Wagga Wagga City Council

Urban Salinity Management Plan 2008- 2013

WAGGA WAGGA CITY COUNCIL

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Contents

1. Introduction and Objectives

In the early 1990's, Wagga Wagga was one of the first urban areas in Australia to recognise the symptoms of urban salinity and to develop management plans to deal with its causes.

Wagga Wagga City Council has developed this Plan in cooperation with government agencies and the community to manage salinity within the Local Government Area.

The *Urban Salinity Management Plan*, (USMP), as a way to provide a coordinated approach to address urban salinity with practical and measurable outcomes.

Much assistance has come from state and federal agencies and funding by way of the Murrumbidgee Catchment Management Authority (MCMA) and its predecessors.

In 2006, as an extension of this approach, Wagga Wagga City Council joined with the MCMA in implementing the *Local Government Urban Salinity Action Project.*

As part of this project, Council has committed to developing and implementing this *Urban Salinity Management Plan* with a focus on Wagga Wagga urban areas.

Vision

"Salinity in urban and village areas causes minimal detrimental impact on the natural environment, economic condition or life style of residents living in the City of Wagga Wagga."

Goal

'To manage the ground water tables and salinity in the Wagga Wagga Local Government Area.'

General *Objectives*

- Ecological Sustainable Development principles are followed in salinity management
- Salinity impacts are managed to a level acceptable to the community and to minimise effects on the natural environment
- Salinity awareness is enhanced and acted on by Council, community and business
- Promote community involvement and awareness in salinity management through volunteer salinity educators, Urban Landcare and educational organisations.

Existing Council Plans and Reports

Wagga Wagga City Council has a range of existing plans and reports that guide Council actions, including management of salinity, ground water and vegetation management.

Salinity reference documents are summarised below.-

Table 1: Existing Council Plans and Reports

Instrument	Relevant Management Actions
Wagga Wagga Draft Natural Resource Management Plan July 1998 and the Urban Salinity Action Plan June 2000	Implement the Urban Salinity Action Plan involving the following major projects • Education • Revegetation • Rear of Block Drainage • Urban Borefield • Monitoring • Evaporation Basin • Leakage from Watersupply pipes • Leakage from Sewer Pipes • Building Controls • Septic Tank Removal
State of the Environment Reports 2003 to 2005	Salinity management is included in the Executive Summary. Options for future Council Action are included under the Land and Water sections of the State of the Environment Report. Main actions include: • Install and monitor further piezometers in newer developments across the City • Continue to develop the Integrated Water Cycle Management Program • Monitor and reduce Wagga Wagga's contribution to the pollutant load in the Murrumbidgee River • Continue with the Landcare Action program involving the community in environmental improvements
Council Management Plan- Wagga Wagga Strategic Plan – ' Towards 2010'	General reference is made to Ecological Sustainable Development, land degradation and natural resource management issues, which include Salinity Management, under the Environment Section of the 5 year Strategic Management Plan. Main actions include: • Ongoing implementation of the Urban Salinity

	Management Plan • Implement education and on-ground works to address water quality, availability and sustainability • Manage land degradation to minimise the impact on the natural and built environment • Improvement and implementation of LEPs and DCPs • Provide support to community groups and individuals in land management projects and on-ground works • Contribute to meet the targets for water quality in the Murrumbidgee Catchment Action Plan
Wagga Wagga Local Environment Plan- 1985 (New LEP due 2007)	• Environmental Protection Zone- The objective is to identify and protect land which is environmentally sensitive. In particular, the protection of land which is susceptible to degradation • No direct reference to salinity or ground water
Wagga Wagga Development Control Plan	• DCP Chapter 29 – Rural Residential Revegetation • Tree management Policy • Future inclusion of Salinity management ' BASIX/ Building requirements
Wagga Wagga Spatial Plan 2007 – (In preparation)	• Actions will meet the Key Challenge of protecting biodiversity and reducing degradation of land and water resources to ensure a healthy environment and maintain economic well-being
Urban Salinity Annual Status Reports (1997- 2006)	• Education program • Revegetation program • Rear of block drainage (rubble pit removal) program • Water reticulation –Pipe Leakage Reduction program • De-watering bores- Calvary Hospital area • Sub –surface drainage and evaporation basin- Showground • Monitoring program

Linking the Urban Salinity Management Plan to Murrumbidgee Catchment targets

The Murrumbidgee Catchment Management Authority has developed a Catchment Action Plan to guide Natural Resources Management in the Murrumbidgee Catchment to 2015. As a partner of the MCMA, Wagga Wagga City Council can align the goals of this Urban Salinity Management Plan with catchment targets.

