

APPENDIX B

Surface Water System

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Annex BA

Pumping records from IDB areas

B.1 Introduction

This Appendix describes the surface water features of the study area. These can be separated into the main rivers, where records of flows and levels are kept by the Environment Agency, and the areas managed by the Internal Drainage Boards (IDBs).

B.2 Data sources

Information from the following sources was acquired:

- Flow and level data for the rivers were obtained from the Environment Agency offices at York and Leeds.
- Long term river flow statistics were obtained from the Nation River Flow Archive held by the Centre for Ecology and Hydrology at Wallingford (www.nerc-wallingford.ac.uk/ih/).
- Data on river bed elevations for the Derwent, Ouse, Wharfe and Aire were available from hydraulic models of the rivers, developed by the Environment Agency for flood prediction purposes. The data input files were provided by the Agency and the channel profiles extracted at suitable intervals along the rivers.
- Data was obtained from the IDBs showing the location of subcatchments within each board area, location of pumping stations and gravity outfalls and, where available, pump capacities and hours run.

B.3 Description of drainage system

B.3.1 Rivers

Seven major rivers drain the study area, flowing from higher ground in the west to the east towards the River Humber which discharges to the sea at Grimsby. Anti-clockwise, from north to south, these are the River Derwent, River Nidd, River Wharfe, River Ouse, River Aire, River Went and the River Don (Figure B.1).

River Derwent: Within the study area the River Derwent flows in southerly direction from north of Stamford Bridge to its confluence with the River Ouse at Barmby, to the south east of Selby. It is fed from an extensive upland, moorland catchment (North York Moors) of over 1500 km².

Water levels in the Derwent are artificially managed at two locations, Barmby Barrage and Elvington Weir. The Barmby Barrage, located just above the confluence with the River Ouse, was built in 1975 as a flood relief measure and to allow more water to be abstracted for public water supply by preventing the ingress of saline water from the River Ouse. At low tides the Barrage is opened to allow water to flow into the Ouse, while at high tides, the Barrage is closed. A weir at Elvington supports water levels upstream of the weir. Water level difference across this weir averages around 2 m.

River Nidd: The River Nidd joins the River Ouse towards the northern limit of the study area. The reach of the River Nidd that falls within the study area flows in a north easterly direction from the western aquifer boundary to the confluence with the River Ouse, 11 km north west of York. The catchment served by the River Nidd is over 500 km² and is a predominantly rural catchment, becoming rugged in the headwater areas.

River Wharfe: The River Wharfe joins the River Ouse at Cawood, approximately 8 km north west of Selby. It drains a predominantly rural catchment to the west of the study area, with moorland headwaters, of over 750 km². Headwater reservoirs exist in the catchment and the effects of these may be seen at times of low flow. The river is tidal up to the town of Ulleskelf.

River Ouse: The River Ouse is the principal river in the study area, flowing from north to south to the River Humber, becoming tidal below the Naburn Weir (Figure B.1). It's

catchment is over 3300 km² and is predominantly rural draining the northern parts of Vale of York and the Yorkshire Dales.

River Aire: The River Aire flows from west to east across the central part of the study area, joining the River Ouse at Airmyn (472300, 426200). Its catchment is almost 2000 km² in area and is predominantly rough grazing land in the Pennine headwaters with a considerable urban and industrial influence in the lower reaches. Its major tributary, the River Calder, joins it towards the western limit of the study area.

River Went: The River Went is the smallest of the principal rivers and flows in an easterly direction to its confluence with the River Don in the southern part of the study area. Its catchment is principally rural and less than 90 km² in size.

River Don: The River Don in the south flows in a northeasterly direction, through Doncaster, to the River Humber. Its catchment is over 1200 km² and exhibits contrasting moorland headwaters and urbanised valleys of the lower catchment. Its course has been heavily altered in the past and within the study area it flows through a largely artificial channel, part of which is known as Dutch River.

B.3.2 IDB Areas

Outside the main rivers the drainage of the surrounding low lying areas is under the control of Internal Drainage Boards (IDBs). The location of the drainage boards within the study area are shown on Figure B.2.

Each Drainage Boards is responsible for the supervision of all aspects of land drainage within their boundary. Drainage from the watercourses within each Board is eventually into the main river system and this may be accomplished by gravity drainage active pumping, or a combination of these.

B.4 Hydrometric data

Due to the tidal nature of the rivers within the study area, most of the hydrometric data relates to river stage levels rather than flow data. The location of the level and flow gauges are shown on Figure B.3. The data available are summarised below on the basis of each river.

B.4.1 Ouse

The most downstream flow gauge on the River Ouse is at Skelton (SE 568 554) located just to the north of York (F2405, Figure B.3). The mean flow at the gauge is 50.1 m³/s (4,328 MI/d) and the Q95 is 7.448 m³/s (643 MI/d).

There are 10 river level gauges on the River Ouse within the study area and summary details of the data supplied by the Agency are shown on Table B.4.1.

Table B.4.1 Summary of level gauge data on the River Ouse

| Station ID | Name | Gauge zero (mAOD) | Record | | Water level | | |
|------------|----------------------|----------------------|-----------|-------------|-------------|--------|------|
| | | | Start | End | Min | Max | Avg |
| L24013 | Goole | 0 | 31-Mar-96 | 11-Aug-03 | -1.7 | 4.93 | 0.95 |
| L2400 | Barmby Barrage | 0.521 | 08-Jun-96 | 02-Apr-03 | -0.157 | 7.552 | 2.14 |
| L2401 | Selby Toll Bridge | 0.044 | 31-Mar-96 | 04-Aug-03 | -0.484 | 6.225 | 2.06 |
| L24012 | Blacktoft | 1.5 | 31-Mar-96 | 11-Aug-03 | -0.17 | 11.74 | 2.27 |
| L2403 | Cawood | -0.027 | 31-Mar-96 | 04-Aug-03 | 0.204 | 7.882 | 2.66 |
| L2402 | Naburn | 4.775 | 02-Oct-00 | 11-Mar-03 | 5.042 | 8.935 | 5.77 |
| L2404 | Foss Barrier | | 31-Mar-96 | 04-Aug-03 | 4.891 | 10.189 | 5.65 |
| L2406 | Viking Hotel | 5 | 31-Mar-96 | 04-Aug-03 | 4.351 | 10.043 | 5.69 |
| L2407 | Clifton Ings Intake | | 23-Feb-96 | 06 May 2003 | 5.895 | 11.01 | 6.43 |
| L2408 | Clifton Ings Outfall | | 08-Feb-96 | 06 May 2003 | 6.935 | 11.072 | 7.10 |

Figure B.4 shows selected level measurements from gauges along the Ouse. The change from tidal to normal river flow conditions above Naburn is readily apparent.

B.4.2 Derwent

Within the study area there is one currently active flow gauging station at Buttercrambe (SE731 587). In 1973 this gauge superceded an older gauge located at Stamford Bridge (SE714 557). The mean flow for the Stamford Bridge gauge is given as 1,422 MI/d and the Q95 as 467 MI/d. Statistics for the new gauge at Buttercrambe are similar with a mean flow of 1,445 MI/d and a Q95 of 347 MI/d.

There are 8 river level gauges on the River Derwent, summary details for which are shown on Table B.4.2. Selected measurements are shown on Figure B.5.

