

Version 3.0

**ABU DHABI DISTRIBUTION COMPANY
AL AIN DISTRIBUTION COMPANY
ABU DHABI COMPANY FOR SERVICING REMOTE AREAS**

THE WATER DISTRIBUTION CODE

**Version 3.0
July 2010**

Approved by:

**The Regulation and Supervision Bureau for the Water, Wastewater
and Electricity Sector in the Emirate of Abu Dhabi**

THE WATER DISTRIBUTION CODE

PREFACE.....	2
CHAPTER 1 GLOSSARY AND DEFINITIONS.....	4
CHAPTER 2 WATER DISTRIBUTION GENERAL CONDITIONS.....	12
1. INTRODUCTION.....	12
2. SCOPE.....	12
3. UNFORESEEN CIRCUMSTANCES.....	12
4. THE WATER DISTRIBUTION CODE REVIEW PANEL.....	12
5. COMMUNICATION BETWEEN DISCOs AND USERS.....	13
6. MISCELLANEOUS.....	13
7. OWNERSHIP OF PLANT AND/OR APPARATUS.....	13
CHAPTER 3 WATER DISTRIBUTION PLANNING CODE.....	15
1. GENERAL INTRODUCTION.....	15
2. OBJECTIVE.....	16
3. SCOPE.....	16
4. PLANNING PROCEDURES AND DATA TRANSFER.....	16
<i>APPENDIX A - WATER PLANNING DATA.....</i>	<i>20</i>
<i>APPENDIX B - DISCO NETWORK DATA.....</i>	<i>21</i>
<i>APPENDIX C – TECHNICAL PARAMETERS AND DESIGN GUIDELNES.....</i>	<i>22</i>
<i>APPENDIX D – FIRE FIGHTING REQUIREMENTS.....</i>	<i>31</i>
1) Water Distribution System.....	31
2) Internal Firefighting & Suppression Systems.....	32
CHAPTER 4 WATER DISTRIBUTION CONNECTION CODE.....	33
1. GENERAL INTRODUCTION.....	33
2. OBJECTIVE.....	33
3. SCOPE.....	33
4. PROCEDURE.....	33
5. CONNECTION.....	33
6. TECHNICAL, DESIGN AND OPERATIONAL CRITERIA.....	34
7. SITE RELATED CONDITIONS.....	35
<i>APPENDIX A - PROCEDURE TO BE USED IN THE PREPARATION OF SITE</i> <i>RESPONSIBILITY SCHEDULES.....</i>	<i>39</i>
<i>APPENDIX B - NON-EXHAUSTIVE LIST OF APPARATUS TO BE INCLUDED ON</i> <i>OPERATION DIAGRAMS.....</i>	<i>42</i>
CHAPTER 5 WATER DISTRIBUTION OPERATING CODE.....	44
1. GENERAL INTRODUCTION.....	44
2. GENERAL SCOPE.....	44
3. DEMAND FORECASTS INCLUDING OUTAGE PLANNING.....	44
4. SAFETY CO-ORDINATION.....	46
5. WATER QUALITY.....	47
6. OPERATIONAL LIAISON.....	48
7. CONTINGENCY PLANNING AND PROCEDURES.....	50
8. START-UP AND SHUT-DOWN PROCEDURES.....	52
9. NUMBERING AND NOMENCLATURE OF PLANT.....	53
<i>APPENDIX A - TYPICAL CONTINGENCY PLAN.....</i>	<i>55</i>

PREFACE

The Water Distribution Code

The **Water Distribution Code** has been developed to reflect the organisation of the Abu Dhabi Water and Electricity Sector into the following Entities:

- a) Desalinated Water Producers
- b) The Abu Dhabi Water and Electricity Company (ADWEC), the single buyer and seller of Desalinated Water Producers capacity and output
- c) A Transmission Operating Company and a Scheduling and Despatch Company (**TRANSCO**)
- d) Distribution Companies, initially Abu Dhabi Distribution Company, Al Ain Distribution Company and Abu Dhabi Company For Servicing Remote Areas (**DISCOs**)
- e) The Abu Dhabi Company For Servicing Remote Areas is responsible for well-field production and some Desalinated Water Production.
- f) **Customers**

The Code is designed to allow operation of the Abu Dhabi **Water Distribution System** and provide controlled connection arrangements at the entry and exit points to the **Water Distribution System** between directly connected **Water Producers**, other Distribution Companies (other connected **DISCOs**) and **High Consumption Customers** respectively. In this Code, **Users** are defined as **Water Producers** connected directly to the **DISCO**, other connected **DISCOs** and **Customers** with high consumption levels.

The Water Distribution Code is divided into the following Chapters:

- 1. **Glossary and Definitions** that describe certain words and terms used in the Code;
- 2. **Water Distribution General Conditions** that describe provisions of general application and include requirements and arrangements not otherwise referred to in the Code including the role and constitution of **The Water Distribution Code Review Panel**;
- 3. A **Water Distribution Planning Code** which provides generally for the supply of water demand data by **Users** in order for **DISCOs** to undertake the planning and development of the **Water Distribution System**;
- 4. A **Water Distribution Connection Code** which describes the connection conditions criteria which must be complied with at

Connection Sites and by **Users** already connected to or seeking new or modified connections with the **Water Distribution System**;

5. A **Water Distribution Operating Code**, which is split into a number of sections. These principally deal with the forecasting of short and medium term water **Demand**, production requirements (for routine operation and outage planning), safety co-ordination, maintenance of water quality, operational liaison, contingency planning, start-up and shut-down of plant and numbering and nomenclature of plant and apparatus;

TRANSCO has produced a **Water Transmission Code**, approved by the Regulation and Supervision **Bureau** for the Water and Electricity Sector, which defines the technical aspects of the working relationship between **TRANSCO** and those connected to the **TRANSCO** Transmission System. **TRANSCO** also has a duty to manage and control **Scheduling** and **Despatch** of potable water to balance availability with **Demand** at strategic locations in the **Total System**.

The **Water Transmission Code** makes provision for abstraction of groundwater from well-fields to be included within the definition of a **Water Producer**. **Water Producers** are generally connected with the water transmission system and the transmission system in turn is connected with water distribution systems. In some cases **Water Producers** supply **DISCOs** direct. All **Customers** are supplied and billed by the **DISCOs**.

CHAPTER 1 GLOSSARY AND DEFINITIONS

In the **Water Distribution Code** the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the following meanings:

<u>ADWEC</u>	The Abu Dhabi Water and Electricity Company (ADWEC), the single buyer and seller of Desalinated Water Producers capacity and output
<u>Bureau</u>	The Regulation and Supervision Bureau for the Water and Electricity Sector.
<u>Completion Date</u>	Has the meaning set out in the Connection Agreement with each User .
<u>Connection Agreement</u>	An agreement setting out terms relating to a connection with the DISCO Distribution System (excluding any such agreement with TRANSCO).
<u>Connection Point</u>	A Water Distribution System connection or junction with a User System .
<u>Connection Site</u>	A DISCO Site or User Site
<u>Customer</u>	Any person who has an agreement with a DISCO for the provision of potable water.
<u>Customer Categories</u>	The categorisation of Customers into different bands based on their indicative water consumption and main purpose of use and tariff arrangements.
<u>Customer Water Rationing</u>	Reducing the availability of potable water to a User 's site, either on a reduced pressure or "time supply" band or disconnecting a Customer in a manner agreed between a DISCO and a User
<u>Demand</u>	The required potable water needed to meet Customer use, adjusted to take into account Water Demand Management policies, which may include water conservation, efficiencies of use and water leakage.
<u>Demand Control</u>	Any or all of the methods of achieving a Demand reduction.
<u>Despatch</u>	Issue by the Water Control Centre of instructions for pumping/storage plant to meet Demand within the Scheduling and Despatch Parameters as

referred to in the **Transmission Licence**.

Determinant

A **Water Quality** parameter which is the result of direct in-situ measurement or testing of a water sample. **Determinants** include test results for pH, Electrical Conductivity, Chlorine Residual, Hardness, Alkalinity, Chlorides and other substances.

Directly Connected Water Producers

Water Producers having a direct connection to the **Water Distribution System**.

DISCO

A holder of a **Distribution Licence**.

DISCO Site

Means a site owned (or occupied pursuant to a lease, licence or other agreement) by the **DISCO** in which there is a **Connection Point**.

Distribution Entry Point

A **Connection Point** at which a **Directly Connected Water Producer** or **TRANSCO** or **DISCO** is directly connected to a **DISCO** Distribution System through which water can enter the **DISCO's** system

Distribution Exit Point

A **Connection Point** at the exit from the **DISCO** **Distribution System**.

Distribution System

The system consisting (wholly or mainly) of water pipes and associated plant which are owned or operated by a **DISCO** and used for the distribution of potable water to the point of delivery to **Customers**, or other **Users**.

Flow Meter

A device used for measurement of water flow which is either read manually or recorded remotely.

Good Industry Practice

In relation to any undertaking and any circumstances, the exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances;

High Consumption Customer

A **Customer**, generally metered, whose demand is equal to or exceeds the stated amount of Paragraph 5 a) of Condition 27 of the **DISCOs** Licence such as commercial, retail, industrial and other special **Customers**. Also included in this category are other high consumption **Customers**, sometimes metered,

with a connection pipe > 50 mm diameter (or multiple connection pipes each more than 50 mm diameter).

Law

Law No 2 of 1998 Concerning the Regulation of the Water and Electricity Sector in the Emirate of Abu Dhabi

Licence

Any **Licence** granted to a **DISCO** or a **User**, under Article 82 of the **Law**.

Licence Standards

Those standards set out or referred to in Condition 254 of the Distribution License.

Low Consumption Customer

A **Customer** whose demand is beneath the stated amount of Paragraph 5a) of Condition 27 of the DISCOs Licence

Modification

Any actual or proposed replacement, renovation, modification, alteration or construction by or on behalf of a **User** or **DISCO** to either that **User's** Plant or Apparatus or **DISCO's** Plant or Apparatus, or the manner of its operation which has or may have a material effect on a **DISCO** or a **User**, at a particular **Connection Site**.

Network Data

The data to be provided by a **DISCO** to **Users** in accordance with the Water Distribution Planning Code, as listed in Appendix B to the Water Distribution Planning Code

Network Security Standard

A License Standard for planning and development of the water network which employs best practice planning tools and procedures to ensure that pipelines, pumping stations, and reservoirs have sufficient capacity to meet all reasonable demand with view to the risk of interruption and contingencies.

Operating Manuals

A manual that describes operation, maintenance needs and maintenance requirements for **Potable Water Plant** or Apparatus, for the purposes of maintaining secure day to day operation.

Operation Diagrams

Diagrams which are a schematic representation of the **Potable Water Plant** and the connections layout at a **Connection Site**.

Operational Planning

Planning through various timescales the matching of **Water Production** output with **Demand** together

with a reserve of production capacity to provide a margin, taking into account outages of certain **Water Production Units** or parts of the **TRANSCO Water Trunk Mains System** and of parts of **Water Distribution Systems** carried out to achieve, so far as possible, the standards of security set out in the **DISCO Licence**.

Potable Water Plant

A generic term that describes the plant used in raw water abstraction, water production, water treatment, transmission and distribution that may be both above and below ground.

Preface

The **Preface** to the **Water Distribution Code** (which does not form part of the Code and therefore is not binding).

Pressure Transient

A rapid change (+ or -) in water pressure within a closed pipe network due to **Pump Start-Up** and **Shut-Down** and **Valve** operation.

Pump

Plant that mechanically raises water pressure within a closed pipe network for the purposes of producing water flow along the pipe.

Pumping Head

The variable pressure, generally referred to in metres of water, which is exerted on the pipe work and pumping plant by operation of that pumping plant. The operating pressures vary throughout the **Water Trunk Mains System** or **Distribution System**.

Record Drawings

Sections and plans (usually to different scales) of a **User's Potable Water Plant** that describe in detail the above and below ground installation after construction.

