- The incident management procedures / contact list must be displayed on site.
- Basic monitoring equipment for determining free chlorine should be kept on site.
- Ablution facilities are required at the fountain source. The building and surrounds also need attention, both structurally and aesthetically.
- Booster pumps and surrounds need attention regarding physical appearance, and leakage of glands.

*Franskraal WTW:* The WTW was completely rebuilt a number of years ago and is currently well equipped and well-operated. The plant operates well within its design capacity under normal conditions. It received two consecutive Blue Drop awards and also received an award for being the best small WTW in the country from DWA. The recommendations included in the 2013 Process Audit Report were as follows:

- A Maintenance Logbook must be kept on site reflecting the "Plant Man" software information applicable to the Franskraal WTW.
- The existing Operation and Maintenance Manual must be kept on site and followed meticulously.
- A chlorine audit must be arranged, which will indicate whether the chlorine facilities comply with the legal requirements. The audit must include training, chlorine building, dosing equipment, safety equipment, chlorine handling, procedures to display signage and internal transport and emergency showers.
- All personnel handling chlorine must have undergone appropriate accredited chlorine handling training.

*De Kelders WTW:* This new Reverse Osmosis WTW was constructed during 2011 at De Kelders. The recommendations included in the 2013 Process Audit Report were as follows:

- The installation must be classified and Registration certificates must be displayed on site.
- A Maintenance Logbook must be kept on site reflecting the "Plant Man" software information applicable to the De Kelders WTW.
- Operation and Maintenance Manuals must be put in place and kept on site.
- The present system is very sophisticated and caters for a variety of treatment options. The quality of the feed water does not constantly require all unit processes and operation as installed. Very careful consideration of treatment method must be applied for each blend of raw water allowed to the plant. Processes and operations not required to the moment must be carefully maintained to ensure on / off operation under all circumstances.

*Pearly Beach WTW:* The Pearly Beach WTW is a new treatment plant that was recently constructed, and uses state-of-the-art ultrafiltration membrane technology to ensure a high quality final effluent. The distribution system obtained Blue Drop status in May 2012. The recommendations included in the 2013 Process Audit Report were as follows:

- The present system is very sophisticated and caters for a variety of treatment options. The quality of the feed water does not constantly require all unit processes and operation as installed. Very careful consideration of treatment method must be applied for each blend of raw water allowed to the plant. Processes and operations not required to the moment must be carefully maintained to ensure on / off operation under all circumstances.
- Uncontrolled overflow from sludge pond must be properly adhered to.

*Baardskeerdersbos WTW:* The plant operates well within its design capacity. The recommendations included in the 2013 Process Audit Report were as follows:

- Classification and Registration certificates must be obtained and carried in a special folder by the operator.
- A Maintenance Logbook must be kept and filed into the special folder carried by the operator.
- The Operation and Maintenance Manual must be present at the site or carried by the operator, as well as an Operational Monitoring Logbook.
- The unit processes and operations must be reconsidered and appropriate technology applied.
- Office and ablution facilities are required and the security measures need upgrading.

*Buffeljagsbaai Bay WTW:* The chlorine installation is new and care was taken to ensure that all the safety requirements are met. The recommendations included in the 2013 Process Audit Report were as follows:

- Classification and Registration certificates must be obtained and carried in a special folder by the operator.
- A Maintenance Logbook must be kept and filed into the special folder carried by the operator.
- The Operation and Maintenance Manual must be present at the site or carried by the operator, as well as an Operational Monitoring Logbook.
- Office and ablution facilities are required and the security measures need upgrading at the borehole.
- Step-irons at reservoir to be secured and safety protection to be provided to step-irons.

**BULK WATER INFRASTRUCTURE**

The Water Master Plan (July 2012) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water supply systems.

*Buffels River:* The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.

- Upgrading of the 300mm dia bulk pipeline from Buffels River WTW to Betty's Bay Voorberg reservoir (The upgrading of this pipeline can be postponed if a booster pump station is constructed on the pipeline before the draw-off point to the Pringle Bay reservoir).

*Kleinmond:* The existing bulk water supply system has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. No future feeder mains are required.

*Greater Hermanus:* The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. The following upgrades to the existing Coastal bulk pipeline supply system will be required in future to augment bulk water supply through this system.

- Replace the existing 300mm dia bulk pipeline with a 500mm dia pipeline when the existing 300 and 400mm dia bulk pipes reaches capacity.
- New 200mm dia parallel reinforcement of the existing 160mm dia bulk supply pipeline to the Onrus reservoir in order to augment supply to the reservoir.
- Replace the existing 300mm dia bulk pipeline with a 500mm dia pipeline when the existing 300 and 350mm dia bulk pipes reaches capacity.
- New 550mm dia parallel reinforcement of the existing 250mm dia pipeline when the existing 250mm dia bulk pipe reaches capacity.

- New 500mm dia parallel reinforcement of the existing 150mm dia bulk supply pipeline to the Hawston LL reservoir in order to augment supply to the reservoir.

- New 200mm dia parallel reinforcement of the existing 250mm dia bulk supply pipeline to the Fisherhaven LL reservoir in order to augment supply to the reservoir.

- New 250mm dia parallel reinforcement of the existing 200mm dia bulk supply pipeline to the Fisherhaven LL reservoir in order to augment supply to the reservoir.

The following upgrades to the existing Hermanus bulk pipeline supply system will be required in future to augment bulk water supply through this system.

- Replace the existing 225mm dia bulk pipeline with a 400mm dia pipeline when the existing 225 and 300mm dia bulk pipes reaches capacity.

- New 315mm dia parallel reinforcement of the existing 400mm dia bulk supply pipeline when the 400mm dia pipeline reaches capacity.

The following new feeder mains will be required in future.

- New 335mm dia bulk supply pipeline from the Hawston LL reservoir to the proposed Hawston HL reservoir when it is constructed.

Other future mains that will require upgrading are

- New 250mm dia parallel reinforcement of the existing 150mm dia bulk supply pipeline to the Sandbaai reservoir in order to augment supply to the reservoir.

- Replace the existing 225mm dia bulk pipeline (from the Preekstoel WTW to the Coastal and Hermanus bulk pipelines) with a 500mm dia pipeline when the existing 225, 400 and 600mm dia bulk pipes from the Preekstoel WTW reaches capacity.

*Stanford:* The existing bulk water supply system has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. No future feeder mains are required.

*Greater Gansbaai:* The existing Greater Gansbaai bulk supply system was designed to supply water to De Kelders, Gansbaai, Kleinbaai and Franskraal from the Klipgat water source. During peak demand periods, zone valves before Gansbaai reservoirs are closed to ensure that Klipgat pump station provides water only to De Kelders and a portion of the Gansbaai consumers whereas the remaining consumers are temporarily provided with water from the Franskraal Pump System.

The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.

For the future scenario the Greater Gansbaai bulk system was designed to supply water from the Franskraal pump system to Franskraal, Kleinbaai and Gansbaai. De Kelders will be supplied with water from the Klipgat system and be supplemented by water from the Franskraal pump system. The following upgrades to the existing Greater Gansbaai bulk supply system will be required in the future:

- Replace the existing 200mm dia bulk pipeline with a 315mm dia pipeline when the existing 200mm and 355mm dia bulk pipes reaches capacity.

- New 200mm dia parallel reinforcement of the existing 150mm dia bulk supply pipeline to the Kleinbaai reservoir in order to augment supply to the reservoir.

- New 315mm dia parallel reinforcement of the existing 250mm dia bulk supply pipeline in order to augment supply to the Gansbaai and De Kelders reservoirs.

- New 400mm dia bulk supply pipeline to the Gansbaai reservoir. This item is required in order to utilize the existing bulk pipelines between Gansbaai and De Kelders so that bulk water supply to the De Kelders reservoirs can be augmented from Gansbaai.

- Dedicate the existing 250mm dia pipeline between the Greater Gansbaai bulk system and the De Kelders reservoirs as a bulk supply pipeline to the De Kelders reservoirs. This item is required to isolate the bulk and distribution systems from each other when the new supply pipeline from the reservoirs to the De Kelders network is implemented.

- New 450mm dia bulk supply pipeline from the Franskraal WTW to the Franskraal reservoirs.

*Pearly Beach:* The existing bulk water supply system has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. No future feeder mains are required.

## WATER PUMP STATIONS

The Water Master Plan (July 2012) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water pump stations:

**Table 6.2.2: Future water pump stations required**

| Distribution System | Recommendations included in the Water Master Plan | Capacity (l/s) | Head (m) | Cost (R Million) |
|---|---|---|---|---|
| Buffels River | To improve the residual pressures of the higher lying erven in the Voorberg reservoir zone | 10 | 25 | 0.559 |
| | Required to augment bulk supply to Voorberg reservoir | 70 | 10 | 0.655 |
| | Required to sustain pressure in the Voorberg reservoir zone network | 15 | 150 | 0.154 |
| Kleinmond | Verify duty point of PS for modeling purposes | 3 | 45 | - |
| | Verify duty point of PS for modeling purposes | 7 | 30 | - |
| | Required when future area KM4 develops | 15 | 30 | 0.596 |
| Greater Hermanus | When Hawston High level reservoir is constructed | 130 | 57 | 2.050 |
| | When supply problems to Fisherhaven HL reservoir occur, investigate existing capacity first | 20 | 50 | 0.707 |
| | To augment bulk water supply when existing supply reaches capacity (upgrade PS) | 310 | 20 | 0.756 |
| | To augment bulk water supply when existing supply reaches capacity | 100 | 20 | 0.920 |
| Stanford | No future pump stations are required | - | - | - |
| Greater Gansbaai | New bulk PS to supply bulk water to Kleinbaai, Gansbaai and De Kelders reservoirs | 55 | 35 | 0.906 |
| | When Franskraal PS reaches capacity, after MP items OGW.B4 & OGW.B5 is implemented | 140 | 40 | 0.657 |
| | When Franskraal PS reaches capacity, after MP items OGW.B2 & OGW.B3 is implemented | 210 | 45 | 0.731 |
| | New bulk PS to supply bulk water to De Kelders reservoirs | 40 | 60 | 0.993 |
| | Required when Franskraal HL reservoir is constructed | 70 | 65 | 1.443 |
| Pearly Beach | No future pump stations are required | - | - | - |
| **Total** | | | | **11.127** |

## RESERVOIR INFRASTRUCTURE

Overstrand Municipality's overall storage factors of the reservoirs for the various towns, based on 1 x PDD (24 hours storage capacity), are 1.21 for Buffels River, 1.59 for Kleinmond, 2.10 for Greater Hermanus, 1.90 for Stanford, 1.55 for Greater Gansbaai, 2.08 for Pearly Beach, 1.58 for Baardskeerdersbos and 4.00 for Buffeljagsbaai Bay.

