Water and sewerage acceptance testing guide

This guide has been produced to assist Contractors and Consultants (in particular the RPEQ for the Development) in arranging for the correct acceptance tests to be completed on all new works.

NOTE: The Developers Representative/Agent maybe the Contractor, Engineer or RPEQ for the development.

Conformance with Codes
All tests shall conform with the relevant SEQ Water Supply and Sewerage Design and Construction Code and the Water Services Association of Australia (WSAA) requirements, and it is the responsibility of the RPEQ to ensure that all tests and CCTV investigations are completed as specified in the relevant construction code and are acceptable without defects prior to submission to the City of Gold Coast (City).

The following website links have been listed for further information on the construction codes:

What works require testing and CCTV
Acceptance testing is a requirement for all new water or sewerage mains and services as follows (but not limited to):
- Water services (20mm and 25mm) installed as part of a subdivision are required to be pressure tested as part of the reticulation mains testing prior to connection. Water quality testing is required as part of the reticulation mains testing prior to connection.
- Single water services (20mm, 25mm, 40mm and 50mm) not installed as part of a subdivision are not required to be pressure tested or water quality tested prior to connection. NOTE: Although full disinfection is not required, the contractor shall spray or swab/clean the pipe and fittings in accordance with WSA 03.
- Water services (100mm and greater – water main on same side of road) are not required to be pressure tested or water quality tested prior to connection. NOTE: Although full disinfection is not required, the contractor shall spray or swab/clean the pipe and fittings in accordance with WSA 03.
- Water services (100mm and greater – water main on opposite side of road) shorter than 14 metres in length (from main connection to face of meter pit) are not required to be pressure tested and water quality tested prior to connection. NOTE: Although full disinfection is not required, the contractor shall spray or swab/clean the pipe and fittings in accordance with WSA 03.
- Water services (100mm and greater – water main on opposite side of road) longer than 14 metres in length (from main connection to face of meter pit) are required to be pressure tested and water quality tested prior to connection.
- Water main installations shorter than 14 metres in length, are not required to be pressure tested and water quality tested prior to connection. NOTE: Although full disinfection is not required, the contractor shall spray or swab/clean the pipe and fittings in accordance with WSA 03.
- Water main installations longer than 14 metres in length, are required to be pressure tested and water quality tested prior to connection.
- Single sewer (gravity) installations shorter than 14 metres in length not installed as part of a subdivision, CCTV is not required to be completed but the pipe must be visually inspected by the Gold Coast Water Asset Audit and Handover (AA&H) representative. All other tests as stated below in the gravity sewer section are required to be completed prior to connection.
- Sewer (gravity) installations shorter than 14 metres in length installed as part of a subdivision, CCTV and tests as stated below in the gravity sewer section are required to be completed prior to connection.
• Sewer (gravity) installations longer than 14 metres in length, CCTV and tests as stated below in the gravity sewer section are required to be completed prior to connection.
• Sewer (pressure) installations longer than 14 metres in length shall be tested as stated below in the pressure sewer section prior to connection. CCTV is not required for pressure sewers.
• Sewer (gravity) manholes require tests as stated below in the gravity sewer section, to be completed prior to connection. The CCTV footage shall also include completed manholes.
• Sewer (vacuum) installations longer than 14 metres in length, shall be tested as stated below in the vacuum sewer section prior to connection. CCTV is not required for vacuum sewers.

All acceptance tests and CCTV investigations are either witness or hold points. The Contractor shall liaise directly with the Gold Coast Water Representative, except for water quality tests which need to be booked by contacting Gold Coast Water on 5582 7068 48 hours prior, to be on site during the testing in accordance with the Gold Coast Water “Water and sewerage construction inspection requirements” information sheet. The Gold Coast Water Representative is not on site to determine for the Contractor if the testing or CCTV is being completed is acceptable or in accordance with the SEQ Code requirements.

Testing and CCTV Submission Requirements
Gold Coast Water requires all acceptance test results (including a copy of any unsatisfactory results – to be noted for information only and not for review) and CCTV footage (including a hardcopy of the report) to be submitted for review and acceptance as part of the development’s construction process prior to the works being approved for a Pre-connection Inspection and ultimately the connection to the City’s infrastructure. Failure to produce adequate test results or CCTV information and associated documentation will result in the required Pre-connection Inspection being delayed.