Responsible Engineer/Operator

A person nominated by a **User** to be responsible for **System** control.

Responsible Manager

A manager who has been duly authorised by a **User** or **DISCO** to sign **Site Responsibility Schedules** on behalf of that **User** or **DISCO**.

Safety Co-ordinator

A person or persons nominated by a **DISCO** and each **User** to be responsible for the co-ordination of safety precautions at each **Connection Point** when work (which includes testing) is to be carried out on a system.

Safety Rules

The rules of a **DISCO** or a **User** that seek to ensure that persons working on plant to which the rules apply are safeguarded from hazards arising from the system.

Scheduling

The process of compiling and issuing a potable water schedule, as set out in Water Scheduling and Despatch Code of the **Transmission Code (Water)**.

Security Standard

A coordinated set of criteria and methodologies which Licensees shall use in the planning and development of their Water Distribution Systems.

Shut-Down

The condition of pumping plant when the motor is static and the system becomes depressurised over time once gravity equilibrium is achieved.

Site Common Drawings

Drawings prepared for each **Connection Site** which incorporate **Connection Site** pipe layout, pumping plant, local storage and associated apparatus.

Site Responsibility Schedule

A schedule containing the information and prepared on the basis of the provisions set out in the Water Distribution Connection Code.

Standby Generation

Standby power supply capability for **Potable Water Plant** (generally pumping stations remote from Power Stations) in case of power cuts.

Start-Up

The action of bringing pumping plant from Shutdown into operation.

Supply Regulations

Regulations issued by the Bureau pursuant to Article 62 of the **Law**.

Tariff Customer

A **Customer**, generally comprising domestic premises with a connection pipe less than 50 mm diameter (or multiple connection pipes each less than 50 mm diameter), usually metered and supplied on a tariff basis. **Tariff Customers** are not subject to this Code.

TRANSCO

The Abu Dhabi Transmission and Despatch Company, operating the **Water Trunk Mains System**, associated **Potable Water Plant** and undertaking central **Scheduling** and **Despatch** functions (at the **Water Control Centre**).

Transmission Code (Water)

The Code required under the terms of the **Transmission Licence** to be produced and

maintained by **TRANSCO**.

Transmission Licence

The **Licence** granted to **TRANSCO** under Article 82 of the **Law**.

User

A term utilised in various sections of the **Water Distribution Code** to refer to the persons connected to the **DISCO Water Distribution System**, as more particularly identified in each section of the Code concerned.

User Development

User Potable Water Plant and/or Apparatus to be connected to the **DISCO Water Distribution System** or a **Modification** relating to a **User's Plant** and/or Apparatus already connected to the **DISCO Water Distribution System**.

User Site

A site owned (or occupied pursuant to a lease, **Licence** or other agreement) by a **User** in which there is a **Connection Point**. For the avoidance of doubt, a site owned by **DISCO** but occupied by a **User**, is a **User Site**.

Valve

Plant associated with pipe work within a pressurised system that control flows, expulsion of air and isolate sections of pipe.

Water Control Centre

A location used for **Scheduling** and **Despatch** of potable water to meet **Demand**.

Water Distribution Code

The Distribution Code that is required to be drawn up by each **DISCO** and approved by the **Bureau**, as from time to time revised with the approval of the **Bureau**.

Water Distribution Code Review Panel

The panel with the functions set out in the **Water Distribution General Conditions**

Water Demand Management

The strategic management and control of **Demand** for potable water that includes water conservation, recycling of water, water losses management and water rationing.

Water Distribution System

The network of **Potable Water Plant** operated by the **DISCO** as part of the system. For the purpose of this Code this shall not include meters installed for the purpose of measuring customer's consumption.

Water Planning Data

The water **Demand** data generally required by a **DISCO**. It is also the data which a **DISCO** requires

from a new **User** in an application for a **Connection Agreement**.

Water Producer

An entity producing potable water under a desalination **Licence** or from well-field abstractions

Water Quality

The quality of potable water defined by reference to minimum acceptable standards that relate to bacteria (hygienic quality), chemical composition, health related characteristics, aggressive effects, odour, taste and others as prescribed in the **Water Quality Regulations**.

Water Trunk Mains System

The network of trunk mains, pumping stations and associated **Potable Water Plant** that constitutes the water transmission system operated by **TRANSCO**.

Water Supply Regulations

Regulations issued by the Bureau under Article 62 of the Law.

Construction and Interpretation

In the **Water Distribution Code:**

- a) A table of contents, a **Preface** and headings are inserted for convenience only and shall be ignored in construing the **Water Distribution Code**;
- b) Unless otherwise required, all references to a particular paragraph, subparagraph, Appendix or Schedule shall be a reference to that paragraph, subparagraph Appendix or Schedule in or to that part of the **Water Distribution Code** in which the reference is made;
- c) Unless otherwise required, the singular shall include the plural and vice versa, references to any gender shall include all other genders and references to persons shall include any individual and any other entity, in each case whether or not having a separate legal personality;
- d) References to the words “include” or “including” are to be construed without limitation to the generality of the preceding words;
- e) Unless there is something in the subject matter or the context which is inconsistent, any reference to the **Law** or any Article of or Schedule to, or other provision of the **Law** shall be construed as including a reference to any **Modification**, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made under or deriving validity from the relevant **Law**;
- f) References to “in writing” or “written” include word processing, printing, fax and other modes of reproducing and transmitting words and text;
- g) Where the **Glossary and Definitions** refers to any word or term which is more particularly defined in a part of the **Water Distribution Code**, the definition in that part of the **Water Distribution Code**, will prevail over the definition in the **Glossary and Definitions** in the event of any inconsistency;
- h) A cross-reference to another document or part of **Water Distribution Code** shall not impose any additional, further or co-existent obligation or confer any additional, further or co-existent right in the part of the text where such cross-reference is contained; and
- i) Nothing in the **Water Distribution Code** is intended to or shall derogate from DISCO’s or User’s statutory or Licence obligations.

CHAPTER 2 WATER DISTRIBUTION GENERAL CONDITIONS

1. INTRODUCTION

The Water Distribution General Conditions (WDGC) contain provisions which are of general application to all provisions of the **Water Distribution Code**. Their objective is to ensure, to the extent possible, that the various sections of the **Water Distribution Code** work together and work in practice for the benefit of all **Users**.

2. SCOPE

The General Conditions apply to all **Users** including the relevant **DISCO**.

3. UNFORESEEN CIRCUMSTANCES

If circumstances arise which the provisions of the **Water Distribution Code** have not foreseen, the **DISCO** shall, to the extent reasonably practicable in the circumstances, consult promptly and in good faith all affected **Users** in an effort to reach agreement as to what should be done. If agreement between the **DISCO** and those **Users** as to what should be done cannot be reached in the time available, the **DISCO** shall determine what is to be done. Wherever the **DISCO** makes a determination, it shall do so having regard, wherever possible, to the views expressed by **Users** and, in any event, to what is reasonable in all the circumstances. Each **User** shall comply with all instructions given to it by the **DISCO** following such a determination provided that the instructions are consistent with the then current technical parameters of the particular **User's System** registered under the **Water Distribution Code**. The **DISCO** shall promptly refer all such unforeseen circumstances and any such determination to the Panel for consideration.

4. THE WATER DISTRIBUTION CODE REVIEW PANEL

The **DISCOs** shall jointly establish and maintain a single Panel, which shall be a standing body to carry out the functions referred to below.

The Panel shall:

- i) Keep the **Water Distribution Code** and its working under review;
- ii) review all suggestions for amendments to the **Water Distribution Code** which the **Bureau** or any **User** may wish to submit to the **DISCOs** for consideration by the Panel from time to time;
- iii) Publish recommendations as to amendments to the **Water Distribution Code** that each **DISCO** or the Panel feels are necessary or desirable and the reasons for the recommendations;
- iv) Issue guidance in relation to the **Water Distribution Code** and its implementation, performance and interpretation when asked to do so by any **User**; and
- v) Consider what changes are necessary to the **Water Distribution Code** arising out of any unforeseen circumstances referred to it by each **DISCO**.

The Panel shall consist of:

- i) A Chairman and up to 3 members appointed by the **DISCOs**
- ii) A person appointed by the **Bureau**
- iii) A maximum of 1 person appointed on behalf of **Water Producers** directly connected to a **DISCO** system
- iv) A person appointed by the Abu Dhabi Water and Electricity Company, and the following members:
- v) A person appointed on behalf of **High Consumption Customers**
- vi) A person appointed on behalf of the **Low Consumption Customers**;

each of whom shall be appointed as set out below.

The Panel shall establish and comply at all times with its own rules and procedures relating to the conduct of its business, which shall be approved by the **Bureau**.

The **DISCO** shall consult in writing all **Users** and representatives of **Customers** who are liable to be materially affected in relation to all proposed amendments to the **Water Distribution Code** and shall submit all proposed amendments to the Panel for discussion prior to such consultation.

5. COMMUNICATION BETWEEN DISCOS AND USERS

Unless otherwise specified in the **Water Distribution Code**, the methods of operational communication and data transfer shall be agreed between the **DISCO** and **Users** from time to time.

6. MISCELLANEOUS

Data and notices to be submitted to the **DISCOs** under the **Water Distribution Code** (other than delivery of data which is the subject of a specific requirement of the **Water Distribution Code**) shall be delivered in writing either by hand, sent by registered pre-paid post, or communicated by telex or facsimile transfer.

Communications referred to above, shall be addressed to the **Responsible Manager** of either a **DISCO** or a **User** at the addresses previously notified to all parties.

7. OWNERSHIP OF PLANT AND/OR APPARATUS

References in the **Water Distribution Code** to Plant and/or Apparatus of a **User** include Plant and/or Apparatus used by or on behalf of a **User** under any agreement with a third party.

8. DUTY OF GOOD FAITH AND STANDARD OF CONDUCT

Each party to the Code shall at all times in its dealings with the other parties to this Code:

- (a) Act in good faith;
- (b) Act in accordance with **Good Industry Practice**.

9. CODE RESPONSIBILITIES

The **Water Distribution Code** sets out procedures and principles governing the relationship between the **DISCO** and all **Users** of the **DISCO Water Distribution System** as required by the relevant sections of the **Water Distribution Code**.

CHAPTER 3 WATER DISTRIBUTION PLANNING CODE

1. GENERAL INTRODUCTION

The Water Distribution Planning Code (WDPC) specifies the criteria and procedures to be applied by a **DISCO** in planning and development of the **DISCO Water Distribution System** and to be taken into account by **Users** in the planning and development of their own needs. It details information to be supplied by **Users** to a **DISCO**, and certain information to be made available by a **DISCO** to **Users**.

Development of the **DISCO Water Distribution System**, involving network expansion (including new Mains) and its reinforcement or extension, will arise for a number of reasons including, but not limited to:

- i) New development and therefore increased water **Demand** by **Users** already connected to a **DISCO Water Distribution System**;
- ii) Introduction of a new **Connection Site** or the Modification of an existing **Connection Site** between a **User** and a **DISCO Water Distribution System**;
- iii) Cumulative changes in both **Low Consumption Customer** and **High Consumption Customer** water use, improved **Customer** levels of service and security of **Customer** supply;
- iv) The cumulative effect of a number of such developments referred to above by one or more **Users**.

Accordingly, the expansion, reinforcement or extension of the **DISCO Water Distribution System** may involve work:

- i) At a **Customer** connection which is also a **Connection Site** where **User's** plant is connected to the **DISCO Water Distribution System**;
- ii) On distribution mains which join that **Connection Site** to the **DISCO Water Distribution Main System**;
- iii) On distribution mains at points remote from that **Connection Site**; or
- iv) At the interface between **DISCOs**

The time required for the planning and development of a **DISCO Water Distribution System** will depend on the type and extent of the necessary expansion, reinforcement and/or extension work. Other influences may include the need or otherwise for local planning consent, the associated possibility of the need for an independent planning determination and the degree of complexity in undertaking the new work while maintaining satisfactory security and quality of water supply on the existing **DISCO Water Distribution System**.

