RAW WATER SUPPLY AGREEMENT

between

THE DEPARTMENT OF WATER AFFAIRS AND FORESTRY

and

THE CITY OF CAPE TOWN

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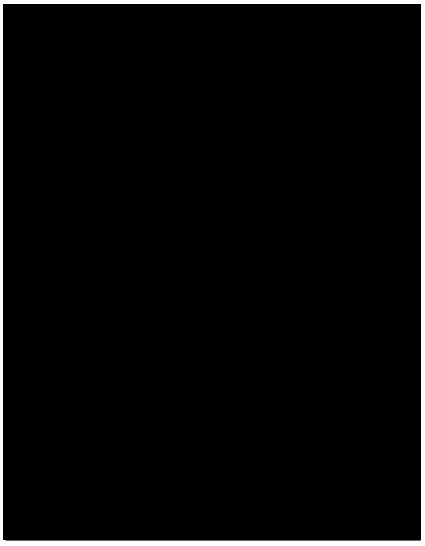

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ANNEXURES

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1. **INTERPRETATION**

1.1 In this agreement, the singular includes the plural and vice versa, and the following expressions bear the meanings assigned to them below:-

1.1.1 "agreement" includes the annexures to this agreement, provided that in the event of any conflict or ambiguity between the expressions and/or provisions in the main agreement and in the annexures, the main agreement shall govern;

1.1.2 "assurance of supply" means the likely number of years, out of a hundred years, that a water user will obtain its allocated yield, without the application of water restrictions;

1.1.3 "BWP" means the Berg Water Project;

1.1.4 "BWP agreement" means the agreement entered into between DWAF and TCTA in respect of the implementation of the BWP, attached as Annexure "I";

1.1.5 "Berg Water Marginal Cost" means the marginal cost of a unit of water from the BWP based only on the City's demand for water from the BWP as set out in Annexure "F";

1.1.6 "Berg Water Capital Charge" means the capital charge to be levied by DWAF against the City for purposes of implementing the BWP; as set out in Annexure "F";

1.1.7 "City" or "CCT" means the City of Cape Town, a municipality established in terms of the City of Cape Town Establishment Notice (Provincial Notice 479 of 22 September 2000, as amended by Provincial Notice 665 of 4 December 2000) as read with the provisions of sections 12 and 14 of the Local Government: Municipal Structures Act, No. 117 of 1998, of Civic Centre, 12 Hertzog Boulevard, Cape Town, 8001, fax number: 400 1332, as herein represented by the City Manager;

[redacted]

1.1.8 "commencement date" means the date on which the last-signing party signs this agreement;

1.1.9 "construction phase" means the period preceding the date specified in the final take over certificate to be furnished by TCTA to DWAF, and from which date the BWP will be deemed operational;

1.1.10 "CPI-X" means the weighted average of the Consumer Price Index (Headline Inflation), excluding mortgage interest rates for metropolitan and other urban areas as published by Statistics South Africa from time to time;

1.1.11 "date of commencement of the NWA" means 1 October 1998;

1.1.12 "DWAF" means the Department of Water Affairs and Forestry;

1.1.13 "*force majeure*" means any relevant event, occurrence, circumstance or condition (including viz major, causus fortuitus or act of state) beyond the control of the parties which could not have been reasonably foreseen when the agreement was entered into and which, despite the exercise of diligent efforts, could not have been prevented, limited or minimized and which results in either of the parties not being able to fulfill its duties and obligations in terms of the agreement, excluding drought;

1.1.14 "government waterwork" means a government waterwork as defined in the NWA;

1.1.15 "Government Water Scheme" or "GWS" means one or more government waterworks;

1.1.16 "implement" means to plan, design, supervise, manage, construct and finance the BWP and to undertake any matter incidental to such activities, as more fully set out in the BWP agreement;

[redacted]

1.1.17 "interest" means interest in respect of water use charges at a rate determined from time to time by the Minister, with the concurrence of the Minister of Finance, by notice in the Gazette, as provided for in section 59(3)(a) of the NWA;

1.1.18 "low water demand projections" means the water demand projections of the City if it meets its water demand objectives, as contained in its Water Services Development Plan and Water Demand Management Policy and Strategy, as set out in Annexure "D";

1.1.19 "Minister" means the Minister of Water Affairs and Forestry;

1.1.20 "NWA" means the National Water Act, No. 36 of 1998;

1.1.21 "parties" means DWAF and the City;

1.1.22 "pricing strategy" means the Raw Water Pricing Strategy published in Government Gazette 1353 dated 12 November 1999, in terms of section 56(1) of the NWA;

1.1.23 "project account" means a separate bank account opened by and managed by TCTA for purposes of implementing the BWP;

1.1.24 "responsible authority" means the Minister or a Catchment Management Agency, as the case may be, as defined in section 1 of the NWA;

1.1.25 "TCTA" means the Trans-Caledon Tunnel Authority, established by Government Notice 2631 of 12 December 1986 (as amended by Government Notice 21017 of 24 March 2000);

1.1.26 "third party user" means any user of water from the Western Cape Water System, other than the City, which user's requirement is deemed to be allocated from the yield of the BWP, or which user receives an allocation from the BWP, in accordance with this agreement;

[redacted]

1.1.27 "third party capital charge" means the capital charge levied by DWAF against any third party user which shall be used to fund the BWP as set out in clause 12;

1.1.28 "user sectors" means the irrigation sector, the municipal sector and the industrial sector for purposes of the pricing strategy;

1.1.29 "Water Act" means the Water Act, No. 54 of 1956;

1.1.30 "Water Services Act" means the Water Services Act, No. 108 of 1997;

1.1.31 "Western Cape Systems Model" means the computer model designed to assist in the optimal future development of water supply to all users of the Western Cape Water System and includes the Water Resource Planning Model;

1.1.32 "yield" means the volume of water that can be abstracted annually for a specified assurance of supply.

1.2 Any reference to an enactment is to that enactment as at the date of signature hereof and as amended or re-enacted from time to time.

1.3 If any provision in a definition is a substantive provision conferring rights or imposing obligations on any party, notwithstanding that it is only in the definition clause, effect shall be given to it as if it were a substantive provision in the body of the agreement.

1.4 When any number of days is prescribed in this agreement, same shall be reckoned exclusively of the first and inclusively of the last day unless the last day falls on a Saturday, Sunday or public holiday, in which case the last day shall be the next succeeding day which is not a Saturday, Sunday or public holiday.

1.5 Where figures are referred to in numerals and in words, if there is any conflict between the two, the words shall prevail.

[redacted]

1.6 Expressions defined in this agreement shall bear the same meanings in schedules or annexures to this agreement which do not themselves contain their own definitions.

1.7 Where any term is defined within the context of any particular clause in this agreement, the term so defined, unless it is clear from the clause in question that the term so defined has limited application to the relevant clause, shall bear the meaning ascribed to it for all purposes in terms of this agreement, notwithstanding that that term has not been defined in this interpretation clause.

1.8 In the event of any conflict between the provisions of this agreement (excluding the annexures), and the provisions of any of the annexures, the provisions of the agreement (excluding the annexures shall prevail).

2. RECORDAL

2.1 The Western Cape Water System is an integrated water supply system comprising Government Water Schemes as well as certain of the dams and infrastructure owned by the City.

2.2 The Western Cape Water System currently comprises the City's Steenbras (upper and lower) and Wemmershoek schemes and the Palmiet River, Voëlvlei and Riviersonderend/Berg River Government Water Scheme as described more fully in Annexure "A".

2.3 The City operates its own dams and water treatment plants within the Western Cape Water System so as to ensure the long term sustainability of water resources. This is achieved by the City through measures such as shifting its water demand onto dams within the Western Cape Water System that are more likely to spill and introducing additional capacity in its water treatment works and bulk water pipelines to enable flexibility in the allocation of demands on the different dams and to provide interconnectivity between the various sources within the Western Cape Water System. These actions benefit all water users of the Western Cape Water System.

2.4 After reviewing, and being satisfied with, progress made by the City in water conservation and water demand management and after obtaining an

[redacted]

Environmental Authorisation in terms of section 22 of the Environment Conservation Act, No. 73 of 1989, the Minister has, in terms of section 109 of the NWA, approved the implementation of the BWP, a Government Water Scheme, which will augment the water supply of the Western Cape Water System, as more fully described in Annexure "B".

2.5 The Minister has directed TCTA to finance and implement the BWP, subject to a number of conditions, including but not limited to, that the BWP must be implemented in the most efficient manner, with due regard to cost and timing, both of which are of great concern to the end user.

2.6 On or about the date of signature, the BWP agreement will be concluded to implement the BWP via an off-budget funding mechanism which will be arranged by TCTA on the strength of the revenue from the sale of water by DWAF to the City from the Western Cape Water System. The City is obliged to pay the Berg Water Capital Charge, as determined from time to time, until such time as the full costs of implementing the BWP have been settled.

2.7 The City will be the largest consumer of the additional water supply generated by the BWP within the Western Cape Water System and, accordingly, will bear a substantial proportion of the water use charges in respect of the BWP.

2.8 In terms of the Water Services Act, the City has a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services. Accordingly, water use charges, including in respect of the BWP, must be within an affordable structure to the City's end consumer.

2.9 The Minister has established a Pricing Strategy for water use charges in terms of the provisions of the NWA.

2.10 In accordance with its directive, TCTA has already commenced implementation of the BWP and all costs incurred by TCTA will be included in calculation of the Berg Water Capital Charge payable by the City in respect of the BWP as set out in this agreement, irrespective of when the project costs are incurred.

2.11 The anticipated date on which construction of the BWP will commence is 1 July 2003 and the target date for substantial completion of the dam is prior to the wet season of 2007.

2.12 The parties now wish to enter into an agreement in respect of the supply of raw water by DWAF to the City from the Government Water Schemes within the Western Cape Water System, and in respect of the imposition of water use charges on the City, both in relation to the Government Water Schemes within the Western Cape Water System as a whole, and the BWP in particular.

2.13 The parties wish to record the terms of their agreement in writing as they hereby do.

3. GUIDING PRINCIPLES

3.1 Within the framework of the National Water Resources Strategy, the BWP is to be planned to maximise benefit to current and future users while ensuring sustainable management of the Western Cape's limited water resources.

3.2 Future administrative actions by DWAF, including but not limited to, the granting of water use licences and conclusion of agreements with other users, as set out in clause 20, should take into account that the BWP is an integral component of the Western Cape Water System as a whole, and benefits all users of the Western Cape Water System.

3.3 The parties envisage that there will be further water resource development in the Western Cape following the BWP, which may include but not be limited to, exploitation of the Table Mountain Group Aquifer and Cape Flats Aquifer, as well as the development of the Voëlvlei, Lourens River and Eerste River Augmentation Schemes, water recycling and desalination, some or all of which water resource developments may be owned by the City.

3.4 Where possible, future water resource developments within the Western Cape should form part of the Western Cape Water System and should be based on the principles contained in this agreement.

[redacted]

3.5 The parties shall, within the framework of the National Water Resources Strategy, the relevant Catchment Management Strategies, development planning at both provincial and local levels (which at local level includes the City's Water Services Development Plan as part of the City's Integrated Development Plan), engage in joint long term planning to ensure that water resources are developed timeously and responsibly to ensure that the City receives a 98% level of assurance of supply, or such other level of assurance of supply as may be agreed by the parties from time to time.

4. EXISTING LAWFUL WATER USE

4.1 Water users are currently permitted, in terms of the NWA, to continue with existing lawful water use.

4.2 To qualify as an existing lawful water use under the NWA, such water use must -

4.2.1 either have lawfully taken place during a period of two years immediately before the date of commencement of the NWA; or

4.2.2 have been declared an existing lawful water use by a responsible authority.

4.3 Existing lawful water use includes, but is not limited to, specific allocations made in terms of the Water Act and other applicable laws and policies.

4.4 It is recorded that DWAF is in the process of registering the existing lawful water use of the City.

5. LICENSING OF WATER USE

5.1 It is further recorded that, at a future date which has still to be determined, the responsible authority will in all probability implement a policy of compulsory licensing of water use in terms of the provisions of the NWA. From the aforementioned date, all water users will require a licence and will not be able to continue using water on the basis of their "existing lawful water use".

[redacted]

5.2 In the event that the BWP is declared operational prior to introduction of compulsory licensing, the City will be obliged to apply for a license to use water that it has been allocated from the BWP in terms of this agreement.

5.3 It is furthermore recorded that, in the event that compulsory licensing is introduced, applicants for licences will be provided with an opportunity to object to proposed allocation schedules and to appeal against preliminary allocation schedules as required by the NWA.

6. YIELD OF THE WESTERN CAPE WATER SYSTEM

6.1 DWAF shall every 10 (ten) years or at any such other time as may be necessary, determine the yield of the Western Cape Water System by updating the hydrological records, including the additional yield deemed to be due to the BWP, and shall use the Western Cape Systems Model or any other appropriate technique or model in making such a determination.

6.2 In the event that the available yield of any of the Government Water Schemes within the Western Cape Water System is over-allocated, at any time, DWAF shall be obliged to consult each user sector in determining appropriate measures to redress such over-allocation.

7. ASSURANCE OF SUPPLY

7.1 Whereas the Pricing Strategy provides that:-

7.1.1 the long term mean (average) annual water use by sectors shall be taken into account in determining capital charges levied on users, which will be based on assurance of supply;

7.1.2 the mean annual water use by user sectors is currently considered by DWAF to be as follows:-

7.1.2.1 Irrigation sector – 91% of allocations;

7.1.2.2 Municipal sector – 97% of allocations;

[redacted]

7.1.2.3 Industrial sector - 97% of allocations or 100% for strategic use as provided for by the National Water Resource Strategy.

7.2 The parties expressly agree that DWAF shall:-

7.2.1 agree the assurance of supply required by user sectors and the rules to be applied to water restrictions, with each such user sector before altering the mean annual sectoral use for pricing purposes; and

7.2.2 take into account each user sector's assurance of supply when –

7.2.2.1 determining the yield of the Western Cape Water System;

7.2.2.2 determining the annual allocation of yield, as set out in clause 6.1 and Annexure "C"; and

7.2.2.3 imposing any water restrictions.

8. CONDITIONS OF SUPPLY

Further conditions for the supply of raw water by DWAF to the City are contained in Annexure "G".

9. DWAF'S GENERAL OBLIGATIONS

9.1 DWAF shall ensure that all the Government Water Schemes within the Western Cape Water System are developed, operated and maintained in a cost effective, consultative and efficient manner, (taking best practice principles into account).

9.2 DWAF shall comply with all its obligations in terms of the BWP agreement, including taking the necessary steps in terms of the breach provisions thereof if TCTA is in breach of any of its obligations.

9.3 If DWAF fails to comply with clause 9.1, the City shall be entitled to furnish DWAF with a written notice to remedy the breach within 60 (sixty) days of receipt of the notice, failing which the City shall be entitled to declare a dispute in terms of clause 23.

10. BWP DEEMED WATER USE

10.1 As a result of the fact that –

10.1.1 the City is required, and agrees, to pay capital costs in respect of the BWP from 1 July 2003, i.e. at least 4 (four) years before the BWP will be operational; and

10.1.2 in terms of the Pricing Strategy, capital charges are determined on the basis of water use allocations;

it is necessary, for purposes of imposing the Berg Water Capital Charge on the City, to determine a deemed water use allocation for the BWP.

10.2 On 1 July 2003, the City will, accordingly, be deemed to be allocated the full yield of the BWP, until such time as the BWP is declared operational, notwithstanding the fact that no water will be drawn from the BWP during that period.

10.3 In the event that a third party user:-

10.3.1 has not previously received a water allocation from the Western Cape Water System and requires an allocation;

10.3.2 exceeds, in any subsequent year the water use allocation for 2002/2003, and the agricultural sector exceeds the capped allocation, as set out in Table C2 of Annexure "C"; and/or

10.3.3 requires a level of supply assurance resulting in average use over and above the current levels as set out in clause 7.1.2;

[redacted]

prior to the BWP being declared operational, then in any such event the additional water required to guarantee the increased level of supply assurance, or the additional water use, as the case may be, shall also be deemed to be drawn from the BWP for water pricing purposes, and the deemed yield allocation of the City, in terms of clause 10.2, shall be reduced accordingly.

10.4 Once the BWP is declared operational, DWAF shall allocate the yield of the BWP to water users on an annual basis. It is anticipated that the full yield of the BWP will only be taken up by approximately 2013, even if the BWP is operational prior to such date.

10.5 As the additional water generated by the BWP will be delivered into, and operated within, the Western Cape Water System on an integrated supply basis in order to maximise the yield of the system as a whole, water users will not necessarily draw their BWP allocation from the BWP itself.

10.6 Until such time as the full yield of the BWP is allocated, the City will be allocated all the water in the BWP that has not been allocated to other water users. An allocation to third party users will decrease the allocation to the City by the proportionate amount allocated to third party users.

11. GENERAL WATER USE CHARGES

11.1 DWAF is entitled to levy various water use charges on water users in terms of the Pricing Strategy, including but not limited to:-

11.1.1 water resource development (capital) costs;

11.1.2 use of waterworks (operation and maintenance) costs; and

11.1.3 water resource management costs.

11.2 Provisions in respect of the levying of such water use charges, which charges shall be imposed on an annual basis, excluding capital costs in respect of the BWP (which are dealt with in clause 12 and Annexure "F"), are contained in Annexure "E".

11.3 DWAF shall, 5 (five) months before the end of the City's financial year provide the City with an estimate of proposed water use charges for the following 3 (three) years in order to enable the City to prepare its operating budget and engage in long term planning.

11.4 DWAF shall notify the City at least 4 (four) months before the end of the City's financial year of the water use charges to be imposed in DWAF's next financial year, as determined in terms of Annexures "E" and "F".

11.5 The City shall be entitled to query the amount of any water use charge imposed by DWAF, including in respect of the BWP, if the amount of such water use charge appears to be unreasonable, taking into account the principle of cost effectiveness and efficiency.

11.6 For purposes of levying water use charges, the yield of the Government Water Schemes within the Western Cape Water System will be allocated to users by DWAF on an annual basis according to existing lawful water use or any future licensing allocations, as the case may be, and such annual yield allocations will be communicated to the City in writing.

11.7 The annual yield allocation referred to in clause 11.6, for the year 2002/2003, is set out in Table C1 and C2 of Annexure "C".

11.8 In the event that DWAF implements further water resource developments which are funded off-budget, in addition to the BWP, DWAF will enter into a written agreement with the City for the levying of capital charges in respect of any such Government Water Scheme, provided that such agreements shall accommodate the City's obligation to pay the Berg Water Capital Charge.

12. BERG WATER CAPITAL COSTS

12.1 Capital costs in respect of the BWP will be calculated and levied on a different basis, as set out in Annexure "F", to the capital costs levied on users of the existing Government Water Schemes in the Western Cape Water System. DWAF shall levy:-

[redacted]

12.1.1 the Berg Water Capital Charge against the City; and

12.1.2 a Third Party Capital Charge against third party users.

12.2 The City's obligation to pay the Berg Water Capital Charge commences on 1 July 2003 and terminates when the full costs of implementing the BWP have been settled.

12.3 The parties shall ensure that the Berg Water Capital Charge is calculated within a structure affordable to the end user of the City's water services in order that the City may comply with its obligations to its consumers to ensure affordable and economical access to water services, as determined in terms of Annexure "F".

12.4 Adjustments to the Berg Water Capital Charge shall be undertaken as more fully set out in Annexure "F".

12.5 Whenever the Berg Water Capital Charge is adjusted in accordance with Annexure "F", DWAF and TCTA shall, prior to such adjustment, consult with the City and shall furnish the City with the relevant calculation sheets and financial information required in order for it to verify the calculations and projections.

12.6 In the event that the parties dispute any adjustment, or right to adjustment as set out in Annexure "F", either party may declare a dispute within 3 (three) months of such dispute having arisen, to be resolved in accordance with the procedure set out in clause 23.

12.7 Unless otherwise agreed with the City, any additional costs of implementing the BWP arising from, or due to, *force majeure* or any defect in the design or construction of the BWP, of whatsoever nature, shall not be included in the calculation of the Berg Water Capital Charge and shall not be otherwise recoverable from the City.

12.8 In the event that the City's water supply from the Western Cape Water System is significantly affected for more than 1 (one) year, as a result of *force majeure* impacting on the BWP, or any defect in the design or construction of

the BWP, of whatsoever nature, the City shall, after consultation with DWAF and TCTA, be entitled to proportionally reduce the amount of the Berg Water Capital Charge and/or Operation and Maintenance Costs in respect of the BWP, for the remaining period during which the water supply is so affected.

12.9 The Third Party Capital Charge will be applicable when any deemed or actual allocation in respect of the BWP is made by DWAF to a third party user. The Third Party Capital Charge will be recalculated annually for each allocation made by DWAF to third party users, in terms of clause 10.4, in order that cost apportionment in respect of implementation of the BWP is reflected in the final BWP allocation of water use.

12.10 The City, by agreement with DWAF and TCTA, may from time to time elect that DWAF forthwith pay over to TCTA any amounts levied by it as a Third Party Capital Charge, in which event adjustments shall be made to the Berg Water Capital Charge as set out in Annexure "F", or that DWAF credit the City with any such amounts.

12.11 Should any water user of the Western Cape Water System, including the City, request a once-off release from the BWP, in addition to such user's BWP allocation, DWAF may grant such request provided that any once-off release does not reduce the level of assurance of supply of any water users. DWAF shall be entitled to levy an additional capital charge in respect of such release, which shall be at the Berg Water Marginal Cost, and which must be paid by DWAF to TCTA and set-off against the costs of implementation of the BWP.

12.12 Upon termination of the period during which the Berg Water Capital Charge is payable by the City, as set out in clause 12.2, and subject to the Pricing Strategy, DWAF shall set the return on assets component of the capital cost charges in respect of the BWP levied on the City at a level that takes into account that the capital cost of the BWP will have been repaid.

13. WITHHOLDING OF THE BERG WATER CAPITAL CHARGE

13.1 In the event that construction of the BWP:-

13.1.1 has not commenced by 10 May 2006; or

[redacted]

13.1.2 is 18 (eighteen) months or more behind the approved construction schedule once construction has commenced;

the City shall be entitled to serve a notice on DWAF requiring DWAF, within 30 (thirty) days to outline the steps it has taken to remedy such delay in construction.

13.2 Should the City not be reasonably satisfied with the steps taken by DWAF to remedy the delays referred to in clause 13.1 the City shall, until such time as the delay in construction has been remedied, to the reasonable satisfaction of the City, be entitled:-

13.2.1 to withhold payment of the Berg Water Capital Charge, without attracting interest on such withheld amount; and

13.2.2 to re-negotiate the basis of calculation of the Berg Water Capital Charge.

13.3 In the event that the BWP agreement is cancelled or terminated, for whatsoever reason, prior to the BWP being declared operational, the City shall:-

13.3.1 until such time as implementation of the BWP resumes, to the reasonable satisfaction of the City, be entitled to –

13.3.1.1 immediately withhold payment of the Berg Water Capital Charge, without attracting interest on such withheld amount;

13.3.1.2 re-negotiate the basis of calculation of the Berg Water Capital Charge;

13.3.1.3 elect to complete implementation of the BWP as agent of DWAF; and to continue to pay DWAF a Berg Water Capital Charge, the basis of calculation of which shall be re-negotiated by agreement between the parties, in the event that implementation of the

BWP does not resume within 1 (one) year of such cancellation or termination.

13.4 In the event that agreement has not been reached in respect of the Berg River Capital Charge within 3 (three) months of construction commencing or resuming, in terms of clause 13.2, or implementation resuming, in terms of clause 13.3.1, or the City electing to complete implementation of the BWP in terms of clause 13.3.1.3, either party may declare a dispute to be resolved in accordance with the procedure set out in clause 23.

13.5 The City may not withhold payment of the Berg Water Capital Charge in the event that DWAF fails to adequately operate and maintain the BWP.

14. OPERATION AND MAINTENANCE COSTS

14.1 Once the BWP has been declared operational, in terms of the BWP agreement, DWAF shall be entitled to levy operation and maintenance costs against the City and third party users.

14.2 DWAF shall give the City 15 (fifteen) months notice prior to imposition of operation and maintenance costs in respect of the BWP, so as to provide the City with sufficient time to budget for the aforesaid costs.

14.3 DWAF shall be in breach of its obligation to operate and maintain a Government Water Scheme within the Western Cape Water System in the event that:-

14.3.1 DWAF fails to comply with the provisions of the NWA, and any regulations issued or saved thereunder, pertaining to dam safety; or

14.3.2 the City's water supply is significantly affected for 1 (one) year or more due to a failure by DWAF to operate or maintain a Government Water Scheme.

14.4 If an event of breach occurs, as set out in clauses 14.3.1 or 14.3.2, the City shall be entitled to furnish DWAF with a written notice to remedy such failure,

within 60 (sixty) days of the City becoming aware of the breach, failing which the City may declare a dispute in writing which dispute shall be determined by an independent expert appointed by the parties. In the event that the parties cannot agree on the appointment of an independent expert within 30 (thirty) days of the declaration of the dispute, such independent expert shall be nominated by the South African Institution of Civil Engineers. If either party is dissatisfied with the decision made by the independent expert, such party may refer the dispute for determination in terms of clause 23.

14.5 When following the dispute procedures in terms of clause 14.4, the City shall have the right, without prejudice to any other rights it may have, to claim:-

14.5.1 specific performance;

14.5.2 a reduction in the operation and maintenance costs payable by the City commensurate with the degree of DWAF's non-compliance, as set out in clause 14.3.1 or the impact on the City's water supply as set out in clause 14.3.2; or

14.5.3 a discharge of the City's obligation to pay operation and maintenance costs for the period of DWAF's breach of its obligation to operate and maintain the relevant Government Water Scheme.

14.6 Any costs arising from a negligent failure by DWAF to operate and maintain any of the Government Water Schemes within the Western Cape Water System shall not be recoverable from the City.

