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Evaluation of municipal water demand and related parameters

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2008-08-20T10:15:38Z
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APPENDIX B

Mean Annual Precipitation and Mean Annual Evaporation Measurement Stations and Data Used

Mean Annual Precipitation

Municipality	Suburb	StationNo	StationName	MAP	Period
AlbertonEkurhuleni	Alberton	0476163	ROSHERVILLE	740.30	1905 1989
AtteridgevilleTshwane	Atteridgeville	0513227	PRETORIA VOORTREKKERHOOGTE	720.10	1924 1989
BeaufortWest	BeaufortWest	0092141	BEAUFORT WEST TNK	234.50	1920 1963
BenoniEkurhuleni	Benoni	0476398	JOHANNESBURG INTERNATIONAL	723.30	1959 1980
Bergriver	Aurora	0061766	DROMMELVLEI	311.7	1978 1989
Bergriver	Bergriver	0061594	KERSEFONTEIN	263.4	1920 1949
Bergriver	Dwarskersbos	0060620	CAPE COLUMBINE	237.5	1959 1985
Bergriver	Eendekuil	0062671	EENDEKUIL POL	292.1	1967 1989
Bergriver	Laaiplek	0060620	CAPE COLUMBINE	237.5	1959 1985
Bergriver	Piketberg	0062444	PIKETBERG POL	446.2	1920 1989
Bergriver	Redelinghuys	0084059	REDELINGHUYS POL	260.7	1936 1989
Bergriver	Velddrif	0060620	CAPE COLUMBINE	237.5	1959 1985
Blaauwberg	Blaauwberg /Milnerton /Altlantis /Mamre	0020764	MELKBOSSTRAND	343.2	1971 1985
BoksburgEkurhuleni	Boksburg	0476398	JOHANNESBURG INTERNATIONAL	723.30	1959 1980
BrakpanEkurhuleni	Brakpan	0476736	Springs RWB	658.70	1909 1968
BreedeRiver	Bonnievale	0024146	BONNIEVALE SKL	266.30	1925 1982
BreedeRiver	Roberston	0023678	ROBERTSON	299.90	1920 1985
BreedeRiver	Montagu	0024197	MONTAGU POL	314.60	1920 1989
BreedeRiver	BreedeRiver	0023678	ROBERTSON	299.90	1920 1985
BreedeRiver	Ashton	0024110	ASHTON POL	316.20	1962 1989
BreedeRiver	McGregor	0023678	ROBERTSON	299.90	1920 1985
BreedeValley	Worcester	0022759	WORCESTER TNK	252.80	1920 1989
BuffaloCity	EastLondon	0080629	AMALINDA	813.6	1917 1986
BuffaloCity	BeaconBay	0080629	AMALINDA	813.6	1917 1986
BuffaloCity	Berlin	0080143	BERLIN SAR	697.1	1913 1983
BuffaloCity	Bebelele	0080355	FORT JACKSON	661.7	1882 1989
BuffaloCity	Gonubie	0080569	UMZONIANA RSV	838.3	1919 1989
BuffaloCity	KiddsBeach	0080569	UMZONIANA RSV	838.3	1919 1989
BuffaloCity	Potsdam	0080143	BERLIN SAR	697.1	1913 1983
BuffaloCity	Mdantsane	0080143	BERLIN SAR	697.1	1913 1983
BuffaloCity	KingsWilliamTown	0080355	FORT JACKSON POL	661.7	1882 1989
BuffaloCity	Bisho	0080355	FORT JACKSON	661.7	1882 1989
BuffaloCity	ZWELITSHA	0080355	FORT JACKSON	661.7	1882 1989
CapeAgulhas	Bredasdorp	0003032	BREDASDORP POL	447.2	1920 1989