Accordingly, Council has been eligible for, has previously been successful at and continues to utilise MCMA funding for focused on-ground works associated with salinity management.

The implementation of this USMP and the Urban Salinity Actions links to catchment targets as listed in Table 2.

Table 2. Murrumbidgee Catchment Action Plan Targets Addressed by the Wagga Wagga Urban Salinity Management Plan

Land Management Target : by 2015

Develop in cooperation with Local Government Authorities 10 Urban Salinity Management Plans and partner implementation in 75% of all actions identified within the plans.

Water Management Target : by 2015

Reduce the water quality impacts of urban, industrial and rural residential development within the Murrumbidgee catchment**.**

Community Management Target

Foster partnerships with private landholders, land managers, Landcare and the community to encourage consistent Natural Resource Management practices.

2. Reference Information

There is a range of existing information that supports this management plan produced by WWCC and government agencies, in particular, by the former NSW Dept of Natural Resources.

Existing and proposed amendments to planning instruments developed by Council and others are referred to in Section 1.

Included below is information to assist in the understanding of the USMP.

In 2006, the MCMA implemented the *Local Government Urban Salinity Action Project.*

As part of this initiative, hydrological investigations of Wagga Wagga urban area and Tarcutta and Humula villages were conducted and technical reports developed.

This information is now available to provide a snapshot of the state of salinity in Wagga Wagga urban areas, including maps and a collation of existing information.

Since 1994, Council has installed over 140 piezometers around Wagga Wagga.

Council is committed to monitor these bores on a monthly basis and to send compiled information to agencies including the MCMA. This collation is a valuable resource and plotting of trends in ground water levels and salinity over time and will continue to assist Council in assessing the success of the USMP implementation.

Main Technical References and Community Education Documents

- Urban Salinity Assessment Report -Wagga Wagga - MCMA , 2007
- Wagga Wagga Urban Salinity – Water Level and Quality Study (1999-2006) (Golder Associates)
- Urban Salinity Resources Kit - WWCC/MCMA 2006 (Contains 10 agency and WWCC Publications)
- Urban Salinity Status Reports – WWCC, !997 to June 2005- June 2006
- Urban Salinity Projects -WWCC and MCMA – 2005 to 2007
- Local Government Salinity Initiative –Urban Salinity series – (12 Technical Publications printed from 2003 to 2007- Dept. Natural Resources)
- Rubble Pit Removal Plans
- Ground Water Management Plans - Riverina Water County Council
- Salt Action Plan 2002-2007
- Urban Salinity Action Plan 2000
- Wagga Wagga Draft Natural Resource Management Plan 1998

- Salinity Docent Program Materials -1997
- Urban Salinity – Council Web site- www.wagga.nsw.gov.au
- Groundwater recharge and discharge in a saline, urban catchment, wagga Wagga , NSW. Cook, P.G et al, CSIRO Land and Water. Technical Report 39/01, 2001.
- Wagga Wagga Urban salinity Soil Survey. Soil salinity Study. Dept.of Land and Water Conservation. Coffey & Partners International P/L AWL5646/1-AE, 1998.
- The Wagga Wagga Urban salinity Study – 'Economic evaluation of options' Socio Economic Assessment Unit, Dept of Land & Water Conservation, 2000.

3. Urban Salinity Management Actions

Current Actions

Wagga Wagga City Council and other groups, agencies and organisations currently implement and are developing a range of actions to manage the causes of salinity in the Wagga Wagga Local Government Area. These are listed below.

In addition, Landcare Action, a joint program initiative of Council and the Wagga Wagga Urban Landcare Group, undertake a number of activities many of which help address salinity.