Table B.4.2 Summary of level gauge data on the River Dewent

| Station ID | Name | Gauge zero (mAOD) | Record | | Water level | | |
|------------|-------------------|----------------------|-----------|-----------|-------------|--------|-------|
| | | | Start | End | Min | Max | Avg |
| L2800 | Barmby YW Intake | 0.521 | 03-May-96 | 04-Aug-03 | 0.481 | 6.767 | 2.66 |
| L2801 | Barmby Barrage | -1.987 | 31-Mar-96 | 04-Aug-03 | -2.196 | 3.162 | -0.05 |
| L2802 | Loftsome Bridge | -0.092 | 10-Sep-92 | 03-Jun-03 | 1.104 | 5.369 | 2.14 |
| L2803 | Bubwith | 0 | 10-Sep-92 | 04-Aug-03 | 1.727 | 6.364 | 2.85 |
| L2804 | Cottingwith | 0 | 10-Sep-92 | 03-Jun-03 | 1.962 | 6.324 | 3.17 |
| L2805 | Elvington | 0 | 10-Sep-92 | 08-Dec-99 | 2.113 | 6.506 | 3.59 |
| L2806 | Elvington Sluices | 0 | 21-Jan-98 | 04-Aug-03 | 4.833 | 7.119 | 5.57 |
| L2810 | Stamford Bridge | 0.057 | 22-May-98 | 04-Aug-03 | 7.038 | 10.011 | 7.25 |

B.4.3 Aire

There are three level gauges on the River Aire, details of which are summarised on Table B.4.3, and one flow gauge at Beal (SE 535 255). The mean flow at the Beal gauge is 35.69 m³/s (3,080 MI/d) and the Q95 is 8.399 m³/s (725 MI/d).

Table B.4.3 Summary of level gauge data for the River Aire

| Station ID | Name | Gauge zero (mAOD) | Start | End | Water level | | |
|--------------------|------------------|----------------------|-----------|-----------|-------------|-------|------|
| | | | | | Min | Max | Avg |
| L1801 ¹ | Carlton Bridge | 1.33 | 12-May-96 | 11-Aug-03 | 1.31 | 7.652 | 3.76 |
| L1802 ² | Haddlesey Tidal | 2.82 | 06-Sep-93 | 02-Jun-03 | 2.555 | 8.092 | 3.41 |
| L1803 ³ | Haddlesey Bridge | 0 | 21-Feb-91 | 02-Jun-03 | 4.866 | 8.367 | 5.39 |

¹ There is some uncertainty with gauge zero at this location

² Gauge zero may be 2.28 mAOD

³ Not surveyed

B.4.4 Wharfe

The lowest flow gauge on the River Wharfe is a Tadcaster (SE 477 441). The mean flow at the gauge is 17.29 m³/d (1,493 MI/d) and the Q95 2.275 m³/s (196 MI/d).

Downstream of Tadcaster there is only one level gauge (L2011) located at Fleet (SE 555 398) in the tidal reach of the river. The water level at this gauge varied from 2.09 mAOD to 8.212 mAOD between March 1996 and August 2003. The average water level was 3.63 mAOD.

B.4.5 River Went

There is one flow gauge on the River Went at Walden Stubbs (SE 5508 1632). There are two level gauges close to the confluence of the Went with the River Don. For the Went Mouth Sluices gauge (L0902) data was supplied for the period November 1990 to August 2003. During this period the river levels varied between 0.35 mAOD and 4.78 mAOD with an average elevation of 1.48 mAOD.

B.5 River bed levels

River bed levels are not routinely measured, however, the Environment Agency has undertaken the development of hydraulic models of some of the rivers in the study area and river bed cross sections are available from these models.

The input data files for these models contain river bed profiles at intervals along the course of the rivers. Selected profiles were taken at intervals down the rivers and the minimum depth recorded. The locations selected are shown on Figure B.7. River bed profiles constructed from these data are shown on Figure B.8.

B.6 IDB Areas

Inquiries were made to the major Internal Drainage Boards within the study area as to whether there was any pumping and water level data available for the catchments under their control. The following sections summarises the data that was obtained. Some of the IDBs provided data on the number of hours the pumps worked at the various pumping stations. These data have been recorded in the Annex to this appendix.

B.6.1 Lower Ouse IDB

There are eight pumping stations in the Lower Ouse area, all located in the southern part of the drainage area. The location of these stations and the subcatchments that they serve are shown in Figure B.9. The specification of the pumps at these stations is summarised in Table B.6.1. All pumping stations within the Lower Ouse have gravity drainage systems via non-return valve in addition to the mechanical pumps. However, the proportion of water released by gravity drainage is small compared to that pumped out of the area.

Table B.6.1 Specification for pumping stations in Lower Ouse IDB

| Pumping Station | Number of Pumps | Pump Capacity (l/sec) | Discharges To |
|-----------------|-----------------|-----------------------|---|
| Marsh | 2 | 341 | River Derwent |
| Lowfield | 2 | 341 | River Ouse |
| Loftsome Bridge | 2 | 417 | River Derwent |
| Yokefleet | 2 | 530 | River Ouse |
| Knedlington | 2 | 227 | River Ouse |
| Howdendyke | 2 | 189 | River Ouse |
| North Howden | 2 | 379 | Pumps to drains that flow into Near Drain |
| Near Drain | 4 | 550 | River Ouse |

In the northern part of the Lower Ouse IDB, there are no pumping stations and all drainage occurs by gravity driven flow. No monitoring data are available to quantify the volume of water removed from the drainage area by this mechanism.

B.6.2 Goole and Airmyn IDB

There are five pumping stations in this area, as shown on Figure B.9. Details of the catchment areas for each pump were not supplied, but the drainage system is shown. The specification of the pumps at these stations is summarised in Table B.6.2. All pumping stations that discharge to a water course outside of the drainage system have an additional drainage mechanism to facilitate the release of water from the drainage channel. This mechanism is a simple non-return valve, pushed opened by a head of water in the drainage channel during periods of low river stage. However, in reality the pumps act to remove the greatest quantity of water, with the gravity drainage system contribution only a small percentage to the removal of water at the pump station.

Due to the development of land for industrial use, the Orchard Cottage pumping station is due to have an additional pump installed within the next year. The new pump will be of similar capacity to those already in place.

Table B.6.2 Specification for pumping stations in Goole and Airmyn IDB

| Pumping Station | Number of Pumps | Pump Capacity (l/hr) | Discharges To |
|-------------------|-----------------|-------------------------|---------------------------------------|
| Downes Ground | 3 | 60,000 | River Aire |
| Hook Clough | 2 | 60,000 | River Ouse |
| Orchard Cottage | 2 | 60,000 | River Don |
| New Potter Grange | 2 | 75,000 | Lifts to Orchard Cottage pump station |
| Southfield Lane | 2 | Uncertain, low capacity | Pumps into the Hook Clough system |

It was reported that a persistent spring maintains water levels in the ponds adjacent to New Potter Grange pump station, even during the driest periods (Clerk to the Board, pers com). It is not known where water flows to from this pond.

B.6.3 Snaith IDB

In the Snaith IDB there is one pumping station at Lord Downes Clough, which discharges into the River Aire. The station has two pumps each with a capacity of 60,000 l/hr.

B.6.4 Cowick IDB

The Cowick drainage area has two pumping station at Finnley's Lane and New Bridge. Finnley's Lane is an intermediate pumping station that lifts water to the New Bridge station, which discharges to the River Don. There are two pumps at the New Bridge station each with a capacity of 60,000 l/hr.

B.6.5 Selby

There are 20 subcatchments in the Selby IDB, as shown on Figure B.10. Each catchment is named after the pumping station that removes water from the catchment. The details of the pumping stations are summarised on Table B.6.3. Pumping hours are reported in the annex to this appendix.