Municipality	Suburb	StationNo	StationName	MAP	Period
CapeAgulhas	Klipdale	0007828	KLIPDALE SAR	345.6	1925 1989
CapeAgulhas	Lagulhas	0002885	ZOETENDALS VLEI	481.4	1974 1989
CapeAgulhas	Napier	0003032	BREDASDORP POL	447.2	1920 1989
CapeAgulhas	Protem	0008136	PROTEM SAR	394.6	1924 1974
CapeAgulhas	Stuisbaai	0003192	DE MOND BOS	405.2	1951 1985
CapeAgulhas	Suiderstrand	0003192	DE MOND BOS	405.2	1951 1985
CapeAgulhas	Waenhuiskrans	0003192	DE MOND BOS	405.2	1951 1985
Cederberg	Citrusdal	0063005	CITRUSDAL	303	1971 1989
Cederberg	Clanwilliam	0084701	CLANWILLIAM	212.1	1920 1989
Cederberg	Elandsbaai	0083515	LAMBERTSBAAI	123.8	1966 1989
Cederberg	Graafwater	0084159	GRAAFWATER	237	1924 1989
Cederberg	Lamberts Bay	0083515	LAMBERTSBAAI	123.8	1966 1989
CenturionTshwane	Centurion	0513382	IRENE	688.00	1916 1989
Drakenstein	Mbekweni	0021824	PAARL TNK	856.90	1978 1989
Drakenstein	Wellington	0021824	PAARL TNK	856.90	1978 1989
Drakenstein	Paarl	0021824	PAARL TNK	856.90	1978 1989
Drakenstein	Hermon	0041713	RIEBEEK KASTEEL	648.90	1937 1982
Drakenstein	Bainskloof	0021824	PAARL TNK	856.90	1978 1989
Drakenstein	Gouda	0042227	TULBAGH POL	468.90	1920 1985
EasternJHB	EasternJHB	0476129	JOHANNESBURG NORWOOD	787.70	1914 1989
George	George	0028838	GEORGE	882.1	1920 1984
George	Wildernis	0028838	GEORGE	882.1	1920 1984
GermistonEkurhuleni	Germiston	0476283A	Germiston Simmer Pan Pow	726.60	1908 1986
Helderberg	GordonsBay	0005545	SOMERSET WEST	576.5	1959 1985
Helderberg	Macassar	0005545	SOMERSET WEST	576.5	1959 1985
Helderberg	SomersetWest	0005545	SOMERSET WEST	576.5	1959 1985
Helderberg	Strand	0005545	SOMERSET WEST	576.5	1959 1985
KemptonEkurhuleni	Kempton	0476398	JOHANNESBURG INTERNATIONAL	723.30	1959 1980
Langeberg	Albertina	0011132	ALBERTINA POL	441.1	1924 1989
Langeberg	Gouritsmond	0011617	DIE EILAND	355.3	1937 1989
Langeberg	Heidelberg	0009815	HEIDELBERG POL	399.6	1920 1988
Langeberg	Jongensfontein	0010742	STILBAAI BOS	424.9	1924 1989
Langeberg	Riversdale	0010456	RIVERSDALE	417	1920 1980
Langeberg	Slangriver	0010456	RIVERSDALE	417	1920 1980
Langeberg	Stilbaai	0010742	STILBAAI BOS	424.9	1924 1989
Langeberg	Theronsville	0010456	RIVERSDALE	417	1920 1980

