

## 4.16 RPA4 – Acle

The cost mechanism for RPA4 is shown in Table 4-16 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-16 along with relevant traffic lights where appropriate.

### Wastewater

- Acle-Damgate WWTW has existing headroom capacity of approximately 150 properties, hence volumetric upgrade will be for only 1,850 properties;




### Water Supply

- Water would be supplied from Heigham WTW

### Water Resources

- Additional water resources are from connections to Thorpe St Andrew BH and Colney BH, GOGDS, River Wensum reuse and off line storage

### Flood Risk

- The area has been assigned a red light as there is more than 25% of the PGA within Flood Zone 2 or 3; 
- Flood risk from the PGA has been assigned the following traffic lights:
  - From Belaugh WWTW – amber (Discharges into the River Bure) 
  - SUDS has been assigned an amber traffic light (average SUDS suitability) 

### Environment




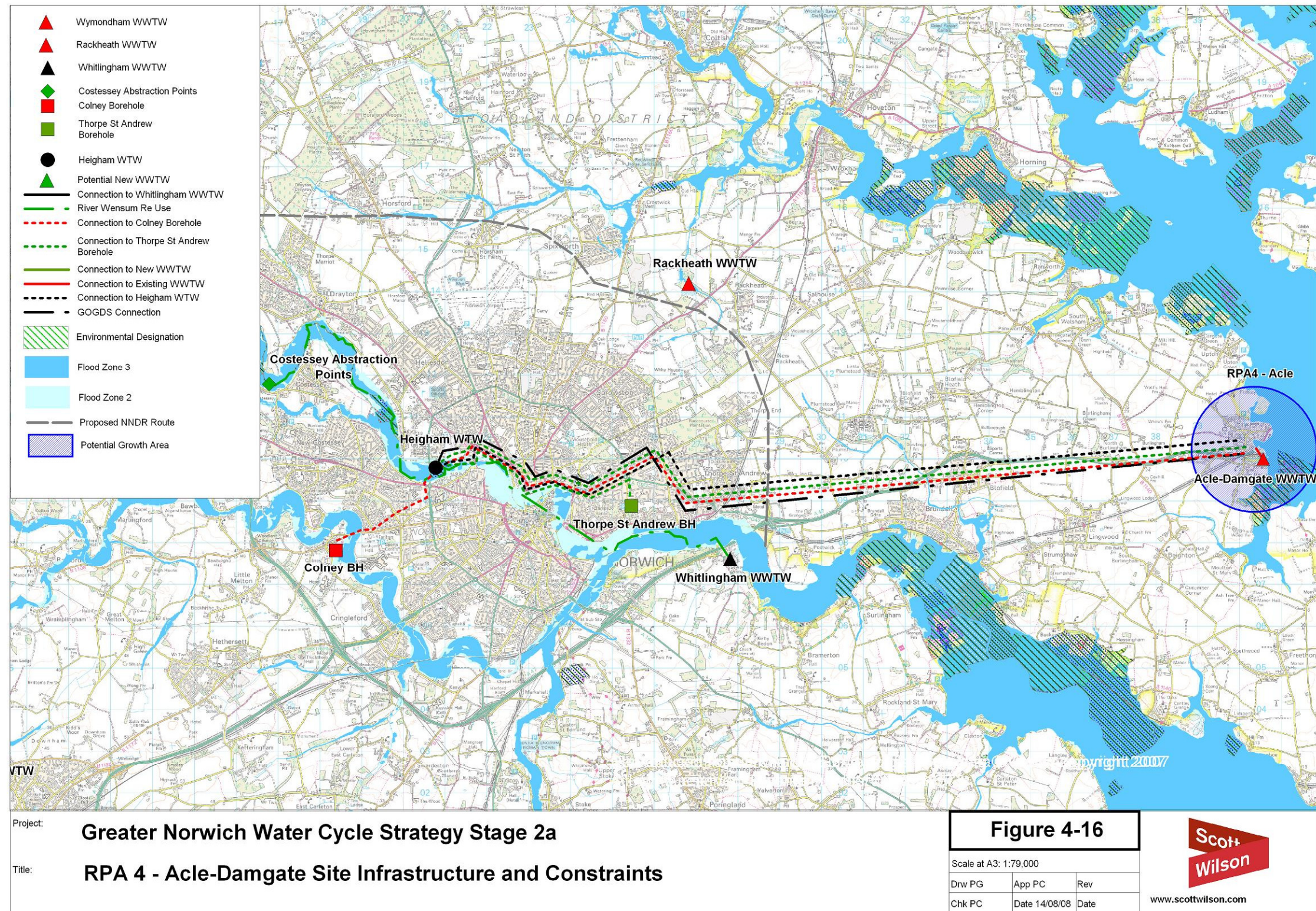
- Conservation designation has been assigned the following traffic lights:
  - From Belaugh WWTW – red (There are significant designated areas within the PGA boundary, including the Decoy Carr SSSI and Damgate Marshes SSSI which are part of the Broads SAC and Broadlands SPA. These areas cover over half of the potential development area. Furthermore, discharge from Acle-Damgate WWTW will be directly into part of the Broads SAC). 
  - The PGA has been assigned a red traffic light in relation to groundwater vulnerability. 
  - The PGA has been assigned a green traffic light in relation to Source Protection Zone requirements. 