Gold Coast Water requires the Registered Professional Engineer (RPEQ) for the development to review all of the test results and the CCTV footage and report, and be satisfied that the testing and CCTV has been completed in accordance with all of the relevant SEQ Water Supply and Sewerage Design and Construction Code requirements and that the actual construction has been completed in accordance with all of the relevant SEQ Water Supply and Sewerage Design and Construction Code and the WSSA requirements, and that there are no defects, prior to submitting the information to Gold Coast Water.

The RPEQ shall provide a written report as part of the test results and CCTV submission (as applicable) to Gold Coast Water. This is in addition to the As Constructed package required for final signoff for the development. This report shall include, but not be limited to:
• The name and address of the development, the business name of the Contractor and Consultancy, and the OPW number on the front of the cover, and
• Marked up layout plans (final approved version of the design drawings) indicating the overall layout of the new works, the maintenance structure numbers, the location of house junctions etc. These plans shall be marked up by the RPEQ as part of their review to ensure that all pipelines, fittings and structures have been tested and CCTV investigated (as applicable), and
• Detailed comments of what defects have been found in the CCTV and rectified (where applicable) during the RPEQ review process, and
• Detailed comments of what failed results have been received and what rectification works have been completed (where applicable) during the RPEQ review process, and
• A copy of the “Test Result Review Check Sheet” (refer to Appendix A at end of this document) shall be completed by both the contractor and RPEQ and submitted with the test results in accordance with the SEQ Water Supply and Sewerage Design and Construction Code requirements; and
• A copy of the “CCTV Review Check Sheet” (refer to Appendix A at end of this document) shall be completed by both the contractor and RPEQ, and submitted with the CCTV digital and hardcopy in accordance with the SEQ Water Supply and Sewerage Design and Construction Code requirements.
Requirements for Potable and Recycled Water Works

Please refer to the relevant sections of the latest version of WSA03 Water Supply Code of Australia and SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA03) for all information.

The Contractor shall ensure that all construction works is fully completed and that all internal surfaces of the pipes are clean before any of the tests are performed.

All tests shall be performed by a NATA accredited testing organisation. All of the result pages shall clearly state the development name, address and development approval number (OPW/MCU/ROL).

In summary, Gold Coast Water require the following tests to be completed and results submitted:

- Compaction tests for embedment and trench fill zones (open trench construction only).
- Hydrostatic pressure test of all pipes and services (potable and recycled).
- Water quality test of all pipes (potable and recycled).
- Under pressure cut-in (tapped) connections (UPT) assembly pressure test.

Water quality (Bacterial) tests shall only be completed after receiving “in principle” approval from Gold Coast Water to connect. To ensure the newly constructed pipework is flushed and disinfected sufficiently, the Developer or the Developers Representative/Agent must provide a marked up layout drawing showing the proposed sample locations to Gold Coast Water for review and acceptance a minimum of 10 working days prior to undertaking the tests. The following locations shall require sampling:

- 1 verification sample point within existing network or supply truck (where used), and
- All end (future and permanent) of new mains, and
- At least 1 point on the feeder system of the new system located centrally within the system, as well as additional central samples if the system has more than 5 branch mains and/or dead ends, and
- 1 property service – location to be randomly determined on site by the GCW representative on the day of sampling

Gold Coast Water may require additional sample points to be included in the testing, and will duly inform the Developer or the Developers Representative/Agent of this requirement. All costs for testing will be borne by the Developer, including any additional locations noted by the City.

The Contractor shall arrange for the bacterial tests to be completed by an NATA accredited testing organisation after receiving ‘in principle approval’ from Gold Coast Water, as part of the water connection application process. To arrange for an inspector for the water quality testing, please contact Gold Coast Water 48 hours prior on 5582 7068 instead of the Gold Coast Water Representative, as the test plan must be submitted and approved by Gold Coast Water prior to the testing being completed. Where the Contractor has undertaken the testing without submitting the test plan to Gold Coast Water for approval, the test results will not be accepted until a test plan is provided to Gold Coast Water and accepted. If the test plan is not acceptable, the Contractor will be required to redo the tests again in accordance with an approved test plan at their cost. Water quality test results have a maximum validity period of 14 days from date of collection in accordance with Gold Coast Water’s Drinking Water Quality Management Plan. Due to all approved water connections having to be completed within the validity timeframe (14 days) of any water quality tests, the Developer or the Developers Representative/Agent must provide all water quality test results to Gold Coast Water within 96 hours of taking the samples. The Developer shall pay all costs to be able to satisfy this requirement. Failure to comply with this requirement may result in the connection not being able to be performed within the 14 days validity period, and new water quality tests being completed at the cost to the Applicant.