Municipality	Suburb	StationNo	StationName	MAP	Period
Langeberg	Witsand	0009656	GRASRUG	444.4	1953 1972
LethabongEkurhuleni	Lethabong	0476096	SANDTON	745.20	1971 1989
LethabongJHB	LethabongJHB	0476096	SANDTON	745.20	1971 1989
MamelodiTshwane	Mamelodi	0513643	EERSTEFABRIEKE	694.70	1907 1985
Matzikama	Koekenaap	0106512	KOEKENAAP IRR	109.00	1938 1989
Matzikama	Doringbaai	0106408	DORINGBAAI	189.30	1951 1989
Matzikama	Lutzville	0106512	KOEKENAAP IRR	109.00	1938 1989
Matzikama	Olifantsdrift	0106512	KOEKENAAP IRR	109.00	1938 1989
Matzikama	Papendorp	0106408	DORINGBAAI	189.30	1951 1989
Matzikama	Strandfontein	0106408	DORINGBAAI	189.30	1951 1989
Matzikama	Vanrhynsdorp	0107396	VANRHYNSDORP TNK	149.90	1922 1989
Matzikama	Vredendal	0106880A	VREDENDAL	151.40	1959 1986
Matzikama	Klawer	0107197	KLAWER IRR	159.50	1957 1973
MidrandJHB	MidrandJHB	0513417	OLIFANTSFONTEIN	633.40	1905 1955
MosselBay	Danabaai	0012220	MOSSELBAAI MAG	427.9	1954 1987
MosselBay	GrootBrak	0012393	GREAT BRAK RIVER	506.4	1920 1984
MosselBay	Hartenbos	0012220	MOSSELBAAI MAG	427.9	1954 1987
MosselBay	KleinBrak	0012215	KLEIN BRAK RIVER	466.3	1968 1985
MosselBay	MosselBay	0012220	MOSSELBAAI MAG	427.9	1954 1987
NigelEkurhuleni	Nigel	0476835	Nigel 1	705.70	1905 1977
NorthernJHB	NorthernJHB	0476031	LEEUWKOP	662.90	1951 1989
NPMSSTshwane	Soshanguve/Rosslyn	0513159	HARTBEESHOEK	710.00	1919 1963
OdiTshwane	GARANKUWA/ Odinburg	0513003	HEBRON	553.90	1916 1943
Oostenberg	Kuilsriver/Brackenfell / Blue Downs	0021441	KRAAIFONTEIN BOS	541.6	1924 1978
Oudtshoorn	Oudtshoorn	0028335B	OUDTSHOORN MUN	246.40	1920 1974
Overstrand	Gansbaai	0001517	DANGER POINT	470.1	1925 1976
Overstrand	Hermanus	0006415	HERMANUS	661.2	1935 1969
Overstrand	Stanford	0006836	STANFORD SKL	542.4	1925 1989
PlettenbergBay	PlettenbergBay	0014633	PLETTENBERGBAAI POL	651.5	1922 1989
PretoriaTshwane	Pretoria	0513343	PRETORIA CAPITAL PARK	683.40	1948 1983
Randfontein	Ranfontein	0475370	Randfontein GM	719.30	1904 1986
Saldanha	Jacobsbaai	0040035	LANGEBAAN POL	241.4	241.4
Saldanha	Langebaan	0040035	LANGEBAAN POL	241.4	1920 1989
Saldanha	Saldanha	0060780	SALDANHA POL	341.3	1939 1985
Saldanha	St Helena	0060620	CAPE COLUMBINE	237.5	1959 1985
Saldanha	Vredenburg	0060864	VREDENBURG POL	318.5	1925 1982

Municipality	Suburb	StationNo	StationName	MAP	Period
Sedibeng	Vereeniging	0438743	VILJOENSDRIFT	629.40	1905 1989
Southern1JHB	Southern1JHB	0475477	EldoradoPark	586.90	1929 1974
Southern2JHB	Southern2JHB	0476072	JOHANNESBURG JOUBERT PARK	841.10	1893 1989
SpringsEkurhuleni	Springs	0476736	Springs RWB	658.70	1909 1968
Stellenbosch	Stellenbosch	0005545	SOMERSET WEST DYN	576.50	1959 1985
Swartland	Abbotsdale	0041417	MALMESBURY	456.1	1920 1989
Swartland	Chatsworth	0041417	MALMESBURY	456.1	1920 1989
Swartland	Darling	0041417	MALMESBURY	456.1	1920 1989
Swartland	Ilinge Lethu	0041417	MALMESBURY	456.1	1920 1989
Swartland	Kalbaskraal	0041417	MALMESBURY	456.1	1920 1989
Swartland	Koringberg	0062444	PIKETBERG POL	446.2	1920 1989
Swartland	Malmesbury	0041417	MALMESBURY	456.1	1920 1989
Swartland	Moorreesburg	0041279	MOORREESBURG POL	377.7	1964 1989
Swartland	Riebeek Kasteel	0041713	RIEBEEK KASTEEL MUN	648.9	1937 1982
Swartland	RiebeekWes	0041681	RIEBEEK WES POL	553.5	1969 1989
Swartland	Yzerfontein	0040035	LANGEBAAN	241.4	1920 1989
TembaTshwane	Temba /Hammanskraal	0550475	HAMMANSKRAAL	575.00	1961 1987
Theewaterskloof	BotRiver	0006527	TUSSENBEIDE	490.70	1920 1989
Theewaterskloof	Caledon	0006733	CALEDON POL	522.40	1920 1989
Theewaterskloof	Genadedal	0007062	GENADEDAL COL	622.30	1923 1950
Theewaterskloof	Grabouw	0006192	LEBANON BOS	669.20	1924 1989
Theewaterskloof	Greyton	0007183	GREYTON MUN	511.80	1968 1989
Theewaterskloof	Riviersonderend	0008136	PROTEM	394.60	1924 1974
Theewaterskloof	Tesselaarsdal	0007263	BOSKLOOF	454.40	1934 1989
Theewaterskloof	Villiersdorp	0022539	VILLIERSDORP	611.30	1924 1982
Tygerberg	Belville	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	BLUEDOWNS	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	CapeTown	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	DELFT	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	Durbanville	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	Goodwood	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	Kenridge	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	Khayelitsha	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	Klipheuwel	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	KUILSRIVIER	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
Tygerberg	Milnerton	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981

