

Our reference: 2308-36104 SRA Your reference: DA230040

23 October 2023

Chief Executive Officer North Burnett Regional Council PO Box 390 GANYDAH QLD 4625 admin@northburnett.qld.gov.au

Attention: Ms Lyn McLeod

Dear Ms McLeod

SARA Response – 22 Dalgangal Road, GAYNDAH (Lot 21 on SP203242)

(Given under Section 56 of the Planning Act 2016)

The development application described below was confirmed as being properly referred to the State Assessment and Referral Agency (SARA) on 11 August 2023.

Outcome:	Referral Agency Response under Section 56(1)(b) of the <i>Planning Act 2016</i>
Date of response:	23 October 2023
Conditions:	The approval is subject to the conditions in Attachment 1
Advice:	Advice to the applicant is in Attachment 2
Reasons:	The reasons for the referral agency response are in Attachment 3

Development Details

Description:

Development Permit for Material Change of Use (MCU) – Multiple Dwelling (5 Units)

SARA role:	Referral agency
SARA triggers:	Schedule 10, Part 9, Division 4, Subdivision 2, Table 4, Item 1– Material change of use of premises near a State transport corridor (Planning Regulation 2017)
SARA reference:	2308-36104 SRA
Assessment Manager:	North Burnett Regional Council
Street address:	22 Dalgangal Road, GAYNDAH
Real property description:	Lot 21 on SP203242
Applicant name:	Mr Tony Bosotas
Applicant contact details:	PO Box 3635 QUEANBEYAN EAST NSW 2620 tonybosotas@hotmail.com
State-controlled road access permit:	This referral included an application for a road access location, under Section 62A(2) of the <i>Transport Infrastructure Act</i> 1994.
	Below are the details of this decision:
	 Approved – with conditions TMR23-040110 Date: 23 October 2023
	If you are seeking further information on the road access permit, please contact the Department of Transport and Main

Representations

An applicant may make representations to a concurrence agency, at any time before the application is decided, about changing a matter in the referral agency response (section 30 of the Development Assessment Rules).

Roads at Wide.Bay.Burnett.IDAS@tmr.qld.gov.au

Copies of the relevant provisions are in Attachment 4.

A copy of this response has been sent to the applicant for their information.

For further information please contact Peter Mulcahy, Principal Planning Officer, on (07) 3307 6152 or via email WBBSARA@dsdilgp.qld.gov.au who will be pleased to assist.

Yours sincerely

Luke Lankowski Manager, Planning – Wide Bay Burnett

enc	Attachment 1 – Referral agency conditions
	Attachment 2 – Advice to the applicant
	Attachment 3 – Reasons for referral agency response
	Attachment 4 – Representations about a referral agency response
	Attachment 5 – Approved plans and specifications

cc Mr Tony Bosotas tonybosotas@hotmail.com

> Department of Transport and Main Roads Wide.Bay.Burnett.IDAS@tmr.qld.gov.au

Attachment 1—Referral agency conditions (Under Section 56(1)(b)(i) of the *Planning Act 2016* the following conditions must be attached to any development approval relating to this application) (Copies of the plans and specifications referenced below are found at Attachment 5)

No.	Conditions	Condition timing		
Development Permit for Material Change of Use (MCU) – Multiple Dwelling (5 Units)				
Schedule 10, Part 9, Division 4, Subdivision 2, Table 4, Item 1 of the Planning Regulation 2017—The Chief Executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Transport and Main Roads to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):				
1.	a) The road access location is to be located generally in accordance with the <i>Site Plan</i> , prepared by Gatley Building Design, Drawing No. 23131, Page 01 dated 24 February 2023 (as amended in red by SARA).	(a) At all times.		
	b) Road works comprising an urban residential concrete crossover a minimum of 6.5 metres wide must be provided in accordance with the <i>Site Plan</i> , prepared by Gatley Building Design, Drawing No. 23131, Page 01 dated 24 February 2023 (as amended in red by SARA).	(b) Prior to the commencement of use.		
	 c) The road access works must be designed and constructed in accordance with the: Department of Transport and Main Roads Planning and Design Manual and Standards and Specifications; and Driveways Residential Invert Crossing prepared by North Burnett Regional Council Standard Drawing R1014, Revision A dated 6 June 2020. 	(c) Prior to the commencement of use.		
2.	Carry out the stormwater management of the proposed development generally in accordance with <i>Stormwater Management Plan</i> prepared by Empire Engineering, Project Reference: CC-7330 Revision A, dated September 2023.	At all times.		

Attachment 2—Advice to the applicant

Gener	General advice			
1.	Terms and phrases used in this document are defined in the <i>Planning Act 2016</i> its regulation or the State Development Assessment Provisions (SDAP) v3.0. If a word remains undefined it has its ordinary meaning.			
Works	s in the road reserve – construction of vehicular crossover			
2.	Under Section 33 of the <i>Transport Infrastructure Act 1994</i> , written approval is required from the Department of Transport and Main Roads to carry out road works or access works on a State-controlled road. Please contact the Department of Transport and Main Roads on (07) 4154 0200 or by e-mail to <u>Wide.Bay.Burnett.IDAS@tmr.qld.gov.au</u> to make an application for road works approval. This approval must be obtained prior to commencing any works on the State-controlled road reserve. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ). The road works approval process takes time – please contact the Department of Transport and Main Roads as soon as possible to ensure that gaining approval does not delay construction.			

Attachment 3—Reasons for referral agency response

(Given under Section 56(7) of the Planning Act 2016)

The reasons for the SARA decision are:

The proposed development complies with the assessment benchmarks and purpose statement within State Code 1: Development in a state-controlled road environment of the State Development Assessment Provisions, as the proposed development is <u>not</u> considered to:

- result in adverse stormwater impacts on the adjoining state-controlled road
- adversely impact the function and efficiency of state-controlled roads

Conditions have been applied to ensure compliance with State Code 1 relating to stormwater management and vehicular access arrangements within the State-controlled road corridor.

Material used in the assessment of the application:

- The development application material.
- Planning Act 2016.
- Planning Regulation 2017.
- The State Development Assessment Provisions (Version 3.0).
- The Development Assessment Rules (DA Rules).
- SARA DA Mapping system.
- Human Rights Act 2019.

Attachment 4—Representations about a referral agency response

Development Assessment Rules—Representations about a referral agency response

The following provisions are those set out in sections 28 and 30 of the Development Assessment Rules¹ regarding **representations about a referral agency response**

Part 6: Changes to the application and referral agency responses

28 Concurrence agency changes its response or gives a late response

- 28.1. Despite part 2, a concurrence agency may, after its referral agency assessment period and any further period agreed ends, change its referral agency response or give a late referral agency response before the application is decided, subject to section 28.2 and 28.3.
- 28.2. A concurrence agency may change its referral agency response at any time before the application is decided if—
 - (a) the change is in response to a change which the assessment manager is satisfied is a change under section 26.1; or
 - (b) the Minister has given the concurrence agency a direction under section 99 of the Act; or
 - (c) the applicant has given written agreement to the change to the referral agency response.²
- 28.3. A concurrence agency may give a late referral agency response before the application is decided, if the applicant has given written agreement to the late referral agency response.
- 28.4. If a concurrence agency proposes to change its referral agency response under section 28.2(a), the concurrence agency must—
 - (a) give notice of its intention to change its referral agency response to the assessment manager and a copy to the applicant within 5 days of receiving notice of the change under section 25.1; and
 - (b) the concurrence agency has 10 days from the day of giving notice under paragraph (a), or a further period agreed between the applicant and the concurrence agency, to give an amended referral agency response to the assessment manager and a copy to the applicant.

¹ Pursuant to Section 68 of the *Planning Act 2016*

² In the instance an applicant has made representations to the concurrence agency under section 30, and the concurrence agency agrees to make the change included in the representations, section 28.2(c) is taken to have been satisfied.

Part 7: Miscellaneous

30 Representations about a referral agency response

30.1. An applicant may make representations to a concurrence agency at any time before the application is decided, about changing a matter in the referral agency response.³

³ An applicant may elect, under section 32, to stop the assessment manager's decision period in which to take this action. If a concurrence agency wishes to amend their response in relation to representations made under this section, they must do so in accordance with section 28.

Attachment 5—Approved plans and specifications





PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE			
SARA ref:	2308-36104 SRA		
Date:	23 October 2023		



Amended in red by SARA on





ABN 21 112 761 510
empireengineering.com.au

Stormwater Management Plan

5 Unit Development

22 Dalgangal Road, Gayndah



Prepared for T & J Builders

Project Ref CC-7330 Date September 2023 Revision A





Bundaberg

Street Address 66A Barolin Street Bundaberg Qld 4670

Postal Address PO Box 2052 Bundaberg Qld 4670

Phone (07) 4154 4894

Email admin.cc@empireengineering.com.au

Sunshine Coast

Street Address The Corporate Centre, 13 Norval Court Maroochydore Qld 4557

Postal Address PO Box 102 Mooloolaba Qld 4557

Phone (07) 5477 6437

Email admin.sc@empireengineering.com.au

Gympie

Street Address 3/19 Tozer Street Gympie Qld 4570

Phone (07) 5354 4080

Email admin.cc@empireengineering.com.au

Document Qualifying and Ownership Statement:

The contents of this document represent an assessment of the facts and circumstances pertaining to this matter, as they are known to the writer at the time of preparation. It is possible that upon completion and distribution of this document further information may come to hand that impact upon the findings, recommendations or conclusions drawn in this document. This document and its contents remains the property of Empire Engineering Pty Ltd and cannot be reproduced in whole or in part for any reasons that could be considered to be outside the exact, intended original use of this document.





