

Appendix A: Stormwater and Wetland Standards

LINWOOD TOWNSHIP

RESOLUTION NO. 2011 – XX

RESOLUTION REGARDING THE ADOPTION OF THE SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION WATERSHED MANAGEMENT PLAN

WHEREAS, Minnesota Rules 8410, requires local government units to adopt a local water management plan; and

WHEREAS, Linwood Township is authorized by the Sunrise River Watershed Management Organization (SRWMO) to adopt the SRWMO Watershed Management Plan by reference to satisfy local water planning requirements.

THEREFORE, BE IT RESOLVED by the Town Board of Linwood Township, the SRWMO Watershed Management Plan is adopted to satisfy local water planning requirements of Minnesota Rules 8410.

Adopted this 25th day of October 2011 by the Town Board of Linwood Township.

LINWOOD TOWNSHIP

Mike Parker, Board Chairman

ATTEST:

Judith K. Hanna, Town Clerk

Linwood Township Stormwater Standards

Background

Stormwater is an all-inclusive term that refers to any of the water running off the land's surface after a rainfall or snowmelt event. Prior to development, stormwater is a small component of the annual water balance. However, as development increases, the paving of pervious surfaces (surfaces able to soak water into the ground) increases stormwater runoff. It is important to manage this water because of the impacts it can have on water quality, flooding, and groundwater recharge. Linwood Township has goals of improving or maintaining water quality, preventing future flooding problems, and encouraging groundwater recharge. Therefore, the Township has minimum stormwater standards. These standards are modeled after the SRWMO Stormwater Standards.

Administration

These stormwater standards will be administered by the Township.

Applicability

The Linwood Township Stormwater Standards apply to the following:

- ☐ Development and redevelopment disturbing one or more acres, including:
 - Disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography that may result in accelerated storm water runoff, leading to soil erosion and movement of sediment into surface waters or drainage systems. Examples of construction activity may include clearing, grading, filling and excavating.
 - Smaller projects that are part of a larger common plan, even though multiple separate and distinct land development activities may take place at different times.
 - In the case of redevelopment, replacement of an existing feature (building, pavement, etc) with a new one is new construction, and therefore must comply with the standards.
- ☐ Projects in the shoreland zone that meet the following conditions (except that peak flow rate control requirements are not applicable for shoreland zone projects):
 - Projects requiring a building permit and a variance from the local maximum impervious surface percentage.
 - Any project requiring a building permit that increases or replaces impervious surface by > 1,000 sq ft.
- ☐ Road projects creating new impervious surfaces.

The following activities are exempt:

- ☐ Road mill and overlay.
- ☐ Maintenance and paving of existing gravel roads.
- ☐ Agricultural crop production activities not creating additional impervious surfaces.
- ☐ Emergency activities necessary for protection of life, property, or natural resources.

Permit Application Materials

Any project to which these standards are applicable must submit, at a minimum, the following as part of their permit application to the Township:

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- ☐ Calculations showing that volume, peak discharge rate, and period of inundation requirements are met.
- ☐ Maintenance plan.
- ☐ Soil boring logs, as required below.
- ☐ Documentation describing how Better Site Design techniques were considered, and where they will be implemented.

Preferred Stormwater Management Techniques

The following order preference for stormwater management techniques must be followed:

- 1st – Better Site Design (as defined in the Minnesota Stormwater Manual Chapter 4)
- 2nd – Infiltration
- 3rd – Biofiltration, filtration, wetland treatment systems, extended detention basins, or NURP ponds (in no particular order of preference)

It is expected that a combination of techniques, used in series, will often be necessary.

Project proposers must show how Better Site Design techniques were considered, where they will be implemented, and if they will not be implemented, why.

Peak Flow Rate Control

Post-development peak flow rates shall not exceed existing rates, in aggregate, within the project boundary for the 2-, 10-, and 100-year 24 hour storm events.