The RPEQ for the development must review all of the test results, including that the location description listed on the documentation stating where the tests and/or samples were taken is correct, prior to submitting the results to Gold Coast Water.
Note that the water quality testing is to be done as part of the water connection application process. It is the only test that is not required before the pre-connection inspection. Water connection approval will only be given after the test results are submitted to Gold Coast Water and accepted as compliant in accordance with the SEQ and WSAA Codes.

Where the results are not compliant, Gold Coast Water will inform the RPEQ of the non-compliance, and the Contractor shall re-flush and disinfect the new works and redo the tests at their cost. Gold Coast Water staff will then coordinate a suitable date(s) with the Contractor for the connection to be completed.

Notes:
Water quality and pressure tests cannot be completed against a City’s live closed valve due to public safety requirements.

Requirements for Sewerage - gravity
Please refer to the relevant sections of the latest version of WSA02 Sewerage Code of Australia and SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA02) for all information.

The Contractor shall ensure that all construction works is fully completed and that all internal surfaces of the pipes and structures are clean before any of the tests and/or CCTV is performed. Failure to comply with this requirement, shall results in the CCTV being rejected by Gold Coast Water.

All tests shall be performed by a NATA accredited testing organisation which holds current listing for the relevant acceptance test. All of the result pages and CCTV reports shall clearly state the development name, address and development approval number (OPW/MCU/ROL).

CCTV inspections shall be completed by certified/qualified CCTV operators using cameras in accordance with the WSA05 Conduit Inspection Reporting Code requirements.

In summary, Gold Coast Water will require the following to be completed and results submitted:
- Compaction tests for embedment and trench fill zones (open trench construction only).
- Vacuum tests of all pipes and manholes.
- Infiltration tests (where applicable).
- Deflection (Ovality) tests of all flexible pipes.
- CCTV inspections of all pipes and structures (includes video footage and hardcopy report, and inclination report).

Ovality testing and CCTV inspections may be performed concurrently. It is strongly recommended that all sewer testing and CCTV is completed within a two week period (maximum) due to the pipes primarily being reviewed using the CCTV footage. If the timeline between the ovality testing (which should be completed before the CCTV) and CCTV investigations is more than the recommended 2 weeks period, where joints are seen as out of round during the CCTV reviews, further ovality testing will be required to be completed by the Contractor at their cost to prove acceptance of the joint.

Gold Coast Water focuses on the following defects during their review of CCTV footage, in accordance with the WSA05 Conduit Inspection Reporting Code:
- Constructed grade of pipe vs approved design grade and absolute minimum grade (WSA 02).
- Vertical (grade) tolerance along pipelines using inclination data.
- Deformation/collapse of pipes and/or joints.
- Joint displacement or defects.
- Obstructions within pipes, joints and junctions.
- Out of tolerance water levels within pipes, junctions and manholes.
- Deposits on walls or invert of pipes and/or joints.
- Surface damage to internal surfaces of pipes and fittings.
• Surface damage to internal surfaces of manholes including benching.
• Damage or significant cracking of internal cement lining (where applicable).
• Linear measurement on footage is continuous.

Refer to Appendix A of this document for further information on the above defects and what is determined as acceptable and not acceptable to Gold Coast Water.

The RPEQ for the development must review all of the test results and CCTV information, including that the location description listed on the documentation stating where the tests were taken is correct, prior to submitting the results and CCTV to Gold Coast Water.

Where defects are found during Gold Coast Water’s CCTV review, the RPEQ will be informed of the defect and instructed to either retest or rectify at their cost. Any retesting required shall be completed with a Gold Coast Water representative on site and the new results submitted to Gold Coast Water for review and acceptance. Where rectification is required, the work shall be completed with a Gold Coast Water representative on site.

A reassessment fee may be charged by Gold Coast Water for CCTV resubmissions in accordance with the City’s registered fees and charges.

A pre-connection inspection is not permitted until after the test results and CCTV are submitted to Gold Coast Water and accepted as compliant in accordance with the SEQ and WSAA Codes.

NOTE: A secondary CCTV inspection is required to be completed by the Contractor not more than two weeks before the onsite inspection for “Off Maintenance” certification inspection. The requirements for secondary CCTV inspections is yet to be determined by Gold Coast Water but will be included in this guide once determined.

Requirements for Sewerage – pressure
Please refer to the relevant sections of the latest version of WSA04 Sewage Pumping Station Code of Australia and SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA04) for all information.

The Contractor shall ensure that all construction works are fully completed and that all internal surfaces of the pipes are clean before any of the tests are performed.