Municipality	Suburb	StationNo	StationName	MAP	Period
Tygerberg	Parow	0021055	CAPE TOWN MAITLAND CEM	454.3	1920 1981
WesternJHB	WesternJHB	0475669	ROODEPOORT MUN	733.40	1904 1989

Mean Annual Evaporation

Municipality	Suburb	StationNo	StationName	MAE (A Pan)	MAE (S Pan)	Period
AlbertonEkurhuleni	Alberton	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
AtteridgevilleTshwane	Atteridgeville	0513227A2E001	HARTEBEESPOORTDAM	1,842.72	1,684.00	1926 1979
BeaufortWest	BeaufortWest	J2E003	BEAUFORT WEST TNK	2,631.00		1965 1979
BenoniEkurhuleni	Benoni	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
Bergriver	De Keur	E1E003	DE KEUR (KOUE BOKKEVELD)	2053		1967 1979
Bergriver	Langebaan	G1E007	LANGEBAANWEG	2245.0424	2057	1978 1979
Blaauwberg	Blaauwberg /Milnerton /Altlantis /Mamre	G2E003	MOLTENO RESERVOIR CAPE TOWN	1551.5026	1414	1954 1979
BoksburgEkurhuleni	Boksburg	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
BrakpanEkurhuleni	Brakpan	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
BreedeRiver	Roberston	H4E001	ROBERTSON	1,799.00		1954 1979
BreedeValley	Worcester	J1E002	MATROOSBERG	2,186.00		1959 1974
BuffaloCity	EastLondon	R4E001	EAST LONDON	1717		1957 1979
BuffaloCity	NahoonDam	R3E001	NAHOON DAM	1437.171	1308	1967 1979
CapeAgulhas	Bredasdorp	G5E001	BREDASDORP	1751		1964 1979
Cederberg	Citrusdal	E1E002	CITRUSDAL	2690		1965 1979
Cederberg	Clanwilliam	E1E004	CLANWILLIAM DAM	2599		1974 1979
Cederberg	Lamberts Bay	G3E001	LAMBERTS BAY	2131		1954 1972
CenturionTshwane	Centurion	A2E025	IRENE	2,346.00		1978 1979
CrocodileTshwane						
Drakenstein	Bainskloof	G1E003	WEMMERSHOEK DAM	1,673.38	1,527.00	1957 1979
Drakenstein	Gouda	G1E001	WELLINGTON	1,717.61	1,568.00	1949 1979
Drakenstein	Hermon	G1E001	WELLINGTON	1,717.61	1,568.00	1949 1979
Drakenstein	Mbekweni	G1E003	WEMMERSHOEK DAM	1,673.38	1,527.00	1957 1979
Drakenstein	Paarl	G1E003	WEMMERSHOEK DAM	1,673.38	1,527.00	1957 1979
Drakenstein	Wellington	G1E001	WELLINGTON	1,717.61	1,568.00	1949 1979
EasternJHB	EasternJHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
George	George	K3E001	GEORGE AIRPORT	1361		1954 1979
GermistonEkurhuleni	Germiston	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
Helderberg	Steenbrasdam	G4E001	STEENBRASDAM	1553.6598	1416	1957 1979
KemptonEkurhuleni	Kempton	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
Langeberg	Riversdale	H9E001	RIVERSDALE	1551		1963 1979

