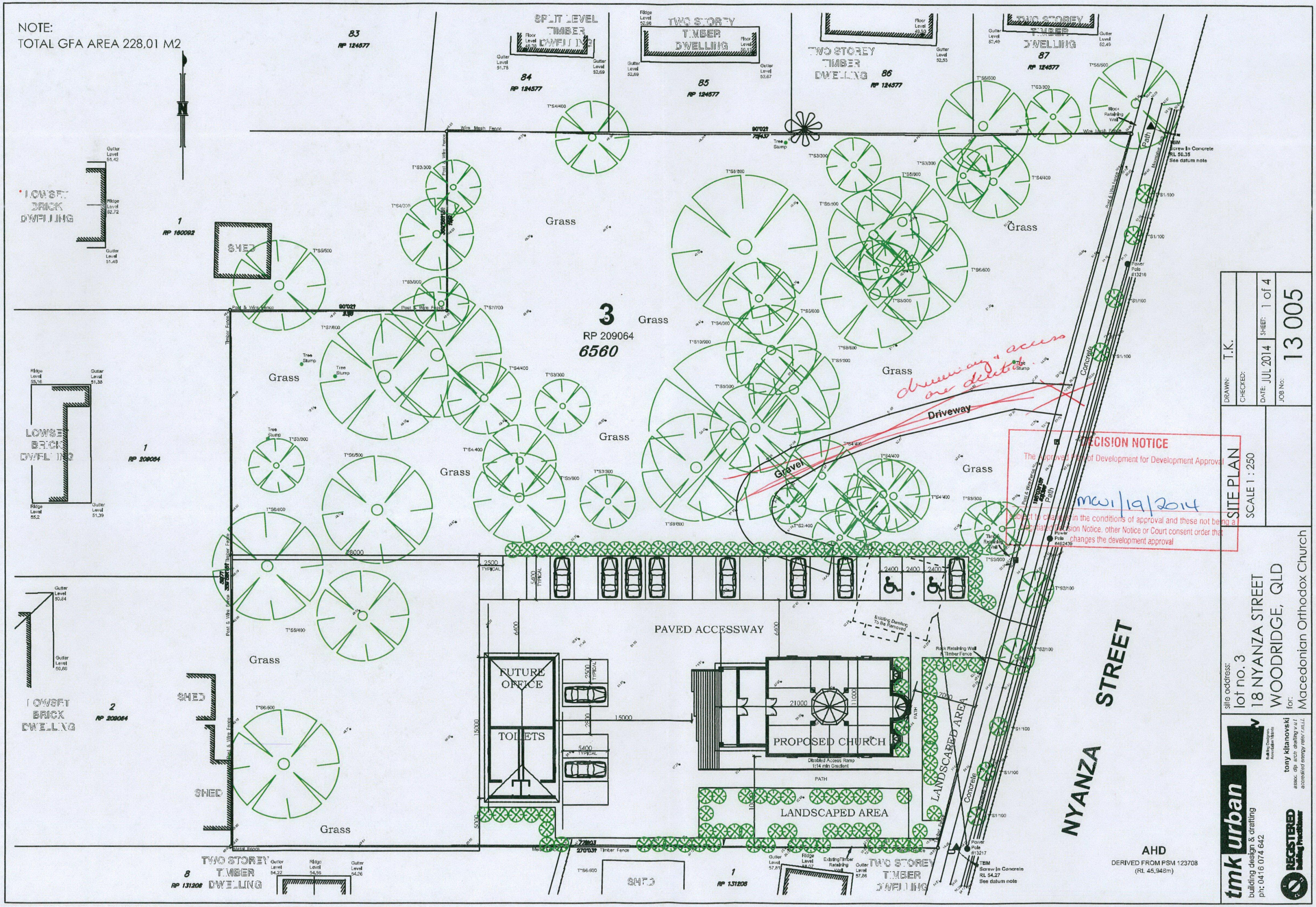
File: 907378-1 Application: MWI / 19 / 2014

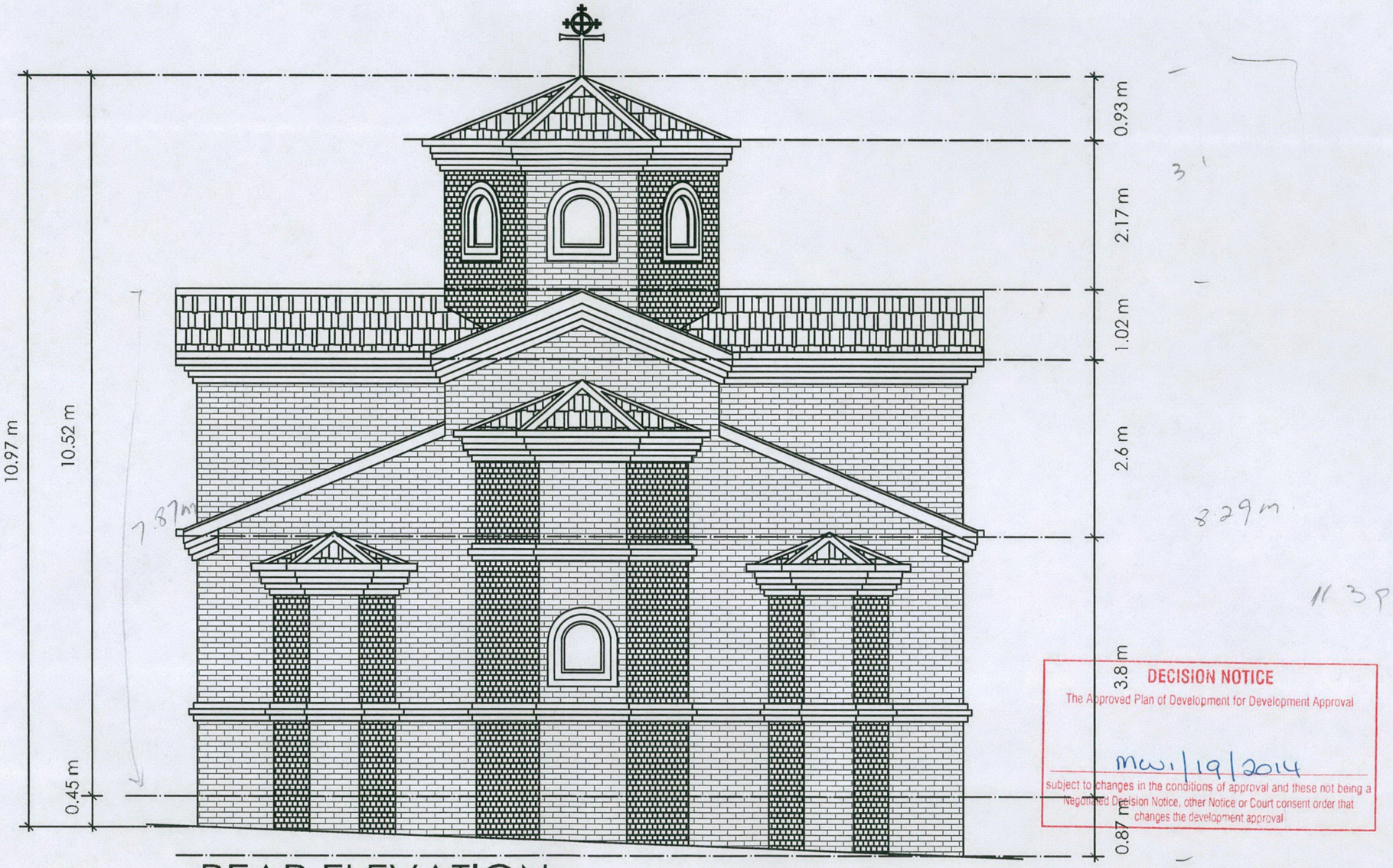
Officer: Sandra Forward to: File

Correspondent: The Macedonian Orthodox Church Bruskane

☑ Internet Ready ☐ Not Internet Ready

APPROVED PLAN OF DEVELOPMENT


NOTE:
TOTAL GFA AREA 228,01 M2
N
83
RP 124577
SPLIT LEVEL TIMBER DWELLING
84
RP 124577
TWO STOREY TIMBER DWELLING
85
RP 124577
TWO STOREY TIMBER DWELLING
86
RP 124577
TWO STOREY TIMBER DWELLING
87
RP 124577
LOWSET BRICK DWELLING
1
RP 160092
SHED
1
RP 209064
LOWSET BRICK DWELLING
2
RP 209064
LOWSET BRICK DWELLING
SHED
SHED
3
RP 209064
6560
Grass
Wire Mesh Fence
Post & Wire Fence
Timber Fence
Metal Fence
Tree Stump
Driveway
Gravel
driveway access are deleted.
PAVED ACCESSWAY
FUTURE OFFICE
TOILETS
PROPOSED CHURCH
Disabled Access Ramp 1:14 min Gradient
PATH
LANDSCAPED AREA
Existing Dwelling To Be Removed
Rock Retaining Wall & Timber Fence
Block Retaining Wall
Timber Retaining Wall
Existing Timber Retaining Wall
Power Pole #13216
Power Pole #492439
Power Pole #13217
TBM Screw In Concrete RL 50.35 See datum note
TBM Screw In Concrete RL 54.27 See datum note
Path
Concrete
Mountable Kerb
8
RP 131206
TWO STOREY TIMBER DWELLING
1
RP 131206
TWO STOREY TIMBER DWELLING
NYANZA STREET
DECISION NOTICE
The Approved Plan of Development for Development Approval
MCW1/19/2014
subject to changes in the conditions of approval and these not being a Negotiated Decision Notice, other Notice or Court consent order that changes the development approval
AHD
DERIVED FROM PSM 123708
(RL 45,946m)
DRAWN: T.K.
CHECKED:
DATE: JUL 2014
SHEET: 1 of 4
JOB No: 13 005
SITE PLAN
SCALE 1 : 250
site address:
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church
tmk urban
building design & drafting
ph: 0416 074 642
tony kitanovski
assoc. dip arch drafting v.u.t
accredited energy rater r.m.i.t.
REGISTERED Building Practitioner



DECISION NOTICE
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MW 1/9/2014
subject to changes in the conditions of approval and these not being a Negotiated Decision Notice, other Notice or Court consent order that changes the development approval

REAR ELEVATION
SCALE : Not To Scale

tmk urban

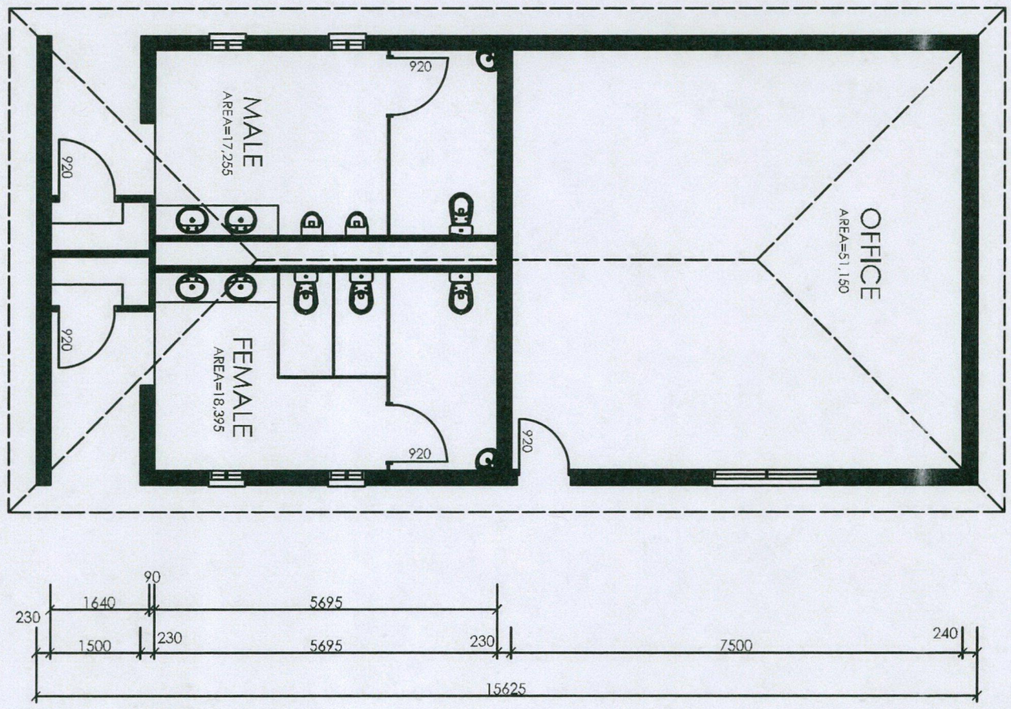
bdav Building Designers Association Victoria

REGISTERED Practitioner

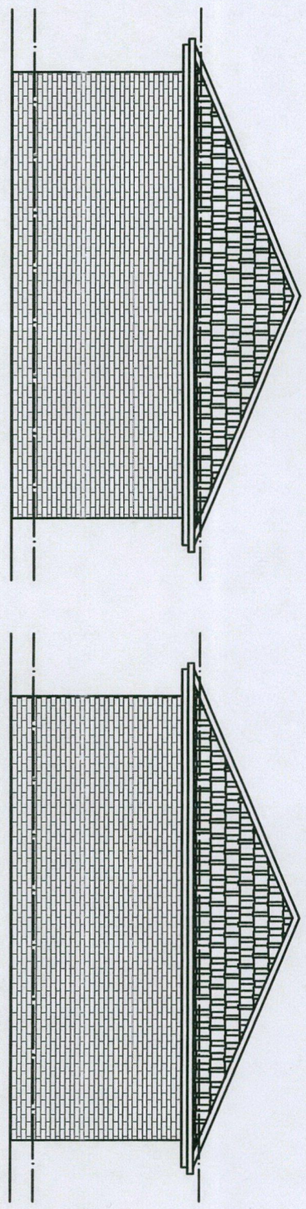
site address:
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

