NARROMINE SHIRE COUNCIL

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

VOLUME 2 - FIGURES

DECEMBER 2013

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Job No: AT316	Date: December 2013	Principal: BWL
File: NLFR-V2-Figures [Rev 1.0].doc	Rev No: 1.0	Author: BWL/SAB



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Lyall & Associates Consulting Water Engineers





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Scale: 1:40,000



NOTE:

THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.

Two-Dimensional Model Boundary

MIKE 11 River Chainage

- FBA

Water Surface Elevation (m AHD)

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY Figure 2.3 (Sheet 1 of 2) TUFLOW MODEL RESULTS AUGUST 1990 FLOOD







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.





Two-Dimensional Model Boundary

Surveyed August 1990 Flood Mark (m AHD) Difference (Modelled Minus Recorded Levels (m)) (Source of Flood Marks: Bewsher, 1998)



MIKE 11 River Chainage

Water Surface Elevation (m AHD)

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

> Figure 2.3 (Sheet 2 of 2) TUFLOW MODEL RESULTS AUGUST 1990 FLOOD







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____ Two-Dimensional Model Boundary MIKE 11 River Chainage

7.30 <36.5

Water Surface Elevation (m AHD)



< 0.05
0.05 to 0.10
0.10 to 0.20
0.20 to 0.30
0.30 to 0.40
0.40 to 0.50
0.50 to 0.60
0.60 to 0.70
0.70 to 0.80
0.80 to 0.90
0.90 to 1.00
> 1.00

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

> Figure 2.4 (Sheet 1 of 2) TUFLOW MODEL RESULTS DECEMBER 2010 FLOOD

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THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.



Two-Dimensional Model Boundary

Surveyed December 2010 Flood Mark (m AHD) Difference (Modelled Minus Recorded Levels (m)) (Source of Flood Marks: NSW SES)



MIKE 11 River Chainage

240

Water Surface Elevation (m AHD)

FEASIBILITY STUDY

Figure 2.4 (Sheet 2 of 2) TUFLOW MODEL RESULTS DECEMBER 2010 FLOOD



LEGEND



December 2010 Flood (TUFLOW Model)
 August 1990 Flood (TUFLOW Model)
 December 2010 Flood Mark (Source: SES)
 August 1990 Flood MArk (Source: Bewsher, 1998)
 Channel Invert
 LiDAR Survey Data Levels along Southern Bank of Macquarie River
 LiDAR Survey Data Levels along Mitchell Highway
 LiDAR Survey Data Levels along Main Western Railway

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 2.5

HISTORIC WATER SURFACE PROFILES MACQUARIE RIVER





FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.

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NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 3.1 (Sheet 2 of 2) TUFLOW MODEL RESULTS 1% AEP (BEST ESTIMATE HYDRAULIC ROUGHNESS VALUES)







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.

Two-Dimensional Model Boundary ____

101

237.5

MIKE 11 River Chainage

Water Surface Elevation (m AHD)



	< 0.05
	0.05 to 0.10
	0.10 to 0.20
	0.20 to 0.30
	0.30 to 0.40
	0.40 to 0.50
	0.50 to 0.60
	0.60 to 0.70
	0.70 to 0.80
	0.80 to 0.90
	0.90 to 1.00
	> 1.00
-	Flow Direction Arrow

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY Figure 3.2 (Sheet 1 of 2) TUFLOW MODEL RESULTS

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0.5% AEP (BEST ESTIMATE HYDRAULIC ROUGHNESS VALUES)







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Two-Dimensional Model Boundary



237.5

MIKE 11 River Chainage

Water Surface Elevation (m AHD)

Indicative Depth of Inundation (m)



NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY Figure 3.2 (Sheet 2 of 2)

MITCHELL HIGHWAY

TUFLOW MODEL RESULTS 0.5% AEP (BEST ESTIMATE HYDRAULIC ROUGHNESS VALUES)





Figure 3.3

DESIGN WATER SURFACE PROFILES MACQUARIE RIVER







NOTE:

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Two-Dimensional Model Boundary

MIKE 11 River Chainage

7.30

Figure 3.4 SENSITIVITY OF FLOOD BEHAVIOUR TO 20% INCREASE IN HYDRAULIC ROUGHNESS VALUES ALONG THE TOTAL LENGTH OF MODELLED REACH OF RIVER 1% AEP

Wind Strangerson and a	Afflux (m)
	 < -0.2 -0.20 to -0.10 -0.10 to -0.01 -0.01 to 0.01 0.01 to 0.02 0.02 to 0.05 0.05 to 0.10 0.10 to 0.20 0.20 to 0.30 0.30 to 0.50 > 0.50 Land Rendered Flood Free as a Result of Change Additional Area of Land Flooded as a Result of Change

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.



