City of Birmingham
A Walkable Community

MEMORANDUM

Office of the City Manager

DATE: **October 20, 2016**

TO: **City Commission**

FROM: **Joseph A. Valentine, City Manager**

SUBJECT: **Storm Water Utility Fee**

Background

The City of Birmingham maintains a sewer system, which includes the disposal of storm water. When it rains, water that is not absorbed into the soil runs into the storm drains in the street. That storm water, once collected in the drains, travels through a vast system of sewer pipes, and is eventually disposed of and purified before being released into the Detroit River by the Detroit Water and Sewer Department (DWSD), currently known as the Great Lakes Water Authority (GLWA).

Residents of the City who are connected to the sewer system pay a fee for this service. In fact, even the City of Birmingham pays into this fund, because the City owns property that is connected into the sewer system. The City gets a bill from the Water Resource Commission for Oakland County (WRC) for the disposal of this storm water. In turn, the WRC gets a bill for this stormwater from the former DWSD, now the GLWA. When the City gets the bill from Oakland County, the City calculates how much each property owner is responsible for, and bills each household that uses the sewer system.

Currently, storm water costs are included in the overall sewer rate charged to all users of the water and sewer system. The amount a user of the system pays for storm water is based on the amount of water that is consumed based on a water meter. This system has been in place for a very long time and is the methodology that is used by many similar cities with combined sewer systems throughout the state. The City is separated into two sewage disposal districts: George W. Kuhn and the Evergreen-Farmington. For FY 2014-2015 the amount the City was charged for storm water was approximately $1,222,000 for the George W. Kuhn and $1,029,000 for the Evergreen-Farmington districts for a total of $2,251,000. This cost is then allocated to each user based on the above referenced method.

In 1998, the Michigan Supreme Court decided a case, *Bolt v City of Lansing,* which dealt with the City of Lansing using its water/sewer bills to raise revenue unrelated to the actual usage. *Bolt* held that raising revenue through the water/sewer bill was an unconstitutional tax. *Bolt* also held that cities may use water and sewer bills to pay for the disposal of storm and sanitary sewage, but the charge had to be proportional to the actual usage. The *Bolt* case has evolved to now stand as a challenge to municipalities in determining the appropriate methodology for a city to use when apportioning storm water disposal fees to its residents. The decision resulted in a change in the law as to how cities like Birmingham should divide that fee

amongst its residents. One of the factors the Court in *Bolt* determined is that the storm water disposal fee must be in proportion to the amount of water that enters the sewer system from each parcel or lot in the city.

Bolt v City of Lansing

A property owner challenged Lansing's newly imposed storm water utility fee, arguing that the fee was a tax levied without voter approval in violation of the Headlee Amendment to the Michigan Constitution. Lansing imposed the storm water fee on virtually all properties in the city to pay for the city's storm water and sanitary sewer separation project costs as permitted under state statute.

The Michigan Supreme Court ruled that the storm water service charge imposed by Lansing was unconstitutional and void on the basis that it was a tax for which voter approval was required and not a valid use fee. The Court established three criteria for distinguishing between a fee and a tax: 1) a user fee must serve a regulatory purpose rather than a revenue-raising purpose; 2) a user fee must be proportionate to the necessary costs of the service; and 3) a user fee must be voluntary – property owners must be able to refuse or limit their use of the commodity or service. The Court found that the charge failed to satisfy the first and second criteria.

Over time, additional rulings from the Michigan Court of Appeals have helped further define the ruling in the *Bolt* case as to the specifics of how storm water charges are allocated. What these rulings from the Court have demonstrated is that the billing methodology used by so many communities in the State must be changed as the ability to divide the storm water disposal fee that the cities get charged from the County based on water consumption is no longer an acceptable practice. As a result, several cities, including Birmingham, have been served with class action lawsuits challenging this methodology resulting from a recent decision by the Michgian Supreme Court. Other class action lawsuits that have recently been filed on this issue include:

CLASS ACTION LAWSUITS	**DATE FILED**
Panzica v City of Jackson	2001
Wolf v City of Ferndale	2014
Wolf v Birmingham	2014
Schroeder v City of Royal Oak	2014
Kish and Bannon v City of Oak Park	2015
v Oakland Township	2015
v City of Dearborn	2016
v City of Detroit	2016
v City of Taylor	2016
v City of Canton	2016
v Westland	2016

City Actions

Going forward, the City is required to implement a new billing methodology beginning January 1, 2017 for storm water utility fees in accordance with a court order. This new method will be based on several factors such as storm/rainfall rates, topography of each parcel of land in the City, size of each parcel and how much pervious v impervious surface exists on each lot. To assist in this effort, the City engaged the services of the engineering firm Hubbell, Roth & Clark (HRC) to develop a storm water utility fee apportionment study to develop an acceptable methodology to charge storm water fees.

HRC has been involved in designing and maintaining the City's water, sewer and storm water systems for several decades and is very familiar with the City's infrastructure. The City has been working with HRC for the past several months in the development of this new method. HRC will present their *Storm Water Utility Fee Apportionment Report* at the City Commission meeting of October 27th to introduce the proposed change in billing methodology.

In conjunction with the development of the Apportionment Report, the City has also been working with the Michigan Municipal League (MML), as well as, State Representative Mike McCready, in the development of state legislation to address the creation of a storm water utility fee. Recently, House Bill 5991 was introduced by Representative McCready to the House and was referred to the committee on Local Government. The City has modeled its ordinance after this legislation. Consequently, we don't expect full adoption of this new statute prior to January 1, 2017, however, it is the intent for the City to adopt its ordinance under the timeframe established by the court order.

Implementation Plan

In order to meet January 1, 2017 requirement to establish a new billing methodology, the following implementation plan has been established.

A presentation to the City Commission will be conducted on October 27, 2016 to present the *Storm Water Utility Fee Apportionment Report* prepared by HRC and allow the City Commission to accept the plan. In addition, a draft storm water utility ordinance will be proposed that complies with the recommendations of the report. Further, a public hearing will be scheduled for December 5, 2016 for formal consideration of a storm water utility ordinance. The Apportionment Report, draft ordinance and additional information will be made available on the City's website at www.bhamgov.org/stormwater for review by the public prior to the public hearing.

The following suggested resolution has been prepared for consideration by the City Commission.

Suggested Resolution:

To accept the Storm Water Utility Fee Apportionment Report prepared by Hubbell, Roth & Clark, Inc. and further, to set a public hearing date of December 5, 2016 to consider adoption of a storm water utility ordinance for the City of Birmingham.

REPORT

FOR

Storm Water Utility Fee Apportionment

FOR

CITY OF BIRMINGHAM

OCTOBER 21, 2016

Prepared by:

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Section 1 - Executive Summary

The City of Birmingham has a combined sewer system that collects and transports both sanitary waste and storm water that enters the sewers through building footing drains and drainage structures, such as catch basins and inlets located in the streets, parking lots and yards. The sanitary waste and storm water that enters the sewers can be referred to as "sewage", and is transported through County Interceptors or Drains owned by the Oakland County Water Resources Commissioner (WRC) to Interceptors owned by the Great Lakes Water Authority (formerly DWSD), and eventually treated at the GLWA wastewater treatment plant in Detroit.

The City of Birmingham is charged for the transportation and treatment of all the sewage generated from within the City. A component of these charges is listed as storm water to reflect the diluted nature of the sewage being treated after precipitation events occur in the region. In the past, the City has passed the storm water charges on to their sewer customers as function of water usage. Due to a recent legal challenge to that method, the City is changing the basis for billing for storm water charges to one that is proportional to the amount of storm water generated from all properties in the City that enters the sewer system, and not just sewer customers.

The Storm Water Utility Fee will be apportioned to all properties in the City that contribute storm water into the City's sewer system, from both surface runoff and underground footing drain inflow. Each properties share of the storm water utility fee will be proportional to the runoff potential of that property, which is based on the size of the property, and the amount of impervious surface area on the property. The runoff potential for a typical single family residential property is defined as a "standard unit", called an Equivalent Storm Water Unit (ESWU). Other types of properties are assigned a multiple of the "standard unit" by dividing their particular runoff potential by the "standard" runoff potential. The ESWU's are totaled for all the properties being assessed, and each property's share of the total is determined by dividing their particular ESWU by the total of the ESWU's.

Procedures will be implemented for property owners to appeal and adjust their ESWU assignments if it is found to be in error. The opportunity for property owners to receive certain credits to their storm water utility fee will be available when measures are taken by the property owner to reduce the amount of storm water that enters the City sewer system from their property.

Section 2 - Background

The sewage produced in the City is transported to the wastewater treatment plant in Detroit through sanitary interceptors owned by either the Oakland County Water Resources Commissioner (WRC) or the Great Lakes Water Authority (formerly Detroit Water and Sewerage Department). The Great Lakes Water Authority charges Oakland County WRC for sewage treatment at their plant, a portion of which is designated as storm water based on the increase in base flow during precipitation events. Oakland County WRC then passes the sewage treatment and storm water charges on to the individual municipalities that are connected to their interceptors. In addition, Oakland County WRC includes costs associated with operating and maintaining the combined sewer overflow retention treatment facilities that are used by the City. In the past, the City has passed these charges on to individual properties as a component of their water and sewer bills as a function of water usage.

In 2014, the water-usage basis for billing for the storm water charges from Oakland County WRC was challenged in Circuit Court as violating the "Bolt criteria". A synopsis of the Bolt criteria (Bolt v City of Lansing 459 Mich 152 – 1998) is as follows:

> *Background:*
> *A property owner challenged Lansing's newly imposed storm water utility fee, arguing that the fee was a tax levied without voter approval in violation of the Headlee Amendment to the Michigan Constitution (Mich Const 1963, art 9, sections 25 and 31). Lansing had imposed the storm water fee on virtually all properties in the city to pay for the city's storm water and sanitary sewer separation project costs as permitted under state statute.*
>
> *What was the outcome?*
> *The Michigan Supreme Court ruled that the storm water service charge imposed by Lansing was unconstitutional and void on the basis that it was a tax for which voter approval was required and not a valid use fee. The Court established three criteria for distinguishing between a fee and a tax: 1) a user fee must serve a regulatory purpose rather than a revenue-raising purpose; 2) a user fee must be proportionate to the necessary costs of the service; and 3) a user fee must be voluntary—property owners must be able to refuse or limit their use of the commodity or service. The Court found that the charge failed to satisfy the first and second criteria.*

The City is modifying the basis of billing for storm water charges by using a method that meets the three aspects of the Bolt criteria.

Section 3 - Purpose and Summary

The purpose of assessing a storm water utility fee to properties in the City is to apportion the sewage treatment charges incurred from Oakland County WRC attributable to storm water that enters the City's combined sewer system in a manner that is proportional to the runoff potential from each property. With this method of apportionment, all properties that contribute runoff to the sewer system will pay their share of the costs, regardless if the property consumes potable water or not, or the amount of water that is consumed.

In general, the amount of runoff generated from a particular property for a given amount of precipitation is largely based on the amount of impervious surface on that property - more impervious surface means more runoff. To a smaller degree, even pervious surfaces will contribute some runoff. Therefore, the runoff potential for a particular property is determined by both the amount of impervious area and pervious area. The runoff potential for a typical single-family residential property is used as a "standard" unit, called an Equivalent Storm Water Unit (ESWU). Other types of properties are assigned a multiple of the "standard unit" by dividing their particular runoff potential by the "standard" runoff potential. The ESWU's are totaled for all of the properties being assessed, and each property's share of the total is determined by dividing their particular ESWU by the total of the ESWU's.

