020.

2 RESPONSE TO SEARS

An environmental noise and vibration assessment is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD – 9914. This table identifies the SEARs and relevant reference within this report.

Table 1 – SEARs and Relevant Reference

SEARs Item	Report Reference
Item 11	
• Identify and provide a quantitative assessment of the main noise and vibration generating sources during demolition, site preparation, bulk excavation construction-related work. Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.	Section 11
• Identify and assess operational noise, including consideration of any public address system, school bell, mechanical services (e.g. air conditioning plant), use of any school hall for concerts etc. (both during and outside of school hours) and any out of hours community use of school facilities, and outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.	Section 7
• Relevant policies and guidelines: o NSW Noise Policy for Industry 2017 (EPA) including Fact Sheets A and B o Interim Construction Noise Guideline (DECC) o Assessing Vibration: A technical Guideline 2006 o Development Near Rail corridors and Busy Roads – Interim Guideline (Department of Planning 2008)	See entire report

3 SITE DESCRIPTION & PROPOSED WORKS

3.1 SITE DESRIPTION

Darlington Public School is located on the corner of Golden Grove Street and Abercrombie Street, Darlington, within the City of Sydney Local Government Area. The school is adjacent to the University of Sydney Darlington Campus and within walking distance to Redfern and Macdonaldtown train stations. The site is legally described as Lot 100 in DP 623500 and Lot 592 in DP 7523049.

The SSD application seeks consent for demolition of existing school buildings and construction of a new part 2, part 3-storey building, increasing the school capacity from 230 to 437 students. The works also include replacement of the existing child-care facility (to the same capacity of 60 students), earthworks and landscaping. For a detailed project description refer to the EIS prepared by Ethos Urban.

Surrounding land uses and potential noise impacts associated with this site are as follows:

- King Street is located north-west of the site, over existing residential developments. The proposed school site is located 90m from the roadway at the closest point. King Street is currently listed as a mandatory road under SEPP (Infrastructure), indicating that it carries an annual average daily traffic volume in excess of 40, 000 vehicles per day;

- Roadways immediately surrounding the site generally consist of local roadways and through traffic for the surrounding residential developments;

- Existing residential developments surround the site on the north, south and west of the school over each of their respective local roads. Residents in this location consist of double storey townhouses and multi-storey apartment buildings.

- Existing commercial educational facilities to the Eastern boundary of the site, The University of Sydney Business School. This development is made up of multiple multi-storey buildings, the use of these buildings includes student accommodation, teaching spaces, and offices.

3.2 NEARBY NOISE RECEIVERS

The nearest noise sensitive receivers around the project site are as follows:

- **Receiver 1:** Regiment Building within the collection of University of Sydney owned buildings. This development is used as student accommodation and is located on the north-west corner of the site at 2-10 Golden Grove Street, Darlington;
- **Receiver 2:** Residential townhouses located north of the school over Darlington Lane, at 118 – 132 Darlington Road, Darlington;
- **Receiver 3:** The Abercrombie Building (H70) within the collection of University of Sydney owned buildings. This development contains teaching spaces and offices and is located east of the school, at 297-303 Rose Street, Darlington;
- **Receiver 4:** Abercrombie Student Accommodation within the collection of University of Sydney owned buildings. This development is located east of the school, at 403-415 Abercrombie Street, Darlington;
- **Receiver 5:** Residential townhouses located south of the school over Abercrombie Street, at 420-454 Abercrombie Street, Darlington.
- **Receiver 6:** Residential development located west of the school over Golden Grove Street, at 11 Golden Grove Street, Darlington.

See figure 1 below for a site map detailing the location of receivers and acoustic measurements.

3.3 PROPOSED OPERATION / HOURS

The proposed redevelopment will allow the school to approximately double its capacity. Accommodating 25 staff members and 415 students. The school will cater for Preschool, Kindergarten through to year six.

The following table describes the general operation of the school as currently proposed.

Table 2 – School Uses and Operating Times

Item	Use	Times
General	Schooling for Preschool, Kindergarten through to Year 6, with a capacity of 415 students.	Monday to Friday: 8am – 5pm
Community Hall	Intended use by school during school hours. Occasional evening use for music performance, presentations, parent/teacher nights. Hall to be made available to the community through a booking system arranged by the school.	Maximum operating time will be 10pm
OSHC	Out of school hours (OSHC) use of the school	Vacation care: 7am -6pm Weekday Mornings: 7am – 9am Weekday Afternoons: 2pm – 6pm
Library	Intended use by school only. Occasional evening use for presentations, parent/teacher nights, extra-curricular programs.	Maximum operating time will be 7pm
Shared Use/ Community Use	DOE is currently exploring shared use opportunities of the proposed school facilities for community use	Maximum operating time will be 10pm.

Attended Noise Measurement

Unattended Noise Measurement

Figure 1 – Aerial View of Site & Receivers

(Sourced from Six Maps 2019)

Project Site

Residential Receiver

Non-Residential Receiver

4 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

The L_{max} level represents the loudest noise event during a measurement period.

5 SURVEY OF AMBIENT NOISE

Unattended long-term monitoring and attended short term measurements were conducted to quantify the existing acoustic environment.

ALC confirm that all monitoring/measurement procedures, measured noise levels and calculated rating background (RBL) noise levels, were carried out in accordance with the requirements of the NSW EPA Noise Policy for industry and Australian Standard 1055.2 Acoustics – Description and measurement of environmental noise.

5.1 ATTENDED NOISE MEASURMENTS

In addition to the unattended noise logging, a series of attended noise measurements were also conducted by this office, to assess the existing background noise levels.

Attended measurements were obtained using a Norsonics Type 140 Sound Level Analyser. The sound analyser was calibrated at the beginning and end of the measurement using a Norsonics type 1251 Sound Level Calibrator. No significant drift was noted. All measurements were conducted on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement period. Measurements were conducted as follows.

Table 3 – Attended Noise Measurements

Measurement Location	Time of Day	Measured Noise Level	Comments
1. Darlington Lane	Wednesday 3rd April 2019 1:30pm – 2:00pm	53 dB(A)$L_{eq(Period)}$ 47 dB(A)$L_{90(Period)}$	Distant Mechanical Noise from University of Sydney Building
2. Golden Grove Street	Wednesday 3rd April 2019 2:00pm - 2:30pm	54 dB(A)$L_{eq(Period)}$ 47dB(A)$L_{90(Period)}$	Typical Local road with minimal traffic
3. Abercrombie Street	Wednesday 3rd April 2019 2:30pm – 3:00pm	54 dB(A)$L_{eq(Period)}$ 46 dB(A)$L_{90(Period)}$	Distant Mechanical Noise from University of Sydney Building

*Please see Figure 1 for detail of the location of each of the attended measurements.

5.2 UNATTENDED, LONG TERM NOISE LOGGING

Unattended noise monitoring was conducted using two Acoustic Research Laboratories noise monitors. The monitors were set to an A-weighted fast response mode, recording continuously at 15-minute intervals. Both monitors were calibrated at the start and end of the monitoring period using a Rion NC-73 Calibrator. No significant drift was noted. Monitoring was conducted as follows;

- **Monitor 1** – Installed along the western boundary of the site, in the Darlington Pre-School courtyard, Darlington. The background noise levels measured at this location will be representative of the ambient noise levels at the residential receivers to the west, across Golden Grove Street. This measurement was also verified by attended noise measurements conducted along the western boundary of the site at the residential properties located at 11 Golden Grove Street, Darlington, as detailed in figure 2-1. The noise monitor was located onsite between the 3rd and the 15th of April 2019, and attended measurements were taken on the 3rd of April 2019. Simultaneous attended

measurements conformed the backgrounds noise level was the same o both sides of the road. Noise monitoring data is attached in Appendix 1.

- **Monitor 2** – Installed along the northern boundary of the project site adjacent to Darlington Lane. The background noise levels measured at this location will be representative of the ambient noise levels at the residential receivers to the north, across Darlington Lane. This measurement was also verified by attended noise measurements conducted along the northern boundary of the site at the residential properties located at from 118 – 132 Darlington Lane, Darlington, as detailed in figure 2-1. The noise monitor was located onsite between the 3rd and the 15th of April 2019, and attended measurements were taken on the 3rd of April 2019. Simultaneous attended measurements conformed the backgrounds noise level was the same o both sides of the road. Noise monitoring data is attached in Appendix 1.

Table 4 – Unattended Long-Term Noise Monitoring

Monitor Location	Measured Noise Level – Time of Day		
	Daytime (7am – 6pm)	**Evening (6pm -10pm)**	**Night (10pm – 7am)**
Western Location Darlington Preschool (Monitor 1)	55 dB(A)$L_{eq(Period)}$ 45 dB(A)$L_{90(Period)}$	53 dB(A)$L_{eq(Period)}$ 43 dB(A)$L_{90(Period)}$	48 dB(A)$L_{eq(Period)}$ 35 dB(A)$L_{90(Period)}$
Northern Location Darlington Lane (Monitor 2)	60 dB(A)$L_{eq(Period)}$ 45 dB(A)$L_{90(Period)}$	54 dB(A)$L_{eq(Period)}$ 44 dB(A)$L_{90(Period)}$	49 dB(A)$L_{eq(Period)}$ 41 dB(A)$L_{90(Period)}$

5.2.1 Weather affected Noise data

Fact Sheet A: Determining Existing Background Noise Levels part A4 of the NSW EPA Noise Policy for Industry document outlines the following with regards to meteorological impacts on noise monitoring:

"Noise monitoring should not be conducted (or the data should be excluded) when average wind speeds (over 15-min periods or shorted) at microphone height are greater than 5 meters per second, or when rainfall occurs."

However, the same section of this policy also outlines that;

"Exceptions to this rule are allowed provided the proponent is able to show that the wind-induced noise on the microphone, and sound levels due to rain, are at least 10 dB below the noise levels under investigation."

Inclement weather conditions recorded at the Randwick (Randwick Street) weather station during monitoring periods are highlighted in Appendix 1.

- No rain was recorded during the monitoring period between the 3rd and the 14th of April 2019.
- No periods of high wind speeds (>5m/s) were noted during the monitoring period.

6 NOISE INTRUSION CRITERIA

6.1 DEVELOPMENT NEAR RAIL CORRIDORS AND BUSY ROADS INTERIM GUIDELINE

The Development Near Rail Corridors and Busy Roads –Interim Guideline (Department of Planning 2008) is used to assess the impact of adjacent road and rail corridors on noise sensitive development. The guideline recommends a maximum noise level within classrooms of 40 dB(A) $L_{eq,1hr}$.

7 OPERATIONAL NOISE EMISSION CRITERIA

The SEARS requires a consideration of noise emissions including any public address system, school bell, mechanical services (e.g. air conditioning plant), use of any school hall for concerts etc, (both during and outside school hours) and any out of hours community use of school facilities, and outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.

There are no specific EPA criteria applicable to the acoustic assessment of schools. The NSW Educational SEPP requirement relating to noise emissions is:

> ***6. Noise***
>
> *A new building or (if the development is an alteration or addition to an existing building for the purpose of changing its use) an existing building that is to be used for the purpose of a school or school-based child care must be designed so as not to emit noise exceeding an Laeq of 5 dB(A) above background noise when measured at any lot boundary.*

Guidelines referenced in the SEARs, as well as other guidelines are provided below:

- EPA Noise Policy for Industry 2017 (applicable for plant/equipment noise)
- EPA Road Noise Policy (for the assessment of noise from traffic generation by the site)
- Assessing Vibration: A Technical Guideline (EPA, 2006)
- Development Near Rail Corridors and Busy Roads – Interim Guideline (Development of Planning 2008) (to assess noise from traffic on the subject development)

We note that the EPA Noise Policy for Industry noise trigger levels are not strictly applicable to school developments, they are primarily intended to assess noise emissions from industrial/commercial developments. However, it is the most useful guideline policy for the assessment of plant and equipment noise impact to surrounding receivers.

In our experience it is extremely common in the assessment of the noise generation by schools that compliance with acoustic guidelines (in particular noise from playgrounds and during pickup and drop off) is not required (and for schools located in residential areas, it is in fact generally not achievable). The NSW Educational SEPP requires noise emissions from school buildings to be limited, and there is no requirement related to external uses.

An outline of relevant acoustic criteria is presented below.

7.1 EDUCATIONAL SEPP

The following table outlines the criteria to assess noise emissions from school buildings:

Table 5- NSW Educational SEPP Criteria

Location	Time of Day	Rating Background Noise Level dB L_{A90}	Intrusiveness Noise Objective dB $L_{Aeq(15min)}$
Residents Located to the North & East	Day Time (7am – 6pm)	45	50
	Evening (6pm-10pm)	44	49
	Night (10pm – 7am)	41	46
Residents Located to the South & West	Day Time (7am – 6pm)	45	50
	Evening (6pm-10pm)	43	48
	Night (10pm – 7am)	35	40

7.2 EPA NOISE POLICY FOR INDUSTRY

The NPfI provides guidelines for assessing noise impacts from developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The NPfI has two requirements which both have to be complied with, namely an intrusiveness criterion and an amenity criterion.

7.2.1 Intrusiveness Assessment

Section 2.3: Project Intrusiveness Noise Level

"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

Table 6 – EPA Intrusiveness Criteria

Location	Time of Day	Rating Background Noise Level – dB(A)L_{90}	Intrusiveness Noise Objective dB(A)L_{eq} (Background + 5dB)
Residents Located to the North & East	Daytime (7am – 6pm)	45	50
	Evening (6pm – 10pm)	44	49
	Night (10pm – 7am)	41	46
Residents Located to the South & West	Daytime (7am – 6pm)	45	50
	Evening (6pm – 10pm)	43	48
	Night (10pm – 7am)	35	40

7.2.2 Amenity Criteria

Section 2.4: Amenity Noise Levels and Project Amenity Noise Levels

"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance.

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location."

Table 2.2 on page 11 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface. The subject site has been assessed against noise emission criteria in accordance with the 'urban' category.

Table 7 – NPfI Project Amenity Criteria

Type of Receiver	Time of day	Recommended Acceptable Noise Level dB(A) L_{eq}
Residential (Suburban)	Daytime (7am – 6pm)	53
	Evening (6pm – 10pm)	43
	Night (10pm – 7am)	38
School Classrooms & other Educational Institutes	Noisiest 1-hour Period	35
Commercial	When in Use	63

7.2.3 Sleep Disturbance Criterion

The NPfI states the following with regards to sleep disturbance, 'Maximum noise level event assessment':

> *"The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages. Where the subject development/premises night-time noise levels at a residential location exceed:*
>
> - *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
> - *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*
>
> *a detailed maximum noise level event assessment should be undertaken.*
>
> *The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the NSW Road Noise Policy.*
>
> *Other factors that may be important in assessing the extent of impacts on sleep include:*
>
> - *how often high noise events will occur;*
> - *the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development.*

- whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods)
- current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night.

Maximum noise level event assessments should be based on the L_{AFmax} descriptor on an event basis under 'fast' time response.

The detailed assessment should consider all feasible and reasonable noise mitigation measures with a goal of achieving the above trigger levels."

Table 8 – NPfI Sleep Disturbance Criteria

Receiver	Period	Background Noise Level	Sleep Disturbance Criteria
Residents Located to the North & East	Night 10:00pm – 6:30am	41 dBL_{A90}	43 $dBL_{Aeq,15min}$
			53 dBL_{AFmax}
	Morning Shoulder 6:30am – 7:00am	43 dBL_{A90}	45 $dBL_{Aeq,15min}$
			55 dBL_{AFmax}
Residents Located to the South & West	Night 10:00pm – 6:30am	35 dBL_{A90}	42 $dBL_{Aeq,15min}$
			52 dBL_{AFmax}
	Morning Shoulder 6:30am – 7:00am	41 dBL_{A90}	43 $dBL_{Aeq,15min}$
			53 dBL_{AFmax}

7.3 ROAD NOISE POLICY

The (RNP) provides guidelines for assessing noise emission from public roads, including the impact of traffic generated by developments.

Abercrombie Street, Golden Grove Street and Darlington Lane would be defined as sub-arterial roads.

The applicable assessment criteria for residential receivers are (measured at the façade of dwellings):

- Sub-arterial – 60dB(A) L_{eq}, 15hr (7am to 10pm) and 55 dB(A) L_{eq}, 9hr (10pm to 7am)

The policy also states that:

- Consideration of the noise increase should be made for sub-arterial and arterial roads
- Noise impacts from increases in noise levels of 2 dB(A) or less are minor, and by implication do not require mitigation.

8 OPERATIONAL NOISE EMISSION ASSESSMENT

An assessment of operational noise emissions is presented below. The following noise sources are assessed:

- Noise from internal areas;
- Noise from mechanical plant, PA system and school bells;
- Traffic generation;
- Waste removal; and
- External activities.

8.1 NOISE FROM INTERNAL SPACES

8.1.1 Learning and Administration Spaces

The administration and teaching spaces generate low to medium levels of noise. The teaching spaces are 25 meters from the nearest residential receiver and emissions from these buildings and therefore would be considered acoustically acceptable.

8.1.2 Communal Hall

The communal hall that may be used for presentations and performances opens out to the north, onto the ground level Covered Outdoor Learning Area (COLA). The most potentially impacted receivers would be the residential receivers to the west (receiver 6) as the building structure of the school shields the northern residential receivers from the Hall. There are also no openings/doors located along the southern faced of the hall.

Noise emissions to the surrounding properties was calculated based on the following assumptions:

- Hall internal level of 80dB(A)$L_{eq,15min}$ representing the sound level during a music performance.
- North facing doors and ventilation openings are closed.
- Door to have minimum sound transmission loss of R_w 20 when closed.

The predicted noise levels to the worst affected receiver (Receiver 6: 11 Golden Grove) are as follows:

- Doors Open 46 $dBL_{Aeq,15min}$
- Doors Closed < 30 $dBL_{Aeq,15min}$

The background + 5 dB(A) noise emissions criteria are not exceeded at all times. Closing the doors during the evening is recommended when amplified music is proposed to be played within the hall.

Noise producing activities on the covered external terrace should be restricted to normal school hours.

8.2 NOISE FROM MECHANICAL PLANT, SCHOOL BUILDINGS PUBLIC ADDRESS SYSTEM AND SCHOOL BELL

8.2.1 Mechanical Plant to Receiver

Detailed acoustic design of mechanical plant cannot be undertaken at approval stage, as plant selections and locations are not finalised. However, detailed acoustic assessment of all ventilation or other plant items should be undertaken at CC stage, once equipment items are selected and location is finalised.

Given the proposed buildings are remote from existing residential buildings, it is both possible and practical to treat noise from the operation of the proposed mechanical equipment to comply with the EPA NPfI criteria using standard acoustic treatments such as lined ductwork, silencers, screens and the like.

8.2.2 School Bell and Public Address Systems

School bell system/PA system, the system should minimise noise spill to adjacent properties.

- Speaker positioning/selection:
    - Speaker location and direction can be used to reduce noise spill to neighbouring properties while still maintaining suitable noise levels within the school grounds (typically 70-75dB(A)).
    - Broadly speaking, more speakers, closer to the noise receiver is a more effective way to provide coverage of external areas while reducing noise spill to neighbouring properties.
    - Similarly, highly directional speakers (angled downwards) will also reduce noise spill. Speakers with a drop of at least 5dB(A) for mid-frequencies noise for each 10 degrees in the horizontal plane outside of the coverage area should be considered.

8.3 TRAFFIC GENERATION

There are no on-site car parking spaces available in the school campus, only two car bays for delivery purposes. The school also has a 'kiss and ride' area allocated along Golden Grove Street where parents will be able to drop off their children. Some car bays which are existing along Golden Grove Street will be removed the accommodate the kiss and ride. No significant changes are proposed along Abercrombie Street.

Currently parents already drop off kids along Golden Grove. Given the distance to the nearest residential receiver is approximately 20m, with no change or increase in spaces to be used by parents dropping off or picking up school kids no significant impact from the pupil drop off bay is anticipated.

The primary period of traffic generation on Abercrombie street and Golden Grove Street is the AM drop off period (8:00-9:30am), and the PM pick up period (2:30-4:00pm).

The above traffic generation is almost identical to the existing traffic which is created by the existing school. Given all of the above, the traffic generation is unlikely to affect residence to the southern and western boundaries.

8.3.1 Traffic Noise Measurement

The traffic noise levels were determined based on the attended noise levels are presented below. Monitoring results are attached at the end of this report. In determination of acoustic treatment, the measured level is adjusted for distance, barrier attenuation and orientation.

Table 9 – Measured Traffic Noise Levels, dB(A) Leq

Location	Traffic Noise Level, dB(A)$L_{eq(worst\ 1hr)}$
	Day time 11am 12pm
Golden Grove Street	54
Abercrombie Street	54

8.4 WASTE REMOVAL

Waste would be stored near the northern boundary of the school adjacent to the preschool building The waste removal truck would park approximately 35 m from the nearest residential building. Waste removal times should time to occur between 7am and 6pm. This distance separation and the proposed time restrictions adequately address noise impact from waste removal operations.

8.5 EXTERNAL ACTIVITIES

The expected external school activities include:

- Use of all external spaces immediately before school commencing and recess/lunch periods.
- Use of courts for sports lessons during the normal school day, plus occasional afternoon and Saturday use for sports tournaments/competitions.

We note that the proposed new school outdoor play area includes a basketball court located at the northern end of the lot. The court is not part of this SSDA scope.

There are no criteria to be met regarding normal activities conducted by the school, nor is its assessment a specific requirement of the SEARS. The external spaces are separated from any existing and future by significant distance buffers, as well as, for the receivers to the west and north, screening from structures.

Noise emissions from the use of the outdoor play areas is predicted based on the following assumptions/information:

- Number of students:
    - Primary School – 415 Students Planned (Max 437)
- General Playground noise measurements:
    - Primary School - noise level per student of 83dB(A) (sound power level one in two students), based on measurements conducted Anzac Park Public School.
- All play areas in operation at once.

8.5.1 Predicted Noise Emissions

The most impacted residential receivers from general playground activity would be those to the north of the site having direct line of sight to parts of the playground and the courts. The remainder of the residential receivers would have much lower levels of noise exposure.

We note that the proposed new school outdoor play area includes a basketball court located at the northern end of the lot. This court is located in the same location as the existing court, and therefore no significant increase in noise impact from the use of the court is anticipated.

The predicted noise levels at the most impacted residential receivers to the north (Receiver 1: Regiment Building) are:

- General recess/lunch – 69dB(A) $L_{eq,15min}$

The predicted noise levels at the most impacted residential receivers to the north (Receiver 2: 118 – 132 Darlington Road) are:

- General recess/lunch – 66dB(A) $L_{eq,15min}$

The predicted noise levels exceed the rating background level by up to 16 dB(A). The level of impact at all other residences will be significantly lower due to the screening effects provide by the school buildings, and because of additional distance loss.

With respect to the above for playground use it is typical to apply a less stringent indicator of noise impact than "background + 5 dB(A)" given that it is present for short periods through the day and it is regarded as "community" noise.

However, in our opinion, the higher exceedances for the most exposed residences are not unreasonable for the following reasons:

- Noise from school playgrounds a noise source intended to be governed by documents such as the EPA Noise Policy for Industry (NPfI) 2017. It is common (and almost unavoidable) in school development that a playground is located in close proximity to residential development. In this regard we note that in *Meriden v Pedavoli [2009 NSWLEC 183]* the NSW Land and Environment Court noted "*All noise that emanates from the normal activities at a school is not offensive*". The Court had regard to the fact that there was other school development in the local government area in which playgrounds adjoin residential development and the fact the proposed use was permissible in the zone. This is consistent with the proposed development.

- As noted above, a playground located near a residential boundary is a common scenario in school developments. At the subject site, the main play areas are located well away from residential receivers.

- Given that there is already significant distance and barrier separation between the play areas and residences, the only way of minimising noise impact is to erect noise barriers around the school, However, these barriers have other negative impacts which, while technically feasible, may not be a reasonable response to a level of impact that typically occurs with schools placed within residential zonings and appears to be a generally accepted level of impact.

The school is existing, and is getting refurbished, and are therefore "play" noise is already part of the normal noise environment.

8.6 NON-SCHOOL USES, AND AFTER HOURS SCHOOL ACTIVITIES

After hour school activities would largely relate to use of the school hall as assessed above. There could also be other "quiet" activities that may occur externally or within the buildings that would not result in significant emissions. This would include parent/teacher nights, election activities, etc. Where music practice occurs within a school classroom outside of normal hours the windows of the rooms should be kept closed. External activities by non-school uses may include use of the external spaces and the hall as described in Table 2. The recommendations regarding the use of the hall by the school should also be adopted for these uses. Use of the COLA and basketball courts should be limited to 7am to 9pm.

9 OPERATIONAL VIBRATION EMISSION ASSESSMENT

There would be no vibration impact from the proposal as there would be no vibration sources that would produce perceptible vibration on any surrounding property.

- Peak hour traffic volumes in the Darlington public school proposed school expansion Traffic Assessment Transport and Traffic Planning Associates Report - 19043 dated May 2019

10 NOISE INTRUSION ASSESSMENT

The school is not impacted by any local environmental noise sources except local traffic on the surrounding streets. The most impacted buildings would be the western façade overlooking grove street as this façade would also experience traffic hum emanating from king street a near-by arterial road. Noise levels were calculated

The measured noise level along Golden Grove is 58dB(A)$L_{eq,wost\ 1hr}$ at the western building façade. If their traffic where to double with the increase in school capacity, the new traffic noise level will be 61dB(A)$L_{eq,worst\ 1hr}$. With the predicted noise level of 61 dB(A) $L_{eq,worst\ 1hr}$. with standard windows the noise level in the classrooms would be expected to be reduced by at least 20dB(A), meaning the 40dB(A) criterion would be achieved, providing the recommendations below are installed.

10.1 RECOMMENDED TREATMENT

The following is recommended to meet the recommended internal noise levels:

- The North, East and South facing windows of the proposed development at Darlington Public School is recommended to have a minimum of 10.38mm glass fitted into openable frames to give a minimum R_w of 35.
- All remaining facades, internally facing, are recommended to have a minimum of 6.38mm glass fitted into openable frames to give a minimum R_w of 31

10.2 WASTE REMOVAL

Waste would be stored near the preschool boundary adjacent to the northern most block of preschool classrooms. Waste removal times should be coordinated with the preschool to avoid child rest periods.

11 CONSTRUCTION NOISE ASSESSMENT

An assessment of likely construction noise impacts has been undertaken. The assessment includes:

- Identification of the noise and vibration guidelines which will be applicable to this project.
- Identification of potentially impacted nearby sensitive receivers.
- Identify likely sources of noise and vibration generation and predicted noise levels at nearby development.
- Formulation of a strategy to address the guidelines identified and including mitigation treatments

Construction works for the proposed school will consist primarily of three construction phases, namely site works/demolition, general construction activities and completion landscaping/external works. The proposal consists of one major building to be erected a three level structure.

There is no below ground/ basement levels proposed, meaning that significant excavation and piling will not be required. Construction works (and typical loudest plant/equipment) expected for the project are as follows:

- Cleaning of the site and earthworks to level the site as required and excavate for footings and services (excavators, pneumatic hammers)
- Erection of structure (powered hand tools for formwork, concrete pump, vibrators);
- Internal fit out
- Landscaping

Work hours for the site are proposed as follows:

- Monday to Friday: 7am – 6pm
- Saturday: 7:30am – 3:30pm*
- Sundays or Public Holiday No work.

*The proposed Saturday construction hours fall outside of the standard hours proposed by the INCG. This extension has been proposed to give workers more time to complete tasks such as disposal of contaminated waste which cannot be completed during school hours during the week.

11.1 RECIEVER LOCATIONS

Sensitive receiver locations please see site description and figure 1.

11.2 NOISE AND VIBRATION GUIDELINES

The EPA Interim Construction Noise Guideline (ICNG) assessment requires:

- Determination of noise management levels (based on ambient noise monitoring);
- Review of generated noise levels at nearby development;
- Recommendation of noise controls strategies when noise management levels are exceeded.

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- "Noise affected" level. Where construction noise is predicted to exceed the "noise affected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise affected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)Leq(15min).
- "Highly noise affected level". Where noise emissions are such that nearby properties are "highly noise affected", noise controls such as respite periods should be considered. For residential properties, the "highly noise affected" level occurs when construction noise exceeds 75dB(A)Leq(15min) at nearby residences.

The construction site will impact both residential and commercial receivers surrounding the site. However, commercial receivers have less stringent recommended management levels, and thus will be less impacted than the other residential receivers. Given this any noise mitigation needed to manage noise to the residential receivers will also adequately address noise to commercial receivers.

A summary of the above noise management levels from the ICNG is presented below.

With regards to the extended construction hours on Saturdays the same criteria applies as the extended hours still fall within the day time period (7:00am – 6:00pm) background noise level.

Table 10 – Noise Management Levels - Residential

Location	"Noise Affected" level – dB(A) $L_{eq(15min)}$	"Highly Noise Affected" Level – dB(A) $L_{eq(15min)}$
All Residential Receivers	55	75

If noise levels exceed the noise management levels identified above, reasonable and feasible noise management techniques will be reviewed

11.3 VIBRATION

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

- For structural damage vibration, German Standard DIN 4150-3 Structural Vibration: Effects of Vibration on Structures; and
- For human exposure to vibration, the evaluation levels presented in the British Standard BS 6472:1992 Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz) for low probability of adverse comment.

11.3.1 Structure Borne Vibrations (Building Damage Levels)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The vibration levels presented in DIN 4150-3 (1999-02) are detailed in Table 4. It is noted that the peak velocity is the value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 11 – DIN 4150-3 (1999-02) SAFE LIMITS FOR BUILDING VIBRATION

Type of structure		PEAK PARTICALE VELOCITY (MMS^{-1})			
		At Foundation at a frequency			Plane of Floor of Uppermost Storey
		<10Hz	*10Hz to 50Hz*	*50Hz to 100Hz*	*All Frequencies*
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under preservation order)	3	3 to 8	8 to 10	8

The surrounding residential buildings would be considered a Type 2 structure.

11.3.2 Assessing amenity

The NSW EPA document "assessing Vibration: A technical Guideline" provides procedures for assessing tactile vibration and regenerating noise within potentially affected buildings and is used in the assessment of vibration impact on amenity. Relevant vibration levels are presented below.

Table 9 – EPA Recommended Vibration Levels

		RMS Acceleration (m/s^2)		RMS velocity (mm/s)		Peak Velocity (mm/s)	
Place	**Time**	**Preferred**	**Maximum**	**Preferred**	**Maximum**	**Preferred**	**Maximum**
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices		0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices		0.64	1.28	13.0	26.0	18.0	36.0
Workshops		0.64	1.28	13.0	26.0	18.0	36.0

11.4 ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE SOURCES

Typically, the most significant sources of noise or vibration generated during a construction project will be demolition, ground works and building structure works. the following table presents assessment noise levels for typical construction equipment expected to be used during the construction of the proposal.

Table 12 – Sound Power Levels of the Typical Equipment

Equipment/ Process	Sound Power Level dB(A)*
Dozer/Excavator	112
Concrete Pump	110
Trucks	100
Bobcat	105
Crane (Electric)	85
Powered Hand Tools	95-100

The noise sources presented in the table above are derived from the following sources, namely;

- Table A1 of the Australian Standard 2436-2010/
- Data held by this office from other similar studies.

Noise levels take into account correction factors (for tonality, intermittency where necessary)

11.5 NOISE PREDICTIONS

The predicted noise levels during excavation and construction will depend on:

- The activity undertaken.
- The distance between the work site and the receiver. The distance between the noise source and the receiver will vary depending on which end of the site the work is undertaken. For this reason, the predicted noise levels will be presented as a range.

Predicted noise levels are presented in the following tables. Predictions take into account the expected noise reduction as a result of distance only.

Table 13 – Predicted Noise Generation to Residential Receivers North of Site

Activity	Predicted Level dB(A) $L_{eq(15min)}$ (External)
Dozer/Excavator	75-83
Concrete Pump	80-88
Trucks	65-73
Bobcat	70-78
Crane/hoist (electric)	65-73
Powered hand tools (Externally)	54-62

Table 14 – Predicted Noise Generation to Residential Receivers West of the Site.

Activity	Predicted Level dB(A) $L_{eq(15min)}$ (External)
Dozer/Excavator	62-70
Concrete Pump	62-70
Trucks	57-65
Bobcat	62-70
Crane/hoist (electric)	57-65
Powered hand tools (Externally)	46-54

Table 15 – Predicted Noise Generation to Residential Receivers East of the Site.

Activity	Predicted Level dB(A) $L_{eq(15min)}$ (External)
Dozer/Excavator	63-74
Concrete Pump	63-74
Trucks	58-69
Bobcat	63-74
Crane/hoist (electric)	58-69
Powered hand tools (Externally)	47-58

Table 16 – Predicted Noise Generation to Residential Receivers South of the Site.

Activity	Predicted Level dB(A) $L_{eq(15min)}$ (External)
Dozer/Excavator	62-70
Concrete Pump	62-70
Trucks	57-65
Bobcat	62-70
Crane/hoist (electric)	57-65
Powered hand tools (Externally)	46-54

11.6 DISCUSSION – NOISE

Without mitigation noise at the sensitive receivers around the site will exceed the NML, and in some cases the HNML.

Therefore, "reasonable and feasible" mitigation should be applied in accordance with the "control of construction Noise and Vibration – Procedural Steps" outlined below.

11.7 DISCUSSION – VIBRATION

There are no significant sources of vibration envisaged.