Even though the Municipality's overall storage capacity might be adequate there might be some distribution zones within the Municipality's networks with inadequate storage capacity, as identified through the Water Master Plan (July 2012) and indicated in the table below:

**Table 6.2.3: Future reservoirs required**

| Distribution System | Recommendations included in the Water Master Plan | Capacity (Ml) | Cost (R Million) |
|---|---|---|---|
| Buffels River | Required to increase reservoir storage for Rooi Els (Implemented) | - | - |
| | Required to increase reservoir storage for Pringle Bay (TWL = 67m). | 2.500 | 5.478 |
| | Required to increase reservoir storage for Betty's Bay (TWL = 66m). | 3.000 | 6.132 |
| Kleinmond | No future reservoirs are required | - | - |
| Greater Hermanus | Required to increase reservoir storage for Fisherhaven (TWL = 60m). | 2.500 | 5.478 |
| | Required to increase reservoir storage for Hawston (TWL = 66m). | 3.000 | 6.132 |
| | New reservoir for higher lying future development areas in Hawston (TWL = 120m). | 5.000 | 8.820 |
| | Required to increase reservoir storage for Hawston HL Zone (TWL = 120m). | 5.000 | 8.820 |
| | Required to increase reservoir storage for Onrus (TWL = 78m). | 1.500 | 3.872 |
| | Required to increase reservoir storage for Kidbrooke Place (Cost to developer) (TWL = 85m). | 0.300 | 0.000 |
| | Required to increase reservoir storage for Sandbaai (TWL = 65m). | 3.000 | 6.132 |
| | Required to increase reservoir storage for Northcliff zone (TWL = 75m). | 0.300 | 1.361 |
| | Required when future areas GH25 & GH26 develop (TWL = 144m). | 0.500 | 1.884 |
| | Required when future area GH1 develops (TWL = 108m). | 1.000 | 2.954 |
| | Required to increase reservoir storage for Mount Pleasant (TWL = 87m). | 0.500 | 1.884 |
| Stanford | A new reservoir is proposed at the existing Stanford reservoir site to augment reservoir storage for Stanford in order to accommodate anticipated future development areas (TWL = 85m) | 1.500 | 3.872 |
| Greater Gansbaai | Required to increase reservoir storage for Franskraal (TWL = 59m) | 1.500 | 3.872 |
| | Abandon existing 0.300 Ml reservoir when new Franskraal 1.500 Ml reservoir is constructed (TWL = 59m) | - | - |
| | Abandon existing 0.225 Ml reservoir when new Franskraal 1.500 Ml reservoir is constructed (TWL = 59m) | - | - |
| | Required to increase reservoir storage for Kleinbaai (TWL = 61m) | 4.000 | 7.616 |
| | Required to increase reservoir storage for Gansbaai (TWL = 63m) | 5.000 | 8.820 |
| | Required to increase reservoir storage for De Kelders (TWL = 98m) | 0.500 | 1.884 |
| | Additional reservoir storage capacity for Franskraal LL zone when future areas GC31 & GC33 develop (TWL = 59m) | 7.000 | 11.368 |
| | New Franskraal HL reservoir when future areas GG32 and higher lying erven of GG33 develop (TWL = 120m) | 5.500 | 9.472 |
| Pearly Beach | No new reservoirs are required | - | - |
| **Total** | | **53.100** | **105.851** |

## WATER AND SEWER RETICULATION INFRASTRUCTURE

The Water Master Plan (July 2012) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

**Table 6.2.4: Future water reticulation infrastructure required**

**BUFFELS RIVER**

**Proposed distribution zones**

- The only changes to the existing distribution zones are that the water network of the higher lying erven in the Betty's Bay Voorberg reservoir zone is rezoned and incorporated in a new Betty's Bay booster zone.

**Proposed future system and required works**

The existing Buffels River water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario

| |
|---|
| and the additional future development areas.<br>• A few distribution pipelines are required to reinforce water supply within the Pringle Bay reservoir, Voorberg reservoir and Sunny Seas reservoir distribution networks.<br>• A few pipelines and valves are proposed in order to implement the Betty's Bay booster zone. |
| **KLEINMOND** |
| **Proposed distribution zones**<br>• The Protearand reservoir zone is increased to accommodate future development areas within the zone.<br>• A new PRV zone is proposed in order to reduce the high static pressures of the lower lying erven within the existing Protearand reservoir zone **(Was implemented)**.<br>• Three new booster pumping zones are proposed for higher lying future development areas KM-1, KM-2 and KM-4.<br>• The existing Protearand reservoir zone is rezoned in order to accommodate the higher lying erven within the Over Hills suburb in the proposed booster pumping zone No.3. |
| **Proposed future system and required works**<br>The existing Kleinmond water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.<br>• A few distribution pipelines are required to reinforce water supply within the Kleinmond distribution networks.<br>• New distribution pipelines are proposed for when future development areas KM-2, 3 and 4 develop.<br>• A new pipeline and valves are proposed in order to implement the Kleinmond booster zone No.3 |
| **GREATER HERMANUS** |
| **Proposed distribution zones**<br>• A new Hawston HL reservoir zone is proposed to accommodate future development area GH-5.1 as well as the existing higher lying erven in Hawston that are currently supplied from the Fisherhave HL reservoir. This zone should be supplied from a new reservoir with a TWL of 120m.<br>• A new Hawston HL PRV zone (supplied from the proposed Hawston HL reservoir zone via a PRV) is proposed to accommodate future development areas GH-6.1 and 6.3. The setting of the PRV should be set at 63m.<br>• The boundaries of the Northcliff reservoir zone are increased to accommodate some of the higher lying erven of the Hermanus reservoir zone.<br>• The boundaries of the Hermanus Heights reservoir zone are increased to accommodate erven that are currently supplied directly from the Hermanus bulk pipeline as well as the higher lying erven in the North Western part of Voëlklip that are currently supplied from the Voëlklip LL reservoir.<br>• The boundaries of the existing reservoir zones are increased to accommodate future development areas in Greater Hermanus. |

| **Table 6.2.4: Future water reticulation infrastructure required** |
|---|
| **GREATER HERMANUS / Continue** |
| **Proposed future system and required works**<br>The existing Greater Hermanus water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.<br>• A few distribution pipelines are required to reinforce water supply within the Greater Hermanus distribution network.<br>• New distribution pipelines are proposed to supply future development areas with water when they develop.<br>• A new inter-connection pipeline between the Fisherhaven LL reservoir zone and the Hawston LL reservoir is proposed as an emergency connection when future development area GH-3 develops.<br>• A new non-return valve on the 200mm dia supply pipeline from the Fisherhaven HL reservoir to the proposed Hawston HL reservoir zone is proposed in order to prevent inflow during the night from the Hawston HL reservoir zone into the Fisherhaven HL reservoir.<br>• A new PRV in the future Hawston HL reservoir zone is proposed in order to manage static pressures in this future zone.<br>• Rezoning between the Northcliff reservoir and Hermanus reservoir zones and between the Hermanus Heights reservoir, Direct Feed and Voëlklip LL reservoir zones is proposed. |
| **STANFORD** |
| **Proposed distribution zones**<br>• The existing Stanford PRV zone is increased to accommodate a larger portion of the existing Stanford reservoir zone (**Was implemented**).<br>• The boundaries of the existing zones are increased to accommodate future development areas in Stanford. |
| **Proposed future system and required works**<br>• A few distribution pipelines are required to reinforce water supply within the Stanford distribution network.<br>• New distribution pipelines are proposed for when future development areas SF-1 to 3 and SF-7 to 9 develop. |
| **GREATER GANSBAAI** |
| **Proposed distribution zones**<br>• A new De Kelders booster zone is proposed to accommodate the higher lying erven of future development area GG-1. |

| |
|---|
| • The boundaries of the existing reservoir zones are increased to accommodate future development areas in Greater Gansbaai. |
| **Proposed future system and required works**<br>The existing Greater Gansbaai water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.<br>• A few distribution pipelines are required to reinforce water supply within the Greater Gansbaai distribution network.<br>• New distribution pipelines are proposed to supply future development areas with water when they develop.<br>• In De Kelders a dedicated supply pipeline from the reservoirs to the network is proposed.<br>• It is proposed that when the Birkenhead area in Kleinbaai is serviced with a formal water network, a secondary pipeline between Birkenhead and the existing Kleinbaai network is constructed along the coast line in order to improve network redundancy and conveyance in the area. |
| **PEARLY BEACH** |
| **Proposed distribution zones**<br>• The boundaries of the existing distribution zones are increased to accommodate future development areas in Pearly Beach. |
| **Proposed future system and required works**<br>The existing Pearly Beach water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.<br>• A few distribution pipelines are required to reinforce water supply within the Pearly Beach distribution network and new distribution pipelines are proposed to supply water to anticipated future development areas. |

The Sewer Master Plan (July 2012) has indicated that based on the most likely land-use development scenario, the following future sewer reticulation infrastructure components will be necessary.

| **Table 6.2.5: Future sewer reticulation infrastructure required** |
|---|
| **BUFFELS RIVER** |
| • A new sewer reticulation system is proposed for the towns of Rooi Els, Pringle Bay and Betty's Bay in the Buffels River area, which are currently serviced by septic tanks.<br>• In Rooi Els four new future pumping station drainage areas are proposed that pumps the sewage of Rooi Els locally and eventually to a proposed Pringle Bay Main bulk pumping station.<br>• In Pringle Bay three new future pumping station drainage areas are proposed that pumps the sewage of Pringle Bay locally and eventually to a proposed Pringle Bay Main bulk pumping station.<br>• In Betty's Bay eight new future pumping station drainage areas are proposed that pumps the sewage of Betty's Bay locally and eventually to three proposed Betty's Bay Main bulk pumping stations.<br>A new bulk sewage pumping system is proposed for the Buffels River area where sewage from the proposed Rooi Els Main PS is pumped to the Pringle Bay Main PS. From the Pringle Bay Main PS to the Betty's Bay Main PS No.1, from the Betty's Bay Main PS No.1 to the Betty's Bay Main PS No.2 and from the Betty's Bay Main PS No.2 to the Betty's Bay Main PS No.3. It is proposed that the sewage of the Buffels River area is then pumped from the Betty's Bay Main PS No.3 directly to the existing Kleinmond WWTW. |
| **KLEINMOND** |
| • The boundaries of the existing drainage areas in Kleinmond are increased to accommodate proposed future development and existing unserviced erven that fall within these drainage areas.<br>• A new future pumping station K1 drainage area is proposed for the existing unserviced erven in the south western areas of Kleinmond areas and future development areas KM-6 and KM-7. A new pumping station and rising main should be constructed for this new drainage area that discharges into the existing Kleinmond PS4 drainage area.<br>• Upgrading of the Kleinmond PS No.4 is proposed when the existing pumping station reaches capacity.<br>• A few existing outfall sewers require upgrading by replacement with larger sized future sewers.<br>• New outfall sewers are proposed to accommodate future development areas and to service the existing unserviced erven in Kleinmond. |
| **GREATER HERMANUS** |
| • The boundaries of the existing drainage areas in the Hermanus WWTW and Hawston WWTW sewer systems are increased to accommodate proposed future development areas and existing unserviced erven that fall within these drainage areas.<br>• In Fisherhaven new future pumping station drainage areas GH1 and GH2 are proposed for the areas in Fisherhaven that cannot gravitate to the existing Fisherhaven PS. New pumping stations and rising mains should be constructed for these new drainage areas that discharge into the existing Fisherhaven PS drainage area.<br>• New future pumping station GH3, GH4, GH5, GH6, GH7 and GH8 drainage areas and proposed for future development areas GH-4, GH-6.1, GH-6.2, GH-6.3, GH-24, a small portion of GH-5.1 and the existing unserviced erven in Hawston that cannot gravitate to the existing Hawston WWTW drainage area. New pumping stations and rising mains should be constructed for these new drainage areas. Future pumping stations GH5 and GH7 should discharge into the proposed future PS GH4 drainage area. Future pumping stations GH4 and GH8 should discharge into the existing Hawston WWTW drainage area and future pumping stations GH3 and GH6 should pump directly into the existing Hawston WWTW.<br>• A new future pumping station GH11 drainage area is proposed for the lower lying erven of future development area GH-1 that cannot gravitate to the existing Hawston WWTW drainage area. A new pumping station and rising main should be constructed for this new drainage area that discharges into the existing Hawston WWTW drainage area.<br>• In Hermanus new future pumping station GH9 and GH10 drainage areas are proposed for the existing unserviced erven in Westcliff that |

cannot gravitate to the existing infrastructure of the Hermanus sewer reticulation system. New pumping stations and rising mains should be constructed for these 2 new drainage areas. Future pumping station GH10 should discharge into the proposed future PS GH9 drainage area and future pumping station GH9 should discharge into the existing Whale Rock PS drainage area.

- Upgrading of the Fisherhaven, Onrus Main, Sandbaai, Mosselrivier, Hermanus No.1 and Hermanus No.4 pumping stations are proposed when the existing pumping stations reaches capacity.
- A few existing outfall sewers require upgrading by replacement with larger sized future sewers.
- New outfall sewers are proposed to accommodate future development areas and to service the existing unserviced erven in the Greater Hermanus area.

**Table 6.2.5: Future sewer reticulation infrastructure required**

**STANFORD**

- The boundaries of the existing drainage areas in Stanford are increased to accommodate proposed future development areas and existing unserviced erven that fall within these drainage areas.
- New future pumping station S1 and S2 drainage areas are proposed for the existing unserviced erven in Stanford that cannot gravitate to the existing infrastructure of the Stanford sewer reticulation system. New pumping stations and rising mains should be constructed for these 2 new drainage areas. Future pumping station S1 should discharge into the existing Stanford Gravity drainage area and future pumping station S2 should discharge into the existing Stanford PS drainage area.
- A new future pumping station S3 drainage area is proposed for future development area SF-2 and a portion of future development area SF-3. A new pumping station and rising main should be constructed for this new drainage area that discharges into the existing Stanford PS drainage area.
- Upgrading of the existing Stanford pumping station is proposed when the existing pumping station reaches capacity.
- A few existing outfall sewers require upgrading by replacement with larger sized future sewers.
- New outfall sewers are proposed to accommodate future development areas and to service the existing unserviced erven in Stanford.