<u>Impervious Areas</u>

An impervious area can be defined as a surface area that is resistant to permeation by surface water. Because precipitation cannot be absorbed by the impervious surface, runoff will be generated that must be managed by the sewer system. For the purpose of this apportionment, the following surfaces are considered to be impervious:

- Pavements – including sidewalks, private roads, parking lots, and patios made from concrete, asphalt, brick pavers and stone materials.
- Buildings
- Athletic courts and tracks
- Gravel (or dirt) driveways and parking areas used by vehicles
- Decks covered by a roof or having an impervious underlying surface (including plastic sheeting)

Pervious Areas

A pervious area will allow an amount of surface runoff to percolate into the soil naturally, to the extent possible based on the type of soil and degree of saturation. Note that large portions of the City have naturally occurring clayey (or loamy) soils near the surface that do not allow high rates of infiltration, so even undeveloped properties will generate some runoff for moderate amounts of rainfall. For the purpose of this apportionment, the following surfaces are considered to be pervious:

- Grass
- Gardens
- Landscape areas without impervious underlying membrane
- Open-slatted decks over an otherwise pervious surface
- Gravel (or dirt) paths used by pedestrians only
- Swimming pools (but not the paved surfaces around the pool)
- Pavers set in porous material specifically designed to be pervious
- Porous pavements specifically designed to be pervious

Section 4 - General Methodology

Properties in the City are considered to be part two general categories – single-family residential (SFR) or non-single-family residential. Non-single-family residential properties include two-family residential, multifamily residential, institutional (public properties, schools and churches), public recreational, commercial, business, office, and parking.

Due to the variability in lot sizes across the City, the single-family residential (SFR) category is divided into six classes based on the total area of the parcel in order to group similarly developed properties together:

SFR CLASS	LOT SIZE RANGE
Class A	0.125 acres or less
Class B	0.126 to 0.250 acres
Class C	0.251 to 0.500 acres
Class D	0.501 to 0.750 acres
Class E	0.751 to 1.000 acres
Class F	1.001 acres or larger

The most numerous type of property in the City is the Class B SFR, which is considered to be the "standard unit" for determining ESWU's. The following table illustrates the distribution of property types across the City:

PROPERTY TYPE	# PROPERTIES	% OF TOTAL
SFR Class A (0.125 acres or less)	1,375	17.3%
SFR Class B (0.126 to 0.250 acres)	3,949	49.6%
SFR Class C (0.251 to 0.500 acres)	1,716	21.6%
SFR Class D (0.501 to 0.750 acres)	115	1.4%
SFR Class E (0.751 to 1.000 acres)	43	0.5%
SFR Class F (1.001 acres or larger)	47	0.6%
Non-Single-Family Residential Properties	719	9.0%
Total # Parcels Part of Apportionment:	7,964	

Runoff Potential

The runoff potential from a property is based on hydrologic engineering principles for calculating runoff that use both the impervious surface area and pervious surface area. All surfaces will generate some amount of runoff during precipitation events, and can be assigned a runoff coefficient to represent the fraction of the precipitation that results in runoff. The runoff coefficients used in this study are based on widely accepted practices for calculating runoff (refer to *"Handbook of Applied Hydrology: A Compendium of Water-resources"* by Chow, 1964).

The runoff coefficient used for impervious surfaces is 0.9, which generally means that 90% of the precipitation on that surface will result in runoff. Every surface has some ability to absorb water or allow it to infiltrate into the earth to one degree or another. Impervious surfaces such as pavements will have pores or cracks in the surface that allow some water to be absorbed or pass through to the underlying soil materials, or have areas where water will pond and eventually evaporate.

The runoff coefficient used for pervious surfaces, which is considered to be the total area minus the impervious area of a given property, is 0.15. Pervious surfaces such as lawn or mulched landscaped areas can only allow a relatively large fraction of the precipitation that occurs to be absorbed and infiltrate into the earth based on the permeability of the soil and how saturated it may be when the precipitation occurs. The predominate near-surface soil types in the City are clayey (or loamy), and have relatively slow permeability rates. The runoff coefficient value of 0.15 generally means that 15% of the precipitation on that surface will result in runoff.

The remaining amount of precipitation that is not absorbed or infiltrated will become runoff that leaves the property and will ultimately be collected by the City's sewer system. Runoff potential is measured in square feet, using the following formula:

Runoff Potential = 0.15 x [Total Area - Impervious Area] + 0.9 x [Impervious Area]

Impervious Area Measurement

The area of a property or parcel of land that is covered by buildings, pavements, or other materials that substantially reduce the rate at which precipitation can infiltrate into the earth is considered to be impervious surface area. Common examples of impervious surfaces include roofs, driveways, parking areas, sidewalks, patios, tennis courts, and gravel surfaces used for vehicles. The Southeast Michigan Council of Governments (SEMCOG) conducted an aerial survey of the region in 2010 that was analyzed to determine the building footprints and impervious surface areas. The resulting data sets were provided to each community, and the building footprint and impervious surface area data sets were used for this study. The impervious surface area measurements made using the SEMCOG data were verified for many properties of different types by visually analyzing aerial photographs of the individual parcels.

Section 5 - Single Family Residential Methodology

The ESWU for each of the six lot-area categories for single-family residential properties is based on the average runoff potential for that category. For each group, the total impervious surface and pervious surface areas were summed up, and then divided by the number of parcels. Those areas were entered into the runoff potential equation to determine the average runoff potential for each category. The single-family residential Class B category that was determined to the "standard unit" has lot sizes between 0.126 acres and 0.250 acres, and an average runoff potential of 4,317 square feet. The Equivalent Storm Water Unit (ESWU) for each category is calculated by dividing the average runoff potential for each by 4,317 square feet. All single family residential properties in each of the lot-size category are assigned the same ESWU for that category. The ESWU values for the single-family residential categories are summarized in the following table:

PROPERTY TYPE	AVE. RUNOFF POTENTIAL	ESWU
SFR Class A (0.125 acres or less)	3,166	0.7
SFR Class B (0.126 to 0.250 acres)	4,317	1.0
SFR Class C (0.251 to 0.500 acres)	6,714	1.6
SFR Class D (0.501 to 0.750 acres)	10,553	2.4
SFR Class E (0.751 to 1.000 acres)	13,904	3.2
SFR Class F (1.001 acres or larger)	19,744	4.6

Section 6 - Non-Single Family Residential Methodology

The ESWU for all other, non-single-family residential properties is based on the runoff potential for each particular property. The impervious surface area and pervious surface area for each of these properties is measured, and the runoff potential is then calculated for each. Each runoff potential value is divided by the "standard unit" runoff potential value of 4,317 square feet to calculate the ESWU value for each.

Verifying Impervious Area Measurements

The impervious area measurements for certain properties were verified by analyzing the aerial imagery of the individual parcel instead of relying on the computer-analyzed impervious surface data. Parcels for verification included all City-owned properties and those with an ESWU over 4.4 as initially determined by the computer-analyzed impervious surface data.

Section 7 - Apportionment

Every parcel included in the apportionment roll will be assessed their share of the costs being apportioned based on the ESWU value for the particular property. To determine each individual property's share, the ESWU value for the particular property is divided by the sum of all the ESWU values.

Major Drainage Districts

The combined sewers in the City drain to two different major drainage districts, the Evergreen Farmington District (EF) and South Oakland County District (SO). In general, the east and south-central part of the City is in the SO District (George W. Kuhn Drainage District, formerly 12-Towns Drainage District), and the western part is in the EF District (includes the Birmingham CSO Drain, Acacia Park CSO Drain, and Bloomfield Village CSO Drain). The City receives separate storm water charges from Oakland County WRC for those districts, and will therefore apportion those costs separately to the particular parcels located within each major drainage district.

Storm Water Utility Fee Examples

To illustrate the storm water utility fees, the following examples are presented. First, the example annual fee for a single ESWU is derived. Afterward, the fees for several typical types of properties with various ESWU values are listed. These examples are for illustrative purposes only, and do not represent the actual fees any particular property. The City Commission will adopt the annual fee amount for a single ESWU in both the EF and SO districts every year. The actual storm water utility fees for each property will be the adopted single ESWU rate multiplied by the ESWU value for the particular property. For this example, based on an annual incurred charge for storm water of $1.17 million in the EF District and $1.24 million in the SO District (approximate 2016 actual charges), the resulting apportioned annual fee per single ESWU would be as follows:

MAJOR DRAINAGE DISTRICT	TOTAL # PARCELS	TOTAL # ESWU's	SHARE FOR ESWU = 1.0	APPROX. ANNUAL FEE PER ESWU = 1.0
Evergreen-Farmington (EF)	4,335	6,442.1	0.00016	$182
South Oakland (SO)	3,629	5,201.8	0.00019	$238

Note: Share for ESWU = 1.0 is equal to 1.0 divided by Total # ESWU's for each District

Using the annual storm water utility fee derived for this example, storm water utility fees for other typical types of properties in the City would be calculated by multiplying the single ESWU rate by the ESWU value for the particular property. For single family residential classes, the example amount of for the storm water fee would be as follows:

EXAMPLE SINGLE FAM. RESID. PROPERTY	ESWU	APPROX. ANNUAL FEE IN EF DISTRICT	APPROX. ANNUAL FEE IN SO DISTRICT
Single Family Residential Class A	0.7	$127	$167
Single Family Residential Class B	1.0	$182	$238
Single Family Residential Class C	1.6	$292	$381
Single Family Residential Class D	2.4	$437	$571
Single Family Residential Class E	3.2	$582	$762
Single Family Residential Class F	4.6	$837	$1,119

Every non-single family residential property will have its ESWU value determined based on the unique characteristics for that property, including the total area of the property and the amount of impervious area on that property. Following are some examples of the storm water utility fee for fictitious properties with the noted characteristics:

EXAMPLE PROPERTY (with size of parcel)	ESWU	APPROX. ANNUAL FEE IN EF DISTRICT	APPROX. ANNUAL FEE IN SO DISTRICT
Two-Family Resid., 0.200 acres, 62% Imperv.	1.2	$218	$286
Multi-Family Resid., 0.730 acres, 76% Imperv.	5.3	$967	$1,261
Multi-Family Resid., 1.750 acres, 72% Imperv.	12.2	$2,217	$2,904
Office/Commercial, 0.150 acres, 100% Imperv.	1.4	$254	$333
Office/Commercial, 1.000 acres, 88% Imperv.	8.2	$1,490	$1,952
School/Institutional, 3.500 acres, 55% Imperv.	19.9	$3,617	$4,736
Park, 3.500 acres, 10% Imperv.	7.9	$1,436	$1,880
Vacant Parcel, 1.000 acres, 0% Imperv.	1.5	$273	$357

Billing for Storm Water Utility Fees – Current Water & Sewer Customers

Under the current system of distributing the sewage treatment costs attributable to storm water, the cost was included in the sewer rate on customers water and sewer bills. Going forward, the sewer rate on their bill will no longer include these costs, but instead there will be a separate line item for the Storm Water Utility Fee. The net effect for the total amount being charged will vary for every customer, with some being less than they have experienced in the past, and others more, dependent upon the characteristics of their particular property and their water consumption habits. As an example of how the new method compares to the old, the following table provides an example for illustrative purposes:

COMPARSION OF QUARTERLY WATER AND SEWER BILLS
OLD METHOD VERSUS NEW METHOD

OLD METHOD		NEW METHOD	
WATER CONSUMPTION	20 UNITS	WATER CONSUMPTION	20 UNITS
WATER	$ 87.20	WATER	$ 87.20
SEWER	$ 193.60	SEWER	$ 134.80
METER CHARGE	$ 8.00	STORM WATER *	$ 45.75
		METER CHARGE	$ 8.00
TOTAL WATER AND SEWER BILL	$ 288.80	TOTAL WATER & SEWER BILL	$ 275.75
		* ASSUMES RESIDENTIAL CLASS B IN THE EVERGREEN-FARMINGTON DISTRICT $183 ANNUAL FEE/4	

Billing for Storm Water Utility Fees – Properties Not Current Water & Sewer Customers

All properties in the City that contribute runoff to the City's sewer system will be assessed a Storm Water Utility Fee, regardless if they had been water and sewer utility customers or not. For those properties that currently do not receive a water and sewer bill, they will expect to receive a bill from the City going forward. For those properties that do not directly consume water, they will find their water consumption listed as zero, and thereby will have zero charges under the water, sewer and meter charge line items. The total of the water and sewer bill will consist of the Storm Water Utility Fee only.