Prepared by	
Report title:	Stormwater Management Plan – 5 Unit Development at 22 Dalgangal Road, Gayndah
Project number:	CC-7330
Author:	Reegan Dunn
Qualifications:	BEng (Civil) Hons

Site information	
Street address:	22 Dalgangal Road, Gayndah
RP description:	Lot 21 on SP203242

Prepared for	
Client:	T & J Builders
Client contact:	Mr Tony Bosotas

Revision history					
Revision Number	Date	Reviewed by		Authorised by	
A	September 2023	Ross Wegner	A	Ross Wegner RPEQ 8042	Æ

Document distribution			
Revision Number	Recipient	Number of copies	Format
A	Mr Tony Bosotas Mr Shane Booth, Booth Town Planning	1	PDF



CONTENTS

Exe	ecuti	ive Summary	1					
1.	Introduction							
	1.1.	Project Background	2					
	1.2.	Aim	2					
	1.3.	Locality and Description	2					
	1.4.	Proposed Development	2					
	1.5.	Lawful Point of Discharge	2					
2.	Stormwater Quantity Management							
	2.1.	Background	4					
	2.2.	Existing Drainage System	4					
	2.3.	Proposed Drainage System	5					
	2.4.	Modelling Overview	5					
	2.5.	Catchments	5					
		2.5.1. Sub-catchment Delineation and Slope	5					
		2.5.2. Fraction Impervious	5					
		2.5.3. Roughness	5					
		2.5.4. Losses	5					
		2.5.5. Routing Method	5					
	2.6.	Storm Events	7					
	2.7.	Pre-development Model	7					
	2.8.	Post-development Model	7					
	2.9.	Post-Development with Mitigation Model	7					
	2.10.	Results	8					
	2.11.	Model Validation						
3.	Con	nclusion	11					
4.	Ref	erences						
Ap	penc	dix A – Development Site Plan prepared by Gatley Building Desig	n13					
Ap	penc	dix B – Concept Stormwater Layout Plan						



FIGURES

Figure 2.1 – Aerial of Subject Site with 1m Contours (Google Maps)	.3
Figure 3.1 – Existing drainage from site (1m contours)	4
Figure 3.2 – Pre-development Catchment	6
Figure 3.3 – Post-development Catchments	6
Figure 3.4 – Post-development with mitigation XP-Storm model layout	8

TABLES

Table 3.1 – XP-Storm Modelling Results
Table 3.2 – XP Storm Model and Rational Method Flow Comparison



Executive Summary

This report outlines stormwater quantity measures recommended to be incorporated into the proposed 5-unit development design as detailed in subsequent sections. Bulk stormwater quantity is proposed to be managed by directing runoff from the site to a small detention basin within the landscaping adjacent to the front of the site, with a throttled outlet discharging flows to the Dalgangal Road Lawful Point of Discharge kerb to no more than peak levels expected from a standard residential allotment.



1. Introduction

1.1. Project Background

Empire Engineering Pty Ltd (Empire Engineering) has been commissioned by T & J Builders to prepare a Site Based Stormwater Management Plan (SMP) for a proposed 5-unit development at 22 Dalgangal Road, Gayndah. This SMP presents the results of a drainage investigation and proposes measures to be adopted in relation to stormwater quantity for the site in question. Industry recognised computer software has been utilised in the preparation of this report. XP Storm has been utilised to size drainage structures and mitigation measures for the relevant Annual Exceedance Probability (AEP) storm events.

1.2. Aim

This SMP aims to provide a conceptual framework of drainage management strategies for the development proposal to be incorporated into the detailed design of the project works. It also aims to specifically act as a response to the SARA Information Request dated 22 August 2023 pertaining to the development proposal.

1.3. Locality and Description

The subject site is a 1395m² residential allotment located on Dalgangal Road which forms part of the state-controlled A3 Burnett Highway. The development site as displayed in Figure 2.1 is a vacant grassed area with some existing trees. Contours from 2011 Lidar display that the land generally falls towards Dalgangal Road.

1.4. Proposed Development

The development proposal involves the construction of a 5-unit complex with associated driveway, visitor carparks and landscaping areas. The proposed site plan prepared by Gatley Building Design is attached as Appendix A.

1.5. Lawful Point of Discharge

It is proposed for the development that stormwater will discharge to the existing kerb on Dalgangal Road, and therefore forms the lawful point of discharge for the development proposal as described by the Queensland Urban Drainage Manual (QUDM). Dalgangal Road is under the control of a statutory authority, being the Queensland Government.





Figure 1.1 – Aerial of Subject Site with 1m Contours (Google Maps)



2. Stormwater Quantity Management

2.1. Background

The purpose of this section of the report is to determine the general requirements for bulk stormwater management for runoff from the proposed development site. Modelling in this section was undertaken using the software package XP-STORM.

The specific objectives of this section of the report are as follows:

- Identify pre and post-development catchment conditions to determine the changes to characteristics of the stormwater runoff generated by the development; and
- If required, demonstrate that the proposed on-site mitigation methods will result in non-worsening of peak flows from the subject site to Dalgangal Road.

2.2. Existing Drainage System

As the site is in a residential area with no existing inter-allotment drainage systems, it is assumed that fencing and boundary treatments result in stormwater runoff discharging from the site to the Dalgangal Road frontage as intended. This is also assumed to be the case for the neighbouring property to the east. Runoff discharging to the existing Dalgangal Road kerb flows west approximately 40m to an inlet pit on the eastern corner of Dalgangal Road and Station Street. This underground system discharges to the Boorunbeh Street drain culvert under Dalgangal Road approximately 140m further to the west, which drains via a waterway to the Burnett River. Figure 3.1 gives an overview of the drainage features downstream of the site.



Figure 2.1 – Existing drainage from site (1m contours)



2.3. Proposed Drainage System

The proposed multi-unit development incorporates an increase in the amount of impervious surface when compared with that of a typical residential allotment. There will therefore be an increase in peak stormwater flow rates from the subject site compared to that expected by the current zoning. It is therefore proposed for the development to incorporate stormwater detention to mitigate peak post-development flow rates from the site. Runoff from the site is proposed to be collected into a small detention basin located within the landscaping adjacent to the front of the site. A throttled outlet from the detention basin will be provided to the kerb on Dalgangal Street.

A concept plan of the stormwater management proposal has been prepared and is attached to this report as Appendix B.

2.4. Modelling Overview

For this development site three 1D XP-Storm hydrology and hydraulic models will be created, the three models being:

- Subject site pre-development;
- Subject site post-development; and
- Subject site post-development with mitigation.

Hydrology assessments for pre and post development were undertaken and iterative 1D hydraulic simulations were combined with the post development case to determine appropriate mitigation measures to reduce peak flows from the site to acceptable levels.

2.5. Catchments

2.5.1. Sub-catchment Delineation and Slope

The main catchment area was delineated with reference to allotment boundaries. The main catchment area of 1395m² is displayed in Figure 3.2. Multiple sections through lidar were analysed and a catchment slope of 4% was adopted for both the pre-development and post-development scenarios.

2.5.2. Fraction Impervious

Fraction impervious was set to 45% to represent a typical residential allotment in the pre-development scenario. The post-development scenario was comprised of 1230m² impervious and 160m² pervious area, as calculated from the proposed site layout (refer to Figure 3.3).

2.5.3. Roughness

Manning's values of 0.015 for impervious and 0.04 for pervious were adopted.

2.5.4. Losses

The Uniform Loss method was used in the models with the initial and continuing losses set as 1 mm and 0 mm/hr for impervious and 10 mm and 1 mm/hr for pervious.

2.5.5. Routing Method

The Laurenson routing method was used with default values retained.





Figure 2.2 – Pre-development Catchment



Figure 2.3 – Post-development Catchments



2.6. Storm Events

The 2019 Australian Rainfall and Runoff (ARR) temporal pattern ensembles have been utilised in this analysis. Storm patterns were setup using 2019 Australian Rainfall and Runoff ensembles and 50th percentile pre-burst volumes for the local area. Storm durations of 10 minutes to 1 hour were investigated for the Annual Exceedance Probability (AEP) 39%, 18%, 10%, 5%, 2%, 1%, and 1% plus climate change (19.7% rainfall increase) storm events. The associated ARR methodology specifies that the design temporal pattern is the storm that produces a median peak flow rate of the ensemble for the duration that has the overall highest mean flow rate. For this analysis, all durations have been included in the pre- versus post-development comparisons.

2.7. Pre-development Model

The pre-development model was created to represent the subject site as a typical residential allotment and was set up with the parameters previously specified. The median peak flow rate results for all storm durations analysed are displayed in Table 3.1 columns 2 and 3, with peak values highlighted in yellow.

2.8. Post-development Model

The post-development model was created to represent the development proposal and was set up with the parameters previously specified. The median peak flow rate results for all storm durations analysed are displayed in Table 3.1 columns 4 and 5, with peak values highlighted in yellow.

2.9. Post-Development with Mitigation Model

The specific objective of the post-development with mitigation model is to demonstrate how the increase in peak flow rates that result from the proposed development of the site can be mitigated prior to discharging from the site. The strategy to achieve this is to receive all stormwater runoff into a small detention basin located within the landscaping adjacent to the front of the site. A throttled outlet will be provided to the kerb on Dalgangal Road.

The post-development model was revised to include a detention basin node as well as links representing the proposed throttled detention basin outlet consisting of underground pipe/s and an overland weir for major storm events. Multiple model iterations were run to determine suitable detention area and outlet sizes, as per the following:

- detention basin with 45m² crest level area, and 27m² bed level area at 0.7m depth;
- 2/150x100 reinforced hollow section (RHS) outlet to kerb at 1%; and
- 400mm wide overflow weir at 0.5m above the detention basin bed level.

The indicative post-development with mitigation model layout is shown as Figure 3.4. The median peak flow rate results for all storm durations analysed are displayed in Table 3.1 columns 6 and 7, with peak values highlighted in yellow.



CC-7330



Figure 2.4 – Post-development with mitigation XP-Storm model layout

2.10. Results

The results displayed in Table 3.1 columns 8 and 10 demonstrate that the proposed development results in an increase in peak design flows from the subject site for all durations compared to that of a typical residential site. The inclusion of the specified detention basin with throttled outlet in the post development with mitigation model reduces the peak design flows to no more than the typical residential site's peak level as shown by columns 9 and 11.