REAR ELEVATION
SCALE : Not To Scale

DRAWN:	T.K.
EDITEDBY:	ATP CONSULTING ENGINEERS
DATE: Oct 14	SHEET: 1 of 1
JOB No:	13 005

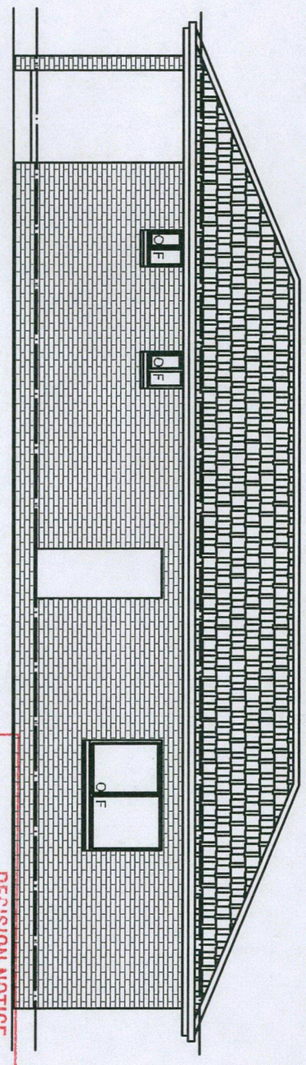


FLOOR PLAN
SCALE 1 : 100



SIDE ELEVATION
SCALE 1 : 100

SIDE ELEVATION
SCALE 1 : 100



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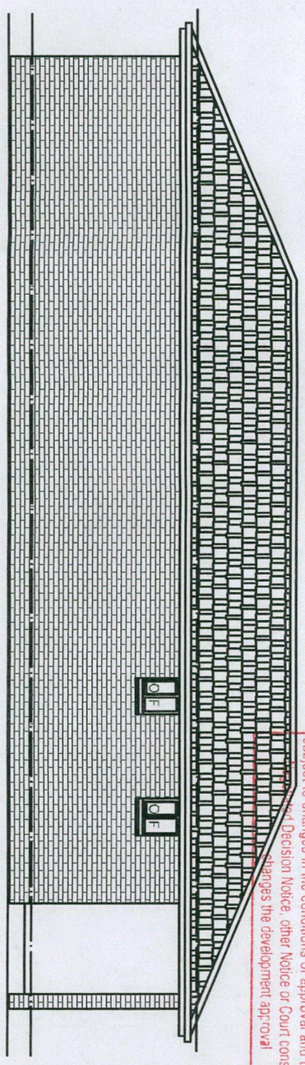
SCALE 1 : 100



REAR ELEVATION
SCALE 1 : 100

tmk urban
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REGISTERED Building Practitioner

tony kitanovski
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site address:
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

FLOOR PLAN
SCALE 1 : 100

DRAWN: T.K.
CHECKED:
DATE: JUL 2014
SHEET: 4 of 4
JOB No: 13 005

LEGEND

- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- 6.00 DESIGN SURFACE CONTOURS
- 6.00 EXISITNG SURFACE CONTOURS
- SITE BOUNDARY

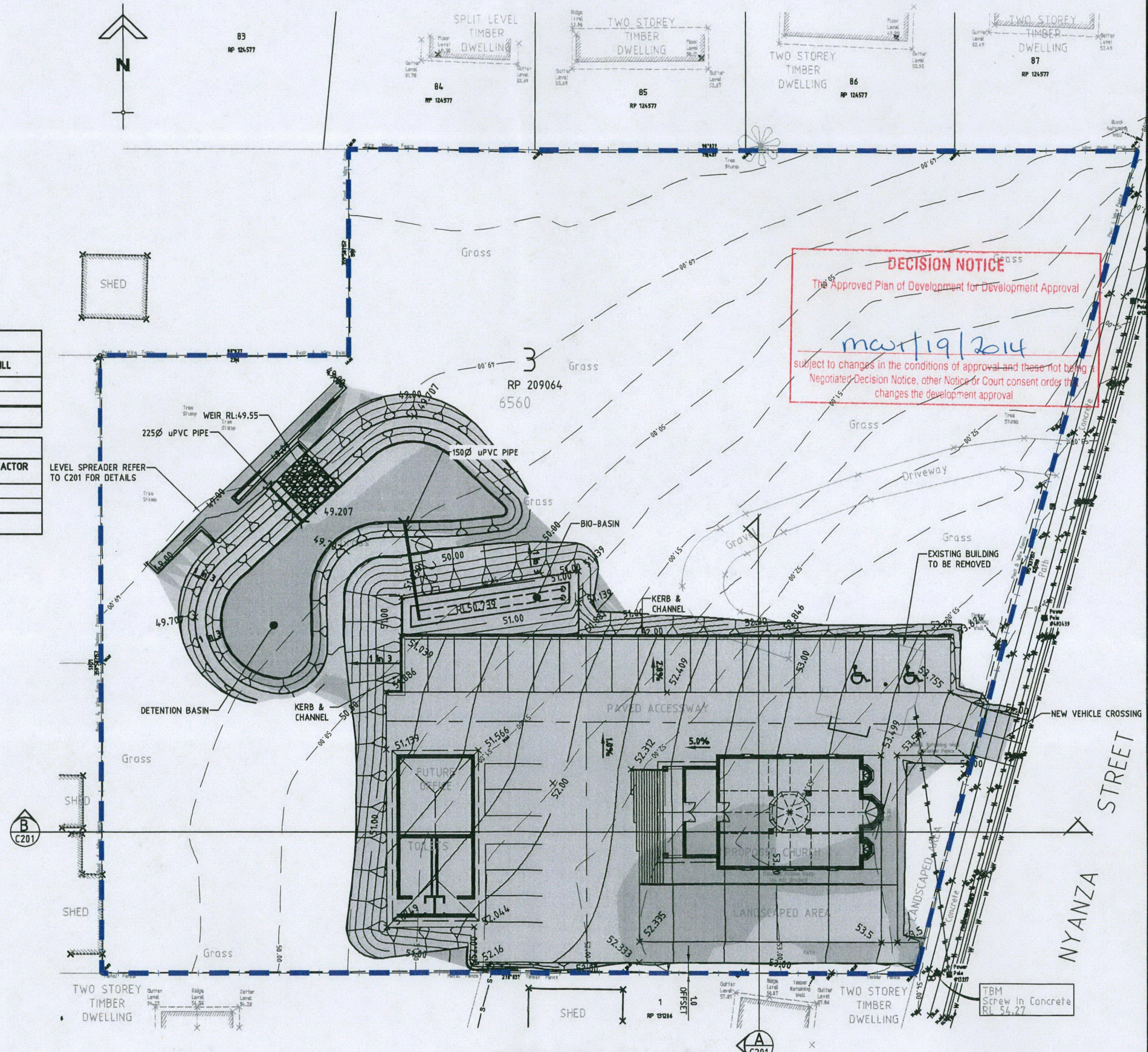
EXCAVATION

AREA	NETT CUT	EQUIV. SOLID FILL
OVERALL EXCAVATION	58.472 cu.m.	
TOTAL CUT	58.472 cu.m.	58.472 cu.m.

STRUCTURAL FILLING

AREA	NETT SOLID FILL	incl. COMPACTION FACTOR (0.85)
OVERALL FILLING	517.38 cu.m.	
TOTAL FILL	517.38 cu.m.	608.68 cu.m.

SUMMARY: i.e. 608.68 cu.m. - 58.472 cu.m. = 550.21 cu.m. TO IMPORT.



EARTHWORKS LAYOUT PLAN

SCALE 0 2 4 6 8 10 (metres)
1 : 200 (FULL SIZE)

ORIGINAL SCALE BEFORE REDUCTION A1 0 10 20 30 40 50mm.

VER.	DESCRIPTION	APPR.	DATE
A	ORIGINAL ISSUE		09-09-14

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42 Marine Parade, Southport QLD 4215
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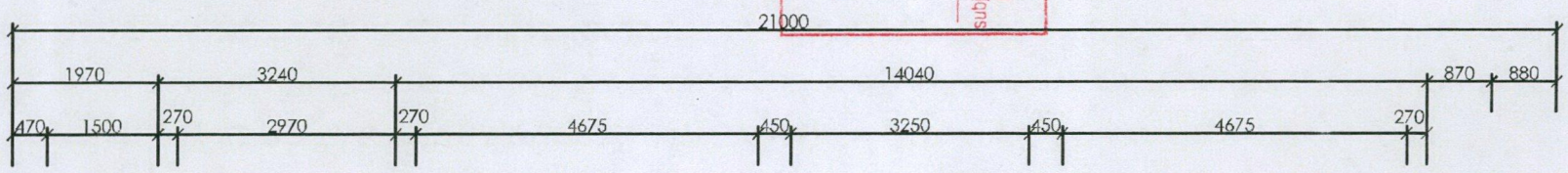
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

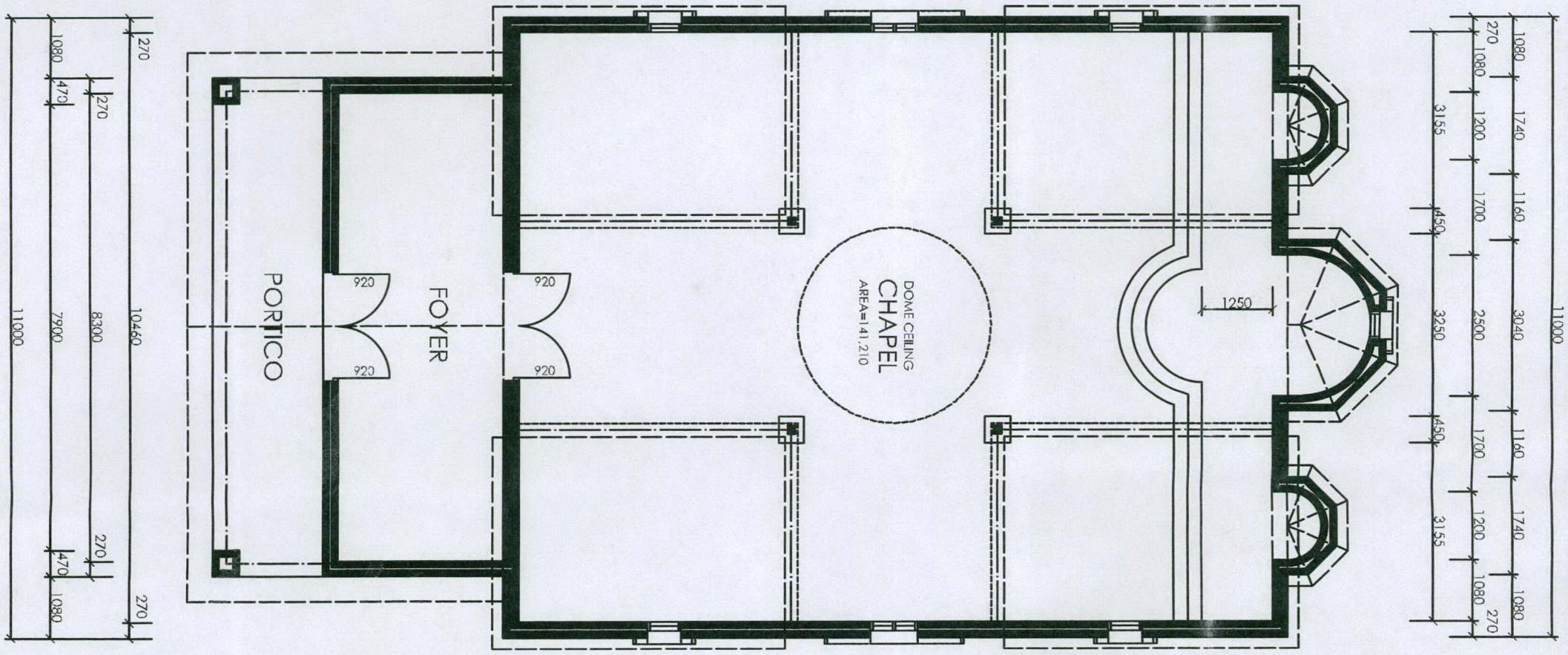
PROJECT:
MACEDONIAN ORTHODOX CHURCH
NYANZA STREET, WOODRIDGE

DRAWING TITLE:
CONCEPTUAL EARTHWORKS LAYOUT PLAN

DEVEL. APPLIC. No.: MCUI/19/2014 DATE: 09-09-14
PROJECT LEADER: MARK MORRIS
DESIGNER: JEREMY FLYNN
DRAFTSPERSON: MITCHELL LITTLEMORE
CHECKED:
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No.: 8093
SCALE: AS NOTED | DATUM: AHD | FULL SIZE: A1
PROJECT No.: BE140037 | DRAWING No.: C200 | VERSION: A

DECISION NOTICE
The Approved Plan of Development for Development Approval
mcu | 19 | 2014
Subject to changes in the conditions of approval and these not being a Negotiated Decision Notice, other Notice or Court consent order that changes the development approval





