## **LIST OF TABLES**

Table 3-1 - Summary of rainfall-runoff methods.  10 Table 3-2 - Design storm standard for various facilities. 11 Table 3-3 - Priorities and time of concentration multipliers used to determine design storm durations. 11 Table 3-5 - Recommended IDF table for use in DMAT. 12 Table 3-5 - Recommended IDF equations for use in DMAT. 13 Table 3-6 - Typical Urban Run-Off Coefficients. 14 Table 3-7 - Typical Rural Run-Off Coefficients. 15 Table 3-7 - Typical Rural Run-Off Coefficients. 16 Table 3-9 - Curve numbers for hydrological soil groups. 17 Table 3-9 - Curve numbers for hydrological soil groups and cover complexes. 18 Table 4-9 - Curve numbers for hydrological soil groups and cover complexes. 19 Table 4-1 - Roughness Coefficients. 20 Table 4-2 - Approved Pipe Materials for Gravity Pipelines. 21 Table 4-3 - Use of Inlets and Catchbasins. 23 Table 4-4 - Manhole Cover Levels. 23 Table 4-5 - Tide Levels. 24 Table 4-5 - Tide Levels. 25 Table 4-5 - Tide Levels. 26 Table 4-5 - Tide Levels. 27 Table 5-1 - Typical Soil Permeability. 28 Table 5-1 - Typical Soil Permeability. 29 Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels. 34 Table 5-3 - Phases of Subsurface Drainage Project Design. 35 Table 5-4 - Reconnaissance Data. 36 Table 5-5 - Soil Properties and Pipe Spacing. 36 Table 5-6 - Approved Drainage Pipe parameters. 37 Table 5-7 - Design Criteria for Gravel Envelopes. 38 Table 5-7 - Design Criteria for Gravel Envelopes. 39 Table 5-9 - Other Well Design Considerations. 39 Table 6-9 - Other Well Design Considerations. 30 Table 6-9 - Methods of Flow Measurement. 31 Table 6-1 - Pumping Main Design Considerations. 32 Table 6-3 - Societ Flow Measurement. 33 Table 6-4 - Pischarge Line Design Considerations. 34 Table 6-7 - Pump Protection Measures: 35 Table 6-7 - Pump Protection Measures: 36 Table 6-7 - Well Design Consideration	Table 2-1 – Design Life	5
Table 3-3 - Priorities and time of concentration multipliers used to determine design storm durations 11 Table 3-4 - Recommended IDF table for use in DMAT	Table 3-1 - Summary of rainfall-runoff methods	9
Table 3-4 - Recommended IDF table for use in DMAT         15           Table 3-5 - Recommended IDF equations for use in DMAT         15           Table 3-6 - Typical Urban Run-Off Coefficients.         17           Table 3-7 - Typical Rural Run-Off Coefficients.         18           Table 3-8 - Soil characteristics and hydrological soil groups         22           Table 3-9 - Curve numbers for hydrological soil groups and cover complexes         21           Table 4-1 - Roughness Coefficients         25           Table 4-2 - Approved Pipe Materials for Gravity Pipelines         33           Table 4-2 - Approved Pipe Materials for Gravity Pipelines         33           Table 4-4 - Manhole Cover Levels         33           Table 4-5 - Tide Levels         33           Table 4-5 - Tide Levels         33           Table 4-5 - Topical Soil Permeability         42           Table 5-1 - Typical Soil Permeability         42           Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundware Levels         43           Table 5-3 - Soil Properties and Pipe Spacing         43           Table 5-4 - Reconnaissance Data         44           Table 5-5 - Soil Properties and Pipe Spacing         44           Table 5-7 - Design Criteria for Gravel Envelopes         55           Table 5-7 - Design Criteria for Gravel Envelopes	Table 3-2 – Design storm standard for various facilities	10
Table 3-5 – Recommended IDF equations for use in DMAT Table 3-6 - Typical Urban Run-Off Coefficients	Table 3-3 – Priorities and time of concentration multipliers used to determine design storm durations	10
Table 3-6 - Typical Urban Run-Off Coefficients.         17           Table 3-7 - Typical Rural Run-Off Coefficients.         16           Table 3-8 - Soil characteristics and hydrological soil groups         22           Table 3-9 - Curve numbers for hydrological soil groups and cover complexes         21           Table 4-1 - Roughness Coefficients         25           Table 4-2 - Approved Pipe Materials for Gravity Pipelines         31           Table 4-3 - Use of Inlets and Catchbasins         33           Table 4-4 - Manhole Cover Levels         34           Table 4-5 - Tide Levels         36           Table 4-5 - Tide Levels         36           Table 4-5 - Tide Levels         36           Table 5-1 - Typical Soil Permeability         42           Table 5-1 - Typical Soil Permeability         42           Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels         43           Table 5-3 - Phases of Subsurface Drainage Project Design         43           Table 5-4 Reconnaissance Data         44           Table 5-5 - Soil Properties and Pipe Spacing         46           Table 5-6 - Approved Drainage Pipe parameters         46           Table 5-7 - Design Criteria for Gravel Envelopes         56           Table 5-8 - Well Screen Materials         55           Table 5-9 - Oth	Table 3-4 - Recommended IDF table for use in DMAT	15
