

ASHGHAL

Interim Advice Note No. 025

Amendments to the TSE System Design Guidelines

Revision No. A1

EXW-GENL-0000-PE-KBR-IP-00025

Summary

This Interim Advice Note (IAN) provides information and guidance on changes to TSE (Treated Sewerage Effluent) design guidance criteria. This IAN takes immediate effect. The following shall be noted:

- This IAN makes amendments to a number of clauses contained within the current Ashghal Drainage Design Manual (ADDM), Volume 4 (TSE System Design), as specified herein.
- This IAN is applicable to TSE systems only and supersedes related clauses found in the local specifications, in particular the Ashghal Drainage Design Manual (ADDM), Volume 4 (TSE System Design).

This document supersedes IAN 025 Rev 0 dated April 2013. Third parties not working on Ashghal projects make use of this document at their own risk. Paper copies of this document are uncontrolled. Refer to Ashghal’s website for the most recent version.

INTERIM ADVICE FOR PWP PROJECTS ONLY



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0	April 2013	For issue to EXW Consultants & Contractors	IF	EDF	MG
Rev	Date	Reason For Issue	Auth	Chk	App

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INTERIM ADVICE FOR PWA PROJECTS ONLY

1. Foreword

- 1.1 Interim Advice Notes (IANs) may be issued by Ashghal from time to time. They define specific requirements for works on Ashghal projects only, subject to any specific implementation instructions contained within each IAN.
- 1.2 Whilst IANs shall be read in conjunction with the Qatar Highway Design Manual (QHDM), the Qatar Traffic Manual (QTM) and the Qatar Construction Specifications (QCS), and may incorporate amendments or additions to these documents, they are not official updates to the QHDM, QTM, QCS or any other standards.
- 1.3 Ashghal directs which IANs shall be applied to its projects on a case by case basis. Where it is agreed that the guidance contained within a particular IAN is not to be incorporated on a particular project (e.g. physical constraints make implementation prohibitive in terms of land use, cost impact or time delay), a departure from standard shall be applied for by the relevant Consultant / Contractor.
- 1.4 IANs are generally based on international standards and industry best practice and may include modifications to such standards in order to suit Qatar conditions. Their purpose is to fill gaps in existing Qatar standards where relevant guidance is missing and/or provide higher standards in line with current, international best practice.
- 1.5 The IANs specify Ashghal's requirements in the interim until such time as the current Qatar standards (such as QHDM, QTM, etc.) are updated. These requirements may be incorporated into future updates of the QHDM, QTM or QCS, however this cannot be guaranteed. Therefore, third parties who are not engaged on Ashghal projects make use of Ashghal IANs at their own risk.
- 1.6 All IANs are owned, controlled and updated as necessary by Ashghal. All technical queries relating to IANs should be directed to Ashghal's Manager of the Design Department, Infrastructure Affairs.

Signed on behalf of Design Department:

Abdulla Ahin A A Mohd

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Design Management (Roads Section)

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2. Ashghal Interim Advice Note (IAN) – Feedback Form

Ashghal IANs represent the product of consideration of international standards and best practice against what would work most appropriately for Qatar. However, it is possible that not all issues have been considered, or that there are errors or inconsistencies in an IAN.

If you identify any such issues, it would be appreciated if you could let us know so that amendments can be incorporated into the next revision. Similarly, we would be pleased to receive any general comments you may wish to make. Please use the form below for noting any items that you wish to raise.

Please complete all fields necessary to identify the relevant item			
IAN title:			
IAN number:		Appendix letter:	
Page number:		Table number:	
Paragraph number:		Figure number:	
Description comment:			
Please continue on a separate sheet if required:			
Your name and contact details (optional):			
Name:		Telephone:	
Organisation:		Email:	
Position:		Address:	

Please email the completed form to:

<p>Abdulla Ahin AA Mohd Acting Manager of Roads and Drainage Networks Design Design Management (Roads Section) Public Works Authority aahin@ashghal.gov.qa</p>
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We cannot acknowledge every response, but we thank you for contributions. Those contributions which bring new issues to our attention will ensure that the IANs will continue to assist in improving quality on Ashghal's infrastructure projects.