Table 4-16: RPA4 total summary costs

Calculations									
Job Title: <b>Norwich Water Cycle Study - Costing Calcs</b>							Date: 01/09/2008		Section: Sheet 1 of 1
Element: RPA4							Job no. D118607		Project no.
Originator	Checked	Revision	Suffix	Orig	1	2	ND		
PC	ND		Date	Check		14/08/2008	PM		
<b>Wastewater</b>									
Upgrade Existing Acle Damgate WWTW									
	Dist (m)	PDS			100	500	1,000	2,000	
Existing Headroom		141	(41)	359		859		1,859	
Trunk Sewer - Rising			-	-		-		-	
Trunk Sewer - Gravity	500		170,000	170,000		190,000		230,000	
Pumping Stations			-	-		-		-	
New WWTW (vol)			-	1,180,000		2,810,000		9,460,000	
New WWTW (nut)			20,000	70,000		140,000		270,000	
<b>Total Costs (£)</b>			<b>190,000</b>	<b>1,420,000</b>		<b>3,140,000</b>		<b>9,960,000</b>	
<b>Water Supply</b>									
Heigham									
	Dist (m)	PDS			100	500	1,000	2,000	
Water Main	21,000		4,700,000	4,800,000		4,900,000		5,100,000	
Pumping Stations			1,700,000	2,100,000		2,500,000		3,000,000	
<b>Total Costs (£)</b>			<b>6,400,000</b>	<b>6,900,000</b>		<b>7,400,000</b>		<b>8,100,000</b>	
<b>Maximise Boreholes</b>									
	Dist (m)	PDS			100	500	1,000	2,000	
Pipework from Thorpe St A	27,000		6,100,000	6,100,000		6,200,000		6,600,000	
Pumping Stations			2,200,000	2,700,000		3,200,000		3,800,000	
Pipework from Colney	24,500		5,500,000	5,600,000		5,700,000		6,000,000	
Pumping Stations			2,000,000	2,500,000		2,900,000		3,500,000	
<b>Total Costs (£)</b>			<b>7,500,000</b>	<b>8,100,000</b>		<b>8,600,000</b>		<b>9,500,000</b>	
<b>Water Resources</b>									
			100	500	1,000	2,000			
Wensum Reuse			6,100,000	6,500,000		6,900,000		7,700,000	
GOGDS			6,400,000	6,900,000		7,300,000		8,100,000	
Off line Storage			200,000	900,000		1,800,000		3,500,000	

Figure 4-16: RPA4 – Acle site infrastructure and constraints



## 4.17 RPA5 – Hingham

The cost mechanism for RPA5 is shown in Table 4-17 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-17 along with relevant traffic lights where appropriate.