**GREATER GANSBAAI**

- A new sewer reticulation system is proposed for the towns of De Kelders and Franskraal in the Greater Gansbaai area, which are currently serviced by septic tanks. In Gansbaai and Kleinbaai only a portion of the existing erven are serviced with a full waterborne sanitation system and new infrastructure is proposed to service these areas in future.
- In De Kelders five new future pumping station drainage areas are proposed that pumps the sewerage of De Kelders locally and eventually to a proposed De Kelders Main bulk pumping station.
- In Gansbaai new future pumping station GB1 and GB4 drainage areas are proposed for the existing unserviced erven in Gansbaai that cannot gravitate to the existing infrastructure of the existing Gansbaai sewer reticulation system. New pumping stations and rising mains should be constructed for these two new drainage areas. Future pumping station GB1 should discharge into the existing Gansbaai Hawe PS drainage area and future pumping station GB4 should discharge into the existing Gansbaai WWTW gravity drainage area.
- A new future pumping station GB2 drainage area is proposed for future development area GG-9. A new pumping station and rising main should be constructed for this new drainage area that discharges directly into the existing Kolgans No.2 pumping station.
- A new future pumping station GB3 drainage area is proposed for future development area GG-10 and GG-11. A new pumping station and rising main should be constructed for this new drainage area that discharges into the existing Gansbaai WWTW gravity drainage area.
- In Kleinbaai new future pumping station KB1, KB2 and KB3 drainage areas are proposed. It is proposed that the existing conservancy tanks are decommissioned in the future. Conservancy tank No.1 should be accommodated in the future pumping station KB1 drainage area and conservancy tanks No.2 and 3 in future pumping station KB2 drainage area. New pumping stations and rising mains should be constructed for these new drainage areas. Future pumping stations KB1 and KB3 should discharge into the future pumping station KV2 drainage area and future pumping station KB2 should pump the sewage of Kleinbaai to a proposed Kleinbaai Main bulk pumping station.
- New future pumping station KB4 and KB5 drainage areas are proposed for future development area GG-25 (Birkenhead area). New pumping stations and rising mains should be constructed for these new drainage areas. Future pumping station KB5 should discharge into the future pumping station KB4 drainage area and future pumping station KB4 should discharge into the future pumping station KB1 drainage area in Kleinbaai.
- In Franskraal three new future pumping station drainage areas are proposed that pumps the sewage of Franskraal locally and eventually to the proposed Kleinbaai Main bulk pumping station.
- The boundaries of the existing drainage areas in Gansbaai and Kleinbaai are increased to accommodate proposed future development areas and existing unserviced erven that fall within these drainage areas.
- Upgrading of the existing Kolgans No.2 pumping station is proposed when the existing pumping station reaches capacity.
- A few existing outfall sewers in Gansbaai require upgrading by replacement with larger sized future sewers.
- New outfall sewers are proposed to accommodate future development areas and to service the existing unserviced erven in the Greater Gansbaai area.
- A new bulk sewage pumping system is proposed for the Greater Gansbaai area where sewage from the proposed De Kelders Main PS is pumped to the existing Gansbaai Hawe PS and sewage from the proposed Kleinbaai Main PS is pumped directly to the Gansbaai WWTW. Upgrading of the Gansbaai Hawe pumping station is proposed when sewage is pumped from De Kelders to Gansbaai.

**PEARLY BEACH**

- The boundaries of the existing Pearly Beach PS drainage area are increased to accommodate future development area PB-2.
- New future pumping station P1, P2 and P3 drainage areas are proposed for the existing unserviced erven in Pearly Beach and future development areas PB-1, PB-3 and PB-4. New pumping stations and rising mains should be constructed for these new drainage areas. Future pumping station P1 should discharge into the future PS P2 drainage area, future pumping station P2 should discharge into the future PS P3 drainage area and future pumping station P3 should discharge into the existing Pearly Beach conservancy tank.

- New outfall sewers are proposed to accommodate future development areas and to service the existing unserviced erven in Pearly Beach.

## SEWER PUMP STATIONS

The Sewer Master Plan (July 2012) has indicated that based on the most likely land-use development scenario, it will be necessary for the following new sewer pump stations, as well as upgrading of the existing sewer pump stations:

**Table 6.2.6: Future sewer pump stations required**

| Drainage System | Recommendations included in the Sewer Master Plan | Capacity (l/s) | Cost (R Million) |
|---|---|---|---|
| Buffels River | New Future Rooi Els No.1 pump station | 5 | 0.343 |
| | New Future Rooi Els No.2 pump station | 8 | 0.399 |
| | New Future Rooi Els No.3 pump station | 15 | 0.516 |
| | New Future Rooi Els No.4 pump station | 5 | 0.343 |
| | New Future Pringle Bay No.1 pump station | 35 | 0.785 |
| | New Future Pringle Bay No.2 pump station | 17 | 0.546 |
| | New Future Pringle Bay No.3 pump station | 5 | 0.343 |
| | New Future Betty's Bay No.1 pump station | 5 | 0.343 |
| | New Future Betty's Bay No.2 pump station | 45 | 0.907 |
| | New Future Betty's Bay No.3 pump station | 20 | 0.590 |
| | New Future Betty's Bay No.4 pump station | 8 | 0.399 |
| | New Future Betty's Bay No.5 pump station | 5 | 0.343 |
| | New Future Betty's Bay No.6 pump station | 5 | 0.343 |
| | New Future Betty's Bay No.7 pump station | 20 | 0.590 |
| | New Future Betty's Bay No.8 pump station | 5 | 0.343 |
| | New Rooi Els Main pump station (Pump to Pringle Bay) | 20 | 0.590 |
| | New Pringle Bay Main pump station (Pump to Betty's Bay) | 55 | 1.020 |
| | New Betty's Bay Main pump station No.1 (Pump to Kleinmond WWTW) | 100 | 1.402 |
| | New Betty's Bay Main pump station No.2 (Pump to Kleinmond WWTW) | 115 | 1.522 |
| | New Betty's Bay Main pump station No.3 (Pump to Kleinmond WWTW) | 140 | 1.710 |
| Kleinmond | Upgrade existing Harbour PS when it reaches capacity | 10 | 0.144 |
| | Upgrade Kleinmond 4 PS | 95 | 0.434 |
| | Upgrade Kleinmond 5 PS | 10 | 0.130 |
| Greater Hermanus | New PS when existing Fisherhaven PS reaches capacity | 18 | 0.165 |
| | New PS for Fisherhaven | 5 | 0.343 |
| | New PS for Fisherhaven | 9 | 0.417 |
| | New PS when future area GH49 develops (Cost for Developer) | | - |
| | New PS when future area GH4 develops | 30 | 0.724 |
| | New PS for Hawston | 10 | 0.436 |
| | New PS for Hawston | 5 | 0.343 |
| | New PS when future area GH6.2 develops | 4 | 0.343 |
| | New PS when future areas GH6.1 and HG6.4 develop | 55 | 1.020 |
| | Upgrade existing Onrus Main PS when it reaches capacity | 60 | 0.334 |
| | Upgrade existing Sandbaai PS when it reaches capacity | 32 | 0.109 |
| | Upgrade existing Mossel River PS when it reaches capacity | 28 | 0.206 |
| | Upgrade existing Hermanus No.1 PS when it reaches capacity | 14 | 0.148 |

| Table 6.2.6: Future sewer pump stations required | | | |
|---|---|---|---|
| **Drainage System** | **Recommendations included in the Sewer Master Plan** | **Capacity (l/s)** | **Cost (R Million)** |
| | Upgrade existing Hermanus No.2 PS to reach scouring velocity through rising main | 11 | 0.149 |
| | New PS for Hermanus | 7 | 0.380 |
| | New PS for Hermanus | | 0.343 |
| | Upgrade existing WWTP Main PS when it reaches capacity. Investigate existing capacity and operation of system from WWTW Main PS to Hermanus WWTW first. | 78 | 0.391 |
| | New PS when lower lying erven of future area GH1 develops (Cost for Developer) | | - |
| | Upgrade existing Hermanus No.4 PS when it reaches capacity. Verify existing capacity first | 65 | 0.368 |
| | Upgrade existing Meerensee No.3 PS when it reaches capacity. Investigate existing capacity first. | 8 | 0.136 |
| | Upgrade existing Whale Rock PS in order to reach scouring velocity through rising main. | 38 | 0.261 |
| | New PS when future areas GH43 and GH44 develop | 15 | 0.516 |
| | New PS when future area GH43 develop | 5 | - |
| | New PS when future areas GH43 and GH44 develop | 5 | 0.343 |
| | Refurbish and upgrade all Hermanus sewer pump stations in phases (R2 million/a) | | |
| Stanford | New PS for Stanford South | 5 | 0.343 |
| | New PS for Stanford North | 9 | 0.417 |
| | New PS for Stanford North | 5 | 0.343 |
| | New PS for Stanford North | 5 | 0.343 |
| | New PS for Stanford North | 5 | 0.343 |
| Greater Gansbaai | New PS for De Kelders | 4 | 0.343 |
| | New PS for De Kelders | 15 | 0.516 |
| | New PS for De Kelders | 25 | 0.659 |
| | New PS for De Kelders | 30 | 0.724 |
| | New PS for De Kelders | 5 | 0.343 |
| | New PS for Gansbaai | 5 | 0.343 |
| | New PS for Gansbaai | 4 | 0.343 |
| | Upgrade existing Kolgans No.2 PS when it reaches capacity, verify existing pump capacity first. | 15 | 0.166 |
| | New PS when future areas GG10 and GG11 develop | 15 | 0.516 |
| | New PS for Gansbaai | 5 | 0.343 |
| | New PS for Kleinbaai | 20 | 0.590 |
| | New PS for Kleinbaai | 50 | 0.964 |
| | New PS for Franskraal | 35 | 0.785 |
| | New PS for Franskraal | 25 | 0.659 |
| | New PS for Franskraal | 15 | 0.516 |
| | New PS for Birkenhead drainage area | 7 | 0.380 |
| | New PS for Birkenhead drainage area | 4 | 0.343 |
| | New PS when lower lying erven of Perlemoenpunt develop | 10 | 0.436 |
| | New PS when future areas GG10.2 and GG11.2 develop | 7 | 0.380 |
| | New PS for Franskraal | 10 | 0.436 |
| | New PS for Franskraal | 5 | 0.343 |
| | New PS when future area GG31 develops | 20 | 0.590 |
| | New PS when future area GG31 develops | 10 | 0.436 |
| | New PS when future area GG32 and GG33 develop | 85 | 1.278 |
| | New PS when future area GG33 develops | 80 | 1.235 |
| | New PS required to pump sewage from Kleinbaai and Franskraal to Gansbaai WWTP | 140 | 1.710 |

| Table 6.2.6: Future sewer pump stations required | | | |
|---|---|---|---|
| **Drainage System** | **Recommendations included in the Sewer Master Plan** | **Capacity (l/s)** | **Cost (R Million)** |
| | New PS required to pump sewage from De Kelders to Gansbaai Hawe PS | 50 | 0.964 |
| | Upgrade existing PS when sewage from De Kelders is pumped to Gansbaai | 85 | 0.392 |
| Pearly Beach | New PS for Pearly Beach | 5 | 0.343 |
| | New PS for Pearly Beach | 20 | 0.590 |
| | New PS for Pearly Beach | 30 | 0.724 |
| | New PS for Pearly Beach | 35 | 0.785 |
| | New PS for Pearly Beach | 5 | 0.343 |
| **Total** | | | **42.867** |

## WASTE WATER TREATMENT INFRASTRUCTURE

The table below gives a summary of the existing capacities and current flows at each of the WWTWs (Ml/d)

| Table 6.2.7: Existing capacities and flows at each of the WWTWs (Ml/d) | | | | |
|---|---|---|---|---|
| **WWTW** | **Existing Hydraulic Capacity** | **Peak Month Average Daily Flow** | **Average Daily Flow (July 2012 – June 2013)** | **Average Wet Weather Flow (Jun, Jul, Aug)** |
| Kleinmond | 2.000 | 1.377 | 1.038 | 1.094 |
| Hawston | 1.000 | 0.429 | 0.328 | 0.362 |
| Hermanus | 12.000 | 7.284 | 4.597 | 4.962 |
| Stanford | 0.500 | 0.548 | 0.421 | 0.462 |
| Gansbaai | 2.000 | 1.911 | 1.376 | 1.334 |

The capacity of the Hermanus WWTW was upgraded from 7.3 Ml/d to 12 Ml/d. The upgrading included a new inlet works, refurbishment of the existing aeration and settling tanks, new anaerobic and anoxic basins and settling tank, mechanical sludge dewatering and a new chlorination system. The sludge handling facilities at the Kleinmond and Gansbaai WWTW were also upgraded during 2012/2013. The capacity of the Stanford WWTW will be upgraded during 2016/2017.