Properties with Multiple Units or Tenants

The storm water utility fee determination is on a parcel by parcel basis, and does not take into account the number of units or tenants that may occupy any particular property. For properties with multiple units or tenants that have a unique property owner, the storm water utility fee will be assessed to the owner of property, and not the individual units or tenants that may occupy the property. For condominium properties with a defined number of units, the storm water utility fee determined for the entire property will be divided by the number of units and assessed to the individual unit owners.

Properties or Land Area Not Included in Apportionment Roll

Certain properties or areas of land are not included in the storm water apportionment as follows:

- Road right-of-way areas under the jurisdiction of the City or other agencies are not included in the apportionment based on the premise that the road systems are part of the drainage system, and benefit the City as a whole.
- Private properties where the development included separated sanitary sewers and storm sewer systems (with footing drain/sump pumps connected to storm) that are not utilizing the City sewer system for storm water.
- Certain public properties that do not contribute any runoff to the sewer system, and are mainly those through which the Rouge River passes.

Section 8 - Administrative Recommendations

Whereas the previous sections of the report were specific to the methodology for determining the ESWU's for properties in the City and establishing the apportionment roll, this section presents some recommendations for administering the storm water utility program. All of these recommendations are general in nature, and for the City's consideration in developing related ordinances and procedures.

Costs Included in the Apportionment

The costs incurred by the City from Oakland County WRC for transportation and treatment of storm water that enters the City's sewer system will vary year-to-year. The City may also find that other costs are incurred as it administers the program going forward, which are necessary and therefore appropriate to be included in the apportionment. Provisions for stipulating the costs to be included in the apportionment on an annual basis should be established.

Public Education

Information should be developed to educate the public on the purpose of the storm water utility fee, how it was determined, how they can appeal or make corrections, and how they can take measures to reduce the runoff being generated from their property that enters the sewer system. Developing a "frequently asked questions" document would also be beneficial. This information can be disseminated on the City's website or through printed brochures.

Process for Appeals and Adjustment

A process should be established for property owners to request adjustments to the impervious area measurements made for their property. To be customer friendly, this process could allow receiving requests throughout the year and have approved changes applied to the next years' apportionment. With this method, a specific deadline for receiving requests should be established each year to allow time for review of the request and to update the apportionment roll before the next years' apportionment is implemented.

For single-family residential (SFR) properties, the average impervious area for each lot-size classification was used to determine the ESWU value for that classification, and therefore, variations from parcel to parcel within each class are expected. Any SFR property's specific deviation from the average is not considered an "error".

Credits and Methods for Reducing Fees

Property owners must have a means for having their storm water utility fee reduced when they employ methods for reducing the amount of runoff generated by their property that enters the sewer system. The means for reducing the storm water utility fee can be accomplished through generally defined credits, or site specific modifications. Due to the method for determining the ESWU for the SFR properties, only credits are appropriate means for reducing their fee. Because the ESWU for non-single-family residential properties is determined on a site specific basis, measures taken for reducing runoff can be more directly applied.

Credits for SFR Properties

Credits for SFR properties must be applied for by the property owner following the process determined by the City to be most appropriate. As part of all applications, it should be clearly stated that application for the credit grants the City access to the property at any reasonable time to inspect or verify the measures related to the credit being applied for. Certain credits by their nature can easily be removed or discontinued, and could require annual application to ensure their continued use. In addition, the City should also have the right to revoke any credits given if the information provided is discovered to be false or if use of the measures were discontinued. Credits are only considered for low impact development (LID) measures that can actually reduce the amount of storm water that enters the sewer system, which benefits the entire City by reducing the treatment costs for storm water. While these measures would also have a water-quality benefit, that is not the primary goal for incentivizing their implementation. SFR credits can include some of the following:

- **Installing rain barrels** would collect the runoff from rooftops and prevent a portion of it from entering the sewer system. To qualify for this credit, the minimum requirements should include that one or more rain barrels be installed to collect the runoff from at least 50% of the main home's roof area, and that the barrels be at least 35 gallons in size. The application for the rain barrel credit should include a plan of the roof area of the home, the location and number of barrels installed, and they manufacturer and model number of the rain barrel installed. Suggested credit amount on the order of $10 to $20 annually.

- **Installing Rain Gardens or Bio-Swales** to collect the runoff from roofs and paved surfaces and prevent a portion of it from entering the sewer system. Rain gardens provide some surface storage volume that allows more time for infiltration and evapotranspiration (adsorption through plant roots) to occur, and can be installed in most soil types (appropriate plant selection based on soil types). This feature is not appropriate for poorly draining soils where captured water would not infiltrate within 24 hours. To qualify for this credit, the minimum requirements should include that at least 50% of the roof area (or equivalent amount of paved area) drain to the feature, the surface area be no less than 130 square feet, and that the depth provided be at least 3 to 6 inches throughout. The application for the rain garden credit should include a plan showing the areas draining to the rain garden, and dimensions of the feature. Rain gardens should be located at least 15 feet away from building foundations, and the overflow path should not go directly to paved surfaces or adjacent properties. Suggested credit amount on the order of $15 to $25 annually.

- **Installing Dry-Wells or Infiltration Trenches** to collect the runoff from roofs and paved surfaces and prevent a portion of it from entering the sewer system by taking advantage of the infiltration capacity of the soils on the property. Dry-wells and infiltration trenches are buried perforated structures or pipes surrounded by high porosity stone encapsulated by filter fabric. These features rely solely on the infiltration capacity of the soil and may only be applied where soil conditions warrant. To test the potential site's capacity for infiltration, a simple percolation test can be conducted by filling 18 inch deep hole (or deeper for dry-wells) with water, let it drain completely, fill with water again and measure time to drain. If less than 24 hours, then the infiltration capacity is adequate. Because these features promote quick, unfiltered infiltration, they should not be used in areas that have the potential to collect large amounts of sediment or where there is a high risk for surface contamination to be present. To qualify for this credit, the minimum requirements should include that at least 50% of the roof area (or equivalent amount of paved area) drain to the feature, and that the volume of the structure(s) and pipes be at least 33 cubic feet (or 250 gallons). The application for the dry-well or infiltration trench credit should include a plan showing the areas draining to the feature, and dimensions of the feature. Dry-wells and infiltration trenches should be located at least 15 feet away from building foundations, and the overflow path should not go directly to paved surfaces or adjacent properties. Suggested credit amount on the order of $20 to $30 annually.

- **Installing a Cistern** to collect the runoff from rooftops and prevent a portion of it from entering the sewer system. Cisterns are larger than rain barrels, and may be located below grade or at above ground. To qualify for this credit, the minimum requirements should include that the cistern be installed to collect the runoff from at least 50% of the main home's roof area, and have a minimum capacity of 500 gallons (or 66 cubic feet). The application for the cistern credit should include a plan of the roof area of the home, the location of the cistern installed, and they details and specifications of the cistern installed. Suggested credit amount on the order of $20 to $30 annually.
- **Installing Porous Pavement or Pavers** to replace otherwise impervious pavements. Porous paving systems must be specifically designed to promote infiltration, and include a porous stone base encapsulated with filter fabric. To qualify for this credit, the minimum requirements should include that the minimum surface area of the porous pavements be at least 200 square feet, and that the porous stone base thickness be at least 6 inches. Porous pavements should not be located within 10 feet of building foundations. Suggested credit amounts are $10 annually for 200 to 300 square feet, $20 annually for 300 to 400 square feet, and $30 annually for over 400 square feet.
- **Disconnecting Footing Drains** with an internal sump pump and outlet to grade. Sump pump discharges must be to a stable, pervious location on the same property, and not outlet or overflow directly to public sidewalks or streets, or to adjacent properties. Sump pump discharges should be at least 15 feet from the building foundation and preferably be collected in a rain garden, bio-swale, dry-well or infiltration trench. Footing drain disconnections require a plumbing permit through the City Building Department. Suggested credit amount on the order of $35 to $50 annually.

Typical details for the low impact development (LID) features mentioned in this section are included in Appendix C. These are excerpts from the Low Impact Development Manual for Michigan, published by SEMCOG, and are included for easy reference. The entire document can be found at http://semcog.org/Reports/LID/index.html.

Credits and Methods for Reducing Fees for NSFR Properties

Credits and other methods for reducing storm water utility fees for non-single family residential properties (NSFR) must be applied for by the property owner following the process determined by the City to be most appropriate. As part of all applications, it should be clearly stated that application for the credit grants the City access to the property at any reasonable time to inspect or verify the measures related to the credit being applied for. Certain credits by their nature can easily be removed or discontinued, and could require annual application to ensure their continued use. In addition, the City should also have the right to revoke any credits given if the information provided is discovered to be false or if use of the measures were discontinued. Credits are only considered for measures that can actually reduce the amount of storm water that enters the sewer system, which benefits the entire City by reducing the treatment costs for storm water. While these measures would also have a water-quality benefit, that is not the primary goal for incentivizing their implementation. NSFR credits or methods for reducing fees can include some of the following:

- **Install LID Features** as described for SFR properties. Suggested credit amounts similar to those noted for SFR properties. However, NSFR property owner can elect to apply for a reduction in their storm water utility fee in excess of the specified credit amount by demonstrating that the calculated ESWU for the parcel considering implementation of properly designed LID features, with impervious areas draining to the features considered to be pervious, will have a greater cost reduction. To qualify for fee reductions in excess of specified credit amounts, plans, details, specifications and calculations for the proposed features must be prepared by a licensed Professional Engineer.

- **Install On-Site Detention Systems** designed to capture and infiltrate 0.5 inches of rainfall on the site. Systems that only detain flows, and slowly release to the sewer system benefit the sewer system by reducing the peak flow from the site during intense rain events, but do not reduce the volume of storm water that eventually enters the sewer system and has to be treated. To qualify for a fee reduction for a detention system, plans, details, specifications and calculations for the proposed features must be prepared by a licensed Professional Engineer.

- **Install Green Roofs or Other LID Building features** designed to capture 0.5 inches of rainfall on the site. To qualify for a fee reduction for other types of systems, plans, details, specifications and calculations for the proposed features must be prepared by a licensed Professional Engineer.