Pro: dev AEP Pre: dev (main pask) Dev (main pask) Dev (main pask)	1	2	3	4	5	6	7	8	9	10	11
APD Ress (ms) Norm define define <thdefine< th=""> define define</thdefine<>	Storm	Pre dev median peak	Pre dev median peak	Post dev median peak	Post dev median peak	Mitigated post dev median peak	Mitigated post dev median peak flow	Pre vs post dev	Pre vs mit post dev	Peak pre vs	Peak pre vs
0.03112 ECK_0.05Fr_10min_1 0.08270 ECN_0.05Fr_10min_1 0.00384 ECN_0.05Fr_10min_0 0.00134 0.03347 ECK_0.05Fr_10min_0 0.04477 ECN_0.05Fr_10min_0 0.00138 ECN_0.05Fr_10min_0 0.00134 0.00038 0.03346 ECN_0.05Fr_10min_0 0.04473 ECN_0.05Fr_10min_1 0.00328 ECN_0.05Fr_10min_0 0.00134 0.03347 ECN_0.05Fr_10min_0 0.03146 ECN_0.05Fr_10min_1 0.00366 ECN_0.05Fr_10min_1 0.00036 0.0387 ECN_0.05Fr_10min_1 0.0366 ECN_0.02Fr_10min_1 0.00367 ECN_0.02Fr_10min_1 0.00388 ECN_0.02Fr_10min_1 0.00388 ECN_0.02Fr_10min_1 0.00387 ECN_0.02Fr_10min_1 0.00388 ECN_0.02Fr_10min_1 0.00388 ECN_0.02Fr_10min_1 0.00388 ECN_0.02Fr_10min_1 0.00388 ECN_0.02Fr_10min_1 0.00488 ECN_0.02Fr_10min_1	AEP	flow (m3/s)	flow storm	flow (m3/s)	flow storm	flow (m3/s)	storm	diff	diff	diff (m3/s)	diff (m3/s)
0000000 ECN_0.25F_15mm_0 0000000 ECN_0.25F_15mm_0 0000000 0000000 0000000 398 000000 CKL_0.25F_15mm_0 000000 00000000 00000000 000000		0.03112	ECN 0.5EV 10min 1	0.05270	ECN 0.5EV 10min 7	0.03342	ECN 0.5EV 10min 10	(m3/s)	(m3/s)		
0.00210 ECN_0.55F_200m_3 0.00139 ECN_0.55F_200m_3 0.00324 ECN_0.55F_200m_3 0.00130 0.00130 0.00364 CRU_0.57F_200m_3 0.00140 ECN_0.57F_200m_3 0.00130 0.00130 0.00130 0.00130 0.00367 CRU_0.57F_200m_3 0.00140 ECN_0.57F_200m_3 0.00140 CCU_0.57F_200m_3 0.00140 0.00014 0.00367 CRU_0.57F_200m_3 0.00140 ECN_0.57F_200m_3 0.00140 CCU_0.57F_200m_3 0.00140 0.00038 0.00014 0.00420 CRU_0.27F_100m_1 0.00557 ECN_0.27F_200m_4 0.00371 CCU_0.27F_200m_5 0.00140 0.00038 0.00138		0.03112	ECN_0.5EY_15min_6	0.03270	ECN_0.5EY_15min_4	0.03289	ECN_0.5EY_15min_6	0.02138	-0.00058		
998 0.03364 ECH_0.5EY_15mn_6 0.04104 ECH_0.5EY_25mn_3 0.03306 ECH_0.5EY_25mn_7 0.0771 0.00051 0.00051 0.0280 ECH_0.5EY_10mn_6 0.0282 ECH_0.5EY_10mn_3 0.03140 ECH_0.5EY_10mn_3 0.00051 0.00051 0.00051 0.00114 0.00051 0.00114 ECH_0.22F_10mn_1 0.00114 ECH_0.22F_10mn_1 0.00114 ECH_0.22F_10mn_1 0.00114 ECH_0.22F_10mn_1 0.00114 ECH_0.02F_10mn_1 0.00114		0.03210	0 ECN 0.5EY 20min 5 0.04733 ECN 0.5EY 20min		ECN 0 5EY 20min 3	0.03344	ECN_0.5EY_20min_9	0.01523	0.00134		
0038468 ECU_05FY_30mm_0 004219 ECU_05FY_30mm_1 002031 ECU_05FY_30mm_10 000751 000314 0.02877 ECU_05FY_45mm_2 002854 ECU_05FY_45mm_2 002954 ECU_05FY_45mm_2 000378 000378 0.04429 ECU_02FY_15mm_1 003657 ECU_02FY_15mm_1 003834 ECU_02FY_15mm_1 003837 ECU_02FY_15mm_1 003834 ECU_02FY_15mm_1 00583 ECU_02FY_15mm_1 00583	39%	0.03364	ECN 0 5EY 25min 6	0.04104	ECN 0 5EY 25min 3	0.03306	ECN_0.5EY_25min_7	0.00740	-0.00058	0.01802	-0.00124
003877 EEN 0.5EY 45mn 2 003616 EEN 0.5EY 45mn 4 002958 EEN 0.5EY 45mn 2 000737 000081 0.04419 ECN 0.2EY 14m 6 0.03288 ECN 0.2EY 14m 6 0.0328 ECN 0.2EY 14m 6 0.0328 ECN 0.2EY 15mn 5 0.0218 0.00418		0.03468	ECN 0.5EY 30min 6	0.04219	ECN 0.5EY 30min 3	0.03140	ECN 0.5EY 30min 10	0.00751	-0.00328		
0.02901 ECN_05F_1hr_6 0.0328 ECN_05F_1hr_6 0.02707 ECN_05F_1hr_6 0.00387 0.00388 0.00388 0.00388 0.00388 0.00388 0.00387 0.00387 0.00388 0.00387 0.00387 0.00388 0.00388 0.00388 0.00388 0.00388 0.00388 0.00388 0.00388 0.00388 0.00387 0.00388 0.0038		0.02877	ECN 0.5EY 45min 2	0.03616	ECN 0.5EY 45min 4	0.02958	ECN 0.5EY 45min 2	0.00739	0.00081		
0.04429 ECN_0219', 10min_1 0.08657 ECN_0219', 10min_1 0.02138 -0.00418 0.04434 ECN_0219', 10min_6 0.06773 ECN_0219', 10min_6 0.03238 0.00124 0.00387 0.04438 ECN_0219', 10min_6 0.06773 ECN_0219', 10min_6 0.00124 0.00388 0.00124 0.00387 0.04388 ECN_0219', 10min_10 0.05123 ECN_0219', 10min_0 0.00146 ECN_0219', 10min_0 0.00148 ECN_0219', 10min_0 0.00148 ECN_0219', 10min_0 0.00148 0.00148 0.000148 0.00148 0.00148 0.00148 0.00148 0.00148 0.00148 0.00148 0.00148 0.00148 0.00318 ECN_0219', 10min_0 0.00148 0.00144 ECN_100ct_15min_10		0.02901	ECN 0.5EY 1hr 6	0.03288	ECN 0.5EY 1hr 4	0.02707	ECN 0.5EY 1hr 6	0.00387	-0.00194		
0.04439 ECN 0.2FY 15min 6 (EX) 0.2FY 15min 7 (EX) 0.2FY 35min 6 (EX) 0.2FY 35min 7 (EX) 0.0FY 35min 7 (EX)		0.04429	ECN 0.2EY 10min 1 0.06567		ECN 0.2EY 10min 7	0.04011	ECN 0.2EY 10min 10	0.02138	-0.00418		
0.04230 CEN_02FY_20min_4 0.05977 EEN_02FY_20min_9 0.03848 EEN_02FY_20min_5 0.03848 EEN_02FY_20min_5 0.03848 EON_02FY_20min_5 0.00738 0.001975 0.001975 0.001975 0.04388 CEN_02FY_40min_10 0.0321 EEN_02FY_25min_3 0.03840 ECN_02FY_40min_10 0.0021 0.00764 0.001975 0.001975 0.03509 EEN_02FY_40min_6 0.04108 EEN_02FY_45min_10 0.04108 CEN_02FY_45min_10 0.00164 0.001976 0.001976 0.035277 ECN_10pt_10min_6 0.07180 ECN_10pt_110min_1 0.04197 ECN_10pt_10min_6 0.00184 0.00186 0.00184 0.035277 ECN_10pt_10min_6 0.07180 ECN_10pt_10min_1 0.04197 ECN_10pt_10min_1 0.04198 ECN_10pt_10min_1		0.04349	ECN 0.2EY 15min 6	0.06273	ECN 0.2EY 15min 4	0.03989	ECN 0.2EY 15min 6	0.01924	-0.00360		
18% 0.04388 ECN_0.02FY_25min_3 0.0316 ECN_0.02FY_25min_3 0.03284 ECN_0.02FY_25min_10 0.00078 0.00176 0.044982 ECN_0.02FY_30min_10 0.03233 ECN_0.02FY_30min_10 0.00331 ECN_0.02FY_30min_10 0.00166 0.00545 0.03698 ECN_0.02FY_30min_10 0.00188 ECN_0.02FY_30min_10 0.00176 0.00186 0.00176 0.03597 ECN_0.02FY_30min_10 0.00488 ECN_10pt10min 6 0.00187 0.00187 0.00187 0.00186 0.00187 0.0018		0.04230	ECN 0.2EY 20min 4	0.05977	ECN 0.2EY 20min 9	0.03843	ECN 0.2EY 20min 5	0.01747	-0.00387		
0.04552 ECN_02EY_30min_10 0.05323 ECN_02EY_45min_1 0.03824 ECN_02EY_430min_10 0.00768 ECN_02EY_45min_10 0.03561 ECN_02EY_45min_10 0.00564 0.000554 0.03501 ECN_00PL_10min_6 0.0713 ECN_02EY_45min_10 0.03561 ECN_02EY_116 0.00164 0.00054 0.05207 ECN_10pt_110min_7 0.07132 ECN_10pt_110min_8 0.0713 ECN_10pt_110min_8 0.0716 0.00565 0.00056<	18%	0.04388	ECN 0.2EY 25min 5	0.05116	ECN 0.2EY 25min 3	0.03880	ECN 0.2EY 25min 5	0.00728	-0.00508	0.01975	-0.00581
0.04106 ECN_0.2FY_45min_2 0.04722 ECN_0.2FY_45min_10 0.03561 ECN_0.2FY_45min_10 0.00468 0.00488 0.00479 0.00488 0.00778 0.05177 FCN_10pct_15min_7 0.07182 FCN_10pct_25min_8 0.00418 FCN_10pct_25min_7 0.0208 0.00666 0.01681 -0.00984 10% 0.04444 FCN_10pct_25min_8 0.00657 FCN_10pct_25min_8 0.00496 0.0081 -0.00984 0.04188 FCN_10pct_15min_8 0.06418 FCN_10pct_15min_18 0.04027 FCN_10pct_15min_8 0.00668 -0.00981 0.04108 FCN_10pct_15min_8 0.06423 FCN_10pct_15min_17 0.04027 FCN_10pct_15min_18 0.00617 0.00496 0.00817 0.04440 FCN_10pct_15min_8 0.06213 FCN_10pct_15min_18 0.00148		0.04592	ECN 0.2EY 30min 10	0.05323	ECN 0.2EY 30min 4	0.03824	ECN 0.2EY 30min 10	0.00731	-0.00768		