### Wastewater

- Wymondham WWTW has existing headroom capacity of approximately 4,000 properties, hence no volumetric upgrade will be required;




### Water Supply

- Water would be supplied from Heigham WTW

### Water Resources

- Additional water resources are from connections to Thorpe St Andrew BH and Colney BH, GOGDS, River Wensum reuse and off line storage

### Flood Risk

- The area has been assigned a green light as there is less than 10% of the PGA is within Flood Zone 2 or 3. 
- Flood risk from the PGA has been assigned the following traffic lights:
  - From Wymondham WWTW– green (discharges into River Tiffey) 
  - SUDS has been assigned an amber traffic light (average SUDS suitability) 

### Environment




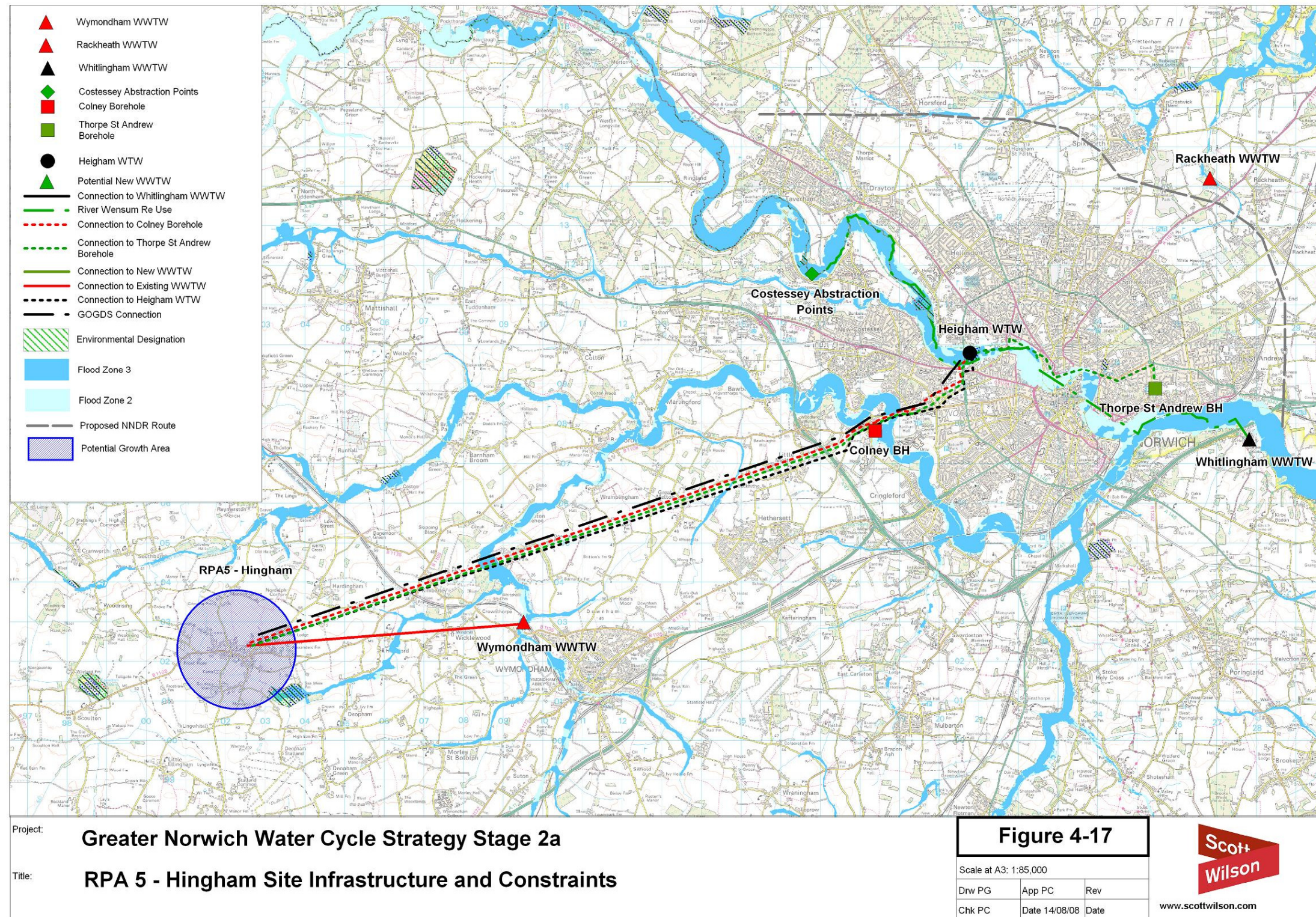
- Conservation designation has been assigned the following traffic lights
  - From Wymondham WWTW - amber (no conservation designated areas within the PGA but discharge into River Tiffey would flow through an SAC site further downstream). 
  - The PGA has been assigned an amber traffic light in relation to groundwater vulnerability. 
  - The PGA has been assigned an amber traffic light in relation to Source Protection Zone requirements. 