Substantial funding assistance is being provided by the Murrumbidgee Catchment Management Authority

Area	Detail
1.Monitoring	A network of approx 140 piezometers in Wagga Wagga are monitored monthly and data recorded. Surface water quality in Lake Albert, Wollundry and Flowerdale Lagoons are monitored as required.
2. Education	The Natural Resource Management Facilitator position undertakes education activities, consultations and responds to enquiries on salinity. Interpretation signs, website, brochures, presentations and schools programs are maintained. Salinity Tours are conducted and a docent Education Program undertaken.
3. Structural /	Groundwater pumping from bores (Hardy Ave area), subsurface drainage

Engineering	(Showground), evaporation ponds (Glenfield)
4. Re-vegetation	Planting of trees and/or deep-rooted perennials on recharge areas and salt-tolerant plants on discharge areas
5. Retrofit or upgrade of storm water drainage	Inter allotment drainage, rubble pit removal (80 residential blocks /year)
6. Asset maintenance	Repair of water supply/sewer pipes, public/heritage buildings, roads, etc
7.Development /Planning	New LEP development, salinity inclusion in Development Control Plan and on section 149 certificates
8. Building controls	Concrete specifications, specific damp course requirements, cut and fill policy, BASIX requirements
9. Council Management practices	Reduced watering in recharge areas, modified irrigation practices at parks and playing fields

Measuring Implementation and Effectiveness

Monitoring and reporting of the effectiveness of Council's management of salinity is critical to success.

All formal monitoring results are conveyed to Council, agencies and the community through the Council's State of the Environment Report and the annual Urban Salinity Status Report. This information is also available on the Council Website.

The report by Golder Associates (Wagga Wagga Urban Salinity – Water Level and Quality Study (1999-2006)) also gives a review of water table levels and salinity of ground water from 1999 through to 2006. It shows that there has been a general lowering of water tables in critical areas around the Calvary Hospital area and north of Lake Albert. However, there has been a rise in water tables in the Kooringal area around Henwood Park and Fay Ave and in the south western corner of Glenfield Park, but not to the point where it would affect infrastructure. The improvements would be partly attributable to Council's salinity program and partly to dry seasonal conditions. The areas adversely affected would be due to no programs being carried out in these areas. A further indication of the effectiveness of Council's programs will become apparent when weather conditions return to more normal levels. Reports similar to this should be procured on a 5-7 year basis.

In regard to borefield pumping data drawn from the annual Salinity Status Reports indicates that the volume of water being pumped is decreasing significantly but that average salinity of the water is gradually increasing.
On this basis, special emphasis should be placed on ensuring the actions in the plan are applied diligently to the Kooringal area, particularly in the Henwood Park/Fay Ave area.

Proposed Actions/ Programs

Action 1- Revegetation Program - Revegetate recharge and discharge areas of urban Wagga Wagga	
Summary Revegetation with native plants of salinity recharge/discharge areas. These are identified by GIS mapping, Council's (Draft) Natural Resource Management Plan, Dept of Natural Resources, Murrumbidgee Catchment Management Authority and Council Asset Management section . The program endeavours to lower water tables and reduce ground water recharge. The objective is to revegetate 20 ha annually. However, this is becoming more difficult as large areas available for plantings are becoming difficult to find. It is intended to change the emphasis towards reviewing existing vegetation and ensuring that this remains healthy.	
Lead section and staff responsible	Asset Services and Natural Environment, - Strategic Asset Planner and NRM Facilitator, Biodiversity Officer, Works Co-ordinator – Parks and Gardens.

	Community Groups
Timing	Autumn to early Spring each year
Indicative capital and staff costs	$120,000 / year ($6,000/ha)
Indicative maintenance cost	$10,000 /yr ($500/ ha) for 2 years
Potential/ actual funding sources	MCMA Projects $40,000/yr, Council Assets $80,000/yr, Wagga Wagga Urban Landcare Group
Work Location(s)- Future	Existing recently developed areas Future urban development areas
Addressing symptom or cause- **Preventive or Remedial Action?**	Both
Target outcome	Decreased outbreaks of surface salinity and effects on environment, buildings and infrastructure. Ground water recharge slowed Lowered water tables, lower water usage, lower infrastructure costs, increased biodiversity
Community involvement	Planting areas on National Tree Day and by Landcare groups
Measurement	Area planted and % plant survival after 12 and 24 months. Health of past plantings. Photographic record. Piezometer readings. Spatial mapping of revegetated areas