The project proposer shall provide calculations or modeling showing requirements will be met. These calculations or models shall use methodologies and runoff curve numbers consistent with the US Department of Agriculture Natural Resource Conservation Service (NRCS) Technical Releases 55 and 20, the Minnesota Stormwater Manual, and subsequent updates (see Table 1 below). In determining curve numbers used to model the post-construction condition, Hydrologic Soil Group must be shifted down 1 classification (1/2 for A because compaction is minimal in sand) to account for grading impacts to soil structure, unless soil is amended or deep ripped.

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TABLE 1. Selected Runoff Curve Numbers for Antecedent Moisture Conditions II (normal conditions). Source: USDA-NRCS Technical Release 55 (TR-55), and also presented in the MN Stormwater Manual.

Land Use Description	Hydrologic Soil Group			
	A	B	C	D
Meadow (continuous grass, protected from grazing and generally mowed for hay)				
Good condition (>75% ground cover and lightly or only occasionally grazed)	30	58	71	78
Forest				
Poor (litter, small trees and brush destroyed by heavy grazing or regular burning)	45	66	77	83
Fair (grazed but not burned and with some forest litter covering soil)	36	60	73	79
Good (protected from grazing with litter and brush adequately covering soil)	30	55	70	77
Open Space (lawn, parks, golf courses, cemeteries, etc)				
Poor (grass cover <50%)	68	79	86	89
Fair (grass cover 50-75%)	49	69	79	84
Good (grass cover >75%)	39	61	74	80
Commercial				
85% impervious	89	92	94	95
Industrial				
72% impervious	81	88	91	93
Residential				
1/8 ac lots (65% impervious)	77	85	90	92
1/4 ac lots (38% impervious)	61	75	83	87
1/2 ac lots (25% impervious)	54	70	80	85
1 ac lots (20% impervious)	51	68	79	84
2 ac lots (12% impervious)	46	65	77	82
Impervious areas	98	98	98	98
Roads (including right of way)				
Paved	83	89	92	93
Gravel	76	85	89	91
Dirt	72	82	87	89
Row Crops				
Straight row – Good	67	78	85	89
Contoured row – Good	65	75	82	86
Pasture				
Poor (<50% ground cover or heavily grazed with no mulch)	68	79	86	89
Fair (50-75% ground cover and not heavily grazed)	49	69	79	84
Good (>75% ground cover, lightly or only occasionally grazed)	39	61	74	80
Open water	99	99	99	99

Volume Control

Stormwater volume management practices shall be the equivalent of infiltrating the first half-inch of precipitation from new impervious surfaces. This requirement may be met off-site for government projects if not practical on site, but preferably within the same subwatershed.

Infiltration Facility Design and Construction

Infiltration basin construction must follow MN Stormwater Manual Chapter 12-INF, vol. 2 or future updates. Additionally:

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- ❑ Projects within a Drinking Water Supply Management Area (DWSMA) should refer to MN Department of Health guidance document entitled "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas" to determine if infiltration techniques are appropriate (<http://www.health.state.mn.us/divs/eh/water/swp/stormwater.pdf>).
- ❑ Storm water discharges from potential stormwater hotspots may require the use of specific structural stormwater treatment practices and pollution prevention practices. Certain practices, such as infiltration, may not be allowed. Potential stormwater hotspots are defined as a land use or activity that produces higher concentrations of trace metals, hydrocarbons, or pollutants than normally found in stormwater. Examples include fueling stations, vehicle service or washing areas, vehicle fleet storage areas, auto recycling or salvage, stockpiled snow from salted roadways, construction site inputs, manufacturing sites, public works storage areas, facilities that generate or store hazardous waste materials, and others as determined by the Township.
- ❑ During the planning and design phase of a project, either soil borings or double-ring infiltrometer tests must be used to verify that the practice will perform appropriately.
 - If soil borings are used, the MN Stormwater Manual recommends at least 3 borings to a depth of 5 feet below the proposed practice bottom. Soil borings shall determine soil type, infiltration rate, groundwater level, seasonally high water table, bedrock, and impeding layers.
 - If infiltration rates are not measured directly with an infiltrometer, soil infiltration rates used for design purposes shall be those found in Table 2 below, which are conservative estimates of long term, sustainable infiltration rates.