FLOOR PLAN
SCALE 1 : 100

tmk urban
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ph: 0416 074 642

bdav Building Designers Association Victoria

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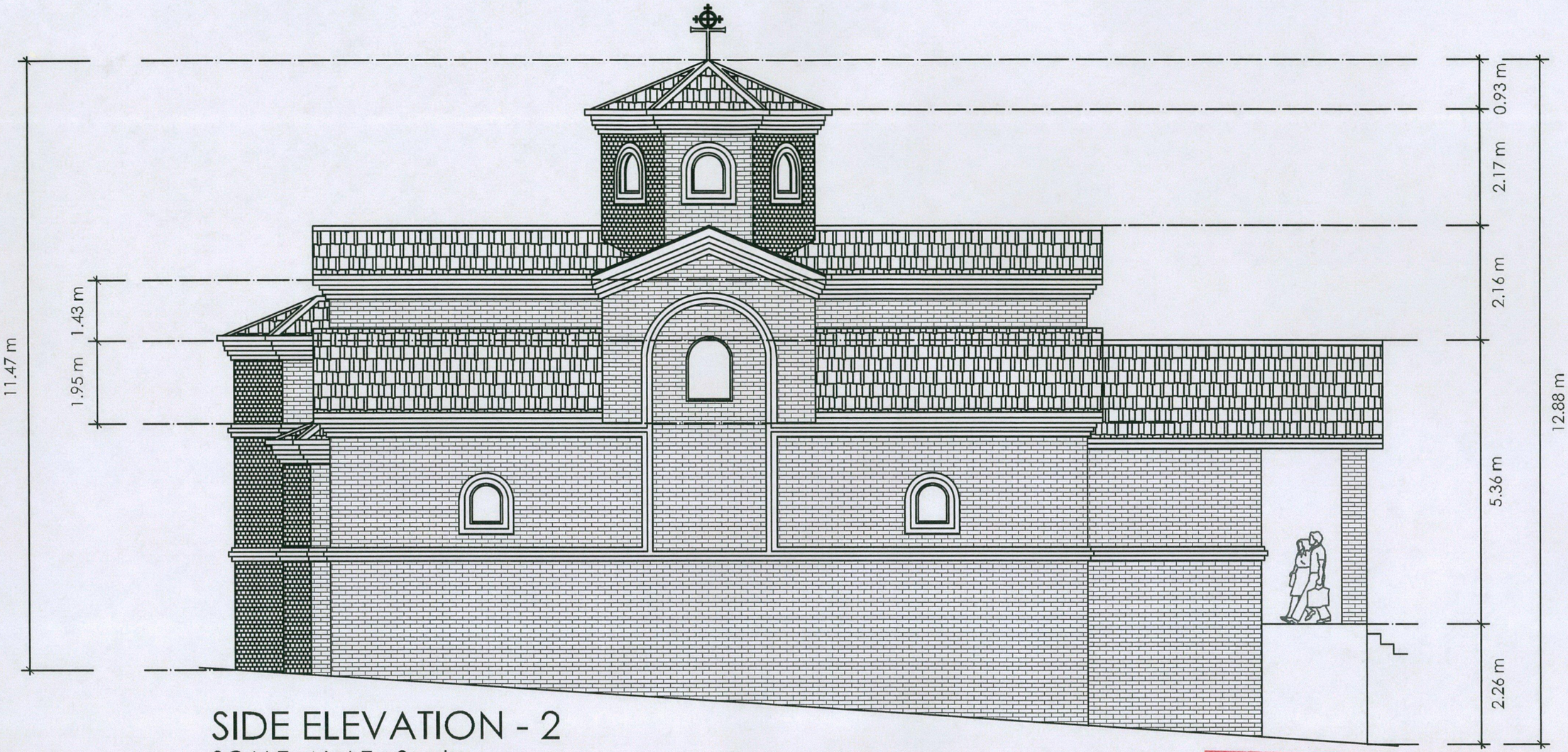
tony kitanovski
assoc. dip. arch. drafting v.u.t.
accredited energy rater r.m.i.t.

site address:
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

FLOOR PLAN
SCALE 1 : 100

DRAWN: T.K.
CHECKED:
DATE: JUL 2014
SHEET: 2 of 4
JOB No: 13 005



SIDE ELEVATION - 2
SCALE : Not To Scale

Northern elevation

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The Approved Plan of Development for Development Approval
mar|19|2014
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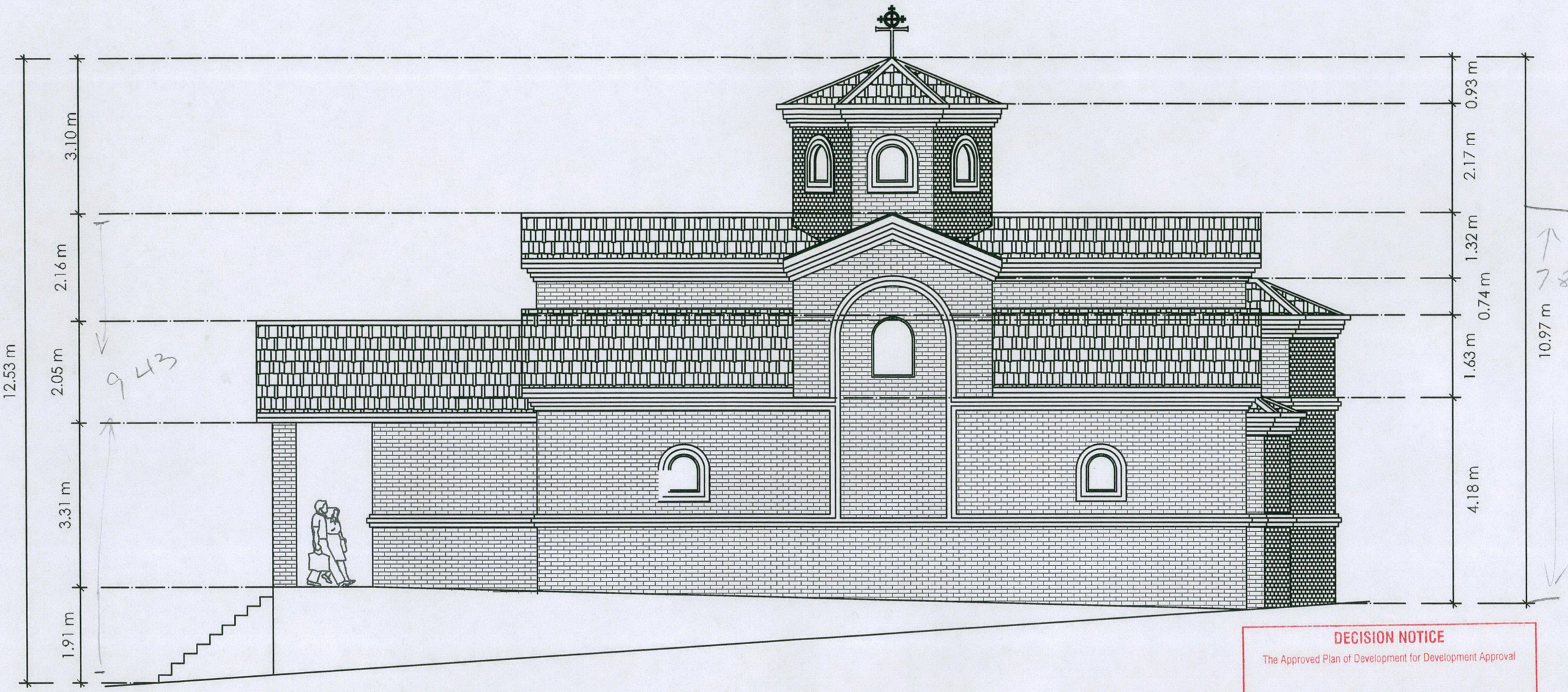
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

SIDE ELEVATION - 2
SCALE : Not To Scale

DRAWN: T.K.
EDITEDBY: ATP CONSULTING ENGINEERS
DATE: Oct 14
SHEET: 1 of 1
JOB No: 13 005



SIDE ELEVATION - 1

SCALE : Not To Scale

Southern elevation

DECISION NOTICE

The Approved Plan of Development for Development Approval

MAY 19 2014

subject to changes in the conditions of approval and these not being a Negotiated Decision Notice, other Notice or Court consent order that changes the development approval

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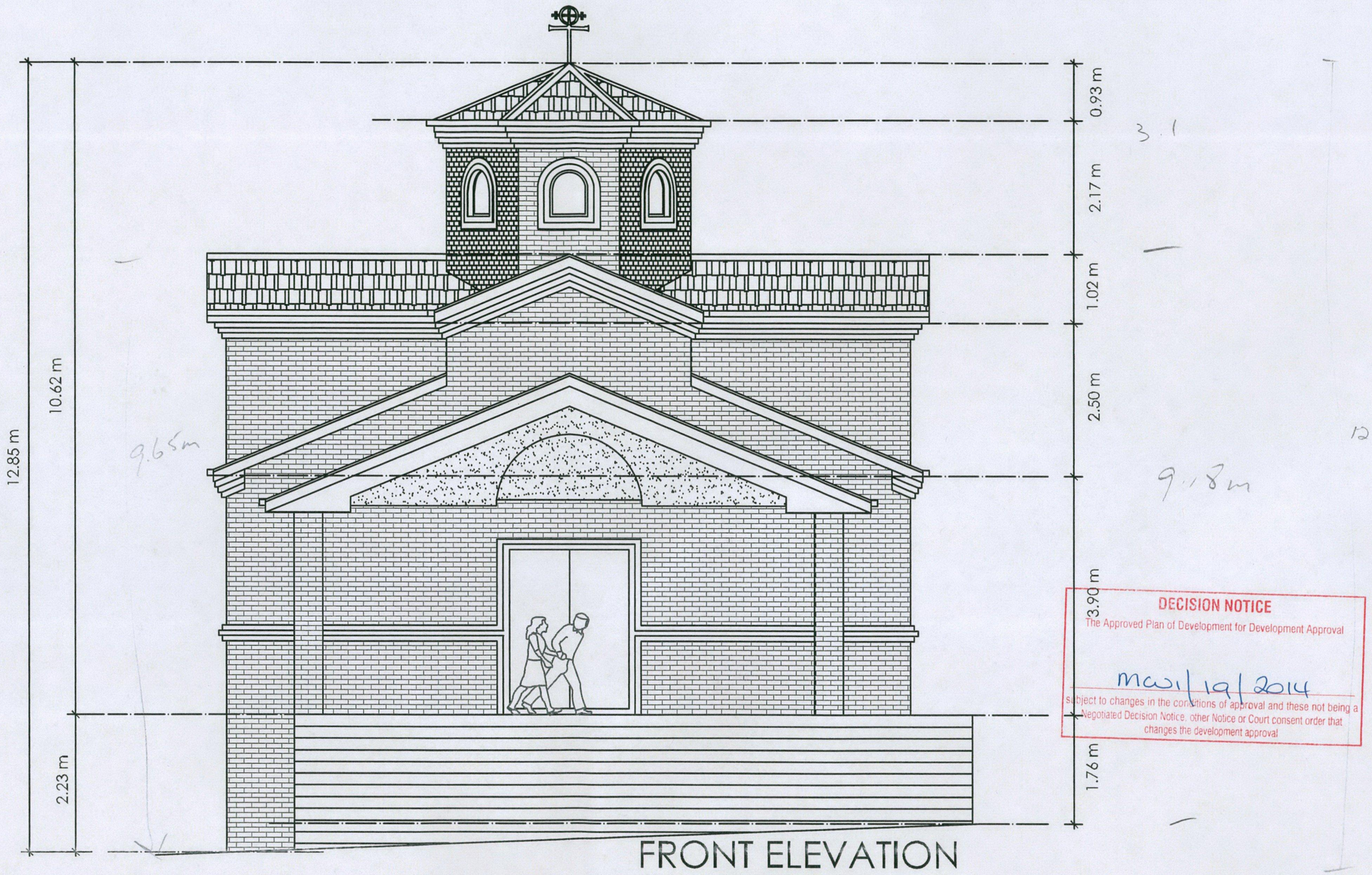
site address:
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

SIDE ELEVATION - 1
SCALE : Not To Scale

DRAWN: T.K.
EDITEDBY: ATP CONSULTING ENGINEERS
DATE: Oct 14
SHEET: 1 of 1
JOB No: 13 005



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The Approved Plan of Development for Development Approval

may/19/2014

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FRONT ELEVATION

SCALE : Not To Scale

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site address:
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18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

FRONT ELEVATION
SCALE : Not To Scale

DRAWN: T.K.
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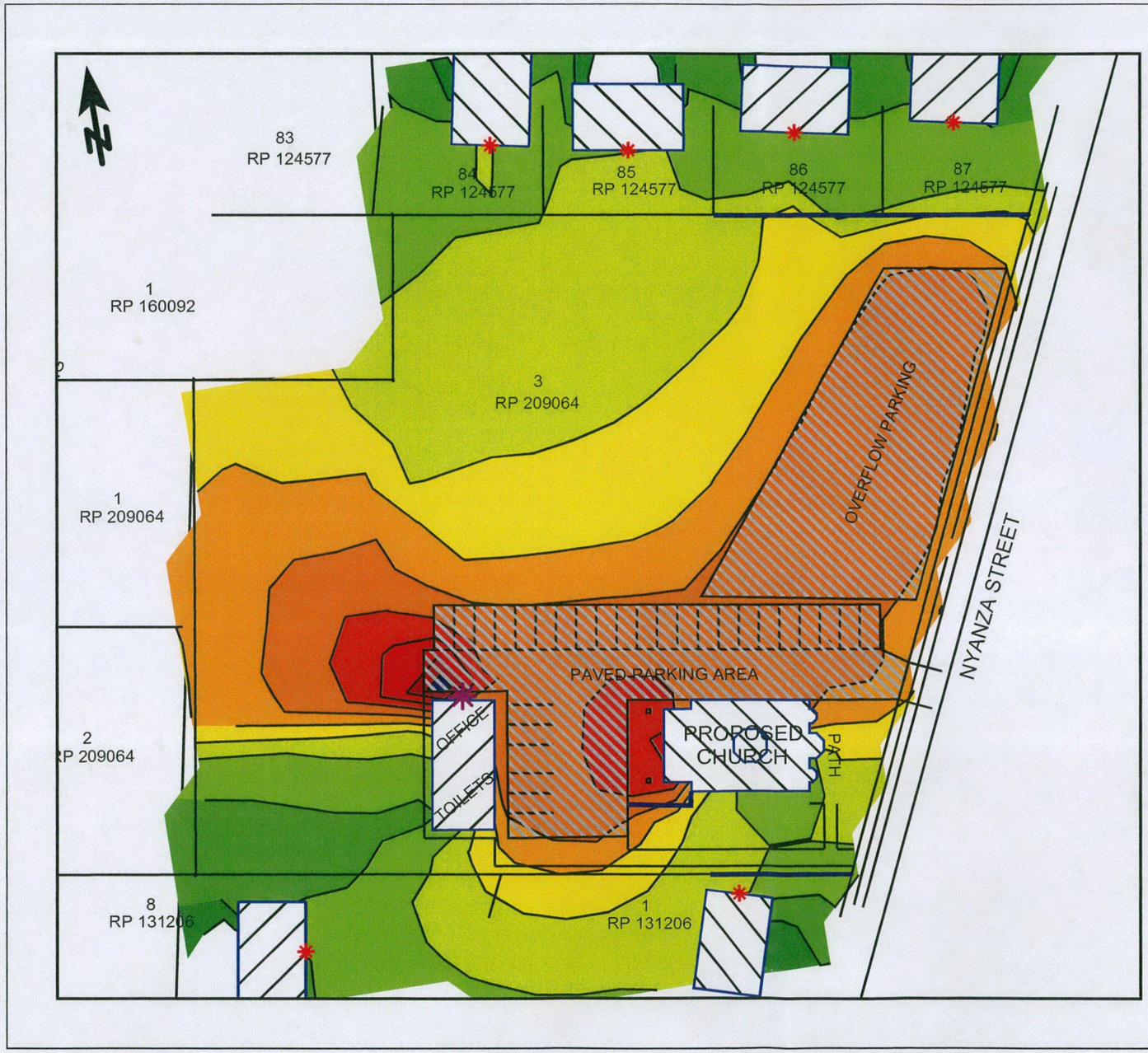
DATE: Oct 14
SHEET: 1 of 1
JOB No: 13 005