15. PAYMENT OF WATER USE CHARGES

15.1 DWAF will render an account to the City on a monthly basis which account shall be payable by the City on the date specified on the account, which date shall not be less than 30 (thirty) days from the date of the account. Such account will include the Berg Water Capital Charge as a separate line item and any credit due to Third Party Capital Charges.

[redacted]

15.2 Any delay in rendering an account will not relieve the City of the obligation to pay any amount payable.

15.3 In the event that a water use charge is not paid when it is due and payable, in terms of the NWA, DWAF may:-

15.3.1 on notice, suspend or withdraw a water use entitlement, provided that the person has been directed to take specified steps to rectify the failure within a specific period, in terms of section 54(3) of the NWA, and the person has had an opportunity to make representations within a reasonable period, in terms of section 54(4) of the NWA, which period the parties agree shall not be less than 60 (sixty) days;

15.3.2 restrict or suspend the supply of water to the water user from a Government Water Scheme, including the deemed supply from the BWP, or the authorisation to use water, until the charges, together with interest in respect of the default period, have been paid, provided that DWAF must give the City an opportunity to make representations within a reasonable period on any proposed restriction or suspension in terms of section 59(4) of the NWA, which period the parties agree shall not be less than 60 (sixty) days.

15.4 The City consents to the cession by DWAF to TCTA of the right to receive payment of the amount of the Berg Water Capital Charge with effect from the moment at which such payment becomes due and payable and that, pursuant to the aforesaid cession, each payment when due, will be made to TCTA by payment into the project account. No such cession shall take place after the costs of implementing the BWP have been repaid in full, or termination of the BWP agreement, whichever is the earlier.

15.5 The City's consent to the cession, in terms of clause 15.4, is subject to an undertaking by TCTA to DWAF that TCTA will adhere to the principles of co-operative government and intergovernmental relations, as set out in Chapter 3 of the Constitution of the Republic of South Africa, Act 108 of 1996, and any

legislation enacted in terms of section 42(2) thereof, prior to instituting any action for recovery of the Berg Water Capital Charge pursuant to the cession.

15.6 A water usage from the Western Cape Water System must be metered, as set out in Annexure "G", by the relevant authority responsible for operating the various schemes.

16. OPERATION AND MAINTENANCE

16.1 The parties have agreed on Operating Rules for the Western Cape Water System, including the BWP, contained in Annexure "H", which Operating Rules shall be amended from time to time, and the parties shall endeavour to adhere to such rules, such that the probability is maximised that each user will receive its existing lawful water use allocation, or any future allocations made in terms of compulsory licensing requirements, at the level of assurance of supply as set out in clause 7, or such other level of assurance of supply as may be agreed between the relevant parties from time to time.

16.2 DWAF shall operate and maintain the BWP as a component of the Western Cape Water System from the date that the BWP is declared operational by TCTA in terms of the BWP agreement.

17. WATER DEMAND MANAGEMENT

17.1 The City shall use all reasonable endeavours to ensure that the water demand management measures contained in its Water Services Development Plan and any other water demand policies adopted from time to time, including the Water Demand Management Policy and Strategy, are implemented.

17.2 DWAF shall monitor the City's compliance with its Water Services Development Plan.

17.3 The City shall be responsible for actively promoting the efficient use of water by its consumers.

[redacted]

18. ACCESS TO THE WESTERN CAPE WATER SYSTEM

The authorised officers, agents and employees of the parties shall be entitled access to any component of the Western Cape Water System in order to perform their official duties as additionally provided for in clause 5.3 of the BWP agreement.

19. PARTICIPATION IN IMPLEMENTATION OF THE BWP

19.1 The City is entitled and obliged to be represented on the TCTA Board Sub-Committee and Operational Committee, as set out more fully in clause 3 of the BWP agreement, in order to:-

19.1.1 provide strategic input on issues relating to the implementation of the Project, as well as the operation and maintenance of the BWP;

19.1.2 participate in the exchange of information relating to the BWP's funding arrangements;

19.1.3 ensure that the requirements of all parties are taken into consideration;

19.1.4 ensure that the BWP is designed and operated as an integral part of the Western Cape Water System.

19.2 DWAF shall promote the City's representation on the Environmental Management Committee referred to in Annexure "C" of the BWP agreement.

19.3 The City's participation in the committees referred to in clauses 19.1 or 19.2, or any further committees that may be constituted by DWAF or TCTA for purposes of implementation of the BWP, shall not give rise to any waiver in respect of any rights or obligations of DWAF or TCTA in respect of the BWP.

20. AGREEMENTS WITH OTHER USERS

20.1 DWAF shall, as soon as possible after the commencement date, be obliged to enter into supply agreements on similar terms as this agreement, excluding Annexure "I", with other users of water from the Western Cape Water System.

[redacted]

20.2 Without limiting the generality of the aforegoing, the supply agreements shall:-

20.2.1 state the applicable assurances of supply, as set out in the pricing strategy or specifically agreed with a user, as well as the operating rules for water restrictions;

20.2.2 require users to supply DWAF, at appropriate intervals, with historical, current and projected long term water demand curves;

20.2.3 contain commitments by users to actively promote and implement measures to ensure that water is used efficiently and that wastage is minimised;

20.2.4 provide for revisions of the projections referred to in clause 20.2.2, and should set out the basis of determining water use charges, as set out in Annexures "C" and Annexure "F";

20.2.5 include mechanisms for users to be consulted in respect of allocations for additional water use, or additional water required to guarantee any increased level of supply assurance, deemed to be drawn from the BWP;

20.2.6 specifically provide that the provisions of the NWA, as set out in clause 15.3 of this agreement, will be applicable to payment of the Third Party Capital Charge payable in respect of the BWP.

21. MUTUAL SUPPORT AND CO-OPERATION

The parties undertake to co-operate fully with each other in order to give full effect to the intent and purpose of this agreement and to take all the necessary steps to implement the terms, conditions and import of this agreement.

22. TERMINATION

This agreement, or parts thereof, may be terminated by mutual agreement between the parties, save that the consent of TCTA, which consent shall not be unreasonably

[redacted]

withheld, is required in respect of termination of any of the obligations of either of the parties in respect of the BWP.

23. DISPUTES

23.1 The parties shall endeavour to resolve any dispute arising out of this agreement amicably or by mediation as agreed to by the parties, unless otherwise provided for in intergovernmental dispute settlement procedures.

23.2 Any costs of a mediator shall be borne by the parties in equal shares.

23.3 Should the dispute not be resolved within (3) three calendar months from such dispute having been declared, or such alternative period as may be agreed by the parties in writing, then either party shall have the right to require that the dispute be referred to arbitration, in which event it shall be submitted to and determined by arbitration in accordance with the Rules of AFSA by an arbitrator appointed by AFSA, provided that:-

23.3.1 the arbitration shall be held in a summary manner with a view to it being completed as soon as possible;

23.3.2 the decision of the arbitrator shall be final and binding;

23.3.3 the cost of the arbitration proceedings shall be borne by the parties as decided by the arbitrator.

23.4 Nothing contained in this clause shall preclude any party from applying to court for a temporary interdict or other relief of an urgent and temporary nature, pending the award of the arbitrator.

24. NOTICES AND DOMICILIA

24.1 The parties choose *domicilium citandi et executandi* ("domicilium") for the purposes of giving any notice, the payment of any sum, the service of any process and for any other purpose arising from this agreement as the addresses below:-

24.1.1 The Director-General
Department of Water Affairs and Forestry
Sedibeng Building
185 Schoeman Street
Pretoria
0001

24.1.2 The City Manager
c/o Water Services
Bulk Water Department
8th Floor, 38 Wale Street
Cape Town
8001

24.2 The parties shall be entitled from time to time by written notice to the others to vary their domicilium to any other address in the Republic of South Africa which is not a post office box or *poste restante*.

24.3 Any notice required or permitted to be given in terms of this agreement shall be valid and effective only if in writing.

24.4 Any notice given and any payment made by one party to the other "the addressee" which:-

24.4.1 is delivered by hand during the normal business hours of the addressee at the addressee's domicilium for the time being shall be presumed, until the contrary is proved, to have been received by the addressee at the time of delivery;

24.4.2 is transmitted by telefax (subject to the transmitter retaining the fax transmission slip) shall be deemed (in the absence of proof to the contrary) to have been received within 1 (one) hour of transmission where it is transmitted during normal business hours of the receiving instrument and within 2 (two) hours of the commencement of the following business day where it is transmitted outside those business hours.

24.5 Notwithstanding anything to the contrary herein contained, a written notice or communication actually received by a party from another, including by way of facsimile transmission, shall be an adequate written notice or communication

to it notwithstanding that it was not sent to or delivered at its chosen *domicilium citandi et executandi*.

25. **SUCCESSION**

This agreement shall be binding on the City's and DWAF's successors-in-title, whether such succession is in whole or in part, to the rights and obligations of either of the parties.

26. **ASSIGNMENT**

Should any functions relevant to this agreement be assigned by DWAF to a water management institution in terms of the NWA or any other applicable legislation, DWAF undertakes to incorporate the relevant provisions of this agreement in any such assignment so as to bind such institution.

27. **GENERAL**

27.1 This document constitutes the sole record of the agreement between the parties pertaining to the matters dealt with herein.

27.2 No party shall be bound by any express or implied term, representation, warranty, promise or the like not recorded herein.

27.3 No addition, variation or agreed cancellation of this agreement shall be of any force and effect unless in writing and signed by or on behalf of the parties, including by persons with delegated authority to do so.

27.4 No extension of time or indulgence which any party ("the grantor") may grant to the other ("the grantee") shall constitute a waiver of any of the rights of the grantor, who shall not thereby be precluded from exercising any rights against the grantee which may have arisen in the past or which may arise in the future.

27.5 In the event that any of the terms of this agreement are found to be invalid, unlawful or unenforceable, such terms will be severable and the remaining provisions shall remain of full force and effect. If any invalid term is incapable

of amendment to render it valid, the parties agree to negotiate an amendment to remove the invalidity.

28. **COSTS**

Each party shall be liable for its own costs in respect of the preparation, drafting and negotiation of this agreement.

SIGNED at CAPE TOWN on this the 15th day of APRIL 2003.

AS WITNESSES

1. [redacted]

2. [redacted]

for and on behalf of
THE CITY OF CAPE TOWN

[redacted]

(who warrants his authority to sign)

SIGNED at CAPE TOWN on this the 15th day of APRIL 2003.

AS WITNESSES

1. [redacted]

2. [redacted]

for and on behalf of
DEPARTMENT OF WATER AFFAIRS

[redacted]

per : NAME

(who warrants his authority to sign)

ANNEXURE A

DESCRIPTION AND LAYOUT OF THE WESTERN CAPE WATER SYSTEM

A1. INTRODUCTION

The Western Cape Water System supplies the City of Cape Town (CCT), other local authorities and irrigators in the catchments of the Riviersonderend, Berg and Eerste Rivers.

The main supply schemes are shown in Figure A1 and the key features of the main dams are summarized in Table A1 (See also Appendix A1).

Figure A1: Layout of the main components of the Western Cape Water System

Table A1 : Main Dams of Western Cape Water System

Main Dam	Type	Height (m)	Gross Capacity (million m^3)	Gross Yield (million m^3/a)	Owner
Palmiet					
Kogelberg	Concrete	54	(17)*	22,5	DWAF
Rockview	Rockfill	48	(17)*		
Upper Steenbras	Earthfill	34	32	40	CCT
Lower Steenbras	Concrete	28	34		
Wemmershoek	Rockfill	55	59	54	CCT
Voëlvlei	Earthfill	10	172	105	DWAF
Theewaterskloof	Earthfill	38	480	241,2**	DWAF
TOTAL			**777**	**462,7****	

* Capacity is mainly utilized for the Palmiet Pumped Storage Scheme.

** The yields of the Riviersonderend-Berg System and of the Western Cape Water System were previously stated to be 219 million m^3/annum and 440,5 million m^3/annum respectively. These figures exclude compensation and exchange releases of 22,2 million m^3/annum.

These dams are the main components of the City of Cape Town's Steenbras and Wemmershoek Schemes and of the Palmiet, Voëlvlei and Riviersonderend Berg Government Water Schemes. However it is the relatively large capacities of DWAF's tunnel system and of the City's pipelines from these dams, as well as the flexibility of the City's bulk reticulation system, that enables the dams to be operated as an integrated system.

The layout of the schemes comprising the Western Cape Water System is shown on Figure A1. Table A2, Appendix A1 and Figures A2 to A6 show the details and schematics of the main schemes which are described in Section 2 below.

Table A2 : Main Features of Schemes of the Western Cape Water System

Scheme	Diversions Dams	Bulk Raw Water Conveyance	Irrigators	Water Treatment Works (WTW)	Bulk Clear Water Conveyance
Palmiet Government Water Scheme (see Figure A2)	Kogelberg pumps to Rockview which releases to	12 m^3/s Canal & pipeline to Steenbras Upper Dam			
Steenbras Scheme (see Figure A2)	Upper Steenbras releases to	Steenbras Pumped Storage 300 Mℓ/day Firlands Pumps & Pipeline		500 Mℓ/day Faure WTW	pipeline to Cape Town
	Upper Steenbras also releases to Lower Steenbras			150 Mℓ/day Steenbras WTW	Three Steenbras pipelines to Cape Town
Wemmershoek Scheme (see Figure A3)	Wemmershoek Dam release to			270 Mℓ/day Wemmershoek WTW	270 Mℓ/day Wemmershoek Pipeline supplying Cape Town, Paarl & Wellington
Voëlvlei Government Water Scheme (see Figure A4)	Klein Berg and 24 Rivers divert in winter	Release to irrigators	24 Rivers		
	into Voëlvlei Dam releases to:			270 Mℓ/day Voëlvlei WTW	Voëlvlei Pipelines to Cape Town
				30 Mℓ/day Swartland WTW	Pipeline to West Coast Towns
		Berg River	Lower Berg		
	Voëlvlei Dam also releases to Misverstand Dam	Berg River	Lower Berg	72 Mℓ/day Withoogte WTW	West Coast Withoogte Pipeline to Vredenburg/Saldanha

Scheme	Diversions Dams	Bulk Raw Water Conveyance	Irrigators	Water Treatment Works (WTW)	Bulk Clear Water Conveyance
Riviersonderend Berg River Government Water Scheme (see Figure A5)	Banhoek and Wolwekloof divert in winter				
	into Theewaterskloof Dam releases to:	Riviersonderend River	Riviersonderend	Overberg	
		Tunnel to Berg Siphon	Upper Berg		
		140 Mℓ/day Pipeline		270 Mℓ/day Wemmershoek WTW	270 Mℓ/day Wemmershoek Pipeline supplying Paarl & Wellington and Cape Town
	Theewaterskloof also releases to Kleinplaas Dam (Eerste River diversion) releases to:		Eerste		
		Tunnel to Stellenboschberg releases to	Stellenbosch Heldelberg	10 Mℓ/day Paradyskloof WTW	Additional supply to Stellenbosch
		500 Mℓ/day Faure Pipeline		500 Mℓ/day Faure WTW	Pipeline to Cape Town
		400 Mℓ/day Blackheath Pipeline		400 Mℓ/day Blackheath WTW	Pipeline to Cape Town
Berg Water Project (see Figure A6)	Supplement Scheme pumps to:				
	Berg Water Dam supplies:	Releases to irrigators, pumps into Dasbos Tunnel and via Tunnel System into Theewaterskloof Dam	Upper Berg		

The operating rules of the Western Cape Water System are discussed in Annexure H.

A2. MAIN SCHEMES

A2.1 Palmiet River Government Water Scheme (Figure A2)

The Palmiet River Government Water Scheme comprises the Kogelberg and Rockview Dams which are the main components of the Government Water Scheme and are connected by ESKOM's 400 Megawatt Palmiet Pumped Storage Scheme. These two dams serve respectively as the tail and headrace dams of the Pumped Storage Scheme which operates on a weekly cycle.

When there is adequate flow in the Palmiet River to meet the instream (environmental) flow requirements and also to transfer water, then the pumping hours of the Pumped Storage Scheme may be extended to deliver up to 3 million m^3 or more, of additional water per week from Kogelberg Dam into Rockview Dam, subject to agreement between DWAF, ESKOM and the City. This water can be released during the week into the Upper Steenbras Dam via 12 m^3/s canal, and the City of Cape Town's conduit, which comprises a canal and a pipeline

A2.2 Steenbras Scheme (Figure A2)

The Upper and Lower Steenbras Dams are both situated on the Steenbras River and are the main storage units of the Steenbras Scheme which is wholly owned by the City of Cape Town.

A2.2.1 Upper Steenbras Dam

The Upper Steenbras Dam stores water from its own catchment as well as water transferred by the Palmiet Pumped Storage Scheme. It also serves as the headrace dam of the 160 Megawatt Steenbras Pumped Storage Scheme which is owned by the City of Cape Town.

Water from the Upper Steenbras Dam can be released to the Lower Steenbras Dam or conveyed to the City's Faure Water Treatment Works. In the latter case, the water is delivered to the Lower Reservoir of the Steenbras Pumped Storage Scheme allowing the generating hours of this Scheme to be extended. From there it is pumped to the City's 500 Mℓ/day Faure Water Treatment Works (which mainly treats water from the Riviersonderend Berg River Government Water Scheme) via the Firlands Pump Station (with a capacity of 300 Mℓ/day) and a steel pipeline with a capacity of 450 Mℓ/day.

A2.2.2 Lower Steenbras Dam

The Lower Steenbras Dam supplies water to the 150 Mℓ/day Steenbras Water Treatment Works. From there, the three Steenbras Pipelines normally convey water by gravity to the higher lying zones of the City of Cape Town. However, the combined capacity of the pipelines can be increased to 160 ℓ/day with booster pumps on two of the pipelines.

A2.3 Wemmershoek Scheme (Figure A3)

The Wemmershoek Scheme is also owned by the City of Cape Town. It comprises the Wemmershoek Dam, the 270 Mℓ/day Wemmershoek Water Treatment Works and the Wemmershoek Pipeline which delivers water to the City and also to the branch pipeline supplying the towns of Paarl and Wellington of the Drakenstein Municipality. The Wemmershoek Water Treatment Works can also be supplied with 140 Mℓ/day of water via a pipeline connection from the Theewaterskloof Tunnel at the Berg River Siphon.

A2.4 Voëlvlei Government Water Scheme (Figure A4)

A2.4.1 Voëlvlei Dam

Voëlvlei Dam is an off-channel dam with a small catchment area of only 38 km^2. The main inflows are provided by two diversion canals:

- A weir on the Klein Berg River diverts water during the winter months into the 8 km long canal with a capacity of 20 m^3/s.
- Weirs on the Twenty-Four Rivers and on the Leeu River divert up to 34 m^3/s into the 29 km long canal to fill Voëlvlei Dam during the winter months and supply irrigators during the summer.

The City of Cape Town's 270 Mℓ/day Voëlvlei Water Treatment Works is supplied directly from the dam via a low lift pump station. A high lift pump station delivers water to the City via the 80 km long Voëlvlei prestressed concrete pipeline.

Water is pumped from the outlet of Voëlvlei Dam to the 30 Mℓ/day Swartland Water Treatment Works of the West Coast District Municipality. From there the water is distributed to various towns.

Water is also released from the dam into a canal which flows into the Berg River to supply water to irrigators during the summer months and to supply the West Coast District

Municipality's Withoogte Water Treatment Works which abstracts water at Misverstand Dam.

A2.4.2 Misverstand Dam

Misverstand Dam does not form part of the Voëlvlei Scheme, however its operation is directly linked to the releases from Voëlvlei Dam. The dam has a storage capacity of 7 million m^3, but this is not utilized as it is necessary to maintain the level at about 0,3 m below full supply level in order to prevent cavitation of the pumps at Withoogte.

The main purpose of Misverstand Dam is to divert water to the West Coast District Municipality's pump station which delivers water to the 72 Mℓ/day Withoogte Water Treatment Works and thence to the Vredenberg/Saldanha area. The dam also provides some regulation of the summer releases from Voëlvlei Dam which are re-released at Misverstand to downstream irrigators.

A2.5 Riviersonderend-Berg River Government Water Scheme (Figures A5 and A6)

The Riviersonderend-Berg River Government Water Scheme comprises Theewaterskloof Dam, the Riviersonderend-Berg River Tunnel System and Kleinplaas Dam. The Scheme supplies irrigators in the Riviersonderend, Berg and Eerste River catchments, and also the City of Cape Town, Stellenbosch and Overberg Water.

A2.5.1 Theewaterskloof Dam

Theewaterskloof Dam is the largest storage dam of the Western Cape Water System. It is filled by runoff from its own catchment and by the diversions during the winter months of the Wolwekloof and Banhoek Rivers into the Riviersonderend-Berg River Tunnel System. In future it will also receive water pumped from the proposed Berg River Dam

The main irrigation demands from Theewaterskloof Dam comprise the following:

- Direct abstractions from the dam by riparian irrigators and releases into the Riviersonderend River for downstream irrigators and Overberg Water.

- Releases via the Riviersonderend-Berg Tunnel System to irrigators in the catchments of the Berg and Eerste Rivers and for the City of Cape Town.

A2.5.2 The Riviersonderend-Berg River Tunnel System

The Riviersonderend-Berg River Tunnel currently conveys water from the Wolwekloof and Banhoek winter diversions (and in future water pumped from the Berg Water Dam) into Theewaterskloof Dam and abstracts water from the Dam to supply users as follows:

- The Upper Berg River irrigators are currently supplied with releases at the Berg River Siphon (where the tunnel system crosses under the Berg River), but will in future be supplied with releases from the Berg River Dam.

- The Eerste River irrigators from Kleinplaas Dam, and

- The Helderberg and Stellenbosch irrigators as well as the City of Cape Town and Stellenbosch Municipality via the Stellenboschberg Tunnel from Kleinplaas Dam.

A2.5.3 Kleinplaas Dam

Kleinplaas Dam is located on the Eerste River at Jonkershoek. The Dam has a very small capacity and is operated as follows:

- The water level is normally maintained at about 0,8 m below full supply level. When the level falls below this level then the three needle valves progressively come into operation and release water from the tunnel system into the dam, ie when the demands exceed the inflow from the Eerste River then water is released from the Tunnel System.

- During the summer most of the supply to the City of Cape Town and the irrigators passes through the dam.

- During the winter months a considerable proportion of the flow in the Eerste River is temporarily stored in Kleinplaas Dam and diverted to the City of Cape Town.

A2.5.4 City of Cape Town Raw Water Pipelines

The City of Cape Town operates two raw water pipelines which are connected to the outlet of the Stellenboschberg Tunnel.

- The Faure pipeline supplies the City's 500 Mℓ/day Faure Water Treatment Works and during the summer months the Helderberg and Stellenbosch irrigators.

- The Blackheath pipeline serves the 400 Mℓ/day Blackheath Water Treatment Works.

A3. MINOR SCHEMES

A3.1 Introduction

The Main Schemes of the Western Cape Water are operated in an integrated way, whereas the Minor Schemes supply individual local authorities, limited areas of the City of Cape Town or irrigators.

A3.2 Local Authorities

Table A3 shows those local authorities that are entirely dependant on their own supplies and those that are partially dependant on the Main Schemes described in the previous sections of this Annexure.

Table A3 : Local Authority Schemes

Scheme Name	Local Schemes			Main Schemes	
	Raw Water Source	Areas Supplied	Scheme Capacity million m^3/a	Scheme	Capacity million m^3/a
Paarl	Nantes Dam Bethel Dam Berg River Pumpstation	Paarl	2,8	Wemmershoek	17
Wellington	Antoniesvlei (supplementing supply from Wemmershoek)	Wellington	0,5		
Stellenbosch	Eerste River at Jonkershoek	Stellenbosch	5,5	RSE Berg	3
Piketberg	Voëlvlei Dam and Local Sources	7 750 people	1,0	Voëlvlei	
Saron	Twenty-four Rivers Canal	Saron	0,34	Voëlvlei	
Porterville	Local Sources	4 350 people	0,6		
Tulbagh	Local Sources	4 700 people	0,6		
Franschhoek	Local Sources	4 500 people	0,6		
Pniel	Local Sources	2 150 people	0,04		

A3.3 Minor Schemes Supplying the City of Cape Town

Table A4 shows the minor schemes which supply limited areas of the City of Cape Town, with augmentation from the major schemes.

Table A4 : Minor Supply Schemes

Scheme Name	Raw Water Source	Area Supplied	Scheme Capacity	
			million m^3/a	limiting factor
Table Mountain and Southern Peninsula Water Supply Scheme	Hely Hutchinson Dam De Villiers Dam Victoria Damn Alexandra Dam Woodhead Dam Albion Spring	Cape Metropolitan Area	5	Raw water yield
	Kleinplaas Dam Lewis Gay Dam	Simon's Town Simon's Town	1,8	Raw water yield
Atlantis	36 Boreholes	Atlantis Mamre	5,0	Raw water yield
Somerset West	Land-en-Zeezicht Dam 4 Boreholes	Somerset West	2,0	Raw water yield

A3.4 Other Irrigation Schemes

The irrigators can be divided into three main categories:

- Irrigators that are entirely reliant on the Main Schemes as described in Section 2 above.
- Irrigators whose quotas are partly supplied by the Main Schemes, partly by run of river flows in the main rivers and tributaries, or partly by their own storage dams.
- Irrigators that are entirely reliant on their own minor schemes such as farm dams.

The irrigation supplies are shown in Table A5 below.