TABLE 2. Infiltration Rates for Hydrologic Soil Groups

Hydrologic Soil Group	Soil Textures	Corresponding Unified Soil Classification	Infiltration Rate (in/hr)
A	Gravel, sand, sandy gravel, silty gravel, loamy sand, sandy loam	GW – Well-graded gravel or well-graded gravel with sand GP – Poorly graded gravel or poorly graded gravel with sand	1.6
		GM – Silty gravel or silty gravel with sand SW – Well-graded sand or well-graded sand with gravel SP – Poorly graded sand or poorly graded sand with gravel	0.8
		SM – Silty sand or silty sand with gravel	0.6
B	Loam, silt loam	ML – Silt OL – Organic silt or organic silt with sand or gravel or gravelly organic silt	0.3
C	Sandy clay loam	GC – Clayey gravel or clayey gravel with sand SC – Clayey sand or clayey sand with gravel	0.2
D	Clay, clay loam, silty clay loam, sandy clay, silty clay	CL – Lean clay or lean clay with sand or gravel or gravelly lean clay CH – Fat clay or fat clay with sand or gravel or gravelly fat clay OH – Organic clay or organic clay with sand or gravel or gravelly organic clay MH – Elastic silt or elastic silt with sand or gravel	<0.2

Source: Minnesota Stormwater Manual. Thirty guidance manuals and many other stormwater references were reviewed by the MPCA when it compiled the recommended infiltration rates.

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- Every storm water treatment practice shall have an acceptable form of pre-treatment. The Township engineer shall decide how much pre-treatment is needed to ensure long-term performance.
- Protection of infiltration areas during the construction process that are discussed in the MN Stormwater Manual are of great importance. Ensuring these measures are taken should be a high priority for reviews of development proposals and municipal construction site inspectors.
- A legally binding and enforceable maintenance plan clarifying responsible parties is required for all infiltration practices. The maintenance plan must specify:
 1. Parts or components of a stormwater management facility that need to be maintained.
 2. Methods (detailed maintenance and repair procedures to ensure continued function of the stormwater feature).
 3. Schedule.
 4. Responsible parties for maintenance.
 5. Equipment and skills or training necessary.
 6. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program.
 7. Need for revisions or additional maintenance procedures.
- An easement is required over the area inundated by a 100-year storm event and shall be adequate to provide access for maintenance.

Linwood Township Wetland Standards

Background

Linwood Township finds that wetlands serve a variety of beneficial functions. Wetlands within the Township maintain water quality, reduce flooding and erosion, are groundwater recharge areas, provide food and habitat for wildlife, provide open space, and contribute to the area's rural "feel". Therefore, wetlands are important to the health, safety, economy, and general welfare of the Township. Regulating wetlands and the land uses around them is therefore in the public interest.

The state Wetland Conservation Act (WCA) provides many protections of the public benefits of wetlands, but does not address all areas of concern. Topics not addressed by state law but considered by the Township include those addressed in the wetland standards. These standards are modeled after the SRWMO Wetland Standards.

Goal

The goal of the Linwood Township wetland standards is to avoid direct or indirect impacts from activities that destroy or diminish the quantity, quality, and biological diversity of wetlands.

Administration

These wetland standards will be administered by the Township.

Applicability

The following standards apply to all parcels where any of the following activities are proposed:

- ☐ Subdivision creating three or more lots and creating impervious surfaces or structures.
- ☐ Any project with wetland impacts as defined by the Wetland Conservation Act (WCA, Minnesota Rules 8420) that do not qualify for a WCA exemption.
- ☐ Wetland excavations >0.5 acres will be subject to the excavation provisions.

Wetland Definition

For the purpose of these standards, wetlands:

- ☐ Are defined in MN Statutes section 103G.005, subdivision 19.
- ☐ Include public waters wetlands defined in MN Statutes section 103G.005, subdivision 15a.

Wetland Delineation and Classification

All wetlands do not have equal value. Some are healthier and provide more benefits to the Township than others. The Township seeks to identify these highly-valued wetlands and give them greater protections, and allow more flexibility in and around lower-valued wetlands. Linwood Township most highly values wetlands that provide (in order of preference):

1. Water quality treatment
2. Wildlife habitat
3. Groundwater recharge

The Township allows more flexibility for wetlands that poorly provide these functions. Wetlands will be delineated and classified on a case-by-case basis for applicable project proposals.