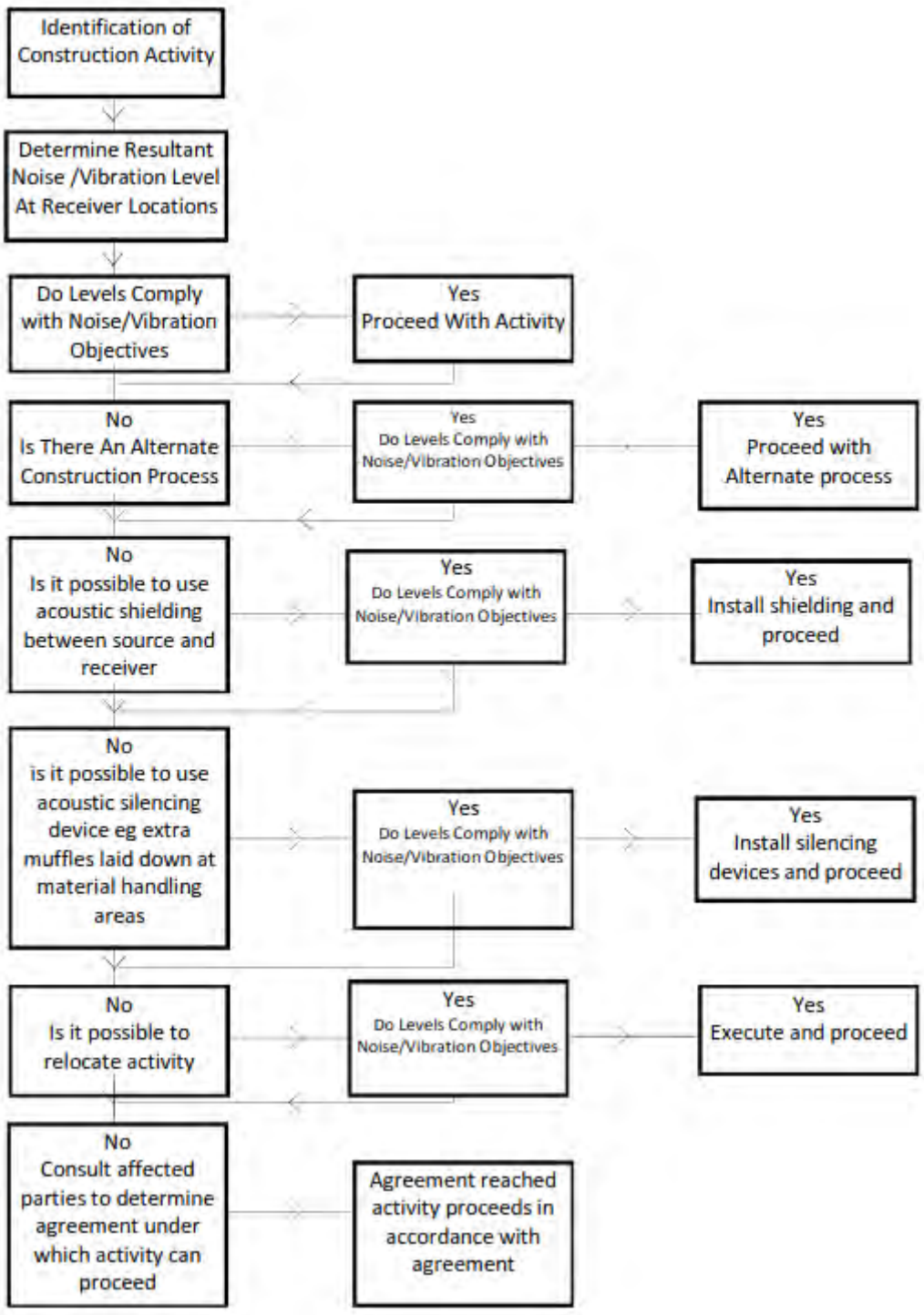
11.8 RECOMENDATIONS

In light of the above, the following recommendations are made to reduce construction noise activities during standard construction hours as well as extended construction hours proposed on Saturdays:

- Operation of large earthmoving equipment (bulldozers and Excavators) should not be operational until 8am.
- Quiet work methods/technologies:
    - The primary noise generating activity at the site will be the ground work period. As much as practicable, use of quieter methods should be adopted.
    - Concrete pumps should be located within bounds of the site (rather than on nearby roads at the perimeter of the site) where possible. We note however, given site constraints concrete pumps may need to be located on the road. Where this is required the concrete pump is to be located on the side of the road closest to site.
    - Materials handling/vehicles:
        - Trucks and bobcats to use a non-tonal reversing beacon (subject to OH&S requirements) to minimise potential disturbance of residential receivers.
        - Avoid carless dropping of construction materials into empty tucks. (i.e. ensure works are placing materials, not throwing them).
        - Trucks, trailers and concrete trucks (if possible) should turn off their engines during idling to reduce noise impacts
- In respect of pneumatic/hydraulic hammering (if required) noise impacts should be addressed via the imposition of respite periods, typically limiting operation to:
    - 9am -12pm, Monday to Friday
    - 3pm – 5pm, Monday to Friday; and
    - 9am to 12pm, Saturday
- Noisy activities (exceeding the NML) should not be carried out after 1pm Saturdays.
- Complaints handling - In the event of complaint, the procedures outlined in Sections 11.9, 11.10 and the applicable construction management plan should be adopted.
- A detailed noise management plan should be developed by the main contractor that describes in detail the construction phases, programme, processes and equipment used, noise impact assessment and proposed mitigation and management.
- Site induction:
    - A copy of the noise management plan is to be available to contractors. The location of the noise Management plan should be advised in any site induction.
    - Site induction should also detail the site contact is to be notified in the event of a noise complaint.

11.9 CONTROL OF CONSTRUCTION NOISE AND VIBRATION – PRCEDURAL STEPS

The flow chart presented below illustrates the process that will be followed in assessing construction activities.



11.10 ADDITIONAL NOISE AND VIBRATION CONTROL METHODS

In the event of complaints, there are a number of noise mitigation strategies available which can be considered.

The determination of appropriate noise control measures will be dependent on the particular activities and construction appliances. This section provides an outline of available methods.

11.10.1 Selection of Alternate Appliance or Process

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. Undertaking this activity using bulldozers, ripping and/or milling machines will result in lower noise levels. This measure has the potential to reduce noise emissions by 10 dB(A) or more.

11.10.2 Acoustic Barriers

Given the position of the project site and receivers, it is unlikely that noise screens will provide significant acoustic benefit for the receivers but will provide noticeable improvement for those on ground level.

The placement of barriers at the source is generally only effective for static plant. Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.

The degree of noise reduction provided by barriers is dependent on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dB(A) can be affected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood (radiata plywood) would be acceptable for the barriers.

11.10.3 Material Handling

The installation of rubber matting over material handling areas can reduce the sound impacts due to material being dropped by up to 20dB(A).

11.10.4 Treatment of Specific Equipment

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

11.10.5 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. A more detailed management plan will be developed for this project in accordance to the construction methodology outlining work procedures and methods for minimising noise.

11.10.6 Combination of Methods

In some cases, it mat be necessary that two or more control measures be implemented to minimise noise.

11.11 ADDRESSING COMPLAINTS

Should ongoing complaints of excessive noise or vibration levels occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices.

If a noise complaint is received the complaint should be recorded. Any complaint form should list:

The name and address of the complainant (if provided);

- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action; and
- Summary of feedback to the complainant.

A permanent register of complaints should be held.

12 SUMMARY OF RECCOMENDATIONS

We recommend the following acoustic treatments/management controls are implemented to mitigate acoustic impact as much as practicable:

- Operation of the school should be limited to the activities and times of operation indicated in table 2 of this report, subject to additional mitigation of noise for certain activities and operation and times as indicated below.
- Detailed acoustic review of all external plant items should be undertaken following equipment selection and duct layout design. All plant items will be capable of meeting noise emission requirements of Council and the EPA Noise Policy for Industry (2017), with detailed design to be done at CC stage.
- External speakers for PA and bells should designed to minimise noise spill, be directional facing away from residential receivers to comply with EPA Noise Policy for Industry (2017) guidelines (refer Sections 6.2.1 and 7.2).
- Waste removal times should be scheduled between 7am and 6pm and co-ordinated with the Preschool to avoid child rest periods.
- The proposal would not produce adverse vibration impacts on nearby structures or impact the amenity of the surrounding properties.
- Construction noise impacts should be managed as outlined in Section 10.8.

13 CONCLUSION

Noise emissions associated with the proposed redevelopment of Darlington Public School, Darlington have been assessed with reference to relevant EPA and relevant acoustic guidelines

The following noise emission sources have been addressed:

- Noise from internal areas
- Noise from PA system and school bell
- Traffic generation
- Waste removal
- External activities
- Construction activities

Recommendations have been made to ensure that noise emissions from the school do not adversely impact the surrounding properties.

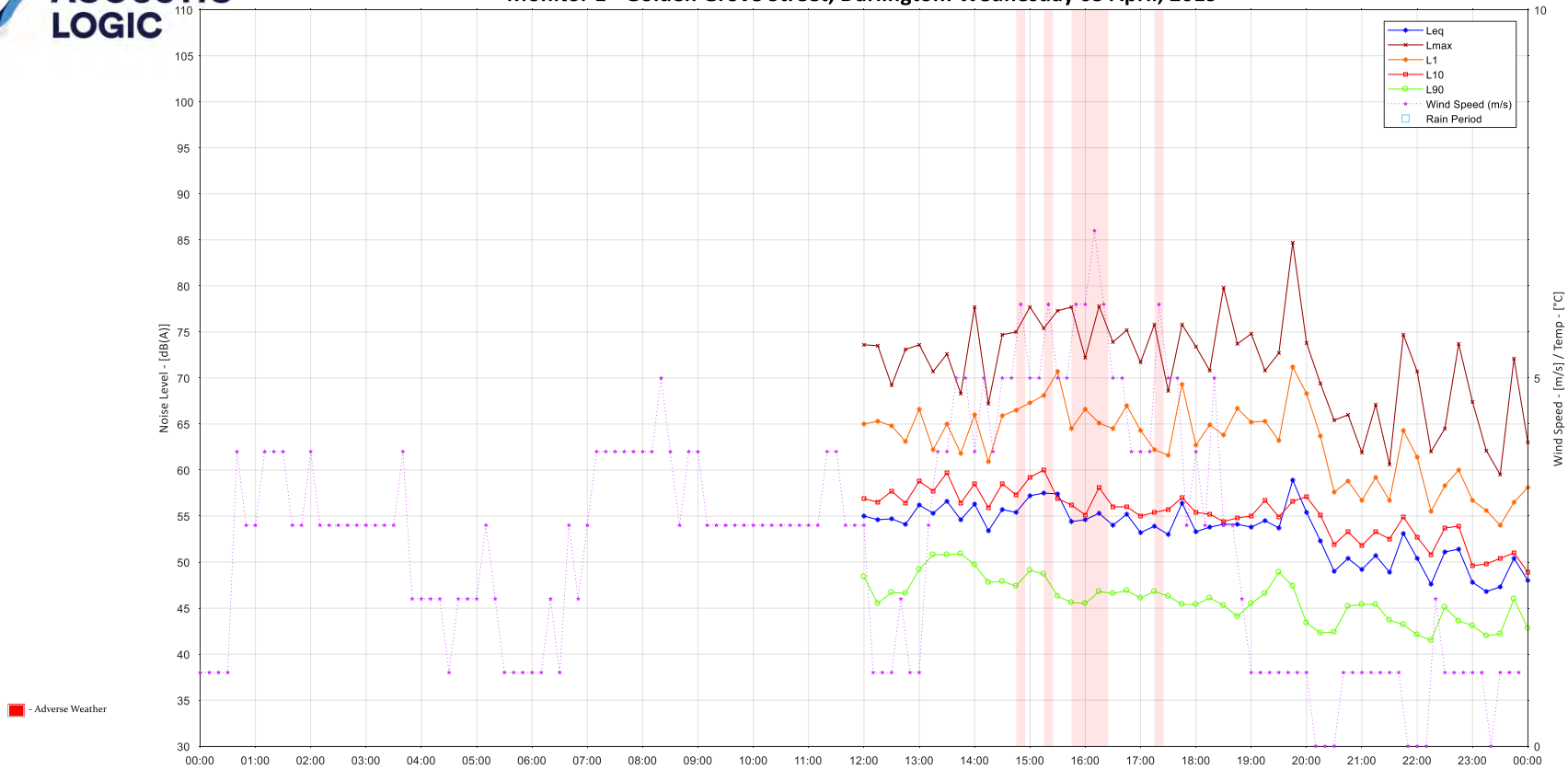
Please contact us should you have any further queries.

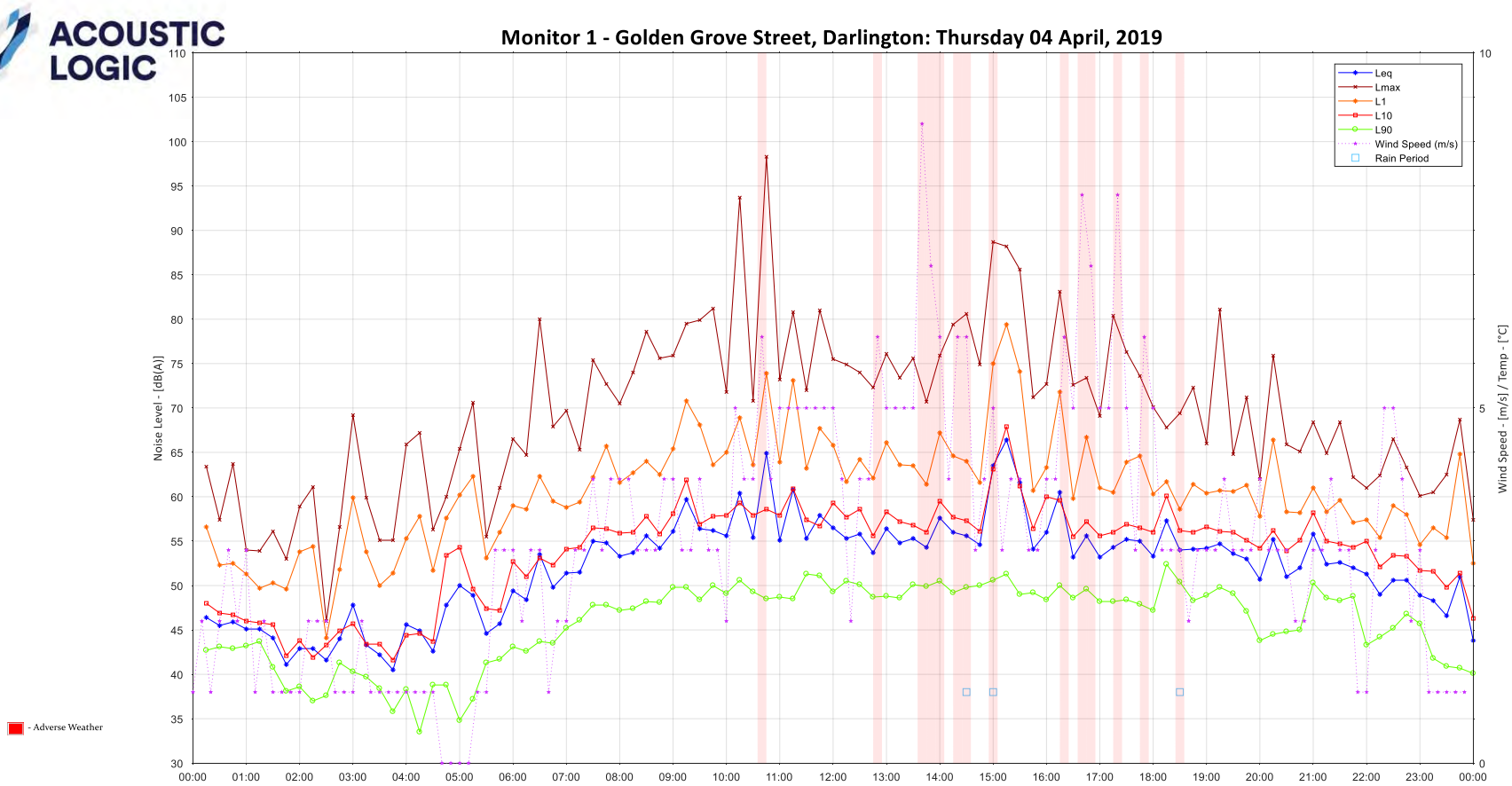
Yours faithfully,

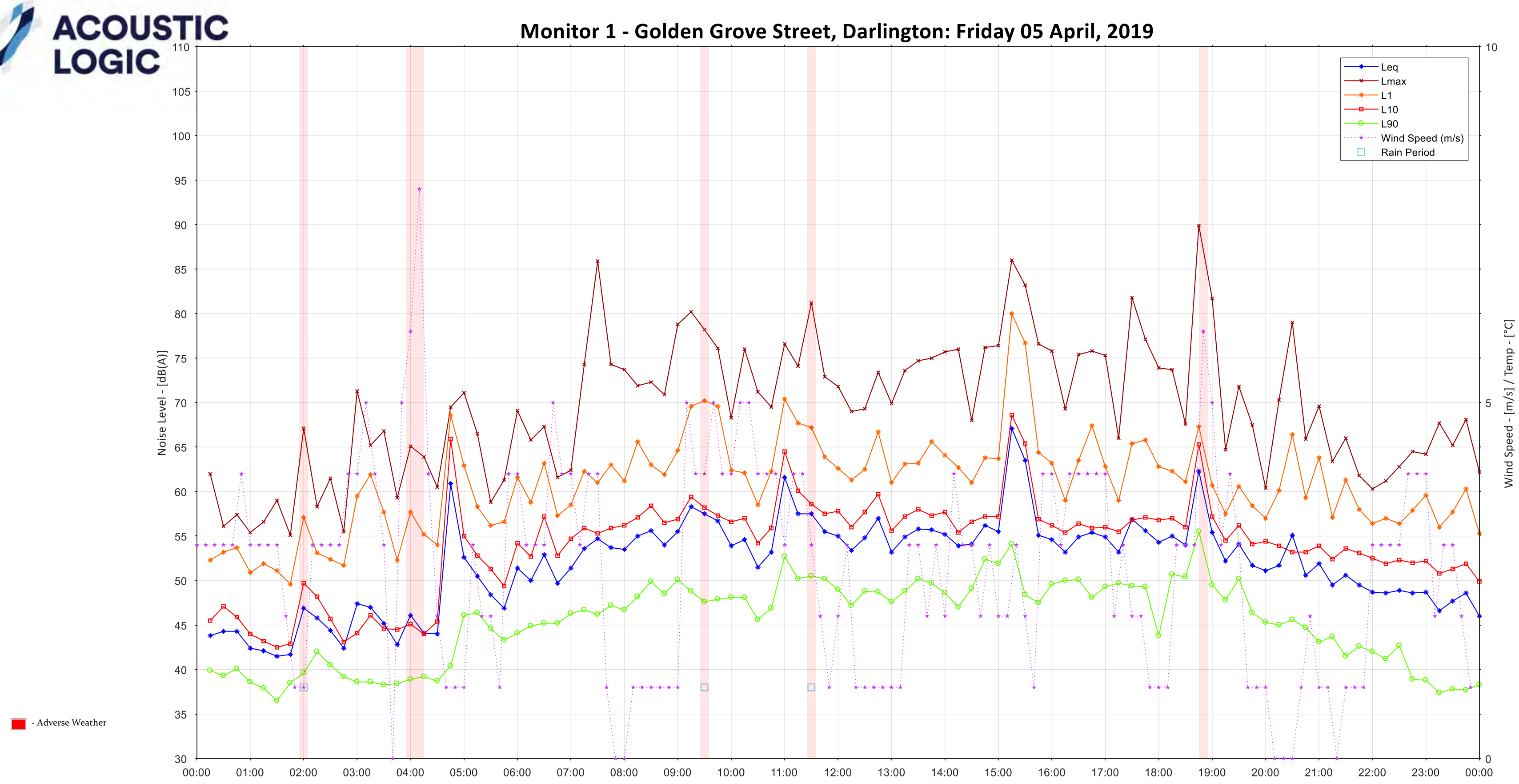
Acoustic Logic Consultancy Pty Ltd
Jenna MacDonald

APPENDIX ONE:
UNATTENDED NOISE MONITORING DATA

Monitor 1 - Golden Grove Street, Darlington: Wednesday 03 April, 2019




Monitor 1 - Golden Grove Street, Darlington: Thursday 04 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather


Monitor 1 - Golden Grove Street, Darlington: Friday 05 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
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Lmax
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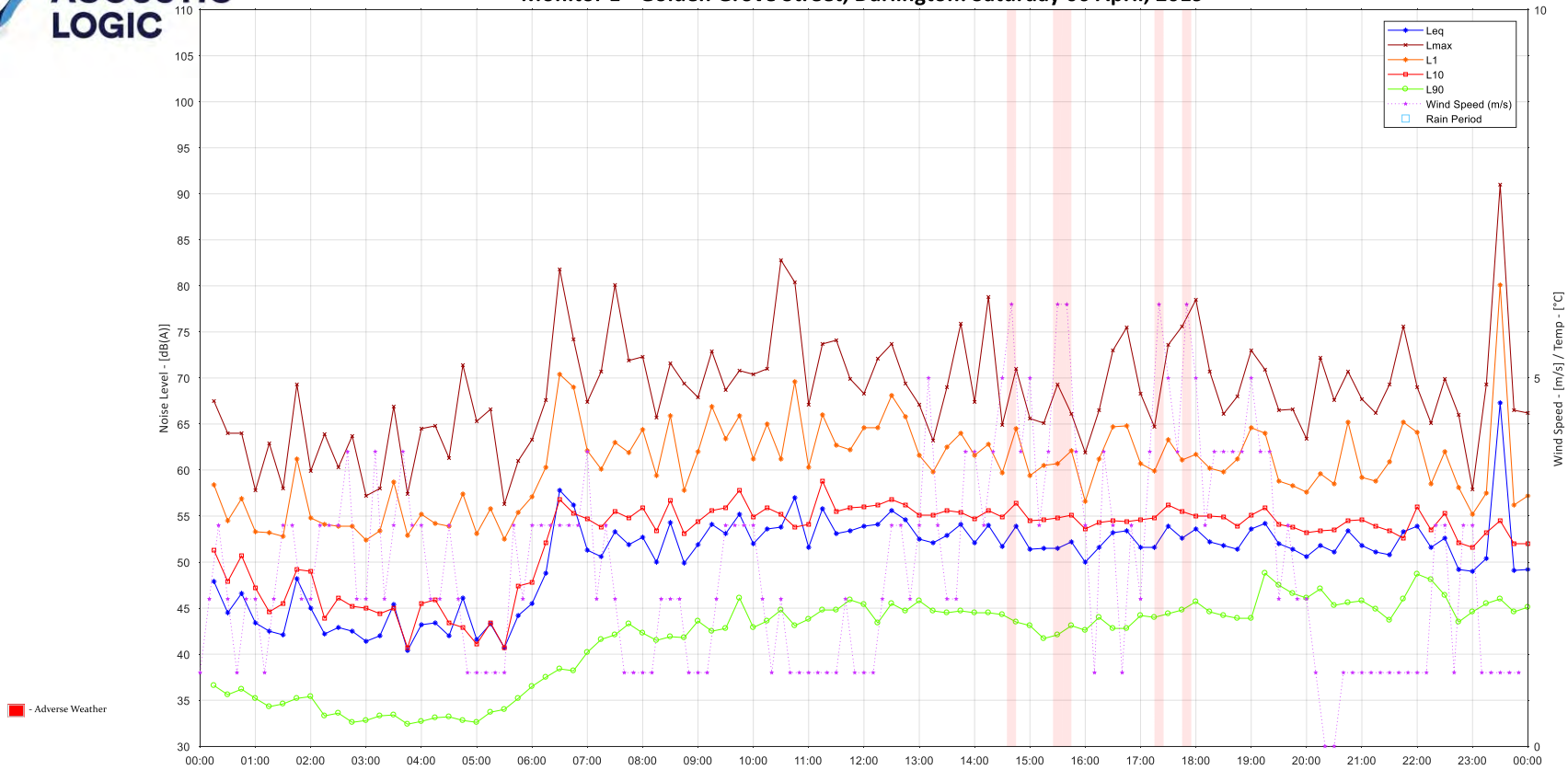
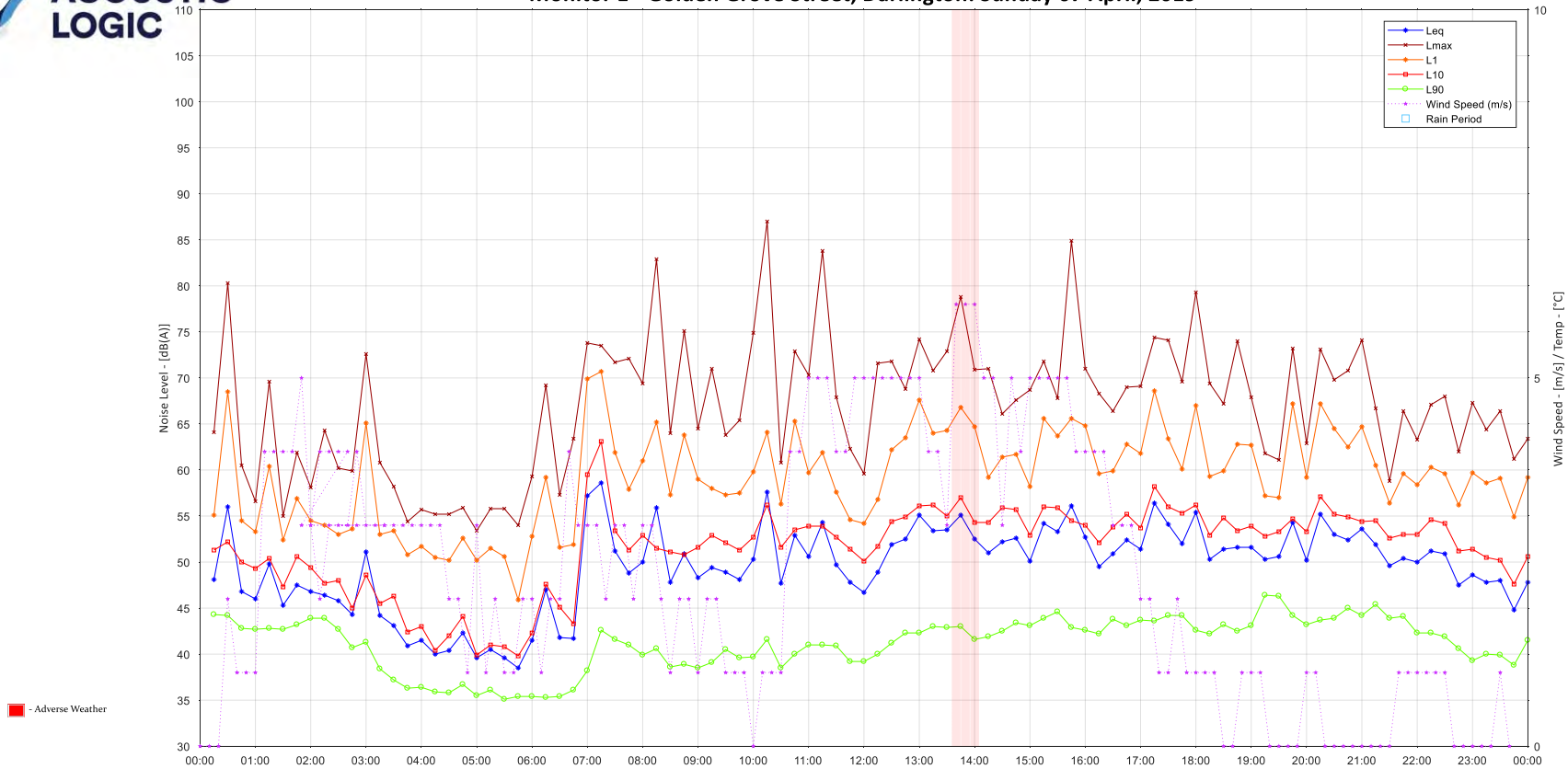
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather

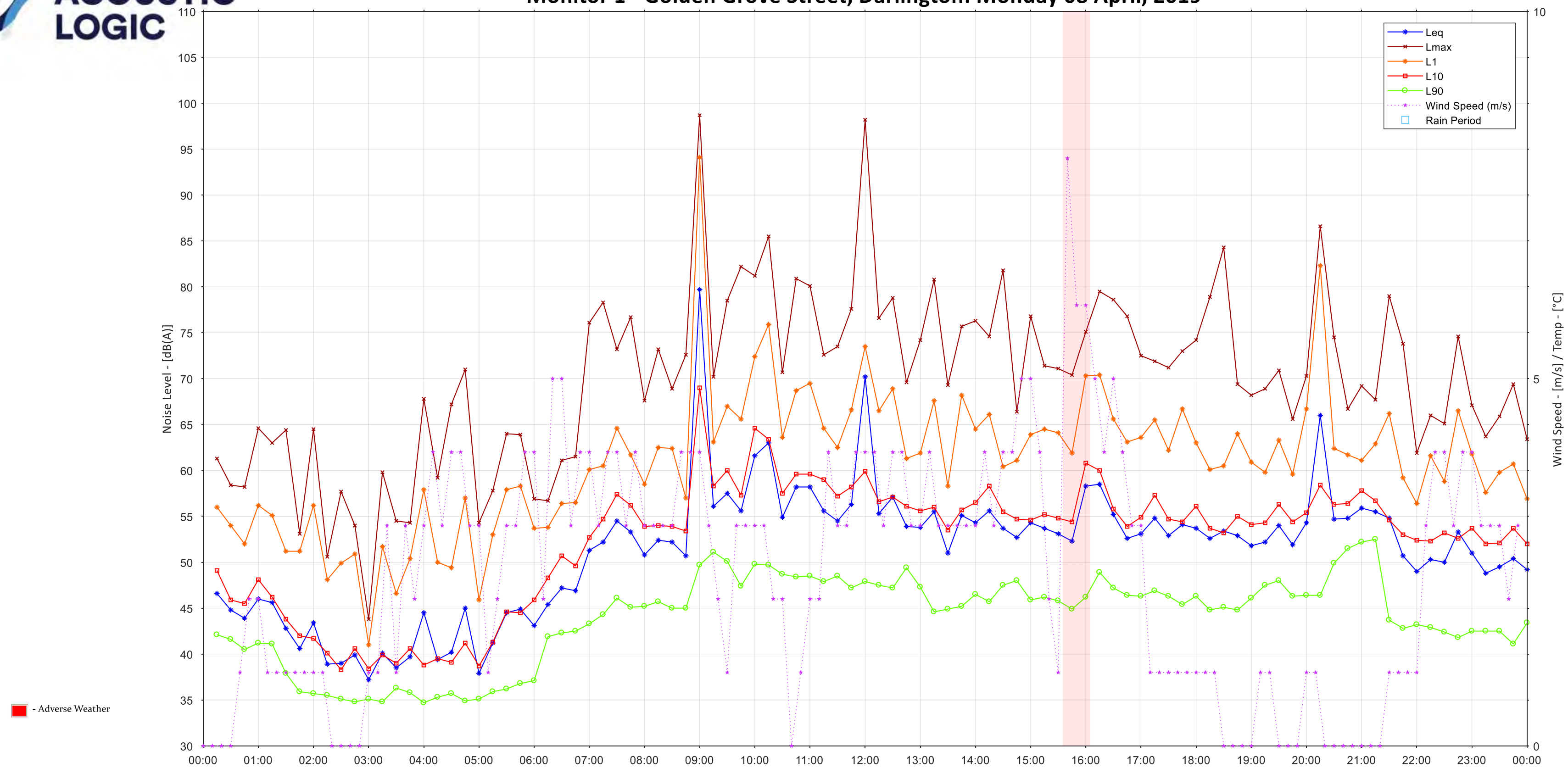

Monitor 1 - Golden Grove Street, Darlington: Saturday 06 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather

Monitor 1 - Golden Grove Street, Darlington: Sunday 07 April, 2019

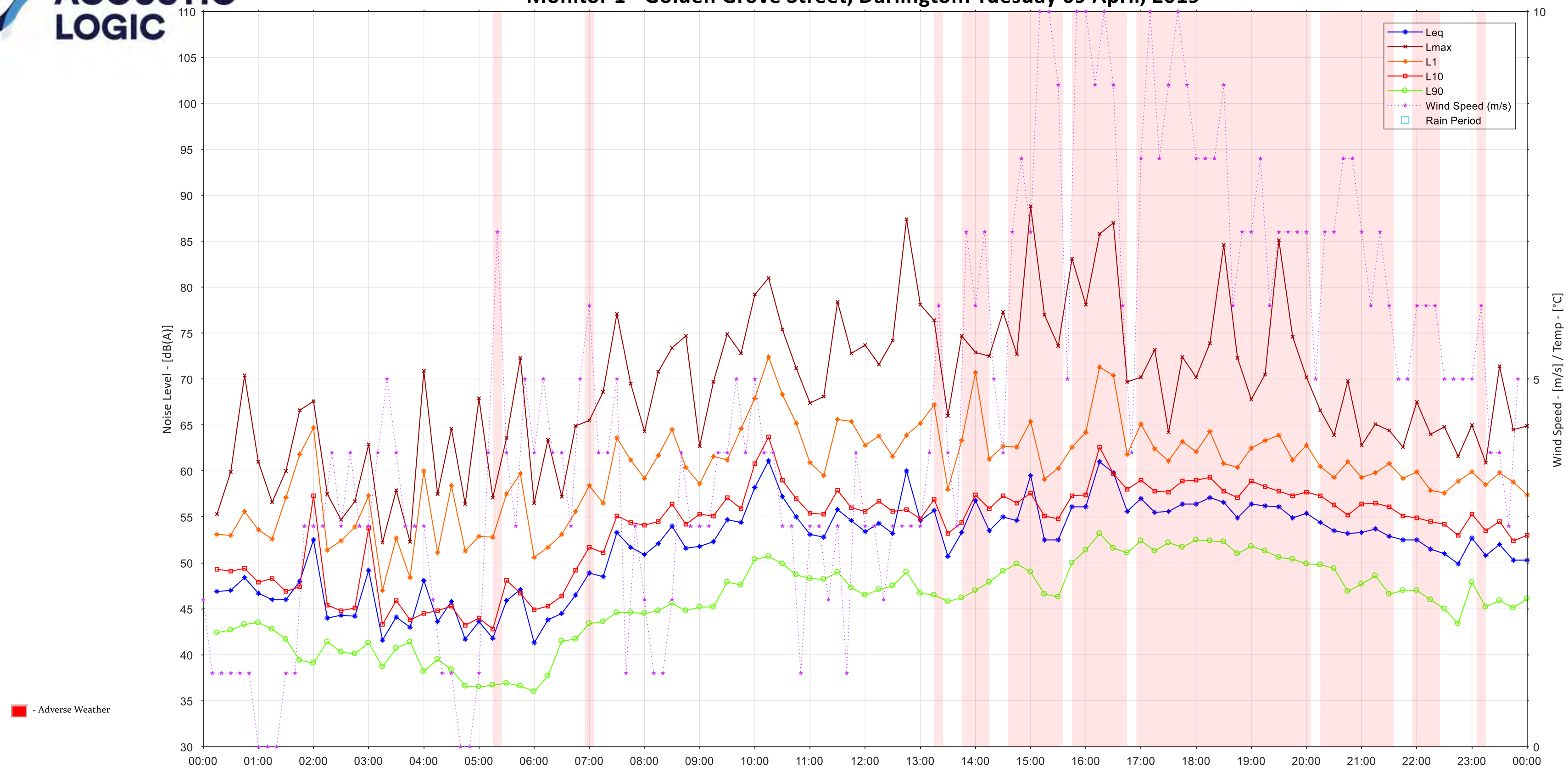


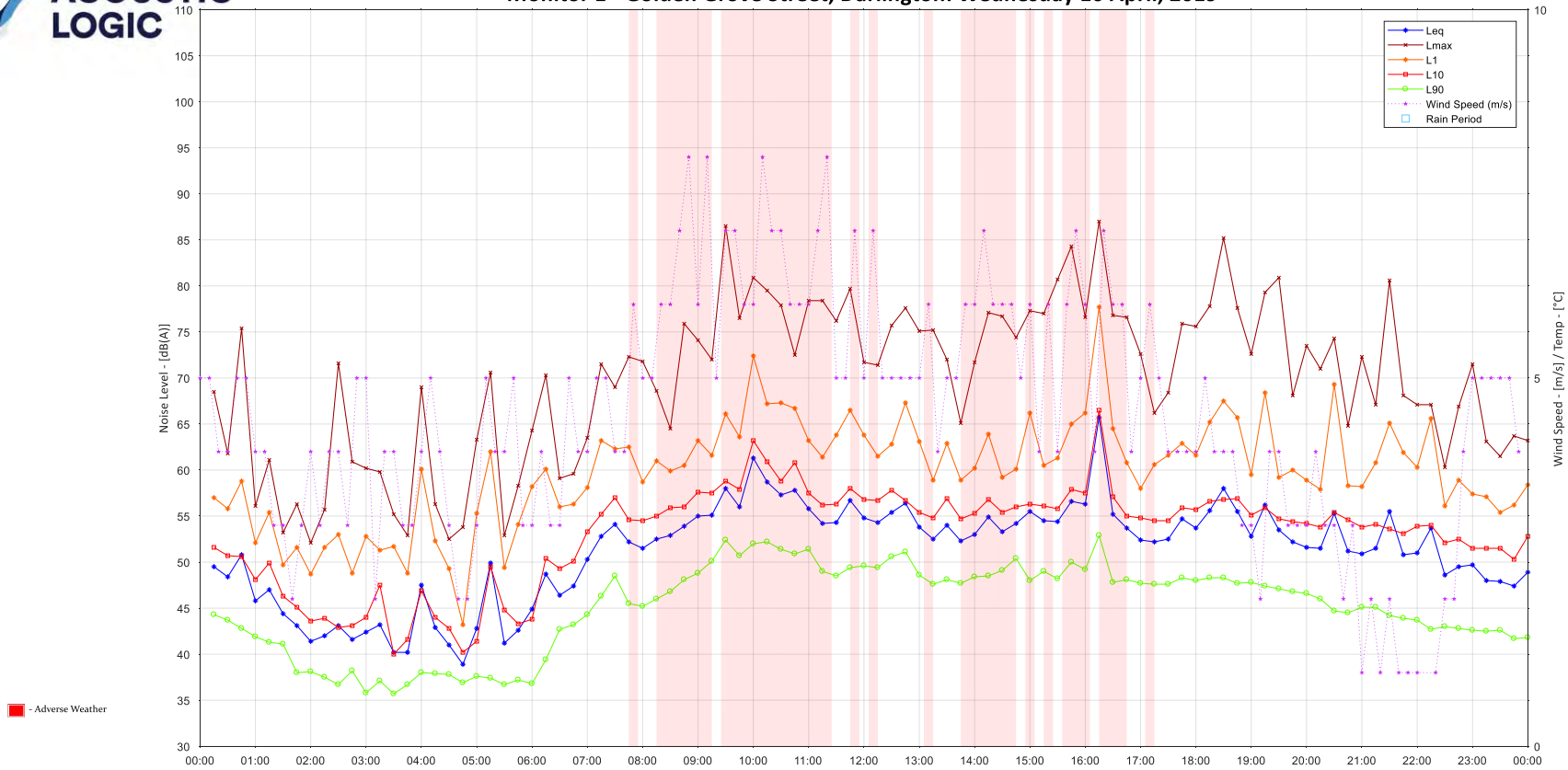
- Adverse Weather

Monitor 1 - Golden Grove Street, Darlington: Monday 08 April, 2019

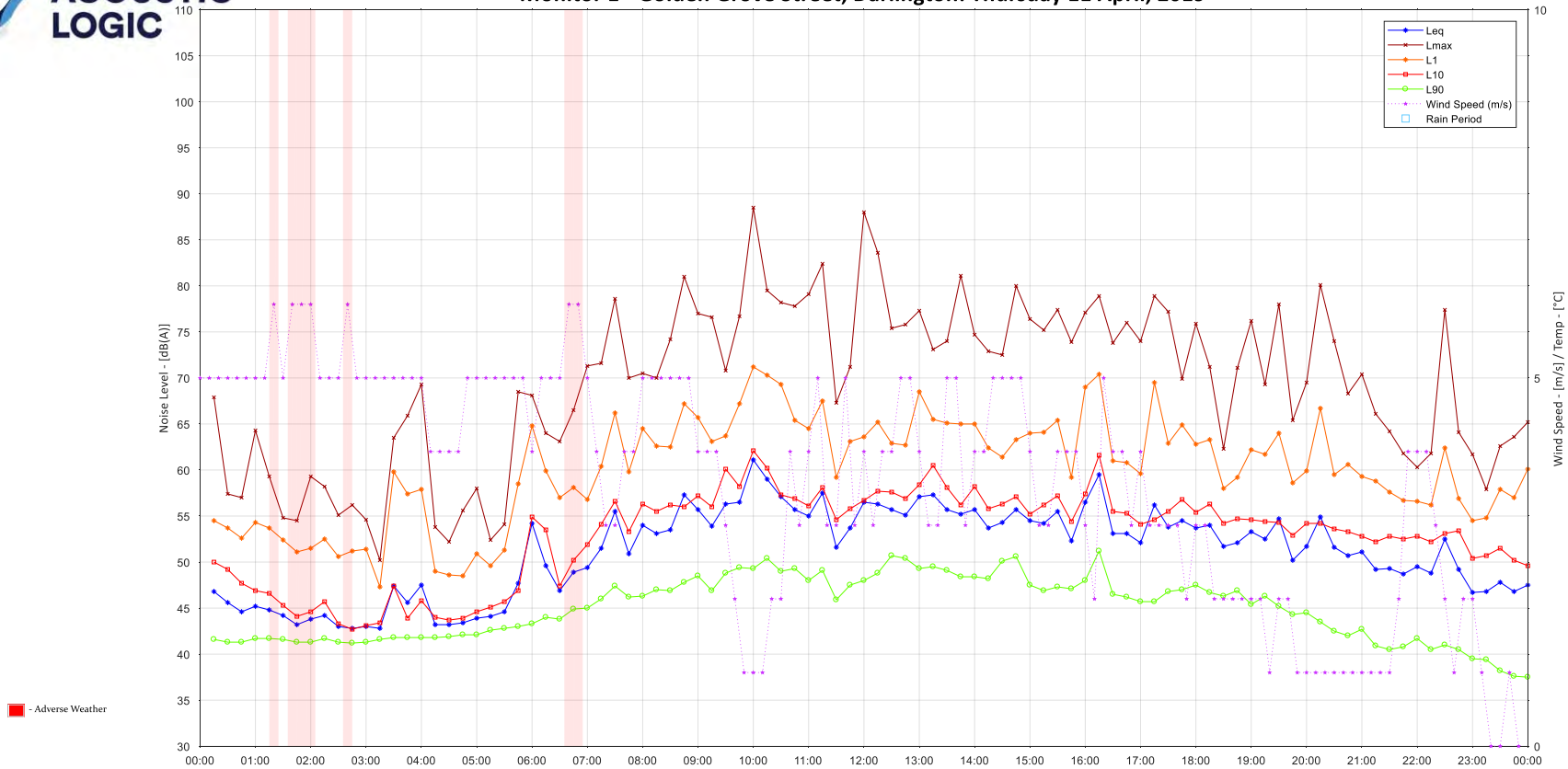


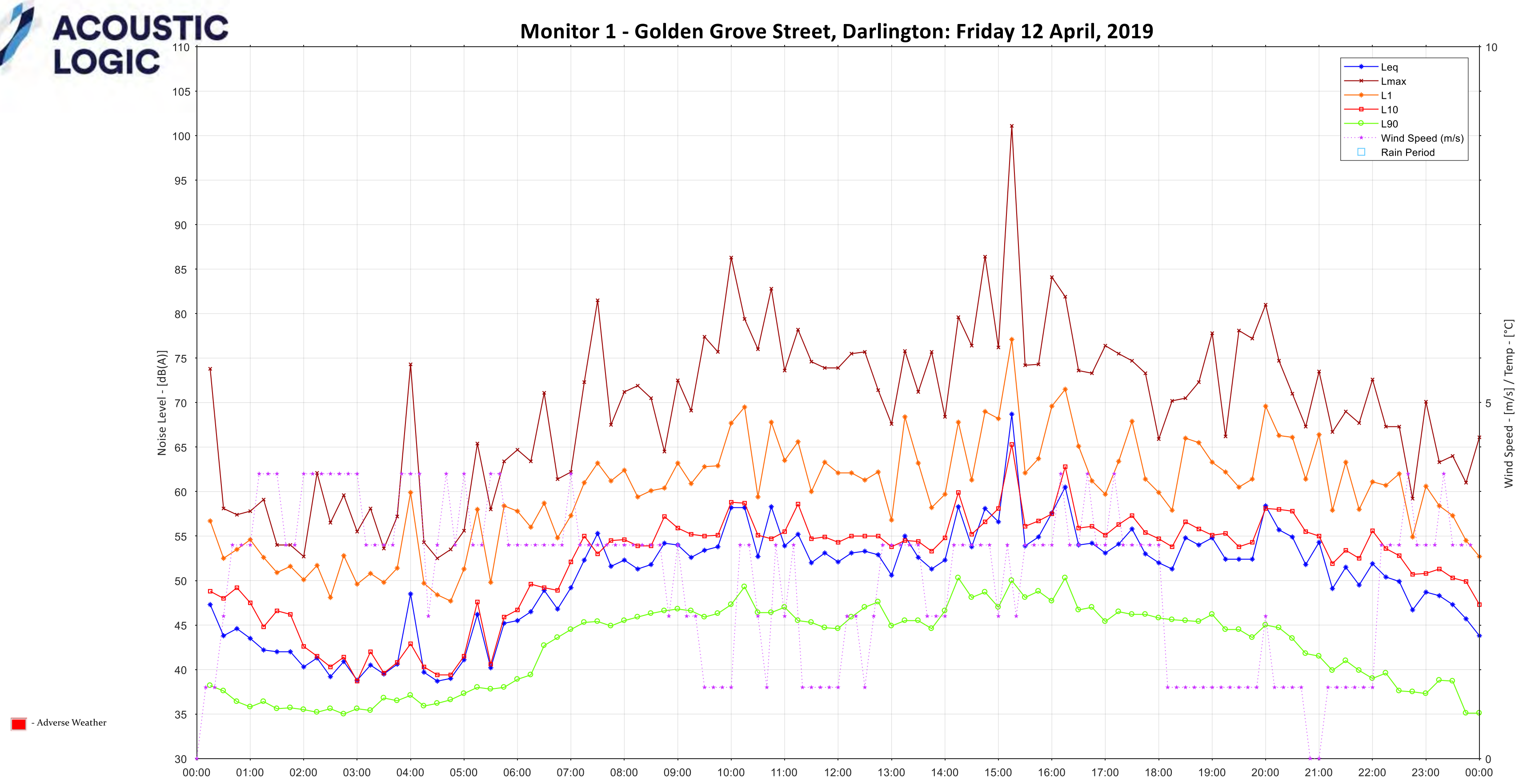
Monitor 1 - Golden Grove Street, Darlington: Tuesday 09 April, 2019




Monitor 1 - Golden Grove Street, Darlington: Wednesday 10 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather

Monitor 1 - Golden Grove Street, Darlington: Thursday 11 April, 2019





Monitor 1 - Golden Grove Street, Darlington: Friday 12 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
00:00
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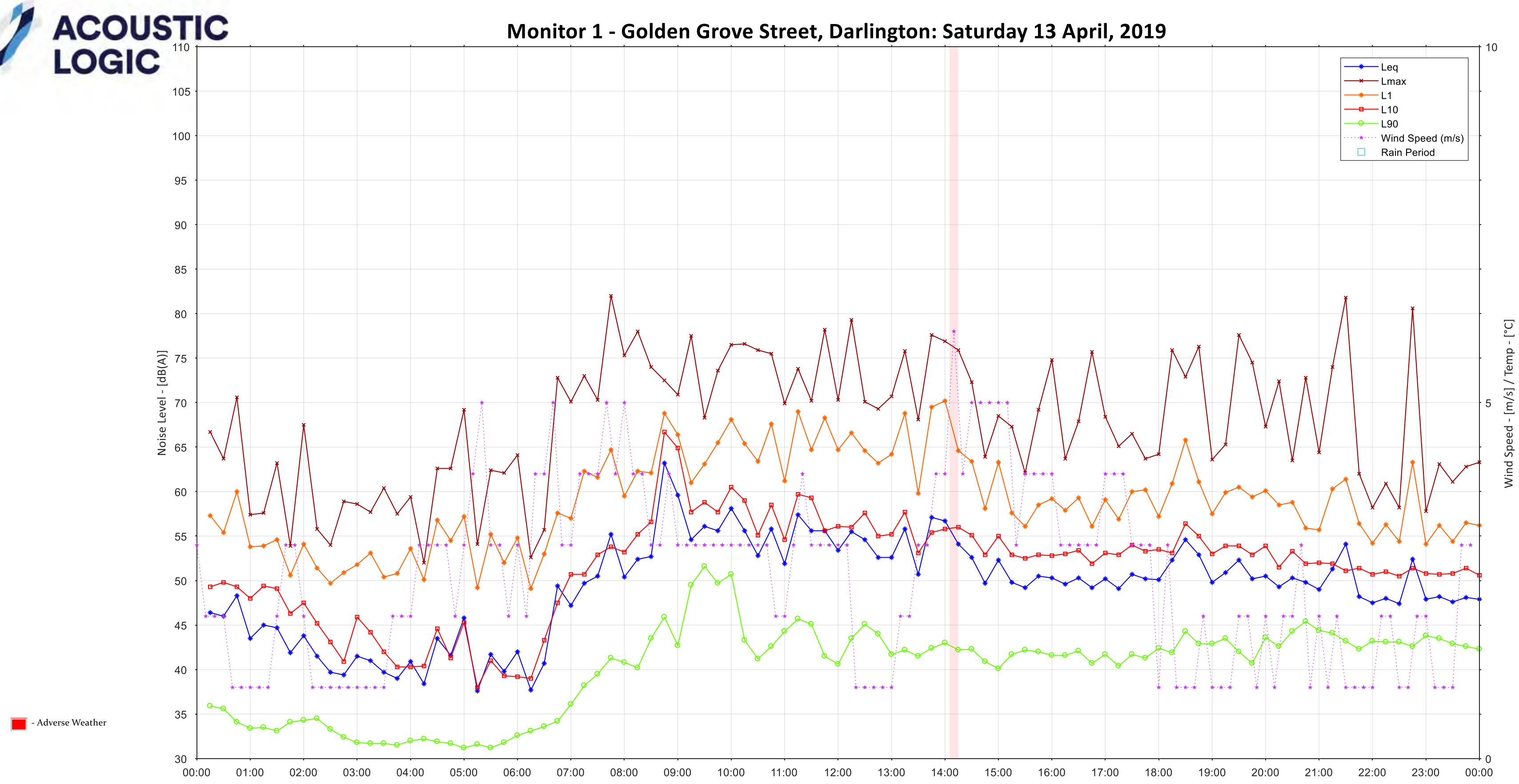

Monitor 1 - Golden Grove Street, Darlington: Saturday 13 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
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Lmax
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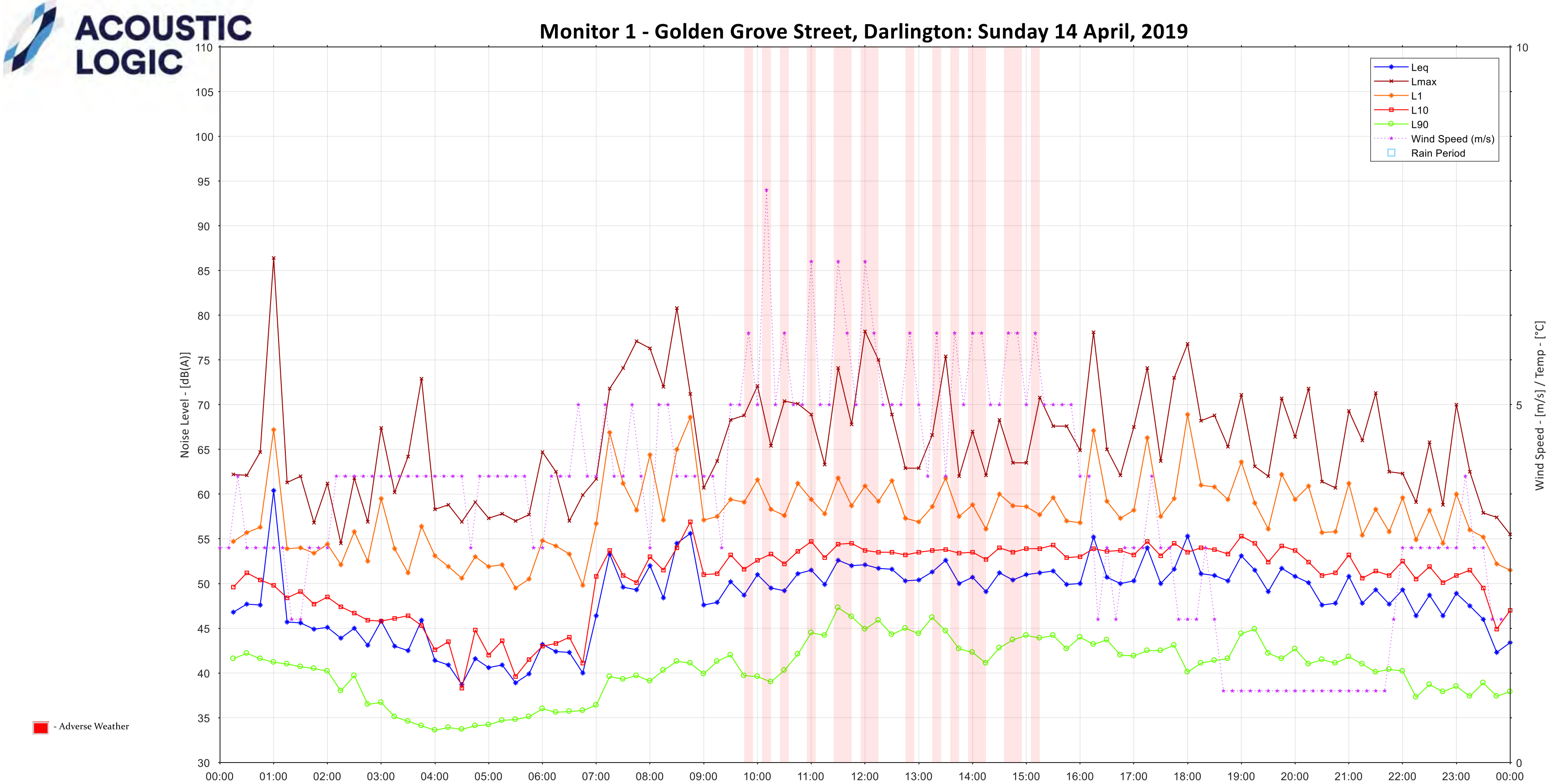
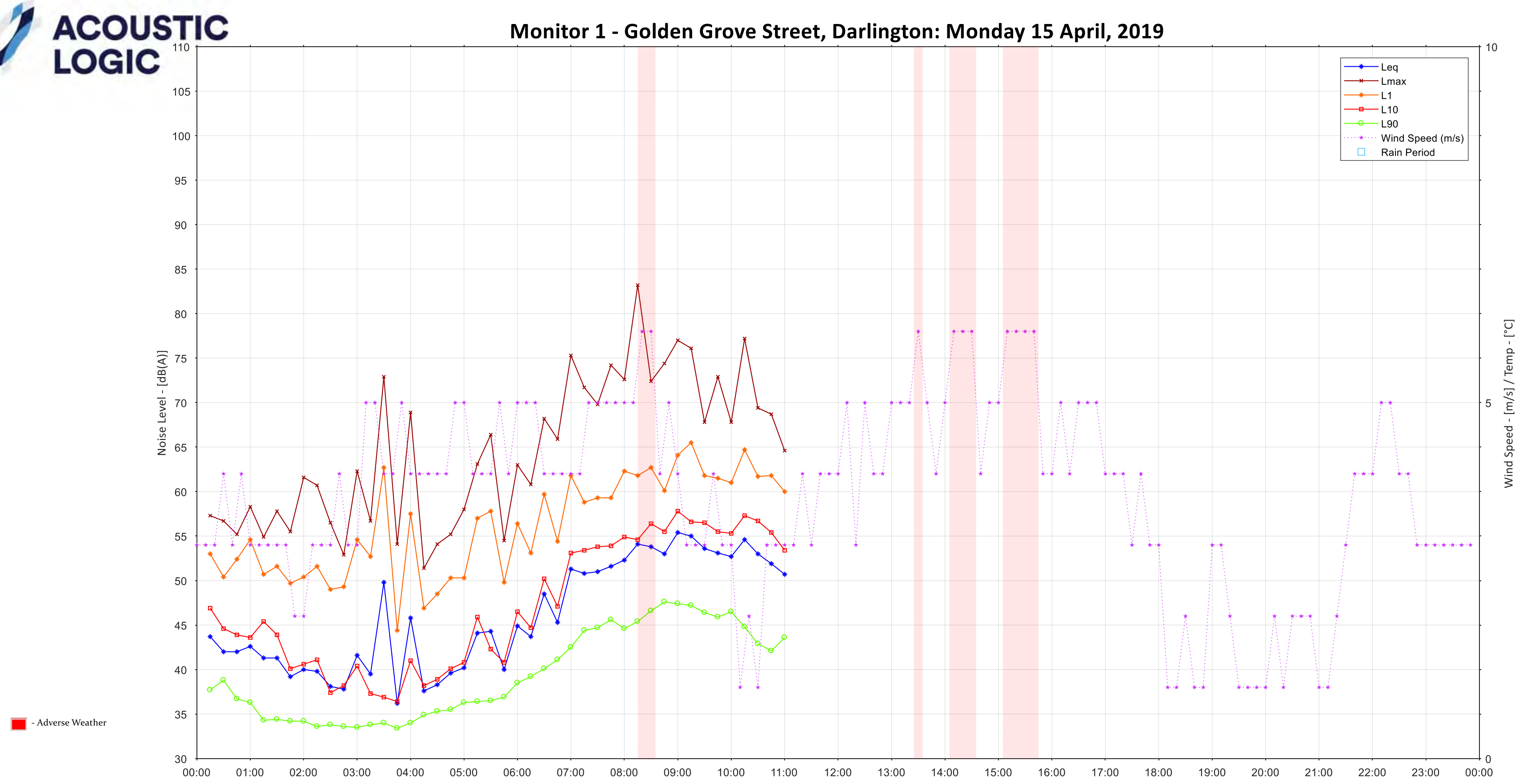
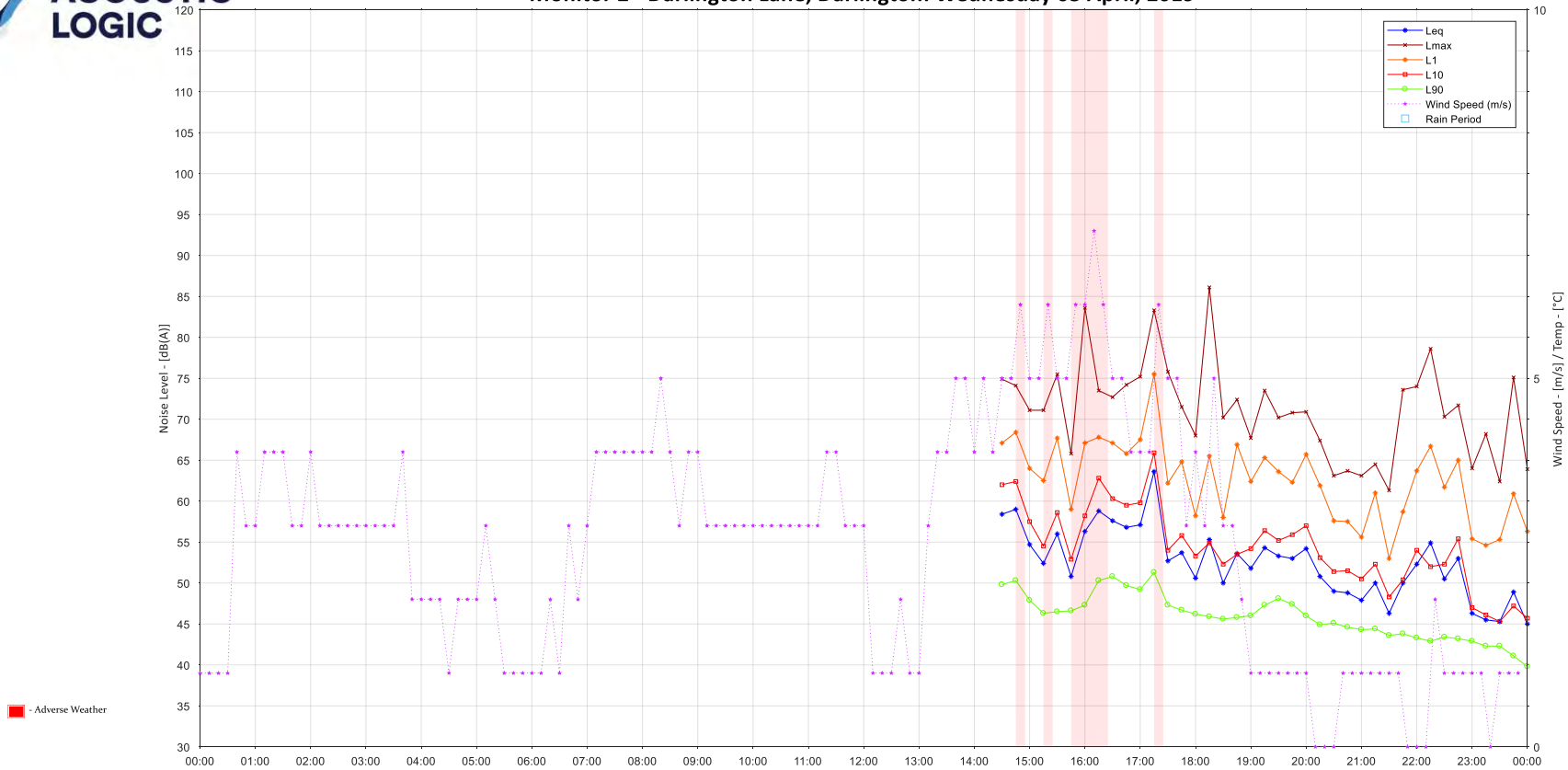
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather

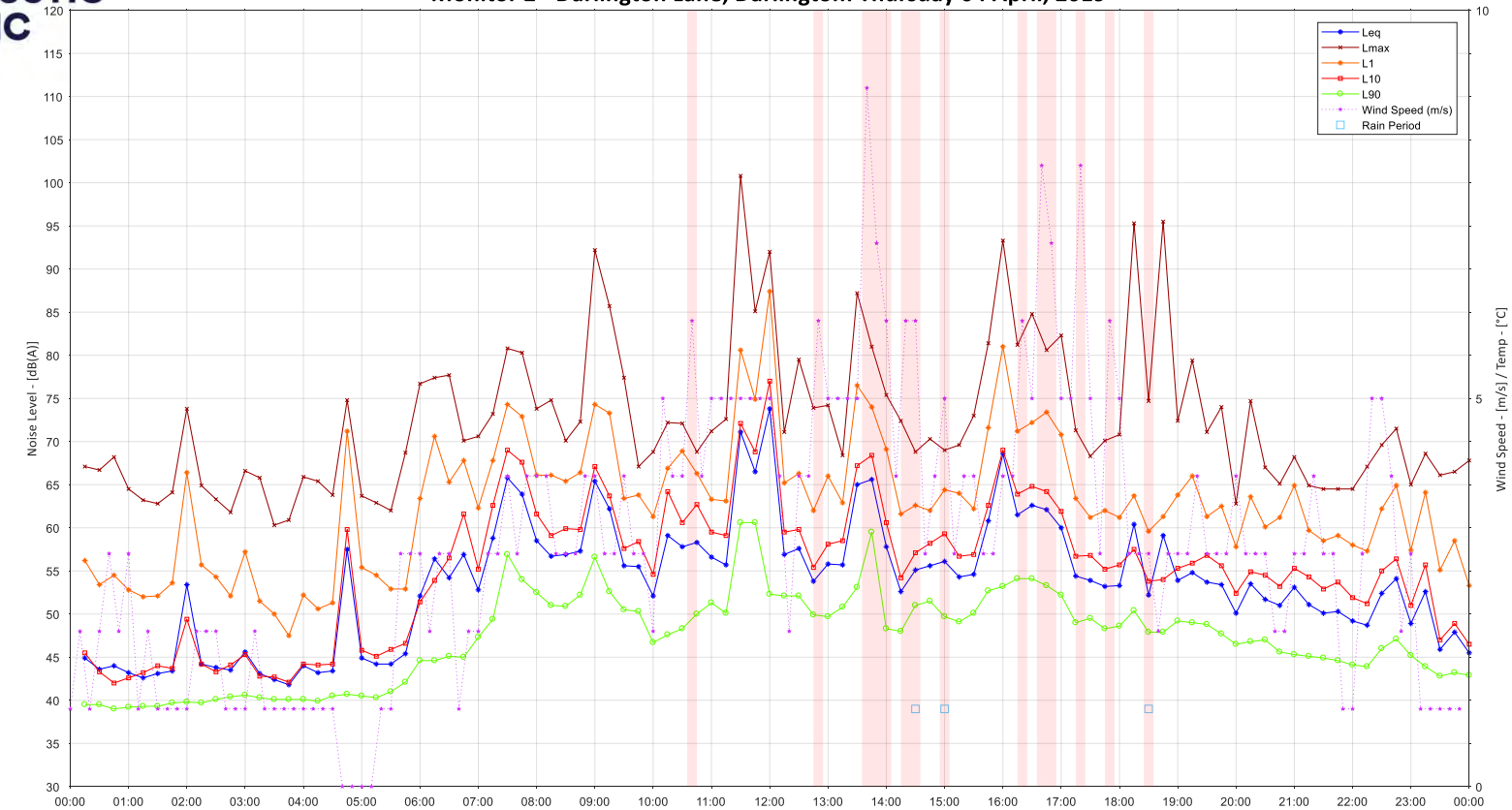

Monitor 1 - Golden Grove Street, Darlington: Sunday 14 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 00:00


Monitor 1 - Golden Grove Street, Darlington: Monday 15 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather

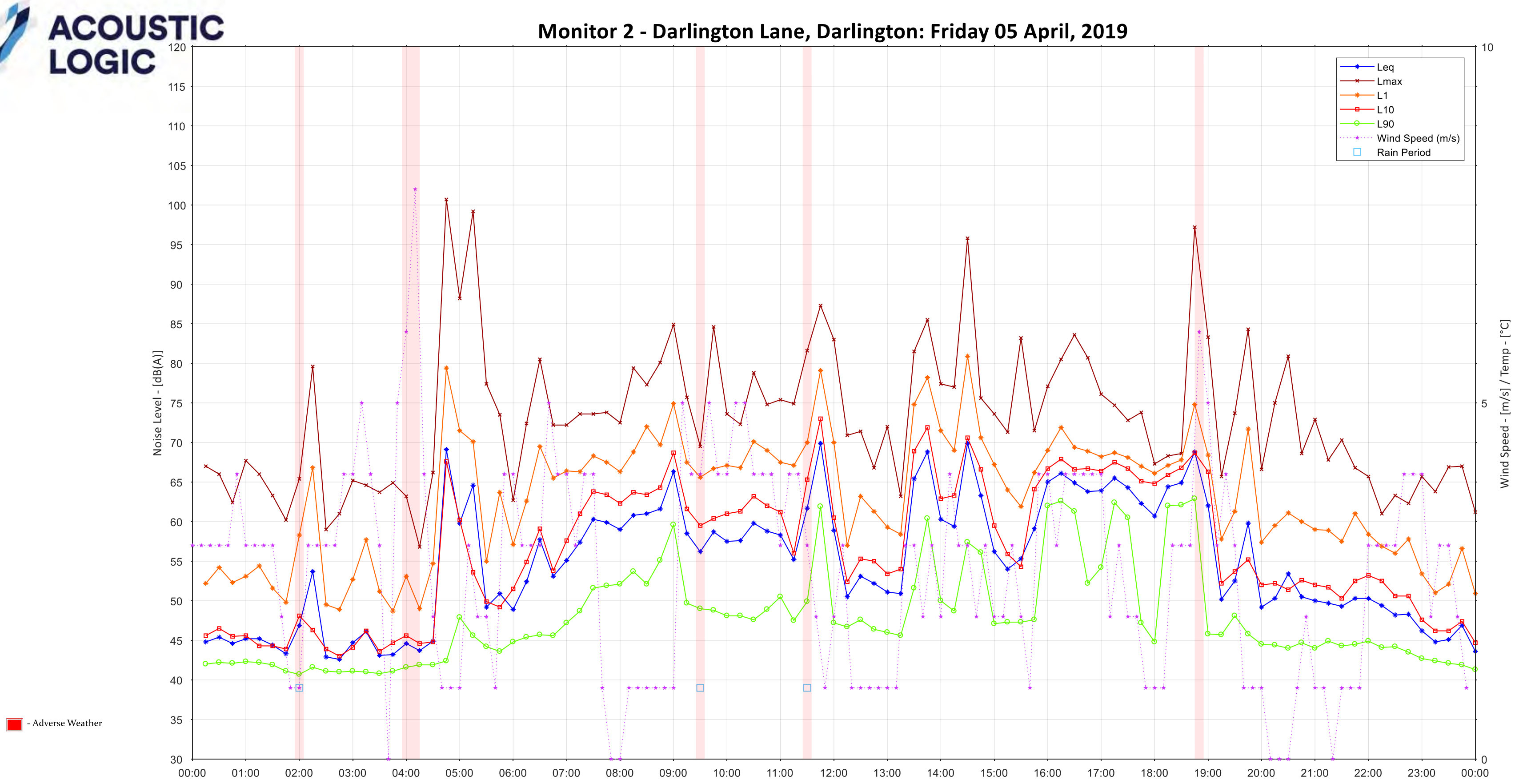
Monitor 2 - Darlington Lane, Darlington: Wednesday 03 April, 2019



Monitor 2 - Darlington Lane, Darlington: Thursday 04 April, 2019

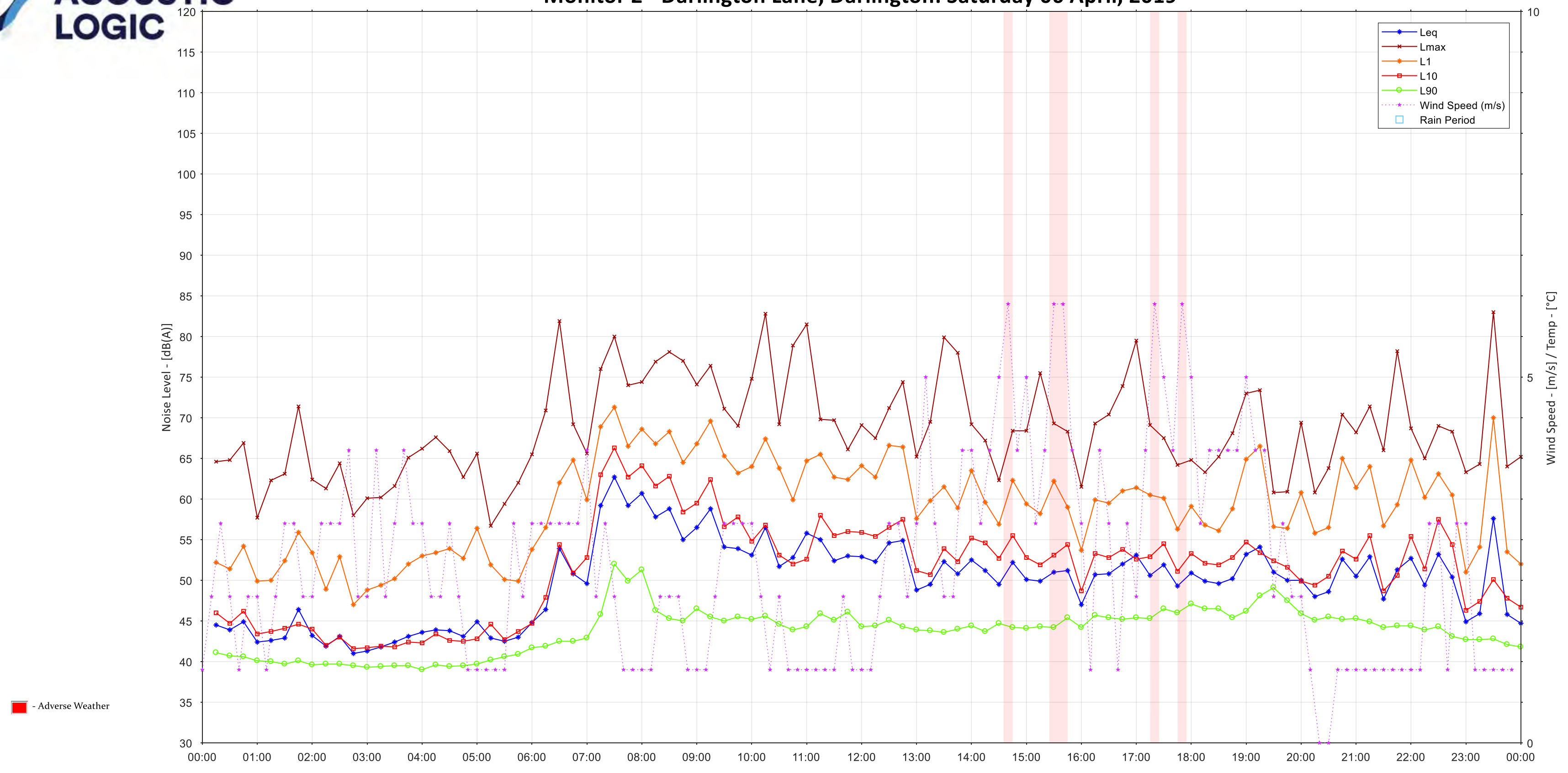


- Adverse Weather

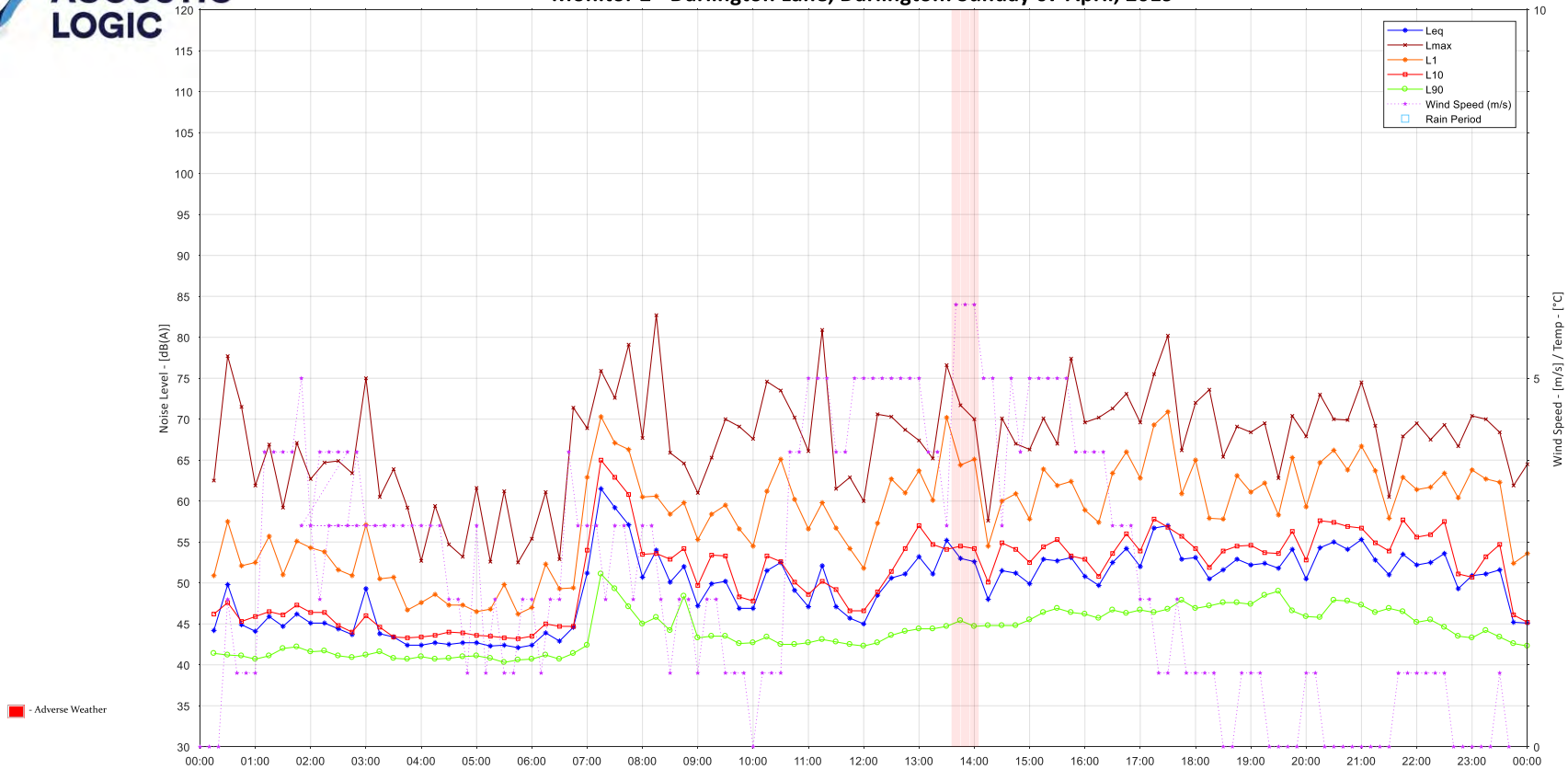


Monitor 2 - Darlington Lane, Darlington: Friday 05 April, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather

Monitor 2 - Darlington Lane, Darlington: Saturday 06 April, 2019



Monitor 2 - Darlington Lane, Darlington: Sunday 07 April, 2019



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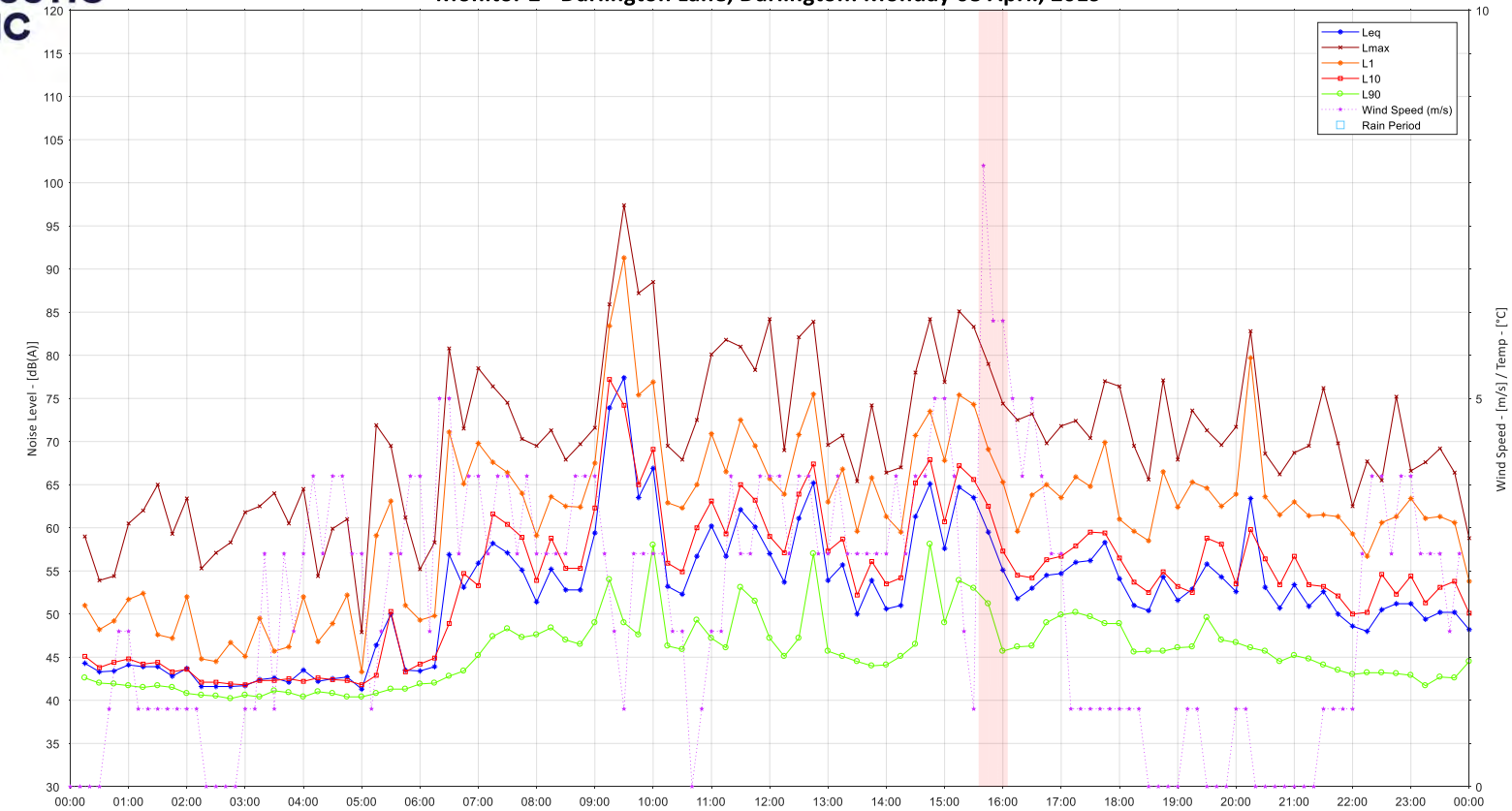

- Adverse Weather

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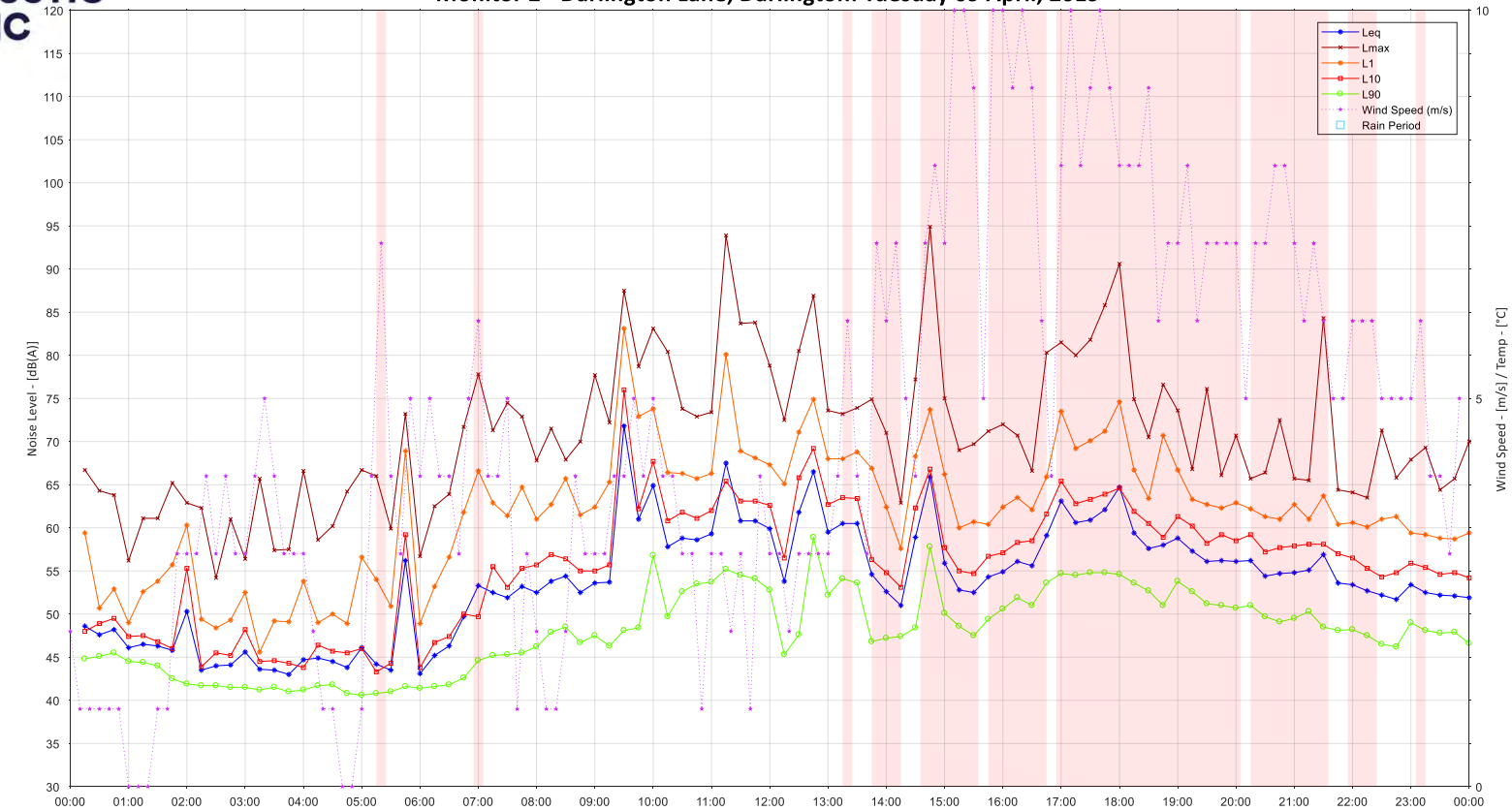

- Adverse Weather

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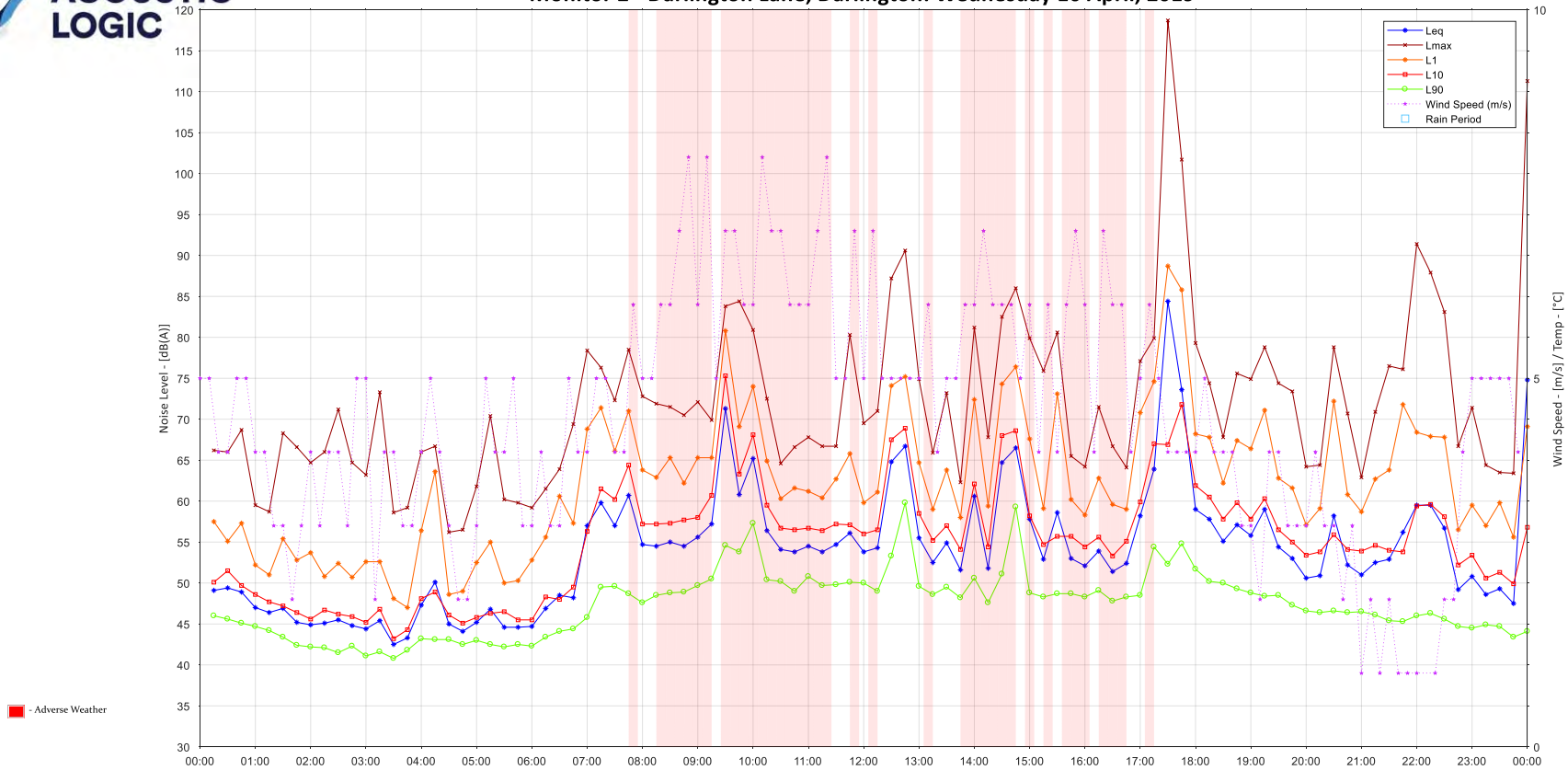
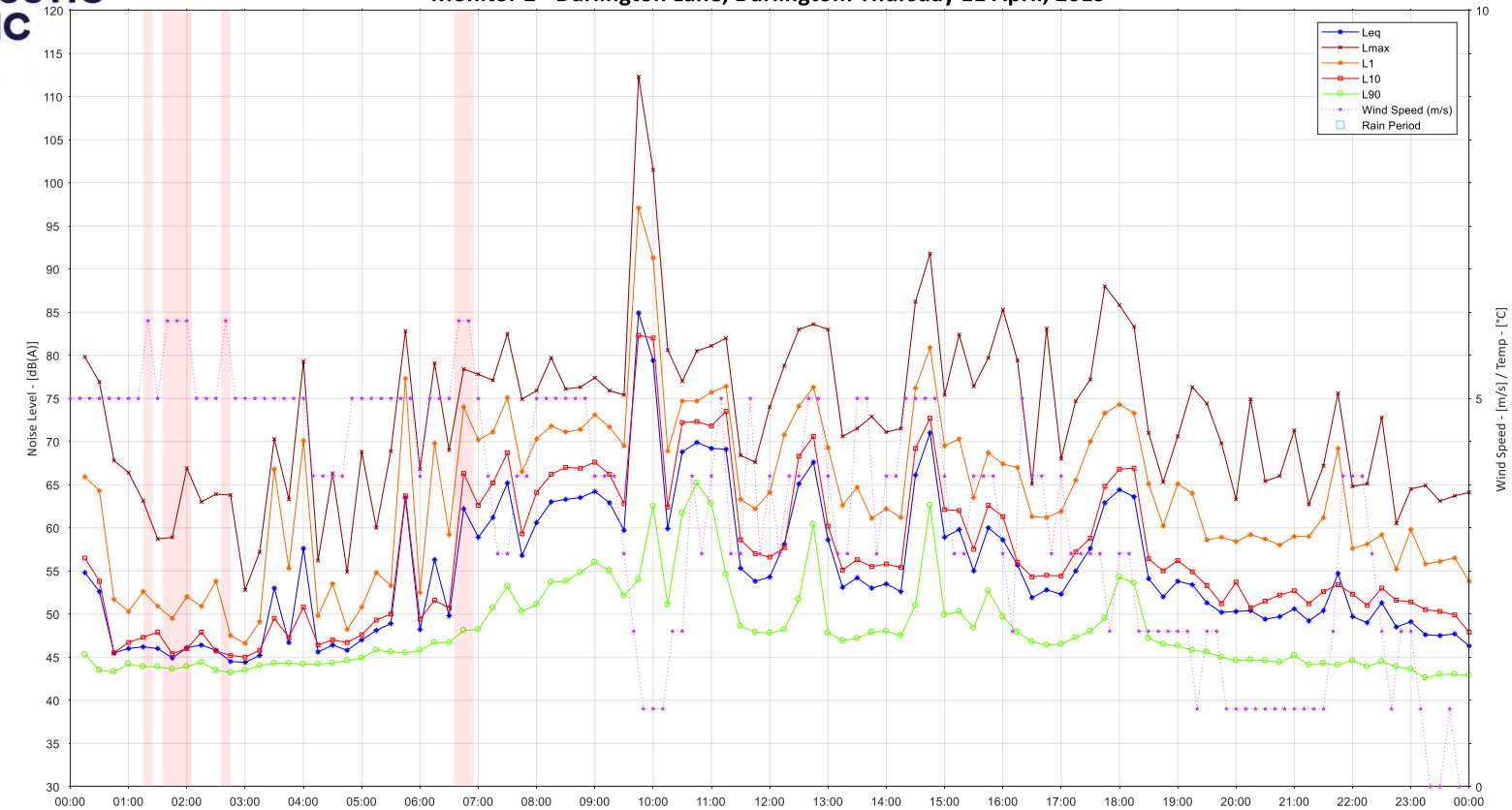


Monitor 2 - Darlington Lane, Darlington: Thursday 11 April, 2019



- Adverse Weather

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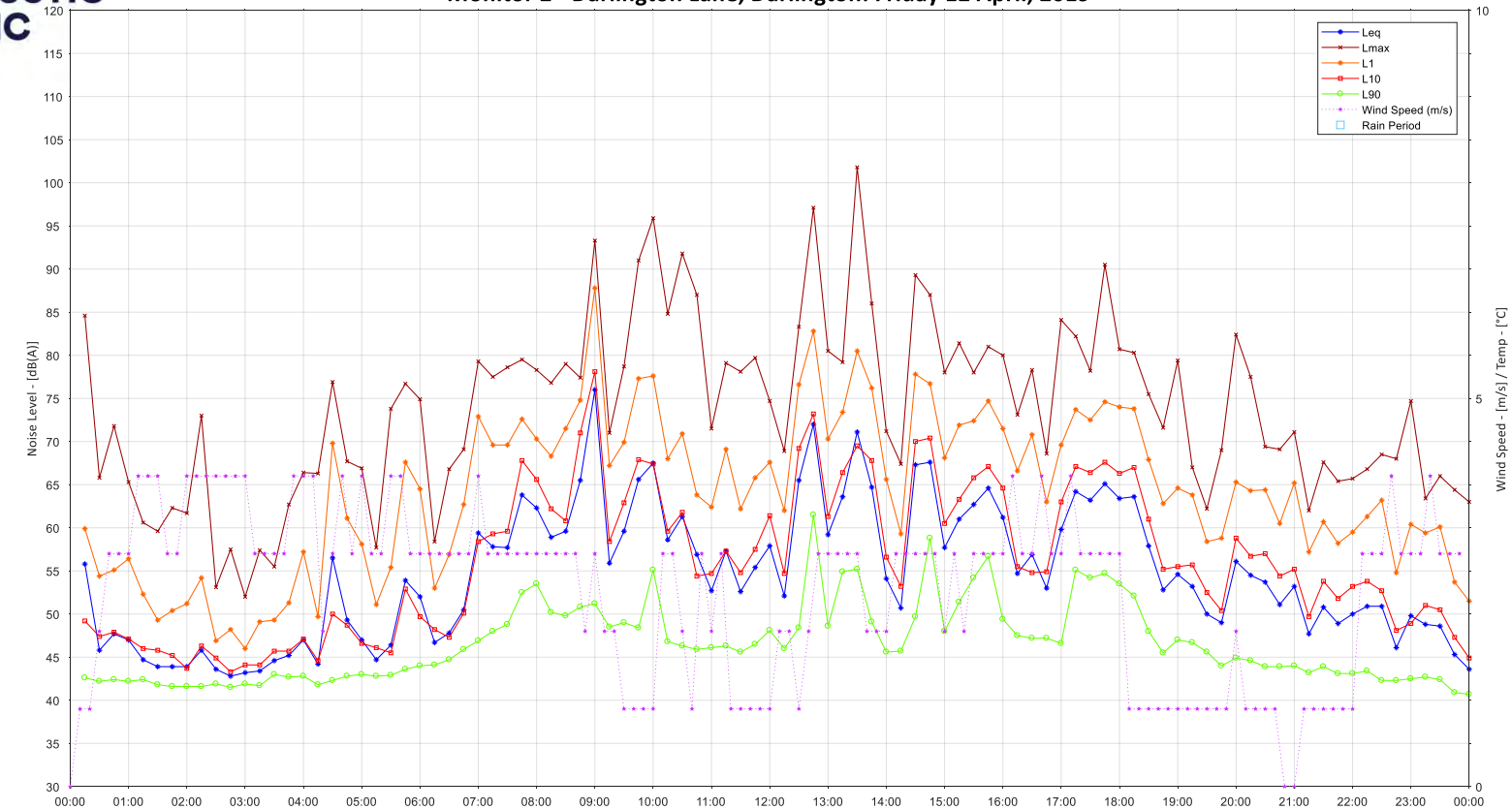

- Adverse Weather

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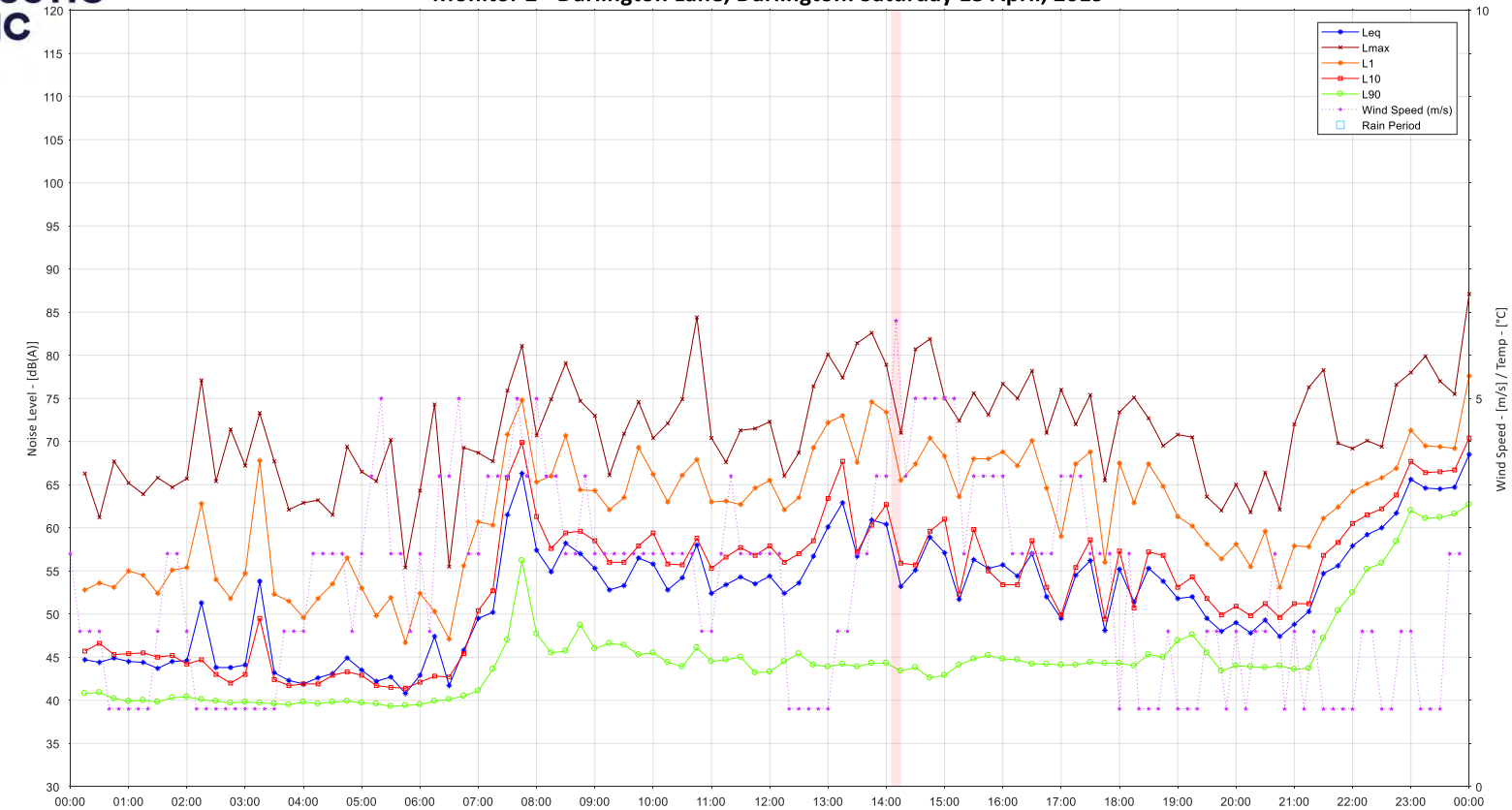