Table 4-17: RPA5 total summary costs

Calculations							Section Sheet 1 of 1		
Job Title						Date		Job no. D118607	
Element						Date		Project no.	
Originator	Checked	Revision	Suffix	Orig	1	2	ND		
PC	ND		Date	Check		14/08/2008	PM		
<b>Wastewater</b>									
Upgrade Existing Wymondham WWTW									
	Dist (m)	PDS			100	500	1,000	2,000	
Existing Headroom		4000	(3,900)	(3,500)	(3,000)	(2,000)			
Trunk Sewer - Rising			-	-	-	-	-	-	-
Trunk Sewer - Gravity	7,000		2,260,000	2,260,000	2,610,000	3,170,000			
Pumping Stations			-	-	-	-	-	-	-
New WWTW (vol)			-	-	-	-	-	-	-
New WWTW (nut)			20,000	70,000	140,000	270,000			
<b>Total Costs (£)</b>			<b>2,280,000</b>	<b>2,330,000</b>	<b>2,750,000</b>	<b>3,440,000</b>			
<b>Water Supply</b>									
Heigham									
	Dist (m)	PDS			100	500	1,000	2,000	
Water Main	19,500		4,400,000	4,400,000	4,500,000	4,800,000			
Pumping Stations			1,600,000	2,000,000	2,300,000	2,800,000			
<b>Total Costs (£)</b>			<b>6,000,000</b>	<b>6,400,000</b>	<b>6,800,000</b>	<b>7,600,000</b>			
<b>Maximise Boreholes</b>									
	Dist (m)	PDS			100	500	1,000	2,000	
Pipework from Thorpe St A	235,000		52,600,000	53,000,000	53,800,000	56,700,000			
Pumping Stations			18,600,000	23,400,000	27,000,000	32,900,000			
Pipework from Colney	23,000		5,200,000	5,200,000	5,300,000	5,600,000			
Pumping Stations			1,900,000	2,300,000	2,700,000	3,300,000			
<b>Total Costs (£)</b>			<b>7,100,000</b>	<b>7,500,000</b>	<b>8,000,000</b>	<b>8,900,000</b>			
<b>Water Resources</b>									
Wensum Reuse									
			6,100,000	6,500,000	6,900,000	7,700,000			
GOGDS									
			5,900,000	6,400,000	6,800,000	7,500,000			
Off line Storage									
			200,000	900,000	1,800,000	3,500,000			

Figure 4-17: RPA5 – Hingham site infrastructure and constraints



## 4.18 RPA6 – Diss

The cost mechanism for RPA6 is shown in Table 4-18 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-18, along with relevant traffic lights where appropriate.

### Wastewater

- Diss WWTW has existing headroom capacity of approximately 4,800 properties, hence no volumetric upgrade will be required;




### Water Supply

- Water would be supplied from Heigham WTW

### Water Resources

- Additional water resources are from connections to Thorpe St Andrew BH and Colney BH, GOGDS, River Wensum reuse and off line storage

### Flood Risk

- The area has been assigned a green light as there is less than 10% of the PGA is within Flood Zone 2 or 3. 
- Flood risk from the PGA has been assigned the following traffic lights:  
From Diss WWTW – red (Discharges into the River Waveney and there is adjacent development). 
- SUDS has been assigned an amber traffic light (average SUDS suitability) 