Delineation and Classification Methodology

Proposers of applicable projects must perform a wetland delineation and wetland functional values assessment. The delineation shall follow methods allowed by WCA. The functional values assessment shall use MnRAM (the Minnesota Routine Assessment Method for Evaluating Wetland

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Functions) version 3.1 or newer, which is the method allowed by WCA. The results should be reported to the Township, which will assign an appropriate wetland classification.

MnRAM scores 15 wetland functions. The Township will use scores from five of these functions to classify wetlands, including:

Water Quality Treatment

1. Downstream water quality protection
2. Maintenance of wetland water quality

Wildlife Habitat

1. Vegetative diversity/integrity
2. Maintenance of characteristic wildlife habitat structure
3. Maintenance of characteristic amphibian habitat

Groundwater recharge functions will not be used in classifying wetlands because almost all Township wetlands provide groundwater recharge functions and therefore the Township will be protective of this function in all wetlands.

Classifications

Four wetland classes will be utilized:

1. High Priority Wetlands
2. Moderate Priority Wetlands
3. Low Priority Wetlands
4. Use Wetlands

The defining characteristics of each wetland class are summarized in Table 1.

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TABLE 1. Wetland Classification

Description →	High Priority Wetlands	Moderate Priority Wetlands	Minor Priority Wetlands	Use Wetlands
	High quality natural basins that serve both target wetland functions of water quality treatment and wildlife habitat.	Wetlands that highly perform one of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands that do not highly perform either of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands created for stormwater management. These wetlands usually need periodic maintenance.

Targeted Wetland Functions		MnRAM Category	
Water Quality Treatment	Downstream water quality protection	MnRAM Score is “high” for at least one of these two MnRAM categories	MnRAM Score is “high” for at least one of these two MnRAM categories
	Maintenance of wetland water quality		
		AND	OR
Wildlife Habitat	Vegetative diversity/integrity	MnRAM Score is “exceptional” or “high” for one or more of these three MnRAM categories	MnRAM Score is “exceptional” or “high” for one or more of these three MnRAM categories
	Maintenance of characteristic wildlife habitat structure		
	Maintenance of characteristic amphibian habitat		
		Does not score “exceptional” or “high” for any of these MnRAM categories	Wetlands created for stormwater management. MnRAM scores are irrelevant.

Almost all wetlands in the SRWMO serve a groundwater recharge function, so wetland standards were designed to be protective of this function in all wetlands..

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Appeals of Wetland Classification

If an applicant disagrees with a wetland classification, they bear the burden of supplying detailed information supporting their assertion. This may include historical aerial photography, topographic, hydrologic, floristic, or soils data deemed necessary by the permitting authority. The municipality or other permitting authority will review the appeal.

Standards for Wetland Classes

Wetland standards vary by wetland class. These standards are summarized in Table 2 and are described in detail on the following pages.

TABLE 2. Summary of Wetland Standards

Wetland Class	Minimum Buffer Width	Minimum Structure Setback	Excavation	Stormwater Discharge to Wetlands
High Priority Wetlands	25 ft	25 ft	Excavations <0.5 acres must be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria	Stormwater discharges to all wetlands must comply with the text
Moderate Priority Wetlands	20 ft	20 ft		
Minor Priority Wetlands	15 ft	20 ft	Only Wetland Conservation Act restrictions apply	
Use Wetlands	15 ft	20 ft		

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Wetland Buffers

Wetland buffers are unmowed areas adjacent to wetlands that contain non-invasive vegetation, preferably dense native vegetation. Buffers filter pollutants before they can enter the wetland, reduce erosion, protect vegetation diversity and wildlife habitat, and minimize human impacts to the wetland. The Township requires buffers around wetlands, with the width dependent upon wetland classification.

Buffer Widths

The Township has developed minimum buffer widths based on soil types, slopes, development rules, and other factors. Minimum buffer widths are shown in Table 2.