Table A5 : Sources of Supply to Irrigators in 2000

Water Management Area	River	Irrigators Reliant on Own Minor Schemes (million m^3/a)	Irrigators Entirely Reliant on or Partly Supplied by Main Schemes (million m^3/a)	Total Irrigation Requirements (million m^3/a)
Berg	Upper Berg	149	50	199
	Lower Berg	40	31	71
	Kuils, Eerste, Lourens, Sir Lowrys	21	20	41
Breede	Riviersonderend	12	44	56
	Palmiet	56	-	56
TOTAL		**278**	**145**	**423**

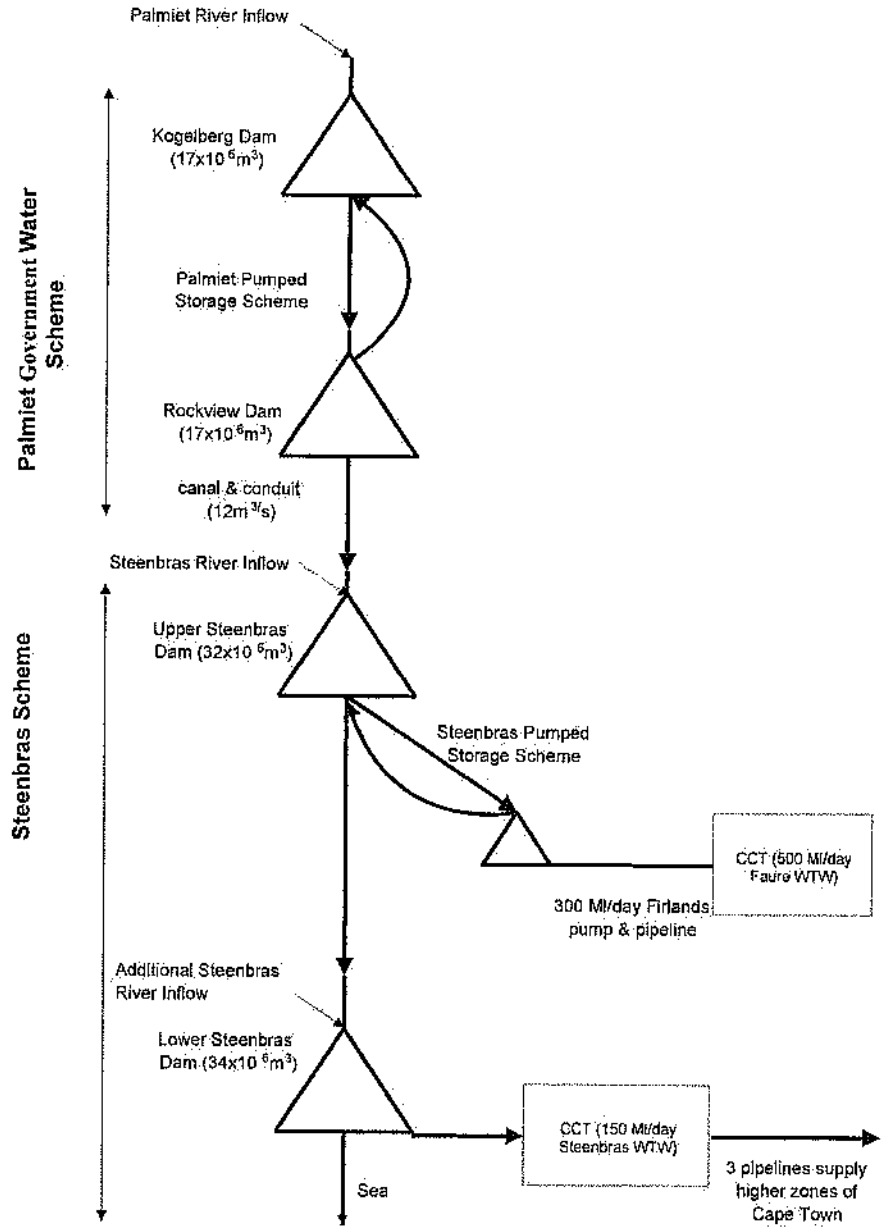
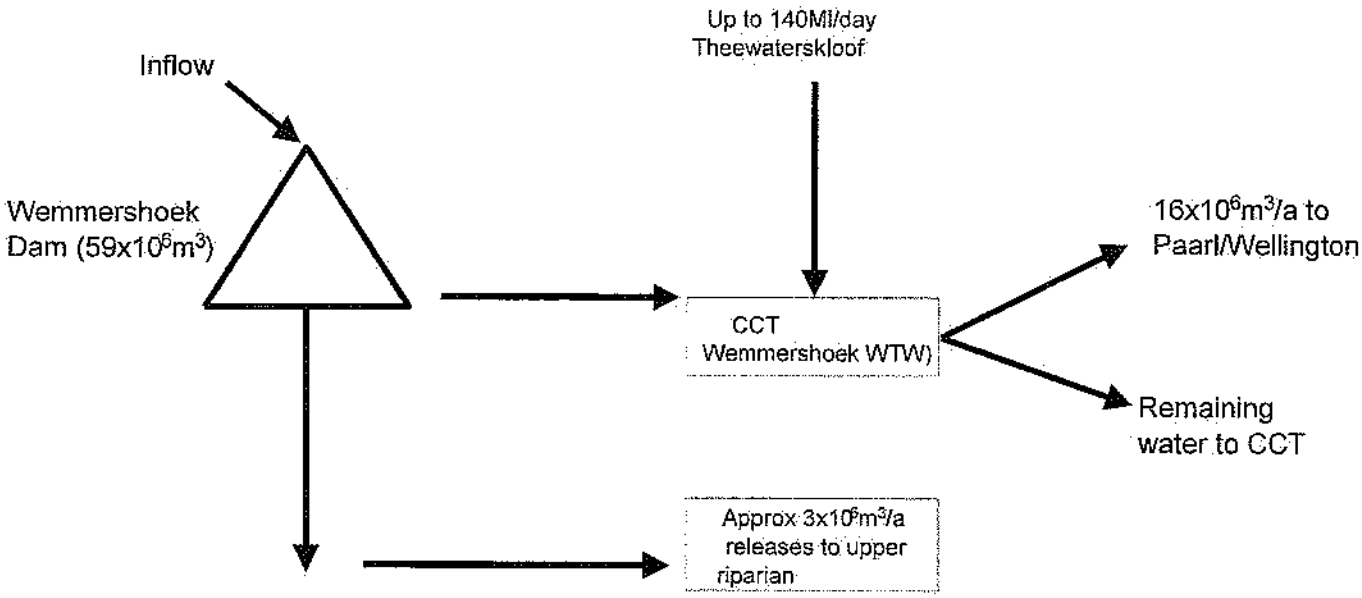
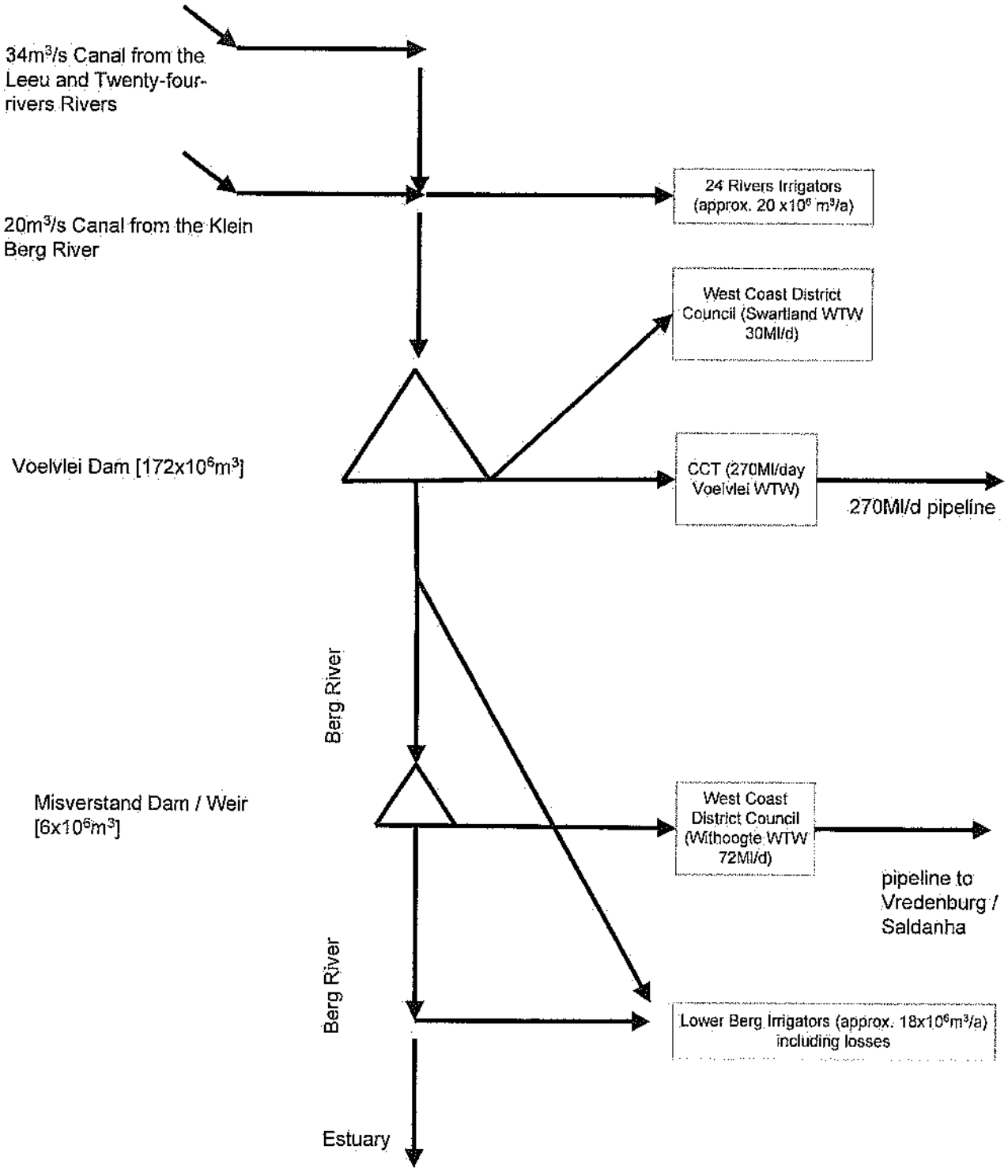


Figure A2: The Palmiet Government Water Scheme and the Steenbras Schemes



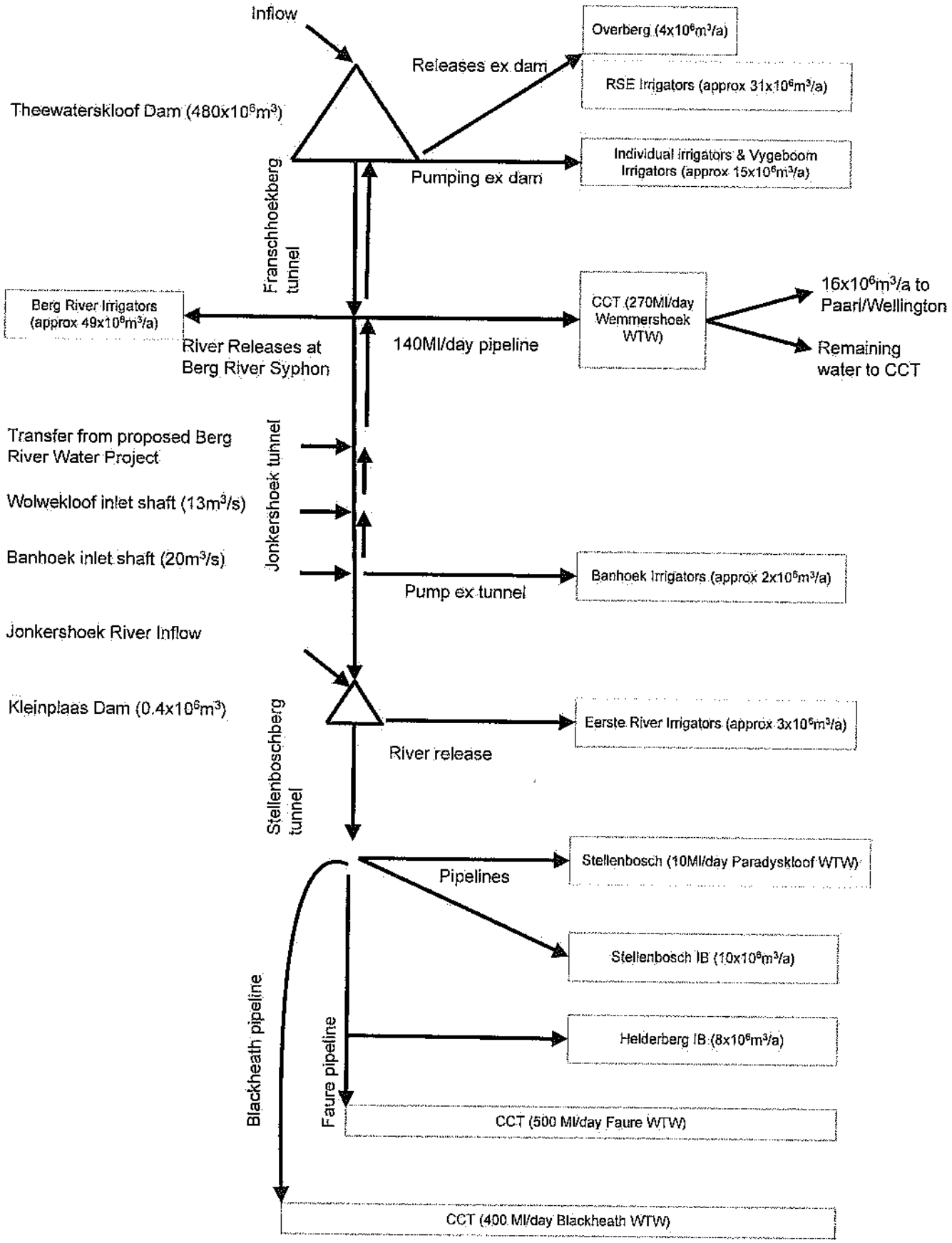
Note : Current Irrigation releases based on Table C2 in Annexure C

Figure A3: The Wemmershoek Scheme



Note : Current Irrigation releases based on second table in Annexure C

Figure A4: The Voëlvlei Government Water Scheme



Note : Current Irrigation releases based on second table in Annexure C

Figure A5: The Existing Berg River Government Water Scheme (Prior to Berg Water Project)

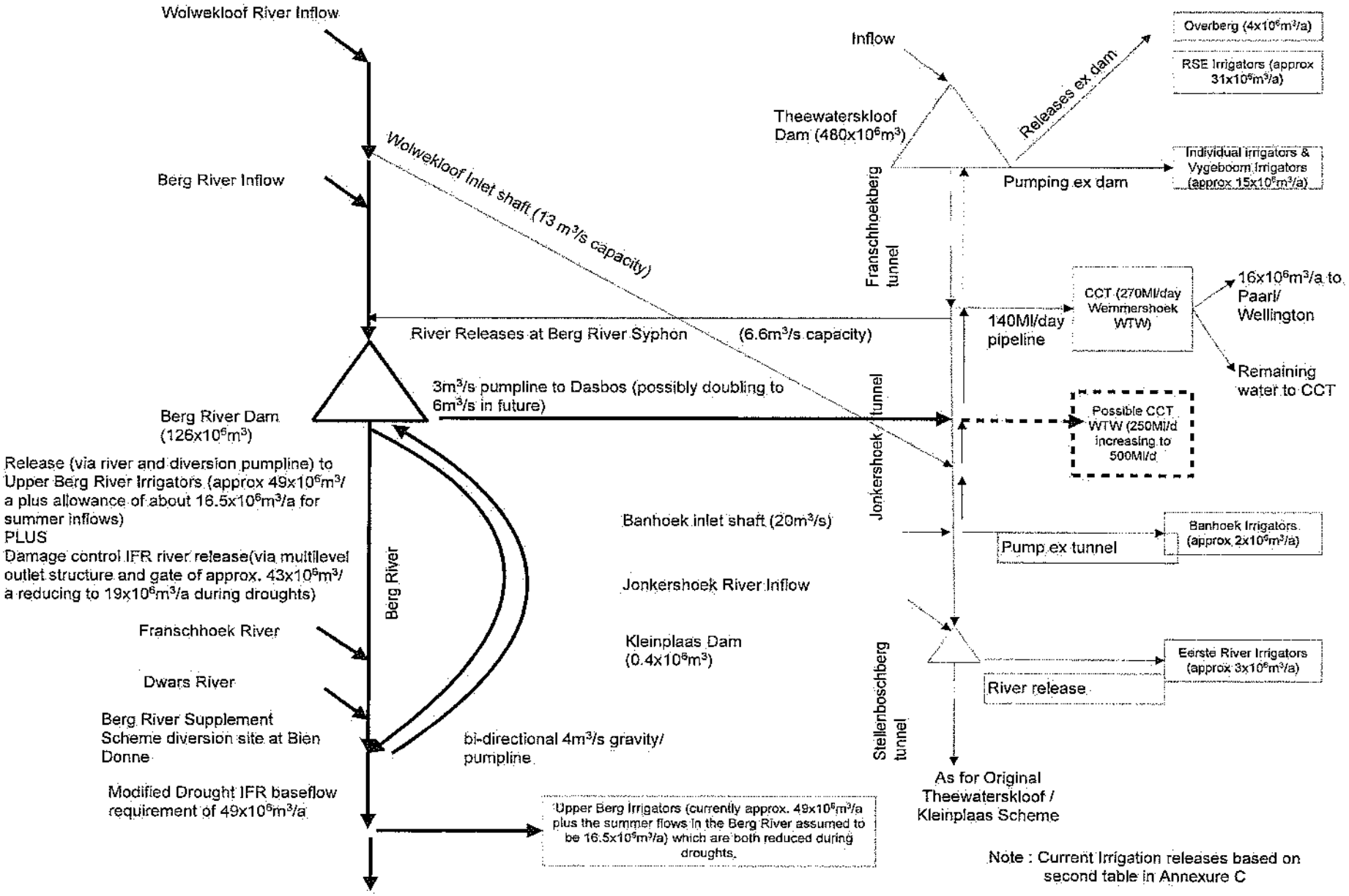


Figure A6: Proposed Berg Water Project

WESTERN CAPE WATER SYSTEM

DETAILS OF MAIN SCHEMES

Positions of schemes are shown on Figure A1

Palmiet River Government Water Scheme : Principal Features

DAMS		
Name of dam	Kogelberg	Rockview
Nearest town	Grabouw	Grabouw
Distance (km)	14	9
Owner	DWAF	DWAF
Completion date	1987	1986
Type of wall	Mass concrete arch gravity with separate earth saddle embankment	Rockfill (main embankment) Sandfill (northern embankment)
Wall height (m)	54	48 (main) 33 (northern)
Crest length (m)	850 (earth embankment) 186,0 (concrete wall)	670 (northern embankment) 1300 (main embankment)
Spillway type	Uncontrolled overflow	None
Full supply capacity ($m^3 \times 10^6$)(% MAR)	17,278	17,486
Active capacity ($m^3 \times 10^6$)	16,841	16,400
Surface area at FSC (ha)	142,6	77,8
Reduced level of FSL (m.a.s.l.)	246,0	531,0
Outlet works	1. River outlet comprising two 1200 mm diameter pipes ending in 610 mm diameter sleeve valves, with 700 mm diameter branches ending in 380 mm diameter sleeve valves, cast into the concrete wall. 2. Tailworks comprising bellmouth, control tower, twin gates and tailrace tunnels leading to pump-turbines.	1. Concrete headworks and 6,2 m diameter headrace conduit of the power system under the main embankment. 2. Two 1500 mm diameter concrete encased pipes under northern embankment.
POWER SYSTEM WATERWAYS		
Headrace conduit	6,2 m diameter steel lined, concrete encased cut and cover conduit 739 m long	
Surge tank	Cylindrical free standing concrete structure 21 m internal diameter 61 m high	
Inclined shaft	6,2 m diameter steel lined tunnel 123 m long at 55E inclination to the horizontal	
Pressure tunnel	6,2 m diameter steel lined tunnel 502 m long at slope of 1:10	
Penstock	5,4 m diameter buried steel pipe 561 m long bifurcating to two steel lined penstorck shafts 3,9 m diameter tapering to 2,6 m, one 135 m long, the other 125 m long	
POWER STATION **Pump-turbines:**		
Number	2	
Type	single-stage reversible Francis	
Rated power output at shaft per machine	203,5 MW	
Range of net head for generation using 2 machines	245,5 m to 285,6 m	
Range of pumping head using 2 machines	264,7 m to 306,2 m	

GENERATOR MOTORS	
Number	2
Continuous rating of each machine of for generation	200 MW at 0,8 power factor
Rated voltage	16,5 Kv
Rated MVA	250,00 MVA
Speed	300 r/min
Tailrace tunnels	Two concrete lined tunnels of 5 m internal diameter, one 84 m long and the other 57 m long
OPERATING DATA	
Generation energy equivalent to 15 m^3 x 10^6 capacity of Rockview Dam	approx. 10 GWh
Time required to pump 15 m^3 x 10^6 of water from lower to upper reservoir	approx. 32 hours
Average pumping capacity	approx. 130 m^3/s
Average generating flow at full load	approx. 165 m^3/s
Operational cycle	Weekly
Cycle efficiency	77,9%
ROCKVIEW/STEENBRAS CANAL AND CHUTE/PIPELINE	
Capacity	12,0 m^3/s
Length	approx. 3,4 km

Steenbras Scheme : Principal Features

Name of dam	Lower Steenbras	Upper Steenbras
Nearest town	Gordon's Bay	Gordon's Bay
Distance (km)	9	13
Completion date	1921, 1928*, 1954*	1977
River	Steenbras	Steenbras
Catchment area (km^2)	68,6**	29,7
Type of wall	Concrete gravity/arch	Earthfill
Wall height (m)	28	34
Crest length (m)	389	550 & 390 (Two embankments)
Spillway type	Uncontrolled overflow	Uncontrolled overflow
Full supply capacity ($m^3 \times 10^6$)	33,725	31,770
Active capacity ($m^3 \times 10^6$)	33,725	26,26
Surface area at FSC (ha)	370	263
Reduced level of FSL (m)	346,5	370,0
Outlet works	Octagonal concrete tower located 700 m from the dam wall. One 610 mm dia and two 762 mm dia scours are located in the dam wall. An 813 mm dia cement mortar lined steel pipe runs from the outlet tower through a tunnel to the treatment plant.	1. Concrete outlet tower with 1225 mm dia cement mortar lined steel pipe encased in reinforced concrete passing beneath the embankment. 2. Pumped storage scheme tunnel intake consisting of 19 m x 9 m screened bellmouth leading to a control tower with a 3 m x 4,4 m gate at the entrance to the 4,5 m diameter, 850 m long low pressure tunnel. This tunnel discharges to a high pressure shaft, tunnnel and penstock leading to the power station turbines.

Wemmershoek Scheme : Principal Features

Name of dam	Wemmershoek
Nearest town	Franschhoek
Distance (km)	15
Owner	Cape Town
Completion date	1957
River	Wemmers
Catchment area (km^2)	84,2
Type of wall	Earthfill
Wall height (m)	55
Crest length (m)	518
Spillway type	Gate-controlled discharge with chute
Full supply capacity ($m^3 \times 10^6$)	58,863
Active capacity ($m^3 \times 10^6$)	58,776
Surface area at FSC (ha)	296
Reduced level of FSL (m)	296,7
Outlet works	Circular reinforced concrete tower with two 1067 mm diameter outlet pipes and one 1067 mm diameter scour pipe in a culvert through the right flank of the dam.

Voëlvlei Government Water Scheme : Principal Features

DAM			
Name of dam	Voëlvlei		Misverstand Weir
Nearest town	Gouda		Piketberg
Distance (km)	7		20
Owner	DWAF		DWAF
Completion date	Raised 1970		1977
River	Off channel storage		Berg
Catchment area (km^2)	31		3967
Type of wall	Earth embankment		Central arch portion Straight gravity on sides
Wall height (m)	9,7		23,4
Crest length (m)	2905 m (north embankment) 1073 m (south embankment)		153,93 m (spillway) ± 200,0 m (total)
Spillway type	None		Ogee
Full supply capacity ($m^3 \times 10^6$)	172,168		7,737
Active capacity ($m^3 \times 10^6$)	164,095		5,2
Surface area at FSC (ha)	1573		255,24
Reduced level of FSL (m)	79,33		26,13
Outlet works **Outlet capacity**	Rectangular reinforced concrete outlet tower and 2 m diameter concrete lined tunnel Limited by delivery pipeline (273 MP/day)		
DIVERSION WORKS	Klein Berg River	Twenty-four Rivers	Leeu River
Weir type	Hollow buttress	Mass gravity	Slab buttress
Max. height of overflow section (m)	4,1	5,9	
Structure length (m)	126	90	
Canal type	Concrete lined parabolic	Concrete lined trapezoidal	Concrete lined trapezoidal
Length (km)	8,2	29,0	
Capacity (m^3/s)	20,0	34,0	18,4

Riviersonderend/Berg River Government Water Scheme : Principal Features

STORAGE RESERVOIRS				
Name of dam	Theewaterskloof		Kleinplaas	
Nearest town	Villiersdorp		Stellenbosch	
Distance (km)	10		8	
Owner	DWAF		DWAF	
Completion date	1980		1981	
River	Riviersonderend		Jonkershoek	
Catchment area (km^2)	500		31	
Type of wall	Earthfill		Composite concrete gravity /rockfill	
Wall height (m)	37,5		21,5	
Crest length (m)	646		345	
Spillway type	Uncontrolled side channel		Uncontrolled overflow	
Full supply capacity ($m^3 \times 10^6$)	480,406		0,376	
Active capacity ($m^3 \times 10^6$)	480,19 432,176 (above tunnel outlet)		0,358	
Surface area at FSC (ha)	5082		7,6	
Reduced level of FSL (m)	308,5		267,0	
Outlet works	1. Octagonal reinforced concrete tower and pipe and culvert under embankment. 2. Concrete inlet/outlet structure to tunnel system.		Outlet works in concrete wall comprising two river discharges and a connection to a conduit leading to the Stellenboschberg Tunnel Portal.	
DIVERSION WEIRS				
Name of weir	Wolwekloof		Banhoek	
Maximum height of weir	8,7 m		11,5 m	
Spillway crest level	335,5 m		434,0 m	
Diameter of shaft to tunnel system	4,0 m		1,8 (upper 80 m) 8,0 (lower 80 m)	
Length of shaft	70 m		160 m	
Diversion capacity of shaft with water weir FSL	22,0 m^3/s		16,4 m^3/s	
TUNNELS				
Name of tunnel	Franschhoekberg	Jonkershoek	Dasbos	Stellenboschberg
Length (km)	12,0	22,6	4,8	5,0
Internal dimensions	3,96 x 4,27 m horseshoe	4,3 & 3,5 m dia.	3,5 m dia.	3,5 m diameter
Design capacity (m^3/s)	33,5	27,4 and 13,3	14,1	15,7

PIPELINES	BERG RIVER SIPHON	STELLENBOSCHBERG/ BLACKHEATH	STELLENBOSCHBERG OUTLET/FAURE (PROPOSED)
Length	200 m	17,8 km	12 km
Diameter	3,5 m	1,5 m	1,8m/1,7 m
Capacity	33,5 m^3/s	5,15 m^3/s	11,6 m^3/s

ANNEXURE B

DESCRIPTION AND COST ESTIMATE OF THE BERG WATER PROJECT

B1 COMPONENTS OF THE PROJECT

The Berg Water Project is to be implemented to meet the growing water demands of the City of Cape Town. Other potential users are the West Coast District Municipality and the agricultural sector. Their requirements from the Berg Water Project are however nominal in comparison to that of the City of Cape Town. The location and general layout of the Project in relation to the Riviersonderend-Berg River Government Water Scheme is shown in Figure B1.