Table 3-7 - Typical Rural Run-Off Coefficients         16           Table 3-8 - Soil characteristics and hydrological soil groups         20           Table 3-9 - Curve numbers for hydrological soil groups and cover complexes         21           Table 4-1 - Roughness Coefficients         25           Table 4-2 - Approved Pipe Materials for Gravity Pipelines         31           Table 4-3 - Use of Inlets and Catchbasins         33           Table 4-4 - Manhole Cover Levels         34           Table 4-5 - Tide Levels         35           Table 4-6 - Potential Hazards in a Storm Water Network         36           Table 5-1 - Typical Soil Permeability         42           Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels         43           Table 5-3 - Phases of Subsurface Drainage Project Design         44           Table 5-3 - Phases of Subsurface Drainage Project Design         44           Table 5-4 - Reconnaissance Data         44           Table 5-5 - Soil Properties and Pipe Spasing         46           Table 5-6 - Approved Drainage Pipe parameters         44           Table 5-6 - Approved Drainage Pipe parameters         44           Table 5-7 - Design Criteria for Gravel Envelopes         50           Table 5-9 - Other Well Design Considerations         56           Table 6-10 - Autonomous and Design	Table 3-5 – Recommended IDF equations for use in DMAT	15
Table 3-8 - Soil characteristics and hydrological soil groups         20           Table 3-9 - Curve numbers for hydrological soil groups and cover complexes         21           Table 4-1 - Roughness Coefficients         25           Table 4-2 - Approved Pipe Materials for Gravity Pipelines         33           Table 4-3 - Use of Inlets and Catchbasins         33           Table 4-5 - Tide Levels         34           Table 4-5 - Tide Levels         36           Table 4-6 - Potential Hazards in a Storm Water Network         36           Table 5-1 - Typical Soil Permeability         42           Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels         43           Table 5-3 - Phases of Subsurface Drainage Project Design         44           Table 5-4 - Reconnaissance Data         44           Table 5-5 - Soil Properties and Pipe Spacing         44           Table 5-6 - Approved Drainage Pipe parameters         46           Table 5-7 - Design Criteria for Gravel Envelopes         56           Table 5-8 - Well Screen Materials         56           Table 5-9 - Other Well Design Considerations         56           Table 6-10 - Autonomous and Design Factors Affecting Design Discharge Rates         57           Table 6-2 - Pump types and applications         56           Table 6-3 - Suction Piping Design Considerat	Table 3-6 - Typical Urban Run-Off Coefficients	17
Table 3-9 - Curve numbers for hydrological soil groups and cover complexes	Table 3-7 - Typical Rural Run-Off Coefficients	18
Table 4-1 - Roughness Coefficients	Table 3-8 - Soil characteristics and hydrological soil groups	20
Table 4-2 - Approved Pipe Materials for Gravity Pipelines       31         Table 4-3 - Use of Inlets and Catchbasins       32         Table 4-4 - Manhole Cover Levels       34         Table 4-5 - Tide Levels       36         Table 4-6 - Potential Hazards in a Storm Water Network       36         Table 5-1 - Typical Soil Permeability       42         Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels       42         Table 5-3 - Phases of Subsurface Drainage Project Design       45         Table 5-4 - Reconnaissance Data       44         Table 5-5 - Soil Properties and Pipe Spacing       45         Table 5-6 - Approved Drainage Pipe parameters       46         Table 5-7 - Design Criteria for Gravel Envelopes       56         Table 5-8 - Well Screen Materials       55         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 - Pump types and applications       55         Table 6-3 - Suction Piping Design Considerations       56         Table 6-4 - Discharge Line Design Considerations       66         Table 6-5 - Motor Control Centre Specification       66         Table	Table 3-9 - Curve numbers for hydrological soil groups and cover complexes	21