Overstrand Municipality revises on an annual basis the capacity and suitability of the WWTWs to meet the requirements of DWA for the quality of the final effluent being discharged to the receiving water bodies. When the water quality requirements for the final effluent becomes stricter and / or when the inflow to the WWTW has increased to such an extent that the capacity of the plant needs to be increased, the Municipality appoints reputed consulting engineering firms to undertake feasibility studies to perform technical and economical evaluation of the different options available for upgrading or extending the capacity of the treatment works.

## ASSET MANAGEMENT ASSESSMENT

It is important for Overstrand Municipality to develop an AMP from their Asset Register. The objective of an AMP is to support the achievement of the strategic goals of the Municipality and facilitate prudent technical and financial decision-making. It is also a vehicle for improved internal communication and to demonstrate to external stakeholders the Municipality's ability to effectively manage its existing infrastructure as well as the new infrastructure to be developed over the next 20 years.

This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. Overstrand Municipality needs to ensure that the maintenance and rehabilitation plan is part of the WSDP and that the plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose. Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increase in (operational) services level coverage's most rapidly. The preparation of maintenance plans and the allocation of sufficient funding for maintenance are required to prevent the development of a large condition backlog. The potential renewal projects for water

and sanitation infrastructure need to be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" need to be prioritised

## 7. OPERATION AND MAINTENANCE

### 7.1 Status Quo

Water Safety Plans are in place for all the water distribution systems and treatment facilities. A detailed risk assessment was executed as part of the process and the existing control measures implemented by Overstrand Municipality were evaluated. An Improvement / Upgrade Plan is also in place with relevant Water and Safety Management Procedures for any type of incident.

A $W_2$RAP for the various WWTWs is also in place. The $W_2$RAP is an all-inclusive risk analysis tool by which risks associated with the management of collection, treatment and disposal of wastewater, are identified and rated (quantified). The identified risks can then be managed according to its potential impacts on the receiving environment / community / resource.

The comprehensive O&M Manuals, which were developed for each of the WTWs and WWTWs, will further assist the Municipality to ensure that the necessary control measures for the effective operation of the WTWs and WWTWs are in place.

An Incident Response Management Protocol is in place and forms part of Overstrand Municipality's Water Safety Plan and $W_2$RAP. The Incident Response Management Protocol entails that certain reactive procedures are followed when an incident occurs, such as when a malfunction of the treatment processes occurs due to power failures, faulty equipment, adverse weather conditions or human error.

Operational Alert Levels are also in place for the various WTWs and WWTWs in order to ensure that the various unit processes in the plant performs optimally. If these pre-determined Alert Levels are exceeded at any of the control points where samples are taken for operational purposes, specific actions are taken to bring the operational parameters back to within the target ranges.

An Operational and Compliance Water Quality and Final Effluent Monitoring Programme, which meets the requirements of the DWA as stipulated in their Blue and Green Drop criteria, were drawn up by Overstrand Municipality and are implemented by the Municipality.

**The blue drop performance of Overstrand Municipality is summarised as follows in the DWA's 2012 Blue Drop Report (May 2012):**

| **Table 7.1.1: Blue drop performance of Overstrand Municipality, as included in DWA's 2012 Blue Drop Report (May 2012)** | |
|---|---|
| **Municipal Blue Drop Score** | **96.82%** |

**Regulatory Impression:** The Overstrand Local Municipality can again take pride in the commitment of all officials that are responsible for the remarkable Blue Drop performance during this audit cycle. In spite of losing out on one certification (Stanford Oog) the Blue Drop tally improved from three in 2011 to five in 2012 and this is reflected in the overall Blue Drop score which increased from 90.56% (2011) to 96.82% (2012). The improvement of drinking water quality management in all systems is commendable and it is trusted that this performance will be sustained.

1. Water loss figures were not reported and this is a concerning factor which requires attention since consumption figures for the Buffels River system is rather excessive in comparison with other volumes used in other supply systems. Even though drinking water quality management in this particular system is deemed excellent when measured against the stringent criteria set, this certification will be reviewed should the Municipality fail to supply the Department with meter readings that prove the contrary or an acceptable plan to improve water use efficiency.
2. The improvement in the chemical compliance is another commendable feat since this was noted in the previous cycle as an area of concern. Further improvement in this regard is expected for the system of Baardskeerdersbos.

**Site Inspection Report: Buffelsrivier WTW - 62.6% -** It was proven that the on-site situation improved since the audit, making this score no longer relevant. **Franskraal WTW - 90.6% -** The on-site audit at Franskraal confirmed that the water supply system of the Greater Gansbaai is worthy of its Blue Drop certification status. It is however trusted that the risks posed by not having a spare chlorinator and the difficulty of cleaning the sedimentation tanks will be given the required attention.

| Performance Area | Greater Hermanus | Buffels River | Kleinmond | Stanford | Greater Gansbaai | Buffeljags Bay | Baardskeerdersbos | Pearly Beach |
|---|---|---|---|---|---|---|---|---|
| **Water Safety Planning** | **98** | **98** | **100** | **91** | **97** | **93** | **91** | **97** |
| **Treatment Process Management** | **85** | **65** | **65** | **65** | **90** | **65** | **65** | **65** |
| **DWQ Compliance** | **100** | **100** | **100** | **100** | **100** | **100** | **91** | **100** |
| **Management, Accountability** | **96** | **96** | **96** | **96** | **96** | **96** | **96** | **96** |
| **Asset Management** | **100** | **87** | **87** | **87** | **91** | **91** | **91** | **91** |
| Bonus Scores | 0.50 | 1.58 | 1.15 | 1.76 | 0.91 | 1.50 | 2.66 | 1.51 |
| Penalties | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Blue Drop Score (2012)** | **97.93%** | **95.00%** | **95.27%** | **92.73%** | **97.12%** | **93.81%** | **91.57%** | **95.22%** |
| Blue Drop Score (2011) | 87.23% | 95.07% | 93.09% | 95.15% | 95.10% | 75.37% | 93.68% | 94.31% |
| Blue Drop Score (2010) | 75.31% | 63.83% | 60.06% | Not Assessed | 63.81% | Not Assessed | Not Assessed | Not Assessed |
| System Design Capacity (Ml/d) | 28.000 | 5.500 | 5.800 | 0.259 | 6.500 | 2.064 | 3.600 | 1.440 |
| Operational Capacity (% i.t.o. Design) | 32.14% | 50.91% | 43.10% | 96.53% | 55.38% | 4.17% | 0.56% | 24.31% |
| Population Served | 42 824 | 3 037 | 9 822 | 5 315 | 15 924 | 290 | 229 | 897 |
| Average daily consumption (l/p/d) | 210.16 | 921.96 | 254.53 | 47.04 | 226.07 | 296.55 | 87.34 | 390.19 |

| Performance Area | Greater Hermanus | Buffels River | Kleinmond | Stanford | Greater Gansbaai | Buffeljags Bay | Baardskeerdersbos | Pearly Beach |
|---|---|---|---|---|---|---|---|---|
| Microbiological Compliance (%) | 99.0% | 99.0% | 99.0% | 99.0% | 99.0% | 99.0% | 99.0% | 99.0% |
| Chemical Compliance (%) | 99.5% | 99.0% | 99.0% | 99.0% | 99.7% | 99.0% | 96.1% | 99.0% |

The DWA also completed their Second Order Assessment of Municipal Waste Water Treatment Plants, DWA's Green Drop Report for 2011, which provides a scientific and verifiable status of municipal waste water treatment. Green drop status is awarded to those WWTWs that comply with 90% criteria on wastewater quality management. The green drop performance of Overstrand Municipality is summarised as follows in the DWA's 2011 Green Drop Report:

**Table 7.1.2: Green drop performance of Overstrand Municipality, as included in DWA's 2011 Green Drop Report**

| Average Green Drop Score | 88.8% |
|---|---|

**Regulatory Impression:** Overstrand Municipality achieved Green Drop certification for Hermanus and even though the Municipality did not achieve Green Drop certification for the other four (4) wastewater systems, the lowest Green Drop score was 75.8%.

The Municipality need to give priority to process optimisation to ensure that effluent quality compliance is improved in order to achieve the expected excellent levels which are an essential requirement that prevented the allocation of Green Drops to the other four (4) systems. In addition, Stanford's system has reached the design capacity and requires appropriate infrastructure investment.

**Green Drop Findings:**

1. The key area of concern remains the two (2) treatment plants that do not comply with the specified effluent quality limits.
2. Low effluent compliance is reached although both plants are operated within their design capacity. This suggests that process control need to be optimised.
3. Kleinmond monitoring regime must be expanded.
4. Asset Management need to improve in the areas where the municipality could not provide sufficient evidence.
5. Data credibility needs to be addressed, as the scientific element lag slightly behind the requirement of the tested criteria.
6. The site inspection score for Greater Gansbaai was 90%, Stanford 57% and Hermanus 80%.

| Criteria | Hermanus | Hawston | Stanford | Gansbaai | Kleinmond |
|---|---|---|---|---|---|
| Process Control, Maintenance and Management Skill | 100 | 100 | 80 | 100 | 90 |
| Monitoring Programme | 80 | 80 | 100 | 100 | 80 |
| Credibility of Sample Analysis | 83.5 | 83.5 | 83.5 | 83.5 | 83.5 |
| Submission of results | 100 | 100 | 100 | 100 | 100 |
| Wastewater Quality Compliance | 88 | 75 | 48 | 20 | 48 |
| Failure Response Management | 100 | 100 | 100 | 100 | 100 |
| Bylaws | 100 | 100 | 100 | 100 | 100 |
| Treatment and Collector Capacity | 100 | 100 | 97 | 100 | 100 |
| Asset Management | 90 | 88 | 87 | 88 | 88 |
| Bonus Scores | 0 | 0 | 3.7 | 2.4 | 3.7 |
| Penalties | 0 | 0 | 0 | 0 | 0 |
| **Green Drop Score (2011)** | **92.1%** | **87.9%** | **83.0%** | **75.8%** | **82.5%** |
| Green Drop Score (2009) | 66% | 57% | 61% | 66% | 66% |
| Treatment Capacity (Ml/d) | 13.000 | 1.000 | 0.500 | 2.000 | 2.000 |
| Operational % i.t.o. Capacity | 56% | 45% | 100% | 43% | 50% |
| Cumulative Risk Rating (CRR) | 8 | 6 | 8 | 7 | 8 |
| % i.t.o. Maximum Risk Rating | 34.7% | 33.3% | 44.4% | 38.9% | 44.4% |

The 2012 Green Drop Risk Profile Progress Report of the DWA is further the product of a "gap" year, whereby progress is reported in terms of the improvement or decline in the risk position of the particular WWTW, as compared to the previous year's risk profile. This tool to collect, assess and report the risk profile is called the Green Drop Progress Assessment Tool (PAT). The PAT progress assessment period was done on compliance data and actions during July 2010 to June 2011, which represents the year immediately following the Green Drop 2011 assessment period.