Table B.6.3 Specification for pumping stations in Cowick IDB

| Pumping Station | Number of Pumps | Pump Capacity (l/sec) | Catchment area (Ha) |
|------------------|-----------------|-----------------------|----------------------------|
| Mearley Clough | 2 | 378 | 847 |
| Hirst MARsh | 2 | 130 | 220 |
| Lendall 2 | 2 | 643 | 2798 shared with Lendall 1 |
| Lendall 1 | 3 | 2 @ 643 1 @ 128 | |
| Great Clough | 2 | 923 | 1789 |
| Selby Dam | 4 | 1250 | 6368 |
| Belfit | 3 | 2 @ 265 1 @ 265 | 996 |
| Bond Ings | 2 | 80 | 50 |
| Botherton Marsh | 4 | 150 | 240 |
| Cawood Marsh | 3 | 530 | 570 |
| Chapel Haddlesey | 2 | 35 | 52 |
| Coats Marsh | 2 | 130 | 131 |
| Fleet Drain | 2 | 115 | 171 |
| Ings | 3 | 2 @ 645 1 @ 265 | 1100 |
| Kellingley Crook | 4 | 2 @ 365 2 @ 1100 | 235 |
| Little Airmyn | 2 | 265 | 503 |
| Old Eye | 4 | 550 | 1194 |
| Paper House | 2 | 595 | 847 |
| Quarlets | 3 | 200 | 12 |
| Temple Hirst | 2 | 370 | 519 |

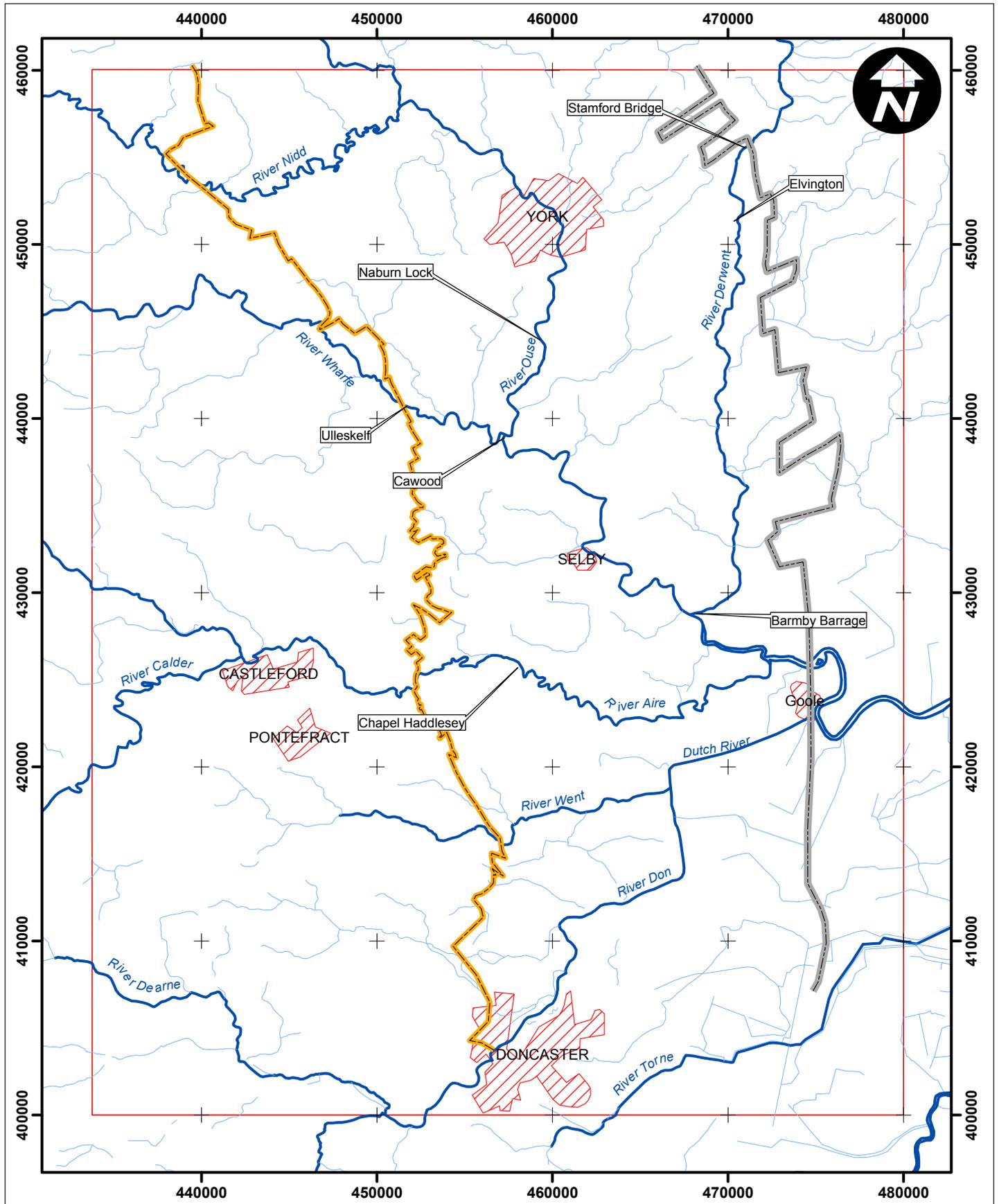
The IDB reported that the depth of watercourses within the area vary in depth and detailed data is not available without a survey being undertaken. However, in general, channel bed levels can be taken to be 1.5 m below ground level in the upstream areas of each catchment and 2.5 to 3 m below ground level at the pumping station (Grantham, Brundell & Farran, pers. com.).

B.7 References

Environment Agency, 1998. Lower Ouse Hydraulic Study. Scoping Report.

Environment Agency, 1999. Lower Ouse Hydraulic Study. Hydraulic Model Construction and Calibration Report.

FIGURES



- Subcrop of base of Sherwood Sandstone
- Rivers
- Subcrop of base of Mercia Mudstone Group
- Towns

Figure B.1
Surface Drainage system

| | | | |
|----------------|--|----------|-----|
| Date | Nov 2005 | Drawn | OXS |
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| File Reference | 6353\Reports\Phase 4\Figures\Appendix B\Figure B.1.mxd | | |