Macedonian Church
18 Nyanza Street,
Woodridge

Noise Propagation
All Sources - Daytime
With 2.0m Noise Barrier Fences

Noise Level
Leq (1-hour) @ 1.8m AGL
in dB(A) (Free-Field)

- = 32
- = 36
- = 40
- = 44
- = 48
- = 52
- = 56
- = 60
- = 64
- = 68
- = 72

Angle Increment = 1
Grid Spacing = 5m

Signs and Symbols

- Car Parking
- Point Source
- Main Building
- 2.0m Noise Barrier Fences
- Point Receiver

Scale 1:600
0 3 6 12 18 24 m

ATP

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MCU/19/2014
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ATP
CONSULTING ENGINEERS

Noise Impact Assessment

Proposed Place of Worship (Church)
18-26 Nyanza Street, Woodridge

Macedonian Orthodox Church

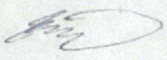
Project No.: ATP140306

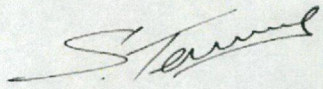
Project Name: 18 Nyanza Street, Woodridge (Macedonian Church)

Document No.: ATP140306-R-NIA-02

October 2014

Document Control Record

Prepared by:	Elton Singh
Position:	Engineer - Acoustics
Signed:	
Date:	31.10.2014

Approved by:	Sasho Temelkoski RPEQ 13551
Position:	Principal Engineer
Signed:	
Date:	31.10.2014

REVISION STATUS

No.	Description of Revision	Date	Approved	Recipient/s
0	Issue 1	17.04.2014	Sasho Temelkoski	Macedonian Orthodox Church
1	Issue 2	31.10.2014	Sasho Temelkoski	Macedonian Orthodox Church

Recipients are responsible for eliminating all superseded documents in their possession.

ATP Engineering Pty Ltd
ACN: 165 211 405

Suite 5, 23 Main Street
VARSITY LAKES QLD 4227

Telephone : +61 7 5593 0487
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Executive Summary

ATP Consulting Engineers was engaged by the Macedonian Orthodox Church to carry out noise impact assessment (NIA) for a proposed place of worship (church and associated facilities) at Lot 3 on RP209064, 18-26 Nyanza Street in Woodridge, within the Logan City Council local area.

The initial report (ATP140306-R-NIA-01 dated April 2014) was submitted to the council as part of the development approval application for the proposed place of worship. The application was subject of Public Notification period and four objections to the proposed place of worship were lodged, some of them raising potential noise impact as concern.

This report (issue 2) presents the results of the additional site specific noise measurements and noise impact assessment addressing the specific issues raised in some of the objections.

Background noise measurements were carried out initially in March 2014 and again in October 2014. Every day of the weeks was covered by background noise measurements to address the specific issue raised in one of the objections. The additional noise measurements carried out in October 2014, are similar but marginally higher than the noise levels recorded in March 2014. To obtain conservative results the noise data recorded in March 2014 (lesser average background noise levels) were adopted in the determination of the noise impact assessment criteria.

The initial assessment was carried out with consideration of the noise criteria as specified in the *Environmental Protection (Noise) Policy 2008* (EPP (noise)). EPP (Noise) is more recent document than the *Logan Planning Scheme 2006* (Schedule 3 Standards) and the relevant criteria from both documents are identical.

Considering the proposed church will provide day-time (after 9:30am) and evening services (starting at 6:00pm), the background creep criteria is the most stringent criteria that the proposed development has to comply with.

Noise propagation modelling was carried out for the proposed development considering all potential noise sources from the regular church activities. The noise sources considered were vehicle noise from parking areas and access ways, conversation (spoken voice) by members of the congregation in an outdoors setting, and mechanical noise from the air conditioning unit on the northern façade of the office building. In one of the objections, it is stated that...*music and amplified speech have not been modelled.* The reason for not considering music and amplified speech is simply because no music is ever played in a Macedonian Orthodox Church. The service in the Macedonian Orthodox Church is a solemn occasion with Liturgy presented by the raised voice of the priest (without amplification) with the congregation standing in reverent silence to be followed by a Holy Communion.

The noise propagation modelling was carried out with consideration of the characteristics of the various noise sources such as pronounced tonal characteristics (continuous "humming" noise) or intermittent (impulsive) noise. In the additional noise propagation modelling the specific issues raised in one of the objections about the impulsive adjustment for car parking (i.e. car door slams) was considered by addition of +5dB(A). The typical noise emissions from conversation in front of the Church were also increased by +5dB(A).

The increased sound power levels of the main noise sources resulted in higher calculated noise levels at the nearest noise sensitive places. The day-time noise criteria was exceeded by 1 dB(A) at most of the nearest noise sensitive places. Only at the house at 14A Nyanza Street the noise criteria was meet without a need for additional noise control measures. To protect the noise amenity at the nearest noise sensitive places the following noise control measures are recommended:

- Construction of 2.0 m high noise barrier fences along the northern and the southern boundary of the proposed Church;
- Along the northern boundary the 2.0 m high noise barrier fence has to extend along the full length of the common boundary with the houses at 2 and 4 Strathdarr Street;
- Along the southern boundary the 2.0 m high noise barrier fence has to extend along 50% of the common boundary with the house at 16 Nyanza Street;
- A 2.0 m high noise barrier fence (acoustic screen) has to be constructed along the southern side of the entry to the Church to screen the direct line of sight to the upper floor of the house at 16 Nyanza Street; and
- A 1.5 m high noise barrier fence (acoustic screen) is required in an 'L' shape to screen the air-conditioning unit along the northern façade of the office.

Should the noise barrier fences be constructed of timber the following design specifications are applicable:

- Minimum paling thickness of 25 mm with a mass of not less than 15 kg/m2.
- The typical spacing of the posts should be 3.0 m.
- Top, middle and bottom railings are required.
- There shall be no gaps in the noise barrier fence and at the contact between the noise barrier fence and the ground.

Typical design of a timber noise barrier fence is presented in Figure 5.1 of this report.

Provided the recommended noise control measures, as presented in this report, are implemented in the detailed design and construction the typical church activities at the proposed Macedonian Orthodox Church at 18-26 Nyanza Street in Woodridge will not impact on the noise amenity at the nearest noise sensitive places.

Table of Contents

Tables

Figures

Appendices

1. Introduction

1.1 Project Background

ATP Consulting Engineers was engaged by the Macedonian Orthodox Church to carry out noise impact assessment (NIA) for a proposed place of worship (church and associated facilities) at Lot 3 on RP209064, 18-26 Nyanza Street in Woodridge, within the Logan City Council local area.

The initial report (ATP140306-R-NIA-01 dated April 2014) was submitted to the council as part of the development approval application for the proposed place of worship. The application was subject of Public Notification period and four objections to the proposed place of worship were lodged, some of them raising potential noise impact as concern.

This report (issue 2) presents the results of the additional site specific noise measurements and noise impact assessment addressing the specific issues raised in some of the objections.

1.2 Study Objectives

Study objectives are as follows:

- Additional noise measurement of the existing background noise levels considering specifically noise levels on Sunday at a representative location within the subject site using an automated noise logger;
- Review of the layout of the proposed development and consideration of additional operational noise sources which may impact on the nearest noise sensitive places;
- Development of a three dimensional noise propagation model considering the proposed development layout, and location & sound power level of the dominant operational noise sources;
- Calculation of the operational noise levels at the facades of the nearest noise sensitive places external to the proposed development site;
- Assessment of operational noise levels "Acoustic Quality Objectives" and "Background Creep" criteria from the *Environmental Protection (Noise) Policy 2008* including consideration of the appropriate time periods and against the Logan City Planning Scheme 2006 – *Schedule 3, Part 1, Noise Emission and Immission Standards;* and
- Recommendation of appropriate noise control measures to prevent noise from the activities at the church impacting on the surrounding noise sensitive places.

1.3 Project Area and Description

The subject site is located at 18-26 Nyanza Street in Woodridge within the Logan City Council local government area. The site is described as Lot 3 on RP209064 with a total area of approximately 6,512 square metres. Access is via Nyanza Street with existing residential dwellings located to the north, south and west of the site. There is an existing high set timber dwelling on the property which will be demolished before construction of the new church begins.

The location of the subject site is presented in Figure 1.1.

Figure 1.1 Site Location (Google Maps Extract)

1.4 Proposed Development

The proposal comprises of the following elements:

- Place of worship (church);
- Priest's office;
- Amenities block;
- Carpark; and
- Landscaping.

The layout of the proposed development is presented in Appendix A.

2. Existing Noise Amenity

2.1 Noise Measurement Location

ATP Consulting Engineers carried out initial site specific noise measurements to obtain information about the existing noise amenity at the subject site from the 30th of March (Sunday) to the 8th of April 2014 (Tuesday).

Additional noise measurements were carried out, to obtain information on the specific background noise levels over a full 24-hour period on Sunday. The additional noise measurement were carried out from the 23rd of October (Thursday) to the 28th of October 2014 (Tuesday). The noise logger was programmed to record noise levels at 15-minute statistical intervals.

The location of the noise logger during the additional noise measurements was the same as in the initial measurements and is presented in Figure 2.1 and in Appendix B.

Figure 2.1 Noise Measurement Location

2.2 Equipment Used

The following noise measurement equipment was used:

- Acoustic Research Labs Pty Ltd – EL315 Noise Logger; and
- Sound Level Calibrator – NC 74.

The noise measurement instruments conform to ASIEC61672.1-2004 and the measurements were undertaken in accordance with AS1055-1997. Calibration was performed prior to commencement of the noise measurements and spot checks were carried out in the field. The maximum calibration drift recorded was <0.2 dB(A).

2.3 Meteorological Conditions

Daily weather observations from the Bureau of Meteorology meteorological station at Logan City Water Treatment Plant indicates that meteorological conditions during the noise measurement periods were fine with light to moderate winds on the days considered in the assessment.

2.4 Noise Measurement Results

The results of the initial noise measurements are presented in Table 2.1 and in Appendix C.

Table 2.1 Initial Noise Measurement Results

Date	$L_{90(11\text{-hour})}$ dB(A)	$L_{90(4\text{-hour})}$ dB(A)	$L_{90(9\text{-hour})}$ dB(A)
31 March 2014 (Monday)	41	37	33
1 April 2014 (Tuesday)	39	38	34
2 April 2014 (Wednesday)	39	38	34
3 April 2014 (Thursday)	38	38	36
4 April 2014 (Friday)	40	40	35
5 April 2014 (Saturday)	40	40	35
Average	**40**	**39**	**35**

The results of the additional noise measurements are presented in Table 2.1 and in Appendix C.

Table 2.2 Additional Noise Measurement Results

Date	$L_{90(11\text{-hour})}$ dB(A)	$L_{90(4\text{-hour})}$ dB(A)	$L_{90(9\text{-hour})}$ dB(A)
23 October 2014 (Thursday)	42	39	37
24 October 2014 (Friday)	44	41	37
25 October 2014 (Saturday)	44	41	36
26 October 2014 (Sunday)	43	43	36
27 October 2014 (Monday)	44	43	38
28 October 2014 (Tuesday)	45	39	35
Average	**44**	**41**	**36**

The noise levels presented above (the initial and the additional noise measurements) are representative of typical noise amenity in areas with low density transportation (noise area category R2 as specified in AS1055.2 – 1997).

This is an indication that the major roads in the area (Campton Road and Acacia Road) and the Brisbane to Gold Coast railway corridor (located at approximately 150 m to the south-west) do not influence the noise amenity at the surroundings of the proposed church.

The additional noise measurements carried out in October 2014, are similar but marginally higher than the noise levels recorded in March 2014. To obtain conservative results the noise data recorded in March 2014 (lesser average background noise levels) were adopted in the determination of the noise impact assessment criteria.

3. Noise Assessment Criteria

The initial assessment was carried out with consideration of the noise criteria as specified in the *Environmental Protection (Noise) Policy 2008* (EPP (noise)). The purpose of EPP (Noise), as subordinate State Legislation, is to achieve the object of the *Environmental Protection Act 1994* (the Act) in relation to the acoustic environment. This is a State wide legal document that provides...*framework for making consistent, equitable and informed decisions about the acoustic environment.*

EPP (Noise) is more recent document than the *Logan Planning Scheme 2006* (Schedule 3 Standards) and the relevant criteria from both documents are identical.

3.1 EPP (Noise) - Acoustic Quality Objectives

The applicable criteria from Schedule 1 of the EPP (Noise) are presented in Table 3.1.