0.03698 ECN_02P_1hr_6 0.04186 ECN_02P_1hr_6 0.03367 ECN_02P_1hr_6 0.00488 0.00311 0.05501 ECN_10pt_10min_7 0.01101 ECN_10pt_15min_7 0.01105 0.00105 0.00105 0.05497 ECN_10pt_15min_7 0.01131 ECN_10pt_15min_16 0.04489 ECN_10pt_15min_17 0.00105 0.00088 0.05497 ECN_10pt_23min_8 0.06613 ECN_10pt_25min_16 0.04489 ECN_10pt_17 0.00081 0.00081 0.04818 ECN_10pt_23min_8 0.06573 ECN_10pt_14min_9 0.04277 ECN_10pt_13min_10 0.00081 0.00081 0.04918 ECN_10pt_15min_8 0.06237 ECN_20pt_10min_1 0.04277 ECN_10pt_11mr_3 0.00081 0.00081 0.04037 ECN_Spt_10min_9 0.04276 ECN_10pt_11mr_3 0.00131 0.00573 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0.00131 0		0.04106	ECN 0.2EY 45min 2	0.04722	ECN 0.2EY 45min 10	0.03561	ECN 0.2EY 45min 10	0.00616	-0.00545		
0.05501 ECN_10pt_10min_6 0.07180 ECN_10pt_10min_1 0.04457 ECN_10pt_115min_7 0.00084 0.05277 ECN_10pt_115min_7 0.07182 ECM_10pt_125min_10 0.04449 ECN_10pt_125min_8 0.000788 10% 0.04844 ECN_10pt_125min_8 0.06645 ECN_10pt_25min_6 0.04499 ECN_10pt_125min_7 0.00088 ECN_10pt_125min_7 0.00081 ECN_10pt_145min_7 0.00081 ECN_10pt_145min_7 0.00081 -0.00081 0.04689 ECN_10pt_14fm_2 0.04217 ECN_10pt_14fm_3 0.06845 ECN_10pt_14fm_3 0.00810 -0.00081 -0.00081 0.04669 ECN_10pt_14fm_6 0.04414 ECN_10pt_14fm_3 0.00813 -0.00081 -0.00751 0.06689 ECN_10pt_15min_8 0.06821 ECN_10pt_15min_1 0.04826 ECN_10pt_15min_7 0.01914 -0.00810 0.05561 ECN_10pt_15min_8 0.06731 ECN_10pt_15min_7 0.01988 -0.00285 -0.00812 ECN_10pt_15min_7 0.01984 -0.00885 0.05660 ECN_10pt_15min_6 0.04826 ECN_10pt_15mi		0.03698	ECN_0.2EY_1hr_6	0.04186	ECN_0.2EY_1hr_6	0.03367	ECN_0.2EY_1hr_6	0.00488	-0.00331		
0.05277 ECN_10pt_15min_7 0.07182 ECN_10pt_15min_10 0.04489 ECN_10pt_10min_1 0.00788 Part 1		0.05501	ECN 10pct 10min 6	0.07180	ECN 10pct 10min 1	0.04517	ECN 10pct 10min 6	0.01679	-0.00984		
0.05497 ECN_10pt_20min_5 0.06193 ECN_10pt_25min_6 0.04409 ECN_10pt_20min_7 0.02001 0.00656 0.01681 -0.00984 10% 0.0444 ECN_10pt_25min_6 0.04188 ECN_10pt_25min_7 0.02001 0.00656 0.01681 -0.00984 0.04918 ECN_10pt_15min_2 0.05473 ECN_10pt_1hr_2 0.03590 ECN_10pt_1Fr.3 0.00813 -0.00884 0.06639 ECN_5pt_10min_9 0.00203 ECN_5pt_10min_1 0.00573 ECN_5pt_10min_7 0.01916 -0.00784 0.06637 ECN_5pt_20min_1 0.07513 ECN_5pt_20min_1 0.0546 ECN_5pt_20min_7 0.01916 -0.00810 0.0573 ECN_5pt_20min_1 0.07513 ECN_5pt_20min_1 0.0546 ECN_5pt_20min_1 0.0184 -0.00810 0.0573 ECN_5pt_20min_8 0.06522 ECN_5pt_20min_1 0.0573 ECN_5pt_20min_1 0.00124 -0.00810 0.0573 ECN_5pt_20min_1 0.0788 ECN_5pt_20min_1 0.04587 ECN_5pt_20min_1 0.00149 0.001639 0.00814		0.05277	ECN 10pct 15min 7	0.07182	ECN 10pct 15min 10	0.04489	ECN 10pct 15min 8	0.01905	-0.00788		
10% 0.04844 ECN_10pt_25min_8 0.06845 ECN_10pt_25min_7 0.02001 0.00655 0.01681 -0.00984 0.04918 ECN_10pt_23min_8 0.06743 ECN_10pt_13min_9 0.00491 -0.00885 0.04098 ECN_10pt_13min_9 0.04297 ECN_10pt_13min_10 0.00491 -0.00881 0.04098 ECN_10pt_11m_6 0.0414 ECN_10pt_11m_2 0.03590 ECN_10pt_11m_3 0.00613 -0.00984 0.06639 ECN_5pt_10min_9 0.08233 ECN_5pt_27min_1 0.05879 ECN_5pt_10min_6 0.001514 -0.00984 0.06637 ECN_5pt_27min_8 0.07513 ECM_5pt_27min_1 0.05876 ECN_5pt_27min_7 0.01988 -0.00984 0.05731 ECN_5pt_45min_2 0.06221 ECN_5pt_15m_9 0.04826 ECN_5pt_11m_3 0.00241 -0.00241 0.07788 ECN_2pt_15min_8 0.07513 ECM_2pt_25min_12 0.06734 ECM_2pt_15min_9 0.04826 ECN_2pt_15min_3 0.00241 0.07784 ECM_2pt_15min_9 0.07535 ECM_2pt_15min_9 0.04838		0.05497	ECN_10pct_20min_6	0.06193	ECN_10pct_20min_1	0.04409	ECN_10pct_20min_1	0.00696	-0.01088		
0.05182 ECN_10pct_30min_8 0.05673 ECN_10pct_45min_9 0.04297 ECN_10pct_43min_9 0.00491 0.00491 0.00491 0.04918 ECN_10pct_45min_2 0.05573 ECN_10pct_45min_1 0.04027 ECN_10pct_1107 0.00491 0.00081 0.06639 ECN_5pct_10min_9 0.08203 ECN_5pct_10min_1 0.05586 ECN_5pct_10min_6 0.01514 -0.00810 0.06637 ECN_5pct_20min_1 0.07138 ECN_5pct_21min_1 0.05586 ECN_5pct_20min_1 0.00738 -0.00640 0.05597 ECN_5pct_20min_3 0.06221 ECN_5pct_20min_1 0.00751 ECN_5pct_20min_1 0.00754 -0.00810 0.05773 ECN_5pct_45min_8 0.06251 ECN_5pct_45min_1 0.00528 ECN_5pct_45min_10 0.00241 -0.00810 0.07788 ECN_2pct_10min_7 0.05806 ECN 2pct_10min_7 0.01848 0.00012 0.00102 0.001037 0.07764 ECN_2pct_20min_1 0.07555 ECN_2pct_20min_1 0.01243 0.00301 0.00241 0.08663 ECN_2pct_20min_1 0.076	10%	0.04844	ECN_10pct_25min_8	0.06845	ECN_10pct_25min_6	0.04188	ECN_10pct_25min_7	0.02001	-0.00656	0.01681	-0.00984
0.04918 ECN_10pct_45min_2 0.0514 ECN_10pct_45min_9 0.04027 ECN_10pct_45min_10 0.00089 0.00030 0.06688 ECN_Spet_10min_9 0.08203 ECN_Spet_10min_10 0.08379 ECN_10pct_11r_3 0.00031 -0.00030 0.06337 ECN_Spet_15min_8 0.08233 ECN_Spet_20min_1 0.005866 ECN_Spet_15min_7 0.01364 -0.00031 0.06410 ECN_Spet_20min_1 0.07581 ECN_Spet_20min_1 0.005866 ECN_Spet_20min_7 0.01384 -0.000549 -0.000549 0.05573 ECN_Spet_30min_2 0.06521 ECN_Spet_45min_9 0.04837 ECN_Spet_45min_7 0.00134 -0.000549 -0.000549 0.04748 ECN_Spet_16min_2 0.06521 ECN_Spet_11r_2 0.04835 ECN_Spet_46min_9 0.00148 -0.000549 -0.000549 0.07048 ECN_2pet_10min_7 0.01684 ECN_2pet_20min_6 0.08737 ECN_2pet_20min_6 0.08738 ECN_2pet_20min_1 0.01638 0.01639 0.01639 0.00241 2% 0.06664 ECN_2pet_20min_6 0.06738		0.05182	ECN_10pct_30min_8	0.05673	ECN_10pct_30min_1	0.04297	ECN_10pct_30min_9 ECN_10pct_45min_10	0.00491	-0.00885		
0.04098 ECN 10pct 1hr 6 0.04911 ECN 10pct 1hr 2 0.03590 ECN 10pct 1hr 3 0.00813 0.00508 0.06689 ECN 5pct 10min 9 0.08203 ECN 5pct 10min 1 0.05879 ECN 5pct 10min 6 0.01514 0.000510 0.06410 ECN 5pct 20min 1 0.0793 ECN 5pct 20min 1 0.05846 ECN 5pct 20min 1 0.00783 0.000520 0.00137 0.00564 5% 0.0563 ECN 5pct 20min 8 0.07531 ECN 5pct 20min 1 0.05848 ECN 5pct 20min 1 0.00520 0.01344 0.05737 ECN 5pct 45min 2 0.06551 ECN 5pct 1hr 9 0.04877 ECN 5pct 45min 10 0.00688 0.07788 ECN 2pct 10min 7 0.09934 ECN 2pct 10min 8 0.007815 ECN 2pct 10min 7 0.01434 0.07788 ECN 2pct 20min 1 0.07651 ECN 2pct 20min 5 0.06714 ECN 2pct 20min 1 0.01243 0.00390 0.07664 ECN 2pct 25min 8 0.07651 ECN 2pct 25min 3 0.06633 ECN 2pct 25min 3 0.06634 ECN 2pct 25min 3 0.06634 0.00339		0.04918	ECN_10pct_45min_2	0.05414	ECN_10pct_45min_9	0.04027		0.00496	-0.00891		
0.06689 ECN_Spct_10min_9 0.08203 ECN_Spct_1smin_10 0.05879 ECN_Spct_1omin_6 0.01514 0.00810 0.06337 ECN_Spct_1Smin_8 0.08238 ECN_Spct_1smin_10 0.05586 ECN_Spct_1smin_7 0.01914 0.00791 0.00791 5% 0.05863 ECN_Spct_2Smin_1 0.07931 ECN_Spct_2Smin_6 0.04826 ECN_Spct_2Smin_7 0.01988 0.01037 0.01564 -0.00810 0.05731 ECN_Spct_4Smin_2 0.06211 ECN_Spct_4Smin_9 0.04826 ECN_Spct_3Omin_10 0.00560 -0.00810 0.05731 ECN_Spct_1fsmin_2 0.06211 ECN_Spct_4Smin_9 0.04827 ECN_Spct_1fsmin 0 0.00520 -0.00114 0.07788 ECN_2pct_1fsmin_9 0.09234 ECN_2pct_1fsmin_2 0.04651 ECN_2pct_1fsmin 0 0.00230 0.00124 -0.00866 0.06664 ECN_2pct_2Smin_1 0.07565 ECN_2pct_2Smin_9 0.06231 ECN_2pct_2Smin_3 0.00653 -0.00254 -0.00263 -0.00254 -0.00563 -0.00232 0.01639 -0.00241 0.06664		0.04098	ECN_10pct_1hr_6	0.04911	ECN_10pct_1hr_2	0.03590	ECN_10pct_1hr_3	0.00813	-0.00508		