All tests shall be performed by a NATA accredited testing organisation which holds current listing for the relevant acceptance test. All of the result pages shall clearly state the development name, address and development approval number (OPW/MCU/ROL).

In summary, Gold Coast Water require the following to be completed and results submitted:

• Compaction tests for embedment and trench fill zones (open trench construction only).
• Hydrostatic pressure tests of all pipes.

The discharge manhole and section of gravity pipe at the discharge end of the pressure main shall have acceptance testing in accordance with the relevant sections of the latest version of WSA04 Sewage Pumping Station Code of Australia and SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA04).

The RPEQ for the development must review all of the test results, including that the location description listed on the documentation stating where the tests were taken is correct, prior to submitting the results to Gold Coast Water.

A pre-connection inspection is not permitted until after the test results are submitted to Gold Coast Water and accepted as compliant results in accordance with the SEQ and WSAA Codes.

Where the results are not compliant, Gold Coast Water will inform the Contractor to redo the tests with a Gold Coast Water representative on site at their cost. All new test results shall be submitted to Gold Coast Water for review and
acceptance. Where rectification is required, the work shall be completed with a Gold Coast Water representative on site.

Once test results are accepted as compliant, Gold Coast Water will coordinate a suitable date with the Contractor for the connection to be completed.

Requirements for Sewerage – vacuum
Please refer to the relevant sections of the latest version of WSA06 Vacuum Sewerage Code of Australia and SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA06) for all information.

The Contractor shall ensure that all construction works are fully completed and that all internal surfaces of the pipes are clean before any of the tests are performed.

All tests shall be performed by a NATA accredited testing organisation which holds current listing for the relevant acceptance test. All of the result pages shall clearly state the development name, address and development approval number (OPW/MCU/ROL).

In summary, Gold Coast Water require the following to be completed and results submitted:

- Compaction tests for embedment and trench fill zones (open trench construction only).
- Vacuum tests of all pipes and services.

The RPEQ for the development must review all of the test results, including that the location description listed on the documentation stating where the tests were taken is correct, prior to submitting the results to Gold Coast Water.

Connection is not permitted until after the test results are submitted to Gold Coast Water and accepted as compliant results in accordance with the SEQ and WSAA Codes. Where the results are not compliant, Gold Coast Water will inform the Contractor to redo the tests with a Gold Coast Water representative on site at their cost. All new test results shall be submitted to Gold Coast Water for review and acceptance. Where rectification is required, the work shall be completed with a Gold Coast Water representative on site.

Once test results are accepted as compliant, Gold Coast Water staff will coordinate a suitable date with the Contractor for the connection to be completed.

NOTE: Acceptance testing of vacuum systems is followed by a series of commissioning tests in accordance with the relevant sections of the latest version of WSA06 Vacuum Sewerage Code of Australia and SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA06).
Appendix A – CCTV Review Technical Specification

As the final owner of newly constructed sewer networks, Gold Coast Water has the responsibility to its customers to only accept new works that have been completed in accordance with the SEQ Water Supply and Sewerage Design and Construction Code requirements. The quality of the construction shall be such that no defects exist at handover of the infrastructure to Gold Coast Water.

The Conduit Inspection Reporting Code of Australia WSA05 has been clearly states acceptance criteria for new sewer pipes and associated structures. Information provided in this appendix provides additional details of what Gold Coast Water consider acceptable and not acceptable for handover of ownership for new gravity sewer assets. The Contractor and RPEQ for the development must be familiar with the contents of the latest version of The Conduit Inspection Reporting Code of Australia WSA05, and this technical specification.

Both the contractor and RPEQ shall undertake a review of the CCTV footage and report to confirm that no defect exist which will impact on the future operation and maintenance of the system including the existing network downstream and any future extensions upstream.

A1 General Information
Gold Coast Water require all CCTV footage to be clear and sharp so that review of the newly constructed works can be completed. CCTV footage has been received previously that is of poor resolution, out of focus, and/or has poor lighting. This type of footage will be rejected by Gold Coast Water, and the contractor will be required to perform the inspection again at their cost.

FIG A1.1: Example of good quality footage – acceptable
FIG A1.2: Example of poor quality footage – not acceptable
FIG A1.3: Example of poor quality footage of a joint - not acceptable
FIG A1.4: Example of poor quality footage of a joint - not acceptable
The CCTV footage and report must conform with the requirements set out in the SEQ Water Supply and Sewerage Design and Construction Code.