**The results for Overstrand Municipality were summarised as follows in DWA's 2012 Green Drop Risk Profile Progress Report**

**Table 7.1.3: Green drop performance of Overstrand Municipality, as included in DWA's 2012 Green Drop Risk Profile Progress Report**

| Assessment Area | Hermanus | Kleinmond | Stanford | Gansbaai | Hawston |
|---|---|---|---|---|---|
| Technology | Activated Sludge Solar / Thermal drying beds / Belt Press | Activated Sludge Lagoons | Activated Sludge Centrifugal Dewatering | Nereda System Solar / Thermal drying beds | Activated Sludge Solar / Thermal drying beds / Centrifugal dewatering |
| Design Capacity (Ml/d) | 7.300 | 2.000 | 0.500 | 2.000 | 1.000 |
| Operational % i.t.o. Design Capacity | 68.5% | 50.0% | 80.0% | 47.5% | 40.0% |
| Microbiological Compliance | 67.0% | 33.0% | 67.0% | 100.0% | 50.0% |
| Chemical Compliance | 89.8% | 79.0% | 87.5% | 89.8% | 52.3% |
| Physical Compliance | 66.7% | 100.0% | 100.0% | 86.0% | 80.7% |
| **Annual Average Effluent Quality Compliance** | **74.5%** | **70.7%** | **84.8%** | **91.9%** | **61.0%** |
| **Wastewater Risk Rating (% CRR / $CRR_{max}$)** | **45.5%** | **41.2%** | **29.4%** | **29.4%** | **47.1%** |
| Highest Risk Area | Effluent quality | Effluent quality | Effluent quality | Effluent quality | Low flow, effluent quality |
| Risk Abatement Process | Draft $W_2$RAP | Draft $W_2$RAP | Draft $W_2$RAP | Draft $W_2$RAP | Draft $W_2$RAP |
| Capital & Refurbishment expenditure in 2010/2011 | R17.29 million | R0 | R0 | R0 | R0 |
| Description of Projects' Expenditure | Refurbishment and upgrading of WWTW (7.3 Ml/d to 12 Ml/d). Upgrade include total refurbishment of plant, inlet works, all new aerators, new anaerobic and anoxic tanks, one new settling tank, new mechanical sludge dewatering, new chlorine building, etc. | Planning mechanical sludge dewatering for 2012/2013 | Mechanical sludge dewatering press for the sludge and a reed bed for the final effluent water was constructed in previous financial year | Reed bed was constructed during previous financial year | Mechanical dewatering was installed during previous financial year |

## 7.2 Gaps and Strategies

The Water Safety Plan and $W_2$RAP Teams of Overstrand Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and $W_2$RAP to ensure that they are still accurate and to determine whether the field assessments need updates or modifications and whether the Incident Response Management Protocol is still adequate. In addition to the regular three year review, the Water Safety Plan and $W_2$RAP will also be reviewed when, for example, a new water source is developed, major treatment improvements are planned and brought into use, or after a major incident.

It is important for Overstrand Municipality to classify all treatment works and operators along the lines of the regulations by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.

Establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Establish budgets to address the shortfall of skilled staff, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operators, technicians and managers will be established.

The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. It is therefore important for Overstrand Municipality to compile a Legal Compliance Audit of their WTWs and WWTW, which will provide the management of Overstrand Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

Overstrand Municipality is committed to work with the DWA and the other role-players in order to further improve on their 2012 Blue Drop Score for the various distribution systems. The Water Safety Plans, Process Audits that were carried out at all the WTWs and Operation and Maintenance Manuals which were compiled for all the WTWs will be used to improve the Municipality's performance. The Improvement / Upgrade Plan of the Water Safety Plan will also be implemented by the Municipality in order to address the potential risks identified through the Water Safety Plan process.

It is also important for Overstrand Municipality to continue with the upgrading of WWTWs when necessary, in order to reduce the risk of source contamination. WWTWs will be managed and operated by Overstrand Municipality to comply with the permitted standards and in so doing intends to work towards green drop status for their other WWTWs as well.

Overstrand Municipality is committed to work with the DWA and the other role-players in order to improve on their 2011 Green Drop Score for the various WWTWs and to get the Municipality ready for the next round of assessments. The $W_2$RAP that are in place for all the WWTWs will assist in reducing the current CRRs for the various WWTWs. The following will also further assist in the process of reducing the CRRs.

- Forward planning and upgrading / refurbishment of treatment plants to ensure adequate capacity for the flows received;
- Operate and maintain the WWTWs within design- and equipment specifications;
- Have trained, qualified and registered staff in place;
- Get support contracts in place where there is a great demand for adequately skilled process controllers and supervision;
- Monitoring of flow to- and from the plants;
- Sampling and monitoring of effluent quality;
- Appropriate authorisation in accordance with the National Water Act (36 of 1998); and / or
- Where plant is overloaded, introduce innovative methods to ensure enhancement of effluent quality.

## 8. ASSOCIATED SERVICES

### 8.1 Status Quo

All the schools, hospitals and clinics in Overstrand Municipality's Management Area are supplied with a higher level of water and sanitation services.

### 8.2 Gaps and Strategies

The environmental health function is currently with the Overberg District Municipality. Typical functions of the Overberg District Municipality, with regard to health services, include the following:

- Households to meet the minimal health and safety requirements
- Monitoring water quality (Including recreational waters)
- Waste management

- Food control
- Schools to meet health requirements
- Contagious disease control
- Community development: Making communities aware of environmental health issues and communicates with farm workers regarding sanitation services.

The Municipal Health Services of the Overberg District Municipality also report monthly to the Department of Environmental Health on water quality. The quality of life of the people within a Municipality is influenced by the available health care. Various things influence the health conditions of people in any region, for example access to clean water, good sanitation, proper nutrition and adequate housing.

It is important that a co-operative relationship exist between the Overberg District Municipality and OM with regard to environmental health issues and that a good communication protocol is followed between the District Municipality and Overstrand Municipality.

The health profile in relation to treated water is good. Within the urban context, drinking water throughout the municipal area is considered to be of a high quality. The most vulnerable groups within Overstrand Municipality's Management Area are the persons living in informal areas with shared services. It is therefore of outmost importance that the communal standpipes are properly maintained, to promote better health and hygiene among users. It is necessary to:

- keep the standpipe area clean and free from stagnant water;
- avoid water spillage by keeping the tap closed when not in use;
- report and rectify leakages immediately;
- keep straying animals away from standpipe area; and
- keep the tap outlet, standpipe slab and soak away clean.

Promote health and hygiene awareness amongst standpipe users by focusing on the following:

- users must use the standpipe only for the filling of containers;
- no body or clothes washing is allowed at standpipes;
- no house pipes or other objects may be attached to the standpipes;
- use clean containers and close containers with a suitable lid when transporting water;
- disinfect containers when necessary; and
- immediately report any irregularities, contamination, tampering or vandalism at standpipes

The rehabilitation and maintenance of the basic services have also had positive results, in that the installations appear neater, a healthier environment has been created and less pollution than previously takes place. It is believed that this played a significant role in reducing disease previously caused by unhygienic conditions and absence of basic services.

The supply of basic sanitation services on the farms needs to be linked to the provision of health and hygiene education. Improved health requires behaviour change, which also cannot be achieved with a single health education talk given by an outside expert. Behaviour change requires sustained monitoring and promotion within the community. This is the key-function of the community health workers employed on sanitation projects.

Against illnesses such as HIV/Aids and TB. A solution to the sustainability of the community health worker's position and employment within the community has been to link their position and function to the activities of the Department of Health. In addition support can be provided to the Community Health Workers through local clinics and through the programmes of the EHPs. Education on the HIV/Aids pandemic would play a key role in stemming the spread of the disease.

Overstrand Municipality will therefore endeavour to improve their efforts to foster partnership-driven development in planning and implementation where partnerships include community members, CBOs, NGOs, the private sector and other spheres of government. In this regard the Department of Health is considered a particularly important partner whose collaboration is much needed.

## 9. CONSERVATION AND DEMAND MANAGEMENT

### 9.1 Status Quo

Overstrand Municipality is committed to reduce the current percentage of non-revenue water for the various distribution systems to 17% by June 2017 (SDBIP). The Municipality's WDM Strategy and Action Plan include the following key activities (March 2014 progress in brackets):

- Sourcing of funding for implementation of water reclamation for potable purposes (applications for RBIG and ORIO grant funding have been submitted to the Department of Water Affairs (DWA));
- Continue with pipe replacement in priority areas with old reticulation networks and history of frequent pipe failures (Tender was awarded for 2014/2015 – 2015/2016);
- Implementation of intelligent pressure management in specific areas. (Stanford and Kleinmond completed and contract was awarded for Betty's Bay, which will be implemented with the 2014/2015 pipeline replacement project);
- Phased pro-active replacement of older water meters (Three year contract was awarded in August 2013);
- Review and improve efficiency of remote monitoring of minimum night flows in all zones (On-going maintenance of SCADA and telemetry systems).
- Link properties with distribution zones in financial data base to enable water balance in smaller areas (Completed for Hermanus);
- Perform focused leak detection and repair programs in areas with highest minimum night flows (Two year leak detection contract awarded in 2013);
- Continue with leak repairs at indigent households and installation of water management devices (Three year contract was awarded in August 2013 – with water meters);
- Enhance public awareness on water demand management issues, e.g. the watering of gardens as determined by the bylaws, rain water harvesting, dam levels, and general water saving tips (Regular publication of water and waste water quality in local media and on Overstrand Municipality's web-site);
- Identify users on financial data base with regular abnormal high or abnormal low water use, and physically inspect the causes (on-going);
- Sourcing of external funds, e.g. from the DWA RBIG, Masibambane and ACIP programs, MSIG, ORIO, Green Fund, and Disaster Reduction Program. ACIP funding of R1 million approved by DWA for Water Demand Management Interventions during 2014/2015;
- Tariffs structured to discourage excessive use of water, including volumetric sewerage tariffs, and specific water restriction tariffs implemented for specific dam levels (implemented and on-going);
- Continue with removal of alien vegetation in catchment areas (existing Work for Water program – on-going);
- Maximum use of treated effluent for irrigation (Implemented in Hermanus and Gansbaai). To be implemented at Pearly Beach in 2015.

A gradual decline in the percentage of non-revenue water is visible over the past number of years, although the recent water restrictions may have skewed the picture, due to an "un-natural" decrease in metered consumption, whereas the unaccounted volume is likely to remain more constant. The table below gives a summary of the non-revenue water for the various distribution systems in Overstrand Municipality's Management Area.

**Table 9.1.1: Non revenue water and ILI for the various distribution systems**

| Description | Unit | 12/13 | Record : Prior (Ml/a) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 11/12 | 10/11 | 09/10 | 08/09 | 07/08 |
| Buffels River | Volume | 540.123 | 463.088 | 513.972 | 543.764 | 653.503 | 630.007 |
| | Percentage | 59.7% | 55.0% | 56.1% | 56.2% | 59.2% | 57.8% |
| | ILI | 5.45 | 5.07 | 5.06 | 6.69 | | |
| Kleinmond | Volume | 283.500 | 239.492 | 198.745 | 268.918 | 212.481 | 213.977 |
| | Percentage | 34.2% | 30.1% | 25.1% | 31.1% | 24.6% | 24.3% |
| | ILI | 2.49 | 2.58 | 2.17 | 4.09 | | |
| Greater Hermanus | Volume | 324.189 | 317.241 | 594.352 | 593.867 | 805.122 | 311.620 |
| | Percentage | 9.0% | 9.7% | 15.6% | 13.3% | 16.6% | 7.9% |
| | ILI | 0.85 | 0.98 | 1.50 | 2.22 | | |
| Stanford | Volume | 91.388 | 142.029 | 128.297 | 194.486 | 163.496 | 123.058 |
| | Percentage | 30.8% | 37.5% | 35.5% | 41.6% | 36.4% | 30.9% |
| | ILI | 2.9 | 5.90 | 5.67 | 11.08 | | |
| Greater Gansbaai | Volume | 405.799 | 435.335 | 457.525 | 457.580 | 438.158 | 402.311 |
| | Percentage | 31.2% | 32.0% | 32.8% | 31.5% | 30.8% | 27.5% |
| | ILI | 3.15 | 3.46 | 3.71 | 2.07 | | |
| Pearly Beach | Volume | 67.435 | 45.689 | 36.511 | 21.683 | 27.326 | 34.163 |
| | Percentage | 41.9% | 32.3% | 26.3% | 19.7% | 21.6% | 25.7% |
| | ILI | 4.79 | 3.02 | 2.41 | 3.20 | | |
| Baardskeerdersbos | Volume | 4.000 | 2.778 | 4.085 | 2.722 | 4.915 | 2.869 |
| | Percentage | 36.3% | 29.3% | 37.3% | 25.9% | 39.4% | 31.3% |
| | ILI | 0.75 | | | | | |
| Buffeljags Bay | Volume | 0.090 | 0.019 | 0 | 0 | 0.112 | 0.360 |
| | Percentage | 2.63% | 0.5% | 0% | 0% | 4.4% | 12.3% |
| | ILI | 0.46 | | | | | |
| **TOTAL** | **Volume** | **1 716.524** | **1 645.671** | **1 933.486** | **2 083.020** | **2 305.113** | **1 718.365** |
| | **Percentage** | **24.20%** | **24.17%** | **26.06%** | **24.96%** | **26.12%** | **21.72%** |
| | **ILI** | 2.26 | 2.02 | 2.33 | 2.94 | | |

Note: Infrastructure Leakage Index (ILI) for Developed Countries = **1 – 2 Excellent (Category A)**, **2 – 4 Good (Category B)**, **4 – 8 Poor (Category C)** and > **8 – Very Bad (Category D)**

**Category A** = No specific intervention required (Hermanus).

**Category B** = No urgent action required although should be monitored carefully (Kleinmond, Pearly Beach and Greater Gansbaai).