Buffer Averaging

Buffers are encouraged to have a meandering shape for a more natural appearance and in order to make reasonable accommodations for nearby features of the development or landscape. The buffer width may vary around the wetland such that:

- It may be 10 feet less than the minimum allowable (see Table 2), but not less than 5 feet.
- The total acreage of buffer cannot be reduced.
- In areas of concentrated inflow to the wetland the buffer cannot be less than the minimum allowable buffer width shown in Table 2.

Buffer Variances

Variances of buffer width may be granted for the following reasons:

- Small wetlands where the entire wetland area is less than or equal to the area of wetland impact allowed without replacement as *de minimis* under WCA. It may be acceptable to have no buffers in these cases.
- Part of the required buffer is outside of the wetland's watershed. Due to topography near the wetland, runoff flows away from and never enters the wetland through surface flows. Variances would only be for that portion of the buffer that would be outside of the wetland's watershed.
- If drainage is redirected to an area where a buffer is feasible.
- If the site is not generating stormwater or is using storm water minimizing techniques that also provide habitat value such as rain gardens, vegetated swales, and other Best Management Practices (BMP's) to replace the functions of buffers.
- If the applicant is protecting additional upland, beyond that required by other ordinances or control measures, to connect existing wildlife habitat.
- Undue hardship, as defined in MN Statutes 462.357, subd. 6, subpart 2.
- Roads and other linear projects, except those created as part of new residential or commercial developments.
- Others as determined by the Township.

Activities Prohibited within Buffers

Activities that disturb the roots or influence the growth of vegetation are prohibited, including:

- Mowing (except as part of Township-approved wetland buffer management or for pedestrian trails)
- Structures
- Paving (except as allowed below in the "Activities Allowed within Buffers" section)
- Retaining walls

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- Clearing and removal of vegetation (except selective clearing and pruning of individual trees and shrubs which are dead, diseased, hazards, or removal of noxious or invasive weeds)
- Introduction of non-native vegetation
- Filling, dumping, or yard waste disposal
- Fertilization
- Removal of buffer monuments
- Septic systems

Activities Allowed within Buffers

- Management needed to establish the buffer, such as mowing or burning.
- Activities consistent with park management plans.
- Plantings that enhance the natural vegetation.
- Selective clearing and pruning of individual trees and shrubs, which are dead, diseased, or hazards.
- Noxious or invasive vegetation removal.
- Use and maintenance of an unimproved access strip not more than 10 ft wide for recreational access and the exercise of riparian rights.
- Pedestrian trails, provided that at least 10 feet of buffer remains between the trail and wetland.
- Placement, maintenance, or repair of utility and drainage systems that exist on creation of the buffer strip or are required by the Township, as long as any adverse impacts have been avoided or minimized.
- Construction, maintenance, repair, or reconstruction of existing and future public roads as long as any adverse impacts have been avoided or minimized.
- Others as approved by the Township.

Buffer Easements

The Township will require a conservation easement (preferred), or functional equivalent such as a drainage and utility easement or outlot, over the wetland and buffer. The applicant shall create electronic files of buffer and easement locations. The files shall be submitted to the Township.

Use of Existing Vegetation as the Buffer

The existing vegetation is acceptable for a buffer and must not be disturbed if:

- It is continuous, dense, deep-rooted perennials (can be trees and shrubs with 60% canopy cover), and
- <30% invasive plant species, and
- Topography does not channelize runoff.

Buffer Establishment and Seed

All buffers (natural or created) must be protected during construction with erosion control.

When existing vegetation is not acceptable for use as the buffer, a buffer must be established by planting. Planting must meet these criteria:

- Planting must be identified on the wetland replacement plan or grading plan.
- Planting must be done by a qualified contractor.
- Install in accordance with the most current BWSR guidance.
- Replant vegetation that is unsuccessful during the first two growing seasons.
- No fertilizer may be used unless prescribed by accredited soil testing lab.