CCTV reports have been received by Gold Coast Water that do not accurately list all defects or features in the main. Footage has in the past shown damaged joints, cracking, joint displacement, damaged house connections, major obstructions, etc. that has not been documented in the report. The contractor is responsible for ensuring that their CCTV contractor is noting all defects found during the investigations, and that these defects are listed in the reports and on the footage. Reports like this are unacceptable and will be sent back to the Contractor to rectify at their cost.

CCTV reports have been submitted to Gold Coast Water in the past that incorrectly state the sewer main/maintenance structure number and location, rendering the report useless. Care must be taken by the CCTV contractor to enter the asset identifier correctly, or the reports will not be accepted resulting in new CCTV being required at the cost to the contractor.

The following sections provide further detail to assist Contractors and RPEQs to understand the quality of review required to be completed prior to submission to Gold Coast Water.

A2 Constructed grade of pipe vs approved design grade and absolute minimum grade (WSA 02)

The RPEQ for the development shall review the CCTV inclination report grade against the design grade and determine whether the longitudinal grades between maintenance structures are within the acceptable tolerances listed in WSA02. The RPEQ is required to consider whether they can review this requirement by using the interpolated inclination grade against the design grade or whether further calculations or survey information is required due to changes in the longitudinal grade taking the camera off the interpolated inclination grade line.

NOTE: The SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA02) requires the CCTV inclinometer to be accurate to +1% (*) providing some variance in the estimated constructed grade. Where the constructed grade is determined to be outside the acceptable tolerances, the RPEQ shall instruct the Contractor to relay the specific line or may wish to request the change by submitting a permissible change application which may or may not be accepted by Gold Coast Water.

A3 Vertical (grade) tolerance along pipelines using inclination data

The SEQ Water Supply and Sewerage Design and Construction Code (Amendment to WSA02) requires the CCTV inclinometer to be accurate to +1% (*) The RPEQ for the development shall determine from the CCTV inclination report and any survey information (as constructed information) whether the longitudinal grade between maintenance structures conform with the acceptable tolerances and the relevant tables in WSA02 adjusting the suit the inclinometer accuracy. This cannot be determined by the invert levels provided in the as constructed survey information at each maintenance structure, but can be determined where the as constructed survey information provides progressive construction levels along the pipe at suitable intervals and at the top of each junction.

The table below provides examples of how the RPEQ should review each line for:

- constructed grade vs approved design grade and absolute minimum grade, and
- vertical (grade) tolerance along pipelines.

<table>
<thead>
<tr>
<th>Description</th>
<th>Approved Design Grade</th>
<th>Design with inclinometer Accuracy (*)</th>
<th>Inclination Grade</th>
<th>Grade Tolerance</th>
<th>Acceptable (Y/N)</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1/22 – 12/15</td>
<td>5.7%</td>
<td>4.7% to 6.7%</td>
<td>5.8%</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Line 1/22 – 12/15</td>
<td>5.7%</td>
<td>4.7% to 6.7%</td>
<td>7.0%</td>
<td>+20% -20%</td>
<td>Y</td>
<td>Review considered accuracy of inclinometer plus tolerance</td>
</tr>
<tr>
<td>Line 1/22 – 12/15</td>
<td>5.7%</td>
<td>4.7% to 6.7%</td>
<td>Varies due to extra vertical bend being installed</td>
<td>+20% -20%</td>
<td>N</td>
<td>Permissible change required for bend and change of grade</td>
</tr>
<tr>
<td>Line 1/22 – 12/15</td>
<td>5.7%</td>
<td>4.7% to 6.7%</td>
<td>12.5%</td>
<td>+20% -20%</td>
<td>N</td>
<td>Permissible change required for change of grade OR if error with inclination new CCTV required</td>
</tr>
</tbody>
</table>
No backfall is permitted along a pipe but Gold Coast Water will allow for short sections less than 500mm long at joints.

FIG A3.1: Example of how to review an inclination report – pipe acceptable

FIG A3.2: Example of how to review an inclination report – RPEQ to determine if acceptable
NOTE (*) The inclinometer accuracy of +/-1% is used to adjust the design grades. Gold Coast Water will currently allow the +/-1% accuracy to be a full 1% adjustment to allow Contractors and Consultants to begin to review grades until 01 July 2017. After 01 July 2017, Gold Coast Water will require the 1% adjustment to be used on the actual design grade. Eg: current 5.7% design is 4.7 - 6.7%, future 5.7% design will be 5.64 - 5.76%.