3. Introduction

- 3.1 This Interim Advice Note (IAN), which takes immediate effect, provides new design guidelines to be adopted in the design of TSE infrastructure. This IAN will provide interim guidance prior to the issue of a revision to the existing Ashghal Drainage Design Manual (ADDM).
- 3.2 The guidelines set out in Appendix A are supplementary to the Ashghal Drainage Design Manual (ADDM), Volume 4 (TSE System Design), Clauses 1.3.2, 2.2, 2.4, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.7.1, 2.7.2, 2.7.3, 2.7.4, 2.7.6, 2.7.8, 2.10, 3.1.1, 3.1.5 and 3.1.7.

4. Amended Standard

- 4.1 Ashghal Drainage Design Manual (ADDM), Volume 4 (TSE System Design), Clauses 1.3.2, 2.2, 2.4, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.7.1, 2.7.2, 2.7.3, 2.7.4, 2.7.6, 2.7.8, 2.10, 3.1.1, 3.1.5 and 3.1.7 are supplemented by this Interim Advice Note (IAN).
- 4.2 This IAN shall take precedence where there is a discrepancy between it and the Ashghal Drainage Design Manual (ADDM), Volume 4 (TSE System Design), Clauses 1.3.2, 2.2, 2.4, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.7.1, 2.7.2, 2.7.3, 2.7.4, 2.7.6, 2.7.8, 2.10, 3.1.1, 3.1.5 and 3.1.7.

5. Implementation

- 5.1 This IAN is to be used with immediate effect on projects as follows:
- All Ashghal projects at Design Stage
- 5.2 For projects at Tender or Construction Stage, the Consultant / Contractor shall carry out a review of the existing design and prepare a report outlining the changes required, including the financial and programme implications. The Authority / Engineer shall confirm what changes, if any, are to be implemented.
- 5.3 If in doubt, Consultants / Contractors should seek guidance from the respective Ashghal Project Manager or designated Programme Management Consultant (PMC) on a scheme specific basis.

**APPENDIX A: Amendments to Volume 4 of the Ashghal
Drainage Design Manual (ADDM) – TSE System Design**

(Document ref: Q700129 Vol 4: June 2005)

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Amendments to Qatar Sewerage and Drainage Design Manual – Volume 4 (TSE)

Item	Page No	Clause	Amendment
1	2	1.3.2	<p>Irrigation Budgets</p> <p><i>Insert new clause after last paragraph:</i></p> <p>The Designer should develop options for landscaping that are based upon using plant species that are appropriate for Qatar and are less water demanding and drought resistant. Selection of plants shall also take into consideration the quality of existing TSE for landscape irrigation (Clause 1.4.3).</p>
2	7	2.2	<p>Standards and Sources of Information</p> <p><i>Delete second paragraph and insert new clause:</i></p> <p>A list of general standards and references pertaining to design is set out below. The Designer shall verify that the standards listed are still current and in force. Where standards have been superseded, the Designer shall use the appropriate replacement standard. The full title and reference of the standard used shall be provided within the Design Standards listed within the project design reports.</p>
3	8	2.4	<p>Sizing and Flow Estimation</p> <p><i>Insert new clause after first paragraph:</i></p> <p>The pipe diameter shall be sized for the future demand plus additional allowance of 30% for future unplanned expansion subject to the approval of Ashghal Drainage Design Section.</p>
4	14	2.5.1	<p>Ductile iron Pipe</p> <p>Recommended use</p> <p><i>Insert new clause:</i></p> <p>Ductile iron pipe shall be used for all pipelines with a normal operating pressure above 8 bar and for all strategic pipelines as advised by Ashghal Drainage Design Section.</p>
5	15	2.5.2	<p>Polyethylene Pipes</p> <p>Recommend Use</p> <p><i>After first paragraph on page 15 insert:</i></p> <p>HDPE pipe SDR11 PE-100 derated for 35°C TSE shall be used for pipelines up to and including 290mm internal (355mm external diameter) and maximum operating pressure, excluding surge, below 8 bar.</p>
6	15	2.5.2	<p>Polyethylene Pipes</p> <p><i>Insert new section before Recommended Use:</i></p> <p>Jointing Polyethylene Pipes</p> <ul style="list-style-type: none"> • All PE butt fusion jointing, PE jointing to GRP and metallic valves and fittings and electro-fusion jointing shall be undertaken by a certified and licensed PE jointer. • The PE jointer shall have attended a minimum 5-day course on the Installation and Welding of high density