### Environment




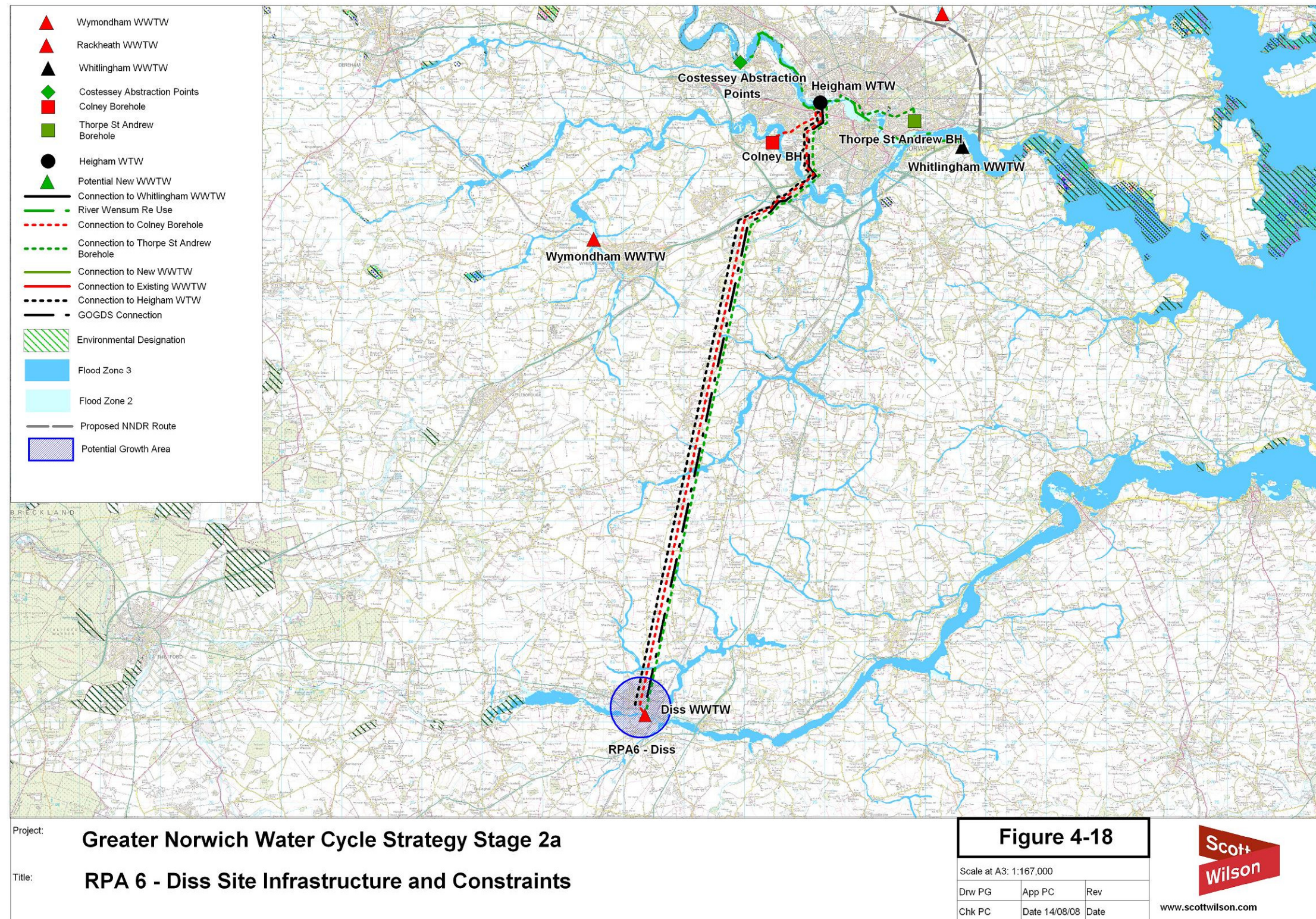
- Conservation designation has been assigned the following traffic lights:
  - From Diss WWTW – amber (there are no conservation designated areas within the PGA; Discharge into the River Waveney would flow through a large SAC designated areas downstream of it within the Broads) 
  - The PGA has been assigned a red traffic light in relation to groundwater vulnerability. 
  - The PGA has been assigned a red traffic light in relation to Source Protection Zone requirements. 