A4 Deformation/collapse of pipes and/or joints

The Conduit Inspection Reporting Code WSA05 states a maximum allowable percentage for any collapse in a pipe or junction. Any collapse above this is not acceptable. Gold Coast Water will not accept collapsed pipes or junctions under any circumstance.

FIG A4.1: Example of collapse at a joint – not acceptable
The Conduit Inspection Reporting Code WSA05 also provides the percentage of circumference deformation (ovality) allowable for newly installed sewer mains.

Where circumference deformation (ovality) is evident on the CCTV footage, and the deflection (ovality) test for the line has been completed more than 2 weeks prior to the CCTV investigation, the Contractor shall be required undertake a new ovality test to prove that the joint is acceptable. The RPEQ shall provide a copy of both test results and include the location in the written report as a non-defect.

**A5 Joint displacement or defects**

Gold Coast Water have determined any visible damage to the end of pipes as defects, and as such these will need to be repaired by the Contractor. Defects can include, but is not limited to:

- cracks, tears, burs, indentations or deformations resulting from bad construction techniques,
- end of pipes cut on site not cut square and cleaned in accordance with manufacturer's recommendations,
- foreign matter caught within the joint during installation,
- rolled rubbers protruding from the joint.

The camera shall be stopped at all defects and features and panned/tilted to provide a clear view of the entire defect or feature. If the feature is a lateral connection, the camera should be longitudinally positioned to allow the furthest view up the connection as possible.

The Contractor must ensure that the ends of pipes being installed are visually checked for any defects prior to installation, and any damaged pipes are not installed. Where pipes are required to be cut on site, the Contractor shall ensure that the technique used is in accordance with the manufacturer's recommendations. All cut ends shall be cut square and cleaned, and deburred on the inside and outside, with the correct chamfer length and angle provided on the outside.

Gold Coast Water do not accept sandwich wall pipes to be used for gravity sewers. Contractors must ensure this type of pipe is not purchased or used.
All manhole/pipe interface joints and rocker pipes must be included in the CCTV investigations so that the joints can be reviewed. The joints and rocker pipes shall be in accordance with SEQ-SEW-1302-1.

FIG A5.1: Example of a defect at a joint – not acceptable
FIG A5.2: Example of defects at a joint – not acceptable

FIG A5.3: Example of a defect at a joint – not acceptable
FIG A5.4: Example of a defective house junction – not acceptable
FIG A5.5: Example of a defective joint – not acceptable
Gold Coast Water do not permit heating of PVC pipes under any circumstance. The process of heating pipes can result in damage to the pipe such as deformation of the socket of spigot.

![Example of a defect at the manhole/pipe interface joint – not acceptable](image)

The Conduit Inspection Reporting Code WSA05 provides some information for the distances of displacement (longitudinal, radial and angular) at joints. To assist Contractors and Consultants further with these requirements, minimum and maximum allowable widths (gaps) of joints have been determined by Gold Coast Water to provide an understanding on what Gold Coast Water will accept.

The Contractor shall use these measurements at all times, and where the widths are estimated during the review of the CCTV footage as being wider than these measurements, the Contractor shall be required to repair the joint accordingly. The width of the joint can easily be determined by the RPEQ by estimating the length of the total gap in regard to the length of the taper. If the footage is clear, the taper should be able to be seen. This removes any unknown due to possible footage magnification.

The nominated gaps for both socket joints and couplings must be provided at all RRJ joints. Gaps allow the movement of the pipes.

The following information details acceptable widths for socket joints.

![Typical Elastomeric Seal Joint on Plain Wall Pipelines and Fittings](image)

Typical PVC-U DWV Rubber Ring Joint shown by above extract copy of Figure 7.1 from AS/NZS1260.
Adjusted Figure 7.1 from AS/NZS1260 showing the “Standard Gap” that is defined in the following Table.

<table>
<thead>
<tr>
<th>NOMINAL DIAMETER DWV PIPE</th>
<th>STANDARD_GAP (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GCW ABSOLUTE MINIMUM₁</td>
</tr>
<tr>
<td>100mm</td>
<td>15</td>
</tr>
<tr>
<td>150mm</td>
<td>20</td>
</tr>
<tr>
<td>225mm</td>
<td>25</td>
</tr>
<tr>
<td>300mm</td>
<td>25</td>
</tr>
</tbody>
</table>

Notes

1. The GCW Absolute Minimum Standard Gap is based on the pipes ability to thermally react and/or be affected by reactive soil movement and close up the Minimum Standard Gap. Gaps smaller than the GCW Absolute Minimum Standard Gap are not acceptable.