0.06337 ECN Spct 15min 8 0.08253 ECN Spct 15min 10 0.05586 ECN Spct 15min 7 0.01916 0.00751 5% 0.05863 ECN Spct 25min 8 0.07831 ECN Spct 25min 8 0.07831 ECN Spct 25min 9 0.01584 ECN Spct 10min 1 0.07838 0.00954 0.00954 0.00954 0.00954 0.00137 0.01564 0.00520 0.01144 0.05731 ECN Spct 10min 7 0.06501 ECN Spct 10min 7 0.06560 ECN Spct 10min 7 0.00585 ECN Spct 10min 7 0.00144 0.07788 ECN 2pct 10min 7 0.09594 ECN 2pct 10min 8 0.07855 ECN 2pct 10min 7 0.01484 0.00241 0.07788 ECN 2pct 10min 7 0.09594 ECN 2pct 10min 8 0.07694 ECN 2pct 10min 7 0.01484 0.00241 0.07104 ECN 2pct 10min 1 0.07594 ECN 2pct 10min 3 0.06613 0.00143 0.00143 0.00144 0.06697 ECN 2pct 10min 10 0.07594 ECN 2pct 10min 3 0.00144 0.00143 0.00143 0.05255 ECN 2pct 11m 8 <		0.06689	ECN_5pct_10min_9	0.08203	ECN_5pct_10min_1	0.05879	ECN_5pct_10min_6	0.01514	-0.00810		
0.06410 ECN_Spct_20min_1 0.07193 ECN_Spct_20min_1 0.00783 0.00964 0.00783 0.00964 5% 0.05833 ECN_Spct_20min_8 0.07851 ECM_Spct_30min_8 0.07851 ECM_Spct_30min_8 0.06522 ECM_Spct_45min_9 0.00583 ECM_Spct_45min_0 0.00583 ECM_Spct_45min_0 0.00583 ECM_Spct_45min_0 0.00584 ECM_Spct_45min_0 0.00144 0.00144 0.00147 0.001639 ECM_2pct_2pcmin_0 0.001639		0.06337	ECN_5pct_15min_8	0.08253	ECN_5pct_15min_10	0.05586	ECN_5pct_15min_7	0.01916	-0.00751		
5% 0.05863 ECN_Spt_25min_8 0.07851 ECN_Spt_25min_6 0.04826 ECN_Spt_25min_7 0.01988 0.01037 0.01564 0.00810 0.0573 ECN_Spt_25min_8 0.06521 ECN_Spt_23min_9 0.00549 0.00549 0.00549 0.00144 0.05731 ECN_Spt_45min_2 0.00521 ECN_Spt_45min_9 0.04587 ECN_Spt_45min_10 0.00140 0.00144 0.04788 ECN_2pt_10min_7 0.03593 ECN_2pt_11min_9 0.00953 ECN_2pt_11min_7 0.04052 ECN_2pt_10min_7 0.01448 0.000341 0.07788 ECN_2pt_10min_7 0.09935 ECN_2pt_11min_2 0.07694 ECN_2pt_20min_1 0.01639 0.00144 0.07104 ECN_2pt_20min_1 0.06138 ECN_2pt_20min_1 0.01638 0.00133 0.00143 0.000310 0.06664 ECN_2pt_20min_1 0.06213 ECN_2pt_20min_8 0.00144 0.00241 0.00499 0.00053 0.0525 ECN_2pt_20min_1 0.05888 ECN_2pt_45min_10 0.00493 ECN_2pt_45min_5 0.001634 0.00144		0.06410	ECN_5pct_20min_1	0.07193	ECN_5pct_20min_1	0.05446	ECN_5pct_20min_1	0.00783	-0.00964		-0.00810
0.05973 ECN_Spct_30min_8 0.06522 ECN_Spct_40min_9 0.00588 ECN_Spct_30min_9 0.00589 0.00114 0.00580 0.00114	5%	0.05863	ECN_5pct_25min_8	0.07851	ECN_5pct_25min_6	0.04826	ECN_5pct_25min_7	0.01988	-0.01037	0.01564	
0.05731 ECN 5pct 45min 2 0.06251 ECN 5pct 45min 9 0.04587 ECN 5pct 45min 10 0.00520 0.00114 0.04748 ECN 5pct 1hr_2 0.04052 ECN 5pct 1hr_3 0.00912 0.00696 0.08096 ECN 2pct 10min 7 0.09594 ECN 2pct 10min 8 0.007855 ECN 2pct 10min 7 0.0094 0.00914 0.07788 ECN 2pct 10min 7 0.09735 ECN 2pct 15min 2 0.076954 ECN 2pct 10min 7 0.0094 0.00944 0.07104 ECN 2pct 20min 6 0.08347 ECN 2pct 20min 5 0.06714 ECN 2pct 20min 1 0.0123 0.00944 0.06664 ECN 2pct 45min 10 0.06586 ECN 2pct 1hr 8 0.04518 ECN 2pct 1hr 9 0.00530 0.00939 0.05325 ECN 1pct 10min 7 0.05588 ECN 1pct 10min 8 0.04939 ECN 1pct 10min 7 0.0093 0.00939 0.05629 ECN 1pct 20min 6 0.09249 ECN 1pct 10min 9 0.07636 ECN 1pct 1min 5 0.0176 ECN 1pct 20min 6 0.0127 0.00174 0.07952 ECN 1pct 20min 6 0.09249		0.05973	ECN_5pct_30min_8	0.06522	ECN_5pct_30min_1	0.05088	ECN_5pct_30min_9	0.00549	-0.00885		
0.04748 ECN_Sptlhr_6 0.05600 ECN_Sptlhr_2 0.04052 ECN_Sptlhr_3 0.00912 0.00969 0.08096 ECN_2ptl10min_7 0.09594 ECN_2ptl10min_8 0.07855 ECN_2ptl10min_7 0.01498 0.00214 0.07788 ECN_2ptl15min_9 0.09735 ECN_2ptl20min_5 0.01744 ECN_2ptl20min_9 0.06764 ECN_2ptl30min_1 0.00309 0.06664 ECN_2ptl45min_10 0.06586 ECN_2ptl30min_9 0.06213 ECN_2ptl30min_10 0.00451 0.05325 ECN_2ptl1m_8 0.05888 ECN_2ptl45min_5 0.05548 ECN_2ptl1m_9 0.0563 0.00932 0.05225 ECN_1ptl10min_7 0.10599 ECN_1ptl10min_8 0.04393 ECN_1ptl10min_7 0.00049 0.00174 0.00049 0.0529 ECN_1ptl10min_7 0.10599 ECN_1ptl10min_8 0.04393 ECN_1ptl10min_7 0.00044 0.00044 0.07736 ECN_1ptl_20min_6 0.09249 ECN_1ptl20min_9 0.07635 ECN_1ptl30min_8 0.00127 0.00176 0.07745 ECN_1ptl_25min_8 0		0.05731	ECN_5pct_45min_2	0.06251	ECN_5pct_45min_9	0.04587	ECN_5pct_45min_10	0.00520	-0.01144		
0.08096 ECN_2pct_10min_7 0.09594 ECN_2pct_110min_8 0.07855 ECN_2pct_110min_7 0.01498 -0.00241 0.07788 ECN_2pct_15min_9 0.09735 ECN_2pct_20min_6 0.08347 ECN_2pct_20min_5 0.01634 ECN_2pct_20min_1 0.00094 0.07104 ECN_2pct_20min_6 0.08347 ECN_2pct_20min_5 0.06714 ECN_2pct_20min_1 0.00123 0.00390 2% 0.06963 ECN_2pct_25min_8 0.07551 ECN_2pct_25min_10 0.06838 ECN_2pct_30min_8 0.00011 0.000451 0.06664 ECN_2pct_45min_10 0.05886 ECN_2pct_45min_10 0.00633 0.00125 0.00031 0.05325 ECN_1pct_10min_7 0.1599 ECN_1pct_11m 0.08585 ECN_1pct_10min_7 0.00149 0.00031 0.08629 ECN_1pct_10min_7 0.1599 ECN_1pct_10min_9 0.07635 ECN_1pct_20min_6 0.01257 0.00164 0.07736 ECN_1pct_20min_6 0.09249 ECN_1pct_20min_6 0.07635 ECN_1pct_30min_8 0.00627 0.00031 0.06618 ECN_1pctC		0.04748	ECN_5pct_1hr_6	0.05660	ECN_5pct_1hr_2	0.04052	ECN_5pct_1hr_3	0.00912	-0.00696		
0.07788ECN_2pct_15min_90.09735ECN_2pct_15min_20.07694ECN_2pct_15min_50.019470.000940.07104ECN_2pct_20min_60.08347ECN_2pct_20min_50.06714ECN_2pct_20min_10.01243-0.03902%0.06664ECN_2pct_25min_80.07651ECN_2pct_25min_100.06838ECN_2pct_25min_30.00688-0.002410.06664ECN_2pct_30min_10.07265ECN_2pct_30min_90.06213ECN_2pct_45min_100.00683-0.002410.0687ECN_2pct_45min_100.0588ECN_2pct_45min_90.00514-0.00533-0.002410.0532ECN_2pct_1hr_80.0588ECN_2pct_1hr_80.04933ECN_2pct_45min_100.00536-0.003310.0526ECN_1pct_1omin_70.10599ECN_1pct_1omin_80.08994ECN_1pct_1omin_70.01574-0.00310.07992ECN_1pct_2omin_60.09249ECN_1pct_2omin_90.07826ECN_1pct_2omin_60.01751-0.00310.07745ECN_1pct_2omin_60.09249ECN_1pct_2omin_90.07826ECN_1pct_3omin_80.007490.00724-0.00310.07745ECN_1pct_2omin_60.09249ECN_1pct_2omin_90.07836ECN_1pct_3omin_80.00749-0.00734-0.007340.07745ECN_1pct_2omin_60.09293ECN_1pct_Comin_90.07834ECN_1pct_4omin_70.0054-0.007340.0618ECN_1pctC_1omin_70.1268ECN_1pctC_1fr_80.0514ECN_1pctC_1omin_70.0158-0.001341%CCN_1pctC_2omin_60.1144<		0.08096	ECN_2pct_10min_7	0.09594	ECN_2pct_10min_8	0.07855	ECN_2pct_10min_7	0.01498	-0.00241		
0.07104ECN_2pct_20min_60.08347ECN_2pct_20min_50.06714ECN_2pct_20min_10.012430.00300MARAMARA2%0.06603ECN_2pct_25min_80.07651ECN_2pct_25min_100.06838ECN_2pct_25min_30.006880.001250.016390.002110.06604ECN_2pct_45min_100.07655ECN_2pct_45min_50.05548ECN_2pct_45min_100.004990.003390.00110.004990.00110.05325ECN_2pct_1hr_80.05848ECN_2pct_1hr_90.00560.009320.000110.001410.001410.001410.08699ECN_1pct_1omin_70.10599ECN_1pct_1omin_80.08994ECN_1pct_1omin_70.015740.000110.001410.08792ECN_1pct_1omin_60.0999ECN_1pct_1omin_90.08585ECN_1pct_2omin_60.012770.001640.07736ECN_1pct_2omin_60.0999ECN_1pct_2omin_90.07763ECN_1pct_2omin_60.012770.001640.07745ECN_1pct_2omin_10.0872ECN_1pct_2omin_80.00745ECN_1pct_2omin_80.002740.001640.0618ECN_1pct_1hr_80.06592ECN_1pct_1hr_80.05134ECN_1pctC_1omin_70.01580.00131%0.0357ECN_1pctC_1omin_70.1114ECN_1pctC_2omin_90.06514ECN_1pctC_1omin_70.01580.001071%0.0598ECN_1pctC_1omin_70.0114ECN_1pctC_2omin_90.09674ECN_1pctC_1omin_70.01680.001071%0.05917ECN_1pctC_2omin_100.0144<		0.07788	ECN_2pct_15min_9	0.09735	ECN_2pct_15min_2	0.07694	ECN_2pct_15min_5	0.01947	-0.00094		