The Project will involve the design and construction of:

(a) The Berg River Dam on the Berg River in the La Motte forestry plantation near the town of Franschhoek.

(b) The Berg River Dam Pump Station, a short distance downstream of the dam, with a pipeline to deliver water to the Dasbos entrance of the existing Riviersonderend-Berg River tunnel system.

(c) The Berg River Supplement Scheme comprising an abstraction works on the Berg River, located below the Dwars River confluence, and an adjacent pump station with a delivery pipeline connecting to the Berg River Dam.

The total estimated capital cost of the Project by DWAF, at July 2002 prices, is about R 1 500 million. This estimate includes the cost of all the components listed above as well as VAT and land acquisition, but excludes escalation and cost of financing.

B2 BERG RIVER DAM

The proposed dam on the Berg River will supply an incremental historical firm yield to the Western Cape Water System of 56 million m^3 per annum. The Berg River Supplement Scheme will increase the system net incremental firm yield by a further 25 million m^3 per annum thus increasing the total net incremental yield of the system by 81 million m^3 per annum.

The incremental firm yield figures are net after allowance for ecological and compensation (for downstream users) releases. The annual ecological releases will vary between 42.8 million m^3 (for an average hydrological year) and 18.5 million m^3 (for a drought year). The net effect of these ecological releases will be an effective annual reduction of the gross yield of the scheme by 38 million m^3. The annual compensation releases will amount to 16 million m^3.

The approximately 560 hectares of land required for the dam and reservoir area are on land presently owned by the State except for two privately owned farms.

The dam site is located on the Berg River approximately 4 km upstream of the road from Franschhoek to Stellenbosch. The river channel and the left flank are underlain by sandstone of variable quality while the right flank is underlain by weak sandstone with a soft siltstone horizon.

At the time of preparation of this Annexure, the final dam type had not been selected and is being subjected to an optimisation study. Details of the dam are therefore not provided in this Annexure, but only the main Project parameters. The dam wall will not be designed for later raising.

In addition to the construction of the dam the Project will require that the saddle at Robertsvlei be grouted to prevent seepage into the adjacent valley.

The main features of the dam are as follows :

Gross storage capacity	126,4 million cubic metres
Net storage capacity	124,4 million cubic metres
Type of dam	To be decided
Full supply level	RL 250,0 metres
Water surface area at FSL	525 hectares
Lowest drawdown level for pump station	RL 213 metres
Lowest river outlets	RL 206 metres
Dead storage volume	1 400 000 cubic metres
River bed level at dam	RL195 metres

B3 DAM PUMP STATION

A pump station is required downstream of the Dam to pump water from the Dam into the Riviersonderend- Berg River tunnel system for transfer to Theewaterskloof Dam or consumers in the City of Cape Town metropolitan area. A pipeline, approximately 3 km long, will link the pump station to the existing tunnel system at the Dasbos portal.

The inlet structure at the Dasbos tunnel portal will also make provision for a connection to the new water treatment works, which is being investigated by the City of Cape Town. Provision will be made for vehicle access into the tunnel, a connection for the possible future Molenaars Scheme and a connection for farmers currently receiving water from the tunnel. A pumping capacity of 3 cubic metres per second (m^3/s) is initially required with provision for an increase to 6 m^3/s in future.

B4 BERG RIVER SUPPLEMENT SCHEME

The Supplement Scheme entails abstracting water from the Berg River at a point downstream of the confluence with the Dwars River, about 9 km downstream of the proposed Berg River Dam into a balancing dam and then pumping it back to the Dam. The operating rules for these abstractions will take the instream flow requirements into account.

The scheme comprises a low weir on the Berg River to deliver water to the Supplement Pump Station from where it is pumped into a delivery pipeline leading to the Dam. The capacity of the Supplement Scheme is 4 m^3/s. The pipeline will also transfer as much of the releases from the dam to downstream users as possible during the summer months with the objective of preferably not exceeding natural summer flows.

B5 COST ESTIMATE OF BERG WATER PROJECT

The estimated capital cost of the Project, including the dam, pump stations, pipelines and abstraction weir is summarised below. The estimate includes VAT and land acquisition, but excludes escalation and cost of financing

No.	Component	Cost (R million)
1.	Berg River Dam	1 071,25
2.	Dam pump station	78,0
3.	Pipeline to Dasbos tunnel entrance	37,0
4.	Dasbos tunnel inlet structure	35,0
5.	Supplement Scheme abstraction works	25,0
6.	Supplement Pump Station	116,0
7.	Pipeline to Berg River Dam	130,0
	TOTAL	**1 492,25**

Note :
1. The cost estimate is based on July 2002 prices.
2. The cost estimate for components 2 to 7 is based on the available information as at August 2002.

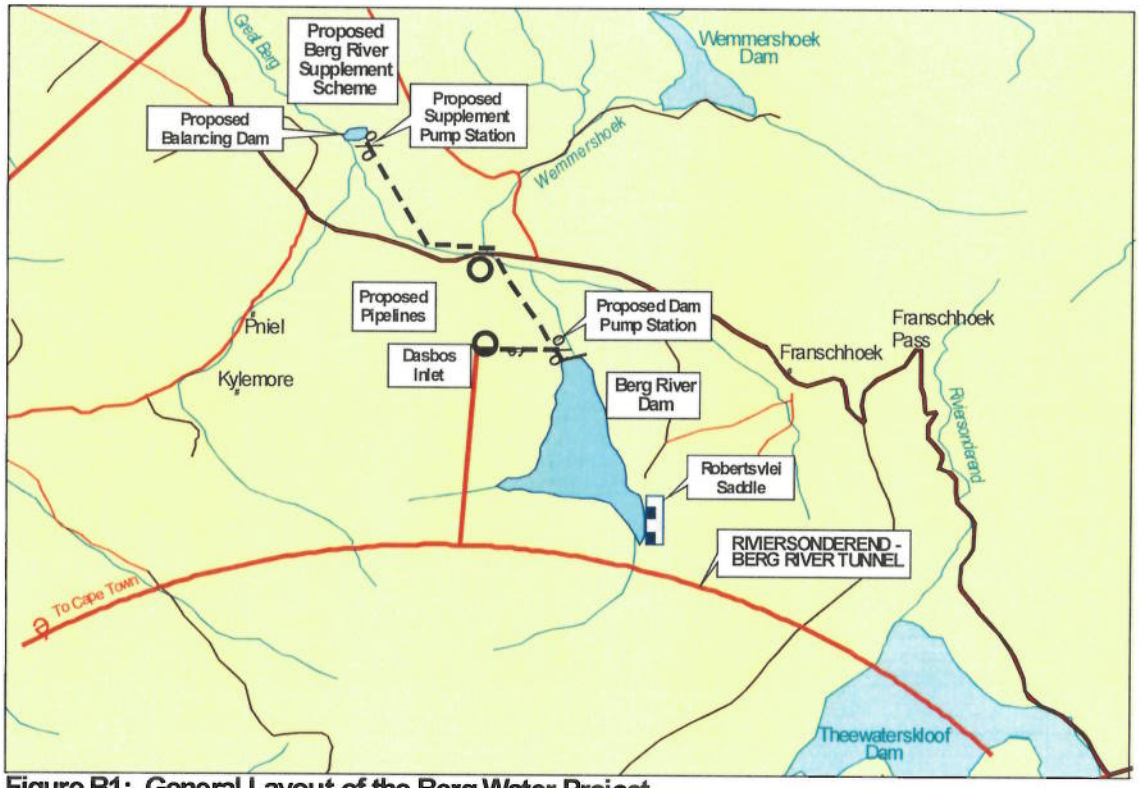


Figure B1: General Layout of the Berg Water Project

ALLOCATION OF THE YIELD OF GWS FOR WATER PRICING PURPOSES

C1. PRINCIPLES: The sharing of the capital cost between users of existing GWS forming part of the Western Cape Water System (i.e. excluding the BWP) will be based on existing lawful use. The yield of GWS will be allocated by DWAF on an annual basis in accordance with existing lawful water use until such time as compulsory licences are issued in terms of the NWA. Sectorial levels of supply assurance will be taken into account in determining the sharing of such costs.

C2. EXISTING LAWFUL WATER USE PER SECTOR

C2.1 Agriculture

The following blanket declaration of existing lawful water use has been made by DWAF in terms of section 33(2) of the National Water Act, 1998: All lawful scheduling in terms 63 (Government Water Scheme scheduling) and/or section 88 (Irrigation Board scheduling) of the previous Water Act, 1956, for which all due water use rates and charges were paid on 30 September 1998, should be treated as existing lawful water uses, until compulsory licences are issued.

All other unexercised water rights on 30 September 1998, which would have been lawful if exercised, do not qualify in terms of this blanket declaration

C2.2 Urban/industrial

Permits issued in accordance with section 56(3) of the Water Act 1956, will qualify for declaration of existing lawful water use in terms of section 33(3) of the NWA, regardless of [1]whether fully exercised or not on 30 September 1998.

C3. APPLICATION OF PRINCIPLES ON MULTIPURPOSE SCHEMES[2]

C3.1 Theewaterskloof (TWK) Dam

(i) Existing lawful water use allocations

- Agricultural sector Urban/Industrial sector

  For this sector the sharing of the capital cost of the dam with other sectors for water pricing purposes will be based on the water allocations made from the TWK Dam in terms of the previous Water Act, 1956.

  In the case of the City of Cape Town (CCT), a fixed allocation of 90 million m^3/a is applicable.

  CCT was also granted an additional temporary allocation by DWAF in 1989 based on that portion of the allocation to Agriculture, which was not being utilised, until such time as agriculture utilized such portion.

  A part of the latter is considered as existing lawful water use in terms of the blanket declaration for Agriculture as set out above. However, it also comprises existing

[2] "Multipurpose schemes" means a government water scheme which supplies water to more than one user.

lawful water use for CCT, to be utilised on a temporary basis, subject to water availability. This temporary yield allocation must be re-assessed on an annual basis.

- Agricultural sector

  An assessment will be made of the maximum lawful quantity of water required per annum ex storage for each Irrigation Board as well as irrigators pumping from the TWK Dam. This assessment must take account of scheduled areas paid for (see C2.1), the quotas at field edge, water available from run of river (winter and summer) and distribution losses from storage. Compensation releases will form part of this demand. This total quantity will be regarded as the **capped yield allocation** for existing lawful use ex storage for Agriculture. This yield allocation will be subject to curtailments during droughts, depending on the assurance of supply adopted for Agriculture.

  As Agriculture has not developed to the full extent of the declared existing lawful use in terms of the declaration set out above, their current use of the yield of TWK Dam will be less than the **capped yield allocation**. The maximum historical release or abstraction per annum from the dam for each of the various stakeholders since implementation of the National Water Act, 1998, will provide the best available estimate of the required **current yield allocation** for existing lawful use. As the maximum historical releases represent unrestricted supplies during drought periods, it can be assumed that they reflect a relatively high assurance of supply (98% suggested). These maximum releases will be measured at the dam/tunnel outlets and thus include compensation water requirements and distribution losses, where applicable.

(ii) Assurance of supply

In terms of the Pricing Strategy, supplies to sectors from State Dams could be subject to differential assurances of supply in which case the sector demanding a higher assurance will be paying a premium towards capital cost charges for this benefit. In terms of the Pricing Strategy, the capital cost of dams will be shared in proportion to the long-term mean annual volumetric use of allocations, which will depend on the adopted operating rules, annexure H to this agreement, and different water restrictions during droughts. In the case of dams where such supply assurances and operating rules have not yet been negotiated with the stakeholders, long-term annual use figures of 97% and 91% of allocations will be applied to the urban/industrial and agricultural sectors respectively.

For the TWK Dam, the urban/industrial and agricultural sectors will be allocated an equal assurance of supply while the temporary allocation to the CCT is being phased out. The reason for this is that it would be unfair to impose more severe water restrictions on Agriculture while they cannot access their full lawful use allocations during droughts.

(iii) Determination of annual existing lawful water use allocations

The following procedure will be followed by DWAF to determine annual existing lawful water use allocations to water users :

- Determine 1:50 yield (98% assurance) of TWK Dam (including required compensation releases).

- Determine **capped** and **current** annual existing lawful use allocations from the yield of TWK Dam for Agriculture as set out in C3.1 (i).

- The maximum historical release/abstraction from TWK Dam for Agriculture is regarded as the **current yield allocation** at 98% assurance.

- Subtract the total current annual lawful water use allocations for Agriculture and the Urban/Industrial sectors from the 1:50 yield of TWK Dam to give the current irrigation surplus and thus the temporary yield allocation to CCT for pricing purposes. (CCT will therefore get 90 million m^3/a fixed, plus variable temporary allocation).

- Repeat the above by using the **capped yield allocation** for Agriculture to determine the estimated future fixed allocation to CCT.

- Cost sharing and pricing [calculated as per annexure E] will be based on the current yield allocations per sector, weighted at equal assurance of supply. This will be revised annually until the CCT temporary allocation has been phased out, whereafter the assurance levels prescribed in the Raw Water Pricing Strategy will apply.

- Agriculture will be billed and controlled by the volumes released from TWK Dam, i.e. the quantity released on demand will not exceed the **current yield allocation**.

- Review **current and capped yield allocations** and temporary allocation to CCT on an annual basis, adding another year 's record of actual releases or demands.

- Upon compulsory licensing, the responsible authority shall take into account the City's temporary allocation as an existing lawful water use and the investment already made by the City in respect of such water use, including the development of infrastructure and payment of water resource development costs.

C3.2 <u>Voëlvlei and Misverstand Dams</u>

(i) Existing lawful use allocations

- Agricultural sector

  Apply the same procedure as for TWK Dam to determine the **capped** existing lawful use allocations.

- Urban/Industrial sector

  Section 56(3) allocations i.t.o. the Water Act, 1956 less run-of-river abstractions plus water losses where applicable, will determine the **capped yield allocation** to the urban/industrial sector, from Voëlvlei and Misverstand dams.

(ii) Assurance of supply

Apply the principles laid down in the Pricing Strategy (97% and 91% mean annual use i.r.o. **the capped yield** allocations for Urban/Industrial and Agriculture respectively).

(iii) Annual lawful use allocations

Cost sharing and pricing will be based on **the capped yield allocations** weighted at 97% and 91% as indicated in (ii) above.

C4. ALLOCATION OF YIELD TABLE

Information regarding yield, allocations and demands from Theewaterskloof and Voëlvlei Dams and the adopted 2002/2003 sectoral yield allocation tables are attached in Tables C1 and C2.

The current and capped irrigation surplus must be revised at the end September each year for yield allocations and charge determination for the following (April to March) financial year.

Table C1: VOëLVLEI AND THEEWATERSKLOOF DAMS: YIELD, ALLOCATIONS AND DEMANDS

Dam	1:50 Yield (million m^3/a)	Water user	Allocation				Losses (Gains) (million m^3/a)	Yield allocation (million m^3/a)	Maximum historical supply (million m^3/a)	Remarks
			Source	Area (ha)	Quota (m^3/ha/a)	Volume (million m^3/a)				
Voëlvlei		Cape Town	Voëlvlei			70,4	-	70,4		Includes 4 million m^3 allocation to Armscor
		Swartland (WCDC)	Voëlvlei			4,2	-	4,2		
		WCDC	Berg R at Misverstand Dam			17,4	1,2	18,6		20% of allocation from run of river and 25% lost from storage
		Pretoria Portland Cement	Voëlvlei			0,8	-	0,8		
		Piketberg	Voëlvlei & Berg R			0,7	-	0,7		
		Lower Berg River IB	Berg R	3 643,8 (S) 2 302,0 (W)	3 000	10,9	3,6	*18.1	40,8	* Includes 3,57 million m^3 purchased from ICS
Total	**105**			**3 643,8 (S)**		**104,4**	**6,6**	**112,8**	**40,8**	
Theewaterskloof		Zonderend IB	Zonderend R	4 451,6 (S) 1 389,1 (W)	6 000	26,7	4,8	31,5	30,8	15% losses from storage assumed
		Vyeboom IB	TWK Basin	1 852,4	7 100	13,2	-	*13,2	16,3	*Existing lawful use i.r.o. allocations
		Pump from TWK Dam	TWK Basin	Unknown	7 100	1,5	-	*1,5	1,5	*Existing lawful use at Oct 1998
		Upper Berg River IB	Berg R	15 174,0 (S) 1 074,0 (W)	Varies	74,9	(-) *16,3	58,6	48,6	*Draws from run of river in summer. Max supply from dam estimated on basis of 10% of allocation being undeveloped and 25% river losses
		Banhoek IB	TWK Tunnels	450,0	4 000	1,8	-	*1,8	1,9	*Existing lawful use i.r.o. allocation
		Stellenbosch IB	TWK Tunnels	3 010,1	4 000	12,0	-	12,0	9,7	
		Helderberg IB	TWK Tunnels	3 027,9	4 000	12,1	-	12,1	7,8	
		Lower Eerste River IB	Eerste R	514,0	4 000	2,1	*1,0	3,1	2,8	*30% losses assumed
		Overberg Water	Zonderend R			3,0	1,0	4,0		25% river losses assumed
		Cape Town	TWK Tunnels			90,0	-	90,0		Used irrigation surplus extra
		Stellenbosch	TWK Tunnels			3,0	-	3,0		
Total	**241,2**			**28 480,0 (S)**		**240,3**		**230,8**	**119,4**	

Note: Yield of dams and supply from dams include required compensation releases for irrigation.
(S) = Summer
(W) = Winter

TABLE C2

RIVIERSONDEREND (RSE)/BERG RIVER SYSTEM
ADOPTED 2002/2003 SECTORAL ALLOCATIONS FOR WATER PRICING PURPOSES
(million m^3 per annum)

	Domestic/ Industrial	Irrigation	
Berg River (Voëlvlei & Misverstand Dams)		Current	Capped
Cape Town	70,4		
Swartland	4,2		
WCDC	18,6		
PPC	0,8		
Piketberg	0,7		
LBR IB		18,1	18,1
Totals	94,7	18,1	18,1
RSE / BR (Theewaterskloof Dam)			
Overberg Water	4,0		
Zonderend IB		30,8	31,5
Vyeboom		13,2	13,2
Pump from TWK Dam		1,5	1,5
Totals Riviersonderend Supply Area	4,0	45,5	46,2
Cape Town (Fixed)	90,0		
Stellenbosch	3,0		
Upper Berg IB		48,6	58,6
Banhoek IB		1,8	1,8
Stellenbosch IB		9,7	12,0
Helderberg IB		7,8	12,1
Lower Eerste River		2,8	3,1
Totals Berg-Eerste Supply Area	93,0	70,7	87,6
Grand Totals	97,0	116,2	133,8
1:50 YIELD		241,2	
Irrigation surplus		28,0	10,4
Cape Town (Temporary)	28,0		
Palmiet River (Rockview and Kogelberg Dams)			
Cape Town	22,5		
Totals	22,5		

ANNEXURE D

WATER DEMAND PROJECTIONS FOR THE CITY OF CAPE TOWN

(ESTIMATES OF WATER DEMAND AS AT DECEMBER 2002)

The historic growth rate of the total bulk water supplied by the CCT between 1973 and 2000 was between 3% to 4% per annum. In order to ensure a sustainable supply of water for the future, the CCT initiated an Integrated Water Resource Planning (IWRP) Study to best assess how to manage its water demand. The results of the IWRP Study indicated that the CCT has to actively implement Water Demand Management (WDM) measures, whilst at the same time investigate and implement additional water augmentation schemes. The implementation of the WDM recommendations contained in the IWRP Study include *inter alia* pressure management, user educational, elimination of automatic flushing urinals, leakage repair, tariffs, metering and credit control. The CCT through its WDM strategy and programme, which has been accepted and adopted by Council, has committed itself to the implementation of the recommendations emanating from the IWRP Study. The objective of the WDM Policy and Strategy is to reduce the projected demand for water by 20% by the year 2010. The CCT through its Water Services Development Plan (WSDP) has also committed itself to ensuring a sustainable supply of water for the future. The Comprehensive WSDP of the CCT was approved by its Executive Committee on 23 April 2002. Figure D1 below shows the historic growth in water demand, the results of the IWRP study and the low water demand projection for the CCT. The low water demand projection ties in with the 20% reduction in water demand objective stated in the WDM Policy and Strategy. Taking into account the lower actual water consumptions during and post the 2000/2001 water restrictions and the implementation of water demand management measures, the low water demand curve is considered to be a realistic curve upon which to base the repayment of the Berg Water Project. Annexure F details the sources which will be utilised to meet this demand in terms of supply from sources owned by the CCT and from Government Water Schemes.

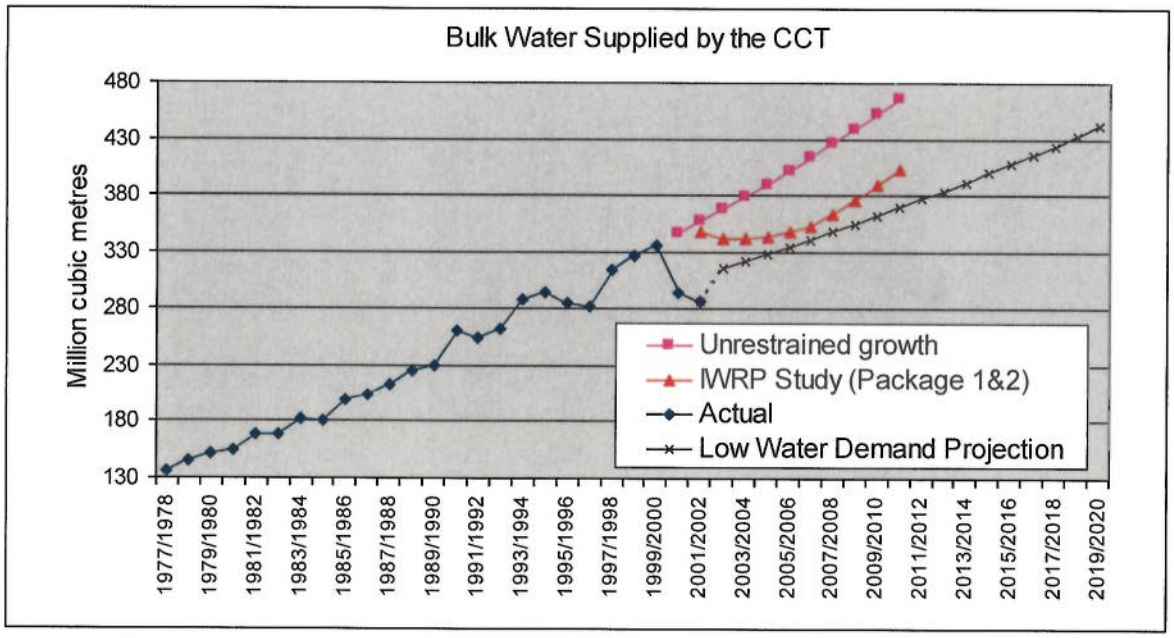


Figure D1: Water demand projections of the City of Cape Town

TABLE D1

LOW WATER DEMAND PROJECTION FOR BULK WATER SUPPLIED BY THE CCT

FINANCIAL YEAR 1 July to 30 June	LOW WATER DEMAND PROJECTION IN MILLION m^3
2002/03	315
2003/04	321
2004/05	328
2005/06	334
2006/07	341
2007/08	348
2008/09	355
2009/10	362
2010/11	369
2011/12	376
2012/13	384
2013/14	392
2014/15	399
2015/16	407
2016/17	416
2017/18	424
2018/19	432
2019/20	441
2020/21	450
2021/22	459
2022/23	468
2023/24	477
2024/25	487
2025/26	497
2026/27	507

IMPACTS CONSIDERED IN DERIVING THE LOW WATER DEMAND PROJECTION UPON WHICH TO BASE THE REPAYMENT OF THE BERG WATER PROJECT

* Impact of current and future of WDM measures (*e.g.* tariffing, pressure control)
* Effect of recent water restrictions
* On-going user education
* Population growth projections – refer to WSDP
* Future pressure on tariffs due to the implementation of the Berg Water Project
* Predicted economic growth - refer to WSDP

ANNEXURE E

WATER USE CHARGES

E1. THE CITY

The water use charges set below are established in terms of the Pricing Strategy.