Typical details for the low impact development (LID) features mentioned in this section are included in Appendix C. These are excerpts from the Low Impact Development Manual for Michigan, published by SEMCOG, and are included for easy reference. The entire document can be found at http://semcog.org/Reports/LID/index.html.

Process for Updating Apportionment Roll

A process should be established for updating the apportionment roll on an annual basis. The updates would include property transactions (splits or combinations), developments, additions, modifications, adjustments, and corrections that had occurred in the previous year. After changes are made to the property data, ESWU values would be recalculated along with each parcel's share of the overall cost to be apportioned. In addition, when new impervious surface data is available from SEMCOG, we would recommend that the average impervious area measurements for the SFR classifications be updated, and new values be established for the "standard" ESWU.

Appendix A

Figure 1 – Major Drainage District Map

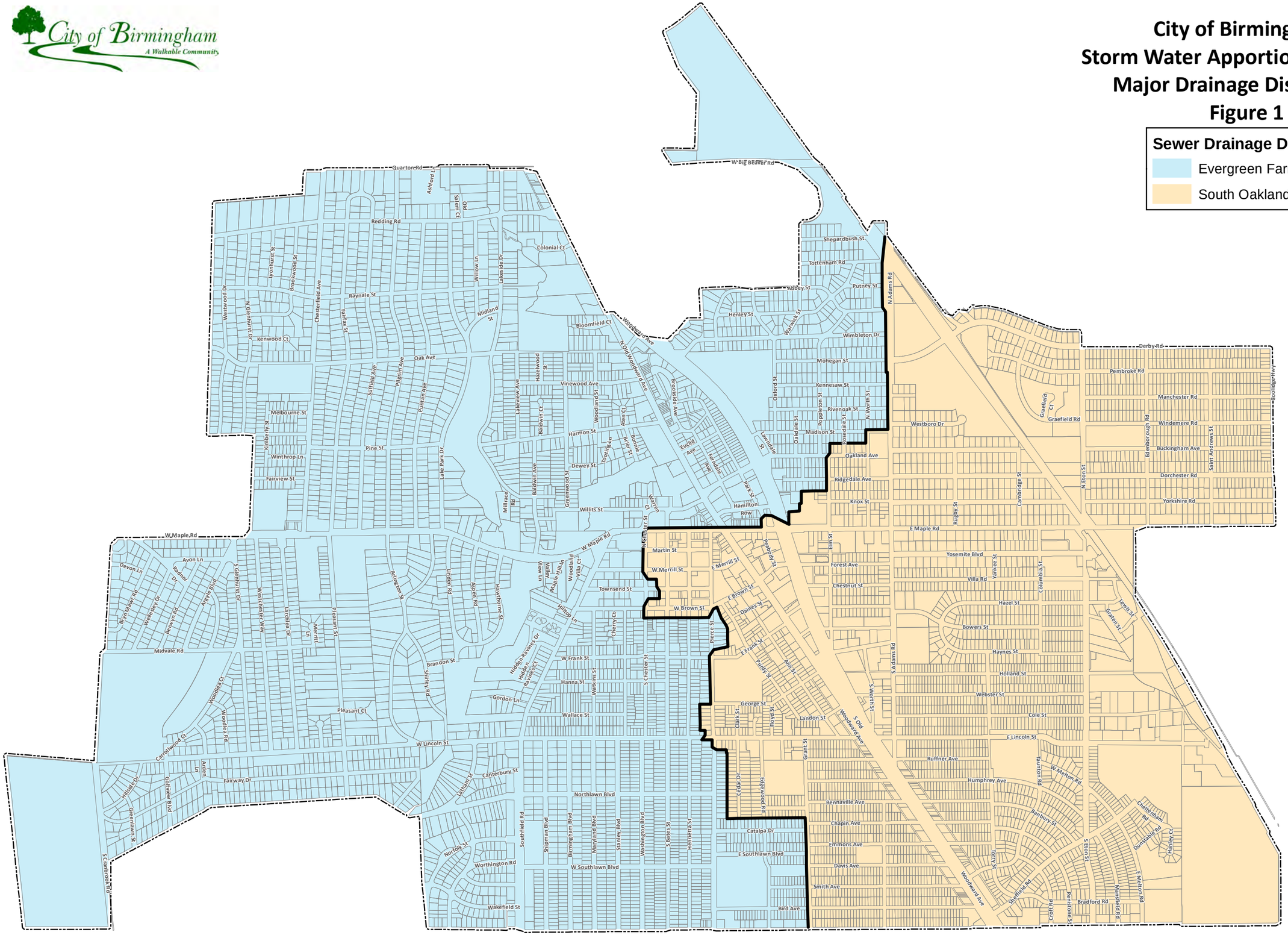
Figure 2 – Single Family Residential Parcel Map

Figure 3 – Non-Single Family Residential Parcel Map

City of Birmingham
Storm Water Apportionment Study
Major Drainage District Map
Figure 1

Sewer Drainage Districts

- Evergreen Farmington
- South Oakland



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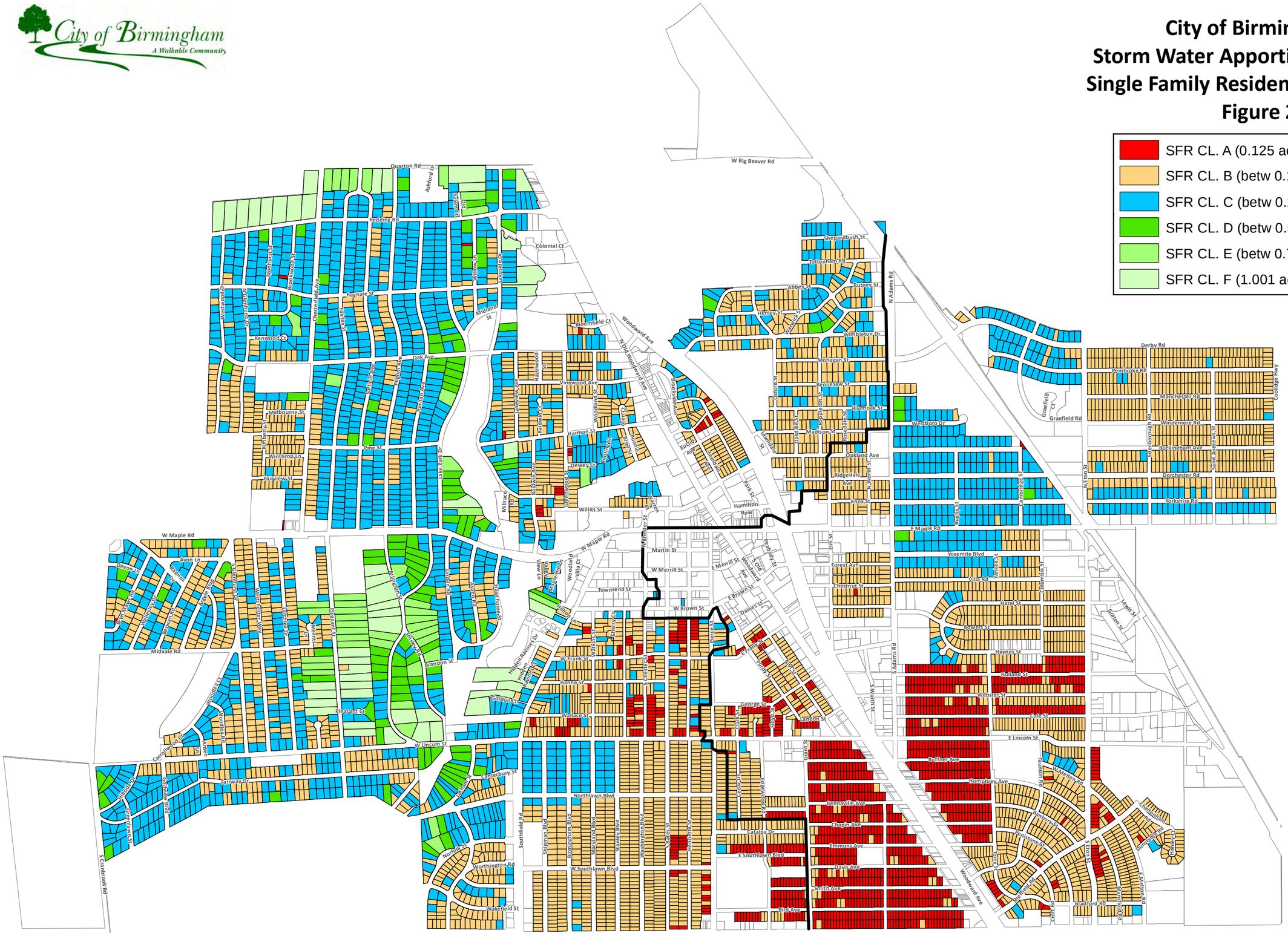
City of Birmingham
A Walkable Community

City of Birmingham
Storm Water Apportionment Study
Single Family Residential Parcel Map
Figure 2

- SFR CL. A (0.125 ac or less)
- SFR CL. B (betw 0.126 & 0.250 ac)
- SFR CL. C (betw 0.251 & 0.500 ac)
- SFR CL. D (betw 0.501 & 0.750 ac)
- SFR CL. E (betw 0.751 & 1.000 ac)
- SFR CL. F (1.001 ac or greater)



HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

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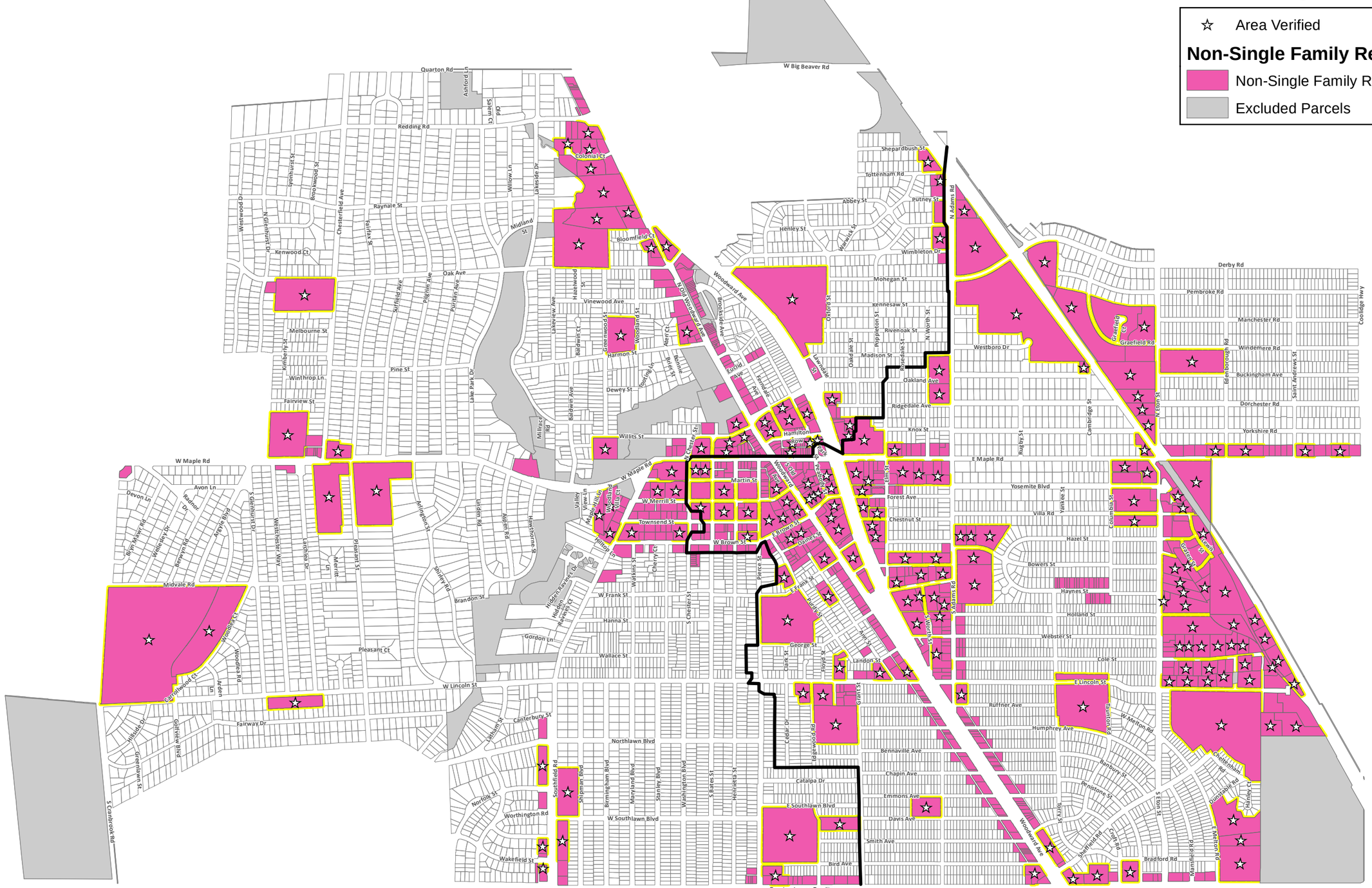
City of Birmingham
Storm Water Apportionment Study
Non-Single Family Residential Parcel Map
Figure 3



