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watersmartinnovations.com
Net Blue National Ordinance: Making New Development Water Neutral

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The Problem

- Many cities in North America are already challenged to meet their customer demands for water.
- Growing population and economic growth will place even more pressure in arid and water-short areas.
- As drought and water shortages occur, residents raise the issue about available water for new development when they are being restricted.
The Answer: Water Offsets

- Can allow growth without increasing system-wide water consumption across a community or a water supply service area
- Can be a combination of on-site water efficiency and off-site water efficiency
- Can reduce or completely eliminate impact of new development on water supply
- Can help avoid building moratoriums in resource-constrained communities
- Not a new concept
Reviewing Existing Examples

- AWE conducted research related to water demand offset policies
  - Reviewed terminology
  - Reviewed literature
  - Reviewed existing and past policies
- Purpose of review was to provide basis for the development of a national model planning and zoning ordinance
Net Blue: Water-Neutral Growth

- 3-year project to create a national model ordinance that can be tailored to create a customized water demand offset approach
- Partners: AWE, Environmental Law Institute, and River Network
- Funders: Scherman Foundation, Paul Johanson Foundation, and the Metropolitan Water District of Southern California
- Working with 7 partner cities to pilot approach
Net Blue Project Advisory Committee

1. Dave Anderson (Planning & Zoning)
2. Jacob Atalla (Builder)
3. Sarah Bates (Water law)
4. Bill Cesanek (APA Water Task Force)
5. Doug Farr (Sustainability architect)
6. Kyle Harwood (Offset ordinance attorney)
7. Paula Kehoe (City)
8. Cooper Martin (League of Cities)
9. Dwight Merriam (Developer attorney)
10. Brian Richter (Environmental expert)
Net Blue Toolkit

1. Model Ordinance
2. Model Ordinance User Guide
3. Three Ordinance Examples
4. Offset Methodology Workbook
5. Offset Methodology User Guide
6. Three Offset Examples matching the ordinance examples
7. Outreach Materials
Approach

- Reviewed literature to identify potential water constraint scenarios where the ordinance may be used
- Dissected existing water offset ordinances
- Designed framework and needed decision points
- Drafted a model ordinance tool with:
  - Elements of existing water offset ordinances
  - Elements drawn from other laws
  - The results of AWE’s water offset research
The Model Ordinance Worksheet

We built an ordinance-development tool, not just a model ordinance, because:

- Variety of settings: constraints, governing entities, enabling laws
- We anticipate a variety of users (not just lawyers)
- It is intended to assist with outreach

This tool is intended to help the users identify and think about critical issues
The Ordinance Parts and Organization

Establishing the Legal Basis
- Purpose
- Findings
- Authority

Fashioning the Ordinance
- Requirement and Applicability
- Incentive
- Definitions
- Determining the Offset Amount
- Identifying the Offset Activities

Enforcing the Ordinance
- Compliance with the Offset
- Verification
- Monitoring (optional)
- Enforcement

Options for the Ordinance
- Offset Credit Bank (optional)
- In-Lieu Fee (optional)
- Administrative Fees (optional)
- Modifications (optional)

Administering the Ordinance
- Appeals
- Severability
- Consistency with Other Laws
- Effective Date
The purpose of this ordinance is to: [select all that apply]

- Protect and promote the public health, safety, and general welfare
- Ensure that there is enough water at all times to meet the basic needs of the community, including fighting fires
- Establish and assist in achieving sustainability goals and objectives
- Manage the demand for more water in identified city, county, or district, to ensure that [select the applicable one]
  - demand for water does not exceed available current or future supply
  - demand for water does not exceed the sustainable yield of the source
  - demand for water does not disproportionately adversely affect certain water user groups (e.g., low-income communities or the environment)
  - demands on water infrastructure do not exceed its capacity or impair its function
- Ensure a reasonable and orderly process and pace of making water supply / infrastructure capacity available to new users
- Minimize the adverse effects on the community of limitations on identified city, county, or district’s water supply / infrastructure
- Manage water / water infrastructure to better satisfy both present and future human needs
- Manage water / water infrastructure to be more resilient to drought
- Manage water to better protect / protect and restore fish, wildlife, and recreation, now and in the future
- Manage water to better protect water quality as it relates to flows
- Comply with the specified plan(s)
  - by identified means
- Retain groundwater aquifers at levels sufficient to remain healthy
  - (e.g., protecting against contamination from saltwater intrusion)
  - (e.g., protecting against increased levels of harmful substances in drinking water)
- Retain groundwater aquifers at levels sufficient to prevent subsidence / increased pumping costs / reduced baseflows to streams
- While preserving water resources, allow reasonable time to complete necessary studies and reports for amendments to [select the applicable one]
  - the general / comprehensive plan
Methodology Workbook

- Designed to help communities evaluate and select off-site offsets for development projects

**Net Blue** is a collaborative initiative of the Alliance for Water Efficiency, the Environmental Law Institute, and River Network to support sustainable community growth.