2% 0.06963 ECN_2pct_25min_8 0.07651 ECN_2pct_25min_10 0.06838 ECN_2pct_25min_3 0.00688 -0.00125 0.01639 -0.00241 0.06664 ECN_2pct_30min_1 0.07265 ECN_2pct_30min_9 0.06213 ECN_2pct_30min_8 0.00609 -0.00451 -0.00451 0.06087 ECN_2pct_45min_10 0.06586 ECN_2pct_45min_5 0.05548 ECN_2pct_45min_10 0.00499 -0.00539 0.05325 ECN_2pct_1hr_8 0.05888 ECN_2pct_1hr_8 0.04393 ECN_2pct_1hr_9 0.0053 -0.00932 0.08629 ECN_1pct_10min_7 0.10599 ECN_1pct_10min_8 0.08994 ECN_1pct_10min_7 0.00744 -0.00031 0.07922 ECN_1pct_20min_6 0.09249 ECN_1pct_25min_10 0.07763 ECN_1pct_20min_8 0.04949 -0.00031 0.07736 ECN_1pct_45min_10 0.08072 ECN_1pct_25min_8 0.06184 ECN_1pct_45min_10 0.07763 ECN_1pct_30min_8 0.0027 -0.00360 0.03618 ECN_1pct_45min_10 0.07323 ECN_1pct_20min_8 0.11071		0.07104	ECN_2pct_20min_6	0.08347	ECN_2pct_20min_5	0.06714	ECN_2pct_20min_1	0.01243	-0.00390		
0.06664 ECN_2pct_30min_1 0.07265 ECN_2pct_30min_9 0.06213 ECN_2pct_30min_8 0.00601 -0.00451 0.06087 ECN_2pct_45min_10 0.06586 ECN_2pct_45min_5 0.05548 ECN_2pct_45min_10 0.00499 -0.00539 0.05325 ECN_2pct_1hr_8 0.05888 ECN_2pct_1hr_8 0.04939 ECN_2pct_1hr_9 0.00563 -0.00313 0.08629 ECN_1pct_10min_7 0.10599 ECN_1pct_15min_2 0.08585 ECN_1pct_15min_5 0.0176 ECN_1pct_20min_9 0.07826 ECN_1pct_20min_6 0.09249 ECN_1pct_20min_9 0.07826 ECN_1pct_20min_6 0.01257 -0.00166 0.07736 ECN_1pct_25min_8 0.08485 ECN_1pct_25min_10 0.07763 ECN_1pct_30min_8 0.06277 -0.00360 0.07745 ECN_1pct_30min_1 0.08072 ECN_1pct_45min_5 0.06508 ECN_1pct_45min_10 0.00749 0.00774 -0.00361 0.06018 ECN_1pctC_10min_7 0.12682 ECN_1pctC_10min_8 0.11071 ECN_1pctC_15min_5 0.0268 -0.00074 -0.00874 -0.00103	2%	0.06963	ECN_2pct_25min_8	0.07651	ECN_2pct_25min_10	0.06838	ECN_2pct_25min_3	0.00688	-0.00125	0.01639	-0.00241
0.06087 ECN_2pct_45min_10 0.06586 ECN_2pct_45min_5 0.05548 ECN_2pct_45min_10 0.00499 -0.00539 0.05325 ECN_2pct_1hr_8 0.05888 ECN_2pct_1hr_8 0.04393 ECN_2pct_1hr_9 0.00533 -0.00932 0.09025 ECN_1pct_10min_7 0.10599 ECN_1pct_10min_8 0.08994 ECN_1pct_10min_7 0.01574 -0.00031 0.08629 ECN_1pct_15min_5 0.10776 ECN_1pct_20min_9 0.07826 ECN_1pct_20min_6 0.01277 -0.00166 0.07736 ECN_1pct_25min_8 0.08485 ECN_1pct_25min_10 0.07763 ECN_1pct_25min_8 0.00277 -0.00360 0.07745 ECN_1pct_45min_10 0.0733 ECN_1pct_25min_8 0.06578 ECN_1pct_45min_10 0.0733 ECN_1pct_45min_10 0.00574 -0.00360 0.06018 ECN_1pctC_10min_7 0.1282 ECN_1pctC_15min_8 0.01534 ECN_1pctC_10min_7 0.0168 -0.00031 0.03757 ECN_1pctC_10min_7 0.1282 ECN_1pctC_15min_2 0.03534 ECN_1pctC_1omin_7 0.01036 -0.00013		0.06664	ECN_2pct_30min_1		ECN_2pct_30min_9	0.06213	ECN_2pct_30min_8	0.00601	-0.00451		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		0.06087	ECN_2pct_45min_10	0.06586	ECN_2pct_45min_5	0.05548	ECN_2pct_45min_10	0.00499	-0.00539		
0.09025ECN_1pct_10min_70.10599ECN_1pct_10min_80.08994ECN_1pct_10min_70.01574-0.00310.08629ECN_1pct_15min_50.00776ECN_1pct_15min_20.08585ECN_1pct_15min_50.02147-0.00440.07992ECN_1pct_20min_60.09249ECN_1pct_20min_90.07826ECN_1pct_20min_60.01257-0.001660.07736ECN_1pct_25min_80.08485ECN_1pct_25min_100.07763ECN_1pct_25min_80.00027-0.003600.07445ECN_1pct_30min_10.08072ECN_1pct_30min_90.07085ECN_1pct_45min_100.00574-0.002740.06018ECN_1pct_45min_100.07323ECN_1pct_45min_50.06508ECN_1pct_45min_100.00574-0.00840.06018ECN_1pct_1hr_80.06592ECN_1pct_1hr_80.05134ECN_1pct_1hr_90.00574-0.001630.11774ECN_1pctC_10min_70.12622ECN_1pctC_10min_80.11071ECN_1pctC_10min_70.01508-0.00131%0.09694ECN_1pctC_20min_100.1114ECN_1pctC_20min_90.09674ECN_1pctC_20min_60.01791-0.001331%0.09282ECN_1pctC_25min_80.10177ECN_1pctC_25min_100.09674ECN_1pctC_25min_80.00129-0.017911%0.09174ECN_1pctC_25min_80.10177ECN_1pctC_25min_100.09674ECN_1pctC_25min_80.00129-0.001331%0.09282ECN_1pctC_25min_80.10177ECN_1pctC_25min_100.09674ECN_1pctC_25min_80.00172-0.00103 <t< td=""><td></td><td>0.05325</td><td>ECN_2pct_1hr_8</td><td>0.05888</td><td>ECN_2pct_1hr_8</td><td>0.04393</td><td>ECN_2pct_1hr_9</td><td>0.00563</td><td>-0.00932</td><td></td><td></td></t<>		0.05325	ECN_2pct_1hr_8	0.05888	ECN_2pct_1hr_8	0.04393	ECN_2pct_1hr_9	0.00563	-0.00932		
0.08629ECN_1pct_15min_50.010776ECN_1pct_15min_20.08585ECN_1pct_15min_50.021470.000441%0.07992ECN_1pct_20min_60.09249ECN_1pct_20min_90.07826ECN_1pct_20min_60.012570.001661%0.07736ECN_1pct_25min_80.08485ECN_1pct_25min_100.07763ECN_1pct_25min_80.002740.000270.017510.000310.07445ECN_1pct_45min_100.07323ECN_1pct_45min_50.06508ECN_1pct_45min_100.002740.002740.002740.06018ECN_1pct_1hr_80.06592ECN_1pct_1hr_80.05134ECN_1pctC_10min_70.01035-0.001680.11174ECN_1pctC_10min_70.12682ECN_1pctC_10min_80.11071ECN_1pctC_10min_50.02088-0.000171%0.09694ECN_1pctC_20min_100.1114ECN_1pctC_20min_90.09674ECN_1pctC_20min_60.012490.017911%0.09282ECN_1pctCC_20min_100.1114ECN_1pctC_20min_90.09411ECN_1pctC_20min_60.0146-0.002741%0.0917ECN_1pctCC_30min_90.09739ECN_1pctCC_30min_90.09411ECN_1pctCC_20min_60.0146-0.001031%ECN_1pctCC_30min_90.09739ECN_1pctCC_45min_50.0829ECN_1pctCC_45min_100.00722-0.002841%0.0917ECN_1pctCC_45min_100.08389ECN_1pctCC_45min_100.006840.00722-0.002841%0.0917ECN_1pctCC_45min_100.08389ECN_1pctCC_45min_100.00682<		0.09025	ECN_1pct_10min_7	0.10599	ECN_1pct_10min_8	0.08994	ECN_1pct_10min_7	0.01574	-0.00031		
0.07992 ECN_1pct_20min_6 0.09249 ECN_1pct_20min_9 0.07826 ECN_1pct_20min_6 0.01257 -0.00166 1% 0.07736 ECN_1pct_25min_8 0.08485 ECN_1pct_25min_10 0.07763 ECN_1pct_25min_8 0.00027 0.01751 -0.00031 0.07745 ECN_1pct_30min_1 0.08072 ECN_1pct_30min_9 0.07685 ECN_1pct_45min_10 0.00274 -0.00360 0.06782 ECN_1pct_1hr_8 0.06592 ECN_1pct_1hr_8 0.055134 ECN_1pct_1hr_9 0.00574 -0.00884 0.01357 ECN_1pctC_10min_7 0.12682 ECN_1pctC_10min_8 0.11071 ECN_1pctC_10min_7 0.01265 -0.00301 1% 0.09694 ECN_1pctC_15min_5 0.12652 ECN_1pctC_15min_2 0.0135 ECN_1pctC_10min_7 0.0108 -0.00103 1% 0.09694 ECN_1pctC_20min_10 0.1144 ECN_1pctC_20min_9 0.09674 ECN_1pctC_20min_6 0.0146 -0.00204 0.09898 ECN_1pctC_25min_8 0.10147 ECN_1pctC_25min_8 0.0129 0.01791 -0.00103		0.08629	ECN_1pct_15min_5	0.10776	ECN_1pct_15min_2	0.08585	ECN_1pct_15min_5	0.02147	-0.00044		
1% 0.07736 ECN_1pct_25min_8 0.08485 ECN_1pct_25min_10 0.07763 ECN_1pct_25min_8 0.00749 0.00027 0.01751 -0.00031 0.07745 ECN_1pct_30min_1 0.08072 ECN_1pct_30min_9 0.07763 ECN_1pct_30min_8 0.0027 -0.00360 -0.00361 0.06782 ECN_1pct_45min_10 0.07323 ECN_1pct_45min_5 0.06508 ECN_1pct_45min_10 0.00274 -0.00274 -0.00274 0.06018 ECN_1pct_1hr_8 0.06592 ECN_1pct_45min_5 0.05134 ECN_1pct_1hr_9 0.00574 -0.00884 -0.00274 0.11174 ECN_1pctC_10min_7 0.12682 ECN_1pctC_10min_8 0.11071 ECN_1pctC_10min_5 0.0268 -0.00030 0.10357 ECN_1pctC_215min_5 0.12655 ECN_1pctC_20min_9 0.01745 ECN_1pctC_20min_6 0.0146 -0.00020 0.09694 ECN_1pctCC_25min_8 0.10147 ECN_1pctC_25min_10 0.09411 ECN_1pctC_25min_8 0.0129 0.01791 -0.00103 1% FCN_1pctCC_30min_9 0.09739 ECN_1pctCC_30min_9 <		0.07992	ECN_1pct_20min_6	0.09249	ECN_1pct_20min_9	0.07826	ECN_1pct_20min_6	0.01257	-0.00166		