- Adverse Weather

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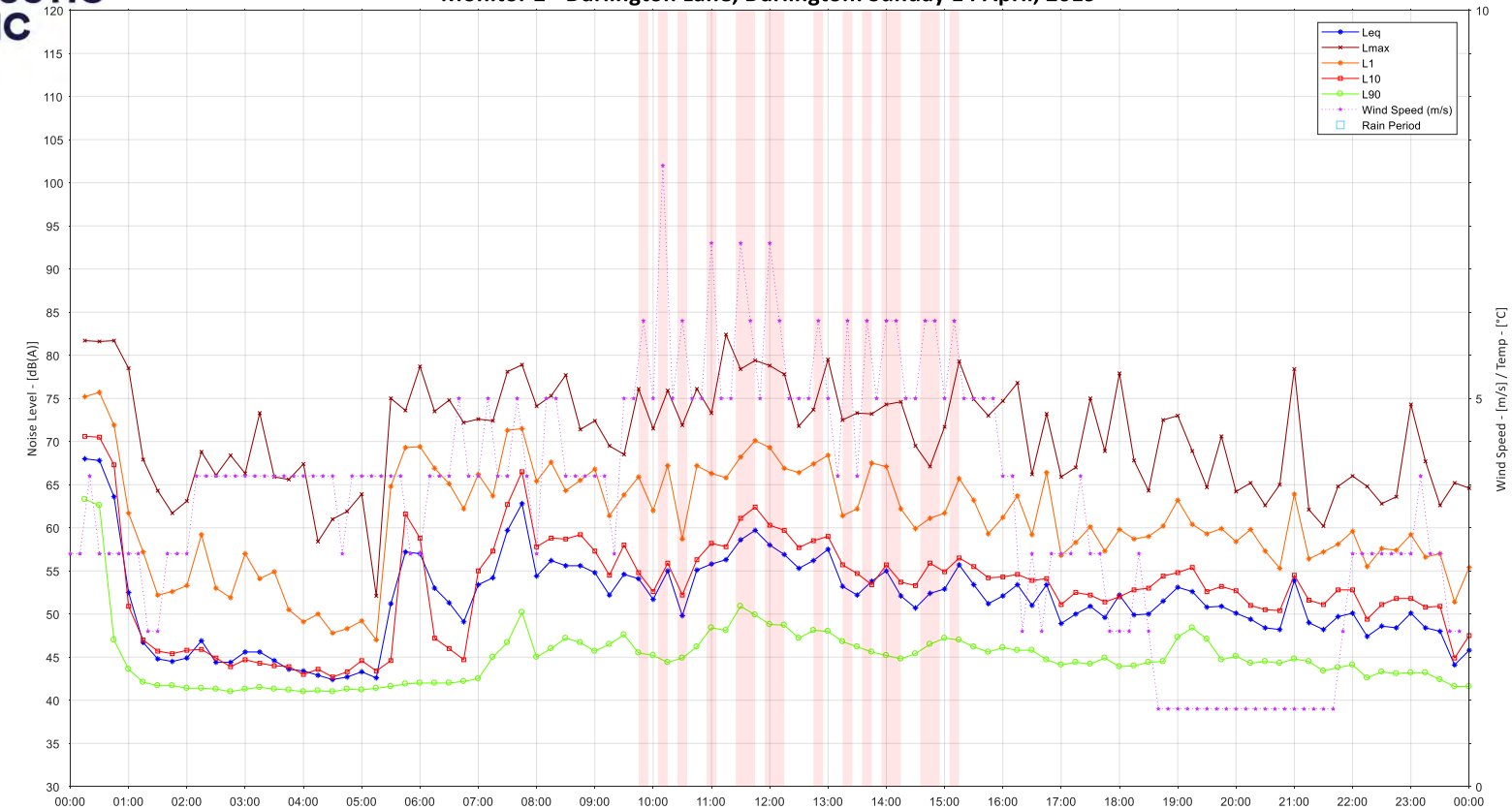
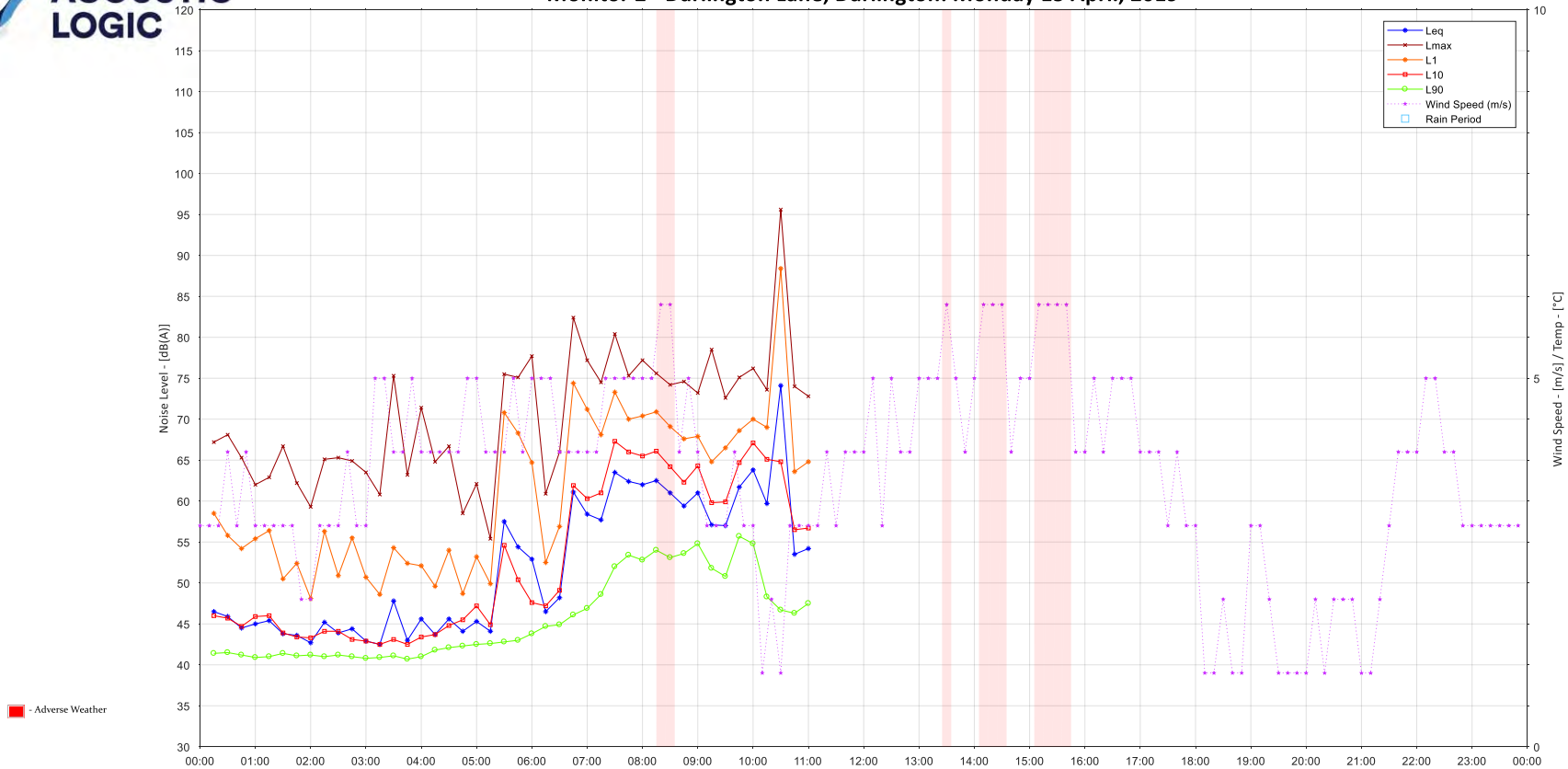


- Adverse Weather

Monitor 2 - Darlington Lane, Darlington: Monday 15 April, 2019



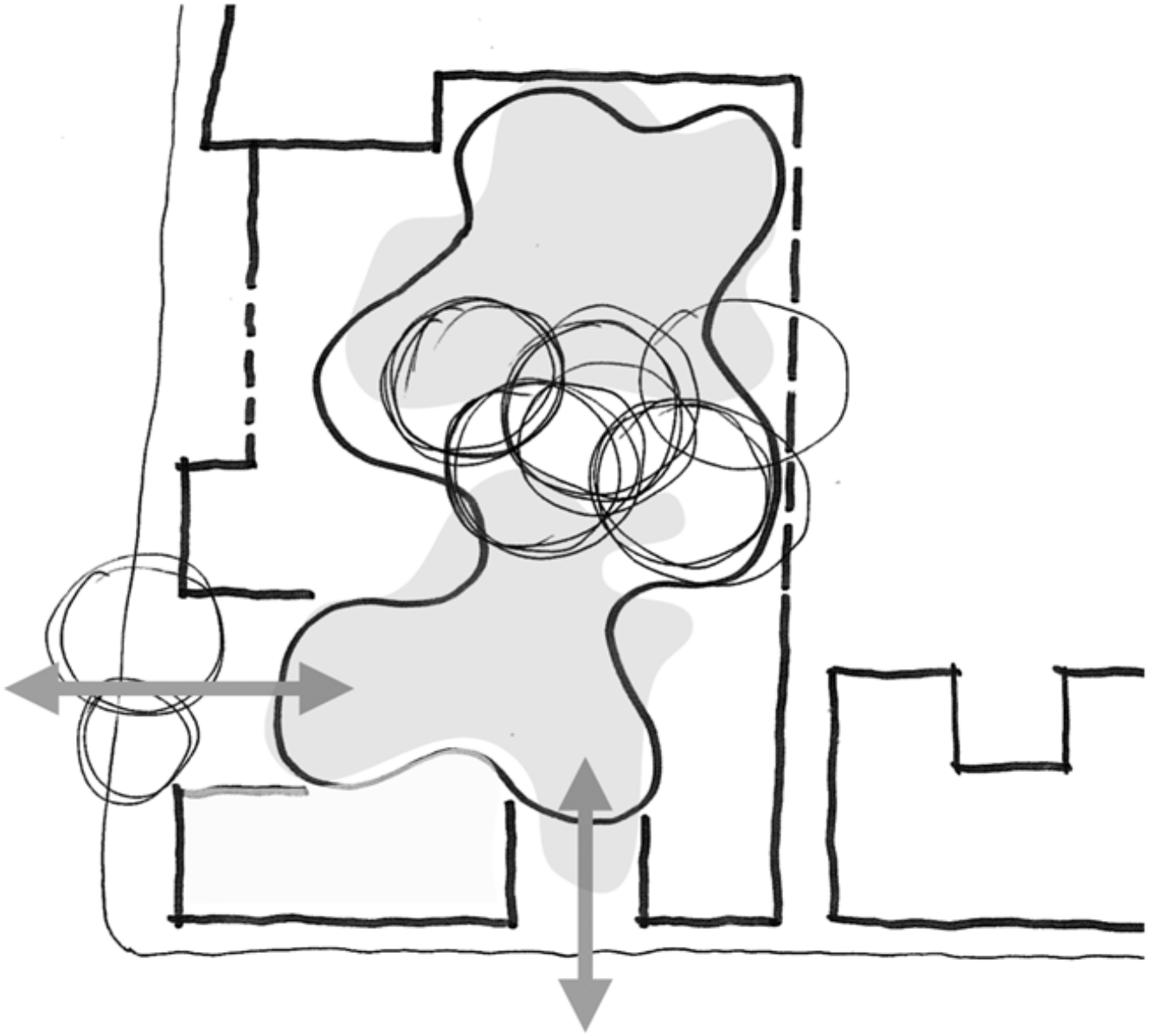
DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix GG — Integrated Water Management Plan

SSD-9914

Prepared by WS+P

For NSW Department of Education



Warren Smith & Partners

— SINCE 1981 —

14th April 2020

HYDRAULIC SERVICES
WATER CYCLE MANAGEMENT PLAN
Darlington Public School

HYDRAULIC SERVICES
WATER CYCLE MANAGEMENT PLAN
Darlington Public School

01	12th February 2020	Draft SSDA Integrated Water Cycle Management Plan Issue for Review
02	27th February 2020	SSDA Integrated Water Cycle Management Plan
03	6th April 2020	Updated with ETHOS Comments from meeting 12/03/2020
04	14th April	Updated as per ETHOS & MACE Comments 14/04/2020
Rev #	**Date**	**Description**

APPROVALS

01	**J. Skubevski**	**Superseded**	**D. Power**	
02	**J. Skubevski**	**Superseded**	**D. Power**	
03	**J. Skubevski**	**Superseded**	**D. Power**	
04	**J. Skubevski**	**Current**	**D. Power**	
Rev #	**Author**	**Status**	**Reviewer**	**Approver**

PREPARED BY:

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T 02 9299 1312

PREPARED FOR:

SCHOOL INFRASTRUCTURE NSW

Level 8, 259 George Street

Sydney 2000 NSW Australia

T 1300 482 651

Executive Summary

This Darlington Public School is located on the corner of Golden Grove Street and Abercrombie Street, Darlington, within the City of Sydney local Government Area. The school is adjacent to the University of Sydney Darlington Campus and within walking distance to Redfern and Macdonaldtown train stations. The site is legally described as Lot 100 in DP 623500 and Lot 592 in DP 7523049.

The SSD application seeks consent for demolition of existing school buildings and construction of a new part 2, part 3-storey building, increasing the school capacity from 230 to 437 students. The works also include replacement of the existing childcare facility (to the same capacity of 60 students), earthworks and landscaping. For a detailed project description refer to the EIS prepared by Ethos Urban.

Sears Requirement / Description	Relevant Section of Report
Water Cycle Management	
Detail any proposed alternative water supplies	See Section 3
Detail the proposed end uses of the potable and non-potable water	See Section 4
Detail any water sensitive urban design	See Section 7
Water related Infrastructure Requirements	
Determine service demands following servicing investigations	See Section 2
Determine satisfactory arrangements for drinking water services have been made	See Section 4.1
Obtain endorsement and/or approval from Sydney Water to ensure that the proposed development does not adversely impact on any existing water main, or other Sydney Water asset, including any easement or property	See Section 8
Outline any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed	See Section 6
Demonstrate water sensitive urban design (principles are used) and any water conservation measures that are likely to be proposed	See Section 7
Demonstrate any water conservation measures that are likely to be proposed	See Section 6

Warren Smith & Partners

Contents

INTRODUCTION

1. GENERAL

Warren Smith & Partners (WS+P) has been engaged by Schools Infrastructure NSW to prepare an Integrated Water Cycle Management Plan for the proposed redevelopment works at the Darlington Public School.

The Darlington Public School campus ("the site") is located at Golden Grove Street, Chippendale NSW 2008 and is shown in **Figure 1** (approximate site location identified in red). The site is encompassed by Golden Grove Street to the west, Abercrombie Street to the South, Darlington Lane to the north and the University of Sydney Business School to the east.

Figure 1: *Aerial View of Property Boundary (Source: Google Maps)*

This report will aim to address the following general SEARS condition; "Integrated Water Cycle Management: Outline any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and any water conservation measures that are likely to be proposed".

This report will address the main objectives on the condition through mention of water efficient fittings and fixtures, rainwater harvesting and reuse. The hydraulic scope does not extend to "demonstrate water sensitive urban design" and hence this aspect of the SEARS condition will be addressed by the Civil Engineer and is contained within APPENDIX A – WATER SENSITIVE URBAN DESIGN (BONACCI GROUP).

2. DEMAND CALCULATIONS

2.1 WATER SUPPLY DEMAND CALCULATIONS

The school currently has 230 students and 16 staff. It is proposed to increase the number of students to 437 and staff to 29. The student numbers were sourced from the ETHOS Urban report and the staff numbers were sourced from information provided by the design team. The assumption used in determining the average daily potable water demands for the proposed additional population of 207 students and 13 staff was sourced from the Sydney Water table, "Average Daily Water Use by Property Type" and is presented in ***Table 1*** below. For this water cycle management plan, the staff water usages were assumed to be the same as that of the students with values sourced from SCHEDULE 1 – SYDNEY WATER TABLE.

Where possible, potable water usage will be reduced by using low flow taps and sanitary fixtures, which typically provide the following flow rates:

- Shower 9.0L/min,
- Basin 4.5L/min,
- Sink 4.5L/min.

We expect Sydney Water to have historical data of the existing site (230 students and 16 staff) of which they can use to assess the effect of the additional 207 students and 13 staff load on the existing infrastructure and ultimately provide advice on the proposed connection location and if any required amplifications or upgrades are required. The preliminary advice included in APPENDIX B – SYDNEY WATER FEASIBILITY ADVICE LETTER confirms the proposed increase will not impact the network.

Table 1: Average Daily Water Demand

Classification	Metric Unit	Average Demand (L/Metric Unit/Day)
Special Use - School	Student	20
Special Use – School	Staff (Student)	20

Please refer to ***Table 2*** below for the average daily water demand increase calculation.

Table 2: Average Daily Water Demand Increase Calculation

Total	Average Demand (L/Metric Unit/Day)	Total Average Daily Water Demand (kL)
207 (Students)	20	4.14
13 (Staff)	20	0.26

The following flows for the entire site have also been calculated:

- Probable simultaneous demand – 1.89 L/sec (subject to change due to architectural layouts),
- Fire flow for hydrants – 20 L/sec,
- Fire flow for sprinklers and drenchers – N / A.

3. CONNECTIONS

3.1 WATER

It is proposed that connection is made to the Sydney Water DN150 CICL water main in Golden Grove Street as shown in **Figure 2**. The connection point should be adjacent to the location of the proposed water meter on site.

Figure 2 also indicates that the property is comprised of two separate land lots, which would normally require separate servicing in order to comply with their (Sydney Water) guidelines. However, it has been recently confirmed by Schools Infrastructure that the land lots will be consolidated, informing the proposed single connection point for supply.

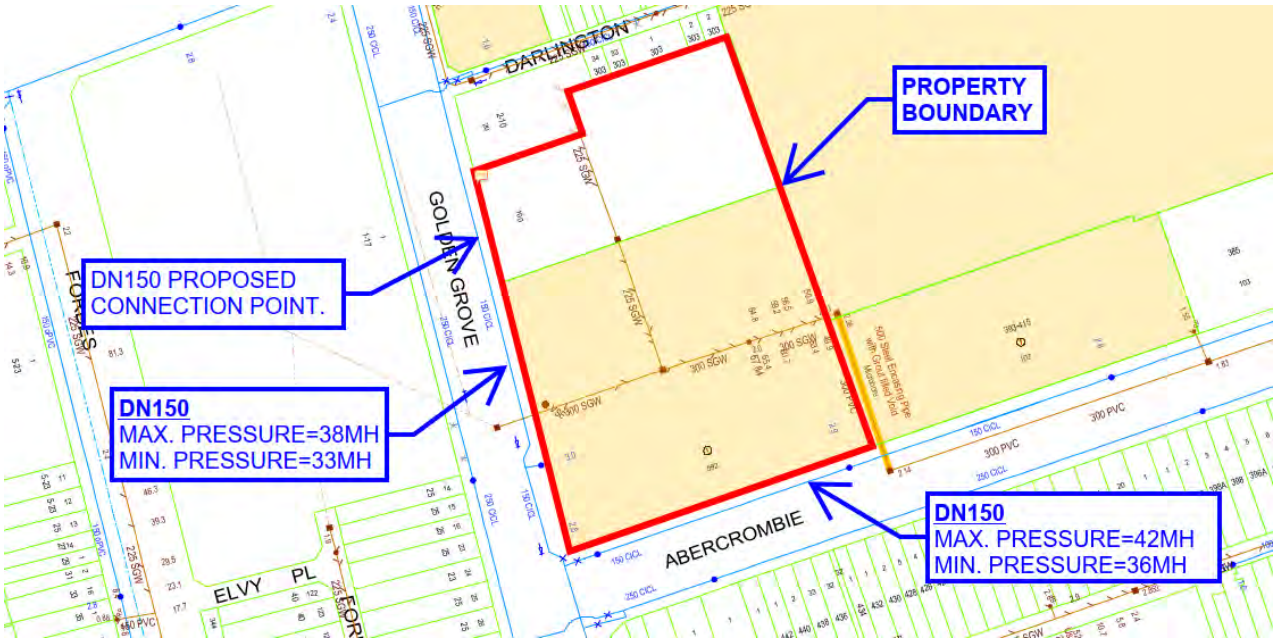


Figure 2: *Proposed Connection Point to Sydney Water Utility (Water) Main*

The geotechnical report mentions that 'No free groundwater was observed in the bores during drilling for the short time they were left open". Additionally, there are no Sydney Water recycled water mains observed within either Golden Grove or Abercrombie Street. Hence, the existing utility main described above was selected for supply to the site.

4. PRIVATE SYSTEM

4.1 POTABLE COLD WATER SERVICES

It is proposed that the potable water services extend from the infrastructure as described in the latest WS+P Schematic Design report to all wet area fixtures and fittings as required, including basins, WC's, showers and the like.

Potable water services will also extend to any mechanical services as required.

4.2 NON-POTABLE COLD WATER SERVICES

It is proposed that non-potable cold water services are not utilised for supply to any internal sanitary fixtures or fittings such as WC flushing. This is to minimise any risk to public health.

The non-potable cold water service extending from the rainwater reuse system will be used for irrigation purposes only. A potable cold water service with a reduced pressure zone device preceding the first take off where zone protection is required in accordance with AS 3500.1 will be utilised as a rainwater top-up supply. The top up supply is to be provided with an air gap (above) the rainwater tank overflow outlet.

5. STAGING

It is proposed that hydraulic services including potable cold water will be extended to the new buildings and re-purposed areas as required for the Stage 1 works prior to connection to any authority mains

During Stage 1, capped provisions for future extension of water services are to be made to supply Stage 2 as required. This will include both a capped provision for potable cold water services on level 1 for future connection during Stage 2.

6. WATER USAGE REDUCTION

6.1 LOW FLOW TAPS

Where possible, potable water usage will be reduced through the use of low flow taps and sanitary fixtures, typically using the following flow rates:

- Shower 9.0L/min,
- Basin 4.5L/min,
- Sink 4.5L/min.

Low flow taps are only to be used if the selected fixtures comply with the EFSG.

6.2 WATER METERING

The development will be metered with a utility (Sydney Water) owned water meter. This water meter will have the capability for connection to building monitoring system (BMS) via pulse read-out and therefore can be water demand and leak monitored.

Privately owned (and read) sub meters shall be provided to meter the usage of the following:

- Domestic hot water heaters cold water supply (not including the proposed below sink ZIP units),
- OSHC Kitchen / Canteen facilities,
- Rainwater tank make-up water.

6.3 RAINWATER REUSE

Rainwater harvesting is designed to provide an alternative source for non-potable water uses for the school. Implementing a rainwater re-use system will result in the conservation of potable cold water sources and a reduction in the daily water demand.

Where practical, rain from sloped roof (metal deck) areas will be collected using gutters and downpipes before reticulating to the rainwater tank for re-use (irrigation purposes only).

6.4 HYDRANT PUMP TESTING

It is proposed that the hydrant pump test water is reticulated directly to the rainwater tank during occasional testing (frequency to be determined in future design phases). This proposal is a great way of conserving water during testing where high flows (approximately 20 L/sec) for extended durations are expected.

Test water normally discharged to the civil stormwater system and so this option allows for the filling of the rainwater tank prior to overflow into the civil stormwater system.

7. APPENDIX A – WATER SENSITIVE URBAN DESIGN (BONACCI GROUP)

Darlington Public School Redevelopment

Water Sensitive Urban Design Section

for

State Significant Development Application (SSDA)

Bonacci Group (NSW) Pty Ltd Consulting Engineers
Level 6, 37 York Street, Sydney NSW 2000 Australia ABN 29 102 716 352 T: +61 2 8247 8400
reception.syd@bonaccigroup.com bonaccigroup.com

Document Amendment Register

Rev. No.	Section & Page No.	Issue/Amendment	Author/Initials		Reviewer/Initials		Date
0	-	Draft issue for comments	Eve W	EW	Stephen N	SN	12/03/20
1	-	Updated with new header	Eve W	EW	Jason B	JB	13/03/20

Prepared by: Eve Wu

Date: 13/03/2020

Project No: 11917

Issued for: State Significant Development Application (SSDA)

Discipline: Civil

Water Sensitive Urban Design (WSUD)

To protect the ecology of City of Sydney, it is expected that this development will be required to satisfy the water quality requirements of City of Sydney Council. *Sydney City Council DCP 2012 Section 3* outlines that any development greater than 1000m^2 must undertake a stormwater quality assessment to demonstrate that the development will achieve the post development pollutant load standards indicated below (Figure 1):

(a) reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;

(b) reduce the baseline annual pollutant load for total suspended solids by 85%;

(c) reduce the baseline annual pollutant load for total phosphorous by 65%; and

(d) reduce the baseline annual pollutant load for total nitrogen by 45%.

Figure 1 City of Sydney Pollution Reduction Target Rates (DCP 2012)

Proprietary water quality treatment products including Enviropods and stormfilter cartridges are to be provided on site to achieve Council's adopted pollutants reduction rates. Site constraints may not allow large bio-retention basin, however other Water Sensitive Urban Design approaches including the following have been included as part of the water quality treatment train:

- Grassed swales
- Raingarden(s)
- Linear garden function as buffer
- Rainwater tank

WSUD strategies including raingardens, linear gardens have been shown in the landscape drawings in Figure 2.

Figure 2 Landscape Ground Plane Plan (Work in Progress, 28.02.2020).

As discussed above, a rainwater tank is to be provided as part of the WSUD strategy. It is expected the rainwater from the northern portion of the roof will be captured via downpipes and reticulated to the rainwater tank. Rainwater reuse will be for outdoor irrigation purpose only. Rainwater tank has been modelled in addition to above mentioned WSUD measures as part of the water quality treatment train using MUSIC (a water quality assessment model software) (version 6.3). An overall catchment plan is as shown below in Figure 3.

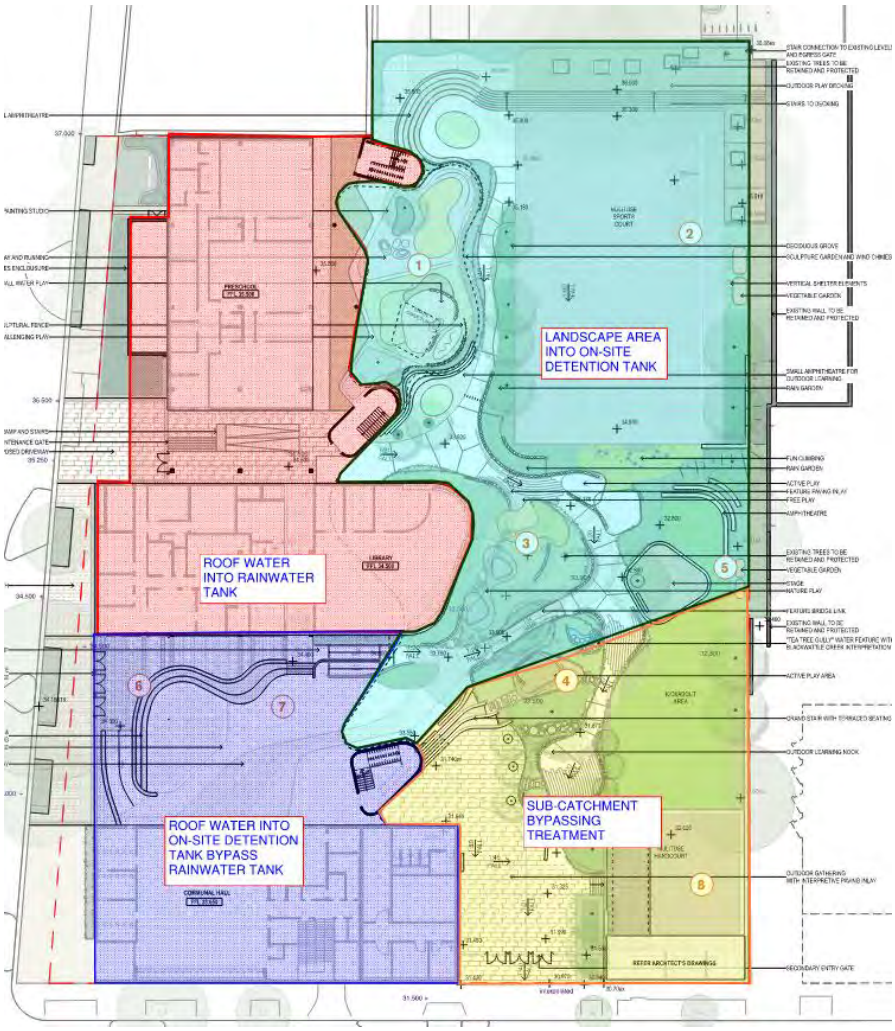


Figure 3 MUSIC Catchment Plan

The results of MUSIC modelling indicate that in addition to the proposed WSUD strategies, 19 stormfilter cartridges and 6 Enviropods shall be provided to achieve the pollutant reduction targets adopted by City of Sydney Council. Result also suggests a 30kL rainwater tank can meet 90% rainwater reuse demand for irrigation purpose over 450 m^2 landscape area.

MUSIC modelling results are as shown below in Figure 4. It can be seen, the proposed stormwater quality treatment train complies with Council's adopted water quality removal targets as shown in Figure 1.

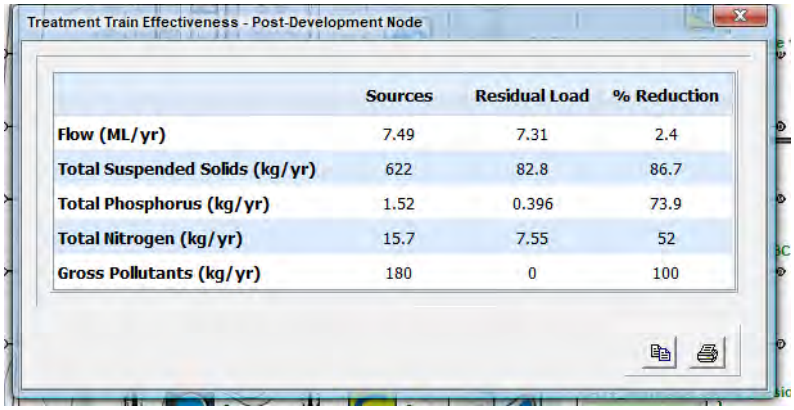


Figure 4 MUSIC Modelling Results (Based on Architectural Plan Issued 28.02.2020)

Please be noted the water quality treatment train strategy and effectiveness are preliminary only until the architectural/landscape layout is finalised.

8. APPENDIX B – SYDNEY WATER FEASIBILITY ADVICE LETTER

Case Number: 181476

11 February 2020

SCHOOL INFRASTRUCTURE NSW
c/- WARREN SMITH & PARTNERS PTY LTD

FEASIBILITY LETTER

Developer:	**SCHOOL INFRASTRUCTURE NSW**
Your reference:	**6606000**
Development:	**Lot 100 DP623500 GOLDEN GROVE ST, Darlington**
Development Description:	**Proposed Redevelopment of Darlington Public School**
Your application date:	**16 October 2019**

Note: **Level 2 water restrictions are in place from December 10**, which limits how and when water can be used outdoors. This can impact you and your contractors in the activities they need to undertake for this proposal.

Using water to suppress dust is only permitted via a permit when no other water source is available.

You/your contractors will need to apply for an exemption permit to use water for most outdoor uses including:

- Cleaning equipment and the exterior of **new** buildings
- Drilling and boring, and
- Batching concrete on-site

Fines for deliberate breaches of restriction rules are in place.

For more information on the restrictions and for applying for an exemption, visit our web site at https://www.sydneywater.com.au/SW/water-the-environment/what-we-re-doing/water-restrictions/level-2-water-restrictions/index.htm

The more water everyone saves, the longer we can stave off the progression to stricter restrictions or emergency measures.

Please provide this information to your contractors and delivery partners to inform them of their obligations and check our web site for up to date restriction information.

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed) or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/ site layout, after today, the requirements in this Letter could change when you submit your new application; and

- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

You have made an application for specific information. Sydney Water's possible requirements are:

Are Shown under Water and Sewer Works.

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land development.

1. **Obtain Development Consent from the consent authority for your development proposal.**

2. **Engage a Water Servicing Coordinator (Coordinator).**

   You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

   For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92.**

   The Coordinator will be your point of contact with Sydney Water. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including Sydney Water costs).

3. **Developer Works Deed**

   It would appear that your feasibility application is served from existing mains and does not require any works to be constructed at this time. Sydney Water will confirm this with you after you have received Development Approval from Council and your Coordinator has submitted a new Development application and Sydney Water has issued you with a formal Notice of Requirements.

4. **Water and Sewer Works**

   4.1 **Water**

   Your development must have a frontage to a water main that is the right size and can be used for connection.

   Sydney Water has assessed your application and found that:

   The existing 150mm water mains in Abercrombie and Golden Grove Streets servicing the school are primarily supplied from a 375mm trunk main located 85m south of the site in Wilson Street.
   The proposed increase in demand will not have a significant impact on the existing network.

4.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

Sydney Water has assessed your application and found that:

The school is proposed to be serviced by via two connections, one of the 225mm and the other to the 300mm sewer mains traversing the site.
The additional discharge (27 EP) from the proposed redevelopment will not have an significant impact on the either of the mains traversing the site.