E1.1 Capital cost charges

E1.1.1 Basis of setting charges

- An equalised unit charge ("system tariff") will be determined for all water supplied to City from any of the GWS within the WCWS, excluding the BWP, i.e.
  - Riviersonderend - Berg River (Theewaterskloof Dam, Kleinplaas Dam and Tunnels)
  - Berg River (Voëlvlei and Misverstand Dams and Klein Berg and Twenty-four Rivers augmentation canals)
  - Palmiet River (Rockview and Kogelberg Dams and ESKOM Pumped Storage scheme)

- The system tariff will be based on the annual cost allocated to CCT, as set out in E1.4 below, related to:
  - a 4% return on the current value of assets (ROA)
  - depreciation of the current value of assets

- The system tariff will be determined by dividing the total scheme related annual capital cost allocations to the City by the total estimated water demand of the City from the GW schemes within the WCWS, including the BWP.

- The estimated water demand from GWS for pricing purposes will be based on the low water demand projection for the City, excluding local sources, as set out in Annexure F.

E1.1.2 Value of Assets

- The current value of assets is defined as the current replacement cost, less depreciation.

- The value of assets will be based on engineering valuations to be repeated within a maximum period of 10 years. The current base date for the completed engineering valuation is March 2000.

- Between engineering valuations the previous year's asset value and thus the annual cost allocations, will be inflated by the Production Price Index (PPI) to determine the nominal values of costs for pricing purposes.

- Capital cost charges for a particular financial year (April to March) will be determined by indexing the base engineering asset costs by PPI up to 30 September of the previous year.

E1.1.3 Annual costs

- To cater for the declining value of the ROA in real terms due to depreciation, the annual ROA cost allocation will be expressed as a constant real term annuity, which can be annually indexed by PPI to provide nominal costs. This annuity is based on the base year present value of the ROA revenue stream, discounted at a real term interest rate (6% assumed) over the useful scheme life (45 years assumed).

- Depreciation of asset values will be accounted for on a straight line basis over estimated asset lives, as shown:

Asset	Depreciable portion %	Estimated useful life years
Dams & weirs	10	45
Tunnels	10	45
Canals	40	45
Buildings	100	40

E1.1.4 Allocation of annual costs

- Cost sharing by sectors of existing GWS forming part of the Western Cape Water System, will be based on actual lawful use allocations as may be determined annually by DWAF until such time as compulsory licences are issued. Allocations will be based on the principles contained in Annexure C.

- Sectorial levels of supply assurance from storage dams will be taken into account in determining the proportional capital cost share of sectors. This will be accomplished by weighting the existing lawful use allocations to reflect comparative long-term mean annual use, taking differential levels of water restrictions into account. For distribution systems, cost sharing will be based on required rates of supply. The following weighting percentages will apply for the existing assets.

Asset		Weight (%)	
		Urban/ Industrial	Irrigation
TWK Dams and Tunnels while temporary allocation to CCT is phased out		100	100
TWK scheme after temporary allocation to CCT has been phased out	Dam	97	91
	Tunnel	100	100
Voëlvlei & Misverstand Dams and augmentation canals		97	91
Palmiet River scheme		100	-

- In respect of Palmiet River Scheme, CCT will be allocated 31,67% of capital costs of the State dams, the rest being assigned to ESKOM.

E1.1.5 Phasing in of system tariff

Annual increases over current tariffs, shall not exceed PPI + 10% until target system tariffs are reached. Thereafter maximum increases will be limited to PPI.

E1.1.6 Tariff payments

- CCT will be billed on a monthly basis for the total quantity of water actually used as measured at the water meters provided for this purpose. Water supplied in excess of the low water demand projection from Government Water Schemes (Annexure F), will be subject to the same unit charge. This basis for calculation will be reviewed for water resource development after the BWP.

- CCT will be liable for the payment of at least 90% of the annual amount comprising the total capital costs allocated for a particular financial year. This allocated amount is determined by the unit charge times the expected demand (see E1.1.1). Annual reconciliation will be applied.

E1.2 Operations and Maintenance charges (O&M) (excluding the BWP)

E1.2.1 Basis of setting charges

- Scheme-related charges will apply, for all GWS
- The apportionment of O&M costs will be based on the actual quantities used by sectors in the financial year preceding the one in which charges are set, e.g. the actual sectoral use by sectors in 2000/2001 from a particular scheme will be used in 2001/2002 to set charges for 2002/2003.
- Sector-specific costs will be allocated to the water users reaping the only benefit of any specific cost incurred.

E1.2.2 Payment for O&M costs

The budgeted O&M costs apportioned to the CCT will be recovered in equal monthly amounts, with annual reconciliation of actual costs of O & M against budgeted costs.

E1.3 Other charges

E1.3.1 Wemmershoek Dam exchange water

- The CCT will be liable to pay for the 9,22 million m^3 per annum compensation water released from TWK Dam to the Upper Berg Major Irrigation Board in terms of the exchange ex Wemmershoek Dam which was authorised in terms of the Southern Suburbs of Cape Town Water Supply Amendment Act (Private), 1952 (Act 6 of 1952).
- The amount payable will be annually based on the unit charge determined for irrigation supply to the Upper Berg River and will be invoiced on the applicable dates as mentioned under E2.2.

E1.3.2 Water resource management charge (WRM)

This charge is not related to the development and operation of Government Water Schemes and will be charged in addition to the capital cost charges covered in this agreement, to fund the cost of water resource management within the Berg River Water Management Area. This price will be set in terms of the pricing strategy as reviewed from time to time.

- This charge will be applicable to all registered water use by the City for urban and industrial purposes.
- WRM charges for urban/industrial purposes in the Berg River WMA will be announced annually before the beginning of a financial year and will be billed on a monthly basis in equal amounts.

E1.3.3 Water research fund levy

This levy will be determined annually in terms of section 11 of the Water Research Act, 1971 (Act 34 of 1971) and will be applicable to all water sold by the City.

E2. CHARGES I.R.O. OTHER WATER USERS

E2.1 Urban/Industrial (Other than CCT)

- Charges will be based on the same basis as the City, but capital costs will be on a scheme related basis and not a system tariff.
- Capital cost and O&M charges will be expressed in unit tariffs and will be invoiced monthly on water actually used.
- WRM charges and Water Research Fund levies will be treated in the same way as for the CCT.

E2.2 Irrigation

- Scheme-related unit and per hectare charges will apply.
- The irrigation sector will not attract ROA charges, but Depreciation, O&M, WRM and Water Research Fund charges will apply.
- Amounts payable i.r.o. all charges will be invoiced every six months to water user associations.

E3. O&M CHARGES FOR BERG WATER PROJECT

- Once the BWP has been declared operational, O&M costs for the Berg Water Project plus that of the Theewaterskloof scheme, will be allocated to all users with water allocations and who are supplied from the Berg Water Project and the Theewaterskloof tunnels system, on the basis as set out in E1.2.1 and charges will be determined in terms of the Raw Water Pricing Strategy. This will include allocations deemed to be supplied from the Berg Water Project.
- The payment for O&M costs will be based on the conditions prescribed under
  - E1.2.2 for the CCT, E2.1 for other urban/industrial users and under E2.2 for irrigation.

E4. CALCULATION OF CHARGES

- The calculation of the unit system tariff i.r.o capital cost for the CCT for
  - 2002/2003 is attached as Appendices E1,E2 and E3.
  - Refer to Annexure F for the calculation of the Berg Water Capital charge.

Table E1: Costing: Cape Town Agreement

Unit charge for capital costs: Berg River, Riversonderend and Palmiet
2002/2003 Financial year

			1	2	3	4	5	6	7	8	9
			2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009
INFLATION RATE(%)	= 8.9 %	6%									
RETURN ON ASSETS (%)	= 4.0 %	4%									
PRODUCTION PRICE INDEX	=8.9 %	5.4%									
DISCOUNT RATE	= 6.0 %	6%									
EXPECTED WATER SUPPLY											
SALEABLE YIELD FOR COST DETERMINATION – m^3		m^3	212 900 000	212 900 000	208 000 000	214 000 000	221 000 000	227 000 000	234 000 000	241 000 000	248 000 000
TOTAL COSTS CALCULATIONS – R											
*DEPRECIATION (See KPMG calculations)		R	1 448 944	4 507 933	4 952 966	5 393 780	5 873 826	6 396 597	6 965 894	7 585 859	8 261 000
*RETURN ON ASSETS (Smoothed to be constant in real terms)		R	23 164 885	40 233 843	43 363 778	47 223 154	51 426 015	56 002 930	60 987 191	66 415 051	72 325 991
TOTAL COSTS (Based on Saleable Yield)		R	24 613 829	44 741 776	48 316 744	52 616 934	57 299 841	62 399 527	67 953 085	74 000 910	80 586 990
ANNUAL TOTAL COSTS **ACCORDING TO OLD AGREEMENT**		R	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520
ANNUAL UNIT COST (Based on saleable yield) c/m^3											
*DEPRECIATION UNIT COST		c/m^3	0.68	2.12	2.38	2.52	2.66	2.82	2.98	3.15	3.33
*RETURN ON ASSETS UNIT COST		c/m^3	10.88	18.90	20.85	22.07	23.27	24.67	26.06	27.56	29.16
TOTAL CHARGE CALCULATION c/m^3											
UNIT CHARGE ACCORDING TO OLD AGREEMENT			13.20	13.20	13.51	13.13	12.71	12.38	12.01	11.66	11.33
UNIT COST ACCORDING TO NEW AGREEMENT			11.56	21.02	23.23	24.59	25.93	27.49	29.04	30.71	32.49
PROPOSED NEW UNIT CHARGE			13.45	15.79	18.78	22.33	25.93	27.49	29.04	30.71	32.49

Figure E1: Cape Town Agreement : Schematic Draft 2002/2003

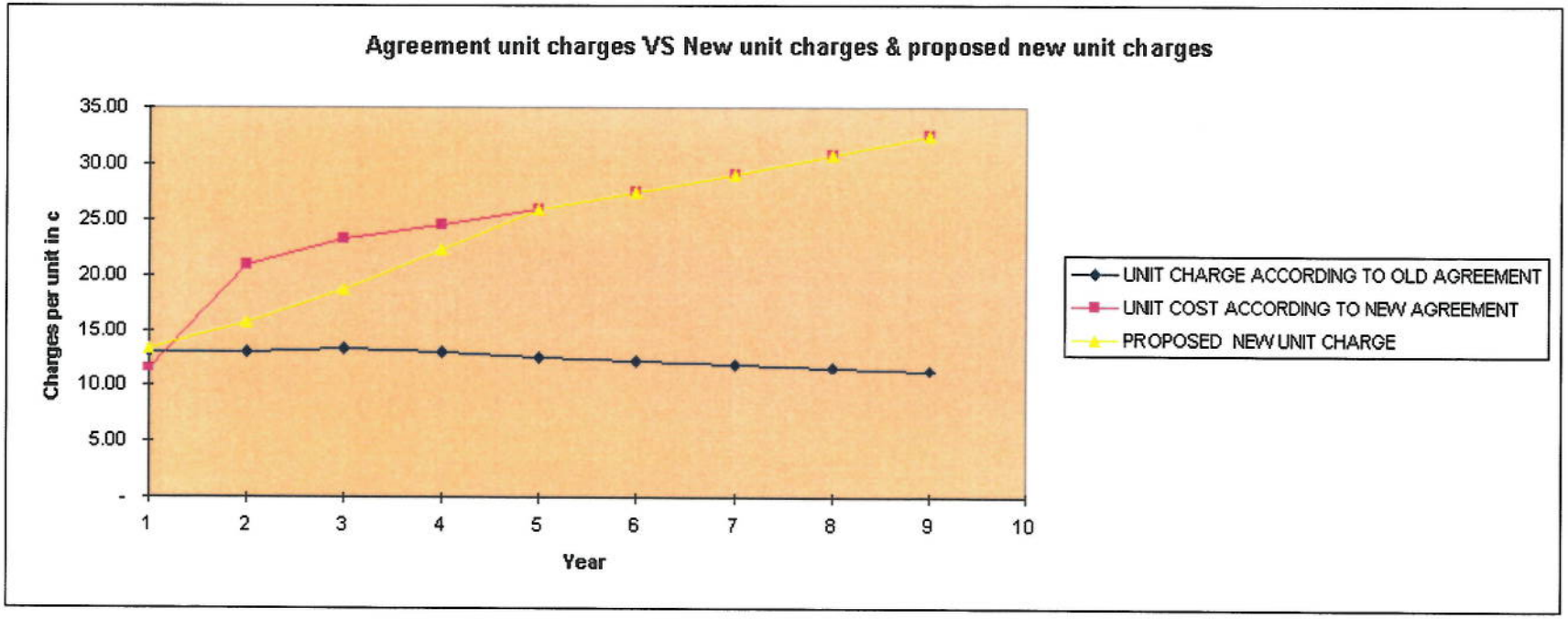


Table E2: General notes

1. Expected water supply – m^3

	Domestic & Industrial				Irrigation			
	Voelvlei dam & Canal	Theewaterskloofdam & Tunnels	Palmiet	Total	Voelvlei dam & Canal	Theewaterskloofdam & Tunnels	Palmiet	Total
Cape Town	70 400 000	118 000 000	22 500 000	210 900 000				
Other users	24 300 000	7 000 000	0	31 300 000	18 100 000	116 200 000		134 300 000
	94 700 000	125 000 000	22 500 000	242 200 000	18 100 000	116 200 000	0	134 300 000
% used by Cape Town	74.34%	94.40%	100.00%	87.08%				

2. Calculation of long term annual use of allocation

Voelvlei, Misverstand dams & canal

	Allocated usage – m^3	Average use %	Average usage – m^3	Weighted use per sector %
Domestic & industrial	94 700 000	97%	91 859 000	85%
Irrigation	18 100 000	91%	16 471 000	15%
	112 800 000		108 330 000	100%

Theewaterskloof dam

	Allocated usage – m^3	Average use %	Average usage – m^3	Weighted use per sector %
Domestic & industrial	125 000 000	100%	125 000 000	52%
Irrigation	116 200 000	100%	116 200 000	48%
	241 200 000		241 200 000	100%

Theewaterskloof tunnels

	Allocated usage – m^3	Average use %	Average usage – m^3	Weighted use per sector %
Domestic & industrial	124 000 000	100%	124 000 000	65%
Irrigation	65 400 000	100%	65 400 000	35%
	189 400 000		189 400 000	100%

3. Allocation of capital cost

Voelvlei dam & canal

	*Capital cost per database – R	% of total average usage by D&I	% of actual D&I used by CT	CT's liability of capital cost –R
Depreciation	4 966 882	85%	74.34%	3 130 974
Return on assets	19 760 431	85%	74.34%	12 456 386
	24 727 313			15 587 360

**Refer to Appendix E1 for more detailed info.*

Theewaterskloof dam

	*Capital cost per database – R	% of total average usage by D&I	% of actual D&I used by CT	CT's liability of capital cost –R
Depreciation	392 603	52%	94.40%	192 069
Return on assets	6 668 142	52%	94.40%	3 262 192
	7 060 744			3 454 261

**Refer to Appendix E2 for more detailed info.*

Theewaterskloof tunnels

	*Capital cost per database – R	% of total average usage by D&I	% of actual D&I used by CT	CT's liability of capital cost –R
Depreciation	1 956 041	65%	100.00%	1 280 618
Return on assets	33 164 033	65%	100.00%	21 712 461
	35 120 074			22 993 079

**Refer to Appendix E2 for more detailed info.*

Palmiet

	*Capital cost atabase – R	# % of total average usage by D&I	% of actual D&I used by CT	CT's liability of capital cost –R
Depreciation	1 103 066	31.67%	100.00%	349 304
Return on assets	18 734 964	31.67%	100.00%	5 932 739
	19 838 030			6 282 043

According to White paper WPK'82 government will only be responsible for R19 000 000 of the total capital cost (R60 000 000) of the Rockview and Kogelberg dams. Eskom is responsible for the remaining cost. Therefore Cape Town is only responsible for 31.67 % (19/60) of the capital cost.

**Refer to Appendix E3 for more detailed info.*

4. Total capital cost

	Depreciation R	Return on assets R
Voëlvlei dam & canals	3 130 974	12 456 386
Theewaterskloof dam	192 069	3 262 192
Theewaterskloof tunnels	1 280 618	21 712 461
Palmiet	349 304	5 932 739
	4 952 966	43 363 778

5. Annual cost according to agreement

Financial year	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Berg River & Riversonderend	23 462 000	23 462 000	23 462 000	23 462 000	23 462 000	23 462 000	23 462 000	23 462 000	23 462 000	23 462 000
Palmiet*	4 636 520	4 636 520	4 636 520	4 636 520	4 636 520	4 636 520	4 636 520	4 636 520	4 636 520	4 636 520
	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520	28 098 520

***Total capital cost paid for Palmiet per year :**

		R
Dams		
Capital balance	27 928 900	
Rate %	15.48%	
Redemption & interest		4 330 060
Conveyance structures		
Capital balance	1 750 000	
Rate %	17.50%	
Redemption & interest		306 470
		4 636 530

Appendix E1

Department of Water Affairs and Forestry
Summary of Depreciation and ROA per scheme component
Berg River (Voelvlei & Misverstand Dams)

	ROA annuity	Adjusted ROA annuity as on 30/9/01	Annual depreciation	Adjusted annual depreciationas on 30/09/01	Replacement value on 31 March 2000
Group1 – Voelvlei	17 006 659	19 266 844	4 358 566	4 937 820	535 825 470
Group2 – Misverstand	435 685	493 588	25 652	29 061	11 543 400
Group3					
Group4					
Group5					
Group6					
Group7					
Group8					
Group9					
Group10					
Unmatched					
Total	17 442 344	19 760 431	4 384 218	4 966 882	547 368 870
Control total (must be R0)			-		0

Group	Name of component	Component type	ROA annuity	Annual depreciation	Depreciable portion	Total life	Component age on 31 March 2000	Replacement value on 31 March 2000
1	Voëlvlei	Dams & weirs	2 289 086	134 775	10%	45	18	60 648 938
2	Misverstand	Dams & weirs	435 685	25 652	10%	45	18	11 543 400
1	Twentyfour Rivers Canal	Canals	12 450 946	3 573 293	40%	45	18	401 995 459
1	Klein Berg Canal	Canals	2 266 627	650 498	40%	45	18	73 181 073

Appendix E2

Department of Water Affairs and Forestry
Summary of Depreciation and ROA per scheme component
Riversonderend – Berg River

	ROA annuity	Adjusted ROA annuity as on 30/9/01	Annual depreciation	Adjusted annual depreciationas on 30/09/01	Replacement value on 31 March 2000
Group1	5 885 905	6 668 142	346 547	392 603	155 946 046
Group2	29 273 575	33 164 033	1 726 579	1 956 041	776 960 474
Group3					
Group4					
Group5					
Group6					
Group7					
Group8					
Group9					
Group10					
Unmatched					
Total	35 159 480	39 832 175	2 073 126	2 348 644	932 906 520
Control total (must be R0)					

Group	Name of component	Component type	ROA annuity	Annual depreciation	Depreciable portion	Total life	Component age on 31 March 2000	Replacement value on 31 March 2000
2	Wolwekloof	Tunnels	9 614 339	569 094	10%	45	18	256 092 375
2	Stellenboschberg	Tunnels	3 855 683	227 013	10%	45	18	102 155 654
2	Franschoekberg	Tunnels	7 714 914	454 234	10%	45	18	204 405 343
2	Dasbos	Tunnels	3 694 067	217 497	10%	45	18	97 873 680
2	Bergriver	Tunnels	4 394 572	258 741	10%	45	18	116 433 423
1	Theewaterskloof Dam Concrete	Dams & weirs	1 355 925	79 833	10%	45	18	35 925 000
1	Theewaterskloof Dam	Dams & weirs	3 325 275	195 784	10%	45	18	88 102 605
1	Kleinplaas concrete	Dams & weirs	899 610	52 967	10%	45	18	23 835 000
1	Kleinplaas	Dams & weirs	305 095	17 963	10%	45	18	8 083 441

Appendix E3

Department of Water Affairs and Forestry
Summary of Depreciation and ROA per scheme component
Palmiet River (Rockview & Kogelberg Dams)

	ROA annuity	Adjusted ROA annuity as on 30/9/01	Annual depreciation	Adjusted annual depreciation as on 30/09/01	Replacement value on 31 March 2000
Group1	16 537 173	18 734 964	973 665	1 103 066	438 149 601
Group2					
Group3					
Group4					
Group5					
Group6					
Group7					
Group8					
Group9					
Group10					
Unmatched					
Total	16 537 173	18 734 964	973 665	1 103 066	438 149 601
Control total (must be R0)			(1)		-

Group	Name of component	Component type	ROA annuity	Annual depreciation	Depreciable portion	Total life	Component age on 31 March 2000	Replacement value on 31 March 2000
1	Rockview earth	Dams & weirs	2 085 829	122 808	10%	45	18	55 263 680
1	Rockview	Dams & weirs	11 017 680	648 692	10%	45	18	291 911 540
1	Kogelberg earth	Dams & weirs	790 282	46 530	10%	45	18	20 938 381
1	Kogelberg	Dams & weirs	2 643 384	155 636	10%	45	18	70 036 000

APPENDIX E4

The registered existing lawful water use (in terms of Section 21 A of the National Water Act) for the City of Cape Town (January 2003) is given in the Table below

Source	Owner	Registered Water use in million cubic metres (January 2003)
Theewaterskloof	DWAF	118 (90 fixed 28 variable)
Voelvlei	DWAF	70.4
Palmiet	DWAF	22.5
Wemmershoek	City of Cape Town	54
Steenbras Upper and Lower Dam	City of Cape Town	40
Albion Spring	City of Cape Town	1.5
Woel River (Lewis Gay and Kleinplaas)	City of Cape Town	1.8
Land en Zeezicht Dam (Lourens River)	City of Cape Town	1
Disa River (Table Mountain Dams)	City of Cape Town	3.5
Atlantis Aquifers	City of Cape Town	5

ANNEXURE F

BERG WATER PROJECT - CAPITAL CHARGE CALCULATIONS

F1. INTRODUCTION

1.1 The objective of this Annexure is to set out the principles for calculating the following charges:

- the Berg Water Capital Charge (BWCC)
- the Berg Water Marginal Cost (BWMC), and
- the Third Party Capital Charge (TPCC).

1.2 The parties agree that while the principles shall not change, it is acknowledged that the Base Data used to calculate the Charges may change over time.

1.3 This annexure is attached to both the Raw Water Supply Agreement and the BWP Agreement. "Parties" therefore refers to CCT, DWAF and TCTA.

F2. PRINCIPLES USED IN CALCULATING THE BWCC

2.1 The BWCC is based on the projected low water demand growth of CCT over a 24-year period (see Annexure D).

2.2 The BWCC is calculated on water sold to CCT from Government Water Schemes (GWS) within the Western Cape Water System (WCWS).

2.3 It is anticipated that the construction period will be from 2002/03 financial year to the 2006/07 financial year.

2.4 The BWCC is phased-in over a 4-year period commencing on 1 July 2003, on a straight-line basis, to 30 June 2007.

2.5 The step-down BWCC approach will be calculated and applied as set in clause 5.3 below.

2.6 For purposes of calculating the BWCC as set out in clause F6 it was assumed that the costs relating to the implementation and funding of the BWP needed to be repaid 20 years after completion of construction.

2.7 The Project Cost shall be repaid within a reasonable period which should not be longer than the economic life of the asset ,determined on the basis of:

2.7.1 the debt profile and acceptable growth and level of debt of the Project;

2.7.2 the anticipated funding requirements of the augmentation of the Western Cape Water System; and

2.7.3 within an affordable structure to the end user of the CCT water services.

2.8 Since operations and maintenance on the BWP is not managed by TCTA, the BWCC excludes costs relating to this. The operations and maintenance charge will therefore be levied by DWAF.

F3. PAYMENT OF THE BWCC

3.1 The BWCC is payable by DWAF to TCTA which is in turn levied by DWAF on CCT. Pursuant to a cession of the BWCC, at the moment such BWCC is due and payable, CCT will effect payment directly into the Berg Water Project account held by TCTA.

3.2 DWAF will render an account to CCT on a monthly basis which account shall be payable on the date specified on the account, which date shall not be more than 30 (thirty) days from the date of the account. Such account will include the BWCC.

3.3 The first BWCC is payable from 1 July 2003 which is the first date of the financial year 2003/04 of CCT.

F4. BASE DATA USED AS INPUT INTO THE BWCC CALCULATION

4.1 Financial Data

- CPI-X: 6% year-on-year increase
- Funding cost: 13.5% per annum
- Loan repayment period of 20 (twenty) years post construction No capitalisation of interest will take place after the 4-year phase-in period.
- Capital expenditure as set out in the table below:

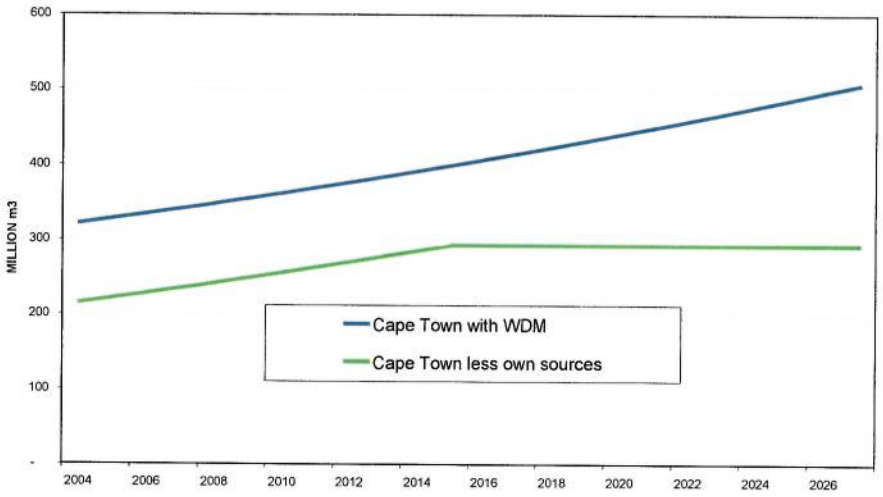
Estimated cost of the BWP: Capital expenditure

Financial Year	Rand in Future Terms
2002/03	77 404 380
2003/04	328 194 571
2004/05	347 886 245
2005/06	368 759 420
2006/07	390 884 985
2007/08	310 753 563

4.2 Water Demand Forecasts

For the purposes of calculating the BWCC, the water demand curve is based on the CCT demand curve as anticipated in Annexure D.