2. OBJECTIVE

The objectives of the WDPC are:

- i) To promote **DISCO/User** interaction in respect of any proposed water services development on the **User System** which may impact on the discharge capacity or the network layout of the **DISCO Water Distribution Main System**;
- ii) To formalise the exchange of information on water **Demand** and;
- iii) To provide sufficient information for a **User** to plan and develop his own system and assess connection opportunities.
- iv) To provide safe, reliable, and efficient water supply facilities by adopting planning standards.

3. SCOPE

The **Users** to whom the Water Distribution Planning Code (WDPC) apply are those who use or intend to use the **DISCO Water Distribution System**, as follows:

- i) **High Consumption Customers.**
- ii) Other connected **DISCO**
- iii) **Directly Connected Water Producers**

Low Consumption Customers will become bound by their own **Connection Agreement** on successful acceptance of their respective application to receive potable water supply and therefore are not **Users** under this Code.

4. PLANNING PROCEDURES AND DATA TRANSFER

4.1 General

The means by which **Users** and potential **Users** of a **DISCO Water Distribution System** are able to investigate connection to and use of the system comprises two distinct parts, namely:

- i) A planning statement, prepared by the **DISCO** which is available on request; and
- ii) An offer, in accordance with the **Licence**, by the **DISCO** to enter into a **Connection Agreement** for connection to the **DISCO Water Distribution System**.

4.2 Provision of Water Planning Data For Connection

4.2.1 Demand Data

This section of the WDPC specifies the information required from **Users**, other than **Directly Connected Water Producers**, by the **DISCO** in order to ensure adequate technical provision is made for new supplies or increases in the **Demands** of existing supplies. The information required is termed **Water Planning Data** and detailed in Appendix A.

At the time a **User** applies for a **Connection Agreement**, the **User** shall submit to the **DISCO**, the **Water Planning Data**.

Subsequent to receiving an offer and entering into a **Connection Agreement**, the **User** shall submit to the **DISCO** any changes to the **Water Planning Data** previously submitted. Similarly, updated **Water Planning Data**, including validated actual values and updated estimates for the future shall be submitted subsequent to a connection being made.

An existing **User** proposing a new **Connection Site** shall similarly provide data within the requirements of the WDPC.

4.2.2 Data Provided by Directly Connected Water Producers

The **Water Distribution System** that is developed by a **Directly Connected Water Producer** must be developed in conjunction with that of a **Directly Connected Water Producer**, in order to ensure compatibility between systems. **Directly Connected Water Producers** shall provide the **DISCO** with **Planning Data** that includes data on existing and proposed pump and pressure specifications and **Water Quality** equipment that supplies potable water to the **Water Distribution System**. The **Water Planning Data** shall be provided at the same time as the application and confirmed and updated on entering into a **Connection Agreement** and subsequent to the connection being made. Any subsequent changes shall also be advised to the **DISCO**.

4.3 Offer of Terms for Connection

The completed **User** application form for a **Connection Agreement** will include:

- i) A description of the new plant to be connected to the **Water Distribution System** or of the **Modification** relating to the **Users** plant already connected to the system;
- ii) The **Water Planning Data** as listed in Appendix A WDPC; and
- iii) The desired **Completion Date** of the proposed **User** Development.

The completed application form will be sent to the **DISCO**.

Any offer of a **Connection Agreement** made by the **DISCO**, must be accepted by the applicant **User** within the period stated in the offer, after which the offer automatically lapses. Acceptance of the offer renders the **DISCO** works relating to that **User Development**, reflected in the offer, committed and binds both parties to the terms of the offer. Within 28 days (or such longer period as the **DISCO** may agree in any particular case) of acceptance of the offer the **User** shall confirm the **Water Planning Data** pertaining to the **User Development**, as listed in Appendix A of WDPC.

Before entering into a **Connection Agreement** it will be necessary for the **DISCO** to be satisfied that the **Users** system at the boundary with the **Water Distribution System** will comply with all appropriate requirements of the **Water Distribution Code**.

The **User** installation shall comply with the principles contained in the **Supply Regulations**.

4.4 Planning Statement

On request the **DISCO** will prepare a statement detailing present and future distribution system network arrangements, capacities and any other restrictions that may limit water supplies. The statement will be prepared by the **DISCO** within 28 days after the date of receipt of the request or the date on which the **DISCO** receives agreement from the person making the request to pay any fee.

4.5 Information to be provided to Users

Where the **DISCO** has received from a **User** any information or **Demand** data, or where the **DISCO** proposes to make changes to the **Water Distribution System** which may impact upon the **User's** system, the **DISCO** shall notify the **User**, subject to any confidentiality provisions.

The **DISCO** will also make available to **Users** relevant details of its System. This is termed **DISCO Network Data** as referred to in Appendix B of the WDPC.

4.6 Network Security Standards

The **DISCO** shall take into consideration the following **Network Security Standards** in the planning and development of the **Water Distribution System**:

- 1- Network Capacity Planning Criteria as outlined in Clause 4.6.1 which set the general guidelines for the technical design criteria and performance requirements for the planning and development of the Water Distribution System.
- 2- Performing network risk analysis to the existing network and for major system developments to determine if the risk of interruptions is in accordance with the Security Standard risk criteria as defined in Clause 3 (planning tools) of Appendix B of the Planning Code.

- 3- Contingency planning and procedures as outlined in the Water Distribution Operation Code with emphasis on areas not meeting the Security Standard risk criteria.

4.6.1 Network Capacity Planning

This section sets out the technical design criteria guidelines and performance requirements for the Water Distribution Systems. Network Capacity Planning is divided into three parts: Technical Parameters and Design Guidelines, Sizing of distribution system main components and Planning Tools as set in Appendix C and for fire fighting requirements Appendix D of Chapter 3 (Water Distribution Planning Code).

4.7 Water Demand Management

Longer term and strategic management of water **Demand** and the application of relevant policies and strategies is not detailed in this Code but will be determined by the **Bureau**.

APPENDIX A - WATER PLANNING DATA

1. Demand Data

Water Planning Data (water **Demand** data) is required for new or modified connection applications from **Users**, for the **DISCO** to provide planning statements to **Users**. **Water Planning Data** shall be submitted in accordance with the WDPC.

This data shall include forecast or validated actual water **Demand** over at least the next three years. More particularly, the average daily water **Demand** during the week of maximum consumption in the year and the average annual daily consumption, both in MIG/D should be provided. The water planning data shall make due allowance for operational use of the system, system network efficiencies, losses within the system and where applicable, current **Demand Control** policies that may be in place.

MI/d is mega litres/day (10^6 litres/day)

Conversions: 1 MI/d = 41.67 m³/hour (cubic metres/hour)

1 MIG/D = 4.55 MI/d
(million imperial gallons per day)

The **DISCO** shall maintain a database of **Water Planning Data** of historic and three year forecast **Demand** data for **Users** and **Low Consumption Customers**. Such data shall be maintained on a network node by node basis.

2. Data to be Provided by Directly Connected Water Producers

The following data shall be provided:

- i) Existing and proposed capacities, flow rates and pressure variations;
- ii) Pump specifications;
- iii) Storage tank volumes including top and bottom water levels and usable storage;
- iv) Water Quality equipment.

APPENDIX B - DISCO NETWORK DATA

Both the **DISCO** and **Users** may need to undertake hydraulic analysis and in more complex cases, numerical modelling of the **Water Distribution System** in order to check the pipe network and pumping capacities that feed potable water to the **Water Distribution System**. **Users** may seek to confirm hydraulic feasibility in principle before an application is submitted to modify an existing connection or expand the system with a new connection. **Network Data** made available by **DISCO** for inspection will include the following;

- i) Network node data, normal range of operating pressures
- ii) Operating and design flow rates
- iii) Pipe materials, age (hence friction factor) and lengths
- iv) Variable head storage reservoir levels and storage volumes
- v) Pipe diameters
- vi) Pump type and characteristics (time switched, level controlled or pressure controlling)
- vii) Control valve settings/characteristics

The **DISCO** shall maintain a database of **Network Data** of the existing and planned **Water Distribution System**. **Network Data** shall incorporate all data as identified above, extending from the **Distribution Entry** to **Exit Points** and include connections to **High Consumption** and **Low Consumption Customers**.

The **DISCO** shall also maintain a database of all **Water Quality** monitoring, sampling and dosing points on the **Water Distribution System** and retain a register of **Water Quality** results data.

The **DISCO** shall also maintain data on any **Directly Connected Water Producers** that shall include existing and proposed pumping plant specifications and **Water Quality** treatment equipment.

APPENDIX C – TECHNICAL PARAMETERS AND DESIGN GUIDELNES

The following are the technical parameters and design guidelines used in sizing the distribution system main components.

i) Demand Criteria

Demand is the required potable water needed to meet **Customer** use, adjusted to take into account **Water Demand Management** policies, which may include water conservation efficiencies of use and water leakage. However other demand criteria are generally applied depending in the Water Distribution System planning application.

Table 1- Demand Criteria

The following provides the factors used in assigning the demand calculations	Abbreviation	Definition
Average Daily Demand	ADD	Total Yearly Demand / 365 days (calculated by averaging annual daily rate of consumption)
Peak Daily Demand	PDD	Maximum Demand in a single day in a relevant year (calculated by averaging the daily water demand during the week of maximum rate of consumption in the years or by using the Peak Daily Factors)
Peak Instantaneous Demand	PID	Maximum Hourly Demand in relevant year excluding fire flow

Table 2- Peak Daily Factors (PDF) used where customer storage is available

Peak Factors, PDF (range)		Peak Daily Demand (PDD)
1.25	1.5	PF x Average Daily Demand

Table 3- Peak Hourly Factors (PHF) without customer storage

Population	Peak Factors, PHF		Peak Hourly Demand (PID)¹
100,000 or more	Low	1.5	PF x Average Daily Demand
	High	2.0	
5,000 to 100,000	Low	2.0	PF x Average Daily Demand
	High	2.5	
Less than 5,000	Low	2.5	PF x Average Daily Demand
	High	3.0	

Table 4- Intermittent Water Supply – Permanent

Intermittent (6 to 18hrs)	1.5 to 2.5	PF x Average Daily Demand (permanent intermittent supply) ²
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ii) Water Pipe Velocities

The velocity in water distribution mains shall range between 0.3 m/s and 2.00 m/s depending on the pipeline size and material of construction. Ideally, distribution mains (generally less than 300mm diameter) shall be designed to achieve minimum pressure criteria in the distribution system in a hydraulically and economically efficient manner. However, under extreme conditions (e.g. fire flows in high fire risk areas) velocities up to 3 m/s are acceptable.

The velocities in the following table are applied for the design and operational purposes for the Cement Coated Ductile Iron (DI) pipelines;

¹ Peak Hourly Demand factors are applied in certain applications where varying daily demand requirements in pressurized systems and in the absence of grounds tanks.

² *In case of permanent intermittent water supply i.e. agricultural, the Management of the relevant DISCO shall confirm/approve the supply regime. The pipeline design shall be sized to meet the daily demand with due consideration to demand management.*

Table 5 - Min. /Max. Velocities (m/s)

	Pipelines Type	Minimum (operational) m/s	Maximum (Design/operational) m/s	Remarks
1	Distribution sub-mains	0.30	1.00	Design velocity vary for pipeline material other than Cement Coated DI pipes
2	Distribution mains	≥0.40	1.5	
3	Primary / Pressure Ring mains	≥0. 50	2.00	

ii) Water System Pressure

Water distribution system shall be sized to ensure that the minimum residual pressures at the customer connection boundary shall be generally not less than 12.5 meters head (1.25 bar) at all times for standard length of connections or sufficient to meet the supply to the roof tank of low-rise buildings.