5. Ancillary Matters

5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

6. Approval of your Building Plans

You must have your building plans approved **before the Certificate can be issued. Building construction work MUST NOT commence until Sydney Water has granted approval.** Approval is needed because construction/building works may affect Sydney Water's assets (e.g. water and sewer mains).

Your Coordinator can tell you about the approval process including:

- Your provision, if required, of a "Services Protection Report" (also known as a "pegout"). This is needed to check whether the building and engineering plans show accurately where Sydney Water's assets are located in relation to your proposed building work. Your Coordinator will then either approve the plans or make requirements to protect those assets before approving the plans;
- Possible requirements;
- Costs; and
- Timeframes.

You can also find information about this process (including technical specifications) if you either:

- visit www.sydneywater.com.au > Plumbing, building & developing > Building > Building over or next to assets. Here you can find Sydney Water's *Technical guidelines - Building over and adjacent to pipe assets*; or
- call 13 20 92.

Notes:

- **The Certificate will not be issued until the plans have been approved and, if required, Sydney Water's assets are altered or deviated;**
- **You can only remove, deviate or replace any of Sydney Water's pipes using temporary pipework if you have written approval from Sydney Water's Urban Growth Business. You must engage your Coordinator to arrange this approval; and**
- **You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.**

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:
http://www.sydneywater.com.au/Plumbing/BackflowPrevention/

Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, http:// www.waterrating.gov.au/
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to http://www.sydneywater.com.au/Water4Life/InYourBusiness/ RWTCalculator.cfm
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Contingency Plan Recommendations

Under Sydney Water's customer contract Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at: http:// www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/ or contact Business Customer Services on **1300 985 227** or businesscustomers@sydneywater.com.au

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap in™ and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connection

A water main are available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Other fees and requirements
The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements. These include:

- plumbing and drainage inspection costs;
- the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own

independent professional advice.

END

9. SCHEDULE 1 – SYDNEY WATER TABLE

"AVERAGE DAILY WATER USE BY PROPERTY TYPE"

Development Type	Development Sub-Type	Key Metric	Metric Unit	Average Demand (L/Metric Unit / Day)
Residential	Single Lot Torrens	Dwelling	Each dwelling	623.00
	Flats Torrens	Net Floor Area	Square Meter	2.36
	High Rise Units	Net Floor Area	Square Meter	3.34
	Single Lot Community	Dwelling	Each dwelling	623.00
Mixed	Residential / Commercial	Combined Floor Area	Each dwelling / Square Meter	Use separate rates for each component
	Commercial / Industrial	Combined Floor Area	Square Meter	Use separate rates for each component
Commercial	Aged Accom - Self Care	Net Floor Area	Square Meter	2.50
	Aged Accom - Hostel	Bed	Each bed	271.00
	Aged Accom - Full Care	Bed	Each bed	271.00
	Childcare	Net Floor Area	Square Meter	3.60
	Hotel / motel / serviced apartments	Room	Each room	359.94
	Office	Net Floor Area	Square Meter	2.27
	Shopping Centre	Net Floor Area	Square Meter	3.00
	Laundry / Dry Cleaner	Net Floor Area	Square Meter	10.50
	Café / Fast Food / Butcher / Deli	Net Floor Area	Square Meter	2.48
	Retail Units	Net Floor Area	Square Meter	2.48
	Medical / Veterinary	Net Floor Area	Square Meter	2.48
	Mechanical Repair	Net Floor Areas	Square Meter	2.48
	Car / Boat Sales	Net Floor Area	Square Meter	2.48
	Car Wash	Net Floor Area	Square Meter	9.40
	Club	Net Floor Area	Square Meter	3.77
Industrial	Heavy Process		As required	
	Chemical Manufacturing		As required	
	Printing Manufacturing		As required	
	Beverage Manufacturing		As required	
	Light Factory Unit	Developed floor area	Square Meter	2.82
	Warehousing	Developed floor area	Square Meter	2.82
	Transport / Bus Depot	Site area	Square Meter	0.91
Special Uses	University	Student	Each student	20.00
	School	Student	Each student	20.00
	Hospital	Bed	Each bed	271.00
	Religious assembles	Developed floor area	Square Meter	1.30
	Government Depot	Site area	Square Meter	0.91
	Community Centre / Library	Floor area	Square Meter	1.84
	Sport Fields with Amenities		As required	
	Park & Reserves		As required	
	Services - Police / Ambulance etc.	Floor area	Square Meter	1.40

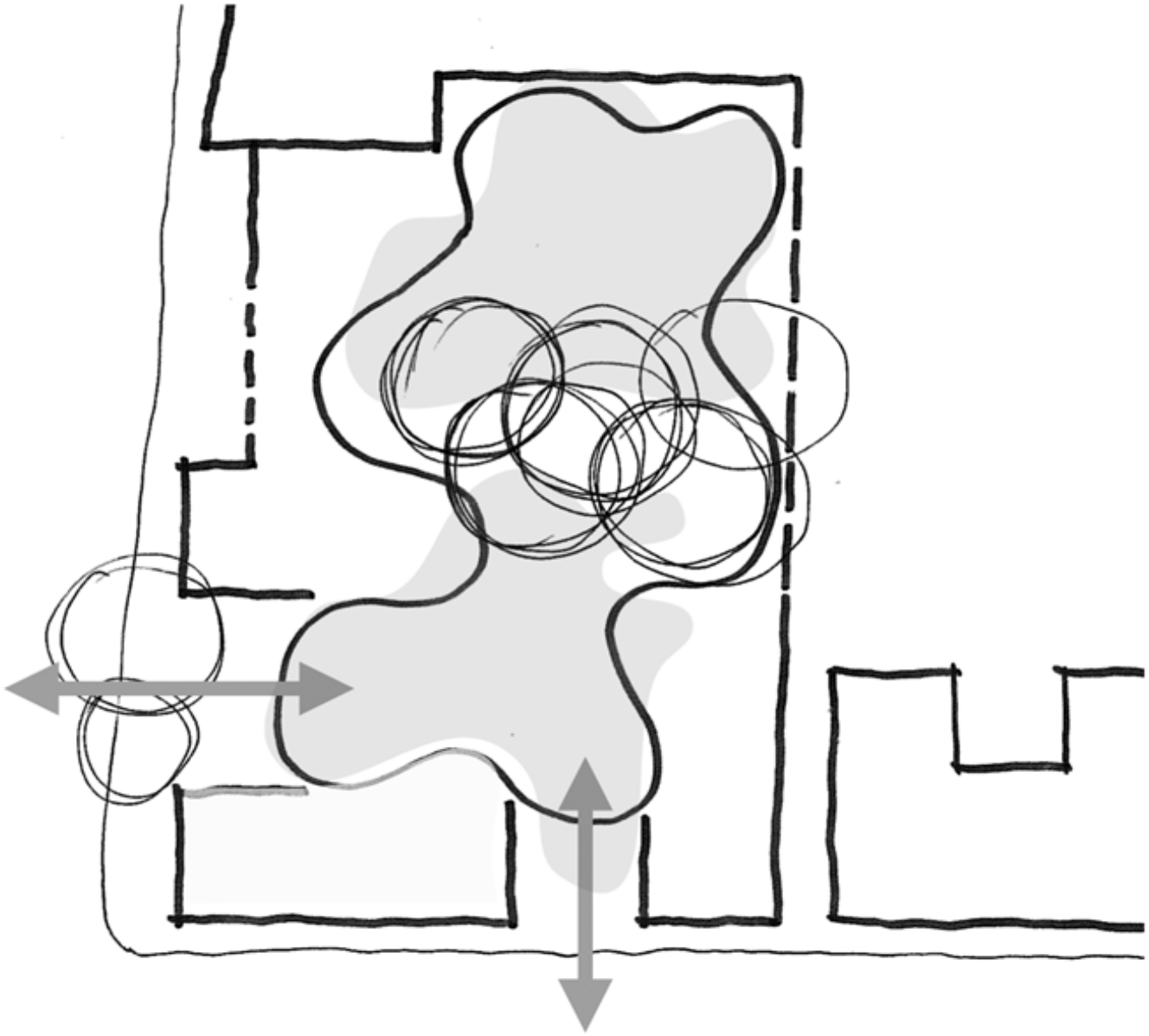
DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix H — Childcare Planning Guidelines Assessment

SSD-9914

Prepared by FJMT

For NSW Department of Education



Component	Proposal
Part 2 - Design Quality	
Principle 1 - Context	The proposed preschool is located on ground level of the proposed development at the northern end of the site, adjacent to Golden Grove Street.
Principle 2 – Built form	The preschool is accommodated in the new school proposed for Darlington Public School which is being assessed under SSDA 9914.
Principle 3 – Adaptive learning spaces	The internal fitout and playground have been designed to align with the Child Care Guidelines.
Principle 4 – Sustainability	Sustainability targets for the proposed building are aligned with the SiNSW Sustainability Pathway. Refer to the ESD report accompanying SSDA 9914.
Principle 5 – Landscape	The preschool playground has been design to align with the Child Care Guidelines.
Principle 6 – Amenity	The preschool provides indoor and outdoor space to provide a variety of experiences. Secure access is provided to the preschool.
Principle 7 – Safety	The preschool provides a welcoming, safe and accessible environment for children and their carers.
Part 3 - Matters for Consideration	
3.1 Site selection and location Objective: To ensure that appropriate zone considerations are assessed when selecting a site.	The proposed location within the overall development is secure and adequately sized to meet the internal and external space guidelines.
Objective: To ensure that the site selected for a proposed child care facility is suitable for the use.	
Objective: To ensure that sites for child care facilities are appropriately located.	
Objective: To ensure that sites for child care facilities do not incur risks from environmental, health or safety hazards.	
3.2 Local character, streetscape and the public domain interface Objective: To ensure that the child care facility is compatible with the local character and surrounding streetscape.	The building envelope is being assessed under SSDA 9914.

Component	Proposal
Objective: To ensure clear delineation between the child care facility and public spaces.	
Objective: To ensure that front fences and retaining walls respond to and complement the context and character of the area and do not dominate the public domain.	
3.3 Building orientation, envelope and design Objective: To respond to the streetscape and site, while optimising solar access and opportunities for shade.	The building envelope is being assessed under SSDA 9914.
Objective: To ensure that the scale of the child care facility is compatible with adjoining development and the impact on adjoining buildings is minimised.	
Objective: To ensure that setbacks from the boundary of a child care facility are consistent with the predominant development within the immediate context.	
Objective: To ensure that the built form, articulation and scale of development relates to its context and buildings are well designed to contribute to an area's character.	
Objective: To ensure that buildings are designed to create safe environments for all users.	
Objective: To ensure that child care facilities are designed to be accessible by all potential users.	
3.4 Landscaping Objective: To provide landscape design that contributes to the streetscape and amenity.	The proposed preschool is located within the school grounds. Refer SSDA 9914 Landscape Report for information regarding the streetscape landscaping.
C18	
Appropriate planting should be provided along the boundary integrated with fencing. Screen planting should not be included in calculations of unencumbered outdoor space. Use the existing landscape where feasible to provide a high quality landscaped area by: ▪ reflecting and reinforcing the local context ▪ incorporating natural features of the site, such as trees, rocky outcrops and vegetation communities into landscaping.	The preschool playground area includes outdoor spaces that allow children to play with natural elements such as water & sand, including a sand pit for digging, and a variety of materials and surfaces including pebbles and softfall - the softscape design will explore options for small garden shortcuts and tactile/ aromatic plant species. Refer Landscape report.

Component	Proposal
C19 Incorporate car parking into the landscape design of the site by: ▪ planting shade trees in large car parking areas to createa cool outdoor environment and reduce summer heat radiating into buildings ▪ taking into account streetscape, local character and context when siting car parking areas within the front setback ▪ using low level landscaping to soften and screen parking areas.	N/A
3.5 Visual and acoustic privacy Objective: To protect the privacy and security of children attending the facility.	✓
C20 Open balconies in mixed use developments should not overlook facilities nor overhang outdoor play spaces.	N/A
C21 Minimise direct overlooking of indoor rooms and outdoor play spaces from public areas through: ▪ appropriate site and building layout ▪ suitably locating pathways, windows and doors ▪ permanent screening and landscape design.	N/A
Objective: To minimise impacts on privacy of adjoining properties.	✓
C22 Minimise direct overlooking of main internal living areas and private open spaces in adjoining developments through: ▪ appropriate site and building layout ▪ suitable location of pathways, windows and doors ▪ landscape design and screening.	The proposed location within the Darlington Public School site does not overlook adjoining properties.
Objective: To minimise the impact of child care facilities on the acoustic privacy of neighbouring residential developments.	✓
A new development, or development that includes alterations to more than 50 per cent of the existing floor area, and is located adjacent to residential accommodation should: ▪ provide an acoustic fence along any boundary where the adjoining property contains a residential use. (An acoustic fence is one that is a solid, gap free fence). ▪ ensure that mechanical plant or equipment is screened by solid, gap free material and constructed to reduce noise levels e.g. acoustic fence, building, or enclosure.	N/A

Component	Proposal
C24 A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters: ▪ identify an appropriate noise level for a child care facility located in residential and other zones ▪ determine an appropriate background noise level for outdoor play areas during times they are proposed to be in use ▪ determine the appropriate height of any acoustic fence to enable the noise criteria to be met.	Refer separate Acoustic Report (SSDA 9914)
3.6 Noise and air pollution Objective: To ensure that outside noise levels on the facility are minimised to acceptable levels.	✓
C25 Adopt design solutions to minimise the impacts of noise, such as: ▪ creating physical separation between buildings and the noise source ▪ orienting the facility perpendicular to the noise source and where possible buffered by other uses ▪ using landscaping to reduce the perception of noise ▪ limiting the number and size of openings facing noise sources ▪ using double or acoustic glazing, acoustic louvres or enclosed balconies (wintergardens) ▪ using materials with mass and/or sound insulation or absorption properties, such as solid balcony balustrades, external screens and soffits ▪ locating cot rooms, sleeping areas and play areas away from external noise sources.	The preschool activity rooms and outdoor play area face into the playground of the school and are shielded from the residential buildings opposite on Golden Grove Street by the proposed building. The preschool playground is over 30m away from the east boundary adjoining the Sydney University Abercrombie Building, which contains offices and teaching space.
C26 An acoustic report should identify appropriate noise levels for sleeping areas and other non play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations: ▪ on industrial zoned land ▪ where the ANEF contour is between 20 and 25, consistent with AS 2021 – 2000 ▪ along a railway or mass transit corridor, as defined by State Environmental Planning Policy (Infrastructure) 2007 ▪ on a major or busy road ▪ other land that is impacted by substantial external noise.	N/A
Objective: To ensure air quality is acceptable where child care facilities are proposed close to external sources of air pollution such as major roads and industrial development.	✓

Component	Proposal
C27 Locate child care facilities on sites which avoid or minimise the potential impact of external sources of air pollution such as major roads and industrial development.	✓
C28 A suitably qualified air quality professional should prepare an air quality assessment report to demonstrate that proposed child care facilities close to major roads or industrial developments can meet air quality standards in accordance with relevant legislation and guidelines. The air quality assessment report should evaluate design considerations to minimise air pollution such as: ▪ creating an appropriate separation distance between the facility and the pollution source. The location of play areas, sleeping areas and outdoor areas should be as far as practicable from the major source of air pollution ▪ using landscaping to act as a filter for air pollution generated by traffic and industry. Landscaping has the added benefit of improving aesthetics and minimising visual intrusion from an adjacent roadway ▪ incorporating ventilation design into the design of the facility.	The preschool is not located adjacent to a major road or in an industrial zone. There will be no changes to the current conditions of the existing preschool at Darlington Public School.
3.7 Hours of operation Objective: To minimise the impact of the child care facility on the amenity of neighbouring residential developments.	✓
C29 Hours of operation within areas where the predominant land use is residiential should be confined to the core hours of 7.00am to 7.00pm weekdays. The hours of operation of the proposed child care facility may be extended if it adjoins or is adjacent to non-residential land uses.	The preschool will operate Monday to Friday, 8.30am - 3.30pm (staff), 9am - 3pm (children) during school days, excluding public holidays. The proposed hours are unchanged from the approved operational hours of the existing preschool on site.
Within mixed use areas or predominantly commercial areas, the hours of operation for each child care facility should be assessed with respect to its compatibility with adjoining and co-located land uses.	
3.8 Traffic, parking and pedestrian circulation Objective: To provide parking that satisfies the needs of users and demand generated by the centre.	Entry to the existing preschool is via the main school entrance off Golden Grove Street. It is proposed that the new preschool will also be accessed from the main school gate off Golden Grove Street. DDA compliant access to the proposed preschool can be achieved from this entrance.
Objective: To provide vehicle access from the street in a safe environment that does not disrupt traffic flows.	✓

Component	Proposal
C31 Off-street car parking should be provided at the rates for child care facilities specified in a Development Control Plan that applies to the land.	Refer Traffic Report
C32 In commercial or industrial zones and mixed use developments, on street parking may only be considered where there are no conflicts with adjoining uses, that is, no high levels of vehicle movement or potential conflicts with trucks and large vehicles.	N/A
C33 A Traffic and Parking Study should be prepared to support the proposal to quantify potential impacts on the surrounding land uses and demonstrate how impacts on amenity will be minimised. The study should also address any proposed variations to parking rates and demonstrate that: ▪ the amenity of the surrounding area will not be affected ▪ there will be no impacts on the safe operation of the surrounding road network.	Refer Traffic Report
Objective: To provide vehicle access from the street in a safe environment that does not disrupt traffic flows.	✓
C34 Alternate vehicular access should be provided where child care facilities are on sites fronting: ▪ a classified road ▪ roads which carry freight traffic or transport dangerous goods or hazardous materials. The alternate access must have regard to: ▪ the prevailing traffic conditions ▪ pedestrian and vehicle safety including bicycle movements ▪ the likely impact of the development on traffic.	N/A
C35 Child care facilities proposed within cul-de-sacs or narrow lanes or roads should ensure that safe access can be provided to and from the site, and to and from the wider locality in times of emergency.	N/A
Objective: To provide a safe and connected environment for pedestrians both on and around the site.	✓

Component	Proposal
C36 The following design solutions may be incorporated into a development to help provide a safe pedestrian environment: ▪ separate pedestrian access from the car park to the facility ▪ defined pedestrian crossings included within large car parking areas ▪ separate pedestrian and vehicle entries from the street for parents, children and visitors ▪ pedestrian paths that enable two prams to pass each other ▪ delivery and loading areas located away from the main pedestrian access to the building and in clearly designated, separate facilities ▪ in commercial or industrial zones and mixed use developments, the path of travel from the car parking to the centre entrance physically separated from any truck circulation or parking areas ▪ vehicles can enter and leave the site in a forward direction.	Pedestrian paths into the preschool are wide enough to accommodate two prams passing.
C37 Mixed use developments should include: ▪ driveway access, manoeuvring areas and parking areas for the facility that are separate to parking and manoeuvring areas used by trucks ▪ drop off and pick up zones that are exclusively available for use during the facility's operating hours with spaces clearly marked accordingly, close to the main entrance and preferably at the same floor level. Alternatively, direct access should avoid crossing driveways or manoeuvring areas used by vehicles accessing other parts of the site parking that is separate from other uses, located and grouped together and conveniently located near the entrance or access point to the facility.	N/A
C38 Car parking design should: ▪ include a child safe fence to separate car parking areas from the building entrance and play areas ▪ provide clearly marked accessible parking as close as possible to the primary entrance to the building in accordance with appropriate Australian Standards ▪ include wheelchair and pram accessible parking.	N/A
Part 4 - Applying the National Regulations to development proposals	
4.1 Indoor space requirements - Regulation 107 - Education and Care Services National Regulations Every child being educated and cared for within a facility must have a minimum of 3.25m2 of unencumbered indoor space. If this requirement is not met, the concurrence of the regulatory authority is required under the SEPP.	60 children @ 3.25m^2 = 195m^2 (65m^2 per activity room) Internal fit out provides for a minimum of 65m^2 of unencumbered indoor space per activity room. Refer floor plans.

Component	Proposal
It is recommended that a child care facility provide: ▪ a minimum of 0.3m3 per child of external storage space ▪ a minimum of 0.2m3 per child of internal storage space.	60 children @ 0.3m^3 = 18m^3 Proposed outdoor storage = 18m^3 60 Children @ 0.2m^3 = 12m^3 Proposed indoor storage = 4m^3 per class.
4.2 Laundry and hygiene facilities - Regulation 106 Education and Care Services National Regulations There must be laundry facilities or access to laundry facilities; or other arrangements for dealing with soiled clothing, nappies and linen, including hygienic facilities for storage prior to their disposal or laundering. The laundry and hygienic facilities must be located and maintained in a way that does not pose a risk to children. Child care facilities must also comply with the requirements for laundry facilities that are contained in the National Construction Code.	Laundry facilities are provided.
On site laundry facilities should contain: ▪ a washer or washers capable of dealing with the heavy requirements of the facility ▪ a dryer ▪ laundry sinks ▪ adequate storage for soiled items prior to cleaning ▪ an on site laundry cannot be calculated as usable unencumbered play space	✓
4.3 Toilet and hygiene facilities - Regulation 109 Education and Care Services National Regulations A service must ensure that adequate, developmentally and age-appropriate toilet, washing and drying facilities are provided for use by children being educated and cared for by the service; and the location and design of the toilet, washing and drying facilities enable safe use and convenient access by the children. Child care facilities must comply with the requirements for sanitary facilities that are contained in the National Construction Code.	The toilet facilities have been designed as per the requirements of the NCC. An adult hand basin has been provided in each of the children's toilet areas.
Toilet and hygiene facilities should be designed to maintain the amenity and dignity of the occupants	Partitions between the toilet pans to a maximum of 900mm have been provided. Adequate sightlines have been achieved with the provision of half-height glazing between the toilets and the activity room.
4.4 Ventilation and natural light - Regulation 110 Education and Care Services National Regulations Services must be well ventilated, have adequate natural light, and be maintained at a temperature that ensures the safety and wellbeing of children. Child care facilities must comply with the light and ventilation and minimum ceiling height requirements of the National Construction Code. Ceiling height requirements may be affected by the capacity of the facility.	Full height glazing to the activity rooms allows for abundant natural light. The classrooms will also benefit from mechanical ventilation and ceiling fans.

Component	Proposal
4.5 Administrative space - Regulation 111 Education and Care Services National Regulations A service must provide adequate area or areas for the purposes of conducting the administrative functions of the service, consulting with parents of children and conducting private conversations.	Office and foyer space has been provided.
4.6 Nappy change facilities - Regulation 112 Education and Care Services National Regulations Child care facilities must provide for children who wear nappies, including appropriate hygienic facilities for nappy changing and bathing. All nappy changing facilities should be designed and located in an area that prevents unsupervised access by children. Child care facilities must also comply with the requirements for nappy changing and bathing facilities that are contained in the National Construction Code.	Nappy change facilities are not required as children are aged 3-5 years.
4.7 Premises designed to facilitate supervision - Regulation 115 Education and Care Services National Regulations A centre-based service must ensure that the rooms and facilities within the premises (including toilets, nappy change facilities, indoor and outdoor activity rooms and play spaces) are designed to facilitate supervision of children at all times, having regard to the need to maintain their rights and dignity.	All rooms and facilities provide full and half height glazing appropriately located to allow for supervision of children.
Child care facilities must also comply with any requirements regarding the ability to facilitate supervision that are contained in the National Construction Code.	The proposed preschool design complies with requirements.
4.8 Emergency and evacuation procedures - Regulations 97 and 168 Education and Care Services National Regulations Regulation 168 sets out the list of procedures that a care service must have, including procedures for emergency and evacuation. Regulation 97 sets out the detail for what those procedures must cover including: ▪ instructions for what must be done in the event of an emergency ▪ an emergency and evacuation floor plan, a copy of which is displayed in a prominent position near each exit ▪ a risk assessment to identify potential emergencies that are relevant to the service.	An emergency evacuation plan has been provided outlining the procedures in an event of an emergency and evacuation of the children from the preschool area.
Multi-storey buildings with proposed child care facilities above ground level may consider providing additional measures to protect staff and children. For example: ▪ independent emergency escape routes from the facility to the ground level that would separate children from other building users to address child protection concerns during evacuations ▪ a safe haven or separate emergency area where children and staff can muster during the initial stages of a fire alert or other emergency. This would enable staff to account for all children prior to evacuation.	N/A
An emergency and evacuation plan should be submitted with a DA	Refer Appendices.

Component	Proposal
4.9 Outdoor space requirements - Regulation 108 Education and Care Services National Regulations An education and care service premises must provide for every child being educated and cared for within the facility to have a minimum of 7.0m2 of unencumbered outdoor space.	60 children @ 7.m^2 = 420m^2 minimum. The total preschool playground area totals 470m^2 with unencumbered outdoor space of 420m^2
If this requirement is not met, the concurrence of the regulatory authority is required under the SEPP.	External play space complies with requirements.
4.10 Natural environment - Regulation 113 Education and Care Services National Regulations The approved provider of a centre-based service must ensure that the outdoor spaces allow children to explore and experience the natural environment. Creating a natural environment to meet this regulation includes the use of natural features such as trees, sand and natural vegetation within the outdoor space.	The preschool playground area includes outdoor spaces that allow children to play with natural elements such as water & sand, including a sand pit for digging, and a variety of materials and surfaces including pebbles and softfall - the softscape design will explore options for small garden shortcuts and tactile/ aromatic plant species
4.11 Shade - Regulation 114 Education and Care Services National Regulations The approved provider of a centre-based service must ensure that outdoor spaces include adequate shaded areas to protect children from overexposure to ultraviolet radiation from the sun.	The outdoor play space includes a large covered undercroft as well as a shade structure in the outdoor play area. Existing mature trees provide dappled shade.
Outdoor play areas should: ▪ have year-round solar access to at least 30 per cent of the ground area, with no more than 60 per cent of the outdoor space covered. ▪ provide shade in the form of trees or built shade structures giving protection from ultraviolet radiation to at least 30 per cent of the outdoor play area ▪ have evenly distributed shade structures over different activity spaces.	50% of the combined total of outdoor play area receives solar access between 9am and 3pm in midwinter. Refer Landscape Plan for location of shade structures and planting.
4.12 Fencing - Regulation 104 Education and Care Services National Regulations Any outdoor space used by children must be enclosed by a fence or barrier that is of a height and design that children preschool age or under cannot go through, over or under it.	1200mm high fence is provided to the outdoor play area, which is enclosed within the school grounds and does not adjoin a public space.
Child care facilities must also comply with the requirements for fencing and protection of outdoor play spaces that are contained in the National Construction Code.	The balustrade complies with the NCC.
Design considerations for side and rear boundary fences could include: ▪ being made from solid prefinished metal, timber or masonry ▪ having a minimum height of 1.8 metres ▪ having no rails or elements for climbing higher than 150mm from the ground.	N/A

Component	Proposal
4.13 Soil assessment - Regulation 25 Education and Care Services National Regulations Subclause (d) of regulation 25 requires an assessment of soil at a proposed site, and in some cases, sites already in use for such purposes as part of an application for service approval. With every service application one of the following is required:	Refer Contamination Assessment for SSDA 9914.
▪ a soil assessment for the site of the proposed education and care service premises ▪ if a soil assessment for the site of the proposed child care facility has previously been undertaken, a statement to that effect specifying when the soil assessment was undertaken ▪ a statement made by the applicant that states, to the best of the applicant's knowledge, the site history does not indicate that the site is likely to be contaminated in a way that poses an unacceptable risk to the health of children.	Refer Contamination Assessment for SSDA 9914.
An assessment of soil for a children's service approval application may require three levels of investigation: ▪ Stage 1 - Preliminary investigation (with or without soil sampling) ▪ Stage 2 - Detailed site investigation ▪ Stage 3 - Site specific human health risk assessment.	

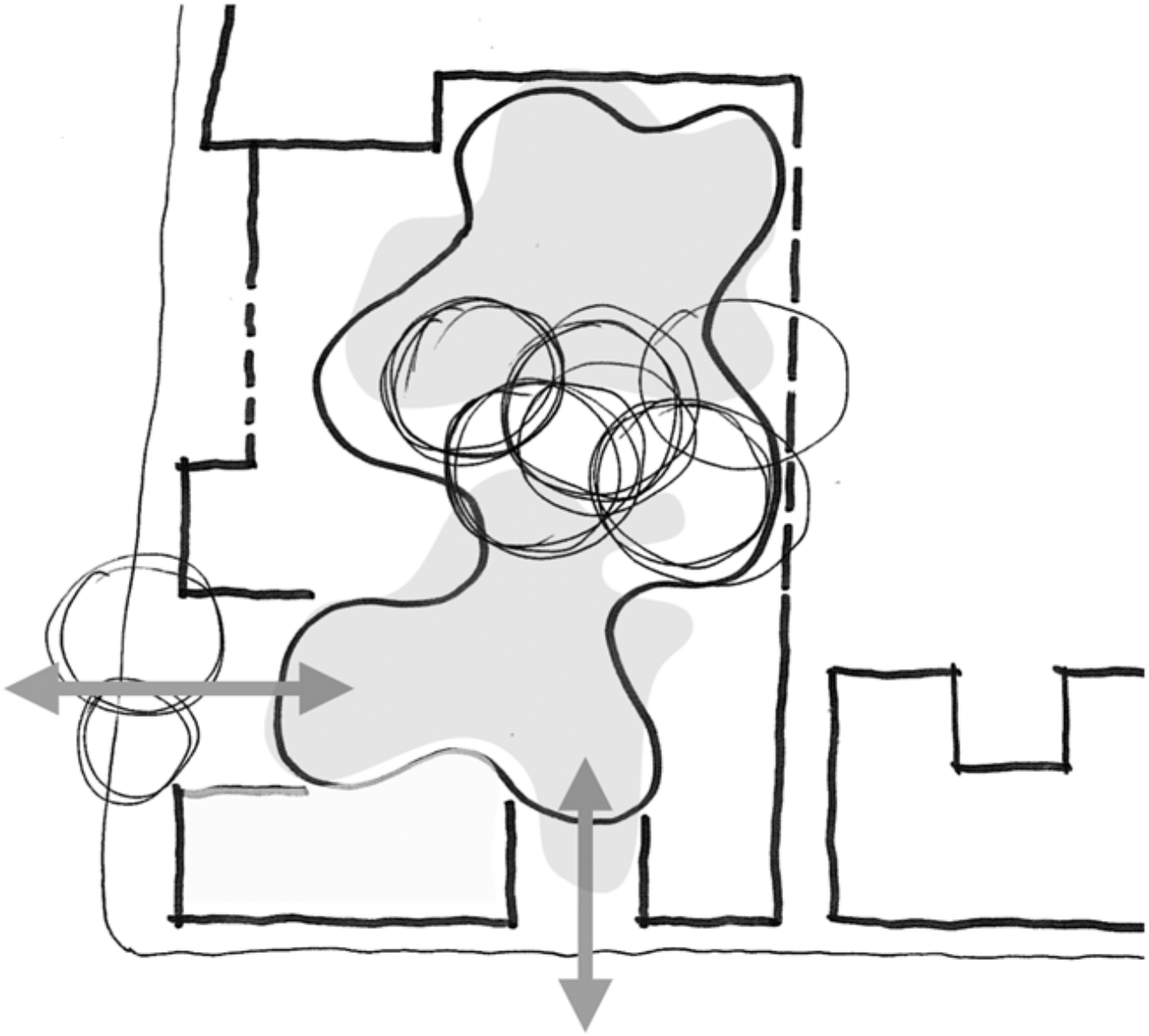
DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix HH — Electrical and Telecommunications Statement

SSD-9914

Prepared by Stantec

For NSW Department of Education



WOOD & GRIEVE ENGINEERS
NOW PART OF
Stantec

Electrical Memo

Enquiries: Peter Mizza
Project No: 44065

To: Brooke Matthews, FJMT

From: Peter Mizza

Date: 23 March 2020

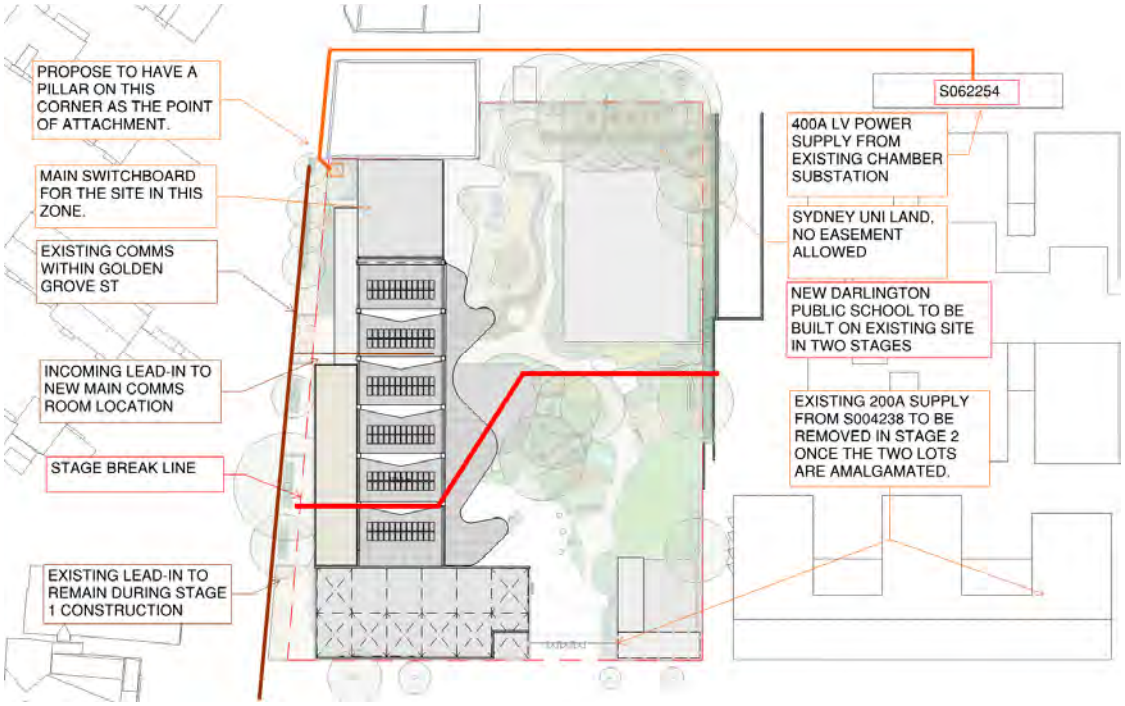
Subject: Darlington Public School - Electrical Services SSDA

The site will be fed from a new 400V low voltage power supply of 400A from the Ausgrid substation on Darlington Lane. The power supply will be fed to a pillar on the north western corner of the site. An application has been sent and an offer received from Ausgrid for the connection. The power supply works will be carried out by a Level 1 ASP contractor within the Early Works phase of the construction program. During the Early Works and Stage 1, the existing power supply to the school will be retained until Stage 2 construction commences.