Table 4-3 - Use of Inlets and Catchbasins       33         Table 4-5 - Tide Levels       34         Table 4-5 - Tide Levels       36         Table 4-6 - Potential Hazards in a Storm Water Network       36         Table 5-1 - Typical Soil Permeability       42         Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels       43         Table 5-3 - Phases of Subsurface Drainage Project Design       44         Table 5-4 - Reconnaissance Data       44         Table 5-5 - Soil Properties and Pipe Spacing       44         Table 5-6 - Approved Drainage Pipe parameters       46         Table 5-7 - Design Criteria for Gravel Envelopes       55         Table 5-8 - Well Screen Materials       55         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       58         Table 6-2 - Pump types and applications       56         Table 6-3 - Suction Piping Design Considerations       56         Table 6-4 - Discharge Line Design Considerations       56         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       66         Table 6-7 - Lighting Design       <	Table 4-1 - Roughness Coefficients	29
Table 4-4 - Manhole Cover Levels       34         Table 4-5 - Tide Levels       36         Table 4-6 - Potential Hazards in a Storm Water Network       36         Table 5-1 - Typical Soil Permeability       42         Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels       43         Table 5-3 - Phases of Subsurface Drainage Project Design       43         Table 5-4 - Reconnaissance Data       44         Table 5-5 - Soil Properties and Pipe Spacing       46         Table 5-6 - Approved Drainage Pipe parameters       46         Table 5-7 - Design Criteria for Gravel Envelopes       50         Table 5-8 - Well Screen Materials       55         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 - Pump types and applications       56         Table 6-3 - Suction Piping Design Considerations       66         Table 6-4 - Discharge Line Design Considerations       66         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       66         Table 6-7 - Lighting Design       76         Table 6-8 - Level Sensor Application	Table 4-2 - Approved Pipe Materials for Gravity Pipelines	31
Table 4-5 - Tide Levels       36         Table 4-6 - Potential Hazards in a Storm Water Network       38         Table 5-1 - Typical Soil Permeability       42         Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels       43         Table 5-3 - Phases of Subsurface Drainage Project Design       45         Table 5-4 - Reconnaissance Data       44         Table 5-5 - Soil Properties and Pipe Spacing       44         Table 5-6 - Approved Drainage Pipe parameters       48         Table 5-7 - Design Criteria for Gravel Envelopes       50         Table 5-8 - Well Screen Materials       50         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 - Pump types and applications       56         Table 6-3 - Suction Piping Design Considerations       56         Table 6-4 - Discharge Line Design Considerations       66         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       66         Table 6-7 - Lighting Design       66         Table 6-9 - Methods of Flow Measurement       72         Table 6-1 - Pump Protection Measures </td <td></td> <td></td>		
Table 4-6 - Potential Hazards in a Storm Water Network		
Table 5-1 – Typical Soil Permeability       42         Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels       43         Table 5-3 – Phases of Subsurface Drainage Project Design       44         Table 5-4 – Reconnaissance Data       44         Table 5-5 – Soil Properties and Pipe Spacing       46         Table 5-6 - Approved Drainage Pipe parameters       46         Table 5-7 – Design Criteria for Gravel Envelopes       50         Table 5-8 – Well Screen Materials       55         Table 5-9 – Other Well Design Considerations       56         Table 5-10 – Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 – Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 – Pump types and applications       55         Table 6-3 - Suction Piping Design Considerations       56         Table 6-3 - Motor Specification       66         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       66         Table 6-7 - Lighting Design       66         Table 6-8 - Level Sensor Application       71         Table 6-9 - Methods of Flow Measurement       72         Table 6-12 - Minimum PLC and RTU Requirements       75         Table 7-2 - Hazen Williams C Coefficients for Types	Table 4-5 - Tide Levels	36
Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels       43         Table 5-3 - Phases of Subsurface Drainage Project Design       43         Table 5-4 - Reconnaissance Data       44         Table 5-5 - Soil Properties and Pipe Spacing       46         Table 5-6 - Approved Drainage Pipe parameters       48         Table 5-7 - Design Criteria for Gravel Envelopes       56         Table 5-8 - Well Screen Materials       55         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 - Pump types and applications       55         Table 6-3 - Suction Piping Design Considerations       63         Table 6-4 - Discharge Line Design Considerations       63         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       66         Table 6-7 - Lighting Design       66         Table 6-8 - Level Sensor Application       71         Table 6-9 - Methods of Flow Measurement       72         Table 6-9 - Hothods of Flow Measurement       72         Table 6-12 - Minimum PLC and RTU Requirements       75         Table 7-1 - Pumping Main Design		
Table 5-3 – Phases of Subsurface Drainage Project Design       43         Table 5-4 – Reconnaissance Data       44         Table 5-5 – Soil Properties and Pipe Spacing       46         Table 5-6 - Approved Drainage Pipe parameters       46         Table 5-7 – Design Criteria for Gravel Envelopes       56         Table 5-8 – Well Screen Materials       55         Table 5-9 – Other Well Design Considerations       56         Table 5-10 – Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 – Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 – Pump types and applications       55         Table 6-3 - Suction Piping Design Considerations       56         Table 6-4 – Discharge Line Design Considerations       66         Table 6-5 – Motor Specification       66         Table 6-5 – Motor Specification       66         Table 6-7 – Lighting Design       68         Table 6-8 – Level Sensor Application       68         Table 6-9 – Methods of Flow Measurement       72         Table 6-9 – Methods of Flow Measurement       72         Table 6-11 – Pump Protection Measures:       75         Table 7-2 – Hazen Williams C Coefficients for Types of Pipe       75         Table 7-3 – K <sub>a</sub> Coefficients for velocity of flow       86 <td></td> <td></td>		
Table 5-4 – Reconnaissance Data       44         Table 5-5 – Soil Properties and Pipe Spacing       46         Table 5-6 - Approved Drainage Pipe parameters       48         Table 5-7 – Design Criteria for Gravel Envelopes       56         Table 5-8 – Well Screen Materials       55         Table 5-9 – Other Well Design Considerations       56         Table 5-10 – Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 – Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 – Pump types and applications       55         Table 6-3 - Suction Piping Design Considerations       63         Table 6-4 – Discharge Line Design Considerations       64         Table 6-5 – Motor Specification       66         Table 6-6 – Motor Control Centre Specification       66         Table 6-7 – Lighting Design       65         Table 6-8 - Level Sensor Application       71         Table 6-9 – Methods of Flow Measurement       72         Table 6-11 – Pump Protection Measures:       74         Table 6-12 – Hazen Williams C Coefficients for Types of Pipe       75         Table 7-2 – Hazen Williams C Coefficients for Types of Pipe       75         Table 7-3 – K <sub>s</sub> Coefficients for velocity of flow       80         Table 7-5 – Minimum Thrust Safety Factors<	Table 5-2 - Guideline Depths of Infrastructure and Minimum Groundwater Levels	43
Table 5-5 - Soil Properties and Pipe Spacing       46         Table 5-6 - Approved Drainage Pipe parameters       48         Table 5-7 - Design Criteria for Gravel Envelopes       50         Table 5-8 - Well Screen Materials       55         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       55         Table 6-2 - Pump types and applications       55         Table 6-3 - Suction Piping Design Considerations       63         Table 6-4 - Discharge Line Design Considerations       62         Table 6-5 - Motor Specification       64         Table 6-6 - Motor Control Centre Specification       65         Table 6-7 - Lighting Design       65         Table 6-8 - Level Sensor Application       65         Table 6-9 - Methods of Flow Measurement       71         Table 6-1 - Pump Protection Measures:       74         Table 6-1 - Pumping Main Design Factors       75         Table 7-1 - Pumping Main Design Factors       75         Table 7-2 - Hazen Williams C Coefficients for Types of Pipe       75         Table 7-3 - K <sub>s</sub> Coefficients for velocity of flow       80         Table 7-4 - Minimum Thrust Safety Factors <td< td=""><td>Table 5-3 – Phases of Subsurface Drainage Project Design</td><td>43</td></td<>	Table 5-3 – Phases of Subsurface Drainage Project Design	43