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- The seed planted must be:
 - i. A 100% native BWSR seed mix or equivalent approved by the Township, with the exception of a 1-time annual nurse or cover crop such as oats or rye.
 - ii. Of local ecotype originating within 300 miles.
- Native trees/shrubs may substitute forbs at 60 per acre.

Buffer Monuments

Buffers shall be adequately marked with signage at a maximum 200 foot spacing or every other lot corner. Signs should be erected before occupation of new developments and before the completion of work for all other projects. Monument requirements can be waived where the Township deems they would serve no practical purpose.

Buffer Maintenance

First two full growing seasons -

During first two full growing seasons the applicant must replant any vegetation that does not survive.

After the first two full growing seasons-

After the first two full growing seasons the buffer must be reseeded if the buffer changes at any time through human intervention or activities.

Structure Setbacks

The Township has developed minimum structure setbacks from the wetland buffer. The minimum structure setbacks are shown in Table 2.

Excavations

Excavations >0.5 acres will be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria.

Stormwater Discharge to Wetlands

- Treatment of storm water is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development. Treatment requirements are included in the Linwood Township Stormwater Standards.
- The allowable bounce of wetland water levels and inundation period due to stormwater discharges shall follow the State Guidance Document entitled "Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands", dated June 1997, and subsequent updates.

Letter of Credit

The Township may require a letter of credit from applicants to ensure compliance with these wetland standards (for example, buffer establishment and maintenance).

Disposition of Wetland Classification Records

The Township will maintain a file containing the functions and values and assigned classifications of wetlands inventoried as part of these standards.

STORMWATER PLANNING AND MAINTENANCE EXPENSES

A. Annual Maintenance Activities		Year								Funding Source
		2012	2013	2014	2015	2016	2017	2018	2019	
1	Street Sweeping	\$2,000	\$2,060	\$2,122	\$2,185	\$2,251	\$2,319	\$2,388	\$2,460	Linwood Twp.
2	Annual Inspection of All Structural Pollution Control Devices	\$1,000	\$1,030	\$1,061	\$1,093	\$1,126	\$1,159	\$1,194	\$1,230	Linwood Twp.
3	Inspection of Minimum of 20 Percent of the Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis	\$2,000	\$2,060	\$2,122	\$2,185	\$2,251	\$2,319	\$2,388	\$2,460	Linwood Twp.
4	Inspect a Minimum of 50 Percent of the Storm Sewer System	\$2,000	\$2,060	\$2,122	\$2,185	\$2,251	\$2,319	\$2,388	\$2,460	Linwood Twp.
5	Periodic Maintenance of Storm Sewer System and Treatment Basins	\$3,000	\$3,090	\$3,183	\$3,278	\$3,377	\$3,478	\$3,582	\$3,690	Linwood Twp.
Subtotal		\$10,000	\$10,300	\$10,609	\$10,927	\$11,255	\$11,593	\$11,941	\$12,299	

B. Stormwater Planning and Ordinances		Year								Funding Source
		2012	2013	2014	2015	2016	2017	2018	2019	
1	Mapping Stormwater Conveyance and Treatment Systems	\$10,000								Linwood Twp.
2	Update Wetland Ordinance		\$3,000							Linwood Twp.
3	Update Septic System Ordinance		\$3,000							Linwood Twp.
4	Update Stormwater Ordinances		\$3,000							Linwood Twp.
Subtotal		\$10,000	\$9,000	\$0	\$0	\$0	\$0	\$0	\$0	

C. SRWMO Expenses		Year								Funding Source
		2012	2013	2014	2015	2016	2017	2018	2019	
1	Operating Expenses, Non-Operating Administration and SRWMO Projects	\$26,437	\$29,388	\$27,558	\$25,321	\$12,906	\$12,529	\$20,848	\$27,553	See Footnote 1
Subtotal		\$26,437	\$29,388	\$27,558	\$25,321	\$12,906	\$12,529	\$20,848	\$27,553	
Grand Total		\$46,437	\$48,688	\$38,167	\$36,248	\$24,161	\$24,122	\$32,789	\$39,852	

1 See Tables 22, 23 and 28 of the SRWMO Watershed Management Plan for a detailed breakdown of funding sources.