Environmental Simulations International Ltd

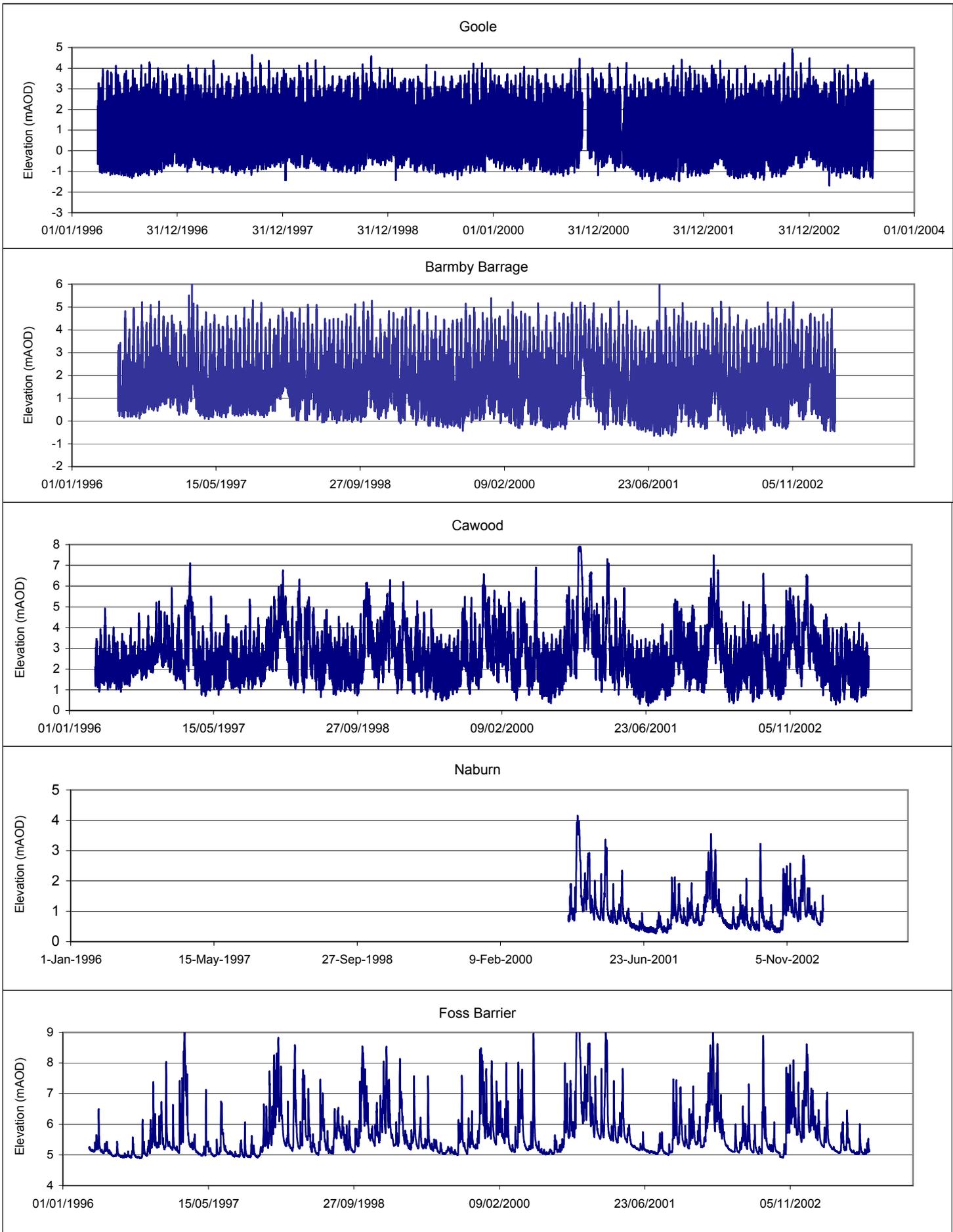


Figure B.4
 Selected river level measurements
 from the River Ouse

| | | | |
|----------------|--|----------|-----|
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| Original | A4 | Revision | 1 |
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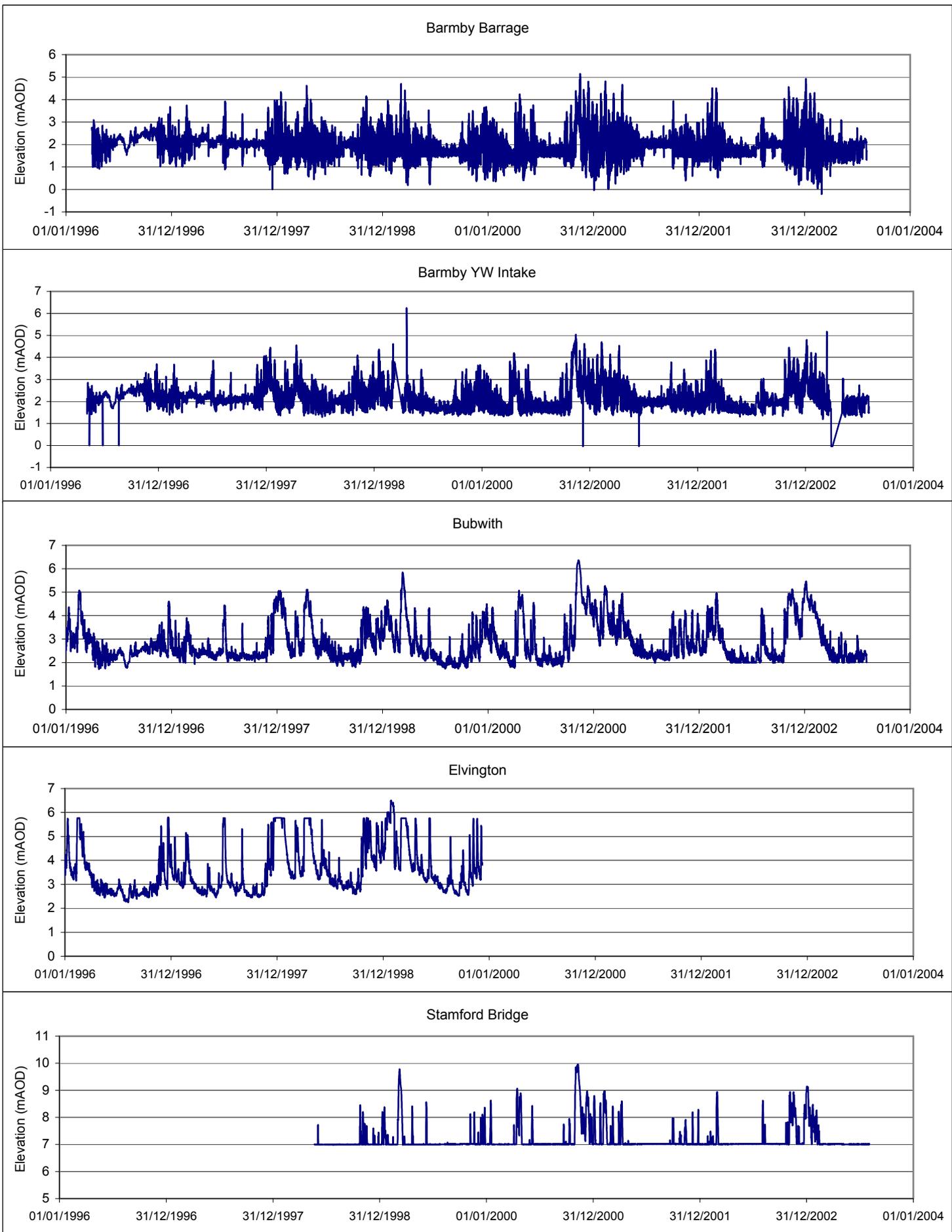


Figure B.5
Selected River level measurements
from the River Derwent

| | | | |
|----------------|--|----------|-----|
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| Original | A4 | Revision | 1 |
| File Reference | 6353\Reports\Phase 4\Figures\Appendix B\Figure B.5.xls | | |