The maximum static pressure at any point should not exceed water system design pressure at any point including the connection part to the customers which are generally ranging between 6.0 bar and 9.0 bar for Ductile Iron pipes with pressure nominal rating of 10.0 bar. The pipeline test pressure shall be 1.5 times the design pressure or as directed by the Distribution Company.

iv) Water Distribution System Pipelines**Table 6- Pipeline Categories**

	Pipeline Categories	Minimum mm	Maximum mm	Remarks
1	Distribution sub-main	100	150 (recommended)	Pipelines smaller than DN150mm may be used in locations where few consumer connections are required.
2	Distribution main	≥150	300	
3	Primary / Pressure Ring Pipeline(mains)	≥ 300	900 or higher	

The above table is applicable to Ductile Iron pipes; other pipeline material made of GRP, HDPE, Steel or UPVC may have different maximum sizing categories related to their technical characteristics.

v) Water Pumps Configuration

- a. A pump-group(s) in a pumping station shall have a combination of duty and standby pumps.
- b. Where more than one pump-group is installed in a pumping station, each pump-group shall have its own standby pump.
- c. The level of security shall be between 30% to 40% standby capacity provided at the pumping station. This is to maintain security of water supply in case of duty pump(s) failure (depending on the frequency of the failure) or in planned maintenance situations.
- d. The number of standby pumps required to be provided shall be in accordance with Table 1 shown below. However increased number of standby pumps must be justified by undertaken risk analysis to individual parts of the system to ascertain the optimum number of standby pumps. Increased numbers are also needed to be considered in the case where no alternative supplies is available in the event of frequent failures or to areas classified as critical i.e. hospitals, centres for the disabled, aged and sick and military.

Table 7- Standby Pumps Provision

Number of Duty Pumps	Number of Standby Pumps (standard) (33%)	Number of Standby Pumps (Increased) (43%)*
1	1	1
2	1	1
3	1	2
4	1	2
5	2	2
6	2	3
7	3	3
8	3	3

vi) Water Network Configuration

- a. The water distribution network shall be designed preferably as loop/ grid network without dead-ends.
- b. In locations where only single or few consumer connections, permanent blow-off arrangement is required.

- c. The water supply system shall be designed to provide two alternate sources to sectors and areas. Risk analysis shall be undertaken to assess the risk of supply interruptions in case of single feed lines or single source. In areas with few customers, single feed line pipeline may be considered.
- d. The fire hydrant location must be in accordance with to Fire Department requirements (Appendix D). However, each segment of pipe between cross-connections should have a hydrant to facilitate flushing and disinfection of pipeline particularly after repair works.
- e. District, area or zone metering shall be considered in the planning process for the purposes of leakage control and demand management.

vii) Water Distribution System Isolation Valves

The isolation valve layouts shall be arranged so as to minimize customer interruptions during the repair work at any section of the main Water Distribution System. Location of isolation valves under road pavements shall be avoided.

For mains within encasements, a stop valve shall be provided at each end of the encasement.

The system valve layout in the Water Distribution System shall have the following as a guideline:

- a. Three (3) numbers of isolation valves to be provided at all cross-connections of the distribution network.
- b. Two (2) numbers of valves to be provided at all the distribution points (Tees) except connection branches (tees), which shall have one (1) isolation valve.
- c. Each area or block shall have an isolation valve in order to make repairs or other works without affecting the adjacent areas.
- d. The isolating valves shall be located between 200 to 300m apart from each other in distribution network having high-density customers (Business, commercial and residential areas)

In a distribution network having wide-spaced customers, the isolating valves shall be located as per the following arrangements:

- a. To isolate maximum of 1,000metres of pipe length of distribution main.
- b. To isolate maximum of 2,000metres of pipe length of secondary main.
- c. To isolate maximum of 3,000metres of pipe length of primary / ring main.

Distribution network shall be designed and developed such as that no segment length shall require more than four (4) valves to isolate it.

Flow / pressure control valves may need to be installed in certain systems in accordance with system pressure management configuration in coordination with other parties.

viii) Stand-by Generators for Pump Stations

Standby generators (either fixed or mobile) shall be provided at sites where no alternative power supply is available (for example, through dual feeds) and where a risk assessment, as per the risk analysis has shown that service to customers is compromised.

ix) Sizing of Water Distribution System Main Components

All system components should be sized with due consideration to the **Demand** growth projections of the various demand categories (domestic, agricultural, industrial) and determine 24hour demand pattern for all the categories based on best engineering judgments.

a. Pump sizing

All Pumps including fixed speed and variable speed pumps must be capable of supplying output required (pressure and flows) to meet the level of service set by the local supply requirements. The pumps should be able to:

- i)** Deliver the maximum flows with the pressures required
- ii)** The duty pump(s) must have adequate capacity to satisfy the flow and pressure requirements of the water distribution system with view to pressure management.
- iii)** The standby pump(s) shall have the same capacity of the maximum size duty pump(s) to meet pumping rate, in case any of the duty pump/s is out of service.

b. Pipeline Sizing

- i)** Use engineering judgement to set out and size pipes along routes to serve future requirements.
- ii)** All water distribution pipelines shall be sized to deliver the Peak Daily Demands (PDD) whilst ensuring head loss not exceeding 3 m/km.

- iii) Primary mains shall be sized to deliver peak daily demand (PDD) at connection nodes and head loss not exceeding 5 m/km.
- iv) Special attention shall be given to the fire flow requirements.

c. Reservoir Sizing:

Service reservoirs shall be designed to serve mainly water storage for operational purposes and to balance downstream diurnal variations in demand with relatively constant rates of inflow mainly during high demand.

In addition to provide contingency storage in the event of a failure in transmission system or during maintenance outages. It also provides damping effect so that small fluctuations are not reflected in the Water Distribution System.

In considering the provision of Water Distribution System storage the following shall be taken into consideration:

- Volume should be calculated based on Average Daily Demand (ADD) including fire reserve and the volume of storage so calculated shall be usable and exclusive of any unusable top or bottom water storage.
- All water storage facilities should have a minimum of two tanks, or one storage tank with minimum of two section or more that can be isolated, at each location;
- The volume of storage tanks at Distribution pumping station acting as forwarding station to other pump stations and to the network should be based on the Average Daily Demand (ADD) including fire reserve in addition to 10% of the design output to the pump station.
- All reservoirs should have interconnecting arrangements.

3- Planning Tools

The planning tools should be used in the process for planning the Water distribution system.

i) Network Modelling

Network hydraulic analysis of the water distribution system shall be undertaken by DISCO to ensure that an adequate and secure water supply is available to all consumers connected to the system for all defined technical requirements.

The Network Hydraulic Model constructed shall be calibrated and updated in accordance with the international best practice. The procedure used for model construction and validation and the criteria applied for determining the adequacy of the model calibration shall be in accordance the Water Research Centre (WRC) Code of Practice of Network Modelling or similar validation standards.

ii) Asset Failure Data (Risk Analysis)

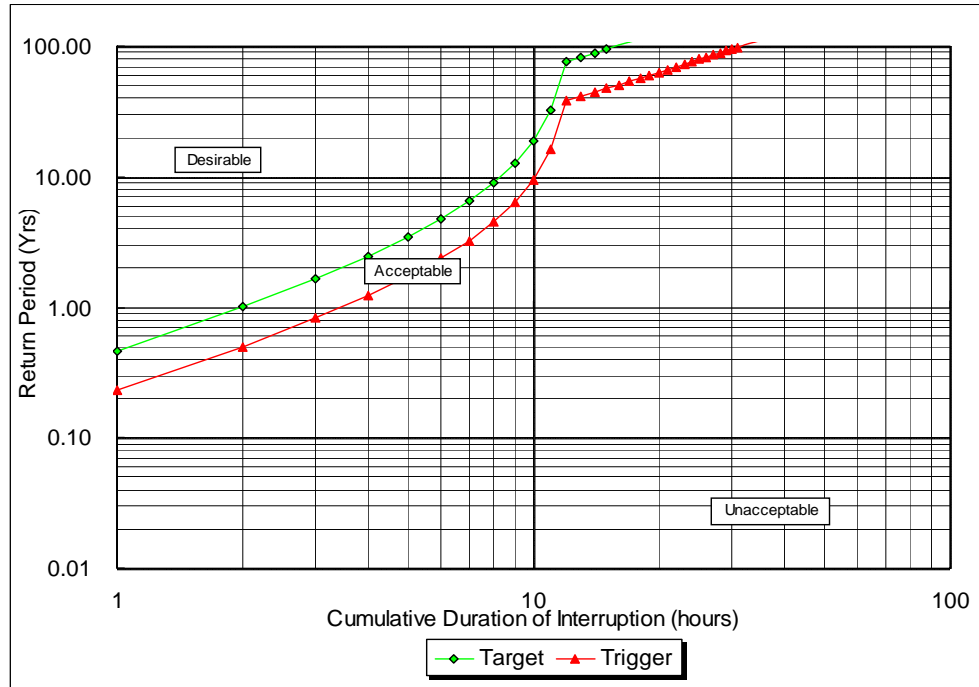
DSICO shall set up systems for recording asset failures and repair times to improve the quantity and quality of the data to support risk assessment analysis. The minimum data recording requirements are set out in following table.

Table 8: Asset Failure Data to Support Risk Analyses

Asset Type	Failure data	Attributes
Pipelines	Bursts	Date, diameter, material, location, failure type, response time, repair time
Power supplies	Power outages	Date, location, outage duration
Pumping stations	Pump outages	Date, location, asset reference (e.g. pump no. 1), asset type (e.g. pump motor), failure type (e.g. failed motor windings), failure mode (e.g. pump over-running and motor operating outside design parameters), response time, repair time

To facilitate cluster analysis (geographical analysis of failure hotspots) all asset failure data should have a geographical reference so that it can be displayed in Geographical Information System.

The representation of the risk analysis is provided by Return Period in the following Risk Criteria Figure: The reciprocal of probability is expressed in return period in years. Thus a probability represented by return period of 100 years is $1/100=0.01$



iii) Whole-life Costs

In considering alternative investment options for network and storage planning, DISCOs to demonstrate that its preferred options are the most economic through undertaking whole-life cost analyses.

Whole-life costs shall be used to determine planning horizons and the appropriate phasing of development, taking account of growth in demand and changing operating conditions. In addition to size mains in conjunction with their associated pumping stations to determine the most economical sizes.

Distribution Companies shall use the discount interest rate stipulated by the Bureau for whole-life costing.

APPENDIX D – FIRE FIGHTING REQUIREMENTS

1) WATER DISTRIBUTION SYSTEM

The design criteria of fire fighting requirements in water distribution systems in all new developments shall be connected to a water distribution system in accordance with the following:

Table 1 Water Distribution System – Minimum Fire Fighting Flow Requirements

Characteristic	Minimum
Residual Pressure	1.25 Bar (12.5m Head)
Fire flow	1800 l/min (2)
Network Supply Pipe Diameters	100 - 150 mm
Duration	120 minutes

NOTES

1) Residual pressure should be measured at the fire hydrant connection with simultaneous design fire flow discharge and Peak Daily Demand (PDD).

2) Supplementary fire flow may be required for high fire risk premises.

To determine if there is a need for supplementary fire flow (above and beyond the minimum network capacity outlined in Table 1), it will be necessary to assess the fire risk presented by their proposed land use, having regard for the proposed fire protection measures, and obtain approval from the Town Planning Department and formal instruction of the General Directorate of Civil Defence. The same residual pressure requirement is applicable where increased fire flows are deemed necessary.

Ground storage tanks requirements in premises shall be in accordance with the Water Supply Regulations. If additional water supplies are required by the General Directorate of Civil Defence, ground storage tanks should be provided either at the building plot or at a planned district level following the approval of the Distribution Company.

Location

The number and location of external fire hydrants is dependant on site planning, building design and the fire risk associated with the development land use. Hydrants are to be positioned along Civil Defence access routes and in no case should hydrants be located more than 150m apart where applicable. Their use should not render emergency access routes unusable and they should not be positioned in any location where access to the hydrant can be restricted. Hydrants should be clearly visible and marked with approved signage.