0.07445 ECN_1pct_30min_1 0.08072 ECN_1pct_30min_9 0.07085 ECN_1pct_30min_8 0.00627 -0.00360 0.06782 ECN_1pct_45min_10 0.07323 ECN_1pct_45min_5 0.06508 ECN_1pct_45min_10 0.00274 -0.00274 0.06018 ECN_1pct_1hr_8 0.06592 ECN_1pct_1hr_8 0.05134 ECN_1pct_1hr_9 0.00574 -0.00884 0.11174 ECN_1pctC_10min_7 0.12682 ECN_1pctC_10min_8 0.11071 ECN_1pctC_10min_7 0.01038 -0.00103 0.10357 ECN_1pctC_20min_10 0.1114 ECN_1pctC_20min_9 0.09674 ECN_1pctC_20min_6 0.00129 -0.00103 1% CCN_1pctCC_20min_10 0.1114 ECN_1pctC_20min_9 0.09674 ECN_1pctC_20min_6 0.0146 -0.00204 0.09694 ECN_1pctCC_20min_10 0.1114 ECN_1pctC_20min_9 0.09674 ECN_1pctC_20min_6 0.0146 -0.00103 1% CC 0.09694 ECN_1pctCC_25min_8 0.10147 ECN_1pctC_25min_10 0.09411 ECN_1pctC_25min_8 0.00129 0.01791 -0.00103 <	1%	0.07736	ECN_1pct_25min_8	0.08485	ECN_1pct_25min_10	0.07763	ECN_1pct_25min_8	0.00749	0.00027	0.01751	-0.00031
0.06782 ECN_1pct_45min_10 0.07323 ECN_1pct_45min_5 0.06508 ECN_1pct_45min_10 0.00274 0.06018 ECN_1pct_1hr_8 0.06592 ECN_1pct_1hr_8 0.05134 ECN_1pct_1hr_9 0.00574 -0.00884 0.11174 ECN_1pctC_10min_7 0.12682 ECN_1pctC_10min_8 0.11071 ECN_1pctC_10min_7 0.0103 -0.00103 0.10357 ECN_1pctCC_15min_5 0.12965 ECN_1pctC_15min_2 0.1035 ECN_1pctC_15min_5 0.02608 -0.00103 0.09694 ECN_1pctC_20min_10 0.1114 ECN_1pctC_20min_9 0.0941 ECN_1pctC_20min_6 0.0129 0.01791 -0.00103 1% CCN_1pctCC_25min_8 0.10147 ECN_1pctC_25min_10 0.09411 ECN_1pctC_25min_8 0.00129 0.01791 -0.00103 1% CCN_1pctCC_30min_9 0.09739 ECN_1pctC_25min_10 0.09411 ECN_1pctC_25min_8 0.00129 0.01791 -0.00103 0.0917 ECN_1pctCC_30min_9 0.09739 ECN_1pctCC_30min_9 0.08989 ECN_1pctC_30min_1 0.00722 -0.00028		0.07445	ECN_1pct_30min_1	0.08072	ECN_1pct_30min_9	0.07085	ECN_1pct_30min_8	0.00627	-0.00360		
0.06018 ECN_1pct_1hr_8 0.06592 ECN_1pct_1hr_8 0.05134 ECN_1pct_1hr_9 0.00574 -0.00884 0.11174 ECN_1pctC_10min 7 0.12682 ECN_1pctC_10min 8 0.11071 ECN_1pctC_10min 7 0.0103 0.10357 ECN_1pctC_15min 5 0.12965 ECN_1pctC_15min 2 0.1035 ECN_1pctC_20min 6 0.0146 -0.00007 0.09694 ECN_1pctC_20min 10 0.1114 ECN_1pctC_20min 9 0.09674 ECN_1pctC_20min 6 0.0146 -0.00020 0.09694 ECN_1pctC_25min 8 0.1017 ECN_1pctC_25min 10 0.09674 ECN_1pctC_20min 6 0.0146 -0.00020 0.09282 ECN_1pctC_25min 8 0.1017 ECN_1pctC_25min 10 0.09739 ECN_1pctC_25min 10 0.09411 ECN_1pctC_25min 8 0.00129 0.01791 -0.00103 0.09017 ECN_1pctC_30min 9 0.09739 ECN_1pctC_30min 9 0.08899 ECN_1pctC_30min 1 0.00722 -0.00028 0.08157 ECN_1pctCC_45min 10 0.08839 ECN_1pctC_25min 10 0.08299 ECN_1pctC_45min 10 0.00682 0.00072		0.06782	ECN_1pct_45min_10	0.07323	ECN_1pct_45min_5	0.06508	ECN_1pct_45min_10	0.00541	-0.00274		
0.11174 ECN_1pctCC_10min_7 0.12682 ECN_1pctCC_10min_8 0.11071 ECN_1pctCC_10min_7 0.0103 -0.00103 1% 0.10357 ECN_1pctCC_15min_5 0.12965 ECN_1pctCC_15min_2 0.1035 ECN_1pctCC_15min_5 0.00007 0.09694 ECN_1pctCC_20min_10 0.1114 ECN_1pctCC_20min_9 0.09674 ECN_1pctCC_20min_6 0.0129 0.00129 0.09282 ECN_1pctCC_25min_8 0.10147 ECN_1pctCC_25min_10 0.09411 ECN_1pctCC_25min_8 0.00129 0.00129 0.01791 -0.00103 0.09017 ECN_1pctCC_30min_9 0.09739 ECN_1pctCC_30min_9 0.08899 ECN_1pctCC_30min_1 0.00722 -0.00103 0.08157 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.08829 ECN_1pctCC_45min_10 0.00628 0.00072 0.07365 ECN_1pctCC_1hr_7 0.07952 ECN_1pctCC_1hr_6 0.06751 ECN_1pctCC_1hr_9 0.00587 -0.00614		0.06018	ECN_1pct_1hr_8	0.06592	ECN_1pct_1hr_8	0.05134	ECN_1pct_1hr_9	0.00574	-0.00884		
0.10357 ECN_1pctCC_15min_5 0.12965 ECN_1pctCC_15min_2 0.1035 ECN_1pctCC_15min_5 0.02608 -0.00007 1% 0.09694 ECN_1pctCC_20min_10 0.1114 ECN_1pctCC_20min_9 0.09674 ECN_1pctCC_20min_6 0.0146 -0.00007 +CC 0.09282 ECN_1pctCC_25min_8 0.10147 ECN_1pctCC_25min_10 0.09411 ECN_1pctCC_25min_8 0.00129 0.01791 -0.00103 0.09017 ECN_1pctCC_30min_9 0.09739 ECN_1pctCC_30min_9 0.08898 ECN_1pctCC_30min_1 0.00722 -0.00028 -0.00103 0.08157 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.00674 ECN_1pctCC_45min_10 0.00672 -0.00103 0.07365 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.006751 ECN_1pctCC_45min_10 0.00678 -0.00618		0.11174	ECN_1pctCC_10min_7	0.12682	ECN_1pctCC_10min_8	0.11071	ECN_1pctCC_10min_7	0.01508	-0.00103		
1% 0.09694 ECN_1pctCC_20min_10 0.1114 ECN_1pctCC_20min_9 0.09674 ECN_1pctCC_20min_6 0.01446 -0.0020 1% 0.09282 ECN_1pctCC_25min_8 0.10147 ECN_1pctCC_25min_10 0.09411 ECN_1pctCC_25min_8 0.00129 0.01791 -0.00103 0.09017 ECN_1pctCC_30min_9 0.09739 ECN_1pctCC_30min_9 0.08898 ECN_1pctCC_30min_1 0.00722 -0.00282 -0.00103 0.08157 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.08829 ECN_1pctCC_45min_10 0.00672 -0.00103 0.07365 ECN_1pctCC_1hr_7 0.07952 ECN_1pctCC_1hr_6 0.06751 ECN_1pctCC_1hr_9 0.00587 -0.00614		0.10357	B357 ECN_1pctCC_15min_5 0.12965 ECN_1pctCC_15min_10694 6694 ECN_1pctCC_20min_10 0.1114 ECN_1pctCC_20min_10222 6282 ECN_1pctCC_25min_8 0.10147 ECN_1pctCC_25min_1022		ECN_1pctCC_15min_2	0.1035	ECN_1pctCC_15min_5	0.02608	-0.00007		
1/0 +CC 0.09282 ECN_1pttCC_25min_8 0.10147 ECN_1pttCC_25min_10 0.09411 ECN_1pttCC_25min_8 0.00129 0.01791 -0.00103 0.09017 ECN_1pttCC_30min_9 0.09739 ECN_1pttCC_30min_9 0.08989 ECN_1pttCC_30min_1 0.00722 -0.00028 -0.00103 0.08157 ECN_1pttCC_45min_10 0.08839 ECN_1pttCC_45min_10 0.08629 ECN_1pttCC_45min_10 0.00682 0.00072 -0.00028 -0.00103 0.07365 ECN_1pttCC_1hr_7 0.07952 ECN_1pttCC_1hr_6 0.06751 ECN_1pttCC_1hr_9 0.00587 -0.00614 -0.00103	10/	0.09694			ECN_1pctCC_20min_9	0.09674	ECN_1pctCC_20min_6	0.01446	-0.00020		
0.09017 ECN_1pctCC_30min_9 0.09739 ECN_1pctCC_30min_9 0.08989 ECN_1pctCC_30min_1 0.00722 -0.00028 0.08157 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_10 0.00072 0.07365 ECN_1pctCC_1hr_7 0.07952 ECN_1pctCC_1hr_6 0.06751 ECN_1pctCC_1hr_9 0.00587 -0.00614	+00	0.09282			ECN_1pctCC_25min_10	0.09411	0.09411 ECN_1pctCC_25min_8 0.00865 0.0012		0.00129	0.01791	-0.00103
0.08157 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_5 0.08229 ECN_1pctCC_45min_10 0.00682 0.00072 0.07365 ECN_1pctCC_1hr_7 0.07952 ECN_1pctCC_1hr_6 0.06751 ECN_1pctCC_1hr_9 0.00587 -0.00614	+	0.09017	ECN_1pctCC_30min_9	0.09739	ECN_1pctCC_30min_9	0.08989	ECN_1pctCC_30min_1	0.00722	-0.00028		
0.07365 ECN_1pctCC_1hr_7 0.07952 ECN_1pctCC_1hr_6 0.06751 ECN_1pctCC_1hr_9 0.00587 -0.00614		0.08157	0.08157 ECN_1pctCC_45min_10 0.08839 ECN_1pctCC_45min_5		ECN_1pctCC_45min_5	0.08229	ECN_1pctCC_45min_10	0.00682	2 0.00072		
		0.07365	ECN_1pctCC_1hr_7	0.07952	ECN_1pctCC_1hr_6	0.06751	ECN_1pctCC_1hr_9	0.00587	-0.00614		