Table 5-6 - Approved Drainage Pipe parameters       48         Table 5-7 - Design Criteria for Gravel Envelopes       50         Table 5-8 - Well Screen Materials       55         Table 5-9 - Other Well Design Considerations       56         Table 5-10 - Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 - Commonly used types of pumping stations in DMAT jurisdiction       58         Table 6-2 - Pump types and applications       59         Table 6-3 - Suction Piping Design Considerations       63         Table 6-4 - Discharge Line Design Considerations       64         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       66         Table 6-7 - Lighting Design       68         Table 6-8 - Level Sensor Application       71         Table 6-9 - Methods of Flow Measurement       72         Table 6-9 - Methods of Flow Measurement       72         Table 6-12 - Minimum PLC and RTU Requirements       75         Table 7-1 - Pumping Main Design Factors       77         Table 7-2 - Hazen Williams C Coefficients for Types of Pipe       78         Table 7-3 - K <sub>s</sub> Coefficients for velocity of flow       80         Table 7-5 - Minimum Thrust Safety Factors       81         Table 7-6 - Manual vs Power Operated Valves		
Table 5-7 – Design Criteria for Gravel Envelopes       50         Table 5-8 – Well Screen Materials       55         Table 5-9 – Other Well Design Considerations       56         Table 5-10 – Autonomous and Design Factors Affecting Design Discharge Rates       57         Table 6-1 – Commonly used types of pumping stations in DMAT jurisdiction       59         Table 6-2 – Pump types and applications       59         Table 6-3 – Suction Piping Design Considerations       62         Table 6-4 – Discharge Line Design Considerations       62         Table 6-5 – Motor Specification       64         Table 6-5 – Motor Specification       66         Table 6-6 – Motor Control Centre Specification       66         Table 6-7 – Lighting Design       68         Table 6-8 - Level Sensor Application       71         Table 6-9 – Methods of Flow Measurement       72         Table 6-9 – Methods of Flow Measurement       72         Table 6-12 – Minimum PLC and RTU Requirements       75         Table 7-1 – Pumping Main Design Factors       77         Table 7-2 – Hazen Williams C Coefficients for Types of Pipe       75         Table 7-3 – K <sub>8</sub> Coefficients for velocity of flow       80         Table 7-4 – K Values for Type of Fittings       81         Table 7-6 – Manual vs Power Operated Valves       84 <td>Table 5-5 – Soil Properties and Pipe Spacing</td> <td>46</td>	Table 5-5 – Soil Properties and Pipe Spacing	46
Table 5-8 – Well Screen Materials	Table 5-6 - Approved Drainage Pipe parameters	48
Table 5-9 – Other Well Design Considerations	Table 5-7 – Design Criteria for Gravel Envelopes	50
Table 5-10 – Autonomous and Design Factors Affecting Design Discharge Rates	Table 5-8 – Well Screen Materials	55
Table 6-1 – Commonly used types of pumping stations in DMAT jurisdiction	Table 5-9 – Other Well Design Considerations	56
Table 6-2 – Pump types and applications       .59         Table 6-3 - Suction Piping Design Considerations       .63         Table 6-4 – Discharge Line Design Considerations       .64         Table 6-5 – Motor Specification       .66         Table 6-6 – Motor Control Centre Specification       .68         Table 6-7 – Lighting Design       .69         Table 6-8 - Level Sensor Application       .71         Table 6-9 – Methods of Flow Measurement       .72         Table 6-11 – Pump Protection Measures:       .74         Table 6-12 – Minimum PLC and RTU Requirements       .75         Table 7-1 - Pumping Main Design Factors       .77         Table 7-2 – Hazen Williams C Coefficients for Types of Pipe       .79         Table 7-3 – K <sub>s</sub> Coefficients for velocity of flow       .80         Table 7-4 – K Values for Type of Fittings       .81         Table 7-5 – Minimum Thrust Safety Factors       .81         Table 7-6 – Manual vs Power Operated Valves       .84         Table 7-7 - Air Valve Nominal Sizes v Main (DN)       .85         Table 7-8 – Washout Nominal Sizes vs Main (DN)       .85	Table 5-10 – Autonomous and Design Factors Affecting Design Discharge Rates	57