Table 4-18: RPA6 total summary costs

Calculations									
Job Title: Norwich Water Cycle Study - Costing Calcs								Section: Sheet 1 of 1	
Element: RPA6								Date: 01/09/2008	
Originator: PC								Job no. D118607	
Checked: ND								Project no.	
Revision:									
Suffix:									
Orig:									
Date:								14/08/2008	
Check:								PM	
<b>Wastewater</b>									
Upgrade Existing Diss WWTW									
Dist (m) PDS 100 500 1,000 2,000									
Existing Headroom 4838 (4,738) (4,338) (3,838) (2,838)									
Trunk Sewer - Rising - - - -									
Trunk Sewer - Gravity 500 170,000 170,000 190,000 230,000									
Pumping Stations - - - -									
New WWTW (vol) - - - -									
New WWTW (nut) 20,000 70,000 140,000 270,000									
Total Costs (£) 190,000 240,000 330,000 500,000									
<b>Water Supply</b>									
Heigham									
Dist (m) PDS 100 500 1,000 2,000									
Water Main 32,750 7,400,000 7,400,000 7,500,000 7,900,000									
Pumping Stations 2,600,000 3,300,000 3,800,000 4,600,000									
Total Costs (£) 10,000,000 10,700,000 11,300,000 12,500,000									
Maximise Boreholes									
Dist (m) PDS 100 500 1,000 2,000									
Pipework from Thorpe St A 38,750 8,700,000 8,800,000 8,900,000 9,400,000									
Pumping Stations 3,100,000 3,900,000 4,500,000 5,500,000									
Pipework from Colney 36,000 8,100,000 8,200,000 8,300,000 8,700,000									
Pumping Stations 2,900,000 3,600,000 4,200,000 5,100,000									
Total Costs (£) 11,000,000 11,800,000 12,500,000 13,800,000									
<b>Water Resources</b>									
PDS 100 500 1,000 2,000									
Wensum Reuse 6,100,000 6,500,000 6,900,000 7,700,000									
GOGDS 10,000,000 10,700,000 11,300,000 12,500,000									
Off line Storage 200,000 900,000 1,800,000 3,500,000									

Figure 4-18: RPA6 – Diss site infrastructure and constraints



## 4.19 RPA7 – Harleston

The cost mechanism for RPA7 is shown in Table 4-19 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-19, along with relevant traffic lights where appropriate.

### Wastewater

- Harleston WWTW has existing headroom capacity of approximately 1,200 properties, hence volumetric upgrade will be required for approximately 800 properties;




### Water Supply

- Water would be supplied from Heigham WTW

### Water Resources

- Additional water resources are from connections to Thorpe St Andrew BH and Colney BH, GOGDS, River Wensum reuse and off line storage

### Flood Risk

- The area has been assigned an amber traffic light as there is between 10-25% of the PGA is within Flood Zone 2 or 3. 
- Flood risk from the PGA has been assigned the following traffic lights:
  - From Harleston WWTW – amber (Discharges into the Starston Brook a tributary of the River Waveney). 
  - SUDS has been assigned an amber traffic light (average SUDS suitability) 