This tool accompanies the model ordinance template and is intended to help communities evaluate and select strategies to offset the projected potable water use of new development or expanded use of existing connections. This workbook is related to on-site offsets and does not include calculations to determine the demand of new development, including onsite demand reduction measures.

This workbook contains the following worksheets:

**Offset Strategies** – The Offset Strategies worksheet can be used to evaluate and select a suite of measures to offset the demand of new or expanded water use. It contains example offset strategies related to indoor water fixture and appliance replacements and retrofits. Custom offset strategies can also be entered by the user.

**Selected Offsets** – This worksheet contains table that can be used to compile selected offset strategies for a new or expanded water use project. It can also be used to tally offset implementation. It is populated based on selections made on the Offset Strategies Worksheet.

**Res-Toilet Stock Estimate** – This worksheet can be used to create a general estimate of the stock of inefficient toilets in a given service area if such an estimate does not already exist. This can be helpful to determine the potential for inefficient toilet replacements which is typically a cost-effective and reliable strategy that provides theoretically permanent water savings.

**Rainwater Harvesting** – This worksheet contains a calculator for estimating the yield of rainwater harvesting (RWH is assumed to be the rain that falls on building roofs; rain not on roofs is considered stormwater.) It carefully addresses how much of the harvested rainwater is used on-site (and thus reducing on-site potable water demand) and how much rainwater is used off-site to offset potable water demand offsite.

**Stormwater Calculator** – This worksheet contains information and links to the USEPA Stormwater Calculator. If stormwater is captured and can be distributed off-site use, then this volume of water would qualify as a potable water demand offset.
Workbook Components

- New demand information
- Offset strategy evaluation worksheet
  - Water conservation strategies
  - Rainwater harvesting
  - Stormwater capture
  - Custom offsets
- Selected offsets worksheet
- Supplemental sheets
  - Inefficient toilet stock estimator
  - Baths and Half Baths Housing Data
Offset Strategy Worksheet

This worksheet can be used to evaluate and select a suite of measures to offset the demand of new or expanded water use. It contains example offset strategies related to indoor water fixture and appliance replacements and retrofits. Cooling tower retrofits are also included. Additionally, the user can enter custom measures. Example savings estimates are provided for the included offsets, but the user is encouraged to evaluate savings of offset strategies in relation to their service area.

User inputs and selections are required in cells with a white background: user input even cells do not require any input or selection.

Selecting "Yes" in Column F will include the offset measure in the Selected Offsets worksheet, as long as Column D is populated with a savings estimate value.

**Step 1: Enter Information about New or Expanded Water Use**

<table>
<thead>
<tr>
<th>Project Name/Description</th>
<th>Example Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected New Potable Water Demand of New or Expanded Use</td>
<td>500,000 Gallons per Year</td>
</tr>
<tr>
<td>Does above estimate include adjustment for on-site rainwater harvesting?</td>
<td>No</td>
</tr>
<tr>
<td>Use RWI Calculator estimate of on-site rainwater harvesting?</td>
<td>No</td>
</tr>
<tr>
<td>Are USEPA Stormwater calculator results used in this model?</td>
<td>No</td>
</tr>
<tr>
<td>Total Offset Requirement for New or Expanded Water Use</td>
<td>550,000 Gallons per Year</td>
</tr>
</tbody>
</table>

**Step 2: Enter Persons Per Household for the Service Area** (used to generate savings for toilet replacements)

| Service Area Average Persons Per Household Single-Family | 2.50 |
| Service Area Average Persons Per Household Multi-Family | 2.00 |