Two-Dimensional Model Boundary

MIKE 11 River Chainage SENSITIVITY OF FLOOD BEHAVIOUR TO 20% INCREASE IN HYDRAULIC ROUGHNESS VALUES ALONG THE MODELLED REACH OF RIVER DOWNSTREAM OF THE NARROMINE-EUMUNGERIE ROAD BRIDGE 1% AEP

Manager and the second second	Afflux (m)
	<-0.2
	-0.20 to -0.10
L. Notes	-0.10 to -0.01
The white the	-0.01 to 0.01
1 14	0.01 to 0.02
- A Min Market	0.02 to 0.05
and the second second	0.05 to 0.10
A A A A A A A A A A A A A A A A A A A	0.10 to 0.20
and a selection	0.20 to 0.30
	0.30 to 0.50
	> 0.50
	as a Result of Change
	Additional Area of Land Flooded as a Result of Change
	A 1
	Part - Land
and a free the	
e al	
TARIE	
1 1 1 1 To The second	
	and the second se
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North and a state of the state of the	
Contraction of the second seco	
THE COM	And the second se
the adding to the second	
and the	the second se
12 You way	N

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 3.5







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES. 730

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Two-Dimensional Model Boundary

MIKE 11 River Chainage

- Levee Route

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.1

IMPACT OF LEVEE OPTION 1 ON FLOOD BEHAVIOUR 1% AEP





Figure 4.2

LONGITUDINAL SECTION ALONG LEVEE OPTION 1 ALIGNMENT







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.

LEGEND

Two-Dimensional Model Boundary

MIKE 11 River Chainage

Levee Route

1

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.3

IMPACT OF LEVEE OPTION 2 ON FLOOD BEHAVIOUR 1% AEP





Figure 4.4

LONGITUDINAL SECTION ALONG LEVEE OPTION 2 ALIGNMENT







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Two-Dimensional Model Boundary

MIKE 11 River Chainage

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Levee Route

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.5

IMPACT OF LEVEE OPTION 2A ON FLOOD BEHAVIOUR 1% AEP





Figure 4.6

LONGITUDINAL SECTION ALONG LEVEE OPTION 2A ALIGNMENT







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.



Two-Dimensional Model Boundary

MIKE 11 River Chainage

Levee Route

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.7

IMPACT OF LEVEE OPTION 2A(i) ON FLOOD BEHAVIOUR 1% AEP



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IMPACT OF LEVEE OPTION 2A(i) ON FLOOD BEHAVIOUR 0.5% AEP





Figure 4.9

LONGITUDINAL SECTION ALONG LEVEE OPTION 2A(i) ALIGNMENT





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Two-Dimensional Model Boundary

MIKE 11 River Chainage

Levee Route

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.10

IMPACT OF LEVEE OPTION 2B ON FLOOD BEHAVIOUR 1% AEP





Figure 4.11

LONGITUDINAL SECTION ALONG LEVEE OPTION 2B ALIGNMENT





Scale: 1:40,000

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Two-Dimensional Model Boundary

MIKE 11 River Chainage

Levee Route

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.12

IMPACT OF LEVEE OPTION 2C ON FLOOD BEHAVIOUR 1% AEP





Figure 4.13

LONGITUDINAL SECTION ALONG LEVEE OPTION 2C ALIGNMENT





Scale: 1:40,000

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MIKE 11 River Chainage

Levee Route

Two-Dimensional Model Boundary

FEASIBILITY STUDY

Figure 4.14

IMPACT OF LEVEE OPTION 3 ON FLOOD BEHAVIOUR 1% AEP





Figure 4.15

LONGITUDINAL SECTION ALONG LEVEE OPTION ALIGNMENT 3







THE TUFLOW MODEL RESULTS SHOWN ON THIS FIGURE ARE NOT TO BE USED FOR PURPOSES OTHER THAN THE ASSESSMENT OF LEVEE OPTIONS. FOR EXAMPLE, THEY ARE NOT TO BE USED FOR SETTING MINIMUM FLOOR LEVEL REQUIREMENTS WITHIN NARROMINE OR DETERMINING THE EXACT EXTENT OF FLOOD AFFECTED LAND FOR PLANNING PURPOSES.



1

LEGEND

Two-Dimensional Model Boundary

MIKE 11 River Chainage

Levee Route

NARROMINE RIVER BANK LEVEE FEASIBILITY STUDY

Figure 4.16

FLOOD BEHAVIOUR RESULTING FROM RAILWAY FAILURE LEVEE OPTION 2A(i) - 1% AEP