Table 3.1 Environmental Noise Criteria

Sensitive Receptor	Period	Objective ($L_{Aeq,adj,1\text{-}hour}$)	Environmental Value
Dwelling (for outdoors)	Daytime and evening	50	Health and wellbeing
Dwelling (for indoors)	Daytime and evening	35	Health and wellbeing
	Night-time	30	Health and wellbeing, in relation to the ability to sleep

3.2 EPP (Noise) - Controlling Background Creep

Clause 10 (2) of the EPP (Noise) makes allowance for maximum allowable additional noise over the existing background noise level ($L_{A90,T}$). This, so called 'background creep', noise criteria is applicable to the combined noise emissions from the church.

The overall A-weighted equivalent continuous adjusted sound pressure level ($L_{Aeq,adj,T}$) must not exceed the background noise levels by more than 5dB(A). These criteria were applied to the activities at the proposed church during day-time and evening services.

The applicable criteria are presented in Table 3.2.

Table 3.2 Environmental Noise Criteria (Background Creep Control)

Period	Objective	Criteria ($L_{Aeq,adj,T}$)
Daytime (7:00am to 6:00pm)	Background noise level[1] ($L_{Abg,T}$) + 5dB(A)	**45** (40 + 5)
Evening (6:00pm to 10:00pm)	Background noise level ($L_{Abg,T}$) + 5dB(A)	**44** (39 + 5)

3.3 Logan City Planning Scheme 2006 - Controlling Background Creep

The applicable criteria from *Logan City Planning Scheme 2006* (Schedule 3 Part 1, Noise Emission and Immission Standards) are presented in Table 3.1.

Table 3.3 Environmental Noise Criteria ((Background Creep Control)

Column 1 Time	Column 2 Noise sensitive place	Criteria ($L_{Aeq,adj,T}$)
Daytime (7:00am to 6:00pm)	$L_{Amax.adj.T} <= L_{Abg}$[2] + 5 dB(A)	**45** (40 + 5)
Evening (6:00pm to 10:00pm)	$L_{Amax.adj.T} <= L_{Abg}$ + 5 dB(A)	**44** (39 + 5)

The noise criteria are expressed in terms of $L_{Aeq,adj,1\text{-hour}}$ for the 1-hour period of maximum activities at the investigated site.

[1] The "Background Noise Level" is the A-weighted sound pressure level equalled or exceeded for 90% of the time interval considered in the absence of the noise under investigation.

[2] The "Background Noise Level" is the A-weighted sound pressure level equalled or exceeded for 90% of the time interval considered in the absence of the noise under investigation.

4. Noise Impact Assessment

4.1 Noise Sensitive Receptors

The proposed development site is adjacent to existing dwellings along the side and rear boundaries. The nearest existing noise sensitive receptors are as follows:

- Two storey house at 2 Strathdarr Street
- Two storey house at 4 Strathdarr Street
- High set house at 6 Strathdarr Street
- High set/split level house at 8 Strathdarr Street
- Two storey house at 14A Nyanza Street
- Two storey house at 16 Nyanza Street

4.2 Modelling Methodology

The industrial module of the SoundPLAN noise propagation software was used to calculate the noise levels at the nearest sensitive receptors. The calculations were carried out as per the procedures specified in the International Standard ISO9613. The calculation method for a single frequency is as follows:

$$L_S = [\ L_W + D_I + K_0\ ] - [D_S + D]$$

Where:
- L_S sound pressure for a single frequency
- L_W sound power
- D_I directivity of the source
- K_0 spherical model
- D_S spreading
- D different contributing factors

The noise propagation losses, in addition to spreading, are calculated as a combination of screening, volume absorption (foliage, buildings) and the ground attenuation. In a large scale model dominated by distance, where the ground attenuation dominates, the effect of the screening is zero dB. Where the screening effect by natural or manmade obstacles along the noise propagation path is bigger than the ground absorption, the ground absorption is ignored.

4.3 Operational Noise Sources

Based on typical noise sources associated with the operation of a church, the following sources were considered in the model:

- Vehicle movement on internal roadways and parking areas;[3]
- Conversation in loud spoken voice outside the church building; and
- Air-conditioning units on the office building.

[3] The traffic report for the project recommends 25 car parking spaces, but to provide conservative noise assessment additional 20 cars parked in the grassed area near Nyanza Street were considered in the model.

It is important to note that the proposed church does not have any amplified 'call to prayer' system or bell tower.

In one of the objections, it is stated that...*music and amplified speech have not been modelled.*

The reason for not considering music and amplified speech is simply because no music is ever played in a Macedonian Orthodox Church. The service in the Macedonian Orthodox Church is a solemn occasion with Liturgy presented by the raised voice of the priest (without amplification) with the congregation standing in reverent silence to be followed by a Holy Communion.

The overall development is small scale, reflecting the relatively small size of the congregation to be served by the proposed church. The proposed church will provide day-time (starting after 9:30am) and evening services (starting at 6:00pm). The highest attendance of church services is expected during day-time on Sunday, starting after 9:30am and finishing at around 1:00pm.

The noise propagation modelling was carried out with consideration of the characteristics of the various noise sources such as pronounced tonal characteristics (continuous "humming" noise) or intermittent (impulsive) noise.

In the additional noise propagation modelling the specific issues raised in one of the objections about the impulsive adjustment for car parking (i.e. car door slams) was considered by addition of +5dB(A).[4] The typical noise emissions from conversation in front of the Church were also increased by +5dB(A).[5]

The sound power levels and tonality/impulsiveness adjustment factors for the noise sources considered in the model are presented in Table 4.1.

Table 4.1 Sound Power Levels of Noise Sources

Type of Activity	Sound Power Level dB(A) (re 10^{-12} W)	Tonality/ Impulsiveness Adjustment dB(A)
Car Parking [6]	84 (max)	+5
Conversation [7]	80	-
Air-conditioning [8]	86	+5

[4] ATP Consulting Engineers uses advanced noise propagation modelling software – SoundPLAN – to account for the complex noise propagation of sound emissions from source to receiver. The algorithm for car parking noise propagation modelling accounts for impulsiveness associated with car door slams. In this case we have added +5dB(A) to generate highly conservative results.

[5] The 75dB(A) used in the initial noise propagation modelling was based on the extensive 'typical sound power levels' from various noise sources incorporated in the SoundPLAN software. The initial assessment was based on sustained 'speaking very loud' at a steady sound power level of 75dB(A) for a continuous period of 1 hour without any reprieve. That is a huge amount of acoustic energy, but we have chosen even higher sound power level in this assessment representative of 'Loud Conversation' in an open restaurant area to generate highly conservative results.

[6] Based on 25 car parking spaces, and additional 20 cars parked in grassed area near Nyanza Street, with 2 car movements per hour.

[7] SoundPLAN Library "loud conversation" equivalent to an open restaurant area.

[8] SoundPLAN Library "Snow Blower (Compressed Air)"

4.4 Modelling Scenarios

4.4.1 Without Noise Control Measures

The noise sources from the proposed church were represented in a three-dimensional model developed using SoundPLAN software. A conservative noise propagation modelling methodology was adopted with the following assumptions:

- Car movements at the car parking areas and on access ways is based on two car movements per hour per parking bay continuously during day time hours (7:00am – 6:00pm) and evening (6:00pm – 10:00pm).
- Up to 50 people in conversation in the area at the rear (main entrance) of the church building for the whole of each hour during day time (7:00am – 6:00pm) and evening (6:00pm – 10:00pm).
- One air conditioning unit located on the northern façade of the office building at ground level and operating at 100% for the whole of each hour during day time (7:00am – 6:00pm).
- Waste collection will be carried out as a curbside collection as per the current established practice in the area.
- Receivers were attached to the most exposed facades of the nearest noise sensitive residential buildings at an elevation of 1.5m above each floor (ground and upper floor).

4.4.2 With Noise Control Measures

After the initial noise propagation modelling without engineering noise control measures, additional noise propagation modelling was carried out with consideration of 2 m high noise barrier fences and acoustic screens. The noise barrier fences are required along the southern boundary of with the house at 16 Nyanza Street and along the northern boundary with the houses at 2 and 4 Strathdarr Street. The acoustic screens are required along the Church entrance (2.0 m high 'L' shaped screen) and along the air-conditioning unit at the northern façade of the office building.

All operational scenarios as mentioned in Section 4.4.1 above were kept constant.

The alignment of the recommended noise barrier fences and acoustic screens are presented in Figure 4.1 and in Appendix D.

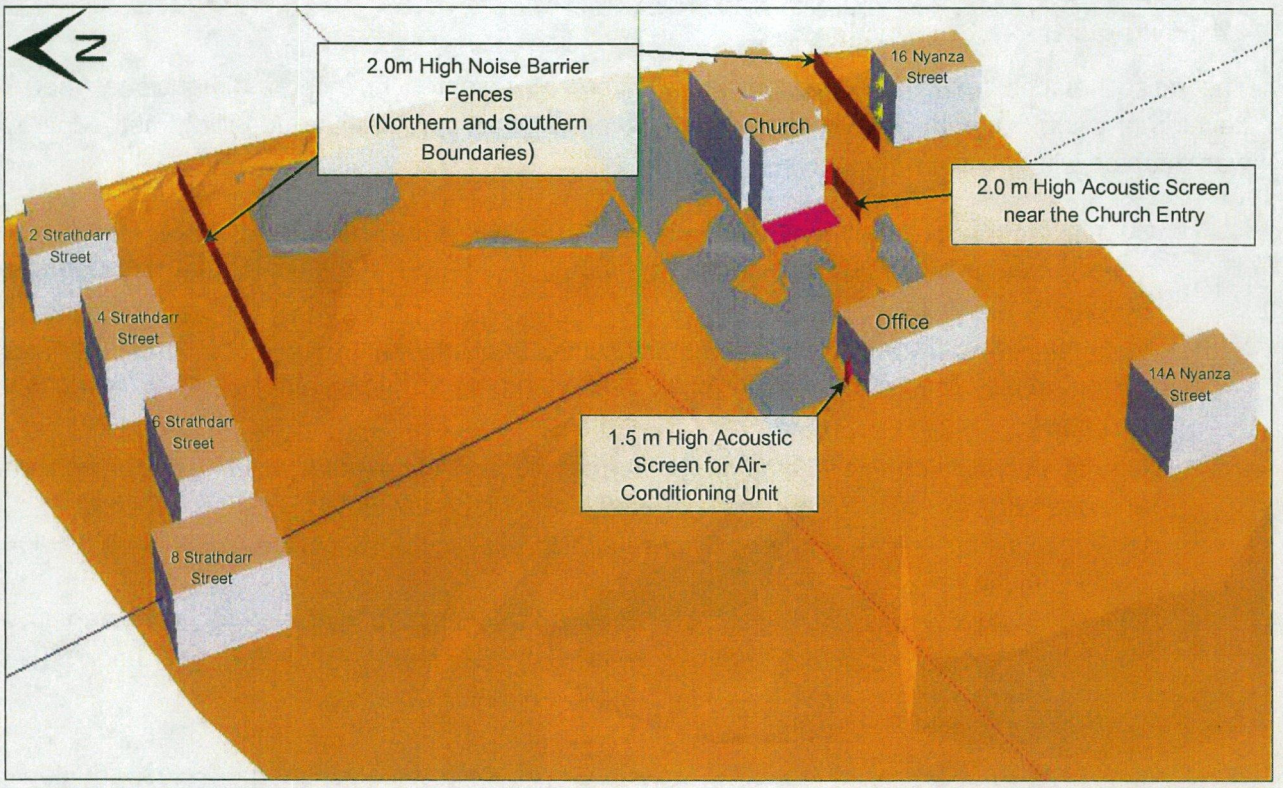


Figure 4.1 Alignment of the Noise Barrier Fences and Acoustic Screens (SoundPLAN Extract)

4.5 Calculated Noise Levels

4.5.1 Without Noise Control Measures

The highest calculated noise levels at the nearest noise sensitive places, without noise control measures, are presented in Table 4.2 with full results presented in Appendix E.

Table 4.2 Calculated Noise Levels without Noise Control Measures

Building	Facade	Floor	Daytime* $L_{eq,adj,1\text{-}hr}$ dB(A)	Criteria Day-time dB(A)$_{Leq,adj,1hr}$	Criteria Evening dB(A)$_{Leq,adj,1hr}$	Compliance
2 Strathdarr Street	S	Ground	45	45	44	No
		First	46			
4 Strathdarr Street	S	Ground	46			No
		First	46			
6 Strathdarr Street	S	Ground	46			No
		First	46			
8 Strathdarr Street	S	Ground	46			No
		First	46			
14a Nyanza Street	E	Ground	40			Yes
		First	41			
16 Nyanza Street	N	Ground	45			NO
		First	46			

**Façade-adjusted*

4.5.2 With Noise Control Measures

The highest calculated noise levels at the nearest noise sensitive places, without noise control measures, are presented in Table 4.3 with full results presented in Appendix E.

Table 4.3 Calculated Noise Levels with the Noise Fences & Screens

Building	Facade	Floor	Daytime* $L_{eq,adj,1\text{-}hr}$ dB(A)	Criteria Day-time dB(A)$_{Leq,adj,1hr}$	Criteria Evening dB(A)$_{Leq,adj,1hr}$	Compliance
2 Strathdarr Street	S	Ground	40	45	44	Yes
		First	43			
4 Strathdarr Street	S	Ground	40			Yes
		First	43			
6 Strathdarr Street	S	Ground	43			Yes
		First	43			
8 Strathdarr Street	S	Ground	42			Yes
		First	42			
14a Nyanza Street	E	Ground	40			Yes
		First	41			
16 Nyanza Street	N	Ground	42			Yes
		First	44			

*Façade-adjusted

Grid noise maps (noise contours) showing the propagation patterns of operational noise sources, are presented in Appendix F.

5. Discussion and Recommendations

The noise impact assessment was carried out at the request of Macedonian Orthodox Church which is proposing to establish a place of worship (church and associated facilities) on land described at Lot 3 on RP209064, 18-26 Nyanza Street in Woodridge, within the Logan City Council local government area. There are existing dwellings to the north, south and west of the site, which are considered the nearest noise sensitive receptors to the proposed church.