The incoming power supply will feed a new main switchboard constructed in Stage 1 of the construction program. This main switchboard will feed the other distribution boards throughout the site installed in Stage 1. The distribution boards in Stage 2 will be fed from the main switchboard, to be installed through the conduits provided in Stage 1.

The site communications shall be fed from the existing NBN and other fibre infrastructure installed along Golden Grove Street. A new main communications room shall be established within the Library and Admin building where a new lead-in cable be supplied. The existing incoming communications will remain in place to service the existing school areas until Stage 2 construction commences, when the new communications connection will supply the whole school.

The site shall be provided with external lighting. The lighting shall comply with the EFSG requirements and AS4282:1997.



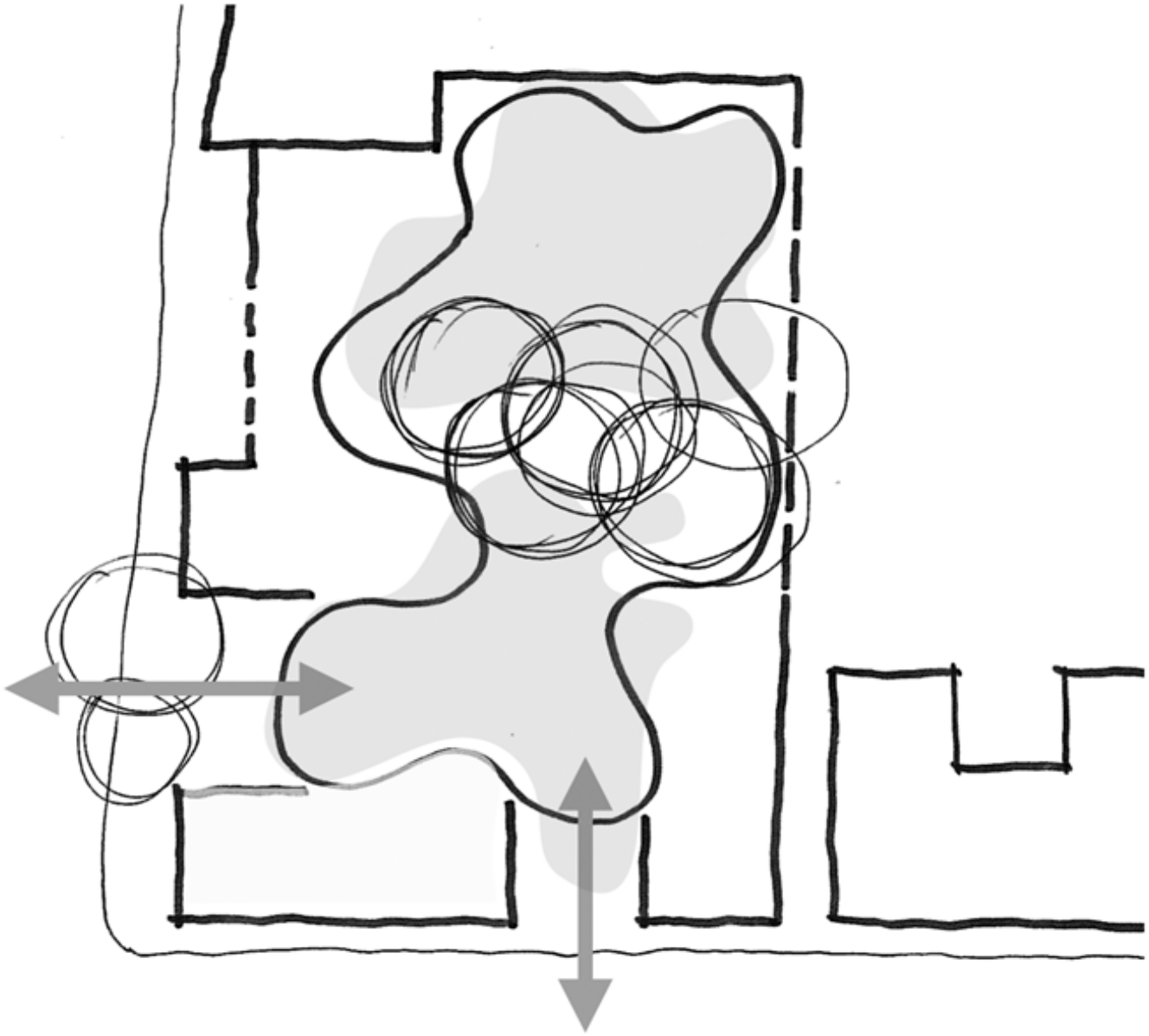
DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix I — Landscape Report

SSD-9914

Prepared by FJMT

For NSW Department of Education



DARLINGTON PUBLIC SCHOOL
SSD - 9914 LANDSCAPE REPORT

GOLDEN GROVE STREET, DARLINGTON, SYDNEY
Department of Education

fjmt studio architecture interiors urban landscape
28 April 2020 Rev 02

Project Name		Darlington Public School	
Project Code		DTPS	
Document Name		SSD-9914 Architectural Design Statement	
Revision	Date	Comment	Approved
01	09.04.20	Preliminary SSD Report	EC
02	17.04.20	SSD Report	EC
03	28.04.20	SSD Report Update	EC

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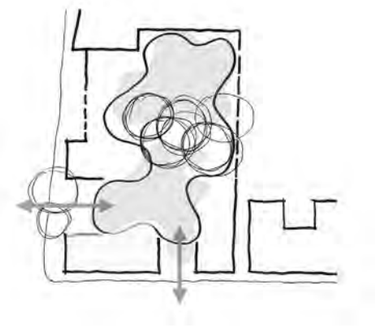
w fjmtstudio.com

Francis-Jones Morehen Thorp Pty Ltd ABN 28 101 197 219
Nominated architect Richard Francis-Jones ARBNSW 5301
Registered architect Richard Francis-Jones
Francis-Jones Morehen Thorp Ltd Company no 7384142 ARB 078103G

CONTENTS



DESIGN PRINCIPLES

Guiding Design Principles

Schools have a vital civic role, and form an important part of the community.

Schools' primary role is to deliver educational outcomes, however, they also have opportunities to engage more broadly with their communities.

The design principles included within this section aim to provide a framework for the Master Plan and to direct the development of the design solution.

They offer a high level of aspiration and quality control which will be used to test options to ensure they align with the Master Plan's intent.

The Design Principles have been grouped under the over-arching EFSG and Educational Space Planning Principles as developed by New Learning Environments and the school community.

Relationship to Darlington Public School Education Model

The Design Principles are to be considered in conjunction with the Darlington Educational Model which identifies the spatial implications of specific pedagogical approaches and the over-arching influence of the Reggio Emilia philosophy.

Education SEPP Design Quality Principles

In the new Education SEPP 2017, there are a number of design quality principles included in the legislation to encourage design excellence. Any application under this legislation will be required to provide a design statement that outlines how these principles have been incorporated.

The SEPP Design Quality Principles include:

- Context, built form and landscape
- Sustainability, efficiency and durability
- Accessibility and inclusiveness
- Health and safety
- Amenity
- Whole of life, flexibility and adaptability
- Aesthetics

LANDSCAPE

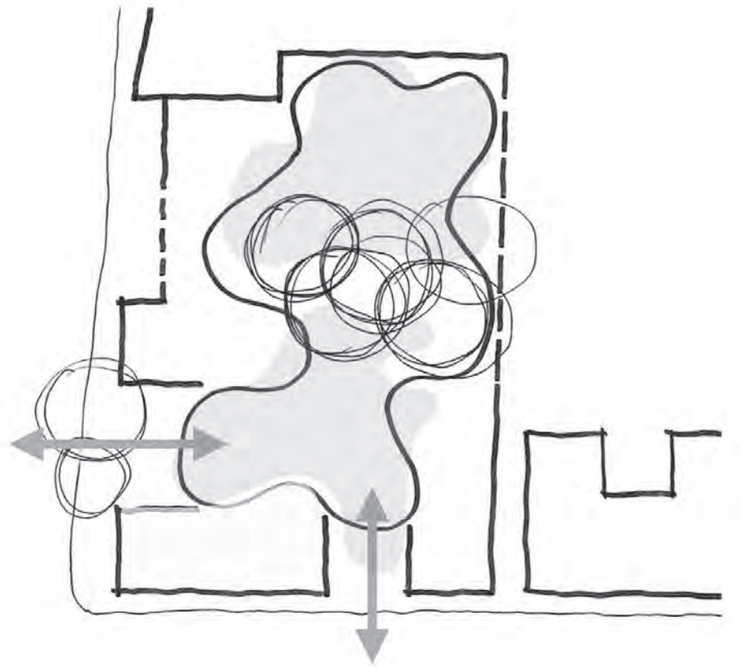
The design philosophy for the Darlington Public School playground centres around providing diverse play spaces with a variety of scales and the maximisation of functionality by providing overlays of potential uses.

The topography and grading of the site creates challenges and opportunities for the landscape design. Pedestrian movement and wheelchair access have been important drivers in creating a series of connected and functional spaces.

The playground embraces opportunities to create learning spaces, outdoor rooms and areas of active, imaginative and quiet play through the use of the connected paths and changing landforms.

Each play space is linked to possible learning games and different learning languages, featuring water, sand, rock, climbing, balls games, lines and decks, pathways and shortcuts.

The design also explores ways to embrace the indigenous culture of Darlington Public School and electorate the rich artistic heritage of the school.

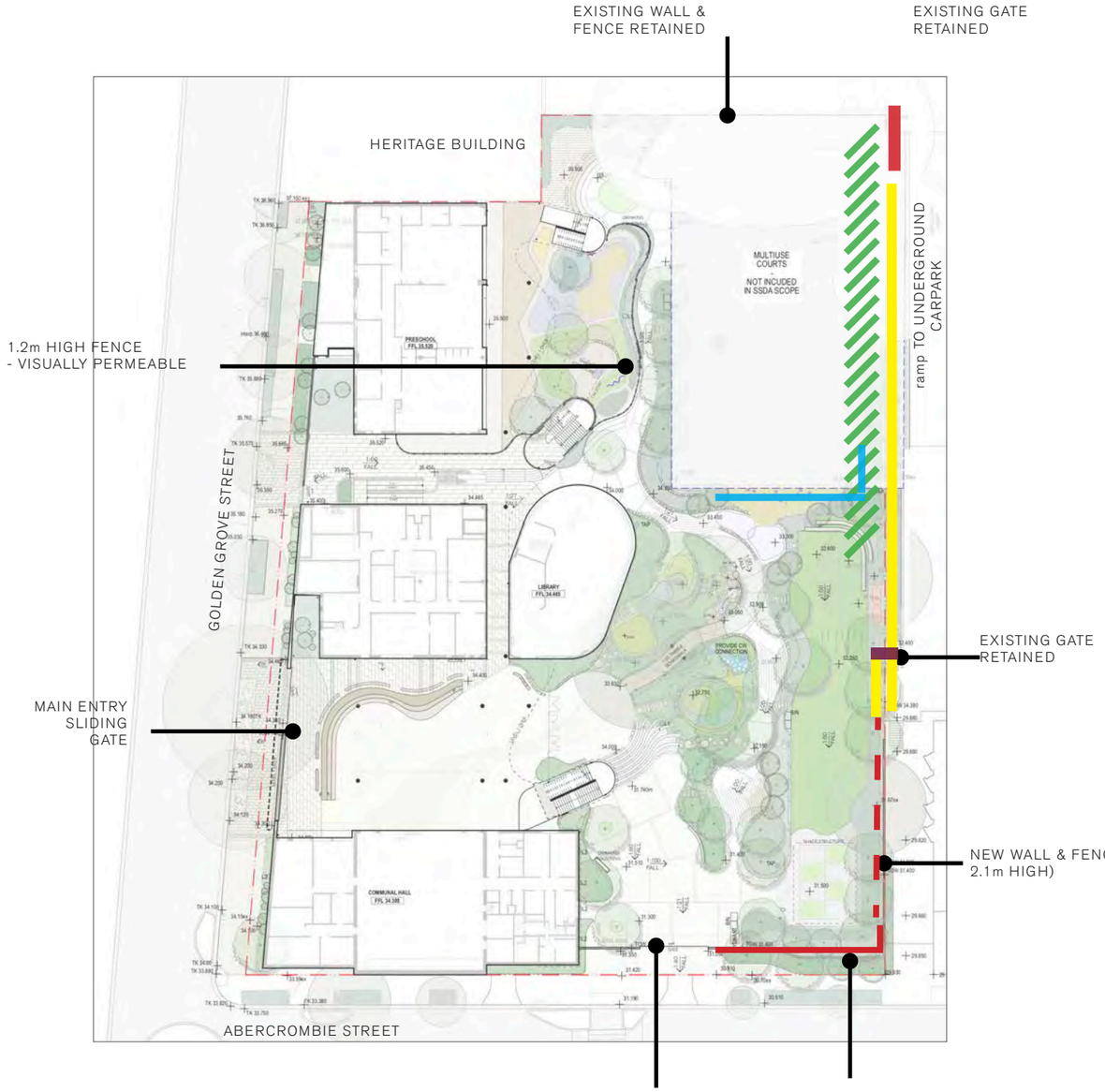


LANDSCAPE CHARACTER ZONES

COMPLETED SCHEME

1. COLA / Assembly Area
2. Nature Play / Indigenous gardens
3. Hardcourt / Multipurpose play
4. The Amphitheatre
5. Active Play
6. Active Play - Ball games
7. Linear Garden & Sculptural Fence
8. Preschool playground & garden
9. Climbing wall

SECURITY & FENCING



LEGEND

- EASTERN GARDEN - RETAIN EXISTING SOFTSCAPE EDGE - SOME REGRADING & REPLANTING MAY BE REQUIRED
- REINSTATE FENCE & GATE - STAGE 2 WORKS
- EXISTING WALL RETAINED

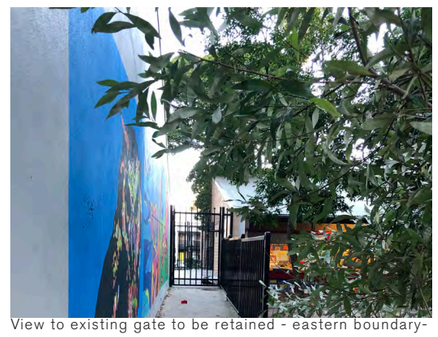
Security Strategy

The design of the new school considers the role of the building as a secure perimeter, where possible fences are minimised and the building is used as a secure line.

The new development proposes the retain existing gated access to the eastern boundary and reinstate the existing gated connection between the school and the University of Sydney building.

The new school design includes entry walls and gates to Golden Grove and Abercrombie Streets to complete the security strategy. There are described on the following page.

View to Eastern Boundary - wall to be retained



View to existing gate to be retained - eastern boundary-

View to Sydney University Student Accommodation - from Abercrombie Street

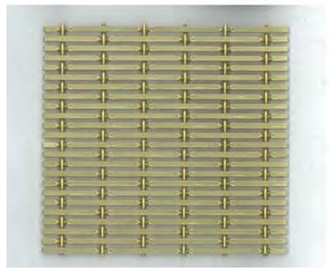
SECURITY & FENCING

Golden Grove Street - Main Entry - Elevation

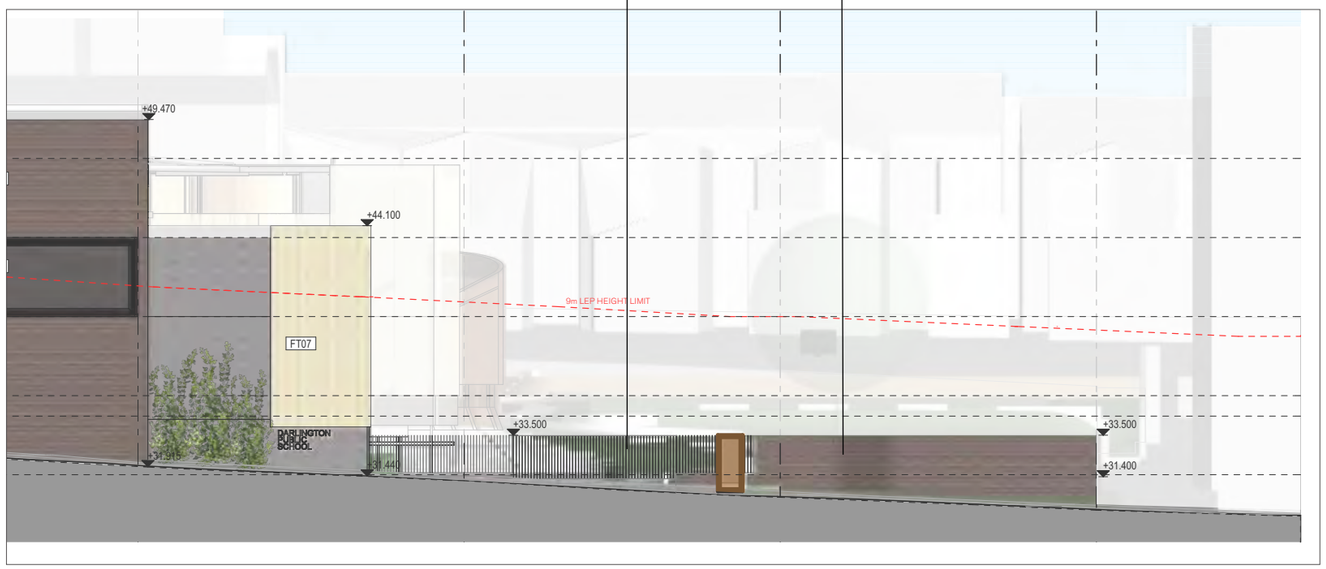
Sliding Gates
Vertical blades - powdercoat bronze to match Architectural

Entry fencing (atop brick wall)
Vertical blades - powdercoat dark grey to match Architectural

Brick wall provides protection from flood events - brick selection to match the Architectural finishes



Playground-side - bronze mesh



Abercrombie Street - Secondary Entry

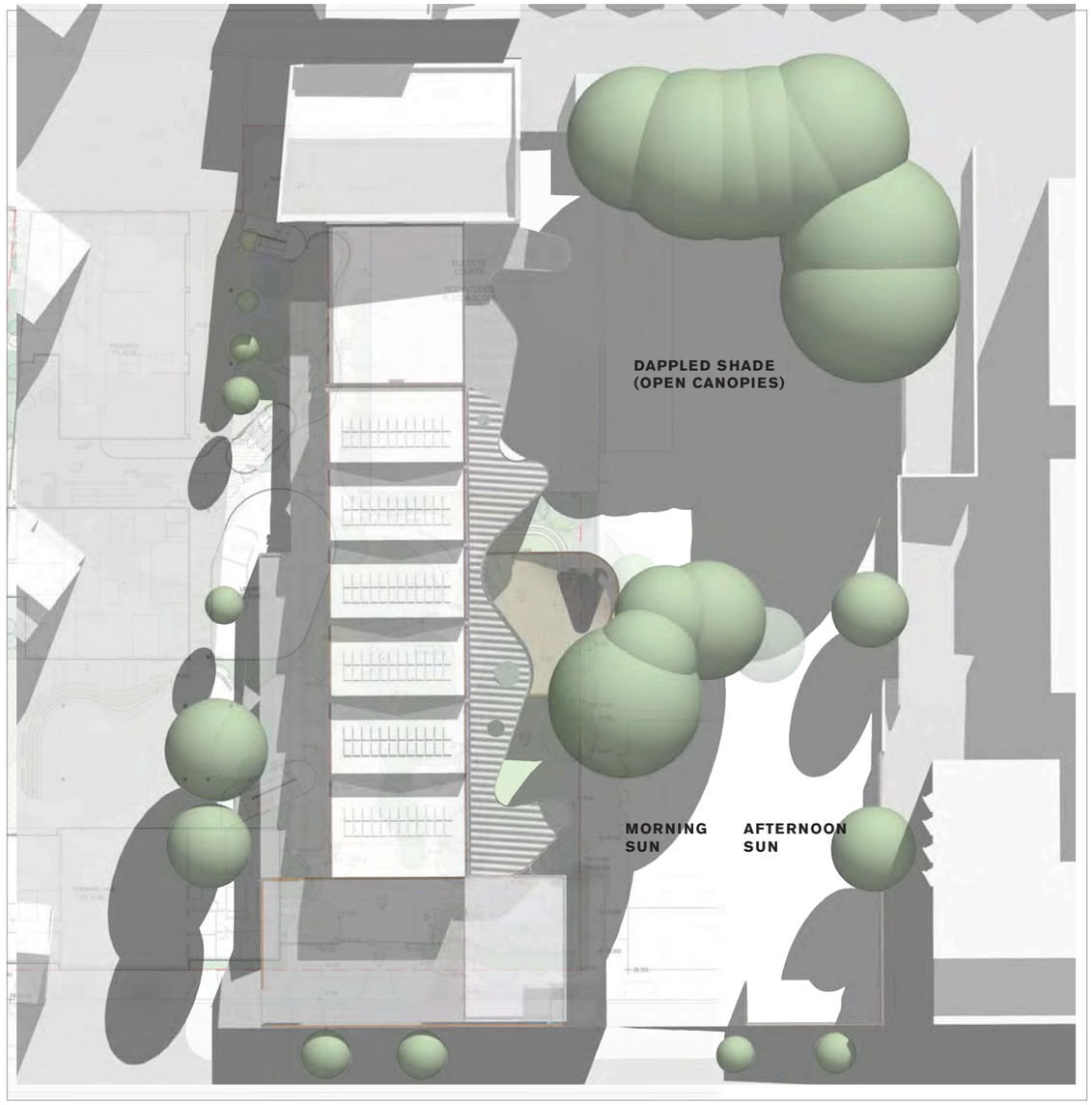
Entry fencing - Vertical blades - powdercoat dark grey to match Architectural finishes

Brick wall provides secure school boundary (min 2.1 high)- brick selection to match the Architectural finishes

SHADE

Summer

Winter



Sun Study

The results of the study suggest that the following should be considered in the design:

- consider deciduous tree planting adjacent the basketball court to provide additional summer shade whilst maintaining winter sunlight

- select locations for trees on the preschool to provide afternoon summer protection, maintain a winter sun trap

- provide additional semi-permeable shelter to provide additional shade to the soft eastern sports court.

TOPOGRAPHY

Levels

LEGEND

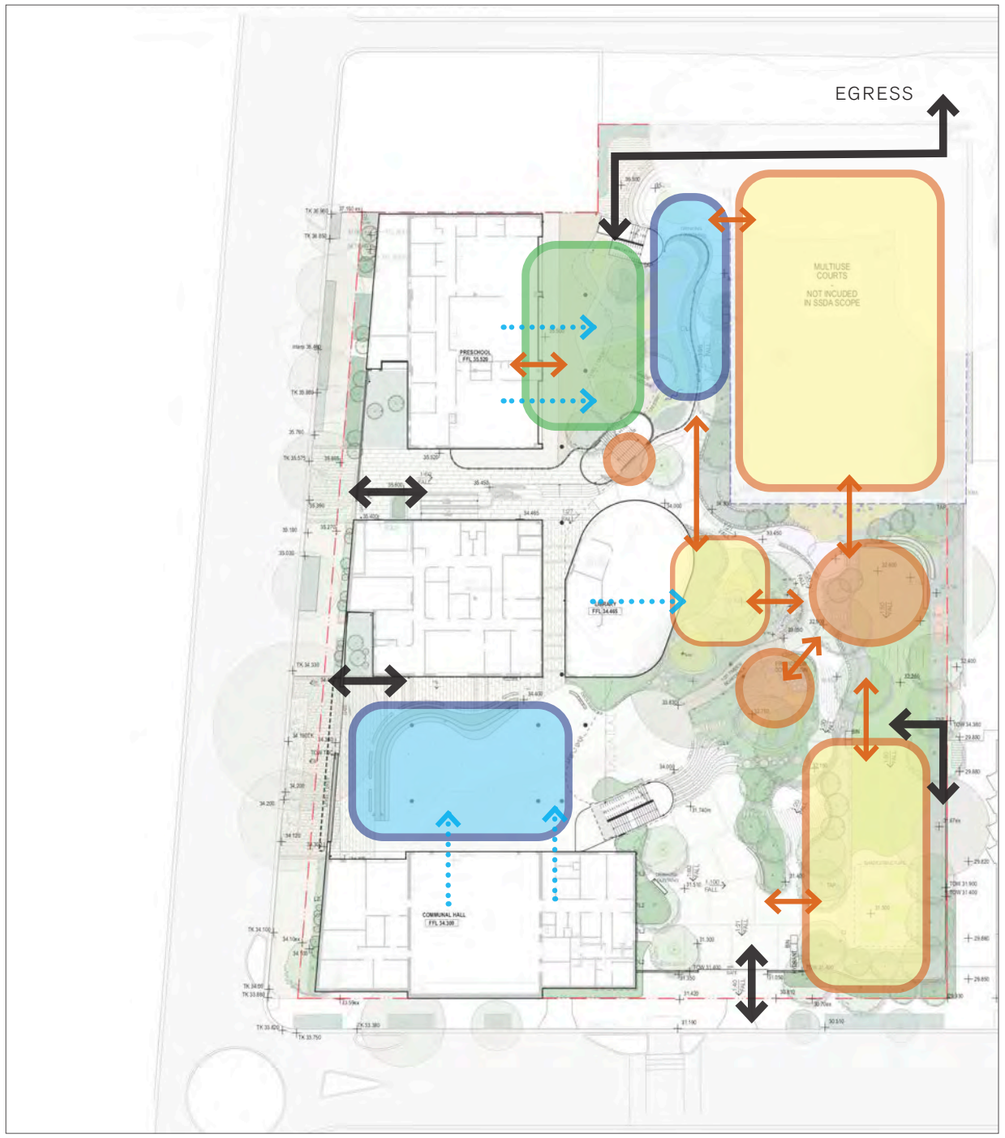
+30.80ex	EXISTING LEVEL
FFL33.650	BUILDING FINISH FLOOR LEVEL
+30.80	DESIGN RL

Accessible circulations

LEGEND

- WHEELCHAIR CONNECTIONS
- STEPPED/ STAIRWAY CONNECTIONS
- SCHOOL ENTRANCE
- BUILDING ENTRANCE

Areas and Connections



LEGEND

- ACCESS TO PLAY
- VIEWS
- PEDESTRIAN MOVEMENT

Indigenous Overlay and Artwork

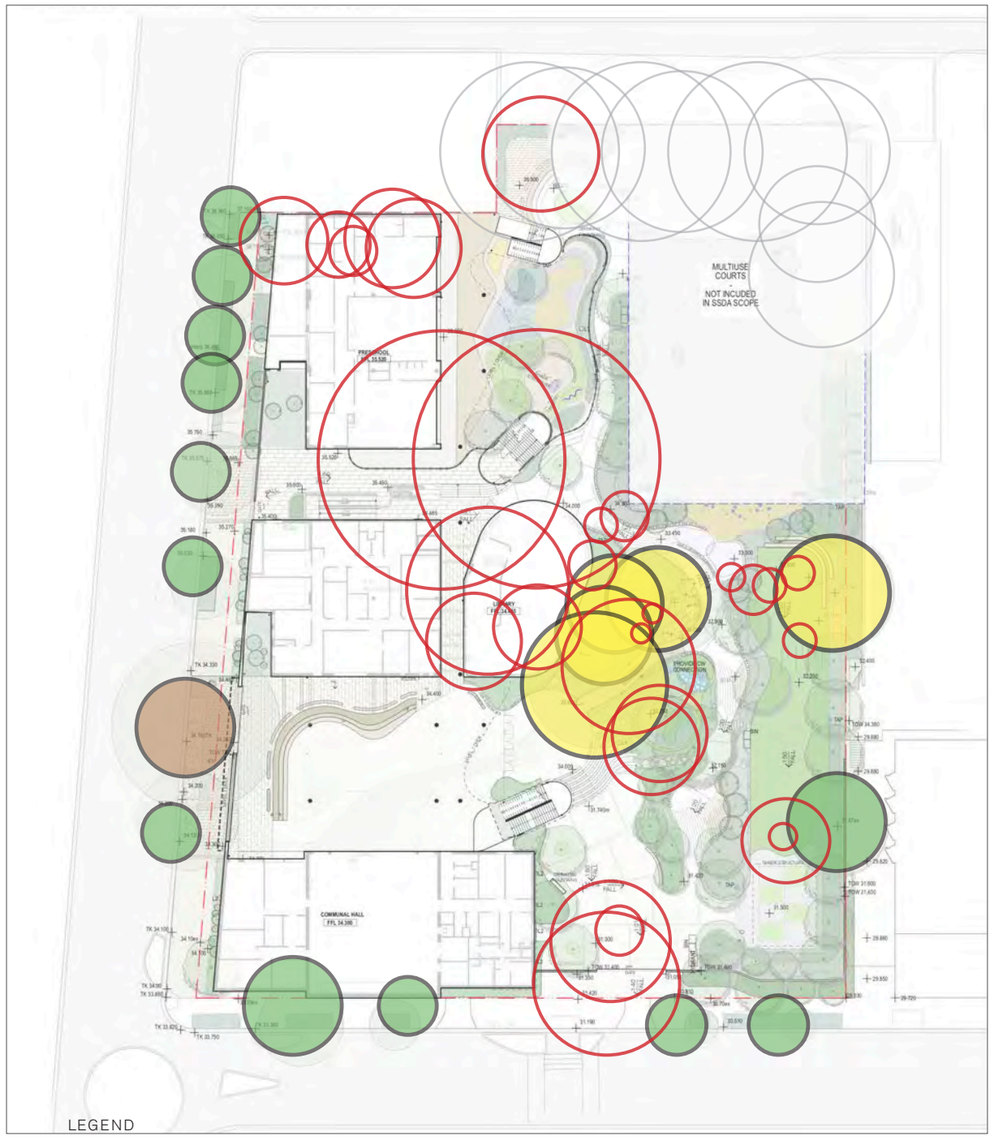
LEGEND

- ARTWORK MOUNTED TO EXISTING WALLS
- ARTWORK MOUNTED TO / OR INTEGRATED WITH NEW WALLS
- WALL ART RELAID INTO THE FACE OF NEW TERRACE SEATS
- ART & / OR INDIGENOUS INTERPRETATION:
  - SET INTO THE UNDERCROFT OF THE ROOF ABOVE
  - INLAID INTO THE NEW PAVED COLA AREA
  - LOCATED IN THE NATURE LEARNING PLAYGROUND OR SCULPTURE GARDEN
  - INTEGRATED WITH THE SCULPTURAL FENCE

A number of opportunities for Art and Indigenous Interpretation are present in the Landscape. Existing artistic works could be salvaged and relaid / mounted into new landscape elements. New artworks could also be incorporated in the outdoor spaces.

EXISTING VEGETATION

Tree management plan



EXISTING TREE TO BE RETAINED

EXISTING TREE TO BE RETAINED SUBJECT TO FINAL LEVEL CONFIRMATION

EXISTING STREET TREE TO BE RETAINED SUBJECT TO FOOT-PATH LEVELS / ARBORIST ADVICE

EXISTING TREE TO BE REMOVED

PROPOSED TREES

RETAINED TREES:
5 (WITHIN SITE BOUNDARY)
12 (STREET TREES)

REMOVED TREES: 25
PROPOSED TREES: 35

PROPOSED TREE

ESD & WSUD

Ecological Sustainable Development & Water Sensitive Urban Design

LEGEND

ON SITE DETENTION & RAINWATER TANKS

GAMES COURT SHED WATER TO RAINGARDENS FOR WATER QUALITY TREATMENT

VEGGIE PATCH AND WORM FARM - ECOLOGICAL LEARNING

PASSIVE IRRIGATION TO GARDENS ADJACENT PATHS

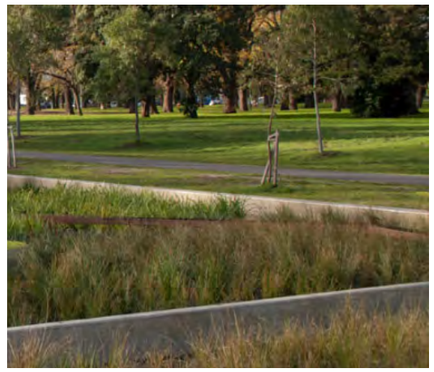
IRRIGATION TO LANDSCAPE TURF & GARDEN AREAS

STORMWATER OVERLAND FLOW

Ecological principles are integrated into the landscape design with the primary focus on water. Principles such as water sensitive urban design (WSUD), plant selection process and site micro climatic analysis inform the layout, materials selection and environmental response.