Municipality	Suburb	StationNo	StationName	MAE (A Pan)	MAE (S Pan)	Period
LethabongEkurhuleni	Lethabong	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
LethabongJHB	LethabongJHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
MamelodiTshwane	Mamelodi	A2E010	PRETORIA	1,755.00		1957 1963
Matzikama	Doringbaai	G3E001	LAMBERTS BAY	2,131.00		1954 1972
Matzikama	Klawer	0107197	VREDENDAL	2,182.00		1958 1979
Matzikama	Koekenaap	0106512	VREDENDAL	2,182.00		1958 1979
Matzikama	Lutzville	0106512	VREDENDAL	2,182.00		1958 1979
Matzikama	Olifantsdrift	0106512	VREDENDAL	2,182.00		1958 1979
Matzikama	Papendorp	G3E001	LAMBERTS BAY	2,131.00		1954 1972
Matzikama	Strandfontein	G3E001	LAMBERTS BAY	2,131.00		1954 1972
Matzikama	Vanrhynsdorp	0107396	VREDENDAL	2,182.00		1958 1979
Matzikama	Vredendal	E3E002	VREDENDAL	2,182.00		1958 1979
MidrandJHB	MidrandJHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
MosselBay	Hartebeeskuildam	K1E001	HARTEBEESKUILDAM	1597.8824	1457	1971 1979
NigelEkurhuleni	Nigel	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
NorthernJHB	NorthernJHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
NPMSSTshwane	Soshanguve/Rosslyn	A2E001	HARTBEESPOORTDAM	1,842.72	1,684.00	1926 1979
OdiTshwane	GARANKUWA/ Odinburg	A2E023	HAMMANSKRAAL GWS	2,177.00		1974 1979
Oostenberg	Kuilsriver/Brackenfell / Blue Downs	G2E007	CAPE TOWN INTERNATIONAL	2004		1957 1979
Oudtshoorn	Oudtshoorn	J3E004	OUDTSHOORN ROOIHEUWEL	2,029.00		1970 1979
Overstrand	Steenbrasdam	G4E001	STEENBRASDAM	1553.6598	1416	1957 1979
PlettenbergBay	PlettenbergBay	K4E001	SWARTVLEI	1590		1977 1979
PretoriaTshwane	Pretoria	A2E010	PRETORIA	1,755.00		1957 1963
Randfontein	Ranfontein	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
Saldanha	Langebaan	G1E007	LANGEBAANWEG	2245.0424	2057	1978 1979
Sedibeng	Vereeniging	C2E001	VAALRIVER BARRAGE	1,564.45	1,426.00	1931 1979
Southern1JHB	Southern1JHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
Southern2JHB	Southern2JHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
SpringsEkurhuleni	Springs	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965
Stellenbosch	Stellenbosch	G2E006	ELSENBURG	1,642.11	1,498.00	1957 1979
Swartland	Voelvleidam	G1E002	VOELVLEIDAM	2566		1952 1979
TembaTshwane	Temba /Hammanskraal	A2E023	HAMMANSKRAAL GWS	2,177.00		1974 1979

Municipality	Suburb	StationNo	StationName	MAE (A Pan)	MAE (S Pan)	Period
Theewaterskloof	BotRiver	G4E002	ELGIN	1,467.00		1965 1979
Theewaterskloof	Caledon	H6E001	THEEWATERSKLOOFDAM	1,859.98	1,700.00	1974 1979
Theewaterskloof	Genadedal	H6E001	THEEWATERSKLOOFDAM	1,859.98	1,700.00	1974 1979
Theewaterskloof	Grabouw	G4E002	ELGIN	1,467.00		1965 1979
Theewaterskloof	Greyton	H6E001	THEEWATERSKLOOFDAM	1,859.98	1,700.00	1974 1979
Theewaterskloof	Riviersonderend	H6E001	THEEWATERSKLOOFDAM	1,859.98	1,700.00	1974 1979
Theewaterskloof	Tesselaarsdal	H6E001	THEEWATERSKLOOFDAM	1,859.98	1,700.00	1974 1979
Theewaterskloof	Villiersdorp	H6E001	THEEWATERSKLOOFDAM	1,859.98	1,700.00	1974 1979
Tygerberg	Cape Town	G2E007	CAPE TOWN INTERNATIONAL	2004		1957 1979
WesternJHB	WesternJHB	A2E009	JOHANNESBURG INTERNATIONAL	2,228.00		1957 1965