PROJECTED DEMAND CURVES



F5. CALCULATION OF THE BWCC

The step-down BWCC is calculated on the base case data. Details of this calculation are set out below:

5.1 The first BWCC will be phased in over a 4-year period, commencing on 1 July 2003, to a level sufficient to cover all annual interest costs incurred by TCTA during the 4 year phase-in period;

5.2 After the 4-year period referred to in the previous paragraph, the BWCC will stay constant in real terms from 1 July 2007 to 30 June 2014;

5.3 From 1 July 2014 the BWCC will be stepped-down over a 5-year period to 30 June 2019 on a straight-line basis to a level sufficient to repay all project implementation and funding costs by no later than 30 June 2027.

5.4 The BWCC will be constant in real terms at the lower stepped-down level from 1 July 2019 to 30 June 2027.

5.5 Based on the above BWCC profile there will be two periods where a constant capital charge in real terms will apply.

In calculating the constant real capital charge, it is assumed that the BWCC will be increased annually by CPIX, i.e. the BWCC will remain constant in real terms. The constant real capital charge is calculated as the one BWCC that will equate the cumulative present value (PV) of project payments to the cumulative present value of income based on the CCT demand curve for a specific period. The present values are stated in June 2003 terms.

$$\Sigma PV\ Income = BWCC\ * \Sigma Water\ Volume = \Sigma PV\ Payments$$

Where in the case of the BWCC, Water volume is defined as follows:

Total CCT Demand
Less CCT Own Sources
CCT demand from Government water schemes (GWS)

Alternatively it can be expressed as the cumulative present value of Payments divided by the total water volume over the period under review. Payments include capital repayments, interest and cost incurred up to final date under review.

$$BWCC = \frac{\Sigma PV\ Payments}{\Sigma Water\ Volume}$$

The constant real capital charge approach is in relation to a specific period eg. 10-year constant real capital charge.

$$BWCC_{t=1\rightarrow10} = \frac{\Sigma PV\ Payments_{t=1\rightarrow10}}{\Sigma Water\ Volume_{t=1\rightarrow10}}$$

In this example, all payments due within the 10-year period need to be repaid by the water sales in the same period, whereby the capital charge calculated will equate the cumulative present value of payments to the cumulative present value of income, therefore having a net present value (NPV) of zero.

$$\Sigma PVIncome_{t=1\rightarrow10} = BWCC * \Sigma Water\ Volume_{t=1\rightarrow10} = \Sigma PV\ Payments_{t=1\rightarrow10}$$

An illustrative example of how the BWCC is calculated in provided under Appendix F1.

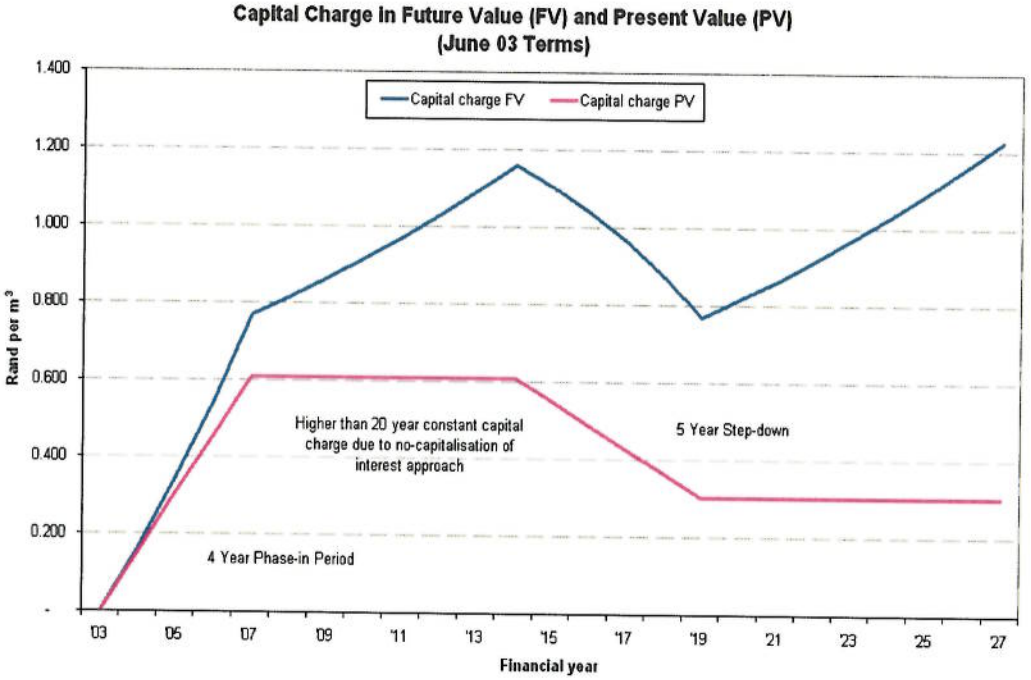
F6. RESULTANT BWCC USING BASE DATA

The table below reflects the BWCC payable by DWAF to TCTA assuming the base data remains constant

Projected Berg Water Capital Charges

Year	Details	Berg Water Capital Charge Rand per cubic metre In June 2003 terms
2003/04	Phase-in 1	0.1525
2004/05	Phase-in 2	0.3050
2005/06	Phase-in 3	0.4575
2006/07 – 2013/14	Phase-in 4 & 1st constant capital charge	0.6100
2014/15	Step-down 1	0.5484
2015/16	Step-down 2	0.4867
2016/17	Step-down 3	0.4251
2017/18	Step-down 4	0.3635
2018/19 – 2026/27	Step-down 5 & 2nd constant capital charge	0.3019

The **preliminary** capital charges based on the above principles are shown below.



F7. THE BERG WATER MARGINAL COST (BWMC)

7.1 The BWMC represents the marginal cost of a unit of water from the BWP based only on CCT's demand for water from the BWP.

7.2 CCT's demand for water from the BWP is determined as follows:

Total CCT Demand
Less CCT Own Sources
Less Supply from GWS (excl BWP)
CCT demand from BWP (Up to a limit of 81 million cubic meters per annum)

7.3 Based on the above calculation, CCT's annual demand for water from the BWP is given below:

Financial Year Ending	Total CCT demand (with WDM)	CCT Own Sources	CT demand less Own sources* (CCT demand from GWS)	Supply from GWS	CCT demand from BWP
	Volume million cubic metre	*Volume million cubic metre*	*Volume million cubic metre*	*Volume million Cubic metre*	*Volume million cubic metre*
			USED FOR BWCC CALCULATION		USED FOR BWMC CALCULATION
Jun-04	321.30	106.80	214.50	210.90	3.60
Jun-05	327.73	106.80	220.93	210.90	10.03
Jun-06	334.28	106.80	227.48	210.90	16.58
Jun-07	340.97	106.80	234.17	210.90	23.27
Jun-08	347.79	106.80	240.99	210.90	30.09
Jun-09	354.74	106.80	247.94	210.90	37.04
Jun-10	361.84	106.80	255.04	210.90	44.14
Jun-11	369.07	106.80	262.27	210.90	51.37
Jun-12	376.45	106.80	269.65	210.90	58.75
Jun-13	383.98	106.80	277.18	210.90	66.28
Jun-14	391.66	106.80	284.86	210.90	73.96
Jun-15	399.50	106.80	292.00	210.90	81.00
Jun-16	407.49	106.80	292.00	210.90	81.00
Jun-17	415.64	106.80	292.00	210.90	81.00
Jun-18	423.95	106.80	292.00	210.90	81.00
Jun-19	432.43	106.80	292.00	210.90	81.00
Jun-20	441.08	106.80	292.00	210.90	81.00
Jun-21	449.90	106.80	292.00	210.90	81.00
Jun-22	458.90	106.80	292.00	210.90	81.00
Jun-23	468.07	106.80	292.00	210.90	81.00
Jun-24	477.43	106.80	292.00	210.90	81.00
Jun-25	486.98	106.80	292.00	210.90	81.00
Jun-26	496.72	106.80	292.00	210.90	81.00
Jun-27	506.66	106.80	292.00	210.90	81.00

Note: * Further WDM and/or supply augmentation required once the full incremental yield of the BWP has been used.

7.4 The constant capital charge in real terms approach is applied and the volume on which this calculation is based is the CCT demand for water out of the BWP.

7.5 The BWMC is calculated on the basis that shortfall between CCT demand for water (excluding own sources) and the supply of water from GWS is met out of the BWP from 01 July 2003. This BWMC will be based on a 24-year repayment period.

$$BWMC_{t=1\rightarrow 24} = \frac{\Sigma PV\ Payments_{t=1\rightarrow 24}}{\Sigma CCT\ demand\ for\ water\ from\ BWP_{t=1\rightarrow 24}}$$

7.6 Based on current assumptions, the BWMC amounts to a **preliminary** charge of R 2.4001/cubic metre in June 2003 terms.

7.7 An illustrative example of how the BWMC is calculated in provided under Appendix F1.

F8. THIRD PARTY CAPITAL CHARGE (TPCC)

8.1 The TPCC is a charge which DWAF will charge any users other than the CCT for water allocated or deemed to be allocated from the BWP, as set out in the Raw Water Supply Agreement.

8.2 The TPCC is calculated using the CCT demand from BWP plus the weighted average demand from other users.

8.3 The TPCC will be calculated separately for each allocation given to each user of water from the BWP. The charge will be determined such that the percentage allocation of water from the BWP equates to the percentage of the total project cost of the BWP for that user allocation. (i.e. if a user receives an allocation of 5% of the yield of the BWP, that user will contribute towards 5% of the total project cost of the BWP)

8.4 The TPCC shall be recalculated for each new (additional) allocation made from the BWP.

8.5 The TPCC and total project cost shall be re-determined each time the BWCC is recalculated for the CCT. Each specific third party capital charge shall be re-adjusted to reflect the updated total project cost and actual water allocated to other users.

8.6 Should any user request a once off release from the BWP (i.e. not part of their allocation), such a release can be considered by DWAF provided that the release does not reduce the level of assurance of the users who have allocations from the BWP. DWAF shall charge the water user for water released under these circumstances at the BWMC of water. The income derived by DWAF under this water use charge shall be passed on to the TCTA to reduce the overall project cost.

To calculate the third party usage charge, the constant charge in real terms method is applied from 1 July 2003 to 30 June 2027

$$TPCC_{t=1\rightarrow 24} = \frac{\Sigma\, PV\ Payments_{t=1\rightarrow 24}}{\Sigma\, CCT\ water\ demand\ from\ BWP + Other\ users\ water\ demand\ from\ BWP_{t=1\rightarrow 24}}$$

Where the total water volume per annum is defined as follows:

Total CCT Demand
Less CCT Own Sources
Less Supply from GWS (excl BWP)
Plus Weighted average demand from Other users
Demand from BWP including Other users (Up to a limit of 81 million cubic metres)

F9. BERG WATER PROJECT - CHARGE REVIEW TRIGGERS

9.1 Automatic adjustments of the BWCC, BWMC and TPCC will take place in the following events:

9.1.1 During the construction period of the Project, the BWCC, BWMC and TPCC will be automatically adjusted annually with the year-on-year CPI-X where CPI-X will be determined in the fourth month preceding the first month of CCT's new financial year.

On completion of construction the introduction of an upper and lower limit to the annual CPI-X adjustment will be set by agreement between DWAF, CCT and TCTA. That is, in the post construction period the BWCC, BWMC and TPCC will be automatically adjusted annually with the year-on-year CPI-X provided that CPI-X falls within the upper and lower range.

9.1.2 Once the construction phase is completed, the actual total cost of the project will be determined and the impact on the BWCC, BWMC and TPCC will be calculated and appropriate adjustments made if necessary.

9.1.3 The reduction in the Amount Outstanding resulting from TCTA's receipt of the TPCC will be calculated, and adjustments to the BWCC, BWMC and TPCC made at least every two years following an election by CCT that DWAF pay over to TCTA any amounts received by DWAF as a TPCC to TCTA.

9.2 The BWCC, BWMC and TPCC will be re-negotiated in the event that:

9.2.1 the allocation of water use on compulsory licensing is different from the allocation, or any deemed allocation, to CCT and third party users in respect of the BWP to take cognizance of the extent to which CCT is pre-paying for the BWP; or

9.2.2 where a change in the yield of the system necessitates an adjustment; or

9.2.3 CCT's demand deviate materially from what is anticipated in Annexure D to the Raw Water Supply Agreement for a period of 4-years;

9.2.4 if there is a material change in circumstances, other than force majeure or defects in design or construction of the BWP; or

9.2.5 in the event there is a change in the base case data, and/or the base data is no longer in accordance with the principles in F2

9.2.6 if the CPI-X falls outside the upper and lower range determined in terms of 9.1.1. above, the adjustment to the charges outside the upper and lower range will be negotiated.

F10. REVIEW TRIGGER DISPUTES

In the event that the parties do not reach agreement within a reasonable time on matters which require further negotiation in terms of 9.2 above, a party may declare a dispute in terms of the dispute procedure: provided that there will be no interruption in the payment of charges.

Calculating Berg Water Capital Charge (BWCC):

Cash Inflows	2003	2004	2005		2025	2026	2027
Water Vol million cubic metre *1			Σ Water Volume				
BWCC Calculated as follows:			Σ PV Payments	divide by	Σ Water Volume		
Tariff Income	A	A	A		A	A	A

Cash Outflows	2003	2004	2005		2025	2026	2027
Operational expenditure							
Capital expenditure							
Debt repayment							
Interest costs							
Sundry expenses							
Total expenses	B	B	B		B	B	B

Net Cashflow	A-B	A-B	A-B		A-B	A-B	A-B
Present Value Cashflow	PV (A-B)	PV (A-B)	PV (A-B)		PV (A-B)	PV (A-B)	PV (A-B)
	Σ PV Payments						

*1- **Demand curve used for calculation:**

Total CCT Demand
Less CCT Own Sources
CCT demand from Government water schemes (GWS)

Calculating Berg Water Marginal Cost (BWMC):

Cash Inflows	2003	2004	2005		2025	2026	2027
Water Vol million cubic metre *2			Σ Water Volume				
BWMC Calculated as follows:			Σ PV Payments	divide by	Σ Water Volume		
Tariff Income	A	A	A		A	A	A

Cash Outflows	2003	2004	2005		2025	2026	2027
Operational expenditure							
Capital expenditure							
Debt repayment							
Interest costs							
Sundry expenses							
Total expenses	B	B	B		B	B	B

Net Cashflow	A-B	A-B	A-B		A-B	A-B	A-B
Present Value Cashflow	PV (A-B)	PV (A-B)	PV (A-B)		PV (A-B)	PV (A-B)	PV (A-B)
	Σ PV Payments						

*2- **Demand curve used for calculation:**

Total CCT Demand
Less CCT Own Sources
Less Supply from GWS (excl BWP)
CCT demand from BWP (Up to a limit of 81 million cubic metre)

Example of the Third Party Capital Charge Calculation sheet

Year	Marginal tariff based on CCT Low Water Demand Curve (R/kl)	CCT Low Water Demand (cubic metres)	Total Project Cost (Rands)	Allocation 1 (User 1)			Allocation 2 (User 1)			Allocation 3 (User 2)		
				Third Party User Charge (R/kl)	Allocation (cubic metres)	Annual Cost (Rands)	Third Party User Charge (R/kl)	Allocation (cubic metres)	Annual Cost (Rands)	Third Party User Charge (R/kl)	Allocation (cubic metres)	Annual Cost (Rands)
2004	2.4001	3,300,000	7,920,330	1.808	1,000,000	1,808,481	2.170		-	3.100		-
2005	2.4001	9,726,000	23,343,373	1.808	1,000,000	1,808,481	2.170		-	3.100		-
2006	2.4001	16,260,520	39,074,876	1.808	1,000,000	1,808,481	2.170		-	3.100		-
2007	2.4001	22,966,130	55,121,010	1.808	1,000,000	1,808,481	2.170		-	3.100		-
2008	2.4001	29,785,453	71,488,066	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100		-
2009	2.4001	36,741,162	88,182,463	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100		-
2010	2.4001	43,835,985	105,210,748	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100		-
2011	2.4001	51,072,705	122,579,599	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100		-
2012	2.4001	58,454,159	140,295,827	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100		-
2013	2.4001	65,983,242	158,366,380	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100		-
2014	2.4001	73,662,907	176,798,343	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2015	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2016	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2017	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2018	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2019	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2020	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2021	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2022	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2023	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2024	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2025	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2026	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
2027	2.4001	81,000,000	194,408,100	1.808	1,000,000	1,808,481	2.170	3,000,000	6,510,530	3.100	4,000,000	12,401,010
	2.4001	1,464,808,264	3,515,686,315	1.808	24,000,000	43,403,535	2.170	60,000,000	130,210,604	3.10	56,000,000	173,614,139
	CCT AVG	61,033,678	146,486,930									
	USER 1 (24YR AVG)											
	USER 2 (24YR AVG)											
	USER 3 (24YR AVG)											
						43,403,535			130,210,604			173,614,139
	AVG CCT DEMAND	**81,000,000**										

CCT Allocation %	90.12%	Allocation 1 Yield %	1.23%	Allocation 2 Yield %	3.70%	Allocation 3 Yield %	4.94%
CCT Cost %	90.12%	Allocation 1 Cost %	1.23%	Allocation 2 Cost %	3.70%	Allocation 3 Cost %	4.94%
			1.00		1.00		1.00

Footnote: 1 kl=1 m^3

ANNEXURE G

CONDITIONS FOR THE SUPPLY OF RAW WATER TO THE CITY OF CAPE TOWN

GENERAL

G-1 Certain of the conditions contained in this annexure also appear in the main body of the agreement, but are re-stated here for ease of implementation, with the intention that these conditions of supply could be read without reference to the main body of the agreement.

G-2 These conditions of supply should be read in conjunction with, and are subject to, all applicable laws, including the National Water Act,1998, the Water Services Act, 1997 and any regulations promulgated under the relevant acts.

QUANTITY OF WATER TO BE PROVIDED

G-3 DWAF will, endeavour to ensure that the City, in terms of its existing lawful water use allocation or water use license as the case may be, is supplied with no less than the estimated volume of water needed for the City to provide basic water supply, as defined in the Water Services Act, to the population to whom the City supplies water services.

G-4 The maximum quantity of water supplied by DWAF to users shall be the ALLOCATABLE YIELD of the DWAF owned portion of the WCWS taking into account the level of assurance required by the different users. Each user will be entitled to abstract a certain amount of water from the Western Cape Water System (WCWS) based on the allocations made in terms of existing lawful water use or any licenses issued which replace such existing lawful water use.

G-5 The acceptable level of assurance for municipal supply is 98% assurance, or such other amount as may be agreed between DWAF and CCT, and DWAF will endeavour to supply the CCT at such level of assurance of supply making use of the Western Cape Water Systems model.

G-6 Water is supplied to the CCT from a system of interconnected water infrastructure, in accordance with the operating rules of the WCWS Annexure "H", DWAF, CCT and other users shall meet at least once a year, and when necessary, to consider the operation of the WCWS and will jointly decide, within the framework of the operating rules, from which sources CCT's water allocations will be drawn.

G-7 DWAF may after consultation with the CCT and other users, and in accordance with the WCWS Operating Rules, Annexure "H", and applicable disaster management legislation, restrict and or limit the quantity of water supplied in terms of this agreement in the event of droughts, floods or other such disasters.

G-8 DWAF shall take all reasonable measures, after consultation with all users of the WCWS timeously inform the CCT of a restriction and/or limitation of supply from its water infrastructure due to a shortage of water.

G-9 DWAF shall consult the CCT in the event that it proposes to reduce the CCT's water allocation.

G-10 The CCT will be given access to the results of the Western Cape Systems Model and all calculations and optimisation techniques on which decisions relating to the source of supply from interconnected DWAF water infrastructure or restrictions has been based.

QUALITY OF WATER TO BE PROVIDED

G-11 DWAF will not be responsible for treating water from the WCWS

G-12 DWAF, while acting as the responsible authority, will have, as part of overall water resource management, to ensure that the levels of water consumption, use, and pollution, as well as the associated infrastructure to impound, supply, treat and dispose of the water, do not cause either unacceptable or irreversible impacts on the population or ecosystems including water resources.

G-13 DWAF shall take all reasonable measures to monitor the quality of the resource, and to inform the CCT should the quality of water at any time not comply with any pre-agreed standards or benchmarks or should any hazardous or toxic substances enter the raw water resource.

G-14 DWAF shall take active steps to prevent pollution of water in the WCWS, including the measures contained in Chapter 3, Part 4 of the NWA.

G-15 DWAF in collaboration with the CCT shall have the right to monitor at its own cost, the water quality in all dams, pipelines, reservoirs and other transport facilities used in the transport of water supplied by DWAF to the CCT. The CCT will have access to this information.

G-16 The CCT in collaboration with DWAF shall have the right to monitor at its own cost the water quality of the resource and DWAF will have access to such information.

CONTINUITY OF SUPPLY AND SUPPLY PRESSURES

G-17 DWAF shall, after first consulting and informing the CCT, have the right to interrupt the supply to the CCT from any of DWAF's infrastructure for the purpose of renewing, testing, examining, repairing or maintaining any water infrastructure. For major planned maintenance shutdowns at least 6 months written notice will be given and 14 days written notice for minor interruptions so that it can be scheduled in the CCT's maintenance programme.

G-18 In emergency situations DWAF shall inform the Bulk Water Department of the City telephonically and by means of a fax or e-mail of an interruption of supply of water CCT shall be responsible for informing its consumers of such an interruption when required.

G-19 The probability of filling the dams in the WCWS will be modelled and optimised before a final joint decision is made on the closure of the Theewaterskloof Tunnel for long periods.

G-20 On at least yearly basis, or as and when required, the WCWS will be modeled and optimised and joint decisions regarding the operation thereof made.

G-21 DWAF shall not be responsible or liable for any loss of or damage to property or injury to persons or for loss of production or for loss of income or profit resulting from an interruption, variation or deficiency in the water supply or water quality or from excess or lack of pressure in DWAF's WCWS, unless such loss or damage is due to the negligence of DWAF.

SUPPLY POINTS

G-22 The point(s) at which a water supply is to be provided to the CCT shall be determined by DWAF in consultation with the CCT and the current supply points are as follows:

- Rockview Dam Outlet
- Stellenboschberg Portal
- Upper Berg River Siphon (pipeline to Wemmershoek)
- Voelvlei Dam (at CCT low lift pump station)

WATER MEASUREMENT DEVICES (METERS AND GAUGING WEIRS)

G-23 Where the CCT obtains water from a DWAF source there will be two measuring devices, one owned and maintained by DWAF and the other owned and maintained by the CCT.

G-24 Both measuring devices are read, and if the readings are within 10 % of each other, the readings are averaged and the averaged reading is the one that is the billed by DWAF. If either party's records show that the discrepancy is attributable to one meter only, the reading of the other meter shall be taken, and in the absence of manifest error be deemed to be the applicable reading.

G-25 If the discrepancy is due to the inaccuracy of both meters a reasonable estimate shall be made by DWAF, in consultation with CCT of the correct quantity. Such meters shall as soon as practically possible be tested and the account adjusted after the inaccuracy has been ascertained. Any inaccurate meter should be rectified as soon as possible.

G-26 The quantity of water registered at the supply point(s) shall be deemed to be the quantity actually provided, unless it can be demonstrated that the water measurement device reading(s) was incorrectly recorded or that the water measurement device(s) was not registering accurately at the time of such reading.

G-27 The chambers provided by DWAF for the housing of the metering equipment shall be locked and the equipment therein shall be under the control of DWAF.

G-28 DWAF shall allow the CCT to accompany DWAF during meter readings or by some acceptable arrangement. Failure of the CCT to accompany DWAF during meter readings will not in any way affect the validity of that meter reading and vice-versa.

G-29 The CCT shall in no way interfere with any equipment in DWAF's water measurement device installations and vice-versa.

G-30 DWAF's employees shall be given unimpeded access at all times to its metering installations on CCT's property for the purpose of reading the meters, effecting alterations and carrying out maintenance and repairs and vice-versa.

G-31 No person shall obstruct or interfere in any way with any duly authorised employee of DWAF engaged in the performance of his or her duties, provided they display such authorisation and vice-versa.

G-32 The cost of all equipment that DWAF may deem necessary to install for the proper operation of the water measurement device, the cost of testing water measurement device(s) and the cost of replacing a water measurement device shall be recovered from the CCT through a water use charge.

G-33 DWAF may, at its discretion, test its own water measurement device through which water is supplied to the CCT; but the water measurement device must be tested and calibrated if DWAF is requested to do so by the CCT.

G-34 Where the water measurement device is a water meter, then the meters tested shall be subjected to a standard industry test to establish its accuracy. Where the water measurement device is a device other than a meter then the Parties shall agree on a suitable testing methodology.

G-35 The CCT shall be entitled to be present at the test. A test carried out on a water measurement device, either at DWAF's discretion or at the CCT's request, shall in no way be invalidated by the latter declining to be present at the test or by it being absent there from and the result of the test shall be binding on the CCT and DWAF.

G-36 A water measurement device shall be considered registering accurately if no error of more than five (5) percent over or under registration is found at the rate of normal flow. Normal flow shall mean two thirds of the maximum flow capacity of the meter.

G-37 The quantity of water registered as having been consumed and the tariff charged during a period that a water measurement fault persisted shall be adjusted in accordance with the degree of error found. The period that the fault persisted will be assumed to be 30 days if the actual period is not known, or cannot be agreed between DWAF and the CCT.

G-38 Where any water measurement device is found to have ceased to register or is found to be faulty in any other respect, DWAF or the CCT shall repair or replace such meter within thirty (30) days or as soon as practically possible.