			<p>Polyethylene (HDPE) Pipes for gas and Water Applications as per the standards of German Technical and Scientific Association for Gas & Water (DVGW) or equivalent national body approved by the PWA.</p> <ul style="list-style-type: none"> • The PE jointer shall hold a current Welder License which shall be subject to annual renewal. The license shall be issued by a training body approved by the PWA • Electro-fusion and butt-fusion joints shall be made in accordance with WIS 4-32-08 using equipment specified in WIS 4-32-16. • Where PE barrier or co-extruded pipes are used the jointing system adopted shall be in accordance with the pipe manufacturer's specification and all protective systems shall be made continuous across the joint. • A section containing a completed weld shall achieve the same strength characteristics as the parent pipe.
7	15	2.5.3	<p>GRP Pipes Recommend Use <i>Insert new clause:</i> For pipes above 290mm internal diameter and normal operating pressure below 8 bars, GRP stiffness number SN10,000 shall be used. If stability calculation show that stiffness above SN10,000 is required, ductile iron pipework shall be used. The maximum diameter for GRP pipework shall be 1000mm internal diameter. All pipework above 1000mm internal diameter shall be ductile iron.</p>
8	19	2.6	<p>Computer Modelling of Irrigation Networks <i>Insert new clause after last paragraph:</i> The network modelling software used by Ashghal to simulate flow and pressure in the network is InfoWorks. WaterCAD or any other equivalent software may be used for design. The final design model of the TSE network shall be converted to InfoWorks and submitted in soft copy format to the PMC as part of the detailed design submission. Ashghal Drainage Design section should be contacted before starting building the model to discuss the protocol to be followed in building the model. A detailed model build report shall be provided as part of the detailed design submission. The report shall demonstrate the verification of the conversion to InfoWorks by tabulating a sample of points and locations comparing the peak and average values from the original design software with the converted InfoWorks outputs.</p>
9	21	2.7.1	<p>Pipeline Horizontal Alignment <i>Insert new clause after last paragraph:</i> Pipelines shall follow the typical corridors through</p>

			<p>roundabouts, intersections, underpasses etc. Pipelines shall be diverted around signalised junction boxes and roundabouts.</p> <p>The Designer shall consider the requirements for protection to TSE pipelines crossing roads.</p> <p>Branch pipeline extending to the limit of road works are to be provided at all road junctions where the Right of Way (ROW) of the branch road is 24m wide or greater. A valve chamber shall be provided at a suitable location on the branch connection. A cap is to be provided on the branch connection at the limit of works. The pipe size of the branch connection to the local road irrigation network will be advised by Ashghal Drainage Design Section.</p>
10	21	2.7.2	<p>Pipeline Vertical Alignment</p> <p><i>Delete last paragraph and insert new clause:</i></p> <p>High and low points in the pipeline shall be created to release air and to drain the pipeline during maintenance works. The minimum recommended gradients for ascending and descending pipeline sections to be 1:1000 (1mm/m).</p> <p>The maximum depth of a chamber should not exceed 3.0m unless specific approval of Ashghal Drainage Design Section is obtained. Minimum depth of pipe cover should be not less than 1.2m.</p>
11	22	2.7.3	<p>Internal Pipe Pressures and Restraint of Thrust</p> <p>Restraint of Thrust</p> <p><i>Delete last paragraph and insert new clause:</i></p> <p>The preferred method of pipeline restraint is through the use of restrained joints.</p> <p>For pipelines with unrestrained joints, thrust blocks and line anchors shall be used.</p> <p>The design of thrust blocks and line anchors shall consider the risk of future utilities being installed adjacent to the TSE pipeline, removing the restraint provided by the ground. Down-stand shear wall thrust blocks shall be used to provide restraint. Piled thrust blocks shall be used for unrestrained joint pipelines where loads or space prevent the use of down-stand shear wall thrust blocks.</p>
12	22	2.7.4	<p>Air Release</p> <p><i>Insert new clause after first paragraph:</i></p> <p>Design of pipelines shall provide for air release where pipelines terminate beyond an air valve or washout. Air valves are to be designed individually, depending on served length of the pipe and its diameter. Maximum spacing of air valves on long rising or falling profiles shall be 800-1000m.</p>
13	22	2.7.4	<p><i>Delete last paragraph and insert new clause:</i></p>