Specification

Hydrant specifications should be in accordance with the requirements of the Directorate of Civil Defence.

2) INTERNAL FIREFIGHTING & SUPPRESSION SYSTEMS

The following fire fighting & suppression systems should meet Town Planning Department requirements and those of the Directorate of Civil Defence:

- Fire Mains (Dry & Wet)
- Automatic Suppression Systems
- Fire Hose Reels

There may be a requirement to provide stored water capacity on site for these systems in addition to any supplementary water supplies provided to meet fire flow requirements for high risk premises.

CHAPTER 4 WATER DISTRIBUTION CONNECTION CODE

1. GENERAL INTRODUCTION

The Water Distribution Connection Code (WDCC) specifies the minimum technical, design and operational criteria which must be complied with by any **User** connected to or seeking connection with the **Water Distribution System**. The WDCC also specifies the minimum technical, design and operational criteria with which the **DISCO** will comply in relation to the part of the **Water Distribution System** at the **Connection Site**.

2. OBJECTIVE

The objective of the WDCC is to ensure that by specifying minimum technical, design and operational criteria, the basic rules for connection to the **Water Distribution System** are common for all **Users**. This will enable the **DISCO** to comply with its **Licence** obligations.

3. SCOPE

The **Users** to whom the Water Distribution Connection Code (WDCC) apply are as follows:

- i) **High Consumption Customers**;
- ii) Other connected **DISCOs**; and
- iii) **Directly Connected Water Producers**

Low Consumption Customers are bound by their own **Connection Agreements** and are not **Users** under this Code.

4. PROCEDURE

The **Connection Agreements** contain provisions relating to the procedure for connection to a **DISCO Water Distribution System** and include requirements relating to certain conditions to be complied with by **Users** prior to the **DISCO** notifying the **User** that the connection can become operational.

5. CONNECTION

The provisions relating to connection to the **Water Distribution System** are contained in each **Connection Agreement** and include provisions relating to the submission of information, reports relating to compliance with the relevant connection conditions for that **User**, **Safety Rules**, commissioning programmes, **Operation Diagrams** and approval to connect.

5.1 Requirements for Completion

Prior to the **Completion Date** in the **Connection Agreement**, the following should be submitted:

- i) The most up to date water planning data available, which prior to the **Completion Date** shall include the latest forecast, estimated or validated actual water **Demand**, as required by the WDPC Appendix A;
- ii) Copies of all **Safety Rules** and local safety instructions applicable at **Users' Sites** which will be used at the **DISCO /User** interface ;
- iii) Information to enable the **DISCO** to prepare **Site Responsibility Schedules** on the basis of the provisions set out in Appendix A to WDCC;
- iv) An **Operation Diagram** for all **Potable Water Plant** on the **User** side of the **Connection Point**;
- v) The proposed name of the **User Site** (which shall not be the same as, or confusingly similar to, the name of any **DISCO Site** or of any other **User Site**);
- vi) A list of **Safety Co-ordinators**;
- vii) The name and contact details for routine and emergency communications between the **DISCO** and the **User**.
- viii) The name of the manager who has been authorised to sign **Site Responsibility Schedules** on behalf of the **User**;
- ix) information to enable the **DISCO** to prepare **Site Common Drawings**;

6. TECHNICAL, DESIGN AND OPERATIONAL CRITERIA

6.1 DISCO Water Distribution System Characteristics

The **DISCO** shall ensure that its Distribution System complies with the following technical, design and operational criteria at the **Connection Site**.

6.1.1 Distribution Main Pressure Variations

Distribution main working pressures will vary depending on location within the pipe network and the pumping head required to transmit the flow rate needed. There is a requirement on each **DISCO** during valve operations, to control **Pressure Transients** to the extent that the effect on **User Potable Water Plant** will be minimised. At each **Connection Site** the **DISCO** will provide any potential **User** with flow and other relevant operating details.

6.1.2 Distribution Main Pipe Work

All new pipe work and connection arrangements will be installed to meet the **Licence Standards** as updated from time to time. All details of existing distribution main pipe work in situ including its location and material shall be available from the **DISCO**.

6.1.3 Water Quality

Water Quality throughout the **Water Distribution System** shall be the responsibility of the **DISCO** from system entry point to point of system exit point and will meet the minimum acceptable standards as based on World Health Organisation Standards. The minimum acceptable standards in use will be set and updated by the **Bureau in Water Quality Regulations**.

6.2 Plant Relating to a DISCO/User Connection Site

The following requirements apply to plant relating to a **DISCO/User Connection Point**, which each **User** and the **DISCO** must ensure are complied with in relation to their plant. Where appropriate the **DISCO** must ensure that the requirements are complied with in relation to its plant.

Connections between the **Water Distribution System** and **Users** will be consistent with the **Licence Standards** and other **Customer** connection standards applicable to **Users**.

All connections with the **Water Distribution System** shall be consistent with the **Supply Regulations** and designed to meet the **Licence Standards**, as updated from time to time. The main components of plant at the connection will be gate valves either side of the flow meter (available for continuous real time flow data monitoring and transfer). The most suitable locations in the distribution systems for sampling points and disinfection monitoring facilities will be determined by the respective **DISCOs**.

6.3 Communications

Where, for operational reasons, a **DISCO** decides that a means of routine and emergency communications between the **DISCO** and the **User** is required then the same shall be provided and maintained by the **DISCO**.

7. SITE RELATED CONDITIONS

In the absence of agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.

Unless otherwise specified, the boundary interface between the **DISCO** and the **User** will be on the underground connection pipe from the **Distribution Main** at entry into the **User** plot or premises. The **User** will generally be responsible for all the pipe work and plant downstream of the valve and flow meter chamber. The flow meter and associated plant will be the responsibility of the **DISCO**.

7.1 Access to DISCO Plant

Users will not be allowed in any circumstances to enter and work on any **Potable Water Plant** operated and owned by the **DISCO**. In emergency or other circumstances the **DISCO** may enter a **User's** site to work on the **DISCO** Plant adopting the **DISCO Safety Rules**, operating standards and technical specifications.

Where possible, at least seven days warning will be given by the **DISCO** to the **User** in respect of any work deemed necessary on the **User** premises to protect the **DISCO Potable Water Plant**.

7.1.1 Site Responsibility Schedules

In order to inform **DISCO** site operational staff and The **User** of agreed responsibilities and the **Safety Rules** applicable for plant at the operational interface, a **Site Responsibility Schedule** shall be produced by the **DISCO** with input from **Users**.

The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedules** are set down in Appendix A.

Each **Site Responsibility Schedule** shall include a reference to the **Safety Rules** which apply at each item of Plant.

7.1.2 Operation Diagram

An **Operation Diagram** shall be prepared for each **Connection Site** at which a **Connection Point** exists using graphical symbols as agreed between **DISCOs** and **Users**.

The **Operation Diagram** shall include all **Potable Water Plant** above and below ground in the vicinity of the connection, approximate site plot boundaries and information describing any **User's Potable Water Plant** on the site.

The **Operation Diagram** is intended to provide a diagrammatic but accurate record of pipes, valves and **Pump** interconnections, pump ratings and referencing of **Potable Water Plant**.

A non-exhaustive guide to the types of **Potable Water Plant** to be shown in the **Operation Diagram** is shown in Appendix B, together with certain basic principles to be followed.

Referencing (Numbering and Nomenclature) for **Potable Water Plant** will be in accordance with the procedures set down in the WDOC.

7.1.3 Preparation of Operation Diagrams for User Sites

In the case of a **User Site**, the **User** shall prepare and submit to the **DISCO** an **Operation Diagram** for all **Potable Water Plant** on the **User** side of the **Connection Point**. The **DISCO** shall provide the **User** with an **Operation Diagram** for all **Potable Water Plant** on the **DISCO** side of the **Connection Point**, in accordance with the **Connection Agreement**.

The **User** will then prepare, produce and distribute, using the information submitted on the **User Operation Diagram** and the **DISCO Operation Diagram**, a composite **Operation Diagram** for the complete **Connection Site**, also in accordance with the **Connection Agreement**.

7.1.4 Preparation of Operation Diagrams for DISCO Sites

In the case of a **DISCO Site**, the **User** shall prepare and submit to the **DISCO** an **Operation Diagram** for all **Potable Water Plant** on the **User** side of the **Connection Point**, in accordance with **Connection Agreement**.

The **DISCO** will then prepare, produce and distribute, using the information submitted on the **User's Operation Diagram**, a composite **Operation Diagram** for the complete **Connection Site**, also in accordance with the **Connection Agreement**.

7.1.5 Changes to Operation Diagrams

When a **DISCO** has decided that it wishes to install new **Potable Water Plant** (or it wishes to change the existing referencing, numbering and nomenclature) of its **Potable Water Plant** at a **DISCO Site**, the **DISCO** will, one month prior to the installation or change, send to each such **User** a revised **Operation Diagram** of that **DISCO Site**.

When a **User** has decided that it wishes to install new **Potable Water Plant**, or it wishes to change the existing referencing of its **Potable Water Plant** at one of its **Sites**, the **User** will one month prior to the installation or change, send to the **DISCO** a revised **Operation Diagram** of that **User Site**.

7.1.6 Validity

The composite **Operation Diagram** prepared by the **DISCO** or the **User**, will be the definitive **Operation Diagram** for all operational and planning activities associated with the **Connection Site**. If a dispute arises as to the accuracy of the composite **Operation Diagram**, a meeting shall be held at the **Connection Site**, as soon as reasonably practicable, between the **DISCO** and the **User**, to endeavor to resolve the matters in dispute.

7.2 Site Common Drawings

Site Common Drawings based where possible on **Record Drawings**, sufficient to show the layout will be prepared for each **Connection Site**. They will include **Connection Site** layout, pipe work layout, chambers, valves, meters and other equipment.

The **DISCO** will with information from the **User** prepare, produce and distribute, **Site Common Drawings** for the **Connection Site** in accordance with the **Connection Agreement**.

When a **User** becomes aware that it may be necessary to change any aspect of the **Site Common Drawings** at a **Connection Site** it will advise the **DISCO** of the changes proposed and the **DISCO** will prepare, produce and distribute, revised **Site Common Drawings**.

When the **DISCO** becomes aware that it is necessary to change any aspect of the **Site Common Drawings** at a **Connection Site** it will prepare, produce and distribute revised **Site Common Drawings**.

The **Site Common Drawings** for the **Connection Site** prepared by the **DISCO** will be the definitive **Site Common Drawings** for all operational and planning activities associated with the **Connection Site**. If a dispute arises as to the accuracy of the **Site Common Drawings**, a meeting shall be held between the **DISCO** and the **User**, to endeavour to resolve the matters in dispute.

7.2.1 Site Operational Procedures

The **DISCO** and **Users** where necessary, must make available staff to take necessary safety precautions and carry out operational duties as may be required to enable work/testing to be carried out and for the operation of plant connected to the Distribution System.

**APPENDIX A - PROCEDURE TO BE USED IN THE PREPARATION OF
SITE RESPONSIBILITY SCHEDULES**

1. PRINCIPLES

At all **Connection Sites** the following **Site Responsibility Schedules** shall be drawn up using the performa attached or with such variations as may be agreed between the **DISCO** and **Users**.

- i) Schedule of **Potable Water Plant**
- ii) Schedule of services and supplies; telecommunications measurement and sampling equipment.

Each **Site Responsibility Schedule** for a **Connection Site** shall be prepared by the **DISCO** in consultation with other **Users** at least 2 weeks prior to the **Completion Date** referred to in the **Connection Agreement**. Each **User** shall provide information to the **DISCO** to enable it to prepare the **Site Responsibility Schedule**. The Schedule shall be sent by the **DISCO** to the **User** for confirmation of accuracy.

Each **Site Responsibility Schedule** will be subdivided to take account of any separate **Connection Sites** for the same **User Site**.