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Appendix B

Apportionment Roll

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925101001	1.181	EF	SFR-F	4.6	0.00071
1925101002	0.368	EF	SFR-C	1.6	0.00025
1925101003	0.370	EF	SFR-C	1.6	0.00025
1925101004	0.369	EF	SFR-C	1.6	0.00025
1925101006	0.275	EF	NR	0.7	0.00011
1925101007	0.081	EF	NR	0.2	0.00003
1925101008	0.051	EF	NR	0.5	0.00008
1925101009	0.050	EF	NR	0.5	0.00008
1925101010	0.301	EF	NR	2.7	0.00042
1925101011	0.050	EF	NR	0.4	0.00006
1925101012	0.299	EF	NR	2.4	0.00037
1925101013	0.201	EF	NR	1.8	0.00028
1925101014	0.431	EF	SFR-C	1.6	0.00025
1925101015	0.068	EF	NR	0.5	0.00008
1925151001	0.395	EF	SFR-C	1.6	0.00025
1925151002	0.398	EF	SFR-C	1.6	0.00025
1925151003	0.402	EF	MFR	3.6	0.00056
1925151004	0.393	EF	MFR	2.1	0.00033
1925151005	1.221	EF	MFR	6.6	0.00102
1925151006	0.488	EF	MFR	3.4	0.00053
1925151007	1.169	EF	MFR	6.5	0.00101
1925151008	1.240	EF	MFR	5.5	0.00085
1925151012	0.920	EF	MFR	4.6	0.00071
1925151013	1.624	EF	MFR	8.5	0.00132
1925151014	0.730	EF	MFR	4.7	0.00073
1925151022	0.176	EF	SFR-B	1.0	0.00016
1925151023	0.142	EF	SFR-B	1.0	0.00016
1925151024	0.149	EF	SFR-B	1.0	0.00016
1925151025	0.156	EF	SFR-B	1.0	0.00016
1925151028	0.170	EF	SFR-B	1.0	0.00016
1925151030	0.204	EF	SFR-B	1.0	0.00016
1925151031	0.176	EF	SFR-B	1.0	0.00016
1925151032	0.109	EF	SFR-A	0.7	0.00011
1925151033	0.170	EF	SFR-B	1.0	0.00016
1925151034	0.157	EF	SFR-B	1.0	0.00016
1925151035	0.164	EF	SFR-B	1.0	0.00016
1925151037	0.335	EF	SFR-C	1.6	0.00025
1925151039	0.230	EF	SFR-B	1.0	0.00016
1925151040	0.345	EF	SFR-C	1.6	0.00025
1925151043	0.832	EF	MFR	5.4	0.00084
1925151057	0.740	EF	MFR	5.2	0.00081
1925151069	2.220	EF	SFR-F	4.6	0.00071
1925151070	1.141	EF	SFR-F	4.6	0.00071
1925151071	0.357	EF	MFR	2.5	0.00039
1925151076	0.866	EF	MFR	4.8	0.00075