**Step 3: Define and Select Water Demand Offset Strategies**

<table>
<thead>
<tr>
<th>Offset Strategy</th>
<th>Example Savings Estimate Per Replacement/ Retrofit in Gallons per Year</th>
<th>User Specified Savings Estimate Per Replacement/ Retrofit in Gallons per Year</th>
<th>Approximate Number of Replacements/ Retrofits to Meet Offset or Solo Strategy</th>
<th>Related Plumbing Code?</th>
<th>Useful Life</th>
<th>Seasonality of Water Savings</th>
<th>Percent of Total Offset Requirement per Replacement/ Retrofit</th>
<th>Include in Selected Offset Table?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family High-Efficiency Toilet Replacements</td>
<td>9,541</td>
<td>9,100</td>
<td>58</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>2%</td>
<td>Yes</td>
</tr>
<tr>
<td>Multifamily High-Efficiency Toilet Replacements</td>
<td>16,472</td>
<td>15,000</td>
<td>37</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>1%</td>
<td>No</td>
</tr>
<tr>
<td>Showerhead Replacement Single-Family</td>
<td>2,092</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Showerhead Replacement Multifamily</td>
<td>1,894</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Single-Family Clothes Washer Replacement</td>
<td>7,043</td>
<td>7,000</td>
<td>79</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>1%</td>
<td>Yes</td>
</tr>
<tr>
<td>Multifamily Clothes Washer Replacement</td>
<td>25,110</td>
<td>25,000</td>
<td>22</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>5%</td>
<td>Yes</td>
</tr>
<tr>
<td>Oil Urinal Replacements or Retrofits</td>
<td>6,306</td>
<td>6,000</td>
<td>92</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>1%</td>
<td>Yes</td>
</tr>
<tr>
<td>Oil High Efficiency Urinal Replacements</td>
<td>33,020</td>
<td>33,000</td>
<td>42</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>2%</td>
<td>Yes</td>
</tr>
<tr>
<td>Laundry clothes Washer Replacements</td>
<td>31,435</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>Theoretically Permanent</td>
<td>Even throughout year</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Commercial Dishwasher Replacements</td>
<td>37,757</td>
<td>-</td>
<td>-</td>
<td>No</td>
<td>26 Years</td>
<td>Even throughout year</td>
<td>-</td>
<td>No</td>
</tr>
</tbody>
</table>
This worksheet contains an auto-populating table based on user selections made in the Offset Strategies worksheet. The table can be populated using the "Update Selected Offsets Table" button to the right of the Net Blue logo. The user manually enters the implementation value (e.g., number of toilet replacements) in 'Column D.' The 'Percent of Total Offset Requirement' column is automatically calculated after the user specifies implementation. If changes are made in the Offset Strategies worksheet, the user must update the selected offsets table using the "Update Selected Offsets Table" button.

<table>
<thead>
<tr>
<th>Offset Strategy</th>
<th>Savings Per Unit in Gallons per Year</th>
<th>Number to be Implemented</th>
<th>Percent of Total Offset Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family High-Efficiency Toilet Replacements</td>
<td>9,000</td>
<td>15</td>
<td>13%</td>
</tr>
<tr>
<td>Multifamily High-Efficiency Toilet Replacements</td>
<td>15,000</td>
<td>10</td>
<td>13%</td>
</tr>
<tr>
<td>Single-Family Clothes Washer Replacement</td>
<td>7,000</td>
<td>10</td>
<td>6%</td>
</tr>
<tr>
<td>Multifamily Clothes Washer Replacement</td>
<td>25,000</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td>CII Urinal Replacements or Retrofits</td>
<td>6,000</td>
<td>10</td>
<td>5%</td>
</tr>
<tr>
<td>CII High-Efficiency Toilet Replacements</td>
<td>13,000</td>
<td>10</td>
<td>12%</td>
</tr>
<tr>
<td>Pre-Rinse Sprinkler Valve Replacements</td>
<td>28,000</td>
<td>10</td>
<td>25%</td>
</tr>
<tr>
<td>Rainwater Harvesting (Off-site)</td>
<td>155,722</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Rainwater Harvesting Calculator

- Calculates the amount of harvested rainwater available for on-site and off-site use
- Simulates daily cistern performance over 10-year period using weather data you import into the model
- Estimates potential on-site uses for landscape irrigation and indoor plumbing
- Calculates surplus harvested rainwater available for off-site uses
- Four steps to setup and use the calculator
Rainwater Harvesting Calculator

This calculator can be used to estimate potential demand offsets from rainwater harvesting and use by a residential or non-residential development fitted with a rainwater collection and storage system (or multiple systems). Three potential demand offsets are estimated: (1) onsite irrigation demand, (2) onsite indoor plumbing demand, and (3) unspecified offsite demand. The calculator simulates daily rainwater collection, storage, and use over a 10-year period using weather data you import into the workbook. There are four steps to setup and use the calculator. The instructions on this worksheet will guide you through each step. Additional information about the calculator is available in the User Guide. The four steps are:

1. Import the weather data.
2. Enter information about onsite landscaping that would potentially use water from the rainwater collection and storage system for irrigation.
3. Enter information about indoor plumbing fixtures that would potentially use water from the rainwater collection and storage system for their operation.
4. Enter information on the design of the rainwater collection and storage system.

Step 1: Import the weather data

Note: to complete this step your computer must be connected to the internet.