Before (1997) and after (2008) photos of revegetated saline park area at Hardy Ave

Action 2. Ground Water Monitoring Program	
Summary. A comprehensive program has developed over the past 15 years to monitor and assess urban salinity through ground water investigations. Over 140 piezometers are monitored on a monthly or bi-monthly basis. Parameters measured include Standing Water Level and Electrical Conductivity. Water quality of the Showground pump-well and Evaporation Basin, Lake Albert and Wollundry and Flowerdale Lagoons are also monitored.	
Lead section and staff responsible	Environmental Compliance Co-ordinator, Environmental Monitoring Officer
Timing	Month or bi-monthly monitoring
Indicative Capital and Staff costs	Materials/ Equipment/ Staff $35,000/yr
Indicative Maintenance costs	Repair and replace piezometers $3,000/yr
Potential/ actual funding sources	WWCC / MCMA
Work Locations **Existing** **Future**	Wagga Wagga Urban Areas (140 Sites) Lake Albert Catchment (install 30 new piezos and carry out soil analysis)
Addressing symptoms or causes or Preventative or Remedial action?	Symptoms
Target outcome	Provision of annual Urban Salinity Status Plan. Allows determination of discharge areas and potential areas where salinity may develop. Basis to develop remedial actions and determine developments
Community involvement	Schools, Urban Landcare
Measurement/ Evaluation	Annual Report and review of data. Also longer term review to assess longer term trends – by 2012. More research as per Golder report (June 2007) into south western area – Glenfield/Lloyd (bores 37 & 47) and the eastern area - Henwood/Fay Ave areas (bores 94, 96 & 98)

Typical piezometer installation for measuring groundwater level and salinity

Action 3. Urban Salinity Education Program	
Summary The education program is a long term plan which aims to : • Raise the level of awareness of issues associated with urban salinity in the community. • Liaise with, agencies and authorities, community, educational institutions, business and industry on ways to remediate urban salinity • Encourage attitudinal and behavioural change, so that works addressing Urban Salinity are supported and undertaken by an informed and active community	
Lead section and staff responsible	Natural Environment Natural Resource Management Facilitator
Timing	Scheduled programming and meeting enquiries through out each year
Indicative capital and staff costs	$50,000/yr
Potential/ actual funding sources	WWCC/ MCMA grants
Work Locations	Throughout the City by conducted tours, interpretational signage and sites (salinity causes and effects, revegetation, monitoring, remedial engineering works, water-wise gardens) Educational institutions and community groups. Water wise garden demonstration

Addressing symptoms or causes **Preventative or Remedial action?**	Education on symptoms, causes, preventative and remedial action
Target outcome	An informed community supporting and undertaking actions to address Urban Salinity
Community involvement	Wagga Wagga Urban Landcare group, Salinity educators
Measurement	Number of tours; community enquiries, publications produced and distributed, presentations made and on-ground activities undertaken. Set targets and keep records of tours, publications and presentations

Showing residents and students how to monitor bores

Action 4. Structural /Engineering Program – Saline Bore water
Summary The pumping and removal of ground water can reduce water table levels and salt brought to the soil surface. By keeping the water level from 2.5 to 3 m below the surface, salt accumulation and water logging, and hence impact on infrastructure, can be managed.

The Calvary Hospital precinct series of dewatering bores have been operational since 1998 and continue to pump saline water indirectly to the Murrumbidgee River. Council has a license to continue this until March 2009 at which time an alternative use(s) of the water will need to be implemented. This program covers both the maintenance of the pumping operation and investigation and implementation of saline water alternative use(s).	
Lead section and staff responsible	Asset Services – Strategic Asset Planner (EA)
Timing	Bore field maintenance – On-going 2007-2015 Alternative disposal of bore water 2007-2009
Indicative capital cost	Alternative disposal of saline water Investigations of alternatives and Works $280,000 - 2007/09
Indicative maintenance cost	Bore operation and maintenance $30,000/yr
Potential/ actual funding sources	WWCC/ MCMA
Work Locations	Calvary Hospital precinct bore field and associated water delivery infrastructure.
Addressing symptoms or causes **Preventative or Remedial action?**	Addressing causes and implementing remedial action
Target outcome	Ground water and salinity in the Calvary precinct area kept below acceptable levels. A beneficial use found for saline bore water
Community involvement	Consultation on alternatives for saline bore water use
Measurement	Ground water and salt levels. Saline water generated monitored and measured. Plan prepared and implemented for disposal of saline water by March 2009