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925151091	8.739	EF	NR	18.7	0.00290
1925151092	3.935	EF	MFR	14.8	0.00230
1925151127	0.593	EF	MFR	4.0	0.00062
1925151137	0.482	EF	SFR-C	1.6	0.00025
1925151138	0.367	EF	SFR-C	1.6	0.00025
1925151139	0.287	EF	SFR-C	1.6	0.00025
1925151140	0.289	EF	SFR-C	1.6	0.00025
1925151141	0.146	EF	SFR-B	1.0	0.00016
1925151143	0.358	EF	SFR-C	1.6	0.00025
1925152001	5.879	EF	MFR	33.1	0.00514
1925177022	0.279	EF	SFR-C	1.6	0.00025
1925177023	0.284	EF	SFR-C	1.6	0.00025
1925177024	0.348	EF	SFR-C	1.6	0.00025
1925177025	0.279	EF	SFR-C	1.6	0.00025
1925177026	0.286	EF	SFR-C	1.6	0.00025
1925177027	0.322	EF	SFR-C	1.6	0.00025
1925177028	0.493	EF	SFR-C	1.6	0.00025
1925178001	1.057	EF	NR	7.2	0.00112
1925179001	0.574	EF	NR	5.2	0.00081
1925179002	0.196	EF	NR	1.6	0.00025
1925180003	0.172	EF	SFR-B	1.0	0.00016
1925180004	0.300	EF	SFR-C	1.6	0.00025
1925226010	0.393	EF	SFR-C	1.6	0.00025
1925226011	0.389	EF	SFR-C	1.6	0.00025
1925226012	0.341	EF	SFR-C	1.6	0.00025
1925226022	0.265	EF	SFR-C	1.6	0.00025
1925226023	0.264	EF	SFR-C	1.6	0.00025
1925226024	0.268	EF	SFR-C	1.6	0.00025
1925226025	0.266	EF	SFR-C	1.6	0.00025
1925229003	0.316	EF	SFR-C	1.6	0.00025
1925230002	0.209	EF	SFR-B	1.0	0.00016
1925230003	0.313	EF	SFR-C	1.6	0.00025
1925230004	0.323	EF	SFR-C	1.6	0.00025
1925230005	0.209	EF	SFR-B	1.0	0.00016
1925230006	0.304	EF	SFR-C	1.6	0.00025
1925230007	0.313	EF	SFR-C	1.6	0.00025
1925230008	0.209	EF	SFR-B	1.0	0.00016
1925230009	0.209	EF	SFR-B	1.0	0.00016
1925230011	0.313	EF	SFR-C	1.6	0.00025
1925230012	0.260	EF	SFR-C	1.6	0.00025
1925230013	0.262	EF	SFR-C	1.6	0.00025
1925230014	0.209	EF	SFR-B	1.0	0.00016
1925230015	0.209	EF	SFR-B	1.0	0.00016
1925230016	0.209	EF	SFR-B	1.0	0.00016
1925230017	0.209	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925230018	0.209	EF	SFR-B	1.0	0.00016
1925230019	0.209	EF	SFR-B	1.0	0.00016
1925230020	0.209	EF	SFR-B	1.0	0.00016
1925230021	0.209	EF	SFR-B	1.0	0.00016
1925230022	0.209	EF	SFR-B	1.0	0.00016
1925230024	1.075	EF	NR	1.6	0.00025
1925230025	0.209	EF	SFR-B	1.0	0.00016
1925230026	0.209	EF	SFR-B	1.0	0.00016
1925251008	0.029	EF	SFR-A	0.7	0.00011
1925251009	0.357	EF	SFR-C	1.6	0.00025
1925251010	0.460	EF	SFR-C	1.6	0.00025
1925251015	0.201	EF	SFR-B	1.0	0.00016
1925251021	0.331	EF	SFR-C	1.6	0.00025
1925251022	0.305	EF	SFR-C	1.6	0.00025
1925251023	0.305	EF	SFR-C	1.6	0.00025
1925251024	0.748	EF	SFR-D	2.4	0.00037
1925252001	0.238	EF	SFR-B	1.0	0.00016
1925252002	0.176	EF	SFR-B	1.0	0.00016
1925252003	0.192	EF	SFR-B	1.0	0.00016
1925252004	0.177	EF	SFR-B	1.0	0.00016
1925252005	0.173	EF	SFR-B	1.0	0.00016
1925252006	0.198	EF	SFR-B	1.0	0.00016
1925252009	0.222	EF	SFR-B	1.0	0.00016
1925252010	0.210	EF	SFR-B	1.0	0.00016
1925252011	0.216	EF	SFR-B	1.0	0.00016
1925252012	0.287	EF	SFR-C	1.6	0.00025
1925252014	0.228	EF	SFR-B	1.0	0.00016
1925252015	0.218	EF	SFR-B	1.0	0.00016
1925253001	0.315	EF	SFR-C	1.6	0.00025
1925253002	0.288	EF	SFR-C	1.6	0.00025
1925253003	0.182	EF	SFR-B	1.0	0.00016
1925253004	0.200	EF	SFR-B	1.0	0.00016
1925253005	0.209	EF	SFR-B	1.0	0.00016
1925253006	0.211	EF	SFR-B	1.0	0.00016
1925253007	0.214	EF	SFR-B	1.0	0.00016
1925253008	0.217	EF	SFR-B	1.0	0.00016
1925253009	0.220	EF	SFR-B	1.0	0.00016
1925253010	0.246	EF	SFR-B	1.0	0.00016
1925253011	0.218	EF	SFR-B	1.0	0.00016
1925253012	0.217	EF	SFR-B	1.0	0.00016
1925253013	0.216	EF	SFR-B	1.0	0.00016
1925253014	0.214	EF	SFR-B	1.0	0.00016
1925253015	0.213	EF	SFR-B	1.0	0.00016
1925253016	0.211	EF	SFR-B	1.0	0.00016
1925253017	0.217	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925254001	0.297	EF	SFR-C	1.6	0.00025
1925254002	0.273	EF	SFR-C	1.6	0.00025
1925254003	0.257	EF	SFR-C	1.6	0.00025
1925254004	0.209	EF	SFR-B	1.0	0.00016
1925254005	0.209	EF	SFR-B	1.0	0.00016
1925254006	0.257	EF	SFR-C	1.6	0.00025
1925254007	0.291	EF	SFR-C	1.6	0.00025
1925254008	0.201	EF	SFR-B	1.0	0.00016
1925254011	0.201	EF	SFR-B	1.0	0.00016
1925254012	0.201	EF	SFR-B	1.0	0.00016
1925254013	0.201	EF	SFR-B	1.0	0.00016
1925254014	0.201	EF	SFR-B	1.0	0.00016
1925254015	0.186	EF	SFR-B	1.0	0.00016
1925254016	0.186	EF	SFR-B	1.0	0.00016
1925254017	0.255	EF	SFR-C	1.6	0.00025
1925254019	0.201	EF	SFR-B	1.0	0.00016
1925254020	0.201	EF	SFR-B	1.0	0.00016
1925255001	0.223	EF	SFR-B	1.0	0.00016
1925255002	0.248	EF	SFR-B	1.0	0.00016
1925255005	0.249	EF	SFR-B	1.0	0.00016
1925255006	0.200	EF	SFR-B	1.0	0.00016
1925255007	0.212	EF	SFR-B	1.0	0.00016
1925255008	0.182	EF	SFR-B	1.0	0.00016
1925255009	0.168	EF	SFR-B	1.0	0.00016
1925255010	0.244	EF	SFR-B	1.0	0.00016
1925255011	0.345	EF	SFR-C	1.6	0.00025
1925256001	0.217	EF	SFR-B	1.0	0.00016
1925256002	0.215	EF	SFR-B	1.0	0.00016
1925257001	0.172	EF	SFR-B	1.0	0.00016
1925257002	0.231	EF	SFR-B	1.0	0.00016
1925257003	0.194	EF	SFR-B	1.0	0.00016
1925257004	0.185	EF	SFR-B	1.0	0.00016
1925257005	0.185	EF	SFR-B	1.0	0.00016
1925257008	0.185	EF	SFR-B	1.0	0.00016
1925257012	0.198	EF	SFR-B	1.0	0.00016
1925257018	0.185	EF	SFR-B	1.0	0.00016
1925257019	0.185	EF	SFR-B	1.0	0.00016
1925257020	0.185	EF	SFR-B	1.0	0.00016
1925257023	0.370	EF	SFR-C	1.6	0.00025
1925258001	0.197	EF	SFR-B	1.0	0.00016
1925258002	0.401	EF	SFR-C	1.6	0.00025
1925258003	0.201	EF	SFR-B	1.0	0.00016
1925258004	0.185	EF	SFR-B	1.0	0.00016
1925258005	0.185	EF	SFR-B	1.0	0.00016
1925258006	0.185	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925258007	0.185	EF	SFR-B	1.0	0.00016
1925258008	0.224	EF	SFR-B	1.0	0.00016
1925276001	0.305	EF	SFR-C	1.6	0.00025
1925276004	0.209	EF	SFR-B	1.0	0.00016
1925276005	0.209	EF	SFR-B	1.0	0.00016
1925276006	0.243	EF	SFR-B	1.0	0.00016
1925276007	0.209	EF	SFR-B	1.0	0.00016
1925276011	0.412	EF	SFR-C	1.6	0.00025
1925276012	0.223	EF	SFR-B	1.0	0.00016
1925276015	0.227	EF	SFR-B	1.0	0.00016
1925276016	0.262	EF	SFR-C	1.6	0.00025
1925276017	0.212	EF	SFR-B	1.0	0.00016
1925276018	0.215	EF	SFR-B	1.0	0.00016
1925276019	0.350	EF	SFR-C	1.6	0.00025
1925276022	0.209	EF	SFR-B	1.0	0.00016
1925276023	0.209	EF	SFR-B	1.0	0.00016
1925276024	0.330	EF	SFR-C	1.6	0.00025
1925276025	0.321	EF	SFR-C	1.6	0.00025
1925276026	0.209	EF	SFR-B	1.0	0.00016
1925276027	0.209	EF	SFR-B	1.0	0.00016
1925277001	0.207	EF	SFR-B	1.0	0.00016
1925277002	0.211	EF	SFR-B	1.0	0.00016
1925277003	0.210	EF	SFR-B	1.0	0.00016
1925277004	0.311	EF	SFR-C	1.6	0.00025
1925277005	0.234	EF	SFR-B	1.0	0.00016
1925277006	0.283	EF	MFR	2.1	0.00033
1925277007	0.273	EF	NR	0.4	0.00006
1925277008	0.303	EF	SFR-C	1.6	0.00025
1925277010	0.531	EF	MFR	3.9	0.00061
1925278001	0.314	EF	SFR-C	1.6	0.00025
1925278002	0.401	EF	SFR-C	1.6	0.00025
1925278008	0.324	EF	SFR-C	1.6	0.00025
1925278009	0.258	EF	SFR-C	1.6	0.00025
1925278010	0.281	EF	SFR-C	1.6	0.00025
1925278011	0.394	EF	SFR-C	1.6	0.00025
1925279001	0.216	EF	SFR-B	1.0	0.00016
1925279002	0.201	EF	SFR-B	1.0	0.00016
1925279003	0.247	EF	SFR-B	1.0	0.00016
1925279004	0.201	EF	SFR-B	1.0	0.00016
1925279005	0.201	EF	SFR-B	1.0	0.00016
1925279008	0.344	EF	SFR-C	1.6	0.00025
1925279009	0.371	EF	SFR-C	1.6	0.00025
1925279012	0.226	EF	SFR-B	1.0	0.00016
1925279013	0.253	EF	SFR-C	1.6	0.00025
1925279014	0.240	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925279017	1.883	EF	MFR	9.9	0.00154
1925279027	0.217	EF	SFR-B	1.0	0.00016
1925279028	0.240	EF	SFR-B	1.0	0.00016
1925280001	0.212	EF	SFR-B	1.0	0.00016
1925280002	0.208	EF	SFR-B	1.0	0.00016
1925280003	0.205	EF	SFR-B	1.0	0.00016
1925280008	0.247	EF	SFR-B	1.0	0.00016
1925280009	0.201	EF	SFR-B	1.0	0.00016
1925280010	0.201	EF	SFR-B	1.0	0.00016
1925280016	0.197	EF	SFR-B	1.0	0.00016
1925280017	0.362	EF	SFR-C	1.6	0.00025
1925280018	0.589	EF	SFR-D	2.4	0.00037
1925280019	0.452	EF	SFR-C	1.6	0.00025
1925280020	0.286	EF	SFR-C	1.6	0.00025
1925280022	0.218	EF	SFR-B	1.0	0.00016
1925280023	0.216	EF	SFR-B	1.0	0.00016
1925280024	0.548	EF	SFR-D	2.4	0.00037
1925281001	0.190	EF	SFR-B	1.0	0.00016
1925281004	0.175	EF	SFR-B	1.0	0.00016
1925281005	0.278	EF	SFR-C	1.6	0.00025
1925281006	0.193	EF	SFR-B	1.0	0.00016
1925281009	0.193	EF	SFR-B	1.0	0.00016
1925281010	0.220	EF	SFR-B	1.0	0.00016
1925281033	0.341	EF	SFR-C	1.6	0.00025
1925281034	0.403	EF	SFR-C	1.6	0.00025
1925281035	0.386	EF	SFR-C	1.6	0.00025
1925281036	0.216	EF	SFR-B	1.0	0.00016
1925281037	0.186	EF	SFR-B	1.0	0.00016
1925282001	0.273	EF	SFR-C	1.6	0.00025
1925282002	0.185	EF	SFR-B	1.0	0.00016
1925282003	0.247	EF	SFR-B	1.0	0.00016
1925282004	0.247	EF	SFR-B	1.0	0.00016
1925282008	0.247	EF	SFR-B	1.0	0.00016
1925282012	0.197	EF	SFR-B	1.0	0.00016
1925282013	0.174	EF	SFR-B	1.0	0.00016
1925282015	0.309	EF	SFR-C	1.6	0.00025
1925282017	0.392	EF	MFR	2.1	0.00033
1925282024	0.247	EF	SFR-B	1.0	0.00016
1925282025	0.185	EF	SFR-B	1.0	0.00016
1925301001	0.191	EF	SFR-B	1.0	0.00016
1925301002	0.155	EF	SFR-B	1.0	0.00016
1925301003	0.155	EF	SFR-B	1.0	0.00016
1925301004	0.155	EF	SFR-B	1.0	0.00016
1925301005	0.155	EF	SFR-B	1.0	0.00016
1925301006	0.155	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925301007	0.205	EF	SFR-B	1.0	0.00016
1925301008	0.193	EF	SFR-B	1.0	0.00016
1925301009	0.155	EF	SFR-B	1.0	0.00016
1925301010	0.155	EF	SFR-B	1.0	0.00016
1925301011	0.155	EF	SFR-B	1.0	0.00016
1925301012	0.155	EF	SFR-B	1.0	0.00016
1925301013	0.155	EF	SFR-B	1.0	0.00016
1925301014	0.208	EF	SFR-B	1.0	0.00016
1925302001	0.195	EF	SFR-B	1.0	0.00016
1925302002	0.155	EF	SFR-B	1.0	0.00016
1925302003	0.155	EF	SFR-B	1.0	0.00016
1925302004	0.155	EF	SFR-B	1.0	0.00016
1925302005	0.155	EF	SFR-B	1.0	0.00016
1925302006	0.155	EF	SFR-B	1.0	0.00016
1925302007	0.205	EF	SFR-B	1.0	0.00016
1925302008	0.197	EF	SFR-B	1.0	0.00016
1925302009	0.155	EF	SFR-B	1.0	0.00016
1925302010	0.155	EF	SFR-B	1.0	0.00016
1925302011	0.155	EF	SFR-B	1.0	0.00016
1925302012	0.155	EF	SFR-B	1.0	0.00016
1925302013	0.155	EF	SFR-B	1.0	0.00016
1925302014	0.205	EF	SFR-B	1.0	0.00016
1925303001	0.161	EF	SFR-B	1.0	0.00016
1925303002	0.149	EF	SFR-B	1.0	0.00016
1925303003	0.149	EF	SFR-B	1.0	0.00016
1925303004	0.153	EF	SFR-B	1.0	0.00016
1925303005	0.153	EF	SFR-B	1.0	0.00016
1925303006	0.153	EF	SFR-B	1.0	0.00016
1925303007	0.153	EF	SFR-B	1.0	0.00016
1925303008	0.200	EF	SFR-B	1.0	0.00016
1925303009	0.206	EF	SFR-B	1.0	0.00016
1925303010	0.203	EF	SFR-B	1.0	0.00016
1925303011	0.206	EF	SFR-B	1.0	0.00016
1925303012	0.154	EF	SFR-B	1.0	0.00016
1925303015	0.150	EF	SFR-B	1.0	0.00016
1925303016	0.148	EF	SFR-B	1.0	0.00016
1925303017	0.149	EF	SFR-B	1.0	0.00016
1925303018	0.151	EF	SFR-B	1.0	0.00016
1925303019	0.295	EF	SFR-C	1.6	0.00025
1925304001	0.159	EF	SFR-B	1.0	0.00016
1925304002	0.159	EF	SFR-B	1.0	0.00016
1925304003	0.159	EF	SFR-B	1.0	0.00016
1925304004	0.159	EF	SFR-B	1.0	0.00016
1925304005	0.158	EF	SFR-B	1.0	0.00016
1925304006	0.158	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925304008	0.164	EF	SFR-B	1.0	0.00016
1925304009	0.160	EF	SFR-B	1.0	0.00016
1925304010	0.162	EF	SFR-B	1.0	0.00016
1925304011	0.162	EF	SFR-B	1.0	0.00016
1925304012	0.162	EF	SFR-B	1.0	0.00016
1925304013	0.162	EF	SFR-B	1.0	0.00016
1925304014	0.197	EF	SFR-B	1.0	0.00016
1925304017	0.275	EF	SFR-C	1.6	0.00025
1925304018	0.255	EF	SFR-C	1.6	0.00025
1925304019	0.325	EF	SFR-C	1.6	0.00025
1925304022	0.160	EF	SFR-B	1.0	0.00016
1925304023	0.200	EF	SFR-B	1.0	0.00016
1925304024	0.182	EF	SFR-B	1.0	0.00016
1925304025	0.180	EF	SFR-B	1.0	0.00016
1925304026	0.138	EF	SFR-B	1.0	0.00016
1925304027	0.257	EF	SFR-C	1.6	0.00025
1925304030	0.166	EF	SFR-B	1.0	0.00016
1925304031	0.241	EF	SFR-B	1.0	0.00016
1925304032	0.383	EF	SFR-C	1.6	0.00025
1925304033	0.201	EF	SFR-B	1.0	0.00016
1925304034	0.267	EF	SFR-C	1.6	0.00025
1925304035	0.174	EF	SFR-B	1.0	0.00016
1925304036	0.181	EF	SFR-B	1.0	0.00016
1925304037	0.342	EF	SFR-C	1.6	0.00025
1925304038	0.181	EF	SFR-B	1.0	0.00016
1925304039	0.181	EF	SFR-B	1.0	0.00016
1925304040	0.181	EF	SFR-B	1.0	0.00016
1925304041	0.149	EF	SFR-B	1.0	0.00016
1925304042	0.149	EF	SFR-B	1.0	0.00016
1925304043	0.230	EF	SFR-B	1.0	0.00016
1925304045	0.185	EF	SFR-B	1.0	0.00016
1925304046	0.159	EF	SFR-B	1.0	0.00016
1925304048	0.217	EF	SFR-B	1.0	0.00016
1925304049	0.217	EF	SFR-B	1.0	0.00016
1925304050	0.272	EF	SFR-C	1.6	0.00025
1925304051	0.158	EF	SFR-B	1.0	0.00016
1925304052	0.158	EF	SFR-B	1.0	0.00016
1925304053	0.238	EF	SFR-B	1.0	0.00016
1925304054	0.236	EF	SFR-B	1.0	0.00016
1925305001	0.147	EF	SFR-B	1.0	0.00016
1925305002	0.137	EF	SFR-B	1.0	0.00016
1925305004	0.147	EF	SFR-B	1.0	0.00016
1925305005	0.153	EF	SFR-B	1.0	0.00016
1925305006	0.191	EF	SFR-B	1.0	0.00016
1925305009	0.214	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925305012	0.141	EF	SFR-B	1.0	0.00016
1925305013	0.153	EF	SFR-B	1.0	0.00016
1925305014	0.146	EF	SFR-B	1.0	0.00016
1925305015	3.521	EF	NR	25.6	0.00397
1925326001	0.148	EF	SFR-B	1.0	0.00016
1925326002	0.163	EF	SFR-B	1.0	0.00016
1925326003	0.146	EF	SFR-B	1.0	0.00016
1925326004	0.482	EF	SFR-C	1.6	0.00025
1925326005	0.151	EF	SFR-B	1.0	0.00016
1925326006	0.146	EF	SFR-B	1.0	0.00016
1925326007	0.149	EF	SFR-B	1.0	0.00016
1925326008	0.146	EF	SFR-B	1.0	0.00016
1925326011	0.158	EF	SFR-B	1.0	0.00016
1925326012	0.154	EF	SFR-B	1.0	0.00016
1925326013	0.150	EF	SFR-B	1.0	0.00016
1925326015	0.598	EF	MFR	3.6	0.00056
1925326023	0.849	EF	MFR	5.4	0.00084
1925326039	0.535	EF	MFR	3.2	0.00050
1925327005	0.179	EF	SFR-B	1.0	0.00016
1925327006	0.206	EF	SFR-B	1.0	0.00016
1925327007	0.221	EF	SFR-B	1.0	0.00016
1925327008	0.216	EF	SFR-B	1.0	0.00016
1925327009	0.222	EF	SFR-B	1.0	0.00016
1925327010	0.215	EF	SFR-B	1.0	0.00016
1925327012	0.148	EF	SFR-B	1.0	0.00016
1925327013	0.154	EF	SFR-B	1.0	0.00016
1925327014	0.323	EF	SFR-C	1.6	0.00025
1925327015	0.284	EF	SFR-C	1.6	0.00025
1925327016	0.288	EF	SFR-C	1.6	0.00025
1925327019	0.363	EF	MFR	2.5	0.00039
1925327020	0.244	EF	SFR-B	1.0	0.00016
1925327021	0.188	EF	SFR-B	1.0	0.00016
1925327022	0.184	EF	SFR-B	1.0	0.00016
1925327023	0.178	EF	SFR-B	1.0	0.00016
1925327024	0.179	EF	SFR-B	1.0	0.00016
1925327031	0.099	EF	NR	0.9	0.00014
1925327032	0.066	EF	NR	0.6	0.00009
1925327033	1.202	EF	MFR	8.3	0.00129
1925327052	0.143	EF	SFR-B	1.0	0.00016
1925327053	0.147	EF	SFR-B	1.0	0.00016
1925327054	0.174	EF	SFR-B	1.0	0.00016
1925327055	0.217	EF	SFR-B	1.0	0.00016
1925327056	0.222	EF	SFR-B	1.0	0.00016
1925327057	0.265	EF	SFR-C	1.6	0.00025
1925327058	0.203	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925327060	0.150	EF	SFR-B	1.0	0.00016
1925327061	0.145	EF	SFR-B	1.0	0.00016
1925327062	0.837	EF	MFR	5.2	0.00081
1925327074	0.185	EF	NR	1.7	0.00026
1925327079	0.422	EF	SFR-C	1.6	0.00025
1925327080	0.392	EF	SFR-C	1.6	0.00025
1925328001	0.568	EF	NR	2.5	0.00039
1925328005	0.054	EF	NR	0.5	0.00008
1925328006	0.054	EF	NR	0.5	0.00008
1925328007	0.054	EF	NR	0.5	0.00008
1925328008	0.056	EF	NR	0.5	0.00008
1925328009	0.043	EF	NR	0.4	0.00006
1925328010	0.043	EF	NR	0.4	0.00006
1925328014	0.080	EF	NR	0.7	0.00011
1925328017	0.064	EF	NR	0.6	0.00009
1925328018	0.065	EF	NR	0.6	0.00009
1925328019	0.049	EF	NR	0.4	0.00006
1925328020	0.119	EF	NR	0.9	0.00014
1925328022	0.037	EF	NR	0.3	0.00005
1925328023	0.054	EF	NR	0.5	0.00008
1925328024	0.054	EF	NR	0.5	0.00008
1925328025	0.054	EF	NR	0.4	0.00006
1925328026	0.055	EF	NR	0.4	0.00006
1925328027	0.055	EF	NR	0.4	0.00006
1925328028	0.055	EF	NR	0.4	0.00006
1925328030	0.153	EF	NR	1.1	0.00017
1925328031	0.092	EF	NR	0.8	0.00012
1925328032	0.044	EF	NR	0.3	0.00005
1925328033	0.044	EF	NR	0.3	0.00005
1925328034	0.069	EF	NR	0.6	0.00009
1925328035	0.030	EF	NR	0.2	0.00003
1925328038	0.161	EF	SFR-B	1.0	0.00016
1925328039	0.258	EF	SFR-C	1.6	0.00025
1925328040	0.267	EF	SFR-C	1.6	0.00025
1925328041	0.167	EF	SFR-B	1.0	0.00016
1925328044	0.133	EF	SFR-B	1.0	0.00016
1925328045	0.320	EF	SFR-C	1.6	0.00025
1925328046	0.271	EF	SFR-C	1.6	0.00025
1925328047	0.281	EF	SFR-C	1.6	0.00025
1925328048	0.194	EF	SFR-B	1.0	0.00016
1925328049	0.173	EF	SFR-B	1.0	0.00016
1925328050	0.114	EF	SFR-A	0.7	0.00011
1925328052	0.137	EF	SFR-B	1.0	0.00016
1925328054	0.167	EF	SFR-B	1.0	0.00016
1925328056	0.143	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925328058	0.129	EF	NR	1.2	0.00019
1925328059	0.438	EF	SFR-C	1.6	0.00025
1925328060	0.107	EF	NR	1.0	0.00016
1925328061	0.143	EF	NR	1.3	0.00020
1925328062	0.289	EF	MFR	2.4	0.00037
1925329006	0.275	EF	SFR-C	1.6	0.00025
1925329007	0.208	EF	SFR-B	1.0	0.00016
1925329010	0.150	EF	SFR-B	1.0	0.00016
1925329011	0.190	EF	SFR-B	1.0	0.00016
1925329012	0.177	EF	SFR-B	1.0	0.00016
1925329013	0.170	EF	SFR-B	1.0	0.00016
1925329014	0.250	EF	SFR-B	1.0	0.00016
1925329015	0.241	EF	SFR-B	1.0	0.00016
1925329016	0.153	EF	SFR-B	1.0	0.00016
1925329017	0.142	EF	SFR-B	1.0	0.00016
1925329018	0.244	EF	SFR-B	1.0	0.00016
1925329019	0.331	EF	SFR-C	1.6	0.00025
1925330001	0.189	EF	NR	1.7	0.00026
1925330004	0.137	EF	NR	1.2	0.00019
1925330005	0.233	EF	SFR-B	1.0	0.00016
1925330006	0.138	EF	SFR-B	1.0	0.00016
1925330007	0.139	EF	SFR-B	1.0	0.00016
1925330008	0.128	EF	NR	1.0	0.00016
1925330009	0.162	EF	NR	1.4	0.00022
1925331001	0.122	EF	SFR-A	0.7	0.00011
1925331002	0.107	EF	SFR-A	0.7	0.00011
1925331003	0.110	EF	SFR-A	0.7	0.00011
1925331004	0.128	EF	SFR-B	1.0	0.00016
1925331005	0.122	EF	SFR-A	0.7	0.00011
1925331006	0.209	EF	MFR	1.3	0.00020
1925331007	0.139	EF	MFR	1.0	0.00016
1925331009	0.233	EF	MFR	1.1	0.00017
1925351001	0.219	EF	SFR-B	1.0	0.00016
1925351002	0.217	EF	SFR-B	1.0	0.00016
1925351003	0.197	EF	SFR-B	1.0	0.00016
1925351004	0.277	EF	SFR-C	1.6	0.00025
1925351005	0.288	EF	SFR-C	1.6	0.00025
1925351006	0.266	EF	SFR-C	1.6	0.00025
1925351007	0.204	EF	SFR-B	1.0	0.00016
1925351008	0.204	EF	SFR-B	1.0	0.00016
1925351009	0.204	EF	SFR-B	1.0	0.00016
1925351010	0.203	EF	SFR-B	1.0	0.00016
1925351011	0.239	EF	SFR-B	1.0	0.00016
1925351012	0.230	EF	SFR-B	1.0	0.00016
1925351013	0.227	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925352004	0.336	EF	SFR-C	1.6	0.00025
1925352010	0.175	EF	SFR-B	1.0	0.00016
1925352013	0.310	EF	SFR-C	1.6	0.00025
1925352014	0.151	EF	SFR-B	1.0	0.00016
1925352015	0.154	EF	SFR-B	1.0	0.00016
1925352017	0.357	EF	SFR-C	1.6	0.00025
1925352018	0.436	EF	SFR-C	1.6	0.00025
1925353001	0.256	EF	SFR-C	1.6	0.00025
1925353002	0.438	EF	SFR-C	1.6	0.00025
1925353003	0.258	EF	SFR-C	1.6	0.00025
1925353004	0.222	EF	SFR-B	1.0	0.00016
1925353005	0.212	EF	SFR-B	1.0	0.00016
1925353006	0.300	EF	SFR-C	1.6	0.00025
1925353007	0.259	EF	SFR-C	1.6	0.00025
1925353008	0.216	EF	SFR-B	1.0	0.00016
1925353009	0.216	EF	SFR-B	1.0	0.00016
1925353010	0.194	EF	SFR-B	1.0	0.00016
1925353011	0.237	EF	SFR-B	1.0	0.00016
1925353012	0.215	EF	SFR-B	1.0	0.00016
1925353013	0.219	EF	SFR-B	1.0	0.00016
1925353014	0.166	EF	SFR-B	1.0	0.00016
1925353015	0.151	EF	SFR-B	1.0	0.00016
1925353016	0.141	EF	SFR-B	1.0	0.00016
1925353017	0.159	EF	SFR-B	1.0	0.00016
1925353018	0.163	EF	SFR-B	1.0	0.00016
1925353019	0.133	EF	SFR-B	1.0	0.00016
1925353020	0.250	EF	SFR-B	1.0	0.00016
1925353021	0.218	EF	SFR-B	1.0	0.00016
1925353022	0.219	EF	SFR-B	1.0	0.00016
1925353023	0.219	EF	SFR-B	1.0	0.00016
1925353024	0.220	EF	SFR-B	1.0	0.00016
1925353025	0.221	EF	SFR-B	1.0	0.00016
1925353026	0.221	EF	SFR-B	1.0	0.00016
1925353027	0.222	EF	SFR-B	1.0	0.00016
1925353028	0.223	EF	SFR-B	1.0	0.00016
1925353029	0.230	EF	SFR-B	1.0	0.00016
1925353030	0.112	EF	SFR-A	0.7	0.00011
1925353031	0.116	EF	SFR-A	0.7	0.00011
1925353032	0.116	EF	SFR-A	0.7	0.00011
1925353033	0.203	EF	SFR-B	1.0	0.00016
1925353040	0.155	EF	SFR-B	1.0	0.00016
1925353041	0.225	EF	SFR-B	1.0	0.00016
1925353042	0.119	EF	SFR-A	0.7	0.00011
1925353043	0.116	EF	SFR-A	0.7	0.00011
1925353044	0.114	EF	SFR-A	0.7	0.00011