**Category C** = Requires attention (Stanford and Buffels River)

**Category D** = Requires immediate water loss reduction interventions

The Infrastructure Leakage Index (ILI) in the above table is the most recent and preferred performance indicator for comparing leakage from one system to another. It is a non-dimensional index representing the ratio of the current real leakage and the "Unavoidable Annual Real Losses". A high ILI value indicates a poor performance with large potential for improvement while a small ILI value indicates a well-managed system with less scope for improvement.

### 9.2 Gaps and Strategies

Overstrand Municipality is committed to continue with the active implementation of their WDM Strategy in order to reduce the water losses within the various distribution systems as follows:

**Table 9.2.1: Committed reduction in total Non-Revenue Water (Include bulk distribution, treatment and internal distribution)**

| Distribution System | 12/13 (%/a) | 2017 (%/a) | 2037 (%/a) |
|---|---|---|---|
| Buffels River | 62.0% | 45.0% | 30.0% |
| Kleinmond | 41.8% | 30.0% | 15.0% |
| Greater Hermanus | 12.0% | 15.0% | 15.0% |
| Stanford | 30.8% | 20.0% | 15.0% |
| Greater Gansbaai | 39.8% | 25.0% | 20.0% |
| Pearly Beach | 41.9% | 30.0% | 15.0% |
| Baardskeerdersbos | 36.3% | 20.0% | 15.0% |
| Buffeljags Bay | 2.63% | 15.0% | 15.0% |

PRVs were installed in Kleinmond and Stanford. A phased approach was followed for the investigation / implementation of pressure management in selected areas in the Overstrand Municipality's Management Area. The phases were as follows:

- Investigation and Logging (Desktop Study, Logging of pressures and flows, Analysis of data)
- Implementation (Design PRV Chambers, Pressure Management Implementation of new PRVs, Supply and installation of smart electronic pressure controllers for existing PRVs)
- Impact Assessment (Post pressure management logging to determine impact of new PRVs and / or installation of smart pressure controllers on existing PRVs)

Overstrand Municipality will continue with the repairing of leaks at all the indigent households. The following steps can be implemented by Overstrand Municipality to ensure that the project is sustainable.

- Identify areas with high minimum night flows. Record these flows before the project starts in order to ensure that the overall savings achieved by the project can be calculated.
- Visit properties occupied by indigent households on a priority basis (highest consumption first).
- Educate the customer about the project and water saving measures that can be implemented.
- Audit properties for any plumbing leaks and repair the leaks that are found.
- Meters found to be faulty must be replaced.
- Identify where there may be inefficient water usage and water wastage.
- Identify the number of people living at the property so as to determine a reasonable water usage.

Mechanisms to ensure that customers repair new water leaks, maintain an affordable consumption and does not build up arrears need to be addressed in the early stages of the project, in order to ensure the sustainability of the project.

The Municipality is busy with the phased pro-active replacement of the old water meters, as identified through the detail water meter audit. The meters not working and the meters with existing leaks were also replaced and the leaks were repaired. The building inspectors include the inspection of the water meter installations during the foundation inspections at construction / building sites. This information is also implemented and captured on EMIS by the Building Inspectorate.

Overstrand Municipality needs to ensure that adequate funding is allocated under their Capital and Operational

budgets towards the implementation of the WC/WDM initiatives. All external funding that could be utilised by Overstrand Municipality for this purpose should be sourced.

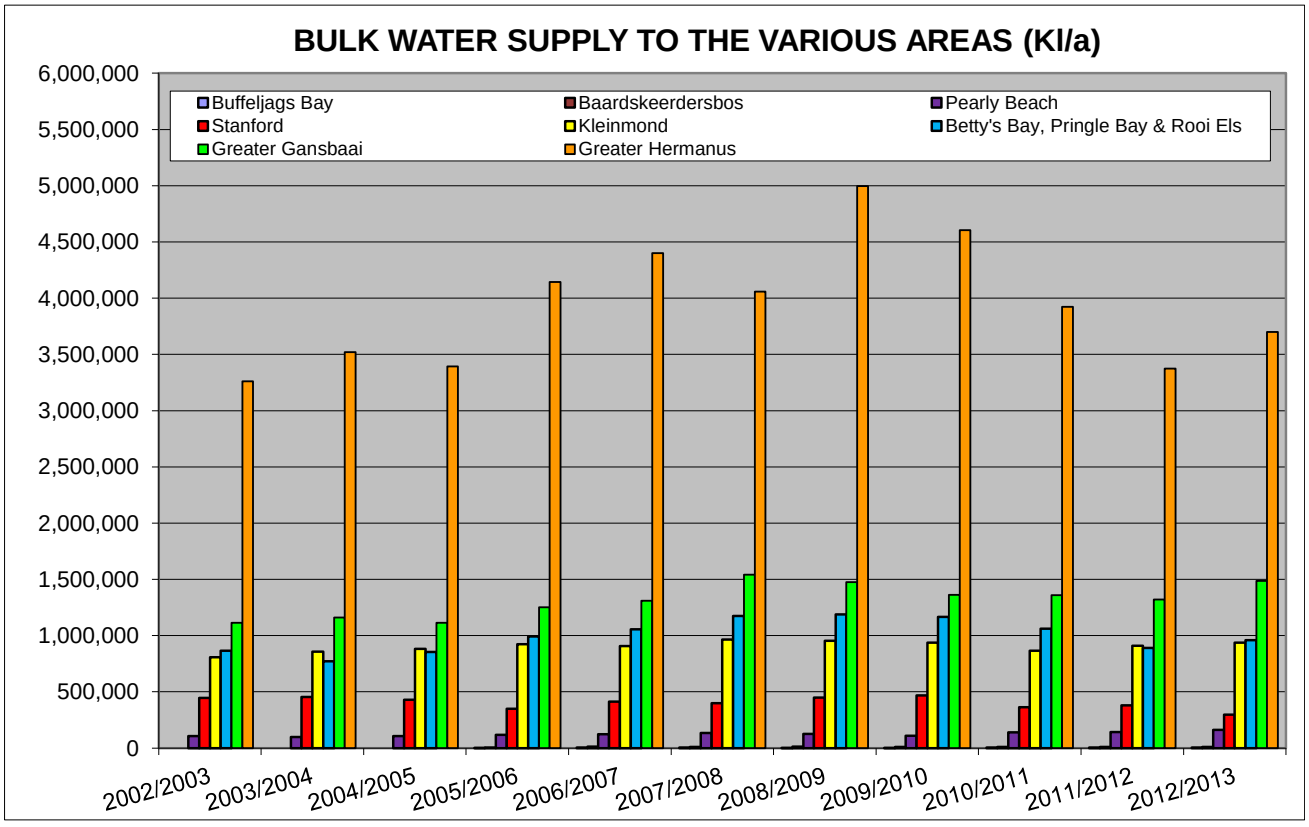
Overstrand Municipality's current water information database appears adequate from a water services management perspective. Overstrand Municipality is committed to continue with the metering of all the influent received at their WWTWs, the quantity of treated effluent re-used and the quantity of treated effluent returned to the Water Resource System. This information is critical for planning purposes with regard to WWTWs upgrading.

Overstrand Municipality is also committed to keep on updating the water balance models on a monthly basis in order to determine locations of wastage and to enable Overstrand Municipality to actively implement their WDM Strategy to reduce losses even further. The water balance will not directly lead to the reduction of the demand, but is an imperative management tool that will inform the implementation of demand- side management initiatives.

## 10. WATER RESOURCES

### 10.1 Status Quo

The graph below gives a summary of the total bulk water supply to the various towns within Overstrand Municipality's Management Area.




**Water Quality:** Overstrand Municipality makes use of an accredited external laboratory to conduct the drinking water compliance sampling and analysis. Samples are taken at various locations in each system and analysed to evaluate the compliance. The water quality results are loaded onto DWA's BDS via the internet. Once entered the data is automatically compared to SANS241. This real-time system allows for immediate intervention to rectify any problems.

The percentage compliance and the additional monitoring required by Overstrand Municipality for determinands identified during the risk assessment exceeding the numerical limits in SANS 241-1:2011 are as follows (Water quality samples taken over the period July 2012 to June 2013).

| Table 10.1.1: Percentage compliance of the water quality samples for the period July 2012 to June 2013 | | |
|---|---|---|
| **Performance Indicator** | **Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2011)** | **% Sample Compliance according to DWA's 2014 Blue Drop Limits** |
| **Buffels River** | | |
| Acute Health – 1 Chemical | No (Excellent) | 100.0% |
| Chronic Health | No (Excellent) | 96.5% |
| Aesthetic | No (Excellent) | 99.2% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 97.6% |
| Operational Efficiency | No (Excellent) | 98.3% |
| **Kleinmond** | | |
| Acute Health – 1 Chemical | No (Excellent) | 100.0% |
| Chronic Health | No (Good) | 94.9% |
| Aesthetic | No (Excellent) | 100.0% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 96.4% |
| Operational Efficiency | No (Excellent) | 97.7% |
| **Greater Hermanus** | | |
| Acute Health – 1 Chemical | No (Excellent) | 99.1% |
| Chronic Health | No (Excellent) | 98.3% |
| Aesthetic | No (Excellent) | 98.8% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 98.7% |
| Operational Efficiency | No (Excellent) | 93.3% |
| **Stanford** | | |
| Acute Health – 1 Chemical | No (Excellent) | 100.0% |
| Chronic Health | No (Excellent) | 95.7% |
| Aesthetic | No (Excellent) | 100.0% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 96.6% |
| Operational Efficiency | No (Excellent) | 97.3% |
| **Greater Gansbaai** | | |
| Acute Health – 1 Chemical | No (Excellent) | 98.8% |
| Chronic Health | No (Excellent) | 100.0% |
| Aesthetic | No (Excellent) | 97.6% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 99.6% |
| Operational Efficiency | No (Excellent) | 96.8% |
| **Pearly Beach** | | |
| Acute Health – 1 Chemical | No (Excellent) | 100.0% |
| Chronic Health | No (Excellent) | 98.4% |
| Aesthetic | No (Excellent) | 94.1% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 98.8% |
| Operational Efficiency | No (Excellent) | 99.3% |
| **Baardskeerdersbos** | | |
| Acute Health – 1 Chemical | No (Excellent) | 100.0% |
| Chronic Health | No (Excellent) | 98.4% |
| Aesthetic | Yes (Unacceptable) | 69.1% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 98.8% |
| Operational Efficiency | Yes (Unacceptable) | 81.4% |
| **Buffeljags Bay** | | |
| Acute Health – 1 Chemical | No (Excellent) | 100.0% |
| Chronic Health | No (Excellent) | 100.0% |

| Table 10.1.1: Percentage compliance of the water quality samples for the period July 2012 to June 2013 | | |
|---|---|---|
| **Performance Indicator** | **Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2011)** | **% Sample Compliance according to DWA's 2014 Blue Drop Limits** |
| Aesthetic | Yes (Unacceptable) | 89.1% |
| Risk assessment defined Health (Acute or Chronic) | No (Excellent) | 100.0% |
| Operational Efficiency | Yes (Unacceptable) | 89.8% |

The table below gives an overview of the five categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified:

| Table 10.1.2: Five categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified | |
|---|---|
| **Category** | **Risk** |
| Acute Health - 1 | Routinely quantifiable determinand that poses an immediate unacceptable health risk if consumed with water at concentration values exceeding the numerical limits specified in SANS 241. |
| Acute Health - 2 | Determinand that is presently not easily quantifiable and lacks information pertaining to viability and human infectivity which, however, does pose immediate unacceptable health risks if consumed with water at concentration values exceeding the numerical limits specified in SANS 241. |
| Aesthetic | Determinand that taints water with respect to taste, odour and colour and that does not pose an unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241. |
| Chronic Health | Determinand that poses an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241. |
| Operational | Determinand that is essential for assessing the efficient operation of treatment systems and risks from infrastructure |

Effluent quality: The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the period July 2012 to June 2013, for the various WWTWs, are as follows:

| Table 10.1.3: Microbiological, chemical and physical compliance percentages of the final effluent taken at the various WWTW over the period July 2012 to June 2013 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **WWTW** | **Micro-biological** | **Chemical** | | | | | **Physical** | | | |
| | **Faecal Coliforms** | **Ammonia** | **Nitrates & Nitrites** | **COD Filtered** | **Ortho-Phosphates** | **Overall** | **pH** | **EC** | **SS** | **Overall** |
| Kleinmond | 58.3% | 75.0% | 75.0% | 100% | 91.7% | 88.3% | 100.0% | 100.0% | 100.0% | 100% |
| Hawston | 83.3% | 50.0% | 100% | 75.0% | 75.0% | 66.7% | 100.0% | 50.0% | 83.3% | 77.8% |
| Hermanus | 83.3% | 75.0% | 100% | 100.0% | 75.0% | 88.3% | 100.0% | 8.3% | 100.0% | 69.4% |
| Stanford | 91.7% | 83.3% | 58.3% | 100.0% | 100% | 86.6% | 100.0% | 100.0% | 100.0% | 100% |
| Gansbaai | 91.7% | 83.3% | 75.0% | 91.7% | 91.7% | 86.7% | 91.7% | 41.7% | 100.0% | 77.8% |
| Total | **81.7%** | **73.3%** | **81.7%** | **93.3%** | **86.7%** | **83.3%** | **98.3%** | **61.7%** | **96.7%** | **85.6%** |

The EMS Section of Overstrand Municipality continues with the extensive monitoring of the recreational waters to determine the severity of faecal pollution in the Klein River Estuary. Data collected and assimilated from the monthly samples form the basis of a monthly Water Quality Report, which is used to recommend actions to address health hazards in the Estuarine and marine recreational environment. The long term goal is to extend the monitoring programme to embrace estuarine and marine environments throughout the municipal region. This will enable the department to establish accurate data and to recommend best practice in the management of these systems to ensure appropriate water quality.