Each **Site Responsibility Schedule** shall detail for each item of plant;

- i) Plant ownership;
- ii) Site Manager (Controller);
- iii) Applicable **Safety Rules** and **Safety Co-ordinator**, or such other person who is responsible for safety;
- iv) Operations (applicable Operational Procedures and control engineer).
- v) Responsibility to undertake maintenance and contact details.

The **Site Responsibility Schedule** for each **Connection Site** must include pipework emanating from the **Connection Site**.

Every page of each **Site Responsibility Schedule** shall bear the date of issue and the issue number.

The **Site Responsibility Schedule** shall be signed on behalf of the **DISCO** by the Manager responsible for the area in which the **Connection Site** is situated and on behalf of each **User** involved by its **Responsible Manager**.

A **DISCO** and **Users** must make the **Site Responsibility Schedules** readily available to their operational staff involved.

2. ALTERATIONS TO EXISTING SCHEDULES

When a **User** identified on a **Site Responsibility Schedule** becomes aware that an alteration is necessary, it must inform the **DISCO** prior to any change taking effect.

Where the **DISCO** has been informed of a change by a **User**, or itself proposes a change, it will prepare a revised **Site Responsibility Schedule** prior to the change taking effect.

When the **DISCO** or a **User** identified on a **Site Responsibility Schedule**, becomes aware that an alteration to the **Site Responsibility Schedule** is necessary urgently to reflect, for example, an emergency situation, the **User** shall notify the **DISCO**, or the **DISCO** shall notify the **User**, immediately and will discuss:

- i) Change(s) necessary to the **Site Responsibility Schedule**;
- ii) Whether the **Site Responsibility Schedule** is to be modified temporarily or permanently;
- iii) The distribution of the revised **Site Responsibility Schedule**.

The **DISCO** will prepare a revised **Site Responsibility Schedule** as soon as possible, and in any event within seven days of it being informed of or knowing the necessary alteration. The **Site Responsibility Schedule** will be confirmed by **Users** and signed on behalf of the **DISCO** and **Users** as soon as possible after it has been prepared and sent to **Users** for confirmation.

3. RESPONSIBLE MANAGERS

Each **User** shall, prior to the **Completion Date** under each **Connection Agreement**, supply to the **DISCO** a list of Managers who have been duly authorised to sign **Site Responsibility Schedules** on behalf of the **User** ("**Responsible Manager**"). The **DISCO** shall, prior to the **Completion Date** supply to that **User** the name of the Manager responsible for the area in which the **Connection Site** is situated.

ATTACHMENT TO APPENDIX A
PROFORMA FOR SITE RESPONSIBILITY SCHEDULE

COMPLEX: _____ AREA _____ SCHEDULE: _____
CONNECTION SITE: _____

APPENDIX B - NON-EXHAUSTIVE LIST OF APPARATUS TO BE INCLUDED ON OPERATION DIAGRAMS

1. BASIC PRINCIPLES

Where practicable, all the **Potable Water Plant** on any **Connection Site** shall be shown on one **Operation Diagram**. Provided the clarity of the diagram is not impaired, the layout shall represent as closely as possible the geographical arrangement on the **Connection Site**. It will not be necessary to produce the diagram to scale.

Where more than one **Operation Diagram** is unavoidable, duplication of identical information on more than one **Operation Diagram** must be avoided.

The **Operation Diagram** must show accurately the current status of the equipment; e.g. commissioned or decommissioned.

Provision will be made on the **Operation Diagram** for signifying approvals, together with provision for details of revisions and dates.

Operation Diagrams will be prepared in A4 format or such other format as may be agreed with the **DISCO**.

The **Operation Diagram** should normally show a pipe as a single line. Symbols for pumps, meters, chemical dosing points, chemical dosing equipment, surge vessels, storage facilities, valves, electrical supplies, telecommunication lines and SCADA equipment will be based on the abbreviations agreed by the **DISCO** and **Users**.

2. APPARATUS TO BE SHOWN ON OPERATION DIAGRAM

- i) Potable water mains and interconnections
- ii) Wash out pipe work
- iii) Storage tanks
- iv) All valves (showing method of operation i.e. manual or powered)
- v) Other pipe work fittings
- vi) Pumps including motors
- vii) Standby generation facilities
- viii) Flow meters
- ix) Chemical dosing points
- x) Chemical dosing equipment
- xi) Sampling/analyser points
- xii) Surge vessels

- xiii) Electrical supplies and Switchgear
- xiv) Telecommunications lines
- xv) Remote data transmitting units and SCADA interfaces

Locations of site boundaries, pipe sizes and other relevant information shall be shown on the diagram.

CHAPTER 5 WATER DISTRIBUTION OPERATING CODE

1. GENERAL INTRODUCTION

The **Water Distribution Operating Code (WDOC)** is concerned with forecasting short and medium-term water **Demand** for routine operation and outage planning, safety co-ordination, maintaining **Water Quality**, operational liaison, contingency planning and procedures, **Start-up** and **Shut-down** of plant and numbering and nomenclature of plant.

2. GENERAL SCOPE

This Code applies to the following **Users**:

- i) **High Consumption Customers**
- ii) Other connected **DISCOs**
- iii) **Directly Connected Water Producers**

3. DEMAND FORECASTS INCLUDING OUTAGE PLANNING.

3.1 Introduction

This section specifies procedures to be followed in forecasting **Demand** over periods between one year and one day in advance to accommodate operational requirements, and the procedures to be followed when programming outages of all **Potable Water Plant** for maintenance or repair.

The **Water Transmission Code** specifies the **TRANSCO** requirements for forecasting **Demand** for **Water Producers** subject to the **Scheduling** and **Despatch** process controlled from the **Water Control Centre**. Forecast availability of the **Directly Connected Water Producers** plant is subject to the **Scheduling** and **Despatch** process incorporated within the **Water Transmission Code**.

The **Water Distribution Code** specifies the forecasts required by all other **Users** of the **DISCO Distribution System** to the **DISCO** so these requirements can be met.

3.2 Objective

- i) To set out the requirements for **Users** to provide **Demand** data to the **DISCO** to enable it to fulfil its obligations under the **Licence**.
- ii) To enable the **DISCO** and **Users** to accommodate outages of all **Potable Water Plant** owned by a **DISCO** or **Users** for maintenance or repair whilst continuing, so far as possible, to meet **Demand**.

3.3 Procedures

3.3.1 Forecasts

Users connected to a **Water Distribution System** shall provide to a **DISCO** by week 39 each year, estimates of their average and peak daily water **Demand** for each week for a period of 52 weeks starting from the first week of the following year.

DISCOs shall, upon receipt of the above forecasts, prepare corresponding forecasts taking account of **Demands**, operational use and losses within the distribution system network and any **Demand Control** policies approved by the **Bureau**.

In preparing the above forecasts, **DISCOs** shall take account of the following factors:

- i) Forecasts received from **Customers** subject to this Code;
- ii) Historic trends and **Demand** patterns over yearly and weekly periods (including the effects of holidays) by **Customer Category**;
- iii) Projected growth in **Demands** from existing **Customers** by **Customer Category**;
- iv) Forecast **Demands** from new **Customers** by **Customer Category**;
- v) Forecasts **Demands** for all **Customers** not subject to this Code by **Customer Category**;
- vi) Initiatives by **DISCOs** to promote the efficient use of water.

Should **Users** connected to the **DISCO Water Distribution System** become aware of factors which would result in material changes to their forecasts, they shall provide updated forecasts to the **DISCO** without delay.

Upon provision of the relevant information and any further or additional or modified information to Transco in accordance with the requirements of the Water Transmission Code the Disco shall also provide a copy to ADWEC for information.

3.3.2 Outage Planning

Users other than **High Consumption Customers** shall provide to the **DISCO**, by weeks 13, 26, 39 and 52 each year, a detailed programme showing all planned outages of **Potable Water Plant** over the following 12 months.

Users other than **High Consumption Customers** shall give notice to the **DISCO**, at the earliest opportunity, of unplanned and forced outages of **Potable Water Plant**.

Should any **User** other than **High Consumption Customers** become aware of factors which would result in material changes to their outage programme, they shall provide updated programmes to the **DISCO** without delay.

The DISCO shall determine, in consultation with **Users**, planned availability of distribution mains and other operational plant to maximise the meeting of **Demand**.

Planned outages within distribution systems shall be co-ordinated to take account of this objective. The **DISCO** may ask a **User** to advance or defer planned outages where this is necessary to meet obligations under either the **Licence or the Code**.

Users shall not be required by the **DISCO** to defer an outage if this would result in risk of injury to persons, serious damage or deterioration to plant. The **DISCO** is obliged to take a reasonable view on the priority that may be attached to the need for outage maintenance and repair and must take due notice of a substantiated need identified by a **User**.

The **DISCO** shall give **Users** at least three months notice of planned outages of pipelines and operational plant which will affect water supplies to their connections.

The **DISCO** shall, where practicable, give notice to both **High Consumption** and **Low Consumption Customers** connected to a distribution system, of unplanned and forced outages of pipelines and operational plant where this outage could affect water supplies.

4. SAFETY CO-ORDINATION

4.1 Introduction

This Section specifies the standard procedures to be used by the **DISCO** and **Users** for the co-ordination of health and safety precautions to allow work to be carried out on a **DISCO Water Distribution System**.

This Section does not impose a particular set of health and **Safety Rules** on the **DISCO** and **Users**, although **Users** are able to agree the application of common health and safety procedures should that be of benefit.

This Section only applies to those **Users** designated by the **DISCO** as having systems of sufficient size and complexity to warrant application of the Procedure. This determination will be made by the **DISCO**.

4.2 Objective

The objective is to achieve safe working conditions when work on a system necessitates safety precautions on another connected system.

4.3 Procedure

The **DISCO** and **Users** shall, where the **DISCO** requires, exchange copies of health and safety procedures relating to their respective sides of the **Connection Point**.

The **DISCO** and **Users** shall, where the **DISCO** requires, have a nominated **Safety Co-ordinator** responsible for health and safety precautions on their system. The **DISCO** and **Users** shall notify each other of the identities of their respective **Safety Co-ordinators**.

If work is to be carried out on a **Potable Water Plant** which necessitates health and safety precautions on a connected system, the requesting **Safety Co-ordinator** shall contact the **Safety Co-ordinator** responsible for that system.

Records of requests for application and implementation of health and safety precautions shall be maintained by the **DISCO** and **Users**. The health and safety precautions to be taken shall be agreed between the **Safety Co-ordinators** concerned.

Implementation of the agreed health and safety precautions shall be confirmed by both the requesting and implementing **Safety Co-ordinators** before work on the system is begun. Should any health and safety precaution become ineffective, the relevant **Safety Co-ordinator** shall advise the other **Safety Co-ordinator** immediately.

The **DISCO** and **Users** shall maintain health and safety logs which shall contain a chronological record of all communications relating to health and safety sent or received in accordance with this section of the WDOC. The health and safety logs must be retained for a period of not less than one year.

5. WATER QUALITY

5.1 Introduction

This section covers matters relating to **Water Quality** monitoring sampling, analysis and control.

It is the responsibility of the **DISCO** to decide the location of monitoring and sampling points within the **Water Distribution System** that ensure compliance with the **Water Quality** standards required at **Customer** boundary interfaces.

5.2 Objective

To provide procedures for **Water Quality** monitoring, reporting and remedial action in the event that **Water Quality** falls below defined standards.

5.3 Water Quality Standards

Concentrations of health-related constituents are required to lie within the limits laid down in World Health Organisation (WHO) "Guidelines for Drinking-Water Quality". Aesthetic quality standards must also be consistent with WHO guidelines. The **Bureau** will be responsible for specifying and reviewing potable water quality standards and for administering independent sampling and testing audits.