Typical bore being installed

Priority 5. Rear of Block Drainage Program	
Summary In many parts of Wagga Wagga rubble pits have been used to dispose of storm water from rooves. This is directly injected into the water table rather than disposal via the City stormwater system. This program removes rubble pits by connecting downpipes to a new stormwater disposal drainage system. From 1998 to 2006, 40 blocks consisting on average of 25 individual lots have been completed (approx 1000 residences). The ongoing program is being extended to remove rubble pits in the suburbs with a minimum of 80 house holds per year	
Lead section and staff responsible	Asset Services
Timing	On-going annual program 2007-2012
Indicative capital cost	$320,000/yr, variable depending on funding
Potential/ actual funding sources	WWCC /MCMA
Work Locations	Progressive plan in suburbs including Lake Albert, Mt. Austin, Kooringal, Ashmont.
Addressing symptoms or causes **Preventative or Remedial action?**	Addressing causes and taking remedial action
Target outcome	Reduced infiltration of roof runoff to, and level of, water table
Community involvement	Individual house owners

Measurement	Implementation of plan D 572. Number of households surveyed and investigated, rubble pits removed

Installation of rear of block drainage

Action 6. Planning, Development and Land Use Processes and Instruments	
Summary Opportunities exist for Council to improve salinity management through reference and requirements in the Local Environment, Development Control and Land Use Plans. Investigations to identify and develop policies , building standards, materials and techniques, notifications under section 149 Certificates and BASIX requirements to help address salinity**.**	
Lead section and staff responsible	Strategic and Community Services – Natural Environment division Planning
Timing	Inclusions in new LEP and DCP 2007
Indicative capital and staff costs	$10,000/yr for 2years
Potential/ actual funding sources	WWCC
Work Locations	Instruments internally administered Implementation on development sites
Addressing symptoms or causes	Preventative Action

Preventative or Remedial action?	
Community involvement	Public Consultation phase in developing instruments and policies
Measurement	Planning instruments and policies contain references to salinity management. Development and building standards and techniques implemented. Review performance on 5 year basis to allow adjustment of information on Section 149 certificates. Seek advice on salinity impacts of future rezonings.

Action 7. Water Reticulation- Pipe Leakage Reduction Program	
Summary Riverina Water County Council supplies reticulated water to Wagga Wagga. Most water pipe networks leak to some degree, and this can result in water reaching the water table and contributing to urban salinity. Riverina Water have an ongoing mains replacement program that ensures oldest pipes are replaced each year. A range of leak detection techniques and improvement to water metering are also being implemented. Council supports Riverina Water in the implementation of this program.	
Lead agency responsible	Riverina Water County Council
Timing	On-going annual Program
Indicative capital cost	Riverina Water - internal funding
Potential/ actual funding sources	Riverina Water
Work Locations	Old reticulation systems as determined by Riverina Water
Addressing symptoms or causes **Preventative or Remedial action?**	Addressing symptoms and causes and taking remedial action
Community involvement	Individual house holders and businesses
Measurement	Advice from Riverina Water on mains systems replaced and upgraded

Leakage Testing

Glossary

DCP	Development Control Plan
Dewatering Bore	Shallow to deep bores sunk to reduce ground water levels by pumping
Discharge area	Area where groundwater brings water (and salts) to or near to the land surface.
LEP	Local Environment Plan
MCAP	Murrumbidgee Catchment Action Plan
MCMA	Murrumbidgee Catchment Management Authority
Piezometer	Small bore drilled into the ground. This is used to measure depth to the watertable.
Recharge area	Place where water entering the ground will, if not evaporated or used by plants, seep down to the watertable. All areas of the landscape are potential recharge areas.
SoE	State of the Environment Report
USMP	Urban Salinity Management Plan
Watertable	Top of the groundwater, below which soil is saturated with water
WWCC	Wagga Wagga City Council
WWLGA	Wagga Wagga Local Government Area