2. The Minimum and Maximum Standard Gaps from Pipe Manufacturer. Gaps greater than the Maximum Standard Gap are not acceptable.

A note while watching the CCTV footage to assist in the determination of a wide joint, the camera normally produces a significant “bump” when the camera traverses over it.
The required gap width for various coupling types are noted on standard drawing SEQ-SEW-1500-1.

**A6 Obstructions within pipes, joints and junctions**

The Conduit Inspection Reporting Code WSA05 states obstructions within a pipe or junction is not acceptable. Gold Coast Water will not accept obstructions of any size within pipes or junctions under any circumstance.
A7 Out of tolerance water levels within pipes, junctions and manholes

The Conduit Inspection Reporting Code WSA05 states acceptable water levels within a pipe. Gold Coast Water will not accept water levels greater than those stated in the Code under any circumstance.

FIG A7.1: Example of minor ponding within a pipe – acceptable

FIG A7.2: Example of minor ponding within a house junction – not acceptable
A8 Deposits on walls or inverts of pipes and/or junctions

All new work must be sufficiently cleaned prior to CCTV being undertaken and to handover to Gold Coast Water. This allows all the pipes, joints, junctions and maintenance structures to be inspected using CCTV. Debris left in the new work also has the potential to create a blockage somewhere in the sewerage network and ultimately could damage pumps at pump stations.

The deposits shown in FIG A8.2 are only acceptable for the last 10m maximum at the temporary plug at the connection point to Gold Coast Water’s existing network. This section of pipe shall be emptied by the Contractor prior to the CCTV investigations, but due to some silt possibly entering the new works during the construction, this section will not be able to be cleaned thoroughly but Gold Coast Water will deemed this acceptable but only to the extent as shown in FIG A8.2 (no large deposits accepted). The Contractor must stop as much silt and foreign matter from entering the new works at all times during the construction. Stored new pipes should be cleaned inside prior to installation, and end caps or similar should be used on all exposed open ends of pipes within the trench, and silt fencing installed around maintenance structures during the construction.
A9 Surface damage to internal surfaces of manholes including benching

All inspections shall start and finish at the centre of a manhole with the camera panned and tilted to provide a complete image of the manhole chamber and the manhole/pipe interface, where possible. This may require any natural light from an open manhole to be temporarily blocked while this is being carried out.

Any inspection not able to start or finish in manhole shall have a comment included on video and report to explain why this was not physically possible to do so. Incomplete manholes will not be accepted as a reason why the inspection cannot start or finish inside a manhole, as all the manholes must be fully completed prior to the inspection being undertaken.

The camera should closely inspect the manhole/pipe interface joint prior to entering the pipeline by panning and tilting the camera to capture detailed footage of this area. A clear photograph should also be provided of all manhole/pipe interface joints showing the condition of the concrete around the joint up to the top of the manhole benching height.

The start point for distance measurement (0.0m) shall be the point at which the conduit passes through the wall (manhole/pipe interface) of the manhole chamber, not the centre of the manhole chamber.

A10 Damage or significant cracking of internal cement lining (where applicable)

The Conduit Inspection Reporting Code WSA05, provides information on the orientation and magnitude of acceptable cracks.
The CCTV footage must be clear and at a speed where the internal cement lining of pipes can be adequately assessed. Most DICL manufacturers permit a crack of 0.8mm wide maximum. Any cracks wider than this or sections of missing cement lining must be repaired by the Contractor following approval by Gold Coast Water of the proposed repair technique and product.

**A11 Linear measurement on footage is continuous**

The footage must include a continuous linear measurement along the pipeline at all times. Footage without the linear measurement will not be accepted. Where excessive slippage occurs, the CCTV will not be accepted. Cutting and joining of CCTV footage along a pipeline is not acceptable.

The following fittings (as a minimum) must have their location along the pipe noted on the footage and in the report in conjunction with the linear measurement:

- Manhole/pipe interface shall be the point noted as 0.0m,
- Manhole couplings
- Rocker pipes
- Bends (vertical and horizontal)
- Junctions
- Couplings

The start point for distance measurement (0.0m) shall be the point at which the conduit passes through the wall (manhole/pipe interface) of the manhole chamber, not the centre of the manhole chamber.