The primary landscape ESD initiatives include:
Fall paving to facilitate surface water recharge to mass planting beds to reduce potable water usage
Provide an appropriate area of planting to improve air quality and reduce the urban heat island effect; and select hardy, low water use, indigenous plant species where possible suited to the harsh urban environment.

Water is a key sustainable focus in the Australian landscape. Although many of the plant species to be selected will have low water requirements (and therefore are inherently water conserving), water-efficient subsoil drip irrigation systems are proposed to ensure that the landscape is maintained to the high standard required.



STREETSCAPES & CONNECTIONS

A number of policy and strategy documents were reviewed in relation to the project - to confirm surrounding bicycle and pedestrian connections, planned connections and their relation to the Darling School streetscapes. The review confirmed that Golden Grove, as the main entrance to the school, is a significant link between priority pedestrian and bicycle networks. A summary of the review is provided below.

Streetscapes Codes

The Code indicates that inset concrete pavement is a suitable treatment for Local Area footpaths.

- the proposed streetscape works includes upgrades to the existing concrete footpath (to match existin and the extension of internal unit pavers to a section of the footpath to emphasize the school address to Golden Grove Street.

- the concrete footpath to Abercrombie Street will be retained / made good as required.

Street Tree Planting
A review of the City's Street Tree Masterplan indicates that:

Golden Grove - Eucalyptus microcorys

Abercrombie - Lophostemon confertus

Street trees will be retained along both streets - resin bonded gravel is proposed to the tree surrounds for the Main Entrance and the entrance to the Preschool - this treatment is proposed to maintain oxygen and moisture to the tree whilst protecting it from high pedestrian traffic.

Any future tree planting should consider the recommendations of the Street Tree Masterplan.

CONSULTATION

The development of the design for the proposed school included several meetings with Darlington Public School Staff & the community

A summary of consultation with the School principal and the staff representative is provided below:

- Can the design include as much kick-about area as possible, increase the size of the open area create more kick about area

- The seating and multifunctionality of the outdoor amphitheatre is good

- Preference not to retain the She Oak trees as they drop too many needles and cause slippery surfaces

- Include power outlet connections to the upper basketball court - this area is used for performances and events

The following points were raised several time as important to the students, the community and staff:

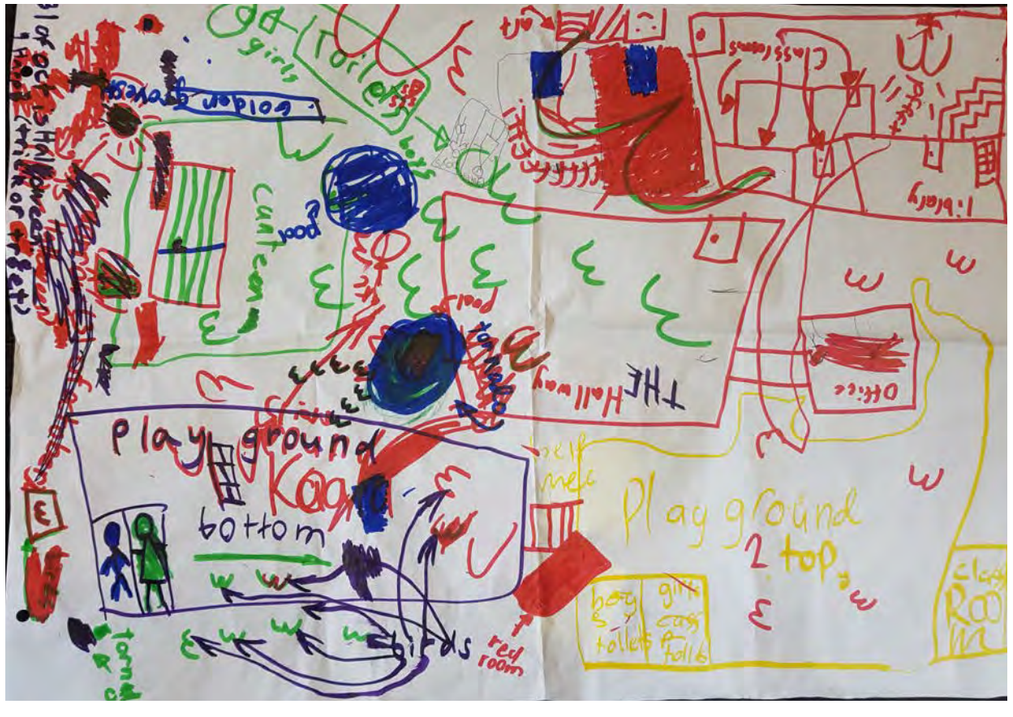
- Allow for good access, links for bikes, scooters, provide accessible connections, more than 1 entry/ exit

- Native planting, tree retention, indigenous gardens

- More kick about area, less hard paving

- More play equipment

- Good sight lines



DARLINGTON INFORMATION SESSION // FEEDBACK

Feedback summarised into reoccurring categories found in the feedback forms from Sessions 1 & 2

STAKEHOLDERS	ACCESS	MATERIALS	LANDSCAPE	EDUCATION	PLAY	EXTRAS
COMMUNITY MEMBER / PARENT #1	Pram access throughout the site. Top to bottom access as some parents drop of at pre-school and then need to send other kids to class at bottom of campus	Brick, slatted timber	Bush garden,Integrate landscaping + play spaces	Convey indigenous culture; local indigenous kids to present to school community plants etc + how used in indigenous culture.	Open play that integrate landscaping.	Undercover bike / scooter storage
#2		Solar panels; In the detailed design phase, looking forward to learning more about solar panel installations given the location	Tree retention, but also the use of native species in the redesign & landscaping			
#3						More specific & informative. Like session on classroom design. Very positive at design level and it is evolving. Very happy to have more than the info boards and capture our feedback.
#4						Satisfied, no further comments
#5	Accessibility from hall for hire/ passive income			Indigenous/food gardens for business purposes passive income		Looking at business opportunities
#6			Community garden with indigenous foods / bush tucker	Workable kitchen for extra curricular activities. Allows children to watch their fruit/vegetables grow, then prepare them in a kitchen (cooking class)	Agriculture learning experience via community garden	
#7			Rooftop garden / ground maintenance considered based on tree type and removal of branches	Composting	Casual play area for kids when parents busy at school (P&C etc)	Passive income via the garden
#8		Retain the red doors	Casuarina trees analysed, keep the tawny frog mouths and birds satisfied	Community room for elders to educate		Would like GML consultation to be used, was very happy with the GML consultation process
STUDENTS	Toilets are too far away, would like more / Seperate exit and entrance for bike storage	Retain the red doors	Community veggie garden, hardscape for play. Grassy spots for games, free play and sports	Chalkboards, outdoor learning.	Tip, soccer, handball, monkey bars, more play equipment, integrated play [like the pre-school] climbing web, tree house, play equipment, tunnels and rock climbing. Sand play,	Searching for pokemon, don't like stones or hard surfaces, more grass.
COMMUNITY CONSULTANTS	80% ride / walk to school. Casual play area near the drop/pick up zones. ASC occupies hall every afternoon meaning that no one else can use it, can we create an alternative space? Agriculture learning experience via community garden. Why is the ASC not located with the Pre-school? Will the corner building at the roundabout be recessed in? She Oak trees creating maintenance issues. Seating in the middle as you can see both gates.					

Summary of Stakeholder's notes and key points to consider as these were re-iterated throughout the feedback.

OVERVIEW	ACCESS	MATERIALS	LANDSCAPE	EDUCATION	PLAY	EXTRAS
KEY POINTS:	Access from the top to the bottom of the site which is pram friendly. Access near the hall to allow events to occur / making it easy to hire out. Access to toilets throughout the playground helpful for the children. Shortcuts that children would potential take to be considered when creating access and selecting materials.	Retain the iconic red doors at the front of the school. A modern aesthetic which isn't too 'clinical'. Suggested use of solar panels due to the schools location.	Community garden with indigenous plants which can be presented by the elders of the community. Food preparation to be incorporated into L&D. Natives, tree retention preferred, ongoing ground maintenance to be considered.	Convey indigenous culture; local indigenous kids to present to school community plants etc + how used in indigenous culture. Open the library to an outdoor area. Outdoor educational areas.	Open play that integrate landscaping. Open grass areas for sport and hardscape for other games such as handball. Play equipment is locked up in the pre-school, kids wish to continue having access to it.	Creating passive income / business opportunities.
	Bike Storage	**View Points**				
FURTHER DETAILS TO CONSIDER:	Undercover, to be able to ride in to the parking area and have more than one entry/exit.	The middle of the site, both gates can be viewed, good sight-lines for supervision.				

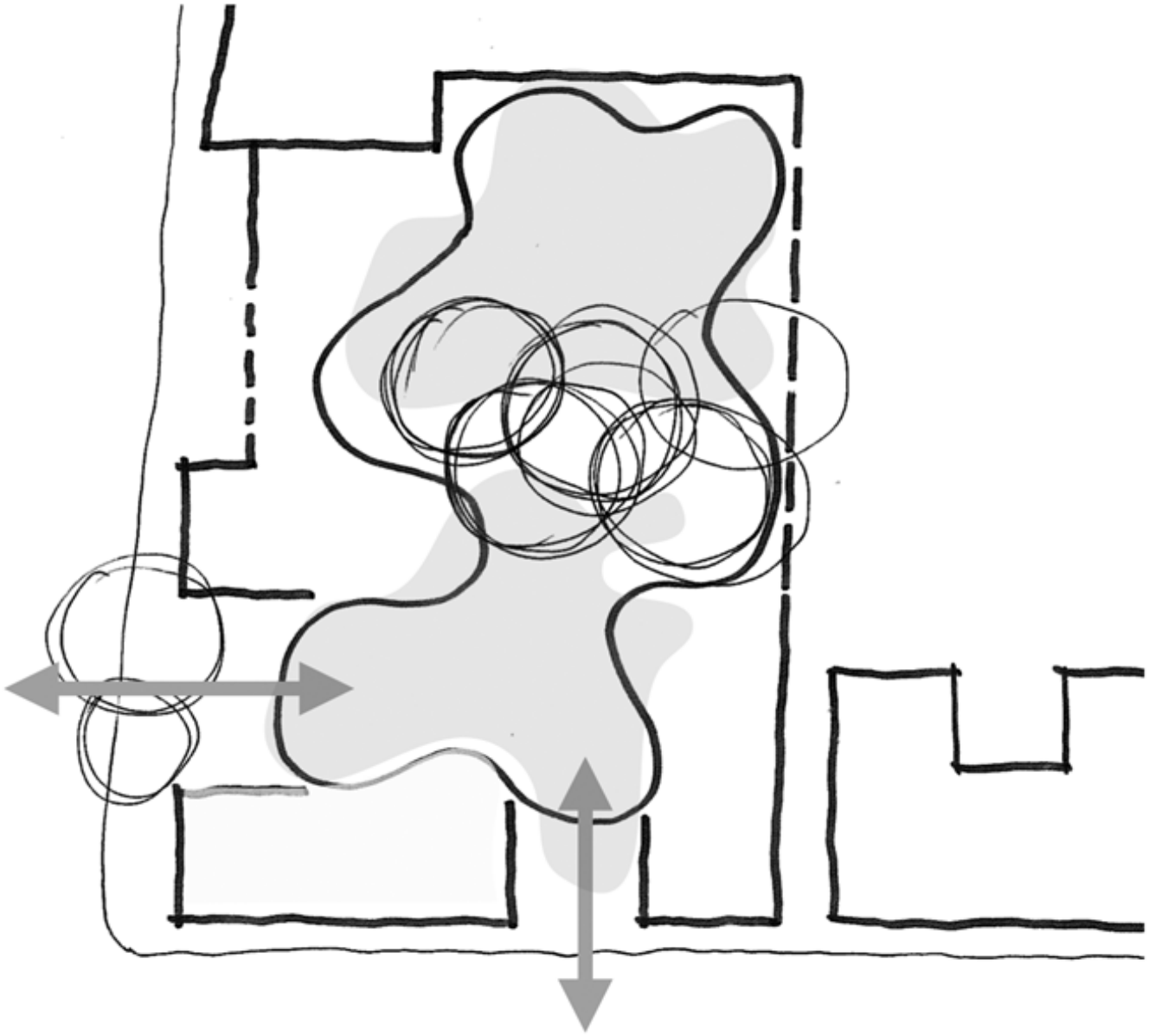
DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix II — Lot Consolidation Plan

SSD-9914

Prepared by CMS

For NSW Department of Education



PLAN FORM 6_E (2020)	**DEPOSITED PLAN ADMINISTRATION SHEET**	Sheet 1 of 2 sheet(s)

Office Use Only

Registered:

Title System: TORRENS

Office Use Only

DP

PLAN OF CONSOLIDATION

OF LOT 100 IN D.P.623500 AND LOT 592 IN D.P.752049

LGA: SYDNEY

Locality: DARLINGTON

Parish: PETERSHAM

County: CUMBERLAND

Survey Certificate

I, STUART BRIAN MCEVOY

of CMS Surveyors Pty Ltd, PO Box 463 Dee Why NSW 2099

a surveyor registered under the *Surveying and Spatial Information Act 2002*, certify that:

(a) ~~Survey~~

(b) ~~Partial Survey~~

(c) The land shown in this plan was compiled in accordance with the Surveying and Spatial Information Regulation 2017.

Type: Urban ☑ Rural ☐

Signature: Dated:

Surveyor Identification No:

Surveyor registered under the *Surveying and Spatial Information Act 2002*

~~Crown Lands NSW/Western Lands Office Approval~~

~~I, ----------(Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.~~

~~Signature: ----------~~

~~Date: ----------~~

~~File Number: ----------~~

~~Office: ----------~~

~~Subdivision Certificate~~

~~I, ---------- certify that the provisions of section 6.15 of the *Environmental Planning and Assessment Act 1979* have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.~~

~~Signature: ----------~~

~~Accreditation number: ----------~~

~~Consent Authority: ----------~~

~~Date of endorsement: ----------~~

~~Subdivision Certificate number: ----------~~

~~File number: ----------~~

Plans used in the preparation of compilation.

DP623500
10319-2030

Statements of intention to dedicate public roads, create public reserves and drainage reserves, acquire/resume land.

Surveyor's Reference: 17702C

PLAN FORM 6_E (2020) **DEPOSITED PLAN ADMINISTRATION SHEET** Sheet 2 of 2 sheet(s)

Office Use Only

Registered:

PLAN OF CONSOLIDATION

OF LOT 100 IN D.P.623500 AND LOT 592 IN D.P.752049

Subdivision Certificate number:

Date of Endorsement:

Office Use Only

DP

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - See 60(c) *SSI Regulation 2017*
- Statements of intention to create and release affecting interests in accordance with section 88B *Conveyancing Act 1919*
- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Lot Number	Sub-Address Number	Address Number	Road Name	Road Type	Locality Name
1		417-445	ABERCROMBIE	STREET	DARLINGTON

If space is insufficient use additional annexure sheet

Surveyor's Reference: 17702C

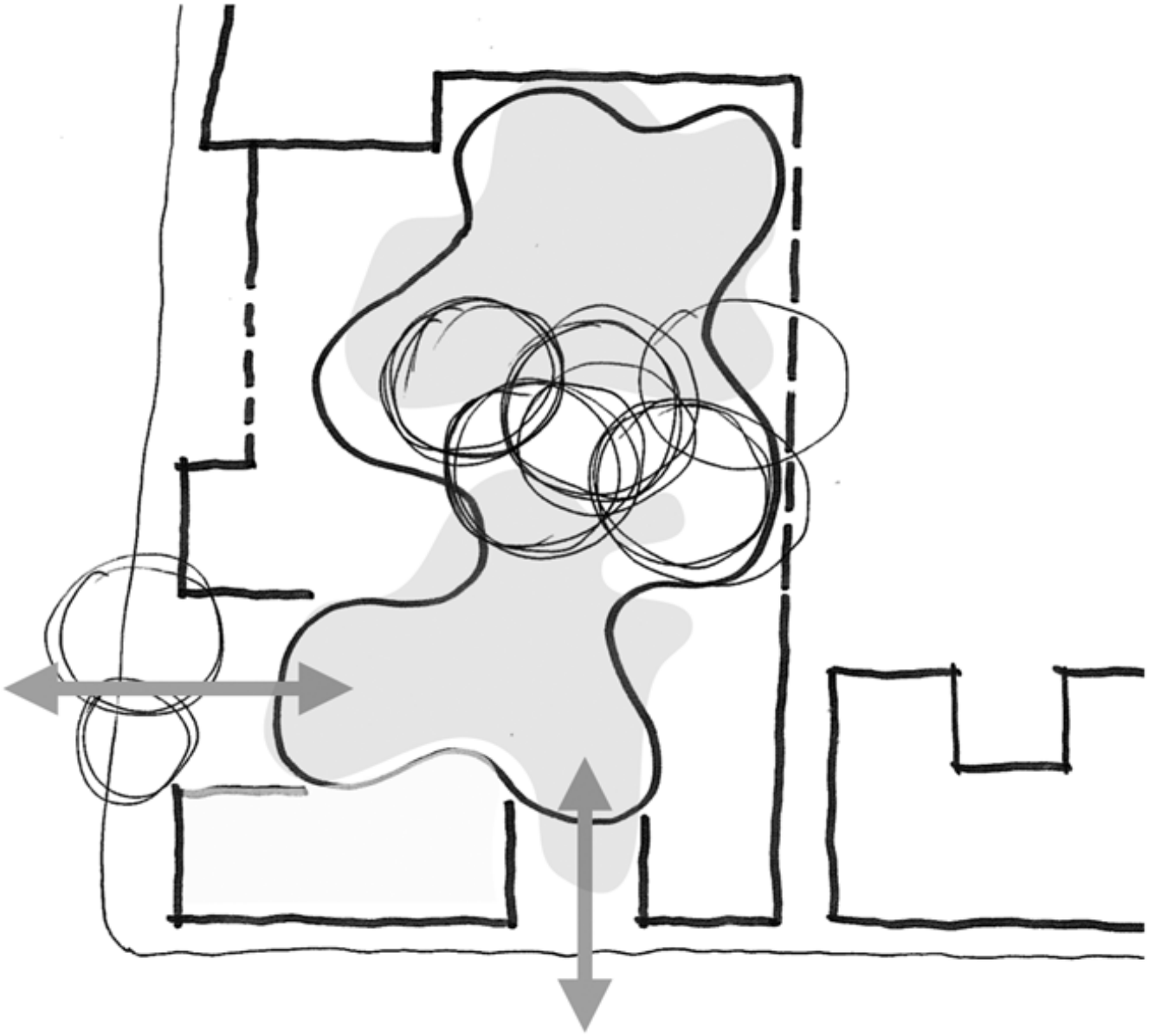
DARLINGTON PUBLIC SCHOOL REDEVELOPMENT

Appendix J — Landscape Drawings

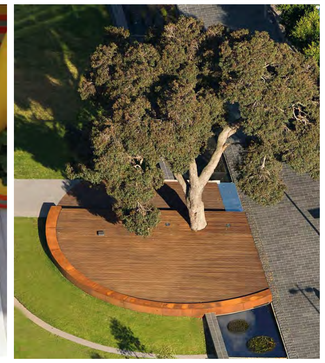
SSD-9914

Prepared by FJMT

For NSW Department of Education



1 Preschool play
3 Active Play
4 Nature Play
5 Amphitheatre
6 MainEntrance
7 COLA & seating terraces
8 Hardcourt



0 2.5 5 10m

GENERAL NOTES

- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK.
- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'.
- DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY.

LEGEND

- SITE BOUNDARY
- **EX RL** Existing Relative Level
- **FFL** Finished Floor Level (internal)
- **RL** Relative Level
- **SSL** Structural Slab Level
- **TK** Top of kerb Level (Survey)
- Existing tree to be retained
- Proposed tree
- Amenity planting
- Astro Turf (Kickabout area)
- Timber decking
- Stone paving
- Concrete unit paving & concrete (50:50)
- Recycled brick paving
- Concrete Pathway
- Softfall
- Asphalt - with linemarking
- Steppers / balancing logs / stone blocks
- Rock climbing handles Vertical elements nom.1800 high - to deflect sports balls
- Sculptural Fence
- School Boundary Fence
- Raised veggie gardens
- Seat wall
- Wall Type #
- Sandstone Blocks
- FP Flagpole
- L1 Light Type #
- Double General Power Outlet

Refer Electrical Engineers' Drawings

- Grated Drain
- Pit

Refer Civil Engineers' Drawings

rev	date	name	by	chk
03	28/4/20	SSDA Submission		CD
02	17/4/20	SSDA Submission		CD
01	9/4/20	For 70% Schematic Design		IL
A	1/4/20	For 70% Schematic Design		CD

fjmt studio architecture interiors landscape urban community
sydney melbourne uk
Level 5, 70 King Street t +61 2 9251 7077 w fjmtstudio.com

fjmt

project

Darlington Public School
Golden Grove Street
Darlington NSW 2008

title

Landscape Plans
Landscape Ground Plane Plan

scale	1:250 @ A1	first issued	1/4/20

project code	sheet no.	revision
DTPS	**8001**	**03**

0 2.5 5 10m

GENERAL NOTES

- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK.
- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'.
- DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY.

legend

TREE PROTECTION

In order to ensure the retention of the trees to be retained the following measures are to be taken:

All detailed architectural, building, engineering (structural, stormwater and drainage, services) and landscape documentation submitted for the construction certificate application shall show the retention of these trees, with the position of their trunks and full diameter of their canopies clearly shown on all drawings.

All detailed documentation submitted for the construction certificate application shall show no alteration in the existing soil levels, cutting or battering of the existing soil profile as per the Arboricultural Assessment. A qualified site arborist is to be engaged for the duration of the works to administer compliance with those conditions relating to trees on the site, with all the site staff to adhere to the arborists instructions.

The trees are to be physically protected by the installation of a steel mesh/chainwire as specified by the site arborist. This fencing shall be installed prior to the commencement of construction works, and shall remain in place until all works are completed, with signage containing the following words: 'tree protection zone, do not enter, clearly displayed and permanently attached. Within this zone there is to be no storage of materials or machinery or site office/sheds, nor is cement to be mixed or chemicals spilt/disposed of and no stockpiling of soil or rubble. Any works required within this zone (only as approved on the construction certificate) shall be under the direction of, and to the satisfaction of, the site arborist.

All site services shall be located as far as practically possible from the trunks of all these trees, with any excavations within 5 metres of either trunk for footings, structures, services, pipes, stormwater infiltration systems etc. to be performed by hand, with any roots encountered to be cut cleanly by hand and the affected area backfilled as soon as practically possible. Composted organic material (vitagrow landcure or similar equivalent) shall be provided to a depth of 100mm within the fenced off protection area, and shall be maintained for the duration of the works.

Irrigation shall be supplied to the trees, within the fenced off area, for the duration of the works to ensure adequate moisture levels are maintained.

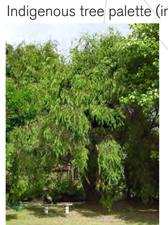
NOTE

Arboricultural Assessment - refer report by Moore Trees Arboricultural Services 04/2019

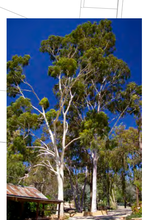
LEGEND

- SITE BOUNDARY
- +27.190ex — EXISTING SPOT LEVEL
- +30.600 — PROPOSED SPOT LEVEL
- TREE ID# — EXISTING TREE TO BE RETAINED IN ACCORDANCE WITH ARBORICULTURAL ASSESSMENT
- TREE ID# — EXISTING TREE TO BE REMOVED
- STRUCTURAL ROOT ZONE
- TREE PROTECTION ZONE
- HOLDING LINE DURING EARLY WORKS

Indigenous tree palette (indicative)


Agonis flexuosa

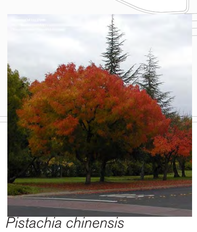

Banksia integrifolia


Eucalyptus citriodora


Eucalyptus piperita


Flindersia australis


Magnolia graniflora


Pistachia chinensis


Ulmus parvifolia

Exotic tree palette (indicative)

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title

Landscape Plans
Tree Management Plan SSDA

scale	1:250 @ A1	first issued	9/4/20
project code		sheet no.	revision
DTPS		8003	03

PRESCHOOL & GAMES COURT

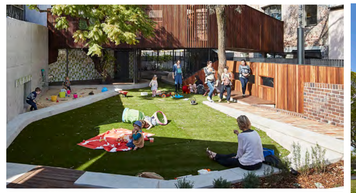
1 Sand pit and small water play
2 Painting studio
3 Softfall and challenging play & climb
4 Sculpture garden and wind chimes
5 Small amphitheatre for outdoor learning
6 Deciduous grove
7 Multicourt space
8 Rain garden

Preschool

- Active and quiet areas are delineated by planted gardens of various heights to maintain visual connections across the play space. Turfed and paved areas to encourage a range of activities
- An artistic sculptural fence delineates the boundary of the preschool play area - the 'fence' aims to provide visually open and connected portions and some screened areas (to encourage student interaction)
- Centrally located supervision hub to allow views in all directions

Games court

- Provide multicourt space for ball games, other games and excercise play area.
- Integrated rain garden for Waster Sensitive Urban Design
- Vertical elements provide shelter from wayward ballgames.



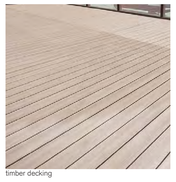


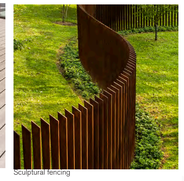


Materials


Pathways - combiantio of finishes - brick, concrete


softfall and synthetic turf


timber decking


Sculptural fencing



0 2 5 10m

GENERAL NOTES

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Landscape Plans
Detail Areas

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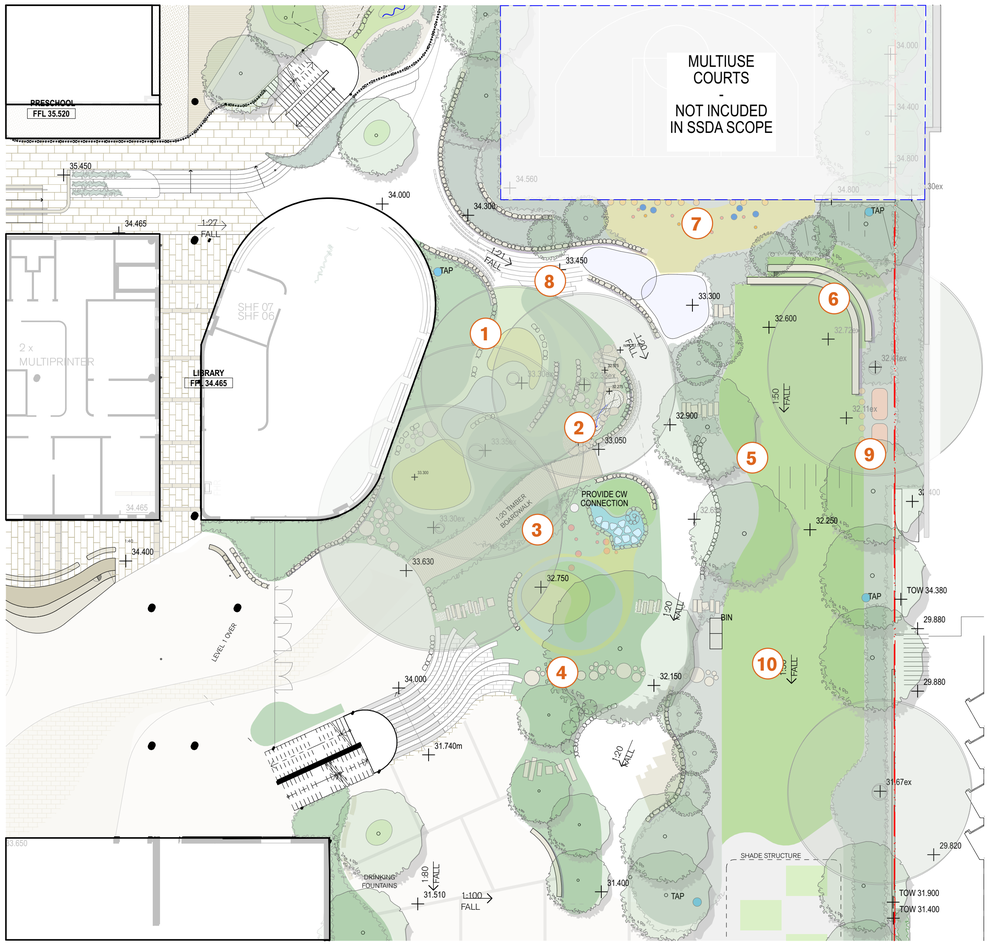
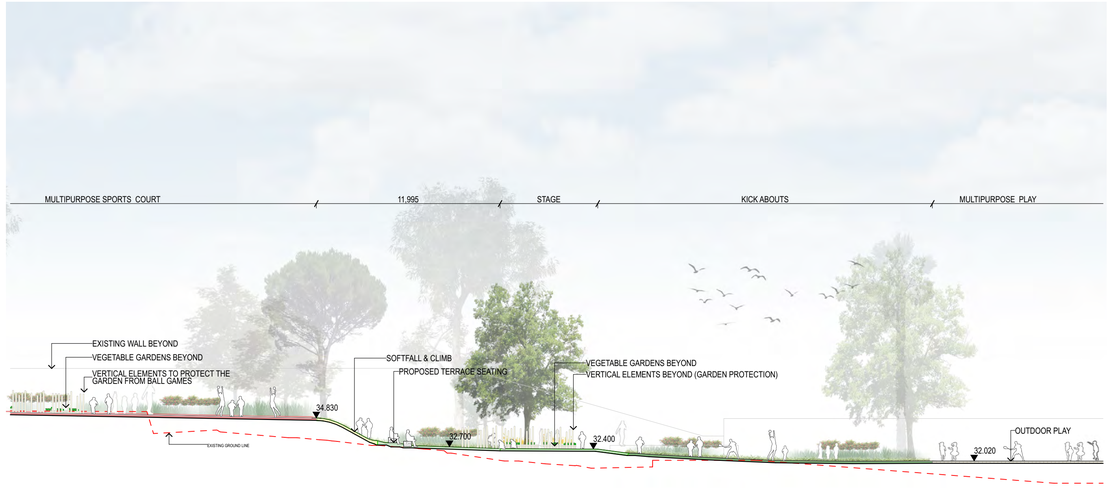
project code		sheet no.	revision
DTPS		8101	03



1 Play equipment
2 Free play
3 Waterway lessons
4 Indigenous themed learning
5 Kickabout Area
6 Amphitheatre
7 Climbing faclity
8 Pathway with integrated raingarden
9 Veggie garden
10 Kick about/ Play space



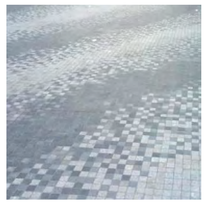
Active Play, Nature Play & Amphitheatre

Active Play
- Using mounded forms, make the most out of the sculptured terrain
- Provide climbable elements, play equipment with tunnel slides
- Form climbing webs with colour and fun

Nature Play
- Blackwattle Creek Interpretation - "Tea Tree Gully" Water Feature with Water Play Element
- Themed indigenous planting pockets
- Existing trees (and shade)retained where possible
- Inviting informal play around natural elements

Amphitheatre & Climbing wall
- Nestled into the slope, tiered seating terraces take advantage of a natural amphitheater space
- A timber stage with evergreen feature tree which accommodates small and large groups & performances
- Veggie gardens (vertical elements provide shelter from wayward ball games)
- Climbing wall addresses level change & provides direct connection with games court

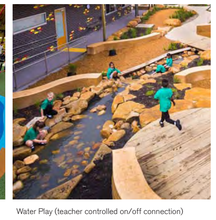
Materials



Nature Play & Balancing

Dry Creek Bed

Softfall & Active Play



Water Play (teacher controlled on/off connection)

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project code		sheet no.	revision
DTPS		8102	03

1 Main school entrance
2 Terraces seating / lunchtime gathering
3 Assembly & performace & Ceremonial events
4 Gated connection
5 Grand stairs with terraced seating
6 Entry & gathering space
7 Multi use hardcourt
8 Kick about / Play space

Main Entrance, COLA Lunchtime terraces & Multi-hardcourt

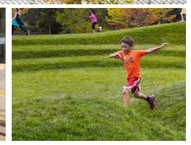
Main Entrance, COLA lunch time terraces

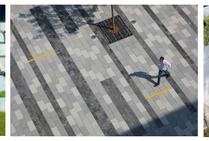
- Provide main Arrival & Sheltered Place
- Rectilinear geometry creates seating with views to the playground
- High quality pavement finishes to acommondate school assembly & events
- Indigenous Interpretive paving pattern

Multi-court & Kickabout Area

- Provide Grid paving patterning & lines for games, learning
- Create art opportunity to perimeter walls and outdoor painting
- Entry avenue of small evergreen trees creates a sense of enclosure
- Artifical turf for hardwearing ball games / kickabout

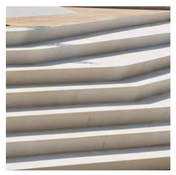



Materials


Pavements - combination of finishes - concrete & unit pavers


Terraced seating & steps


Hardcourt linemarking

Interpretive inlays


Softfall mounds & folds


Vegetative edges

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project code	sheet no.	revision
DTPS	**8103**	**03**