Background noise measurements were carried out initially in March 2014 and again in October 2014. Every day of the weeks was covered by background noise measurements to address the specific issue raised in one of the objections. The additional noise measurements carried out in October 2014, are similar but marginally higher than the noise levels recorded in March 2014. To obtain conservative results the noise data recorded in March 2014 (lesser average background noise levels) were adopted in the determination of the noise impact assessment criteria.

The results of the site specific noise measurements, undertaken in late March and October, are representative of typical noise amenity in areas with low density transportation (noise area category R2 as specified in AS1055.2 – 1997). This is an indication that the major roads in the area (Campton Road and Acacia Road) and the Brisbane to Gold Coast railway corridor (located at approximately 150 m to the south-west) do not influence the noise amenity of the surroundings of the proposed church.

The initial assessment was carried out with consideration of the noise criteria as specified in the *Environmental Protection (Noise) Policy 2008* (EPP (noise)). The purpose of EPP (Noise), as a subordinate State Legislation, is to achieve the object of the *Environmental Protection Act 1994* (the Act) in relation to the acoustic environment. This is a State wide legal document that provides...*framework for making consistent, equitable and informed decisions about the acoustic environment.*

EPP (Noise) is more recent document than the *Logan Planning Scheme 2006* (Schedule 3 Standards) and the relevant criteria from both documents are identical.

Queensland *Environmental Protection (Noise) Policy* has established environmental noise criteria in the form of acoustic quality objectives and control of background noise creep. The former are set criteria not to be exceeded following introduction of new development whilst the latter ensures the existing acoustic environment is not impacted by addition of more than 5dB(A) above the background noise level. Considering the proposed church will provide day-time (after 9:30am) and evening services (starting at 6:00pm), the background creep criteria is the most stringent criteria that the proposed development has to comply with.

Noise propagation modelling was carried out for the proposed development considering all potential noise sources from the regular church activities. The noise sources considered were vehicle noise from parking areas and access ways, conversation (spoken voice) by members of the congregation in an outdoors setting, and mechanical noise from the air conditioning unit on the northern façade of the office building.

It is important to note that the proposed church does not have any amplified 'call to prayer' system or bell tower. In one of the objections, it is stated that...*music and amplified speech have not been modelled.* The reason for not considering music and amplified speech is simply because no music is ever played in a Macedonian Orthodox Church. The service in the Macedonian Orthodox Church is a solemn occasion with Liturgy presented by the raised voice of the priest (without amplification) with the congregation standing in reverent silence to be followed by a Holy Communion.

The 3D model considered the site of Lot 3 on RP209064 as well as the nearest dwellings on the allotments to the north, south and west. Receptors (calculation points) were located on the most exposed façades on the ground and the upper floors of each house.

The noise propagation modelling was carried out with consideration of the characteristics of the various noise sources such as pronounced tonal characteristics (continuous "humming" noise) or intermittent (impulsive) noise. In the additional noise propagation modelling the specific issues raised in one of the objections about the impulsive adjustment for car parking (i.e. car door slams) was considered by addition of +5dB(A). The typical noise emissions from conversation in front of the Church were also increased by +5dB(A).

The increased sound power levels of the main noise sources resulted in higher calculated noise levels at the nearest noise sensitive places. The day-time noise criteria was exceeded by 1 dB(A) at most of the nearest noise sensitive places. Only at the house at 14A Nyanza Street the noise criteria was meet without a need for additional noise control measures.

To protect the noise amenity at the nearest noise sensitive places the following noise control measures are recommended:

- Construction of 2.0 m high noise barrier fences along the northern and the southern boundary of the proposed Church;
- Along the northern boundary the 2.0 m high noise barrier fence has to extend along the full length of the common boundary with the houses at 2 and 4 Strathdarr Street;
- Along the southern boundary the 2.0 m high noise barrier fence has to extend along 50% of the common boundary with the house at 16 Nyanza Street;
- A 2.0 m high noise barrier fence (acoustic screen) has to be constructed along the southern side of the entry to the Church to screen the direct line of sight to the upper floor of the house at 16 Nyanza Street; and
- A 1.5 m high noise barrier fence (acoustic screen) is required in an 'L' shape to screen the air-conditioning unit along the northern façade of the office.

Should the noise barrier fences be constructed of timber the following design specifications are applicable:

- Minimum paling thickness of 25 mm with a mass of not less than 15 kg/m^2.
- The typical spacing of the posts should be 3.0 m.
- Top, middle and bottom railings are required.

- There shall be no gaps in the noise barrier fence and at the contact between the noise barrier fence and the ground.

Typical design of a timber noise barrier fence is presented in Figure 5.1.

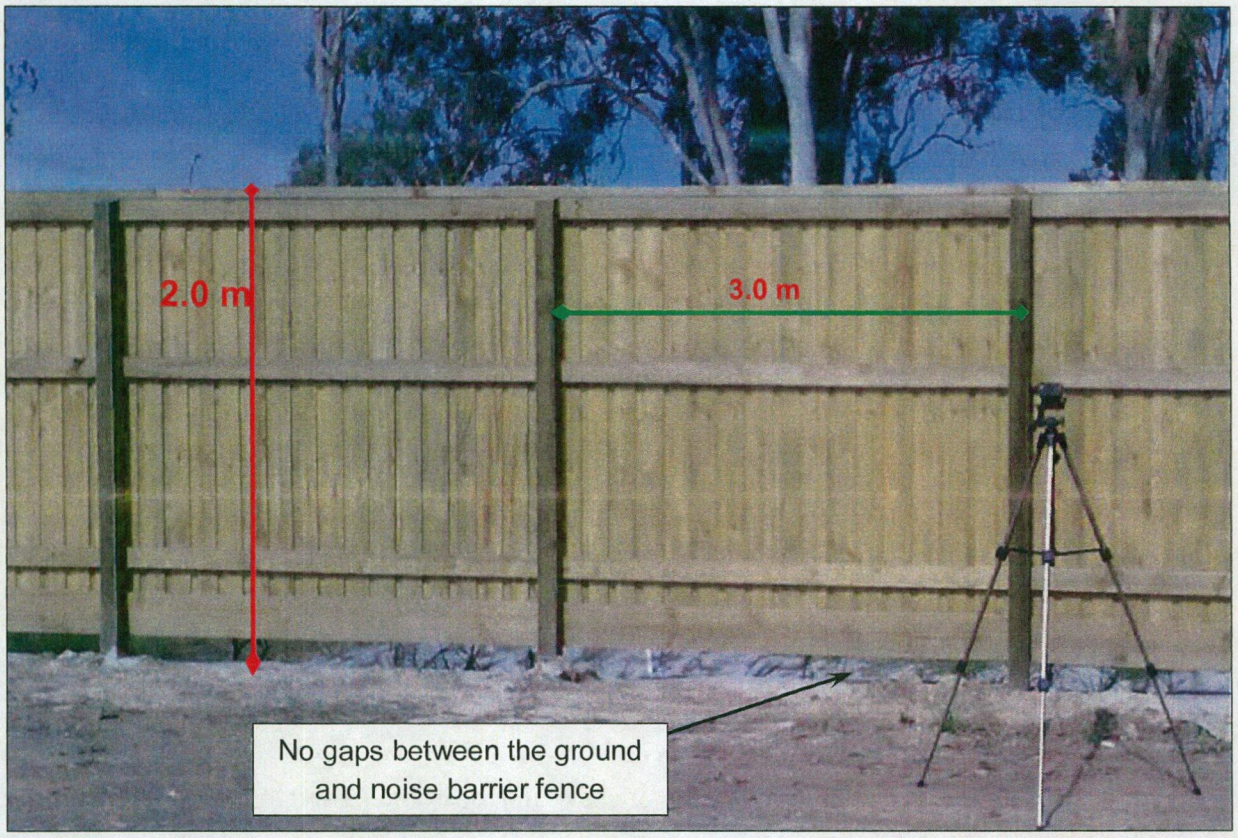


Figure 5.1 Timber Noise Barrier Fence Specifications

Provided the recommended noise control measures, as presented in this report, are implemented in the detailed design and construction, the typical church activities at the proposed Macedonian Orthodox Church at 18 Nyanza Street in Woodridge, will not impact on the noise amenity at the nearest noise sensitive places.

6. Conclusions

Based on the results of the additional noise impact assessment for the proposed place of worship at Lot 3 on RP209064, 18-26 Nyanza Street in Woodridge, the following is concluded:

- Background noise measurements were carried out initially in March 2014 and again in October 2014. Every day of the weeks was covered by background noise measurements to address the specific issue raised in one of the objections.

- The additional noise measurements carried out in October 2014, are similar but marginally higher than the noise levels recorded in March 2014. To obtain conservative results the noise data recorded in March 2014 (lesser average background noise levels) were adopted in the determination of the noise impact assessment criteria.

- The initial assessment was carried out with consideration of the noise criteria as specified in the *Environmental Protection (Noise) Policy 2008* (EPP (noise)). EPP (Noise) is more recent document than the *Logan Planning Scheme 2006* (Schedule 3 Standards) and the relevant criteria from both documents are identical.

- Considering the proposed church will provide day-time (after 9:30am) and evening services (starting at 6:00pm), the background creep criteria is the most stringent criteria that the proposed development has to comply with.

- Noise propagation modelling was carried out for the proposed development considering all potential noise sources from the regular church activities. The noise sources considered were vehicle noise from parking areas and access ways, conversation (spoken voice) by members of the congregation in an outdoors setting, and mechanical noise from the air conditioning unit on the northern façade of the office building.

- In one of the objections, it is stated that...*music and amplified speech have not been modelled.* The reason for not considering music and amplified speech is simply because no music is ever played in a Macedonian Orthodox Church. The service in the Macedonian Orthodox Church is a solemn occasion with Liturgy presented by the raised voice of the priest (without amplification) with the congregation standing in reverent silence to be followed by a Holy Communion.

- The noise propagation modelling was carried out with consideration of the characteristics of the various noise sources such as pronounced tonal characteristics (continuous "humming" noise) or intermittent (impulsive) noise. In the additional noise propagation modelling the specific issues raised in one of the objections about the impulsive adjustment for car parking (i.e. car door slams) was considered by addition of +5dB(A). The typical noise emissions from conversation in front of the Church were also increased by +5dB(A).

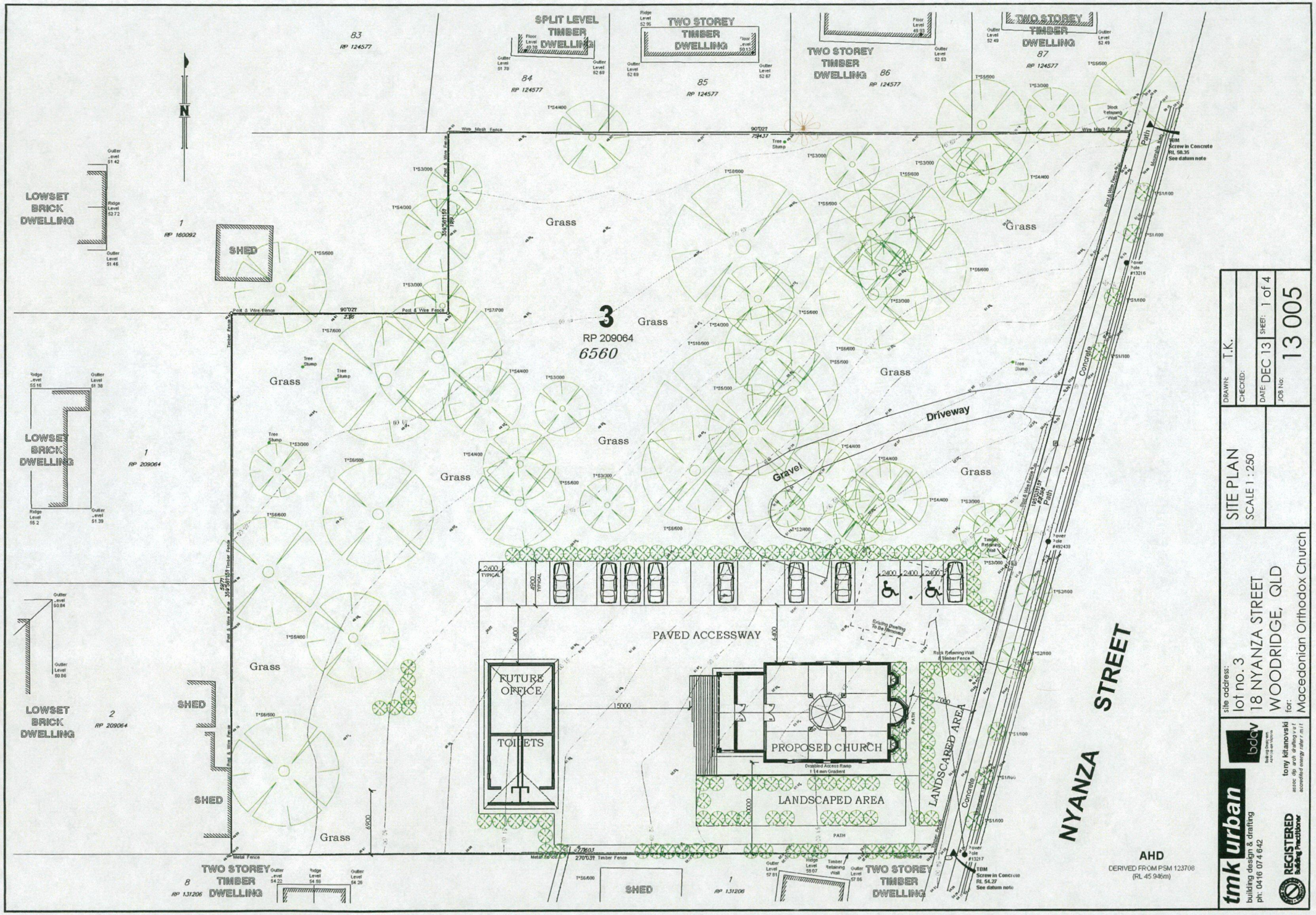
- The increased sound power levels of the main noise sources resulted in higher calculated noise levels at the nearest noise sensitive places. The day-time noise criteria was exceeded by 1 dB(A) at most of the nearest noise sensitive places. Only at the house at 14A Nyanza Street the noise criteria was meet without a need for additional noise control measures.