G-39 The quantity of water consumed, during a period within which both water measurement devices ceased to register or was found to be faulty, will be, calculated by DWAF on the basis of one of the following agreed upon means, the choice of which to use must be agreed upon between the parties: -

- the average monthly consumption of water during the three months prior to the last registration; or
- the corresponding period's water consumption in the previous year; or
- the average monthly water consumption over a period of three months after repair or replacement of the meters has been effected.

INFORMATION MANAGEMENT AND MONITORING

G-40 DWAF will be responsible for the compilation and maintenance of a database containing the data required for operational management of the WCWS monitoring of abstractions from, river flow in, and releases into the WCWS

G-41 DWAF will implement control measures to ensure that abstractions do not exceed water allocations (or in future licence authorisations), evaluate the flow and abstraction monitoring network and/or implement a telemetry system within the WCWS to improve the overall management of the WCWS.

G-42 DWAF will make all water quantity and quality monitoring information in relation to the WCWS available to the CCT and vice-versa.

G-43 DWAF and the CCT will make available to each other any relevant information pertaining to the planning and implementation of their respective water resource functions required for implementation of these supply conditions and when requested to do so.

WATER SUPPLY CONNECTED TO DWAF WATER INFRASTRUCTURE

G-44 No other water supply , water services work, connection or installation shall be connected with or made to any DWAF water infrastructure unless authorized by DWAF and subject to any conditions that DWAF may impose.

G-45 Any existing water supply , water services works, connections or installations connected with or made to DWAF water infrastructure, and not authorised by DWAF, may be removed or altered by DWAF, or DWAF may at any time impose such conditions as it may deem fit in respect of such a connection or installation.

G-46 DWAF shall not be liable for any loss or damage caused by or resulting from the use of the water supply of the Western Cape Water Supply System or water services works or installations or connections of the CCT connected with or made to any DWAF water infrastructure.

G-47 Where it is necessary for the CCT to pump water to higher elevations than is supplied to by DWAF, any pump installed for this purpose shall not be connected directly to DWAF's water infrastructure without prior approval of the specifications thereof by DWAF.

WATER RESOURCE DEVELOPMENT AND WATER DEMAND MANAGEMENT

G-48 The growth of water demand will have an impact on the total water demand from the WCWS and will affect the timing and implementation of additional water supply schemes if the level of supply were to remain at 98% level of assurance.

G-49 The parties shall engage in joint long term planning to ensure that water resources are developed timeously and responsibly to ensure that the City receives a 98% level of assurance of supply, or such other level of assurance which may be agreed by the parties from time to time.

G-50 The City shall ensure that the water demand management measures contained in its Water Services Development Plan and any other water demand policies adopted from time to time, including the Water Demand Policy and Strategy, are implemented.

G-51 DWAF is entitled to monitor the City's compliance with its Water Services Development Plan. The CCT must actively promote the efficient use of water amongst its consumers.

G-52 DWAF may restrict or suspend water supply to CCT in terms of clause 15.3.2 of the Agreement with the City.

WESTERN CAPE WATER SYSTEM OPERATING RULES

This Annexure describes the *Operation* of the main components of the Western Cape Water System that have already been described in Annexure A.

H.1. OPERATION OF THE INTEGRATED SYSTEM

The main storage dams are the Theewaterskloof and Voëlvlei Government Water Scheme Dams; the Wemmershoek, Upper Steenbras and Lower Steenbras Dams owned by the City of Cape Town; and the proposed Berg River Dam (see Figure A1). These will be operated in an integrated manner to maximize the stored water available for essential uses during droughts and other disasters. The effects of droughts are mitigated by minimizing spillage and wastage during the wetter years and restricting the supply to less essential uses during droughts. Various other measures have been introduced to mitigate the impact of other disasters, such as the closure of the tunnel from Theewaterskloof Dam towards Cape Town.

The Western Cape Water System is situated in a winter rainfall area which is characterised by wet winters and dry summers. The dams are filled during the wet winter months (April to September) when about 90% of the annual runoff occurs and water demands comprise only about 30% of the annual demand.

During the dry summer months (October to March) inflows to the dams are small and irrigation demands and garden watering demands in the urban areas are large. Approximately half of the storage in the dams is required to store water during the winter in order to meet the high water demands during the summer. The other half of the dam storage is required to provide long-term carry over storage for drought.

H.1.1 Minimize spillage

During the winter filling of the dams, the demands of the City of Cape Town are shifted onto those dams that appear more likely to spill. This avoids the situation where one dam spills while there is storage available in another dam. A spreadsheet is currently used to adjust the demands on the system and to estimate the probability of the system spilling.

The City of Cape Town has co-operated to help minimize spillage by:

- Introducing additional capacity in its water treatment works and bulk water pipelines to enable flexibility in the allocation of the demands on the different dams and to provide interconnectivity between the various sources.

- Reducing the demands on their own dams (Wemmershoek and Steenbras) although it might be more beneficial for them to use water from their own dams preferentially and only use the other dams as backup during drier periods. However this would increase spills and reduce the system yield.

If it seems probable that the system will spill even without the contributions from the existing Palmiet River transfer and from the proposed transfer from the proposed Berg River Supplement Scheme at Bien Donne to the Berg River Dam, then these transfers may be stopped to reduce unnecessary pumping costs.

H.1.2 Minimize wastage

Water demand management measures have been adopted by the City of Cape Town and are being used to reduce wastage and to conserve more water for drier periods. The target is to reduce the projected demand by 20% by 2010, though the natural growth in demand will mean that the demands still increase during the period.

In the agricultural sector it is proposed that Water User Associations and Irrigation Boards ensure that accurate meters are installed on all their members' pumping schemes and that these are calibrated every five years. Savings are encouraged if water is charged per m^3 consumed, though an additional availability charge may be necessary to ensure that irrigation rights are taken up or sold. All consumers must pay water resource management charges on their total registered use, while those consumers that receive releases from storage or who abstract stored water during summer (October to March) must pay additional scheme related charges in accordance with the Department of Water Affairs and Forestry's Raw Water Pricing Strategy.

The City monitors urban consumption on a monthly basis and agricultural consumption should be monitored by DWAF and compared with the allocated demands (using say the Water Allocation System - WAS) to identify excessive demands, which may not be sustainable for the entire season.

H.1.3 Restrict demand

The water storage in the system is evaluated towards the end of the wet season (September to November), to assess whether supplies must be restricted to ensure that sufficient water remains during droughts for the more essential uses such as basic human needs and industry.

The Water Resources Planning Model (WRPM) of the Western Cape Water System is normally run annually on the 1st November, but sometimes earlier using the current system storage and the latest demand projections to determine if restrictions will be necessary in the coming year. The model also forecasts a set of storage trajectories for the coming year under different inflow scenarios (median and above / below average inflow conditions) and indicates the different levels of restrictions that should be imposed. If restrictions seem likely the matter is discussed at a meeting of the Western Cape Planning Model Committee, comprising DWAF and all the major urban and agricultural stakeholders.

If the Committee agrees that it is necessary to impose water restrictions, the Minister will decide and impose the restrictions. DWAF is responsible for informing all users what their allocations will be from the various Government Water Schemes and for ensuring that all users comply with the restricted allocations imposed on them. Such restrictions will apply until the Committee deems that they can be lifted, whereafter the Minister will decide and announce the lifting of restrictions. This decision will be conveyed to the users by DWAF.

The levels of restrictions to be imposed on the various users will depend on the allocations and assurances of supply as indicated in Annexure E ie 97% for domestic and industrial users (100% for 90% of the time and 70% for 10% of the time) and 91% for irrigation (100% for 70% of the time and 70% for 30% of the time). The progressive curtailment of demands during droughts as modelled in the WRPM in order to correspond with these average levels of assurance of supply must still be determined.

The curtailments originally determined for the Western Cape Water System for application in the WRPM are shown in Table H1. These curtailments may not comply with the assurances of 97% and 91% for the capped yield allocation described in Annexure C (paragraph 3.2) and referred to in Annexure E.

Table H1: Original Curtailments Adopted for the Western Cape Water System.

User Category	Approximate % of total demand	Percentage of normal demand supplied at different recurrence intervals			
		1 in 10 years	1 in 20 years	1 in 100 years	1 in 200 years
Domestic	53	100	90	70	50
Industrial	19	100	100	90	60
Agricultural	28	100	75	50	20
Total	100	100	88	69	44

The curtailments applied in the WRPM to determine the levels of restrictions imposed in November 2000 are shown in Table H2. These curtailments are similar to the equal curtailment of urban and agricultural users from Theewaterskloof Dam described in Annexure C (paragraph 3.1) for the current yield allocation before agricultural usage reaches the capped allocation. This is because the curtailments in Table H2 are the same for domestic and agricultural users, although in November 2002 it was assumed that industrial users would have a higher level of assurance of supply.

Table H2: Curtailments for Different Consumer Categories in the Western Cape as Utilized for the Analysis in November 2000.

User Category	Approximate % of total demand	Percentage of normal demand supplied at different recurrence intervals			
		1 in 10 years	1 in 20 years	1 in 100 years	1 in 200 years
Domestic	53	100	90	70	50
Industrial	19	100	100	90	60
Agricultural	28	100	90	70	50
Total	100	100	92	74	52

Although DWAF understands that the Theewaterskloof, Voëlvlei and Misverstand Dams are also used for recreational purposes, there is no formal agreement limiting the drawdown of these dams, especially during times of drought. If the dams are drawn down below 10% storage then the effect on the fish population is discussed with the Western Cape Provincial Department of Environmental Affairs and Tourism.

H.1.4 Disaster Management

Disaster Management Plans endeavour to implement cost effective measures that reduce, to acceptable levels, the risk of potential impacts due to the disruption of the supply of water.

Once the potential impacts have been identified (eg sabotage, earthquake, plant malfunction) the following classes of measures can be adopted:

- Infrastructure to reduce impact (eg. provide alternative sources of supply)
- Measures to reduce probability (eg. increase security to reduce probability of sabotage and a regular maintenance program to reduce probability of a plant malfunction)
- Monitoring to reduce impact (eg. inspections and telemetry to monitor water volumes and presence of poisons)
- Contingency measures once problem is identified. (Eg If Theewaterskloof tunnel fails then impose restrictions and switch to alternative sources of supply)

The Western Cape Water System is heavily reliant on the water supplied via the Riviersonderend Berg River Tunnel from the Theewaterskloof Dam. Should the

tunnel close prior to the construction of the Berg River Dam then the storage available will reduce from 769 million m^3 to only 289 million m^3 on the Cape Town side of the tunnel and the sustainable treatment capacity of the City of Cape Town will drop from 1245 to 945 Mℓ/day which will further reduce to 595 Mℓ/day when the Upper Steenbras Dam empties. At present the City supplies about 900-1100 Mℓ/day of treated water during summer and 600-800 Mℓ/day during winter, so that the tunnel cannot be closed for routine maintenance during summer.

Routine closure of the tunnel during winter has to be carefully planned by DWAF consulting all affected parties:
i) Eerste River, Stellenbosch and Helderberg Irrigators and the Stellenbosch Municipality. To meet their needs no portion of the tunnel can currently be closed in summer.
ii) Berg River Irrigators. To meet their needs the Franschhoekberg portion of the tunnel cannot be closed during summer.
iii) City of Cape Town. Ideally the City requires notice during the preceding winter that the tunnel is going to be closed in the following winter. The City must adjust the demands on the dams to ensure that there is adequate storage in those dams supplying water while the water in Theewaterskloof Dam is unavailable. The City must also schedule the routine closure of WTW for maintenance around the tunnel closure to ensure that there is sufficient water treatment capacity.

The need to store additional water in dams whose supply will not be affected by the tunnel closure can increase the risk of these dams spilling if high inflows are experienced while Theewaterskloof Dam is fairly empty, though this is mitigated by the large withdrawal capacity from some dams, particularly the Upper Steenbras Dam. If the Lower Steenbras Dam is maintained at 30% of its Full Supply Capacity (FSC) during winter then it can impound spills from the Upper Steenbras Dam.

The Berg Water Project presents an opportunity to improve the resilience of the system by:

- Increasing the storage on the Cape Town side of the tunnel. To be accessible even if the Jonkershoek and Stellenboschberg components of the tunnels failed (as opposed to the Franschhoekberg component) then this storage would have to be linked directly to the existing Wemmershoek WTW or a new WTW, as discussed below. The Berg River Irrigators can be supplied directly from the proposed Berg River Dam so that if there is sufficient water in storage they will be unaffected by the tunnel closure.
- Increasing the Water Treatment capacity independent of the tunnel. If additional schemes such as the proposed Table Mountain Group Aquifer Project (TMG) and the transfer from the Breede River augment the water supply to the Theewaterskloof and Berg River Dam then new WTW would be necessary for the additional water. This WTW could be supplied from the Berg River Dam rather than direct from the tunnel so that in the event of the tunnel failing, water could be supplied from this dam's storage.
- Providing vehicular access to the Franschhoekberg tunnel to facilitate maintenance and repairs. At present the only vehicular access to the tunnel is at Charmaine on the Theewaterskloof Dam side of the tunnel. This system is inadequate for emergency situations because access to the rest of the tunnel is blocked by a 1,5 metre deep pool of water that must first be drained by placing submersible pumps in the pool under hazardous conditions.
- Upgrading the inlet shafts at Banhoek and Wolwekloof to reduce the volume of sediment admitted.

The Berg River Dam will however not help the Eerste River, Stellenbosch and Helderberg Irrigators, if the Jonkershoekberg or Stellenboschberg portions of the tunnel fail.

H.2. OPERATION OF INDIVIDUAL DAMS

Within the broad operating framework of the integrated system it is still necessary to take the operating requirements of the individual dams into account.

H.2.1 Steenbras Dams (including the transfer from the Palmiet River) (Annexure A Figure A2)

H.2.1.1 Inflows

The Steenbras Dams impound water from the Steenbras River and accepts transfers from the adjacent Palmiet River.

H.2.1.2 Consumers

The Steenbras Dams and the Palmiet Transfer Scheme supply water to the City of Cape Town via the Steenbras Water Treatment Works and the Faure Water Treatment Works.

H.2.1.3 Palmiet Transfer

Surplus water is transferred from the Kogelberg Dam on the Palmiet River to the Rockview Dam (the main components of the Palmiet Government Water Scheme) using the spare capacity in Eskom's Pumped Storage Hydropower Scheme. The Palmiet Pumped Storage Scheme is operated on a weekly cycle, with some 16,5 million m^3 being withdrawn from Kogelberg Dam over weekends and stored in Rockview Dam for release during the following week. An additional 3 million m^3 can also be stored in Rockview Dam for release to the Upper Steenbras Dam. The pumping hours of the Pumped Storage Scheme may be extended to deliver up to 3 million m^3 or more, of additional water per week from Kogelberg Dam into Rockview Dam, subject to agreement between DWAF, Eskom and the City.

The Lower Palmiet River forms part of the Kogelberg Biosphere Reserve and the transfers to the Steenbras Dams can only take place once the in-stream flow requirements of the river are satisfied. A weir at Campanula, downstream of the Kogelberg Dam, is used to check whether the river flows meet the environmental requirements. Currently, the following operating rules are used to control the transfer:

- Arieskraal Dam is situated immediately downstream of Kogelberg Dam and has an outlet capacity of only 2 m^3/s. As Arieskraal is always drawn down at the end of summer, the first winter inflows into Kogelberg Dam are released to fill Arieskraal Dam. Thereafter, environmental releases of up to 15 m^3/s can be made from Kogelberg Dam to supply the environmental flow requirements at Campanula, as these releases spill over Arieskraal Dam with little attenuation
- Releases are then made from the Kogelberg Dam to supplement the (observed) flows at the Campanula weir which are provided by natural runoff from the Klein Palmiet River and the Krom River, while surplus water accumulates in the Kogelberg or Rockview Dams. If the flow at Campanula is less than 4.3m^3/s then up to 58% of the inflow into Kogelberg Dam is released.
- The above operating rule needs to be checked by monitoring the effect on the environment.
- The operation of the Palmiet Pumped Storage Scheme requires 16.5 million m^3 of storage. If too much water is stored in the Kogelberg Dam, then there is a risk that the 156 m^3/s discharged through the turbines of the Pumped Storage Scheme will cause spills downstream of Kogelberg Dam. ESKOM is responsible

for the management of the Kogelberg Dam and prefers that the additional volume stored for release to the Upper Steenbras Dam does not exceed 3 million m^3.

- If the environmental flow requirements at Campanula are met and the volume of water stored in the Kogelberg and Rockview Dams exceeds the 16,5 million m^3 required by the Pumped Storage Scheme and this water can be transferred to the Upper Steenbras Dam without an unacceptable risk of the Western Cape Water System dams spilling, then DWAF, the City of Cape Town and ESKOM may arrange to release the additional water from Rockview Dam into the canal to the Upper Steenbras Dam at a rate of up to 12m^3/s.
- At the end of winter 3 million m^3 of water may be stored in Rockview Dam and released later into the Upper Steenbras Dam when spare capacity becomes available.
- Transfers from the Palmiet River could vary from 10 to 40 million m^3/annum and on average increase the yield of the Western Cape System by 22,5 million m^3/annum.

H.2.1.4 Upper Steenbras Dam

The Upper Steenbras Dam can supply up to 300Ml/day to the Faure Water Treatment Works (capacity 500 Mℓ/day) via the City of Cape Town's Pumped Storage Scheme and the Firlands pumpstation. This dam should be kept as full as possible (while avoiding spillage) so that it can supply the City of Cape Town should the tunnel from Theewaterskloof Dam to Kleinplaas Dam and the Stellenboschberg Tunnel outlet be shut down for maintenance or by some unforeseen disaster. However, in order to maximize the potential transfers from the Palmiet River, the Upper Steenbras Dam is drawn down to RL360 by the end of summer (about 30% of Full Supply Capacity FSC). The storage should preferably not drop below RL360, as this would hamper the operation of the City of Cape Town's Steenbras Pumped Storage Scheme. The water between RL360 and RL355 could potentially be used during periods of extreme drought.

During the winter, water from the Upper Steenbras Dam usually spills into the Lower Steenbras Dam in order to fill the Lower Steenbras. The Upper Steenbras Dam, the Lower Steenbras Dam and transfers from the Palmiet River are operated in such a way as to minimise spillage from the Lower Steenbras Dam. During the summer months water could be released from the Upper Dam into the Lower Dam to supplement the supply from the Lower Dam.

H.2.1.5 Lower Steenbras Dam

The Lower Steenbras Dam provides water to the 150 Mℓ/day Steenbras Water Treatment Works which is the main supply to some of the higher lying suburbs of Cape Town. This dam is drawn down preferentially during summer to a level of about 342 m (about 60% FSC), the minimum level required to operate the turbine which supplies power to the Steenbras Water Treatment Works (SWTW) and still supply the peak summer demand of 150 Mℓ/day. If the level drops to 30% FSC then the supply from the SWTW drops to 130 Mℓ/day. Releases into Lower Steenbras Dam are made from the Upper Dam during the later summer months, if required.

The combined yield of the Upper and Lower Steenbras Dams from their catchment area is about 40 million m^3/annum, and about 62,5 million m^3/annum including the Palmiet transfers. The Steenbras Water Treatment Works treats about 30 million m^3/annum from the Lower Steenbras Dam and the Faure Water Treatment Works about 32,5 million m^3/annum from Upper Steenbras Dam, but the latter also treats water from the Theewaterskloof and Kleinplaas Dams.

H.2.2 Wemmershoek Dam (Annexure A Figure A3)

H.2.2.1 Inflows

Wemmershoek Dam impounds the Wemmershoek River.

H.2.2.2 Consumers

- **City of Cape Town:** Wemmershoek Dam supplies the City of Cape Town's 270 Mℓ/day Water Treatment Works at the dam with about 54 million m^3/a of which 38 million m^3/a is supplied to Cape town via the City's Wemmershoek Pipelines.
- **Paarl and Wellington:** About 16 million m^3/a of the water treated at the Wemmershoek Water Treatment Works is supplied via the offtake pipeline from the Wemmershoek Pipeline to Paarl and Wellington (Drakenstein Municipality).
- **Compensation:** A small volume is abstracted from the potable water Wemmershoek Pipeline as compensation to downstream farmers (3 million m^3/a).

H.2.3 Voëlvlei Dam (Annexure A Figure A4)

H.2.3.1 Inflows

The Voëlvlei Dam is an off channel dam supplied during the winter months (April to September) by diversions from the Klein Berg River into the Klein Berg Canal and from both the Twenty Four Rivers and the Leeu River into the Twenty Four Rivers Canal. During the summer months, releases are made from Voëlvlei Dam to supply consumers along the Lower Berg River, however during winter these consumers mainly abstract water from the unregulated flow in the Berg River.

At the start of the winter the quality of the water from the Klein Berg River is poor and may contribute to the algal blooms in Voëlvlei Dam. The reasons for these algal blooms are being investigated, as is the proposal that the early winter flows should not be diverted into Voëlvlei Dam.

H.2.3.2 Consumers

Voëlvlei supplies some consumers directly from the dam while others are supplied via releases made into the Berg River. The Misverstand Dam, located downstream of Voëlvlei Dam, helps to regulate abstractions from the Berg River.

Direct Supply: The following consumers are supplied from Voëlvlei Dam:

- West Coast District Municipality (currently 5 million m^3/a via Swartland Water Treatment Works)
- City of Cape Town (allocation of 70,4 million m^3/a via their own Water Treatment Works. Historically CCT supplied 4 million m^3/a of their allocation to the Armscor site at Krantzkop, though this is not operational at present.)

Supply via Berg River: The following consumers abstract releases made into the Berg River:

- West Coast District Municipality (currently about 14 million m^3/a via abstractions at Misverstand Dam to the Withoogte Water Treatment Works)
- Lower Berg River Irrigators (currently 18,1 million m^3/a via releases from Misverstand Dam)

- Berg River Estuary. In future additional environmental releases may be required to meet the reserve requirements of the Berg River Estuary.

The inlet works of the Withoogte Water Treatment Works have been modified to eliminate cavitation of the pumps when Misverstand Dam is below FSL. Misverstand can now be maintained at about 300 mm below FSL and farmers downstream of Misverstand now receive releases rather than uncontrolled spills. The releases from Misverstand will need to be measured to differentiate between the supply to irrigation and to the environment. Plans are in place to construct a low flow gauging weir below the Dam and to improve the outlet works.

Supply to Irrigators from Twenty Four Rivers Canal: The 24 Rivers Canal also supplies approximately 20 million m^3/a to irrigators.

H.2.4 Theewaterskloof and Kleinplaas Dams (Annexure A Figures 5 and 6)

H.2.4.1 Inflows

The Theewaterskloof Dam impounds water from the Riviersonderend River while the much smaller Kleinplaas Dam helps balance releases from the tunnel and diverts waters from the Jonkershoek River to the City of Cape Town. During the winter months (April to September) water from the Banhoek and Wolwekloof Rivers, which are tributaries of the Berg River, is diverted down vertical shafts into the Riviersonderend Berg River Tunnel from where it can flow under gravity to either the Theewaterskloof Dam or the Kleinplaas Dam.

H.2.4.2 Consumers

The Theewaterskloof Dam supplies consumers in its own catchment as well as consumers in the catchments of the Berg and Eerste Rivers and the City of Cape Town.

Own Catchment: The following consumers are currently supplied from the Theewaterskloof Dam:

- Direct abstractors. Vyeboom Irrigation Board (currently 13,2 million m^3/a), other smaller irrigators who pump directly from the dam (currently 1,5 million m^3/a is measured though considerably more water could be supplied) and sports clubs. Irrigation Boards should ensure that all pumps have meters that are calibrated every 5 years.
- Riviersonderend Irrigation Board (currently 30,8 million m^3/a) and the Ruênsveld East and West stockwatering and urban water supply schemes of Overberg water are supplied by releases into the river downstream of the dam.

Berg River: The following consumers are currently supplied at the Berg River siphon.

- Berg River Irrigators (currently 48,6 million m^3/annum via Summer releases into the river to augment the natural flow in the river of about 16,5 million m^3/a at the Berg River Dam site)
- The City of Cape Town (via a pipeline to the Wemmershoek Water Treatment Works) (varies from 0 to 23 million m^3/a)
- Dewdale trout farm (via releases into the river at the Berg River Siphon)

The releases at the Berg River siphon are adjusted in response to the demands of irrigators so as to maintain a minimum summer flow of about 0,5 m^3/s at Sonquasdrift.

In future, the Berg River Dam will inundate Dewdale Trout Farm and the Berg River Irrigators will be supplied by releases from the Berg River Dam (Annexure A Figure A6).

The Banhoek Irrigation Board pumps water from the tunnel at the Banhoek shaft (currently 1,8 million m^3/a).

Eerste River: In the Eerste River, Kleinplaas Dam is used to supply:

- City of Cape Town (via the Stellenboschberg Tunnel and the pipeline to the 500 Mℓ/day Faure and 400 Mℓ/day Blackheath Water Treatment Works) (currently 118 million m^3/a)
- Helderberg Irrigation Board (currently 7,8 million m^3/a)
- Stellenbosch Irrigation Board (currently 9,7 million m^3/a)
- Riparian farmers around Stellenbosch and the Lower Eerste River Irrigation Board and a fish farm (via releases into the river) (2,8 million m^3/a)
- Stellenbosch Municipality via the Municipality's Paradyskloof Water Treatment Works served from the outlet of Stellenboschberg Tunnel and via their diversion from upstream of Kleinplaas Dam and their Idas Valley Dams (3 million m^3/a)

The Kleinplaas Dam receives unregulated inflow from the Eerste River. This water is used before the water is abstracted from the Riviersonderend Berg River Tunnel from Theewaterskloof Dam. However, if this unregulated inflow is insufficient to meet the demand and the water level drops to 0,8 m below the full supply level (FSL) of Kleinplaas Dam then releases are automatically made from the tunnel by three needle valves. If the water level drops to 6m below FSL sediment will be withdrawn into the Stellenboschberg Tunnel and may affect the City of Cape Town's water treatment works at Blackheath and Faure. In winter, as the dam is not filled to its FSL small floods in the Eerste River can be impounded.