5.4 Procedures for Monitoring and Reporting

The **DISCO** shall monitor the quality test, analysis and monitoring data of water at the **Distribution Entry Point** as provided by **TRANSCO** a **Water Producer** or other **DISCO**. The **DISCO** shall determine how best to comply with its **Water Quality** responsibilities at the **Customer** boundary interface and if the distribution network is such that sampling monitoring and dosing points are found to be necessary to manage this responsibility effectively, then these facilities must be installed.

Procedures to cover more serious and widespread water contamination are included in Section 7 of this chapter on Contingency Planning and Procedures.

The **DISCO** shall prepare annually, in consultation with the **Bureau** a programme for routine sampling of water from the Distribution System. Samples shall be obtained and analysed in accordance with this programme and records of the analyses shall be maintained by the **DISCO** at a location to be notified to **Customers**. The records shall be provided immediately to **TRANSCO** and made available for reference by **Customers** at all reasonable times.

Analysis and testing of water samples shall be carried out at a laboratory accredited for the purpose.

Customers may sample and test **Water Quality** for their own independent purposes, on their own Sites.

6. OPERATIONAL LIAISON

6.1 Introduction

This section sets out the requirements for the exchange of information relating to routine operation and/or unplanned events which might occur, or which have occurred, and which could affect

- i) The **DISCO Water Distribution System** in the case of an operation and/or event on a **User System**, or
- ii) A **User System** in the case of an operation and/or event on the **Water Distribution System**.

6.2 Objective

To specify:

- i) The information to be exchanged between **Users** and the **DISCO** to identify the potential impact of an operation and/or event and to assess the potential risk arising from it so that appropriate action can be taken.
- ii) The information to be exchanged between **Users** and a **DISCO** when an unplanned operation or event has occurred which may have resulted in risk or damage to **Potable Water Plant**.

The Procedures below do not deal with actions arising from the exchange of information, but merely with that exchange.

6.3 Procedures for Notification

In the case of an operation or event on the **DISCO** system which may affect **User** systems, the **DISCO** will notify the **Users** whose systems may be affected.

In the case of an operation or event on a **User** system which may affect the **DISCO** system, the **User** will notify the **DISCO** who will, in turn, notify other **Users** whose systems may be affected.

The notification must contain sufficient detail to enable the recipient to assess the implications and risks. It should also contain the following specific information.

- i) Name and contact details for the individual making the notification;
- ii) The nature of the operation/event;
- iii) The extent of any effects of the operation/event; and
- iv) The timing of the operation/event.

The notification shall be given as far in advance as practicable and in writing if there is sufficient time to do so. If notification is given orally, it shall be recorded by the recipient and confirmed by the sender in writing at the earliest opportunity.

The following are examples of effects where notification will be required:

- i) Where plant is being operated under conditions which presents a hazard to personnel;
- ii) Where an alarm or other indication of abnormal operating conditions has been activated;
- iii) Breakdowns, faults or temporary changes in performance of plant;
- iv) Breakdowns of or faults to control or communication equipment or instrumentation; or
- v) Damage or bursts to pipelines.

In the case of an unforeseen operation or event on the **DISCO** system which may have affected **User** systems, the **DISCO** will notify, at the earliest opportunity, the **Users** whose systems may have been affected.

In the case of an unforeseen operation or event on a **User** system which may have affected the **DISCO** systems, the **User** will notify, at the earliest opportunity, the **DISCO** who will, in turn, notify other **Users** whose systems may have been affected.

The notification shall contain the same information as that required for an operation or event which is expected to take place in the future.

7. CONTINGENCY PLANNING AND PROCEDURES

7.1 Introduction

This section covers:

- i) The implementation of procedures following failures which result in, or may result in serious, widespread loss or disruption of public water supplies to **Users**;
- ii) The establishment of communications between **Responsible Managers** of the **DISCO** and **Users** to facilitate urgent managerial action at all times; and
- iii) Procedures to be followed when normal routine **Scheduling** and **Despatch** activities are inoperative.

Such failures might include:

- i) A total or partial **Shut-Down** of the electricity supply system which would render pumping plant inoperative at sites where **Standby Generation** facilities are not provided;
- ii) A major pollution or water contamination event;
- iii) A burst main in the **DISCO** or a **User** system;
- iv) Forced outages resulting in loss of production capacity; or
- v) Any of the above that may occur on **TRANSCO Trunk Mains** and has consequential impact on the **DISCO Water Distribution System**.

7.2 Objective

- i) To restore water supplies to meet **User Demands** in the shortest possible time.
- ii) To ensure that communications arrangements for use in circumstances of serious disruption of water supplies are available between appropriately authorised representatives of the **DISCO** and **Users**.
- iii) To ensure that the **Water Distribution System** can continue to operate in circumstances where routine **Scheduling** and **Despatch** arrangements are inoperative.

7.3 Procedures

The **DISCO** is responsible for co-ordinating action in the event of a failure which results in, or may result in serious, widespread loss or disruption of public water supplies.

Following a failure which results in serious, widespread loss or disruption of public water supplies, standards of continuity, pressure or water quality may not be met.

Scheduling and Despatch of Water Producers in accordance with the **Water Transmission Code** may be suspended until the **Water Control Centre** decides that normal procedures can be re-implemented.

The complexities of recovery in the event of a major failure of the system will require a flexible approach to operation and hence preclude setting out detailed procedures or operational sequences.

Where parts of the system are isolated while emergency work is carried out, the **DISCO** shall ensure that parts of the system isolated under these circumstances are minimised and that maximum integration is achieved with the minimum possible delay.

Users shall abide by instructions issued by the **DISCO** in the event of a failure which results in, or may result in serious, widespread loss or disruption of public water supplies.

If a **User** is unable to comply with instructions issued by the **DISCO**, the **User** shall advise the **DISCO** accordingly so that the **DISCO** can consider whether to issue revised instructions or provide conditions within the distribution network which enable the **User** to comply.

The **DISCO** shall advise all **Users** when normal operation has been resumed.

The **DISCO** shall initiate and co-ordinate system studies and investigations to enable emergency plans to be prepared and updated as development of the system takes place. This plan shall be made available to **Users**.

A manual of emergency operating procedures covering all plausible events in general terms will be developed and maintained by the **DISCO**, in consultation with **Users** connected to the system. The procedure to be used in any particular event, however, will be determined by the **DISCO** concerned at the time.

As part of the manual of emergency operating procedures, the **DISCO** shall maintain a complete set of **Record Drawings** for all pipe work and fixed installations and operating manuals according to the Performa identified below for all plant and equipment under its control.

The Performa identified in Appendix A has been designed to aid in the development of these plans. These guidelines should read in conjunction with the Performa developed around the following minimum identified elements:

- i) Summary Sheet – General information on the contingency plan.
- ii) Decision Flow Chart – This should identify the process by which a contingency plan is selected for use depending on the failure scenario
- iii) Action Plan – Step by step summary of actions to be taken to resolve issues and reinstate supply
- iv) Procedures – Specific details of activities identified in the action plan

- iv) Plan Specific Information – Essential information for those managing the event, for example consumers affected, volumes not supplied, location and availability of materials
- vi) Pumping Station and Valve Arrangements – Details and timings of operations to be performed
- vii) Contact Details – details for all personnel who should be contacted whilst implementing the contingency plan
- vii) Time Line – A program of work to be undertaken and the expected duration until reinstatement
- ix) Network Schematic – Location plan of area with relevant valves, pumping stations and pipelines identified.

- x) In addition to this list, the date the plan was originally produced, the date it was revised, the version number and the scenario description and location (where appropriate) should be included.

Subject to procedures agreed between the **DISCO** and **Users** to ensure proper confidentiality, copies of the emergency plans and manual of emergency operating procedures shall be maintained by the **DISCO** at a location to be notified to **Users**. The plans and procedures shall be available for reference by **Users** at all reasonable times.

In circumstances where **Demand** cannot be met, the **DISCO** shall supply water intermittently in accordance with a **Customer Water Rationing** schedule issued by the **Water Control Centre** and approved by the **Bureau** drawn up for the purpose of securing **Demand Control**. **Demand Control** can include any of the following:

- i) **Demand** reduction initiated by **Users**;
- ii) Implementation of rota cuts by the **DISCO**;
- iii) **Demand** reduction instructed by the **DISCO**;
- iv) Reduced **Customer** consumption initiated by water conservation and pricing incentives; and
- v) Other **Water Demand Management** policies.

8. START-UP AND SHUT-DOWN PROCEDURES

8.1 Introduction

This section makes provision for procedures relating to

- i) The **Start-up** and **Shut-down** of **Potable Water Plant** or valve operations which may cause **Pressure Transients** within the **DISCO** system or those of **Users**; and
- ii) Recharging pipe work or other installations following internal access by personnel.

8.2 Objective

- i) To avoid damage to **Potable Water Plant** or unstable operating conditions resulting from plant **Start-up** or **Shut-down** or valve operations; and
- ii) To avoid bacterial contamination of the water supply following internal access by personnel.

8.3 Procedures

Users shall ensure that routine **Start-Up** and **Shut-Down** of all **Potable Water Plant** is carried out in accordance with sound operating practices where,

- i) Action by a **User**, may influence hydraulic conditions within the **Water Distribution System**; or
- ii) Action by the **DISCO** may influence hydraulic conditions within **Users'** systems.

These practices shall, so far as possible, ensure that **Pressure Transients** generated as a result of plant **Start-up** or **Shut-down** or **Valve** operations are maintained within the rated working pressures of connected pipelines and other plant and equipment.

Should a situation arise in which it becomes necessary to operate a **Pump** or **Valve** in a manner other than in accordance with normal practice, the entity responsible for it's operation shall, if possible, advise other affected entities in advance of the operation.

Following internal access by personnel to pipe work or other installations in contact with potable water for supply, flushing and disinfection shall be carried out in accordance with the **Licence Standards** as updated from time to time.

9. NUMBERING AND NOMENCLATURE OF PLANT

9.1 Introduction

This section sets out requirements regarding numbering and nomenclature of the **DISCO Potable Water Plant** and certain designated **User** plant.

9.2 Objective

The overall objective of this section is to ensure, so far as possible, the safe and effective operation of the water supply system. The risk of human error is minimised by requiring that the numbering and nomenclature of **User Potable Water Plant** shall be in accordance with the system used by the **DISCO**.

9.2 Procedures

The **DISCO Potable Water Plant** on **Users** sites shall have numbering and nomenclature in accordance with the system used by the **DISCO**.

The DISCO shall advise the **User** of the numbering and nomenclature to be used at least one month prior to the proposed date of installation of such plant and equipment.

Notification will be made in writing and will consist of both an **Operation Diagram** showing the plant to be installed, the proposed numbering and nomenclature and the proposed date of installation.

The **Responsible Manager** shall, on receipt of the notification, confirm that no other **Potable Water Plant** at the site has numbering and nomenclature which could be confused with that proposed by the **DISCO**.

User plant on the **DISCO** site shall have numbering and nomenclature in accordance with the system used by the **DISCO**.

When either the **DISCO** or a **User** installs **Potable Water Plant** which is the subject of this section of the **WDOC**, either the **DISCO** or the **User** respectively shall be responsible for the provision of clear and unambiguous labelling showing the numbering and nomenclature.

Where the **DISCO** changes the system of numbering and nomenclature of its plant, the provisions of this section shall apply.