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925353045	0.155	EF	SFR-B	1.0	0.00016
1925353046	0.149	EF	SFR-B	1.0	0.00016
1925353048	0.172	EF	SFR-B	1.0	0.00016
1925353049	0.161	EF	SFR-B	1.0	0.00016
1925353050	0.266	EF	SFR-C	1.6	0.00025
1925354001	0.209	EF	SFR-B	1.0	0.00016
1925354006	0.204	EF	SFR-B	1.0	0.00016
1925354007	0.226	EF	SFR-B	1.0	0.00016
1925354008	0.074	EF	SFR-A	0.7	0.00011
1925354009	0.069	EF	SFR-A	0.7	0.00011
1925354010	0.138	EF	SFR-B	1.0	0.00016
1925354014	0.279	EF	SFR-C	1.6	0.00025
1925354015	0.286	EF	SFR-C	1.6	0.00025
1925354016	0.298	EF	SFR-C	1.6	0.00025
1925354018	0.340	EF	SFR-C	1.6	0.00025
1925354019	0.290	EF	SFR-C	1.6	0.00025
1925354020	0.300	EF	SFR-C	1.6	0.00025
1925354021	0.409	EF	SFR-C	1.6	0.00025
1925354022	0.396	EF	SFR-C	1.6	0.00025
1925355001	0.189	EF	SFR-B	1.0	0.00016
1925355004	0.190	EF	SFR-B	1.0	0.00016
1925355005	0.190	EF	SFR-B	1.0	0.00016
1925355006	0.179	EF	SFR-B	1.0	0.00016
1925355007	0.167	EF	SFR-B	1.0	0.00016
1925355008	0.165	EF	SFR-B	1.0	0.00016
1925355010	0.852	EF	SFR-E	3.2	0.00050
1925355012	0.166	EF	SFR-B	1.0	0.00016
1925355013	0.167	EF	SFR-B	1.0	0.00016
1925355014	0.379	EF	SFR-C	1.6	0.00025
1925355015	0.403	EF	SFR-C	1.6	0.00025
1925356001	0.184	EF	SFR-B	1.0	0.00016
1925356002	0.159	EF	SFR-B	1.0	0.00016
1925356003	0.217	EF	SFR-B	1.0	0.00016
1925356004	0.217	EF	SFR-B	1.0	0.00016
1925356008	0.182	EF	SFR-B	1.0	0.00016
1925356011	0.246	EF	NR	1.4	0.00022
1925356012	0.188	EF	NR	1.6	0.00025
1925356013	0.329	EF	NR	2.9	0.00045
1925356015	1.920	EF	MFR	7.4	0.00115
1925356023	0.388	EF	NR	3.1	0.00048
1925376005	0.357	EF	SFR-C	1.6	0.00025
1925376008	0.349	EF	SFR-C	1.6	0.00025
1925376009	0.427	EF	SFR-C	1.6	0.00025
1925376011	0.412	EF	SFR-C	1.6	0.00025
1925376014	0.381	EF	SFR-C	1.6	0.00025