- To protect the noise amenity at the nearest noise sensitive places the following noise control measures are recommended:
    - Construction of 2.0 m high noise barrier fences along the northern and the southern boundary of the proposed Church;
    - Along the northern boundary the 2.0 m high noise barrier fence has to extend along the full length of the common boundary with the houses at 2 and 4 Strathdarr Street;
    - Along the southern boundary the 2.0 m high noise barrier fence has to extend along 50% of the common boundary with the house at 16 Nyanza Street;
    - A 2.0 m high noise barrier fence (acoustic screen) has to be constructed along the southern side of the entry to the Church to screen the direct line of sight to the upper floor of the house at 16 Nyanza Street; and
    - A 1.5 m high noise barrier fence (acoustic screen) is required in an 'L' shape to screen the air-conditioning unit along the northern façade of the office.
- Should the noise barrier fences be constructed of timber the following design specifications are applicable:
    - Minimum paling thickness of 25 mm with a mass of not less than 15 kg/m^2.
    - The typical spacing of the posts should be 3.0 m.
    - Top, middle and bottom railings are required.
    - There shall be no gaps in the noise barrier fence and at the contact between the noise barrier fence and the ground.
- Typical design of a timber noise barrier fence is presented in Figure 5.1 of this report.
- Provided the recommended noise control measures, as presented in this report, are implemented in the detailed design and construction, the typical church activities at the proposed Macedonian Orthodox Church at 18 Nyanza Street in Woodridge, will not impact on the noise amenity at the nearest noise sensitive places.

7. References

- Australian Standard AS1055.1-1997 (*Acoustics – Description and measurement of environmental noise Part 1: General Procedures)*
- Australian Standard AS1055.2-1997 (*Acoustics – Description and measurement of environmental noise Part 2: Application to Specific Situations)*
- Bureau of Meteorology, 2014, *Climate Data Online – Logan City, Queensland.* Available at: http://www.bom.gov.au/climate/dwo/201404/html/IDCJDW4073.201404.shtml accessed on 15 April 2014
- Logan City Council, 2006, *Logan Planning Scheme 2006 – Schedule 3 Standards*
- Queensland Government, 1994, *Environmental Protection Act 1994,* Queensland Environmental Protection Authority, Brisbane
- Queensland Government, 2008, *Environmental Protection (Noise) Policy 2008,* Department of Environment and Resource Management, Brisbane
- Queensland Government, 2008, *Environmental Protection Regulation 2008,* Department of Environment and Resource Management, Brisbane

Appendix A – Proposed Development Layout



DRAWN: T.K.
CHECKED:
DATE: DEC 13
SHEET: 1 of 4
JOB No: 13 005

SITE PLAN
SCALE 1 : 250

site address:
lot no. 3
18 NYANZA STREET
WOODRIDGE, QLD
for:
Macedonian Orthodox Church

tmk urban
building design & drafting
ph. 0416 074 642
bdav
tony kitanovski
REGISTERED Building Practitioner

Appendix B – Site Photos

Photo 1: Location of the Noise Logger at the Site (18-26 Nyanza Road, Woodridge)

Photo 2: Existing Uninhabitable High-set Houses at the Subject Site (to be demolished)

Appendix C – Noise Measurement Results

Appendix E – Calculated Noise Levels (SoundPLAN Tables)

18 Nyanza Street, Woodridge
Assessed Receiver Levels
Operational Noise Levels - Without Noise Barrier Fence

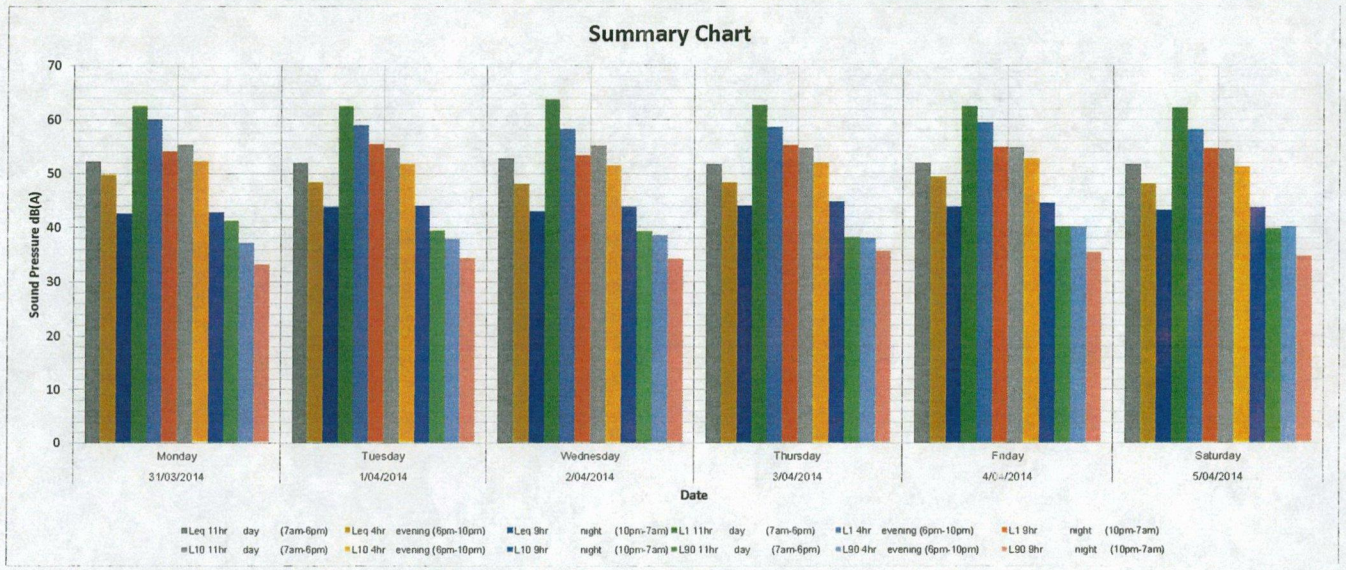
Receiver	Fl	Dir	SPL Daytime Leq(1-hour) dB(A)	SPL Evening Leq (1-hour) dB(A)
2 Strathdarr Street	GF	S	45	44
	F 1		46	45
4 Strathdarr Street	GF	S	46	45
	F 1		46	45
6 Strathdarr Street	GF	S	46	45
	F 1		46	45
8 Strathdarr Street	GF	S	46	44
	F 1		46	44
14A Nyanza Street	GF	E	40	40
	F 1		41	41
16 Nyanza Street	GF	N	45	45
	F 1		46	46

ATP140306
Macedonian Church
Commercial

Use for average	Date	Day	Leq 11hr day (7am-6pm)	Leq 4hr evening (6pm-10pm)	Leq 9hr night (10pm-7am)	L1 11hr day (7am-6pm)	L1 4hr evening (6pm-10pm)	L1 9hr night (10pm-7am)	L10 11hr day (7am-6pm)	L10 4hr evening (6pm-10pm)	L10 9hr night (10pm-7am)	L90 11hr day (7am-6pm)	L90 4hr evening (6pm-10pm)	L90 9hr night (10pm-7am)
√	31/03/2014	Monday	52	50	42	62	60	54	55	52	43	41	37	33
√	1/04/2014	Tuesday	52	48	44	62	59	55	55	52	44	39	38	34
√	2/04/2014	Wednesday	53	48	43	64	58	53	55	51	44	39	38	34
√	3/04/2014	Thursday	52	48	44	63	59	55	55	52	45	38	38	36
√	4/04/2014	Friday	52	49	44	62	59	55	55	53	45	40	40	35
√	5/04/2014	Saturday	52	48	43	62	58	55	55	51	44	40	40	35
	AVERAGE		52	49	43	63	59	55	55	52	44	40	39	35

Acoustic Research Laboratories Pty Ltd - Type 1 Environmental Noise Logger

Logger Serial Number	16-707-017
Measurement Title	ATP140306
Measurement started at	30/03/2014 10:47
Measurement stopped at	8/04/2014 9:43
Frequency Weighting	A
Time Averaging	Fast
Statistical Interval	15 minutes
Auxiliary Power	Disabled
Tape Recorder	Disabled
Short Term Leq	Disabled
Short Term Leq Length	N/A
Start Trigger	N/A
Stop Trigger	N/A
Master Timer	N/A
Sub Timer	N/A
Pre-measurement Reference	94
Post-measurement Reference	94
Engineering Units	dB SPL