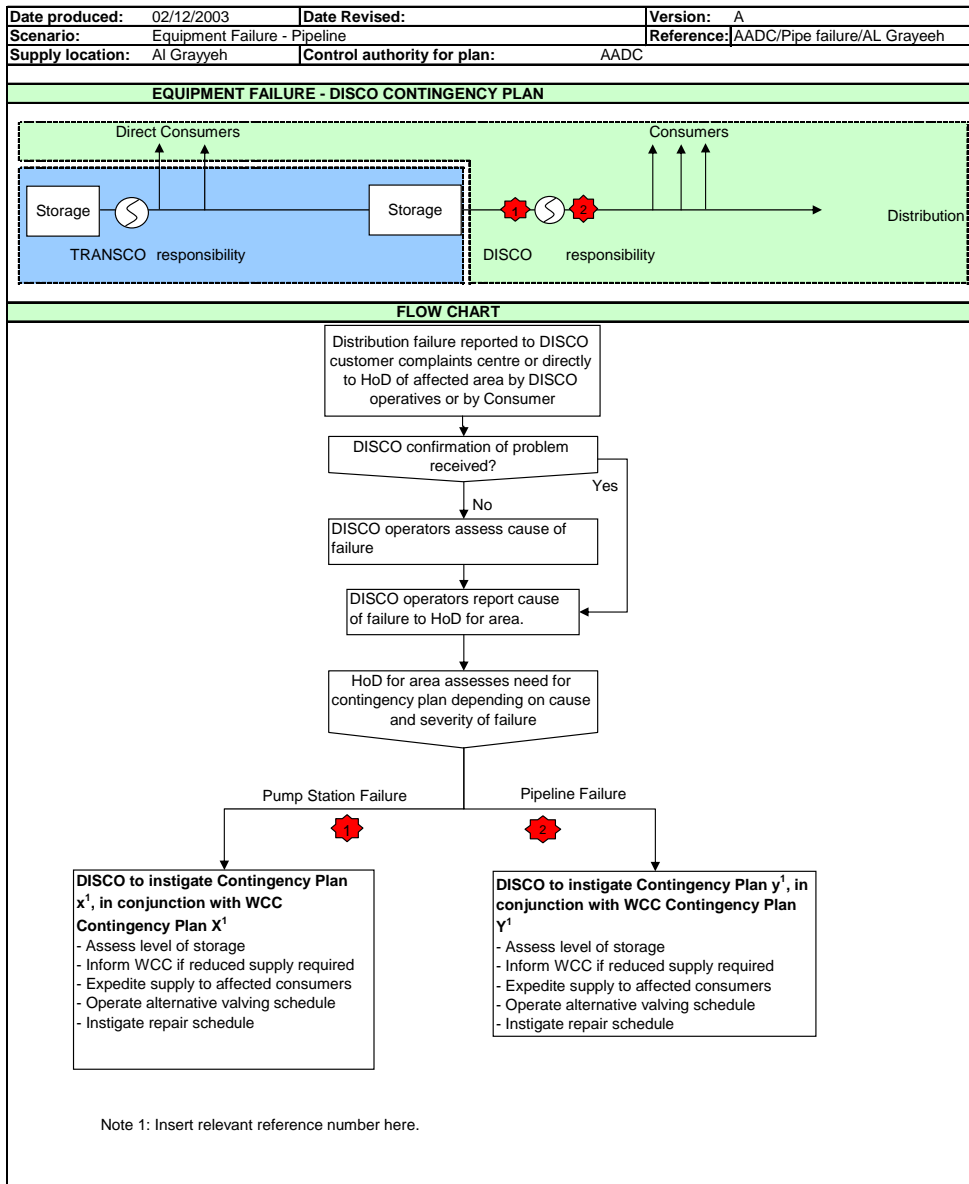
APPENDIX A - TYPICAL CONTINGENCY PLAN

Covering Sheet

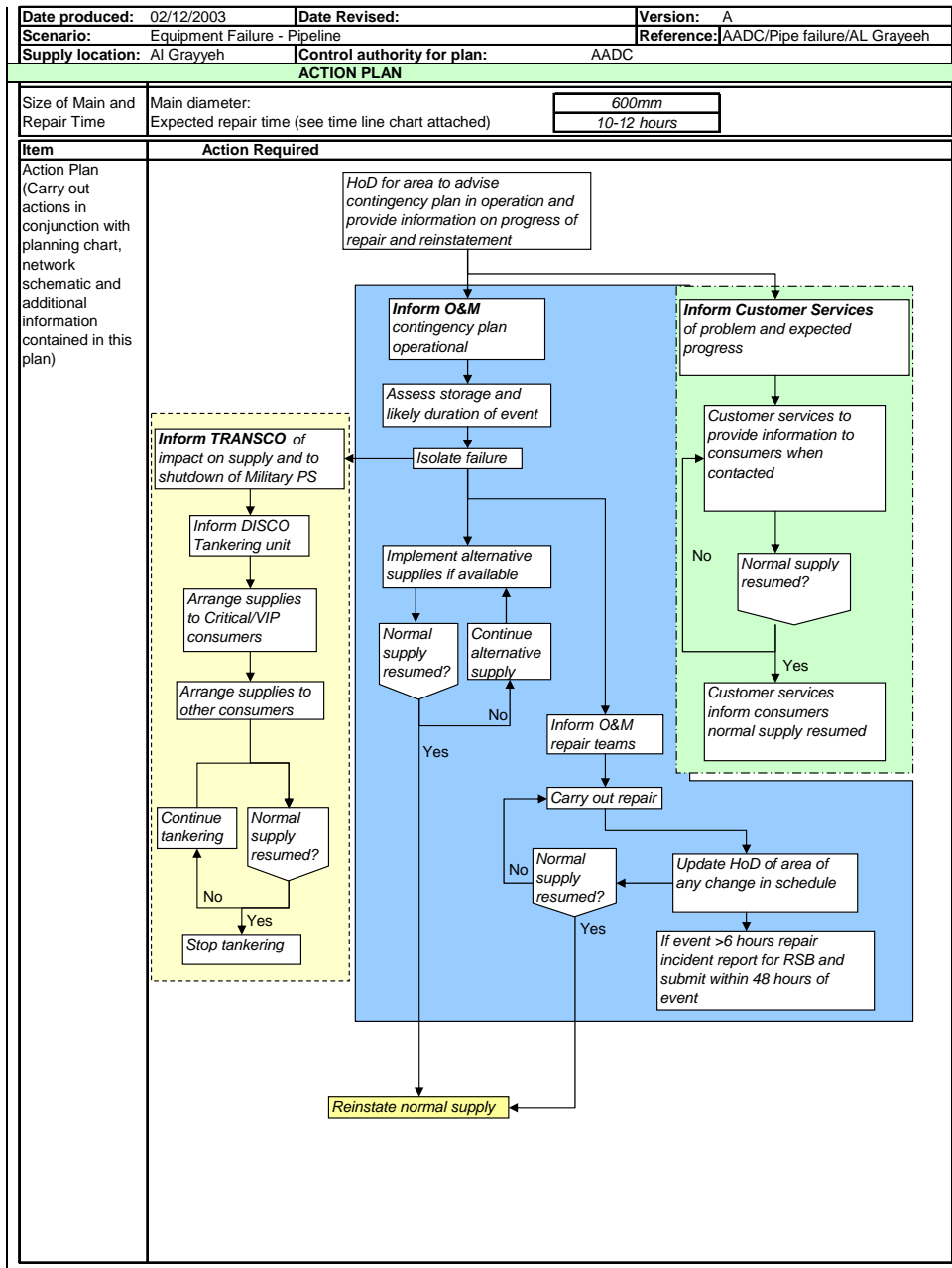
CONTINGENCY PLAN SUMMARY INFORMATION				
Scenario	Equipment Failure - Pipeline			
Geographic Location	Al Grayeeh			
Reference	AADC/Pipe failure/AL Grayeeh			
Control Authority of Plan	AADC			
Location of Master Document	With HoD AADC			
Copies held by				
Name		Location		
Date Produced	Version	Originator	Checker	Approver
Date revised	Version	Revisor	Checker	Approver

This contingency plan should be reviewed as and when network or supply alterations impact on the application of this plan. As a MINIMUM, this contingency plan should be updated once every twelve months

Decision Flow Chart



Action Plan



Procedures

Date produced:	02/12/2003	Date Revised:		Version:	A				
Scenario:	Equipment Failure - Pipeline		Reference:	AADC/Pipe failure/AL Grayeeh					
Supply location:	Al Grayeeh	Control authority for plan:	AADC						
PROCEDURES									
Available Storage Assessment	Assess whether customer storage will cover duration of event by estimating duration between last supply to area and the average consumption to assess remaining hours storage.								
VIP consumers supply Arrangements	Tankered supply required immediately for critical customers without storage. Secondary supplies must also be in place for sensitive customers, before storage is no longer available.								
Other consumer supply arrangements	If event will rely on >24 hours usage of customer storage, tankered supplies should be arranged as above, once all critical and sensitive customers are supplied.								
Valve schedule	Operate valves as shown on valving schedule and network schematic.								
Water Quality	Follow AADC standard flushing, disinfection and recommissioning procedure.								
HSE Procedure	Follow AADC standard HSE procedures.								
Contamination	N/A								
Repair procedure	See time line.								
Customer Notification	If event will impact on customers, inform customer complaints of reason for failure and expected time for repair. Keep customers complaints up to date with progress.								
Date produced:	02/12/2003	Date Revised:		Version:	A				
Scenario:	Equipment Failure - Pipeline		Reference:	AADC/Pipe failure/AL Grayeeh					
Supply location:	Al Grayeeh	Control authority for plan:	AADC						
PLAN SPECIFIC INFORMATION									
Affected Customers	Customers in the following locations could be affected:								
	Reference	Location	Supply	Hours supply	Demand				
	Al Grayeeh South		Timed	5 hrs/day	0.46 MGD				
	Agricultural				0.6 MGD & 0.3 MGD storage available				
	Type	Customer	Location	Demand	Supply				
	Large Customers	Al Grayeeh South		0.46 MGD	Timed				
					5 hours/d				
	Vulnerable Customers								
	Sensitive Customers	Agricultural		0.5	Timed				
					5 hours/d				
	Comment:								
								
								
Secondary Supply Requirements	During a contingency event the following domestic and essential use demand may need to be met through tankered supplies.	Location	Supply required during event MGD	Nr 3000 gallon tanker trips required					
		Al Grayeeh South	0.23	77					
Valving operations	Shut off plan checked:	Yes / No	Yes						
	Valves checked:	Date:							
		By Whom:							
		Status:	HoD area						
Materials / Fittings Availability	Fittings required (for guidance)	<table border="1"> <tr><td>600mm Pipeline</td></tr> <tr><td>Couplings to fit 630 - 647mm</td></tr> <tr><td>Repair clamps to fit 625 - 645 mm</td></tr> <tr><td>repair clamp to fit ranges 584 - 680</td></tr> </table>				600mm Pipeline	Couplings to fit 630 - 647mm	Repair clamps to fit 625 - 645 mm	repair clamp to fit ranges 584 - 680
600mm Pipeline									
Couplings to fit 630 - 647mm									
Repair clamps to fit 625 - 645 mm									
repair clamp to fit ranges 584 - 680									
	Availability	All available							
	Location of parts	AW02							
Water Quality	Under normal conditions, it is reasonable to resume supply after an acceptable result from a physical test of the following parameters whilst waiting for laboratory water quality results.								
	Parameter	Value	Parameter	Value					
	Residual Chlorine		Colour						
	Turbidity		pH						
	Solids								
	In any other situation the standard water quality regulations must be followed.								
Contacts	Name	Position	Number						
Additional Information	Comment:								
								
								

Time Line

Date produced: 02/12/2003		Date Revised:		Version: A						
Scenario: Equipment Failure - Pipeline		Reference: AADC/Pipe failure/AL Grayeeh								
Supply location: Al Grayeeh		Control authority for plan: AADC								
TIME LINE										
Hours	Valving operations and rezoning	Actual Time	Repair activities	Actual Time	Other activities	Actual Time	Secondary supplies	Customer Relations	Actual Time	Milestones
Time in hours after notification of burst										
1	Close off main		Mobilise repair team				Initiate plan	Inform complaints department		
2		Rezoning								
3			Excavate pipe				Tankers to vulnerable customers	Inform customers of problem and tanker/diesel fuel we supply arrangements		
4										
5			Excavate and cut out broken pipe							
6							Tankers to large and sensitive customers			
7			Make repair							
8										
9			Water Quality Test							
10			Recharge and recommission				Tankers to all other customers			
11										
12			Pressure Test							
13										
14										
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Network Schematic