Municipality's Management Area into the Municipality's sewer system are not yet monitored by Overstrand Municipality. The Municipality's tariff structure for the discharge of effluent by industrial consumers does not make provision for nutrient loads and volume to be taken into account. There is no limit on the permitted volume of effluent that can be discharged into the sewer system, but the concentration limits for the various parameters are included in the Municipality's Water Services by-laws (Acceptance of industrial effluent for discharge into the sewage disposal system).

## 10.2 Gaps and Strategies

Metering of all water consumption is one of the most significant steps in order to properly plan and manage water sources. Without metering no management is possible. Overstrand Municipality needs to continue with the monthly reading of all the existing bulk water meters. The table below gives an overview of the years in which the annual water demand is likely to exceed the sustainable yield from the various resources.

**Table 10.2.1: Years in which the annual water demand will exceed the sustainable yield from the various resources**

| Distribution System | Total sustainable Yield (x $10^6$ $m^3$/a) | Annual Growth on 2012/2013 Demand (2%, 3% or 4%) | Annual Growth on 2012/2013 Demand (4%, 5% or 6%) | WSDP Projection Model |
|---|---|---|---|---|
| Buffels River | 1.717 | 2031 (3%) | 2023 (5%) | > 2037 |
| Kleinmond | 2.589 | > 2037 (3%) | 2032 (5%) | > 2037 |
| Greater Hermanus | 5.200* | 2020 (4%) | 2017 (6%) | 2019 |
| Stanford | 1.950 | > 2037 (3%) | > 2037 (5%) | > 2037 |
| Greater Gansbaai | 2.768 | 2027 (4%) | 2022 (6%) | 2031 |
| Pearly Beach | 0.307 | 2033 (3%) | 2025 (5%) | 2034 |
| Baardskeerdersbos | 0.405 | > 2037 (2%) | > 2037 (4%) | > 2037 |
| Buffeljags Bay | 0.028 | > 2037 (2%) | > 2037 (4%) | > 2037 |

Note * With Gateway, Camphill and Volmoed Well Fields fully operational according to the licensed volumes.

The DWA also completed their Reconciliation Strategy during 2010/2011 and the table below gives an overview of the recommended potential future water resources as included in the Strategies (**Corrections by Municipality**):

**Table 10.2.2: Potential future water resources for the various towns (DWA's Reconciliation Strategy)**

| Distribution System | Option | Potential |
|---|---|---|
| Betty's Bay, Rooi Els and Pringle Bay | Re-use of water | • The Buffels River area does not have its own WWTW and therefore the re-use water is not a feasible option for the area. |
| | Groundwater | • Boreholes into the Peninsula Formation north of the Buffels River Dam are likely to yield between 5 – 10 l/s (provided the right structures are targeted), with good water quality (Class 0-1) being present. It is recommended that only 0.5 – 1 M $m^3$/a is abstracted from the Peninsula Formation, in order to prevent any large drawdowns in the environmentally sensitive recharge and discharge areas. Any groundwater use in this area should in turn be carefully managed and monitored. 0.5 – 1 M $m^3$/a will only meet the low-growth scenario shortfalls up to 2035, and other water sources will be required to meet the medium and high-growth scenario future shortfalls. |
| | Surface Water | • Betty's Bay is close to the lower Palmiet River making the river an obvious choice to supply the town when the water requirement exceeds the capacity of the current resources after 2017. Rooi Els River is also another river considered for investigation if the Palmiet River may not be a good choice. |
| | Other Sources | • Rainwater harvesting is a suitable option for the area, considering the MAP is acceptable for rainwater harvesting to be deemed feasible. This should be promoted for all new houses being built. |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM strategies to reduce water losses (Busy with Implementation)<br>• Abstraction from the Palmiet River<br>• Groundwater development<br>• Abstraction from the Rooi Els River<br>• Raising of Buffels River dam wall |
| Kleinmond | Re-use of water | • Re-use of water from the WWTW for domestic purposes can only be allowed if the existing works is upgraded to a suitable process technology that can provide a 95% assurance of supply in terms of quality requirements. |
| | Groundwater | • Future groundwater targets should include the confined Peninsula Formation to the NE of the golf course along a NE-SW orientated normal fault, where high yields and good quality water (Class 0-1) can be expected. The unconfined Skurweberg Formation can also be targeted in the area, although the yields are likely to be lower and higher iron concentrations might be |

| Table 10.2.2: Potential future water resources for the various towns (DWA's Reconciliation Strategy) | | |
|---|---|---|
| **Distribution System** | **Option** | **Potential** |
| | | present. |
| | Surface Water | A study was carried out on the Palmiet River by DWA for further development of the surface water resources with the following recommendations:<br>• Transferring water from the Kogelberg Dam to the Steenbras Dams and this was implemented the same year and provided 22.5 Mm³/a at 1:50 year assurance.<br>• Raising of the current Eikenhof Dam to increase its capacity from 22.5 Mm³/a to 30 Mm³/a and this would provide additional yields of 4.5 Mm³/a for the Palmiet River area.<br>The total storage would be only 27% of the MAR of 301.8 Mm³, but the ecological freshwater flow requirements of the Palmiet River would limit further development. |
| | Other Sources | • Rainwater harvesting can be a suitable option for the area, considering the mean annual precipitation is acceptable for rainwater harvesting. |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM strategies to reduce water losses (Busy with Implementation)<br>• Increase allocation from the Palmiet River<br>• Groundwater development<br>• Regional scheme with Overberg Water for bulk supply from Theewaterskloof Dam or the Palmiet River extended. |
| Hermanus | Re-use of water | • Currently treated water is used for irrigation purposes at the golf course and several schools. Direct and indirect potable water re-use is currently planned.<br>• The cost of utilising treated water has been estimated in Hermanus. A limited cost saving could be obtained should the treated water be incorporated directly in the existing supply system because dormant capacity in the existing system can be used more effectively. The cost of this system will mainly depend on the volume of water supplied.<br>• Selected water users could be supplied with up to 4 Mm³/a by 2030, assuming that 50% of the bulk water consumption is available for re-use. |
| | Groundwater | • PSPs were appointed to proceed with groundwater investigation and exploration projects. Five target options for potential TMG well field sites have been identified and three of these have been investigated and implemented to various stages of progress.<br>Gateway Well field (Within the town of Hermanus)<br>Camphill Well field (In the Hemel en Aarde Valley)<br>Volmoed Well field (In the Hemel en Aarde Valley)<br>• Construction of infrastructure connecting the Camphill and Volmoed well fields to municipal supply is planned for 2012. The Gateway monitoring programme is also applied at Camphill and Volmoed well field and results are presented to the monitoring committee. The two well fields are currently not pumped whilst pipeline infrastructure is completed and monitoring intends to establish baseline data.<br>• The three well fields together can provide an additional 2.62 Mm³/a, equivalent to 37% of the required yield in 2035 under the medium growth scenario. The approved licenses indicate 3.2 Mm³/a in 20 years. |
| | Surface Water | • The only feasible option identified in the Western Overberg Coastal Zone Water Supply Study (DWA, 2000) was the construction of the Hartebeest River Dam. The feasibility study however showed that the costs were significantly higher than the identified groundwater options that are currently being developed.<br>• Regional scheme with Overberg Water for bulk supply from Theewaterskloof Dam or from the Palmiet River. |
| | Other Sources | • Desalination of seawater is seen as a potential future supply source for Hermanus. A feasibility study was undertaken and the design for a pilot plant is available for implementation when required. |
| | **Summary** | • Full implementation of the WC/WDM Strategy (Busy with Implementation)<br>• Full implementation of the Gateway well field (Implemented)<br>• Development of the Camphill and Volmoed well fields. (Implemented)<br>• Potable and or direct use of treated effluent. (Busy with Planning)<br>• Regional scheme with Overberg Water for bulk supply from Theewaterskloof Dam or from the Palmiet River.<br>• Desalination plant<br>• Construction of Hartebeest River Dam and supply to Hermanus via the De Bos Dam (**?**). |
| Stanford | Re-use of water | • Re-use of water from the WWTW for domestic purposes can only be allowed if the existing works is upgraded to a suitable process technology that can provide a 95% assurance of supply in terms of quality requirements. |
| | Groundwater | • Further groundwater development is seen as a potential future source for the town. The |

| Table 10.2.2: Potential future water resources for the various towns (DWA's Reconciliation Strategy) | | |
|---|---|---|
| **Distribution System** | **Option** | **Potential** |
| | | Overstrand Municipality developed the Kouevlakte Wellfield south of the town, which augments the supply to the Stanford area. (Implemented) |
| | Surface Water | • The Klein River runs through Stanford into the Klein River Lagoon, which is a sensitive and protected environment. The low flow of the Klein River at Stanford is close to zero during summer, due to heavy irrigation abstractions upstream of Stanford. |
| | Other Sources | • Rainwater harvesting cannot be a suitable option for Stanford, considering the mean annual precipitation is too low for rainwater harvesting. |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements, if the WC/WDM Strategy is fully implemented. The following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM strategies to be implemented to reduce water losses. (Busy with Implementation)<br>• Kouevlakte Wellfield development (Implemented) |
| Greater Gansbaai | Re-use of water | • The existing WWTW is in a good physical condition, but the waste water will need further treatment to potable standard. |
| | Groundwater | • The best groundwater targets in the area are the TMG and Bredasdorp Group. The unconfined Peninsula Formation could be targeted along the coastline, however there is a risk of saltwater intrusion, as well as groundwater pollution from the Gansbaai landfill site and WWTW (both of which are highly monitored at present).<br>• Gravels of the Klein Brak Formation (Bredasdorp Group) form a significant groundwater resource in the area, however abstraction from this unit could put the springs that are currently used by Gansbaai at risk. The Bredasdorp Group sediments are also highly susceptible to anthropogenic pollution and any future boreholes need to be monitored for contamination.<br>• The confined Peninsula Formation can be targeted at depth in the vicinity of the Franskraal and Kraaibosch dams. The risk of both salt-water (negligible at Kraaibosch Dam) and anthropogenic contamination is reduced in both cases, however monitoring of salt-water intrusion will still be essential at any borehole into the Peninsula Formation at Franskraal Dam. Borehole yields are likely to be in the range of 5 – 10 l/s and water quality is expected to be good (Class 0-1). |
| | Surface Water | • The small size of the rivers, the ecological freshwater flow requirements of the estuaries and the high salinity of the water in some of the rivers are limiting factors for further development of the surface water resources. |
| | Other Sources | • Rainwater harvesting can be a suitable option for the area, considering the mean annual precipitation is acceptable for rainwater harvesting. |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements. The new Kraaibosch Dam will also provide for Gansbaai until 2030. The following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM strategies to be implemented to reduce water losses. (Busy with Implementation)<br>• Abstraction from Franskraal Dam (Implemented, water supplied from Kraaibosch Dam)<br>• Allocation from De Kelder springs. (Used to its full potential)<br>• Groundwater development |
| Pearly Beach | Re-use of water | • The re-use of water for Pearly Beach will not be a feasible option because the town does not have a WWTW and is only serviced by septic tanks. Private WWTW at Resort and developing oxidations ponds for the Municipality. |
| | Groundwater | Three groundwater options exist for Pearly Beach to meet future annual shortfalls.<br>• Either the Peninsula Formation or the Skurweberg Formation could be explored along the Groenkloof Fault, however this may put the presently used springs at risk.<br>• The second TMG option would be the exploration of the Peninsula Formation in a semi-confined state to the east of the Kraaibosch Dam, if the dam is to be used to augment the supply to Pearly Beach. Yields of 5 – 10 l/s can be expected from the two TMG aquifers if either option is followed, with good water quality (Class 0-1). However, use of this resource adjacent to the dam may be in future competition with Gansbaai and surrounding areas that use Kraaibosch Dam.<br>• The most immediate groundwater option would be the exploration of the Bredasdorp Group sedimentary units and the area has the presence of the Klein Brak Formation palaeochannel gravel deposits. Thick palaeochannel deposits can yield boreholes of between 2 – 5 l/s. Two 10 l/s boreholes or four 5 l/s boreholes would meet all scenarios except the high shortfall scenario for 2035, where an additional 10 l/s borehole may be required. |
| | Surface Water | • The Kraaibosch Dam is a potential option to augment the supply for Pearly Beach. This can be achieved by directly linking the Pearly Beach supply to the Kraaibosch Dam. Another option would be to link the Pearly Beach supply to the Gansbaai supply system. |
| | Other Sources | • Rainwater harvesting cannot be a suitable option for Pearly Beach, considering the mean |