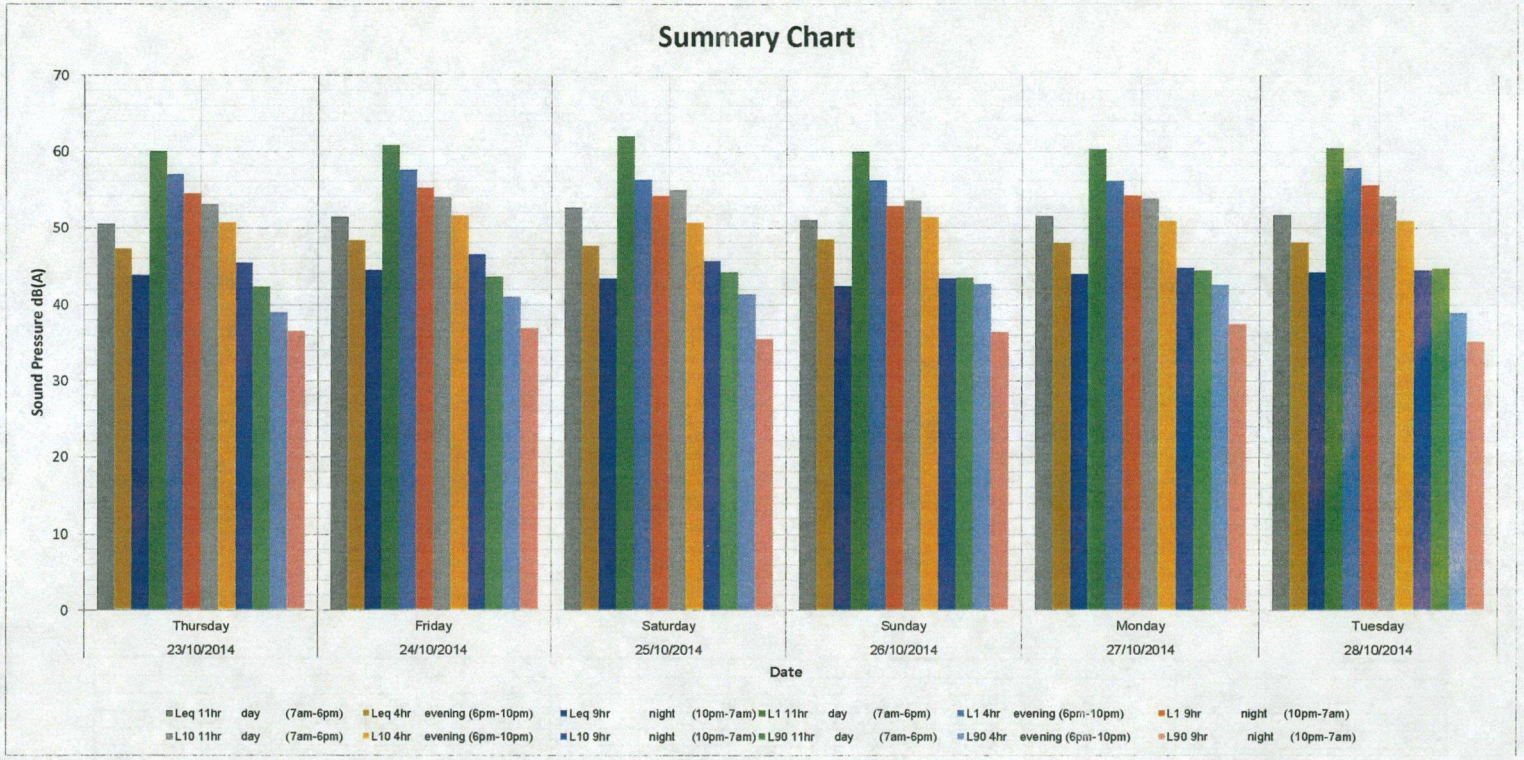


ATP140306
18 Nyanza Sreet, Woodridge
Commercial

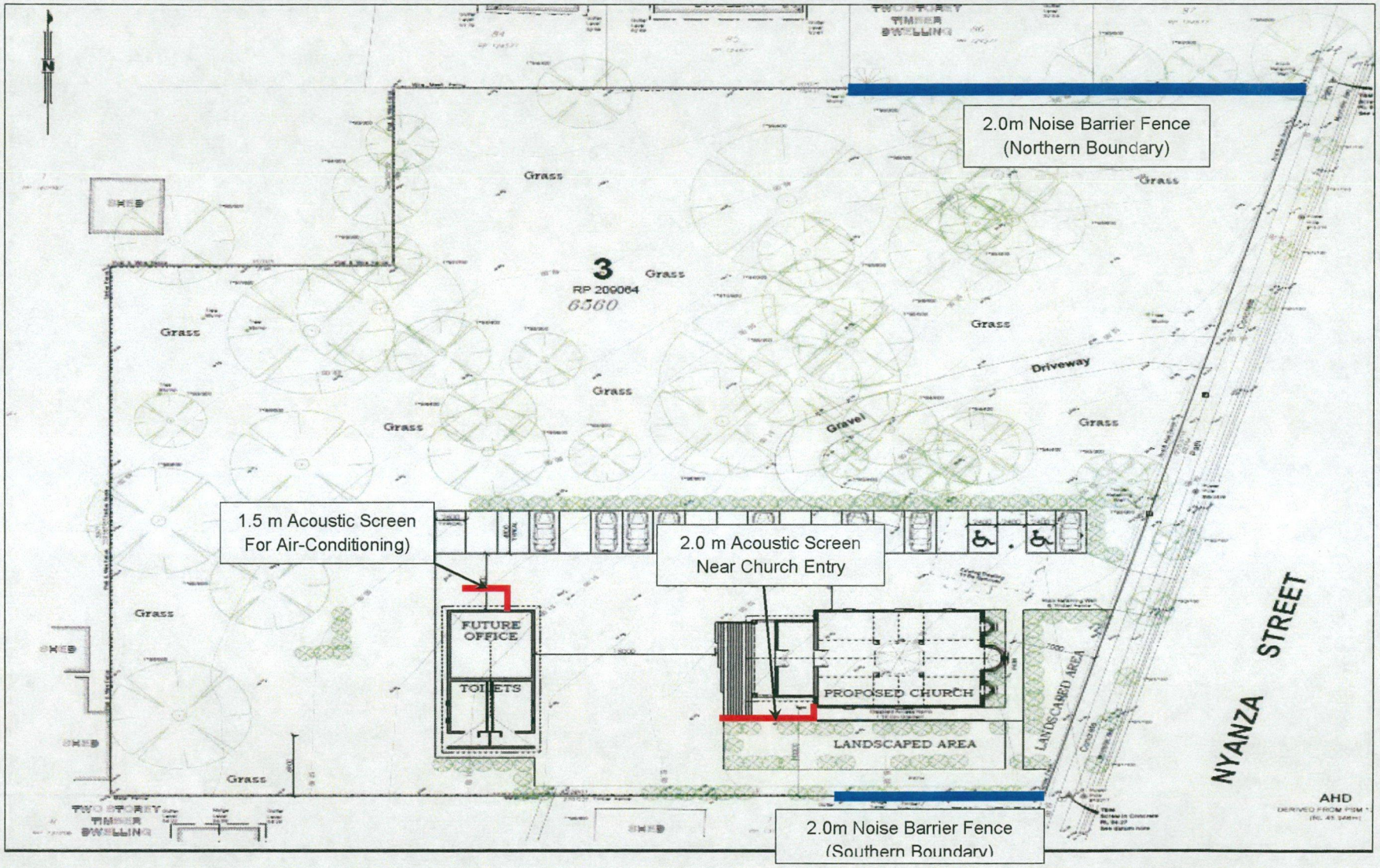
Acoustic Research Laboratories Pty Ltd - Type 1 Noise Logger

Measurement stopped at	16:05:21 , 29/10/2014
Frequency Weighting	A
Time Averaging	Fast
Statistical Interval	15 minutes
Auxiliary Power	Disabled
Tape Recorder	Disabled
Short Term Leq	Disabled
Short Term Leq Length	N/A
Start Trigger	N/A
Stop Trigger	N/A
Master Timer	N/A
Sub Timer	N/A
Pre-measurement Reference	94
Post-measurement Reference	93.9
Engineering Units	dB SPL

Date	Day	Leq 11hr day (7am-6pm)	Leq 4hr evening (6pm-10pm)	Leq 9hr night (10pm-7am)	L1 11hr day (7am-6pm)	L1 4hr evening (6pm-10pm)	L1 9hr night (10pm-7am)	L10 11hr day (7am-6pm)	L10 4hr evening (6pm-10pm)	L10 9hr night (10pm-7am)	L90 11hr day (7am-6pm)	L90 4hr evening (6pm-10pm)	L90 9hr night (10pm-7am)
23/10/2014	Thursday	51	47	44	60	57	54	53	51	45	42	39	37
24/10/2014	Friday	51	48	45	61	58	55	54	52	47	44	41	37
25/10/2014	Saturday	53	48	43	62	56	54	55	51	46	44	41	36
26/10/2014	Sunday	51	48	42	60	56	53	54	51	43	43	43	36
27/10/2014	Monday	52	48	44	60	56	54	54	51	45	44	43	38
28/10/2014	Tuesday	52	48	44	60	58	56	54	51	44	45	39	35
AVERAGE		**51**	**48**	**44**	**61**	**57**	**54**	**54**	**51**	**45**	**44**	**41**	**36**



Appendix D – Alignment of the Noise Fences & Screens

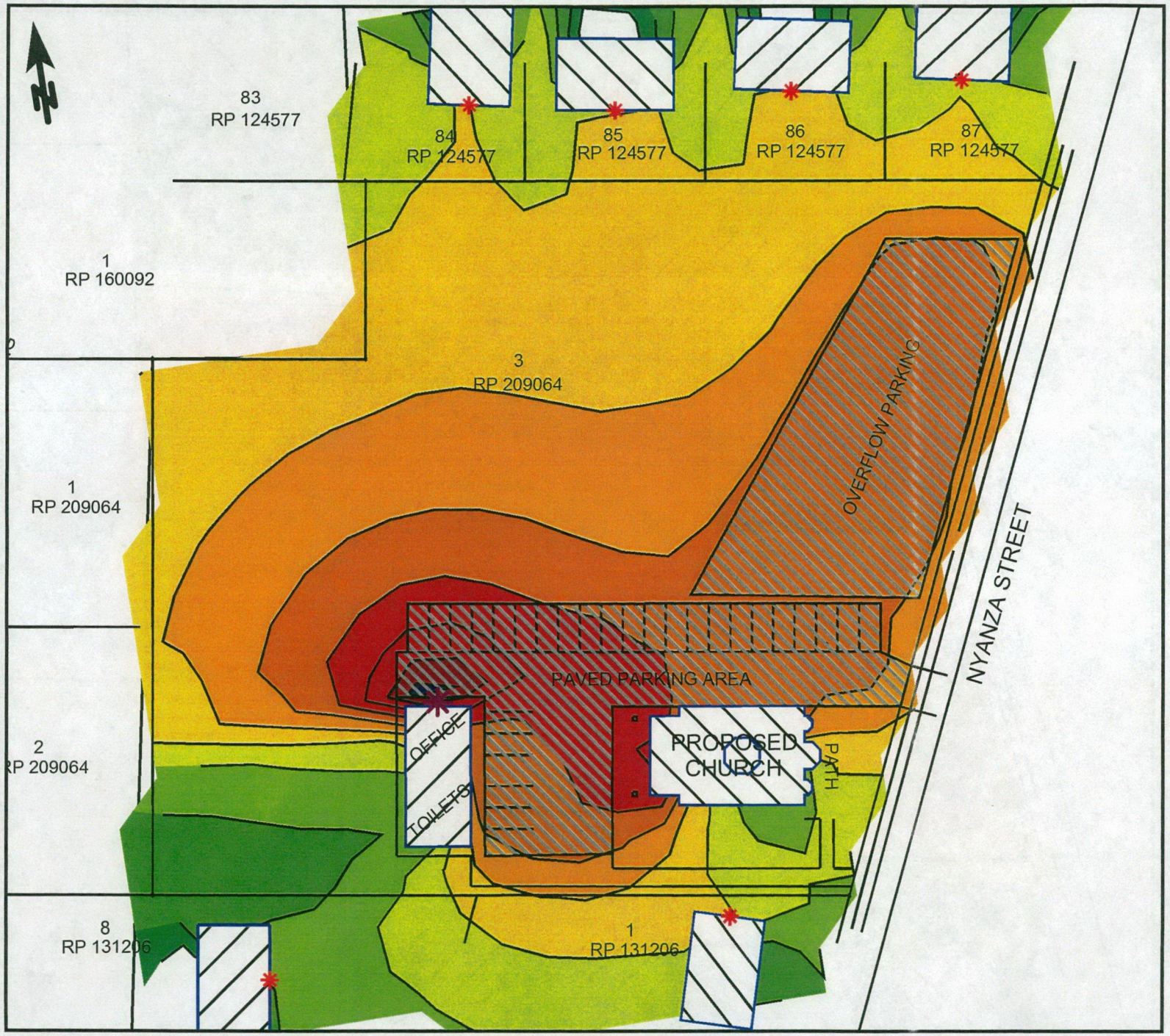


Client: Macedonian Orthodox Church
Doc No.: ATP140306-R-NIA-02
Doc Title: Noise Impact Assessment

18 Nyanza Street, Woodridge
Assessed Receiver Levels
Operational Noise Levels - With Noise Barrier Fences (North & South)

Receiver	Fl	Dir	SPL Daytime Leq(1-hour) dB(A)	SPL Evening Leq (1-hour) dB(A)
2 Strathdarr Street	GF	S	40	40
	F 1		43	43
4 Strathdarr Street	GF	S	40	40
	F 1		43	43
6 Strathdarr Street	GF	S	43	42
	F 1		43	43
8 Strathdarr Street	GF	S	42	42
	F 1		42	42
14A Nyanza Street	GF	E	40	40
	F 1		41	41
16 Nyanza Street	GF	N	42	42
	F 1		44	44

Appendix F – Noise Contour Maps (SoundPLAN Graphical Output)



Macedonian Church
18 Nyanza Street,
Woodridge

Noise Propagation
All Sources - Daytime
No Noise Barrier Fences

Noise Level
Leq (1-hour) @ 1.8m AGL
in dB(A) (Free-Field)

=	32
=	36
=	40
=	44
=	48
=	52
=	56
=	60
=	64
=	68
=	72

Angle Increment = 1
Grid Spacing = 5m

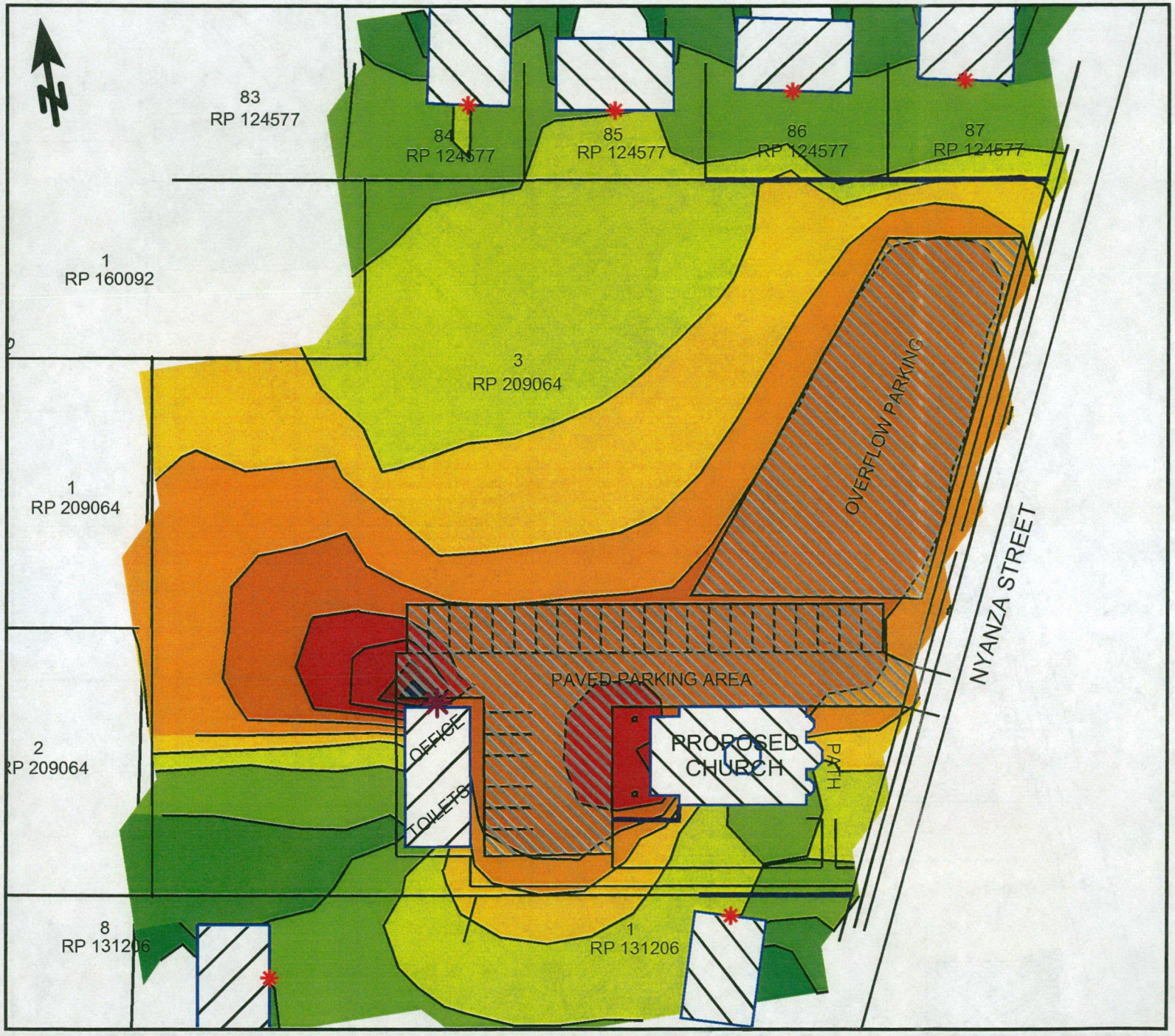
Signs and Symbols

- Point source
- Car Parking
- Building
- Point Receiver

Scale 1:600

0 3 6 12 18 24 m

ATP



Macedonian Church
18 Nyanza Street,
Woodridge

Noise Propagation
All Sources - Daytime
With 2.0m Noise Barrier Fences

Noise Level
Leq (1-hour) @ 1.8m AGL
in dB(A) (Free-Field)

= 32
= 36
= 40
= 44
= 48
= 52
= 56
= 60
= 64
= 68
= 72

Angle Increment = 1
Grid Spacing = 5m

Signs and Symbols

- Car Parking
- Point Source
- Main Building
- 2.0m Noise Barrier Fences
- Point Receiver

Scale 1:600

0 3 6 12 18 24 m

ATP