Table 6-3 - Suction Piping Design Considerations       63         Table 6-4 - Discharge Line Design Considerations       64         Table 6-5 - Motor Specification       66         Table 6-6 - Motor Control Centre Specification       68         Table 6-7 - Lighting Design       69         Table 6-8 - Level Sensor Application       71         Table 6-9 - Methods of Flow Measurement       72         Table 6-11 - Pump Protection Measures:       74         Table 6-12 - Minimum PLC and RTU Requirements       75         Table 7-1 - Pumping Main Design Factors       77         Table 7-2 - Hazen Williams C Coefficients for Types of Pipe       79         Table 7-3 - K <sub>s</sub> Coefficients for velocity of flow       80         Table 7-4 - K Values for Type of Fittings       81         Table 7-5 - Minimum Thrust Safety Factors       81         Table 7-6 - Manual vs Power Operated Valves       84         Table 7-7 - Air Valve Nominal Sizes v Main (DN)       85         Table 7-8 - Washout Nominal Sizes vs Main (DN)       85		
Table 6-4 – Discharge Line Design Considerations       64         Table 6-5 – Motor Specification       66         Table 6-6 – Motor Control Centre Specification       68         Table 6-7 – Lighting Design       69         Table 6-8 - Level Sensor Application       71         Table 6-9 – Methods of Flow Measurement       72         Table 6-11 – Pump Protection Measures:       74         Table 6-12 – Minimum PLC and RTU Requirements       75         Table 7-1 - Pumping Main Design Factors       77         Table 7-2 – Hazen Williams C Coefficients for Types of Pipe       79         Table 7-3 – K <sub>s</sub> Coefficients for velocity of flow       80         Table 7-4 – K Values for Type of Fittings       81         Table 7-5 – Minimum Thrust Safety Factors       81         Table 7-6 – Manual vs Power Operated Valves       82         Table 7-7 - Air Valve Nominal Sizes v Main (DN)       85         Table 7-8 – Washout Nominal Sizes vs Main (DN)       85		
Table 6-5 – Motor Specification       66         Table 6-6 – Motor Control Centre Specification       68         Table 6-7 – Lighting Design       69         Table 6-8 - Level Sensor Application       71         Table 6-9 – Methods of Flow Measurement       72         Table 6-11 – Pump Protection Measures:       74         Table 6-12 – Minimum PLC and RTU Requirements       75         Table 7-1 - Pumping Main Design Factors       77         Table 7-2 – Hazen Williams C Coefficients for Types of Pipe       79         Table 7-3 – K <sub>s</sub> Coefficients for velocity of flow       80         Table 7-4 – K Values for Type of Fittings       81         Table 7-5 – Minimum Thrust Safety Factors       81         Table 7-6 – Manual vs Power Operated Valves       82         Table 7-7 - Air Valve Nominal Sizes v Main (DN)       85         Table 7-8 – Washout Nominal Sizes vs Main (DN)       85		
Table 6-6 – Motor Control Centre Specification68Table 6-7 – Lighting Design69Table 6-8 - Level Sensor Application71Table 6-9 – Methods of Flow Measurement72Table 6-11 – Pump Protection Measures:74Table 6-12 – Minimum PLC and RTU Requirements75Table 7-1 - Pumping Main Design Factors77Table 7-2 – Hazen Williams C Coefficients for Types of Pipe79Table 7-3 – Ks Coefficients for velocity of flow80Table 7-4 – K Values for Type of Fittings81Table 7-5 – Minimum Thrust Safety Factors81Table 7-6 – Manual vs Power Operated Valves84Table 7-7 - Air Valve Nominal Sizes v Main (DN)85Table 7-8 – Washout Nominal Sizes vs Main (DN)85	Table 6-4 – Discharge Line Design Considerations	64
Table 6-7 – Lighting Design	Table 6-5 – Motor Specification	66
Table 6-8 - Level Sensor Application	Table 6-6 – Motor Control Centre Specification	68
Table 6-9 – Methods of Flow Measurement	Table 6-7 – Lighting Design	69
Table 6-11 – Pump Protection Measures:		
Table 6-12 – Minimum PLC and RTU Requirements		
Table 7-1 - Pumping Main Design Factors	·	
Table 7-2 – Hazen Williams C Coefficients for Types of Pipe	·	
Table 7-3 –K <sub>s</sub> Coefficients for velocity of flow		
Table 7-4 – K Values for Type of Fittings	· · · · · · · · · · · · · · · · · · ·	
Table 7-5 – Minimum Thrust Safety Factors		
Table 7-6 – Manual vs Power Operated Valves	,, ,	
Table 7-7 - Air Valve Nominal Sizes v Main (DN)85 Table 7-8 – Washout Nominal Sizes vs Main (DN)85	·	
Table 7-8 – Washout Nominal Sizes vs Main (DN)85	·	
· ,	` ,	
Table 7-9 – Valve Chamber Design Criteria86	, ,	
	Table 7-9 – Valve Chamber Design Criteria	86