### Environment




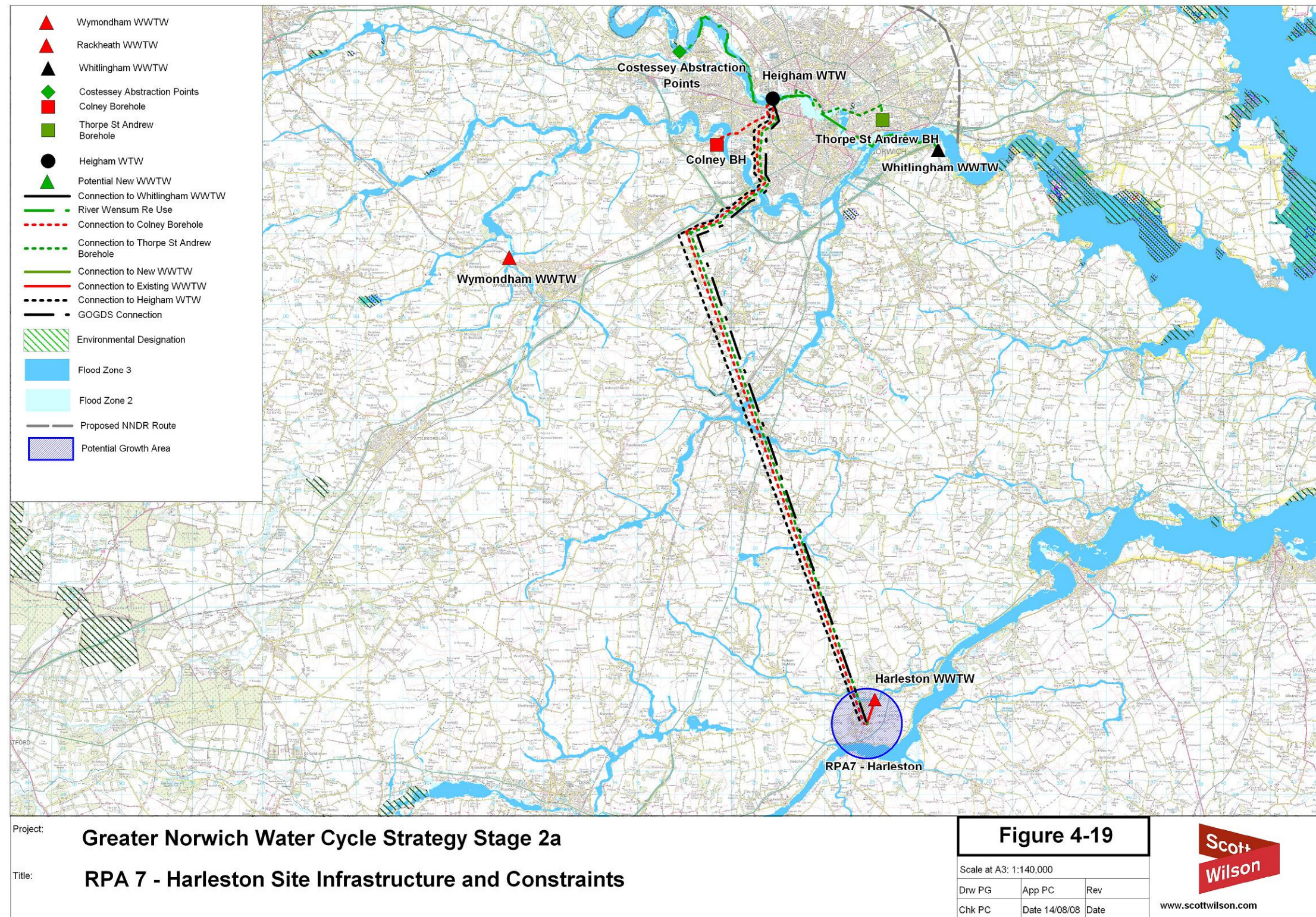
- Conservation designation has been assigned the following traffic lights
  - From Harleston WWTW – orange There are no conservation designated areas within the PGA; Discharge into the River Waveney would flow through a large SAC designated areas downstream of it within the Broads 
  - The PGA has been assigned a red traffic light in relation to groundwater vulnerability. 
  - The PGA has been assigned a green traffic light in relation to Source Protection Zone requirements. 

Table 4-19: RPA7 total summary costs

Calculations		Section		Sheet 1 of 1		Job no. D118607	
Job Title		Norwich Water Cycle Study - Costing Calcs		Date		01/09/2008	
Element		RPA7		Suffix		Orig	
Originator		Checked		Revision		Date	
PC		ND		Revision		Date	
				1		2	
				ND		PM	
				14/08/2008			
<b>Wastewater</b>							
<b>Upgrade Existing Harleston WWTW</b>							
Dist (m)		PDS		100		500	
Existing Headroom		1192		(1,092)		(692)	
Trunk Sewer - Rising							
Trunk Sewer - Gravity		1,100		360,000		360,000	
Pumping Stations							
New WWTW (vol)							
New WWTW (nut)		20,000		70,000		140,000	
<b>Total Costs (£)</b>				<b>380,000</b>		<b>430,000</b>	
<b>Water Supply</b>							
<b>Heigham</b>							
Dist (m)		PDS		100		500	
Water Main		30,500		6,900,000		6,900,000	
Pumping Stations				2,500,000		3,100,000	
<b>Total Costs (£)</b>				<b>9,400,000</b>		<b>10,000,000</b>	
<b>Maximise Boreholes</b>							
Dist (m)		PDS		100		500	
Pipework from Thorpe St A		36,500		8,200,000		8,300,000	
Pumping Stations				2,900,000		3,700,000	
Pipework from Colney		34,000		7,600,000		7,700,000	
Pumping Stations				2,700,000		3,400,000	
<b>Total Costs (£)</b>				<b>10,300,000</b>		<b>11,100,000</b>	
<b>Water Resources</b>							
Wensum Reuse				6,100,000		6,500,000	
GOGDS				9,300,000		10,000,000	
Off line Storage				200,000		900,000	
						1,800,000	
						3,500,000	

Figure 4-19: RPA7 – Harleston site infrastructure and constraints





## 4.20 RPA8 – Loddon

The cost mechanism for RPA7 is shown in Table 4-20 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-20 along with relevant traffic lights where appropriate.