In this step you will download the weather data used by the calculator to simulate rainwater collection and storage system performance. To download the data you will need to know the latitude, longitude, and elevation of the location where the rainwater collection and storage system would be installed. Enter these values in the indicated cells below. If you do not know these values, click on this link: Get Latitude, Longitude, and Elevation. Use the navigation features on the map on the webpage to locate your site. Once you have located your site on the map, use your mouse’s pointer and click the location. Copy the latitude and longitude coordinates and the elevation.

Latitude: 38.600
Longitude: -121.500
Elevation: 20 Feet

Now you are ready to download the weather data. Click this link to go to the website with the data you will download: Get weather data. On this webpage you complete five steps to download the weather data for your site. Screen shots of each step are shown to the right of the text box. Follow these steps exactly. The calculator will not import the data unless it is formatted correctly.

STEP ONE: Set 'Select Frequency of Desired Data' to daily data, set 'Select Scenario' to historical (1950-2005), set 'Min Year' on the left to 1996 and the one on the right to 2005.
STEP TWO: Enter your latitude (n) and longitude (l) values in the indicated fields. You can use the map on the webpage to confirm the coordinates correspond to your site location.
STEP THREE: Set the number of variables for CSV columns to 7.
STEP FOUR: Set the first row of columns 2-7 to MACAV2-METADATA (Climate). Set the first row of column 8 to MACAV2-LIVNEH (Climate). See the example to the right.

<table>
<thead>
<tr>
<th>col 2 pr (Precipitation)</th>
<th>col 3 rad (Downwelling Solar Radiation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>col 4 tasmax (Max Temperature)</td>
<td>col 5 tasmin (Min Temperature)</td>
</tr>
<tr>
<td>col 6 rhumin (Max Humidity)</td>
<td>col 7 rhumin (Min Humidity)</td>
</tr>
<tr>
<td>col 8 wind (Wind Speed)</td>
<td></td>
</tr>
</tbody>
</table>

Warning: The columns must be specified exactly as described above or the calculator will not import the data.

STEP FIVE: Click the button DOWNLOAD CSV. A csv formatted file with the data will download to your default download folder. The default file name is ‘data.csv’. However, if there is already a file in your default download folder with this name, a number in parentheses will be appended to the file name, like ‘data [1].csv.’

Now you can import the weather data into the workbook. Click the ‘Import Weather Data’ button to the right and use the file explorer to navigate to the data file you downloaded. It will be located in your default download folder, which is probably a folder named ‘Downloads.’ Once you have navigated to the folder with the file, highlight the file and click the Open button. If the data is imported successfully, you will receive a message telling you this. Otherwise, you will receive a message telling you the data could not be imported and to try downloading and importing the data again.
Stormwater Calculator

[Click for link to EPA National Stormwater Calculator]

Conceptual Model of EPA National Stormwater Calculator

Enter Site Location ➔ Soil Type (Select or retrieve data) ➔ Soil Drainage (Select or retrieve soil data) ➔ Topography (Select or retrieve data) ➔ Precipitation (Select weather station)

Evaporation (Select weather station) ➔ Climate Change (Select scenario) ➔ Land Cover (Select pervious and impervious land cover) ➔ Low Impact Development (LID) controls (Select from menu of controls) ➔ Runoff (Hydrologic analysis and results)

Are USEPA Stormwater calculator results used in this n | No | Values below not be linked to Offset Strategies

Enter output from National Stormwater Calculator:

<table>
<thead>
<tr>
<th>Area</th>
<th>2.00 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runoff (inches) Current Scenario</td>
<td>6.13 inches annual runoff</td>
</tr>
<tr>
<td>Proportion of Runoff the will be used off-site</td>
<td>50%</td>
</tr>
</tbody>
</table>
Outreach Materials

- Fact Sheet
- Frequently Asked Questions
- All outreach items online
- Requests for toolkit online

www.net-blue.org
Net Blue: Supporting Water-Neutral Community Growth

Net Blue is a collaborative initiative of the Alliance for Water Efficiency, the Environmental Law Institute, and River Network to support sustainable community growth. The project team members developed a model ordinance that communities can tailor and customize to create a water demand offset approach meeting local needs. Communities in different regions throughout the United States were consulted to help develop the model ordinance and the offset components, and to ensure that the program is adaptable to many different political climates, legal frameworks, and environmental challenges.

The Net Blue Project is divided into four parts:

1. Initial Offset Research
2. Model Ordinance
3. Offset Methodology
4. Community Outreach

Project Advisory Committee

A project advisory committee of experts in water resources, water law, and planning and zoning helped guide the project. The three organizations wish to express their heartfelt gratitude for the time and insights donated by these experts to the project.

1. Dave Anderson, Drenner Group
2. Jacob Atalla, KB Homes
For More Information and to order the Net Blue Toolkit, visit: www.net-blue.org