All defects should have their location along the pipe noted on the footage and in the report in conjunction with the linear measurement.
## Acceptance Test Result Review Check Sheet

<table>
<thead>
<tr>
<th>DEVELOPMENT:</th>
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<tr>
<td>OPW NUMBER:</td>
<td>MCU/ROL NUMBER:</td>
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<td>CONTRACTOR COMPANY:</td>
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<td>CONSULTING COMPANY:</td>
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<tr>
<th>CONTRACTOR</th>
<th>REGISTERED PROFESSIONAL ENGINEER (RPEQ)</th>
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<td>YES</td>
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### WATER (Potable and Recycled) TESTING

- Have all end of lines been installed in accordance with the SEQ D&C Code
- Have all mains and property services been fully constructed in accordance with the SEQ D&C Code prior to testing
- Were all mains and property services thoroughly cleaned prior testing
- Was the hydrostatic pressure testing performed on all mains and property services in accordance with the SEQ D&C Code
- Were all mains disinfected in accordance with the SEQ D&C Code including neutralisation of disinfectant
- Were all water quality sampling and testing performed in accordance with the marked up layout plan accepted by Gold Coast Water and the SEQ D&C Code
- Have all failed results been submitted to Gold Coast Water along with all passed results. Were all results reviewed by the contractor and the RPEQ and are they in accordance with the SEQ D&C Code requirements

### SEWER TESTING

- Have all mains, maintenance structures and property services been fully constructed in accordance with the SEQ D&C Code prior to testing
- Were all mains, maintenance structures and property services thoroughly cleaned prior testing
- Has vacuum testing been performed on all mains, maintenance structures and property services by a NATA accredited organisation in accordance with the SEQ D&C Code
- Where applicable, was infiltration testing performed by a NATA accredited organisation in accordance with the SEQ D&C Code
- Has the deflection (ovality) testing performed on all mains, by a NATA accredited organisation in accordance with the SEQ D&C Code
| Have all plastic lined concrete sewers and manholes been visually inspected, spark tested and/or locking key pull-out tested in accordance with the SEQ D&C Code. |
| Have all failed results been submitted to Gold Coast Water along with all passed results. Were all results reviewed by the contractor and the RPEQ and are they in accordance with the SEQ D&C Code requirements |
| Have all defects found during the CCTV review been rectified and new CCTV and tests redone and reviewed accordingly |

**CONTRACTOR COMMENTS:**

| REVIEWED BY (CONTRACTOR): | SIGNATURE: | DATE: |

| RPEQ COMMENTS: |

| REVIEWED BY (RPEQ): | SIGNATURE: | DATE: |

| DATE SUBMITTED TO GCW BY RPEQ: | RPEQ SIGNATURE: |
CCTV Review Check Sheet

| DEVELOPMENT: | | | |
| OPW NUMBER: | MCU/ROL NUMBER: | | |
| CONTRACTOR COMPANY: | | | |
| CONSULTING COMPANY: | | | |
| CCTV DATE(s): | | | |

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- Have all mains, maintenance structures and junctions been fully constructed prior to CCTV inspection
- Have all cut ends of pipes been cut straight and cleanly and installed as per manufacturers recommendations without damage
- Have all mains, maintenance structures and junctions been thoroughly cleaned prior to CCTV inspection
- Have all mains, maintenance structures and junctions had CCTV inspections completed (provide marked up layout plan) and have all lines and structures been correctly titled
- Was the camera calibrated in accordance with WSA 05
- Did the CCTV operator have correct qualifications in accordance with WSA 05
- Is all footage is clear and in focus
- Was the camera positioned in accordance with WSA 05
- Was the camera speed in accordance with WSA 05
- Was the measurement of linear distance shown on the footage in accordance with WSA 05
- Did all inspections start and end within maintenance structures (at center)
- Were all maintenance structures fully scanned in accordance with the SEQ D&C Code
- Were all joints including pipe/structure interfaces inspected using 360 degree pan in accordance with the SEQ D&C Code
- Have photographs been provided in accordance with WSA 05
- Has sandwich wall pipe been installed within the new works
- Have all defects found been noted on the footage and in the report in accordance with the WSA 05 (refer to table F5 and F6 of WSA 05 and Appendix A in this document)
- Have rocker pipe lengths/distances been provided on the CCTV and are the lengths within tolerance in accordance with WSA 05
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I CONFIRM I HAVE REVIEWED THE CCTV FOOTAGE AND REPORT IN ACCORDANCE WITH THE SEQ D&C CODE AND THE CONDUIT INSPECTION REPORTING CODE WSA05. I AM SATISFIED THAT THE WORK DOES NOT INCLUDE ANY DEFECTS AND HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE SEQ D&C CODE.

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