### Wastewater

- Sisland WWTW has existing headroom capacity of approximately 1,000 properties, hence volumetric upgrade will be required for approximately 1,000 properties;




### Water Supply

- Water would be supplied from Heigham WTW

### Water Resources

- Additional water resources are from connections to Thorpe St Andrew BH and Colney BH, GOGDS, River Wensum reuse and off line storage

### Flood Risk

- The area has been assigned an amber traffic light as there is between 10-25% of the PGA within Flood Zone 2 or 3. 
- Flood risk from the PGA has been assigned the following traffic lights:
  - From Sisland WWTW – amber (Discharges into the upper reaches of the River Chet) 
  - SUDS has been assigned a red traffic light (poor SUDS suitability) 

### Environment




- Conservation designation has been assigned the following traffic lights
  - The Hardley Flood SSSI, which is part of the Broads SAC and Broadlands SPA, lies to the northeast of the PGA; Discharge into the River Chet would flow through a large SAC designated areas downstream of it within the Broads; 
  - The PGA has been assigned an amber traffic light in relation to groundwater vulnerability. 
  - The PGA has been assigned a green traffic light in relation to Source Protection Zone requirements. 

Table 4-20: RPA8 total summary costs

Calculations								Section Sheet 1 of 1	
Job Title							Date	Job no. D118607	
Element							01/09/2008	Project no.	
Originator	Checked	Revision	Suffix	Orig	1	2	ND		
PC	ND		Date	Check		14/08/2008	PM		
<b>Wastewater</b>									
Upgrade Existing Sisland WWTW									
	Dist (m)	PDS			100	500	1,000	2,000	
Existing Headroom		1058	(958)	(558)	(58)			942	
Trunk Sewer - Rising			-	-	-	-	-	-	
Trunk Sewer - Gravity	25,000		8,070,000	8,070,000	9,320,000	11,300,000			
Pumping Stations			-	-	-	-	-	-	
New WWTW (vol)			-	-	-	-	-	4,790,000	
New WWTW (nut)			20,000	70,000	140,000	270,000			
<b>Total Costs (£)</b>			<b>8,090,000</b>	<b>8,140,000</b>	<b>9,460,000</b>	<b>16,360,000</b>			
<b>Water Supply</b>									
Heigham									
	Dist (m)	PDS			100	500	1,000	2,000	
Water Main	20,500		4,600,000	4,700,000	4,700,000	5,000,000			
Pumping Stations			1,700,000	2,100,000	2,400,000	2,900,000			
<b>Total Costs (£)</b>			<b>6,300,000</b>	<b>6,800,000</b>	<b>7,100,000</b>	<b>7,900,000</b>			
<b>Maximise Boreholes</b>									
	Dist (m)	PDS			100	500	1,000	2,000	
Pipework from Thorpe St A	26,500		6,000,000	6,000,000	6,100,000	6,400,000			
Pumping Stations			2,100,000	2,700,000	3,100,000	3,800,000			
Pipework from Colney	24,000		5,400,000	5,500,000	5,500,000	5,800,000			
Pumping Stations			1,900,000	2,400,000	2,800,000	3,400,000			
<b>Total Costs (£)</b>			<b>7,300,000</b>	<b>7,900,000</b>	<b>8,300,000</b>	<b>9,200,000</b>			
<b>Water Resources</b>									
		PDS			100	500	1,000	2,000	
Wensum Reuse			6,100,000	6,500,000	6,900,000	7,700,000			
GOGDS			6,300,000	6,700,000	7,100,000	7,900,000			
Off line Storage			200,000	900,000	1,800,000	3,500,000			