			<p>The air valve assembly shall be installed in a concrete chamber. The chamber shall have a vented cover or a vent pipe. For chambers, general requirements, refer to section 2.7.6</p>
14	22	2.7.6	<p>Isolation Valves</p> <p><i>Insert new clause after last paragraph:</i></p> <p>Gate valves shall be used on pipework up to and including 300mm internal diameter. Above 300mm internal diameter butterfly valves shall be used.</p> <p>All gate valves and butterfly valves shall be fitted with a vertical spindle extension so that in the event of flooding of the chamber, the valve can be closed from the surface using a Tee Key or portable actuator.</p> <p>Butterfly valves shall be manufactured and tested for both directions of flow. All valves shall have a dismantling joint to one side.</p> <p>Maximum spacing between isolation valves should be 5km in rural area and 3km in urban area.</p> <p>Ashghal Drainage Design Section in consultation with O & M shall designate the valves, on a case by case basis, which are to be fitted with electrically operated actuators.</p> <p>The high cost of providing a power supply in rural areas will be a consideration in determining whether an electrically operated actuator is installed on a valve. An estimate for the provision of a power supply is to be obtained for each of the designated locations for final confirmation by Ashghal Drainage Design Section.</p> <p>All valves fitted with electrically operated actuators shall be connected to the SCADA system for remote operation. Pressure and conductivity sensors and any other instrumentation as required by Ashghal Drainage Design Section shall be installed at these locations and connected to SCADA for remote monitoring.</p>
15	23	2.7.6	<p>Valve Chambers</p> <p><i>Insert new clauses after last paragraph:</i></p> <p>The top of valve chambers shall be 300mm above ground level in unpaved areas and 600mm above ground level in open rural areas.</p> <p>The Designer shall undertake a thrust analysis for all chambers considering all combinations of open / closed valves. The design of chamber shall consider the risk of future utilities being installed adjacent to the TSE pipeline, removing the restraint provided by the ground. Chambers may require down-stand shear walls to provide restraint. If adequate space is not available and high loads prevent the use of shear walls, construction of piled restraints shall be considered.</p>

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			<p>Valve chambers shall not be located in carriageways.</p> <p>Chambers in on-street parking and paved areas shall be designed for the appropriate traffic loads.</p> <p>Valve chambers shall be sized to provide adequate space and height to house the equipment (air valves, actuators etc) and provide space for future installation of electrically operated actuators. A minimum clearance of 300mm for pipe diameters less than 600mm and 600mm for pipes 600mm diameter and above, shall be provided between any equipment and the chamber walls.</p> <p>Access openings shall be a minimum of 675 x 675mm and sized to provide for man-entry, operation of valves and removal and replacement of equipment.</p> <p>Chambers with full aluminium covers shall only be used in landscaped or open area where there is minimal risk of vehicle loading.</p> <p>Aluminum covers to be strengthened by welding stiffening angle or bars, to allow for occasional 4 ton vehicle to pass for maintenance. This reinforcement to apply to chamber covers that are placed in areas subject to light pedestrian traffic such as footpaths</p> <p>Heavy duty covers flush to the surface, to be used when chamber is located on carriageway. Roof slab to be structurally designed to the required Standards.</p>
16	23	2.7.6	<p>Distribution Chambers</p> <p><i>Insert new section before "Access Covers":</i></p> <p>The spacing of distribution chambers shall be 250m for TSE lines up to 350mm internal diameter. This spacing shall be increased to 500m if the TSE line is of 400mm to less than 600mm internal diameter. The internal diameter of tee connections to distribution chambers from mains 290mm and greater internal diameter shall be 290mm for HDPE pipes or 300mm for GRP pipes. Equal tee shall be used for internal diameters less than 290mm. The connection shall reduce to a minim internal diameter of 147mm, 1.5m from the tee connection to the distribution chamber.</p> <p>No distribution chambers shall be provided on a TSE line of 600mm internal diameter and above. In this case a secondary main shall be provided for landscaping requirements.</p> <p>The details for distribution chambers shall be agreed with the Municipality.</p> <p>The distribution chamber shall be provided with ducts for the installation of future irrigation pipework and for communication / control systems. The size and number of ducts shall be agreed with the Municipality.</p> <p>Fire Hydrants</p> <p>Provisions shall be made for a fire hydrant adjacent to</p>