| Table 10.2.2: Potential future water resources for the various towns (DWA's Reconciliation Strategy) | | |
|---|---|---|
| **Distribution System** | **Option** | **Potential** |
| | | annual precipitation is too low for rainwater harvesting. |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements up to 2020. The following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM implementation to reduce water losses. (Busy with Implementation)<br>• Groundwater development in the TMG Aquifer.<br>• Linking Pearly Beach supply system with the Kraaibosch Dam<br>• Linking the Pearly Beach supply with the Gansbaai supply system |
| Baardskeer-dersbos | Re-use of water | • The re-use of water is not a suitable supply option for Baardskeerdersbos, as there is no formal sewerage system and WWTW available. |
| | Groundwater | • The best groundwater target option is the fractured sandstones and quartzites of the Peninsula Formation, in a confined or unconfined state along the Baardskeerdersbos Fault. Two boreholes were drilled in 2008 targeting the Peninsula Formation, with blow yields of 13.1 and 1.8 l/s. The higher yielding borehole was tested and a sustainable yield of 5 l/s over 24 hours or 8 l/s over 8 hours was determined. The town is not expected to have any water shortfalls up to 2035, after commissioning of the new borehole; however if water is required the Peninsula Formation can be further explored along the fault with similar yields. |
| | Surface Water | Potential future surface water sources for the town, as identified in the Breede WMA ISP (DWA, 2004), are the utilisation of:<br>• A tributary of the Boesmans River, and<br>• The Uilkraals River |
| | Other Sources | • None |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements, with the commissioning of the new borehole. If the town may require alternative water resource options in the future, the following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM Strategies(Busy with Implementation)<br>• Further groundwater development (Implemented)<br>• Abstraction from Uilkraals River to augment the supply |
| Buffeljags Bay | Re-use of water | • The re-use of water is not a feasible option for the town. |
| | Groundwater | • The town is currently supplied by one borehole, which can sustainably supply 0.019 Mm³/a. Both have been drilled into the Peninsula Formation near the shoreline and have low sustainable yields of 0.1 and 0.5 l/s.<br>• Two further groundwater target options for the town, if required, could be the shelly gravels of the Klein Brak Formation and the fractured quartzites and sandstones of the Skurweberg Formation in the Buffeljags Mountains. The Buffeljags Mountains are relatively elevated in comparison to the rest of the region and higher recharge into the unconfined Skurweberg Formation can be expected there in comparison to the deeper confined Peninsula Formation further south-west.<br>• Higher yields of between 2-5 l/s can be expected (with a good water quality of Class 0-1), with a reduced risk of salt-water intrusion. Boreholes into the Klein Brak Formation and overlying Quaternary sediment are likely to have yields of 5 l/s, however Quaternary aquifers can be susceptible to over abstraction and anthropogenic contamination. |
| | Surface Water | • There is no surface water sources in close proximity to Buffeljags Bay |
| | Other Sources | • Rainwater harvesting is not a feasible option due to the low annual rainfall.<br>• Desalination of seawater could be an option, if no other sources are available. |
| | **Summary** | **The current water sources have adequate supply to cater for the medium and longer term future water requirements. If the town may require alternative water resource options in the future, the following sources are identified as potential sources to augment the water supply:**<br>• WC/WDM Strategies (Busy with Implementation)<br>• Further groundwater development (Implemented)<br>• Desalination of seawater |

*Buffels River and Kleinmond Areas:* Overstrand Municipality completed a detail investigation during 2010/2011 of the water resources for the area from Rooi Els to Kleinmond and the recommendations from the Study will be implemented.

*Greater Hermanus Area:* The Gateway, Camphill and Volmoed wellfields were developed by Overstrand Municipality as additional groundwater resources for the greater Hermanus Area. The Gateway boreholes are

in production and the Municipality keep on implementing their Groundwater Monitoring Programmes for all their wellfields, in order to comply with the License conditions. A new pipeline from the Camphill and Volmoed boreholes to the Preekstoel WTWs was constructed and the new boreholes were incorporated into the system. The Municipality further applied for a License review to the DWA which may include amended license conditions for the Gateway Wellfield.

A detail feasibility study was also completed during the 2010/2011 financial year for the re-use of treated effluent from the Hermanus WWTWs. An ORIO application was prepared and submitted for the Hermanus Reclamation Project. The Municipality will also start investigating various desalination options in future.

*Stanford:* The Municipality explored the groundwater potential of the Kouevlakte area since 2009, through exploration borehole siting and drilling. Two newly drilled boreholes were put into operation and new bulk supply pipelines were constructed during the 2011/2012 financial year in order to connect the two newly drilled boreholes to the existing water reticulation network. Irrigation of sports fields with treated effluent from the Stanford WWTW was also investigated.

*Greater Gansbaai:* A new Reverse Osmosis Filtration Plant was constructed during the 2010/2011 financial year in order to fully utilise the Klipgat and Grotte resources and improve the quality of the water.

*Pearly Beach:* Overstrand Municipality is committed to manage the dam efficiently. Other future resource options include groundwater development and the possible Kraaibosch scheme.

*Baardskeerdersbos:* Two new boreholes were recently commissioned and the supply will be adequate to meet the medium- and long-term future water requirements. The supply from the stream will only be utilised as a back-up supply when necessary.

*Buffeljags Bay:* The current source is adequate to supply the medium- and long-term future water requirements. A new electricity connection to the borehole will be contracted by Eskom.

Industrial Consumers: A "Form of Application for Permission to Discharge Industrial Effluent into the Municipality's sewer" is included in Overstrand Municipality's water services by-laws and all industries now need to formally apply for the discharge of industrial effluent into the sewer system.

The following gaps with regard to industrial consumers and their discharge of effluent into Overstrand Municipality's sewer system were identified (although there are not many industries connected to Overstrand Municipality's sewer systems):

- Industrial effluent discharge into the sewer system needs to be quantified.
- All industries need to formally apply for the discharge of industrial effluent into the sewer system.
- Regular sampling of the quality of industrial effluent discharged into the sewer system is necessary.
- Any returns from the industries direct to the Water Resource System needs to be metered.

Overstrand Municipality is committed to ensure that all industries apply for the discharge of industrial effluent into the sewer system, to monitor the quality and volume of industrial effluent discharged and to implement the set of by-laws with regard to the discharge of industrial effluent into Overstrand Municipality's sewer system in order to determine whether the quality comply with the standards and criteria

The industrial consumers in Overstrand Municipality's Management Area are not yet monitored, with regard to the quality and volume of effluent discharged by them. Overstrand Municipality needs to adopt an approach whereby the various parameters at all the industrial consumers are monitored, as well as volumetric monitoring at the larger users. Adaptation of procedures must be undertaken in accordance with any changes to the wastewater discharge criteria set by DWA. It will also be necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place.

All current industrial consumers need to apply for discharge permits and they must supply and maintain a flow meter measuring the volume of water that is discharged into Overstrand Municipality's sewerage system. It is also recommended that the accounts generated by the Municipality include for each cycle a summary of the COD and flow results to enable industries to keep a record and look at ways of improving where possible.

## 11. FINANCIAL

### 11.1 Status Quo

Capital Budget: Overstrand Municipality's proposed Water and Sewerage Capital Budget for 2014/2015 is R13.8 million and R13.0 million respectively. The updated Water and Sewer Master Plans (July 2012) recommends upgrades to the values indicated in the table below in the foreseeable future in order to accommodate development and population growth according to the SDF (2011 Values, which include P&Gs, Contingencies and Fees, but exclude EIA studies, registration of servitudes and / or land acquisition and VAT).

**Table 11.1.1: Future Water and Sewerage Infrastructure required**

| System | Water Infrastructure | | | | Sewerage Infrastructure | | |
|---|---|---|---|---|---|---|---|
| | Reticulation | Reservoirs and Pump Stations | WDM | Total | Reticulation | Pump Stations | Total |
| Buffels River | R8.594 | R12.978 | R1.488 | R23.060 | R132.957 | R13.377 | R146.334 |
| Kleinmond | R6.390 | R0.596 | R0.852 | R7.838 | R31.103 | R0.708 | R31.811 |
| Greater Hermanus | R65.021 | R51.770 | R0.700 | R117.491 | R68.832 | R7.475 | R76.307 |
| Stanford | R1.924 | R3.872 | R0.383 | R6.179 | R11.897 | R1.789 | R13.686 |
| Greater Gansbaai | R46.569 | R47.762 | R0.500 | R94.831 | R113.634 | R16.733 | R130.367 |
| Pearly Beach | R3.631 | R0.000 | R0.100 | R3.731 | R20.713 | R2.785 | R23.498 |
| **Totals** | **R132.129** | **R116.978** | **R4.023** | **R253.130** | **R379.136** | **R42.867** | **R422.003** |

The previous table is for the internal systems and exclude the bulk infrastructure needs (Augmentation of Water Sources, Bulk Pipelines and the upgrading of WTWs and WWTWs).

Operational Budget: The table below gives a summary of the total operating costs and income for water and sanitation services for the various years.

**Table 11.1.2: Summary of Operational and Maintenance expenditure and income budgets for water and sanitation services**

| Description | Actual | Record Prior (Audited) | | | |
|---|---|---|---|---|---|
| | 12/13 | 11/12 | 10/11 | 09/10 | 08/09 |
| Total operating expenditure for Water | R85 498 520 | R83 115 289 | R73 321 373 | R72 496 148 | R48 040 492 |
| Total operating income for Water | -R96 578 920 | -R104 938 998 | -R79 588 700 | -R74 598 682 | -R66 998 742 |
| **Nett Surplus / Deficit** | **-R11 080 400** | **-R21 823 709** | **-R6 267 327** | **-R2 102 534** | **-R18 958 250** |
| Total operating expenditure for Sanitation | R51 607 042 | R45 790 334 | R40 666 933 | R37 715 839 | R25 170 346 |
| Total operating income for Sanitation | -R64 291 003 | -R74 623 658 | -R50 911 542 | -R36 160 168 | -R32 056 044 |
| **Nett Surplus / Deficit** | **-R12 683 961** | **-R28 833 324** | **-R10 244 609** | **R1 555 671** | **-R6 885 698** |

Tariff and Charges: The first six (6) kl of water is provided free to all consumers. Overstrand Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to Overstrand Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services. This implies that either the equitable share is used to cover this cost, or higher consumption blocks are charged at a rate greater than the cost in order to generate a surplus to cross-subsidise consumers who use up to six (6) kilolitres per month.

Overstrand Municipality's current four (4) block step tariff system discourages the wasteful or inefficient use of water. It is expected that this tariff structure will continue to be implemented in the future. The sustainable supply of potable water is becoming an ever increasing challenge. This scarce commodity has to be optimally