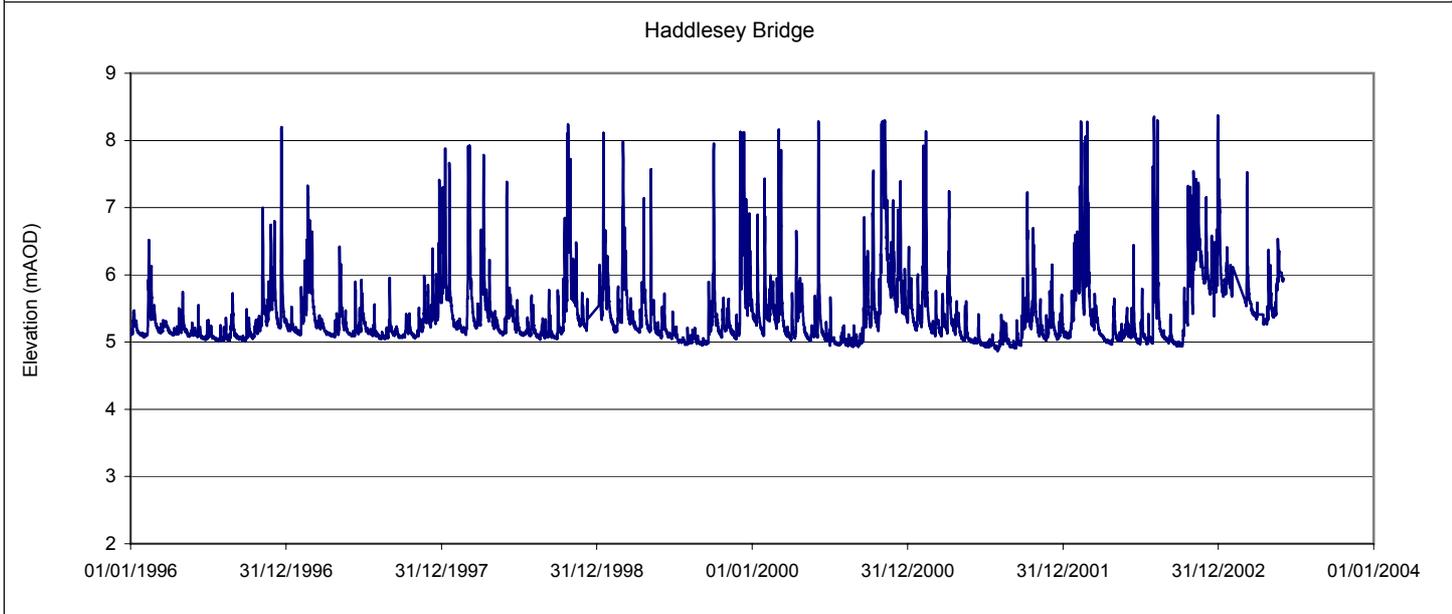
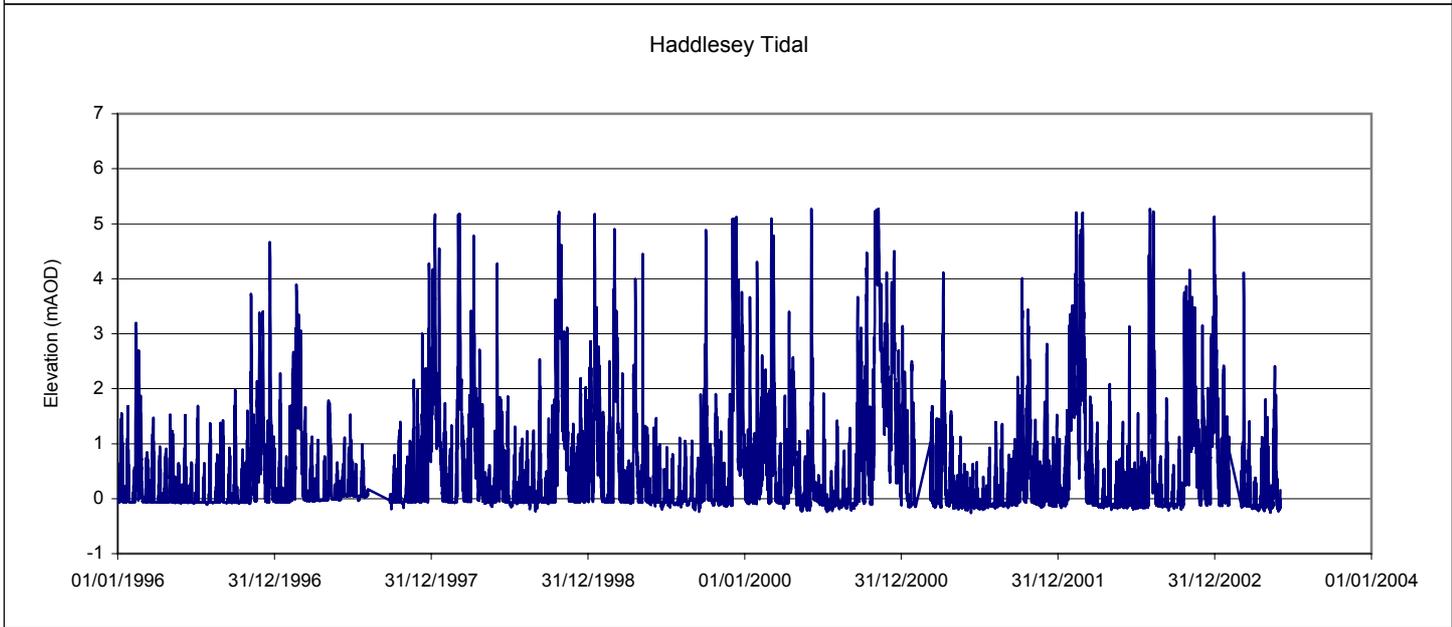
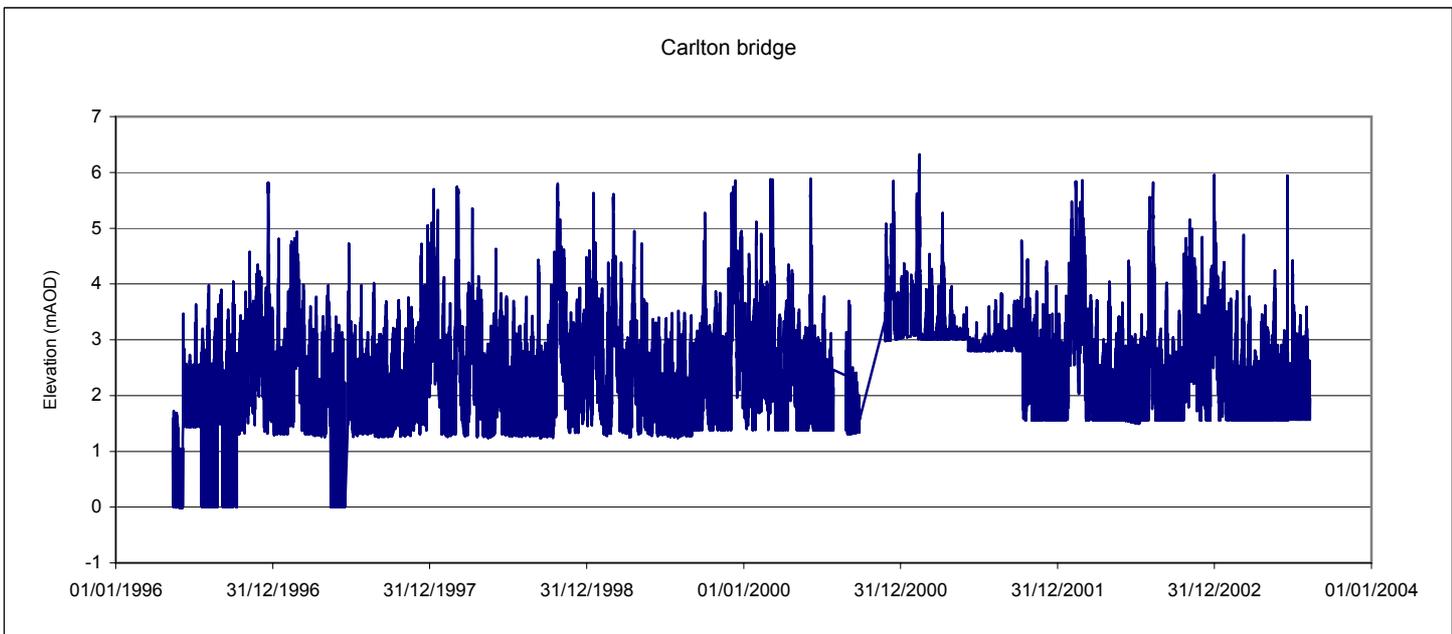
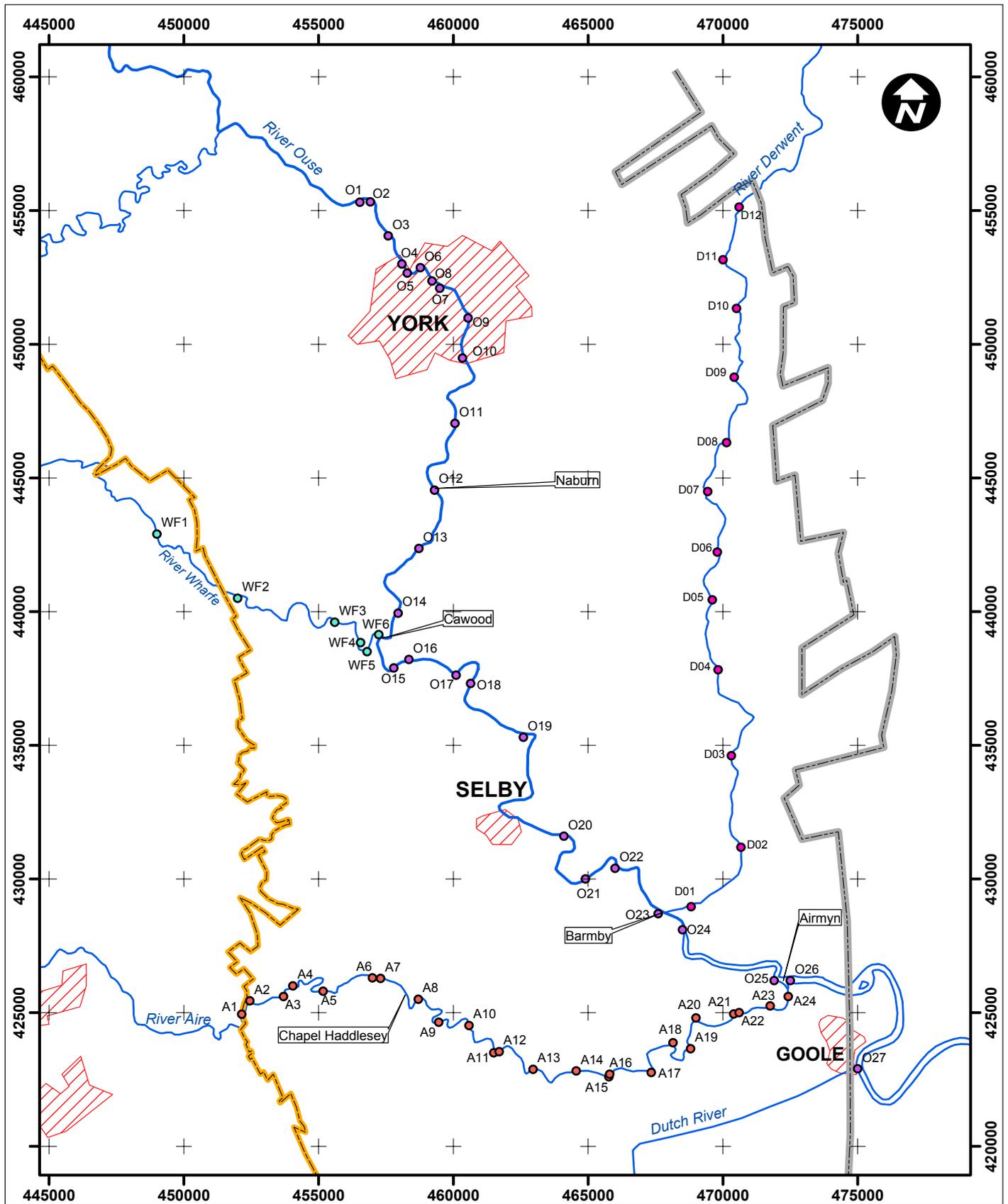