			<p>distribution chambers at locations agreed with Civil Defence and Ashghal Drainage Design Section. The diameter of the hydrant shall be as agreed with Civil Defence.</p> <p>Sampling Points for Testing</p> <p>Provision shall be made for one sampling point for every 5.0km² area having TSE irrigation. Sampling points may be provided within sampling chambers or within other chambers if space is available.</p>
17	25	2.7.8	<p>Design Recommendations</p> <p><i>Insert new section:</i></p> <p>Pipe material shall be selected to suit the specific requirements of the project and to be agreed with Ashghal Drainage Design Section and Operation and Maintenance.</p> <p>Any change in pipe material or standard other than what is specified must be via an official transmittal addressed to the Head of Ashghal Drainage Design Section for review and approval.</p> <p>All fittings inside the chambers are to be Ductile Iron. Change in pipe material is to occur outside the chamber. Any deviation is to be agreed with ADDD and O&M.</p>
18	47	2.10	<p>TSE Ground Tanks</p> <p>Reservoir Size</p> <p><i>Insert new clause after last paragraph:</i></p> <p>Storage Capacity (Local Reservoirs)</p> <p>Parks shall have storage reservoirs with a capacity equal to one day requirement where the demand is more than 500m³/day. No storage reservoirs are required of the daily demand is less than 500m³/day and can be directly supplied.</p> <p>Commercial users shall have storage reservoirs with a capacity equal to two days' requirement. The design and location of the reservoir shall be determined by the Developer and shall be submitted for approval by Ashghal Drainage Design Section.</p> <p>The Designer shall consider the risk of chlorine depletion within storage tanks.</p>
19	50	3.1.1	<p>System Layouts</p> <p><i>Delete next to last paragraph and replace with:</i></p> <p>The number of tapings from the main TSE distribution network should be kept to a minimum, consistent with efficient irrigation system pipework layouts. Each point of connection needs to be provided with an isolation valve located in the main distribution chamber. A flowmeter, pressure sensor and SCADA link shall be provided if requested by the Municipality to permit remote monitoring at the Municipality Control Room. Distribution chambers are typically spaced at 250m intervals for TSE lines up to</p>

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			<p>350mm internal diameter. This spacing shall be increased to 500m if the TSE line is of 400mm to less than 600mm internal diameter.</p> <p>No distribution chambers shall be provided on a TSE main of 600mm internal diameter and above. In this case a secondary main shall be provided for landscaping requirements.</p> <p><i>Insert additional clause after last paragraph.</i></p> <p>Design of the tertiary irrigation network downstream of the distribution chamber, shall be by the tertiary network contractor, based upon the landscaping plans and irrigation regime provided by the Designer. The tertiary irrigation contractor shall provide the means of controlling the irrigation cycles.</p>
20	54	3.1.5	<p>Irrigation Rates</p> <p><i>Insert new clause after last paragraph:</i></p> <p>The demand figures given in table 3.1.3 shall be reviewed and amended to include for less water-demanding and drought-resistant plant species. The Municipality Parks and Gardens Department should be consulted to obtain their recommendations / requirements for planting.</p> <p>The Designer shall prepare a schedule of the daily water demand for each type of road corridor based upon a notional landscape design scheme appropriate for the corridor and also for the area covered by each distribution chamber.</p> <p>A total demand assessment shall be made including the requirements for irrigation of public open spaces, schools, mosques, other buildings and commercial customers. (This is a typical list and is not all-inclusive)</p> <p>The TSE demand calculations shall be provided as part of the concept and detailed design submissions for approval by Ashghal Drainage Design Section.</p>
21	56	3.1.7	<p>Control Systems</p> <p><i>Insert additional clauses after last paragraph:</i></p> <p>The distribution chamber shall be provided with ducts for the installation of communication / control systems. The size and number of ducts shall be agreed with the Municipality.</p>

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