Table 2.1 – XP-Storm Modelling Results



2.11. Model Validation

Rational Method calculations have been undertaken as a validity check of the XP-Storm Laurenson Method hydrology modelling. The calculations were conducted as per the applicable procedure outlined in QUDM for both the pre-development and post-development scenarios. A comparison of the modelled median peak flow rates from XP-Storm and Rational Method flow rates (Q_y) and the Rational Method parameters used are displayed in Table 3.2. The time of concentration adopted from Figure 4.4 in QUDM was 10 minutes for pre-development and 8 minutes was used for post-development.

Scenario	Design Storm Event	Area (Ha)	fi	^י l _{io} (mm/h)	Fy	C 10	Cy	^t l _y (mm/h)	Q _y (m³/s)	XP Peak Flow (m³/s)	Flow Difference (%)
Pre-dev	ECN_0.5EY_30min_6	0.139	0.45	64.1	0.85	0.74	0.63	116.00	0.02817	0.03468	23
Pre-dev	ECN_0.2EY_30min_10	0.139	0.45	64.1	0.95	0.74	0.70	145.00	0.03936	0.04592	17
Pre-dev	ECN_10pct_10min_6	0.139	0.45	64.1	1.00	0.74	0.74	167.00	0.04772	0.05501	15
Pre-dev	ECN_5pct_10min_9	0.139	0.45	64.1	1.05	0.74	0.78	191.00	0.05730	0.06689	17
Pre-dev	ECN_2pct_10min_7	0.139	0.45	64.1	1.15	0.74	0.85	222.00	0.07294	0.08096	11
Pre-dev	ECN_1pct_10min_7	0.139	0.45	64.1	1.20	0.74	0.89	246.00	0.08435	0.09025	7
Post-dev	ECN_0.5EY_10min_7	0.139	0.88	64.1	0.85	0.86	0.73	125.00	0.03528	0.05270	49
Post-dev	ECN_0.2EY_10min_7	0.139	0.88	64.1	0.95	0.86	0.82	156.00	0.04921	0.06567	33
Post-dev	ECN_10pct_15min_10	0.139	0.88	64.1	1.00	0.86	0.86	180.00	0.05977	0.07182	20
Post-dev	ECN_5pct_15min_10	0.139	0.88	64.1	1.05	0.86	0.90	206.00	0.07182	0.08253	15
Post-dev	ECN_2pct_15min_2	0.139	0.88	64.1	1.15	0.86	0.99	240.00	0.09165	0.09735	6
Post-dev	ECN_1pct_15min_2	0.139	0.88	64.1	1.20	0.86	1.03	266.00	0.10599	0.10776	2

Table 2.2 – XP Storm Model and Rational Method Flow Comparison

As can be seen in Table 3.2 the modelled XP-Storm Laurenson Method median peak flow rates tend to be similar to or higher than the estimated peak flow rates calculated via the Rational Method. The variances observed are not unusual as the different methods use different calculation techniques to predict peak flows. Overall, the similar peak flows returned by the Rational Method calculations aid to confirm the XP-Storm model validity. The XP-Storm model is considered to be a more advanced technique than the Rational Method. The XP-Storm model's higher values, and the higher differences in the 10% AEP and lower events post-development versus pre-development suggest that the XP-modelling has returned results that are more conservative than the Rational Method.



3. Conclusion

This report has outlined the detailed modelling and analysis that has been undertaken to determine a strategy for stormwater quantity management for the proposed 5-unit development at 22 Dalgangal Road, Gayndah. On-site stormwater mitigation measures have been sized to ensure a situation of non-worsening of critical duration peak design flow rates from the subject site.

MacLean Street and George Street road reserves have been nominated as the lawful point of discharge for the development proposal.



4. References

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2016, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia).

Institute of Public Works Engineering Australasia Queensland (IPWEAQ), 2017, *Queensland Urban Drainage Manual*, Fourth Edition 2016, Institute of Public Works Engineering Australasia, Queensland (IPWEAQ), Brisbane.



Appendix A – Development Site Plan prepared by Gatley Building Design











Appendix B – Concept Stormwater Layout Plan