When the releases from the Riviersonderend Berg River Tunnel into Kleinplaas Dam are smaller than the inflows at the Banhoek and Wolwekloof inlet shafts some of this water flows into the Theewaterskloof Dam.

H.2.5 Proposed Berg Water Project (Comprising the Dam at Skuifraam and the Berg River Supplement Scheme at Bien Donne) (Annexure A Figure A6)

H.2.5.1 Inflow

The proposed Berg River Dam will impound runoff from the Upper Berg River as well as water abstracted and pumped by the Berg River Supplement Scheme at Bien Donne. At Wolwekloof, upstream of the Berg River Dam, winter flows (April to September) will normally be diverted into the Riviersonderend Berg River Tunnel before reaching the Dam.

H.2.5.2 Consumers

The System Usage of water from the Berg River Dam will require that spillage be minimised by pumping from the Dam into the Riviersonderend Berg River Tunnel system via the Dasbos Branch Tunnel. Pumping will take place in accordance with the needs of the integrated system so as to minimise spillages and in accordance with the more detailed operating considerations described in H.2.5.3 below.

The proposed Berg Water Project will supply:

- **Upper Berg River Irrigators** using the multilevel release structure and the Supplement Scheme pipeline to ensure that the flow in the river below the dam is

reduced as far as possible to comply with the Environmental Instream Flow Requirements. The volume released during summer will replace the current releases at the Berg River siphon (currently 48,6 million m^3/a) and will include an allowance of about 16.5 million m^3 for the natural flow in the river that would otherwise be impounded by the dam. To minimize wastage, DWAF monitors the summer flows in the river and adjusts releases to limit the streamflow past Sonquasdrift (the last point on the river that will normally be supplied by the Berg River Dam) to 0.5 m^3/s. This baseflow is a provisional volume for the environment, prior to the Berg River Reserve being finalized and is not lost to the system as West Coast District Municipality can abstract the water, if desired, when it reaches Misverstand Dam, with the balance being available for irrigators or the environmental requirements of the estuary. The multilevel outlet should be used to make the releases to ensure that the temperature and oxygen levels of the released water match that of the inflow, which means that these properties need to be monitored at the multilevel intake points.

- **The Instream Flow Requirements (IFRs):** The IFRs immediately downstream of the Berg River Dam and at the Supplement Site have been defined and are provided in Tables H3 and H4 below. The releases from the dam will comprise low flow releases (from the proposed multi-level release structure) as well as freshet and flood releases (of approximately 65 m^3/s and 160 m^3/s respectively – though flood releases will vary annually and releases of up to 200m^3/s are feasible), -, the former from the proposed multi-level release structure, and the latter from this structure and the gate with invert located 15 m below full supply level. The releases for the environmental low flows should not be constant but should vary like the natural flows to accommodate ecosystems requiring different durations of inundation.

Table H3: Recommended Environmental Flow Releases from the Berg River Dam (Damage Control Scenario)

MONTH	AVERAGE YEAR					DROUGHT YEAR				
	LOW FLOW		HIGH FLOW			LOW FLOW		HIGH FLOW		
	m^3/s	$M^3 \times 10^6$	M^3/s	$m^3 \times 10^6$	Days	m^3/s	$m^3 \times 10^6$	m^3/s	$m^3 \times 10^6$	Days
October	0,8	2,14				0,5	1,34	0,8	0,07	1
November	0,5	1,30	4,5	0,5	1	0,3	0,78			
December	0,4	1,07	4,5	0,5	1	0,16	0,43			
January	0,3	0,80				0,16	0,43	0,3	0,03	1
February	0,3	0,73				0,16	0,39			
March	0,3	0,80				0,16	0,43			
April	0,5	1,30	5,0	0,8	5	0,30	0,78			
May	1,0	2,68				0,50	1,34			
June	1,6	4,15	30,0[1]	4,5	7	0,80	2,07	15	3,0	7
July	1,6	4,29	65,0[1]	9,8	7	0,80	2,14			
August	1,6	4,29				1,0	2,68			
September	1,2	3,11				1,0	2,59			
TOTAL		26,66		16,1			15,40		3,10	
	42,8 x 10^6 m^3					18,5 x 10^6 m^3				

Note 1: The floods indicated for June and July above would have instantaneous flood peaks of 65 m^3/s and 160 m^3/s respectively.

The baseflow requirements at the Berg River Supplement Site ensure that water is only transferred to the dam if the required baseflow is supplied on average downstream of the site.

Table H4 : Recommended Average Baseflow Requirements in m^3/s at the Berg River Supplement Site (Modified Drought Scenario)

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1.54	0.61	0.46	0.46	0.46	0.46	1.00	2.00	2.86	2.86	2.86	2.86

- **City of Cape Town:** The City of Cape Town will continue to withdraw water from Theewaterskloof Dam, via the Theewaterskloof Tunnel system, at the Stellenboschberg Tunnel Outlet and possibly in the future also at the Dasbos

Tunnel Outlet, if a new water treatment works is constructed in this vicinity. It is currently envisaged that no water will be abstracted directly from the Berg River Dam by the City.

H.2.5.3 More Detailed Operating Considerations for Berg River Dam

(a) Introduction

The operation of the Berg River Dam is complicated by the need to ensure that there is sufficient water in storage at the end of July to make an environmental flood release from its high level gate, whose invert level is situated 15m below the FSL. This increased storage level in the Berg River Dam increases the likelihood of spillage in September and October, towards the end of the wet winter period. However, the level of the gate has been selected to reduce the probability of unnecessary spillage and the need to keep additional water in the dam may be advantageous if the Franschhoekberg tunnel closes. This section presents an operating rule for the Berg River Dam which was devised for a transfer capacity of 2 m^3/s from the Berg River Dam to the Theewaterskloof Dam. It was subsequently decided to provide pumps with an initial capacity of 3 m^3/s with provision for increasing this to 6 m^3/s. The operation described below is for pumping capacity of 2 m^3/s, but will be similar for the transfer capacity of 3 m^3/s or even 6 m^3/s, however the increased transfer capacity will help to reduce the probability of spillage.

(b) Berg River Dam

The Berg River Dam is linked to the Theewaterskloof Dam via the Riviersonderend – Berg River tunnel system. Water can be transferred between the two dams in either direction. The Theewaterskloof Dam is the larger storage unit and has a storage volume of almost three times its natural MAR. A substantial proportion of the Theewaterskloof storage serves to supply the demands on the system during serious droughts when the other dams are heavily drawn down. During the wet winter months there will usually be a net transfer of water from the Berg River Dam into the tunnel system (from whence the water can either be supplied to the City's WTWs at Faure/Blackheath or saved in Theewaterskloof Dam. Otherwise the Berg River Dam would tend to spill towards the end of the wet season. However, there is also a requirement to maintain water levels in the Berg River Dam sufficiently high in the early to mid-winter months to facilitate the release of a substantial environmental flood by the end of August each year through an upper outlet. An operating rule has been devised to facilitate this process. This dictates that the volumes stored in each dam in a particular month should be related. The volumes can be adjusted by transferring water between the two dams, or by changing the relative volumes abstracted by the City from the two dams. Once the environmental flood has been released water would then be pumped from the Berg River Dam to the tunnel to create more storage space in the Berg River Dam to catch the late winter inflows.

(c) Berg River Supplement Scheme

The Berg River Supplement Scheme comprises a low weir on the Berg River to enable water to be diverted into an excavated balancing basin, the pump station and a delivery pipeline that discharges into the Berg River Dam. The water can then be pumped from the dam by the Berg River Dam Pump Station into the Riviersonderend Berg River Tunnel system at the Dasbos Tunnel entrance. The length of the Berg River Supplement Scheme pipeline is 8,7 km and the maximum pumping head at design flow is 130 m. The capacity of the system, 4 m^3/s, provides an incremental firm yield of 25 million m^3/annum, however, up to 50 million m^3/annum could be delivered into the Berg River Dam.

The Berg River Supplement Scheme (Berg River Supplement Scheme Weir and Pumping Station) will operate in the winter months from May to October and will pump water into the Berg River Dam whenever there is sufficient flow in the river in

excess of the Reserve requirements (see Table H4), unless the Berg River Dam is likely to spill.

(d) Outlet Sizes

According to Table H3 the maximum flood release would be a flood with a peak of 160 m^3/s in July, whose magnitude is exceeded annually for 50% of the years of record (median value). A workshop was held in December 2001 to debate the need for such a high peak flow. It was concluded that a high flood peak of 160m^3/s was acceptable on average but that provision should be made in the design of the outlets for even higher releases because it was undesirable to release the same sized flood year after year. The design of the outlets should cater for some variability. It was also decided that it would be acceptable to defer the major release to the end of August, if necessary.

As currently designed the dam will have a multilevel outlet controlled by a sleeve valve with a capacity of 65 m^3/s at FSL of RL250 as well as a high level gate with the gate sill at RL235, 15 metres below FSL. The high level gate will be a submerged sluice gate about 5 metres high. The two outlets when operated in conjunction must release 200 m^3/s when the water level is 5 metres above the gate sill (RL240). When the water is at FSL, the two outlets must be capable of releasing 300 m^3/s. Although environmental flood releases of this magnitude are unlikely to be required, the opportunity exists to release floods in excess of 200 m^3/s if future monitoring of the ecosystem downstream of the dam indicates that this is required.

Water could be transferred from Theewaterskloof Dam into the Berg River Dam during dry years but transfer would have to commence sufficiently early in winter because of the limited release capacity. The capacity of the release valve at the Berg River Siphon is 6.6m^3/s and it may be possible to also make releases using the pipework from the Dasbos tunnel to the Berg River Dam.

To facilitate the use of the high level gate with its sill at RL 235 (15 m below FSL) it will be necessary to ensure sufficiently high water levels in the Berg River Dam in July and August.

(e) Operating Periods

Preliminary rules for operating the Berg River Dam and the Theewaterskloof Dam are described using a number of different zones that are illustrated in Figures H1 and H2. These zones control the transfer between the two dams through the following periods:

- The summer drawdown period (October to April);
- The early and mid winter period – preparing for the environmental flood releases from the Berg River Dam (May to July), and
- The late winter period – minimising the spillage over the Berg River Dam (August and September).

(f) Probability of Making IFR Release/Spilling

The following are illustrated in Figures H1 and H2 assuming that the demands of the Berg River Irrigators during the summer are provided by the Berg River Dam and that the balance is transferred into Theewaterskloof Dam

- The three green lines in Figure H1 show the reservoir storage trajectories in the Berg River Dam that would be followed during lowish inflow periods, (namely a median inflow year, a 1 in 4 drought year and a 1 in 10 drought year), in order for the reservoir water level to rise to RL 240 m (storage capacity 78 million m^3) by the end of July. At that level the high level gate, with its invert level at

RL 235, could make an environmental flood release of up to 160 m^3/s (see Table H3).

- Similarly, the blue lines in Figures H1 and H2 show the storage trajectories in the Berg River and Theewaterskloof Dams that would be followed in high inflow years (for probabilities of spilling of 1 in 2 years, 1 in 4 years and 1 in 10 years), in order for the dam to just fill by the end of November. These trajectories assume that no transfers are made between the Berg River Dam and the Theewaterskloof Dam until after the major environmental release in August, when 2 m^3/s was assumed to be abstracted from the Berg River Dam to reduce the risk of spillage.
- The red lines in Figure H1, show the reservoir storage in the Berg River Dam for a 1 in 10 year drought inflow and releases from Theewaterskloof into the Berg River Dam of 6,6 m^3/s and of 18 m^3/s. The 6,6 m^3/s inflow corresponds to the maximum release that the Riviersonderend Berg River Tunnel at the Berg River siphon that can be made with the existing valves. The 18 m^3/s is merely illustrative, 18 m^3/s being less than the approximate capacity of the Franschhoekberg section of the tunnel (34 m^3/s).

(g) Operating Rules

The integrated operation of the Berg River and Theewaterskloof Dams is also illustrated on Figure H1 and H2 and is described below.

- During the summer drawdown period both the proposed Berg River Dam and the Theewaterskloof Dam are drawn down but sufficient water should be left in the Berg River Dam at the end of March so that median inflows will reach the required levels at the end of July without any supplementary releases from the Theewaterskloof Dam. The high level gate would require that the storage be above 41,1 million m^3 (RL230,1) at the end of March (see Figure H1) so that on average natural inflows alone can increase the storage to 78 million m^3 at the end of July enabling environmental flood releases to be made in August. If the storage of the dams in the Western Cape System is relatively full at the end of March then more than 41 million m^3 may be stored in the Berg River Dam if this is necessary to equalize the risk of spillage amongst the dams in the system. On the other hand, if the Western Cape System is drawn down then the need to provide a minimum storage of 41 million m^3 in the Berg River Dam may increase the risk of that dam spilling relative to the other dams in the system.

- In the early and mid winter period the volumes stored in the Berg River Dam and the Theewaterskloof Dam are kept within the green zones in Figures H1 and H2 unless the winter is unusually dry or wet. If natural inflows cause the storage in the Berg River Dam to rise above the green zone then water can be transferred to the Theewaterskloof Dam should there be spare capacity in its green zone or provisions can be made to make the flood release before August. Conversely, if the storage in the Berg River Dam falls below the green zone then water in the green zone of Theewaterskloof Dam must be released into the Berg River Dam at the Berg River Siphon. In addition, the inlet shaft at Wolwekloof could be closed to increase the inflow into the Berg River Dam, though this method is less controlled than releasing water at the siphon. For a high level gate whose sill is at RL235, 15m below FSL (Figure H1) the green zone indicates a less than 1 in 4 chance of spilling.

- After the IFR flood has been released and until the end of November, water will be transferred from the proposed Berg River Dam to the Theewaterskloof Dam to try to minimise the chance of spills at the Berg River Dam. At this stage the inlet shaft at Wolwekloof should be open to reduce the inflow into the Berg River Dam.

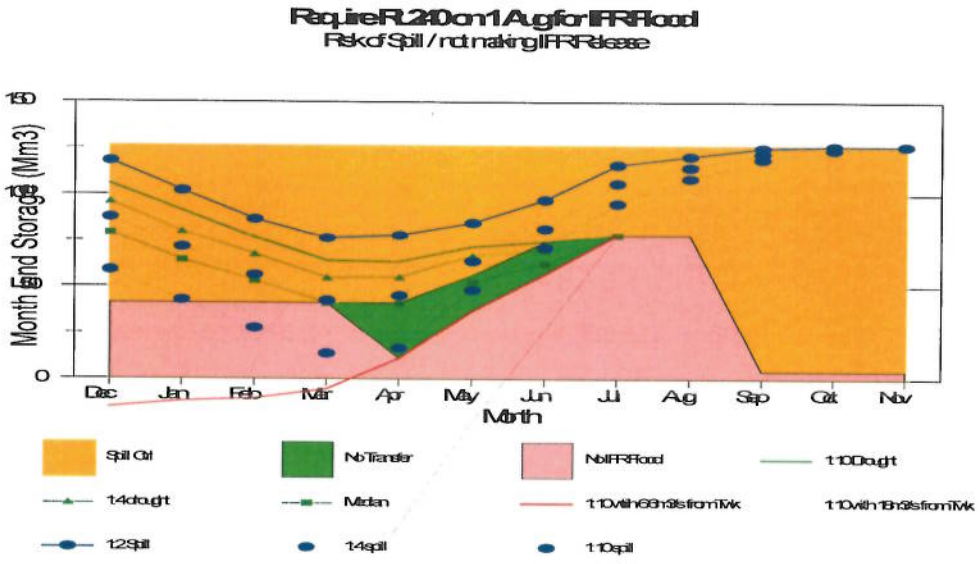


Figure H1: Berg River Dam with Flood Gate Sill at RL235
Risk of Spill / not making IFR Release

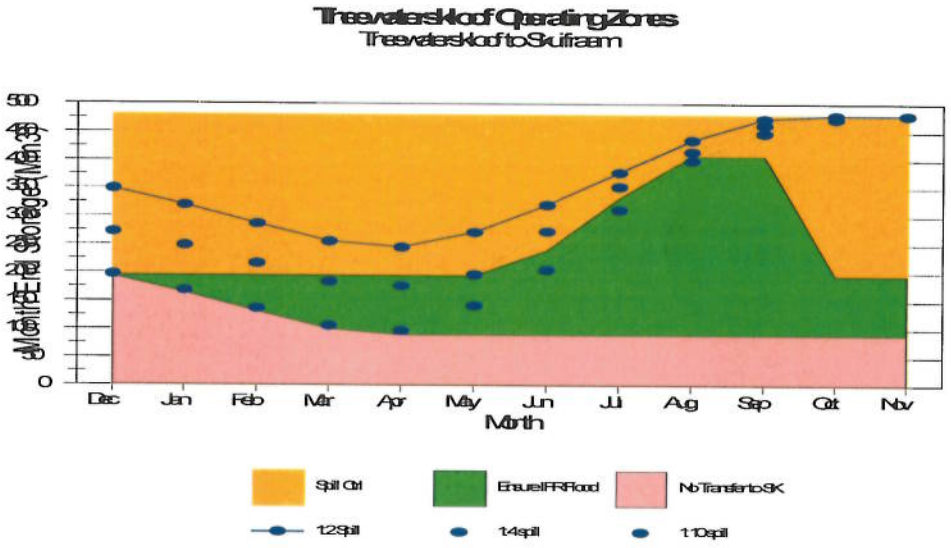


Figure H2: Theewaterskloof Dam

- The release of the major environmental flood should be timed to coincide with a natural event, such as a flood in the adjacent Franschhoek River or in the upstream system, but should not coincide with a release from Wemmershoek Dam, which could result in flooding. This will require monitoring of upstream flows or rainfall. A rapid increase of water levels in the dam itself could possibly also provide a suitable trigger. The exact rule for timing the flood release (and whether additional weirs / instrumentation are required) must still be determined. A suitable flood warning system will have to be put in place to warn the public of the impending flood release. For interest, the flows for the

12 km stretch till the confluence with the Franschhoek River are presented in Table H5.

Table H5 : Flood Release Characteristics

Release Magnitude	Main Channel		Secondary Channel	
	Flow Depth (m)	Velocity (m^3/s)	Flow Depth (m)	Velocity (m^3/s
$160m^3/s$	1,5 to 1,7	1,6 to 1,8	0,65	0,8
$300m^3/s$	2,6 to 2,8	1,6 to 2	unknown	Unknown

- A smaller flood release with a peak of 65 m^3/s is required in June. Water levels will not normally be sufficient to utilise the upper outlet for this and this is why the 65 m^3/s lower outlet has been provided. The release should also be triggered by an upstream flood event. Because of concerns about water quality and temperature, the bottom outlet is linked to a multi-level drawoff arrangement. The selection of the most appropriate drawoff will require the monitoring of water quality and temperature at different depths in the dam.

- The smaller environmental releases, which take place throughout the year, will also be routed through the bottom outlet using the multi-level drawoffs. It should be noted that although Table H3 gives average daily flows for such releases for each month it is not desirable to release a constant flow throughout the month. Some variation, replicating natural conditions, must be introduced.

- In drought years, it is not necessary to release the specified environmental floods in June and July / August. It is thus necessary to establish when one is in a drought situation. This will probably be done by monitoring dam inflows over an extended period (say the previous 6 months) and by assessing whether the environment is robust enough to survive a period of drought. If this long-term inflow falls below a certain limit then the drought IFR regime will apply. Based on the analysis of historical flows at the dam site, the drought IFR regime would apply for about 8 years out of 61 years.

ADDENDUM TO RAW WATER SUPPLY AGREEMENT

made and entered into between:

THE DEPARTMENT OF WATER AFFAIRS AND FORESTRY

("DWAF")

and

THE CITY OF CAPE TOWN

("the City" or "CCT")

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1. **RECORDAL**

1.1 DWAF and the City concluded a Raw Water Supply Agreement on 23 April 2003 ("the Agreement") for the supply of raw water by DWAF to the City from the Berg Water Project ("BWP"), to augment the water supplies of the Western Cape Water System.

1.2 The Agreement makes provision for the payment of the Berg Water Capital Charge ("BWCC"), which is calculated on water sold to the City from Government Water Schemes within the Western Cape Water System. In particular, the Agreement makes provision for the BWCC to be re-negotiated in certain circumstances as set out in 9.2 of Annexure F.

1.3 The parties wish to review the BWCC for a number of reasons *inter alia* the following:

1.3.1 the City's water demand from Government Water Schemes within the Western Cape Water System over the past 4 (four) year period has deviated substantially from that envisaged in 2003;

1.3.2 the base data has changed in that the anticipated construction costs in respect of the BWP have been significantly lower than that originally budgeted for; and

1.3.3 the actual interest rates prevailing over the past 4 (four) year period have been significantly lower than the projected interest rates of 13,5% (thirteen comma five percent) originally provided for in the tariff model.

[redacted]

1.4 The parties have agreed to review the BWCC and to record such amendments to the Agreement as set out in this Addendum.

2. AMENDMENTS TO THE AGREEMENT AND ANNEXURES

Annexure F

2.1 Clause 2.2 of Annexure F is hereby deleted in its entirety and replaced with the following:

"2.2 With effect from 1 April 2009, the BWCC shall be calculated on water sold to CCT from both Government Water Schemes (GWS) within the Western Cape Water System (WCMS) and the CCT's own sources, which are collectively referred to as Total CCT demand (with WDM) in the table under 7.3 below."

2.2 Clause 5.5 of Annexure F is hereby deleted in its entirety and replaced with the following:

"5.5 Based on the above BWCC profile there will be two periods where a constant capital charge in real terms will apply.

In calculating the constant real capital charge, it is assumed that the BWCC will be increased annually by CPIX, i.e. the BWCC will remain constant in real terms. The constant real capital charge is calculated as a single BWCC that will equate the cumulative present value (PV) of project payments to the cumulative present value of income based on the Total CCT Demand for a specific period. The present values are stated in June 2003 terms.

$$\Sigma PV\ Income = BWCC * \Sigma\ Water\ Volume = \Sigma PV\ Payments$$

In the case of the BWCC, the Water Volume is defined as the Total CCT Demand, comprising the sum of the volumes of water sold to CCT from both Government Water Schemes (GWS) within the Western Cape Water System (WCWS) and CCT's Own Sources."

CCT demand from Government Water Schemes
PLUS CCT Own Sources
= Total CCT Demand

2.3 The Table contained under clause 7.3 of Annexure F is hereby deleted in its entirety and replaced with the following:

[redacted]

Financial Year Ending	Total CCT Demand (with WDM) *volume million cubic metre* USED FOR BWCC CALCULATION	CCT Own Sources *volume million cubic metre*	CCT demand less Own Sources* (CCT Demand from GWS) *volume million cubic metre*	Supply from GWS *volume million cubic metre*	CCT Demand from BWP *volume million cubic metre* USED FOR BWMC CALCULATION
Jun-04	321.30	106.80	214.50	210.90	3.60
Jun-05	327.73	106.80	220.93	210.90	10.03
Jun-06	334.28	106.80	227.48	210.90	16.58
Jun-07	340.97	106.80	234.17	210.90	23.27
Jun-08	347.79	106.80	240.99	210.90	30.09
Jun-09	354.74	106.80	247.94	210.90	37.04
Jun-10	361.84	106.80	255.04	210.90	44.14
Jun-11	369.07	106.80	262.27	210.90	51.37
Jun-12	376.45	106.80	269.65	210.90	58.75
Jun-13	383.98	106.80	277.18	210.90	66.28
Jun-14	391.66	106.80	284.86	210.90	73.96
Jun-15	399.50	106.80	292.00	210.90	81.00
Jun-16	407.49	106.80	292.00	210.90	81.00
Jun-17	415.64	106.80	292.00	210.90	81.00
Jun-18	423.95	106.80	292.00	210.90	81.00
Jun-19	432.43	106.80	292.00	210.90	81.00
Jun-20	441.08	106.80	292.00	210.90	81.00
Jun-21	449.90	106.80	292.00	210.90	81.00
Jun-22	458.90	106.80	292.00	210.90	81.00
Jun-23	468.07	106.80	292.00	210.90	81.00
Jun-24	477.43	106.80	292.00	210.90	81.00
Jun-25	486.98	106.80	292.00	210.90	81.00
Jun-26	496.72	106.80	292.00	210.90	81.00
Jun-27	506.66	106.80	292.00	210.90	81.00

Note: * Further WDM and/or supply augmentation required once the full incremental yield of the BWP has been used.

2.4 Clause 7.4 of Annexure F is deleted in its entirety and replaced with the following:

"7.4 The constant capital charge in real terms approach is applied and the water volume on which this calculation is based is the Total CCT Demand as set out in the Table under 7.3 above."

2.5 Appendix F1

The Table appearing under Note 1 dealing with "Demand curve used for calculation" which is used in the example to calculate the BWCC, will be deleted in its entirety and replaced with the following:

CCT demand from Government Water Schemes
PLUS CCT Own Sources
= Total CCT Demand

[redacted]

3. **GENERAL**

Save as set out above, the remainder of the Agreement and the Annexures thereto, remain unaltered and of full force and effect.

THE PARTIES HEREUNDER WARRANT THEIR AUTHORITY TO SO SIGN

THUS DONE AND SIGNED AT Bellville ON THE 7 DAY OF March 2008/9

WITNESSES:

1. [redacted]

2. [redacted]

[redacted]

TER AFFAIRS

NAME: RASHID KHAN

CAPACITY: CHIEF DIRECTOR : WESTERN CAPE

THUS DONE AND SIGNED AT CAPE TOWN ON THE 14th DAY OF NOVEMBER 2008

WITNESSES:

[redacted]

[redacted]

THE CITY OF CAPE TOWN

NAME: BULELWA VUYANI MSENGANA

CAPACITY: EXECUTIVE DIRECTOR : UTILITY SERVICES

[redacted]