Figure B.6
River levels measurements from the
River Aire

| | | | |
|----------------|--|----------|-----|
| Date | Nov 05 | Drawn | LRB |
| Scale | dns | Checked | MJS |
| Original | A4 | Revision | 1 |
| File Reference | 6353/Reports/Phase 4/Appendix B/Figure B.6.xls | | |





- River Aire cross sections (A)
- River Ouse cross sections (O)
- River Wharfe cross sections (WF)
- River Derwent cross sections (D)
- Subcrop of base of Sherwood Sandstone
- Subcrop of base of Mercia Mudstone
- Rivers
- ▨ Towns

Figure B.7
Data points for river bed levels

| | | | |
|----------------|--|----------|-----|
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| File Reference | 6353\Reports\Phase 4\Figures\Appendix B\Figure B.7.mxd | | |

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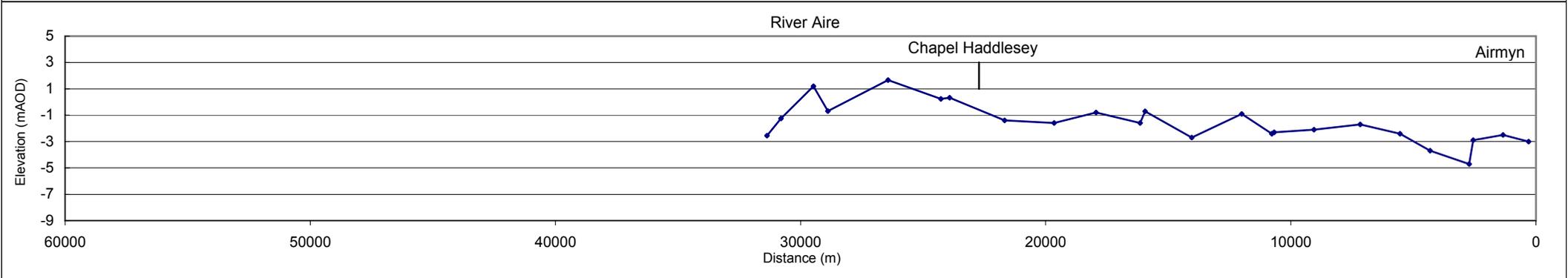
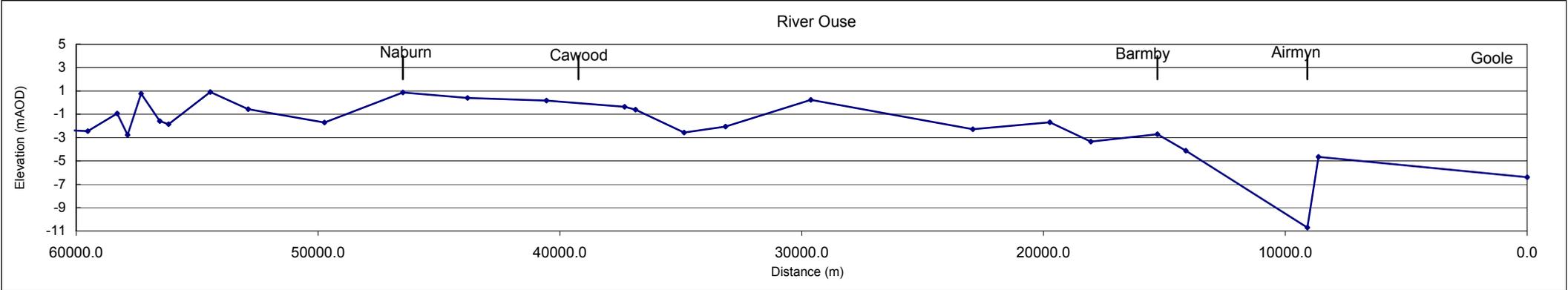
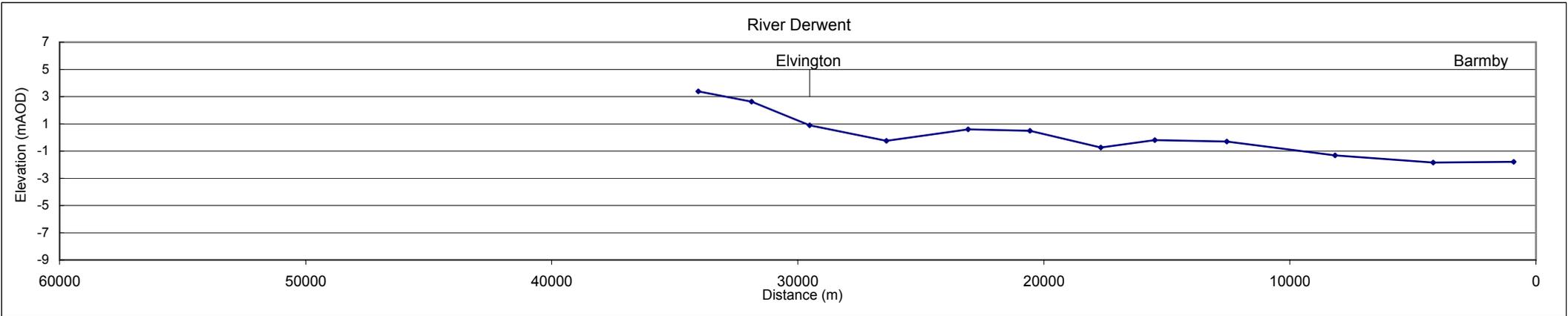
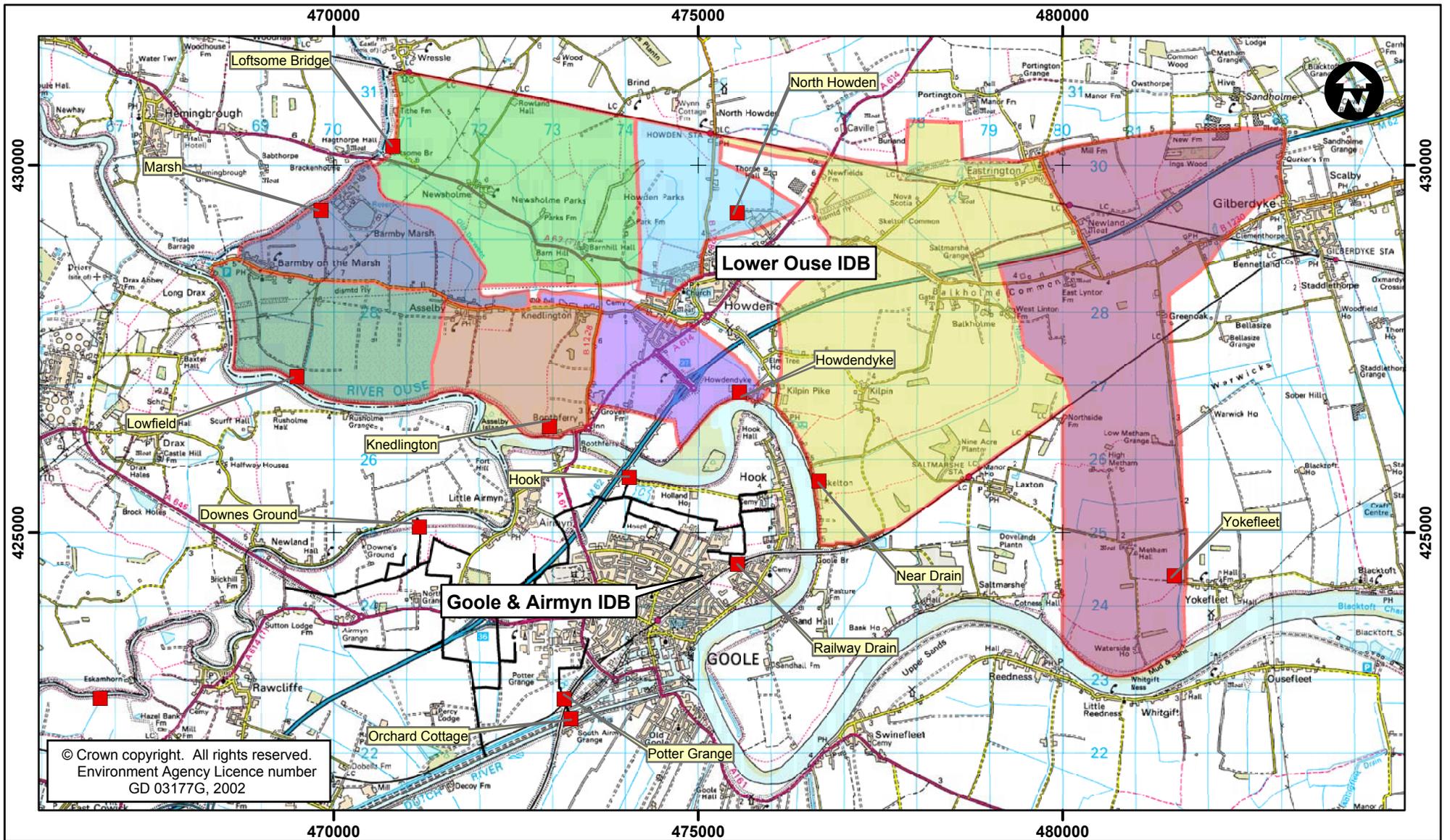


Figure B.8
River bed profiles

| | | | |
|--|--------|----------|-----|
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| Scale | dns | Checked | MJS |
| Original | A4 | Revision | 1 |
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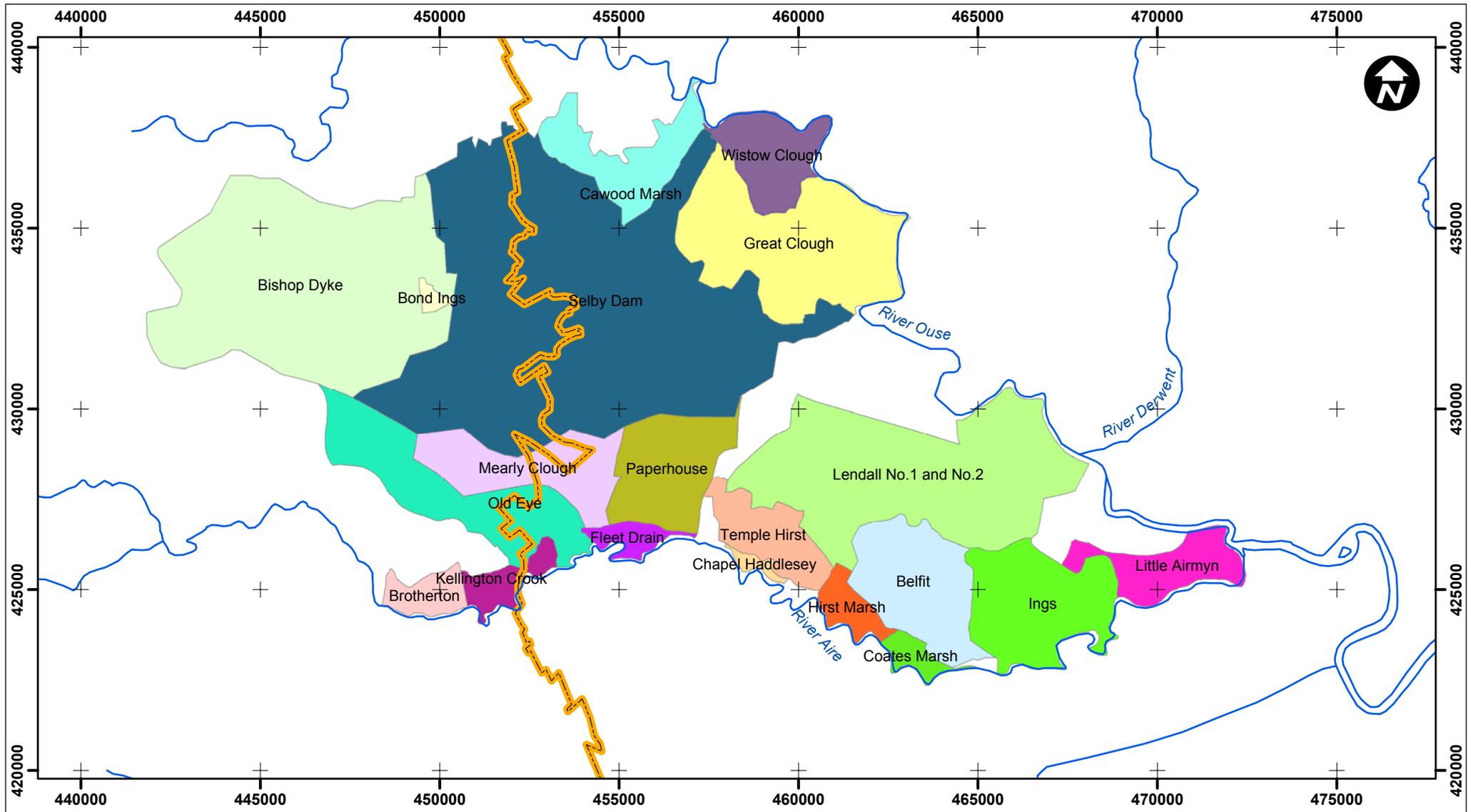




Key Subcatchments within the Lower Ouse IDB Drainage channels in the Goole & Airmyn IDB ■ Pumping Stations

Figure B.9
Pumping stations and subcatchments in the Goole & Airmyn and Lower Ouse IDBs

| | | | |
|----------------|---|----------|-----|
| Date | Nov 2005 | Drawn | LRB |
| Scale | 1:75,000 | Checked | MJS |
| Original | A4 | Revision | 1 |
| File Reference | 6353\Reports\Phase4\Figures\ Appendix B\Figure B.9.mxd | | |



Key  Subcrop of base of Sherwood Sandstone

Figure B.10
Location of subcatchments in the Selby IDB area

| | | | |
|----------------|--|----------|-----|
| Date | Nov 2005 | Drawn | LRB |
| Scale | 1:150,000 | Checked | MJS |
| Original | A4 | Revision | 1 |
| File Reference | 6353\Reports\Phase 4\Figures\ Main Report\Figure B.10.mxd | | |



ANNEX

Annex BA
Pumping records for IDB Areas

BA1. Pumping data for the Lower Ouse IDB

Note that the pumping rates shown on the tables below assume that the pumps are 100% efficient

| Marsh Pumping Station - Barmby-on-the-Marsh | | |
|---|-------------------------------|--------------------------|
| 2 No. Pumps 4,500 Gallons/min/per pump = 341 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 884 | 1085.1 |
| 1994 - 1995 | 814 | 999.1 |
| 1995 - 1996 | 299 | 367.0 |
| 1996 - 1997 | 552 | 677.5 |
| 1997 - 1998 | 612 | 751.2 |
| 1998 - 1999 | 658 | 807.7 |
| 1999 - 2000 | 617 | 757.3 |
| 2000 - 2001 | 1,244 | 1526.9 |
| 2001 - 2002 | 515 | 632.1 |
| 2002 - 2003 | 965 | 1184.5 |

| Lowfield Pumping Station - Barmby | | |
|---|-------------------------------|--------------------------|
| 2 No. Pumps 4,500 Gallons/min/per pump = 341 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 582 | 714.4 |
| 1994 - 1995 | 572 | 702.1 |
| 1995 - 1996 | 59 | 72.4 |
| 1996 - 1997 | 63 | 77.3 |
| 1997 - 1998 | 223 | 273.7 |
| 1998 - 1999 | 421 | 516.8 |
| 1999 - 2000 | 329 | 403.8 |
| 2000 - 2001 | 1,004 | 1232.4 |
| 2001 - 2002 | 243 | 298.3 |
| 2002 - 2003 | 450 | 552.4 |

| Loftsome Bridge Pumping Station - Loftsome Bridge | | |
|--|-------------------------------|--------------------------|
| 2 No. Pumps 5,500 Gallons/min/per pump = 417 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 1,337 | 2,005.8 |
| 1994 - 1995 | 1,119 | 1,678.7 |
| 1995 - 1996 | 105 | 157.5 |
| 1996 - 1997 | 78 | 117.0 |
| 1997 - 1998 | 583 | 874.6 |
| 1998 - 1999 | 801 | 1,201.7 |
| 1999 - 2000 | 826 | 1,239.2 |
| 2000 - 2001 | 2,507 | 3,761.0 |
| 2001 - 2002 | 731 | 1,096.7 |
| 2002 - 2003 | 1,221 | 1,831.8 |

| Yokefleet Pumping Station - Yokefleet | | |
|---|-------------------------------|--------------------------|
| 2 No. Pumps 7,000 Gallons/min/per pump = 530 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 778 | 1,485.5 |
| 1994 - 1995 | 744 | 1,420.6 |
| 1995 - 1996 | 217 | 414.3 |
| 1996 - 1997 | 183 | 349.4 |
| 1997 - 1998 | 597 | 1,139.9 |
| 1998 - 1999 | 827 | 1,579.0 |
| 1999 - 2000 | 752 | 1,435.8 |
| 2000 - 2001 | 1,829 | 3,492.2 |
| 2001 - 2002 | 806 | 1,538.9 |
| 2002 - 2003 | 1,203 | 2,297.0 |

| Knedlington Pumping station - Knedlington | | |
|---|-------------------------------|--------------------------|
| 2 No. Pumps 3,000 Gallons/min/per pump = 227 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 943 | 771.7 |
| 1994 - 1995 | 965 | 789.7 |
| 1995 - 1996 | 191 | 156.3 |
| 1996 - 1997 | 170 | 139.1 |
| 1997 - 1998 | 680 | 556.4 |
| 1998 - 1999 | 590 | 482.8 |
| 1999 - 2000 | 675 | 552.4 |
| 2000 - 2001 | 1,514 | 1,238.9 |
| 2001 - 2002 | 370 | 302.8 |
| 2002 - 2003 | 1,034 | 846.1 |

| Howdendyke Pumping Station - Howdendyke | | |
|---|-------------------------------|--------------------------|
| 2 No. Pumps 2,500 Gallons/min/per pump = 189 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 224 | 152.7 |
| 1994 - 1995 | 208 | 141.8 |
| 1995 - 1996 | 16 | 10.9 |
| 1996 - 1997 | 22 | 15.0 |
| 1997 - 1998 | 110 | 75.0 |
| 1998 - 1999 | 157 | 107.1 |
| 1999 - 2000 | 134 | 91.4 |
| 2000 - 2001 | 516 | 351.9 |
| 2001 - 2002 | 62 | 42.3 |
| 2002 - 2003 | 211 | 143.9 |

| North Howden Pumping Station - Howden | | |
|---|-------------------------------|--------------------------|
| 2 No. Pumps 5,000 Gallons/min/per pump = 379 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 1,025 | 1397.9 |
| 1994 - 1995 | 842 | 1148.3 |
| 1995 - 1996 | 231 | 315.0 |
| 1996 - 1997 | 189 | 257.8 |
| 1997 - 1998 | 394 | 537.3 |
| 1998 - 1999 | 991 | 1351.6 |
| 1999 - 2000 | 831 | 1133.3 |
| 2000 - 2001 | 2,272 | 3098.6 |
| 2001 - 2002 | 889 | 1212.4 |
| 2002 - 2003 | 1,224 | 1669.3 |

| Near Drain Pumping Station - Skelton | | |
|---|-------------------------------|--------------------------|
| 4 No. Pumps 7,260 Gallons/min/per pump = 550 l/s | | |
| Year | Total Duration (Hours) | Water Pumped (MI) |
| 1993 - 1994 | 1,822 | 3,608.1 |
| 1994 - 1995 | 2,312 | 4,578.4 |
| 1995 - 1996 | 136 | 269.3 |
| 1996 - 1997 | 180 | 356.4 |
| 1997 - 1998 | 720 | 1,425.8 |
| 1998 - 1999 | 1,135 | 2,247.6 |
| 1999 - 2000 | 1,787 | 3,538.8 |
| 2000 - 2001 | 3,840 | 7,604.3 |
| 2001 - 2002 | 1,340 | 2,653.6 |
| 2002 - 2003 | 2,210 | 4,376.4 |

BA.2. Pumping data for the Selby IDB

| Mearly Clough Pumping Station | | |
|--------------------------------------|---------------------|--------------------|
| 2 No. Pumps at = 378 l/s | | |
| Year | Pump 1 (hrs) | Pump 2(hrs) |
| 1993 | 254.8 | 644 |
| 1994 | 381.9 | 510 |
| 1995 | 238.7 | 553 |
| 1996 | 79.4 | 257 |
| 1997 | | |
| 1998 | | |
| 1999 | | |
| 2000 | 1,201 | 917 |
| 2001 | 519.8 | 622 |
| 2002 | 722.7 | 509 |
| 2003 | 314.9 | 350.3 |

| Hirst Marsh Pumping Station | | |
|------------------------------------|---------------------|--------------------|
| 2 No. Pumps at = 130 l/s | | |
| Year | Pump 1 (hrs) | Pump 2(hrs) |
| 1993 | 372.61 | 34 |
| 1994 | 123.68 | 304 |
| 1995 | 647.13 | 808 |
| 1996 | 155.47 | 282 |
| 1997 | 81.57 | 260 |
| 1998 | 337.46 | 176 |
| 1999 | 208.92 | 241 |
| 2000 | 696 | 231 |
| 2001 | 219.76 | 271 |
| 2002 | 307.84 | 160 |
| 2003 | 181.58 | 68.6 |

| Lendall 2 Pumping Station | | |
|----------------------------------|---------------------|--------------------|
| 2 No. Pumps at = 643 l/s | | |
| Year | Pump 1 (hrs) | Pump 2(hrs) |
| 1993 | 727.8 | 445 |
| 1994 | 490 | 370 |
| 1995 | 463.6 | 33 |
| 1996 | 117.7 | 246 |
| 1997 | | |
| 1998 | | |
| 1999 | | |
| 2000 | | |
| 2001 | 288.6 | 653 |
| 2002 | 294.9 | 396 |
| 2003 | 248.6 | 129.7 |

| Lendall 1 Pumping Station | | | |
|----------------------------------|---------------------|--------------------|---------------------|
| 2 No. Pumps at = 643 l/s | | | |
| Year | Pump 1 (hrs) | Pump 2(hrs) | Pump 3 (hrs) |
| 1993 | 21 | 0 | 149.8 |
| 1994 | 181.5 | 323 | 28 |
| 1995 | 122.7 | 297 | 246.9 |
| 1996 | 256.5 | 61 | 52.1 |
| 1997 | 205.3 | 40 | 31.6 |
| 1998 | 84.2 | 369 | 284.6 |
| 1999 | | | |
| 2000 | | | |
| 2001 | | | |
| 2002 | 300.8 | 80 | 478.6 |
| 2003 | 186.7 | 31.8 | 241.6 |