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925376020	0.130	EF	SFR-B	1.0	0.00016
1925376021	0.166	EF	SFR-B	1.0	0.00016
1925376022	0.144	EF	SFR-B	1.0	0.00016
1925376023	0.157	EF	SFR-B	1.0	0.00016
1925376024	0.165	EF	SFR-B	1.0	0.00016
1925376025	0.175	EF	SFR-B	1.0	0.00016
1925376026	0.231	EF	SFR-B	1.0	0.00016
1925376027	0.173	EF	SFR-B	1.0	0.00016
1925376028	0.147	EF	SFR-B	1.0	0.00016
1925376030	0.376	EF	SFR-C	1.6	0.00025
1925376031	0.336	EF	SFR-C	1.6	0.00025
1925376032	0.338	EF	SFR-C	1.6	0.00025
1925376033	0.355	EF	SFR-C	1.6	0.00025
1925376034	0.404	EF	SFR-C	1.6	0.00025
1925376036	0.210	EF	SFR-B	1.0	0.00016
1925376037	0.145	EF	SFR-B	1.0	0.00016
1925376038	0.146	EF	SFR-B	1.0	0.00016
1925376039	0.180	EF	SFR-B	1.0	0.00016
1925376040	0.165	EF	SFR-B	1.0	0.00016
1925376041	0.165	EF	SFR-B	1.0	0.00016
1925376042	0.166	EF	SFR-B	1.0	0.00016
1925376043	0.162	EF	SFR-B	1.0	0.00016
1925376044	0.166	EF	SFR-B	1.0	0.00016
1925376045	0.166	EF	SFR-B	1.0	0.00016
1925376059	0.457	EF	SFR-C	1.6	0.00025
1925376062	0.204	EF	SFR-B	1.0	0.00016
1925376064	0.432	EF	SFR-C	1.6	0.00025
1925376068	0.389	EF	SFR-C	1.6	0.00025
1925376069	0.382	EF	SFR-C	1.6	0.00025
1925376070	0.386	EF	SFR-C	1.6	0.00025
1925376072	0.232	EF	SFR-B	1.0	0.00016
1925376073	0.152	EF	SFR-B	1.0	0.00016
1925376074	0.153	EF	SFR-B	1.0	0.00016
1925376076	0.554	EF	NR	4.6	0.00071
1925376081	0.215	EF	SFR-B	1.0	0.00016
1925376082	0.381	EF	SFR-C	1.6	0.00025
1925376083	0.386	EF	SFR-C	1.6	0.00025
1925376086	0.814	EF	MFR	4.3	0.00067
1925376095	0.133	EF	SFR-B	1.0	0.00016
1925376096	0.173	EF	SFR-B	1.0	0.00016
1925376099	0.975	EF	NR	8.9	0.00138
1925377006	1.181	EF	NR	10.7	0.00166
1925378008	0.154	EF	NR	1.4	0.00022
1925378009	0.150	EF	NR	1.4	0.00022
1925378010	0.208	EF	NR	1.9	0.00029

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925378011	0.081	EF	NR	0.7	0.00011
1925378012	0.034	EF	NR	0.3	0.00005
1925378014	0.095	EF	NR	0.9	0.00014
1925378015	0.211	EF	NR	1.9	0.00029
1925378016	0.097	EF	NR	0.9	0.00014
1925378021	0.060	EF	NR	0.5	0.00008
1925378023	0.808	EF	NR	7.1	0.00110
1925378026	0.202	EF	NR	1.8	0.00028
1925378027	0.075	EF	NR	0.7	0.00011
1925378028	0.977	EF	NR	8.8	0.00137
1925378089	0.073	EF	NR	0.6	0.00009
1925378094	0.202	EF	NR	1.8	0.00028
1925379007	0.413	EF	NR	3.8	0.00059
1925379008	0.138	EF	SFR-B	1.0	0.00016
1925379009	0.138	EF	SFR-B	1.0	0.00016
1925379010	0.138	EF	SFR-B	1.0	0.00016
1925379011	0.138	EF	SFR-B	1.0	0.00016
1925379012	0.138	EF	SFR-B	1.0	0.00016
1925379013	0.138	EF	SFR-B	1.0	0.00016
1925379014	0.138	EF	SFR-B	1.0	0.00016
1925379015	0.138	EF	SFR-B	1.0	0.00016
1925379021	0.275	EF	NR	2.5	0.00039
1925379022	0.275	EF	NR	2.5	0.00039
1925379023	0.413	EF	NR	3.6	0.00056
1925379024	0.551	EF	NR	4.8	0.00075
1925401001	17.205	EF	NR	31.1	0.00483
1925401002	0.183	EF	SFR-B	1.0	0.00016
1925401003	0.170	EF	SFR-B	1.0	0.00016
1925401004	0.288	EF	SFR-C	1.6	0.00025
1925401005	0.174	EF	SFR-B	1.0	0.00016
1925401006	0.174	EF	SFR-B	1.0	0.00016
1925401007	0.174	EF	SFR-B	1.0	0.00016
1925402001	0.223	EF	SFR-B	1.0	0.00016
1925402002	0.221	EF	SFR-B	1.0	0.00016
1925402003	0.282	EF	SFR-C	1.6	0.00025
1925402004	0.168	EF	SFR-B	1.0	0.00016
1925402005	0.212	EF	SFR-B	1.0	0.00016
1925402006	0.247	EF	SFR-B	1.0	0.00016
1925402007	0.233	EF	SFR-B	1.0	0.00016
1925402008	0.235	EF	SFR-B	1.0	0.00016
1925403001	0.225	EF	SFR-B	1.0	0.00016
1925403002	0.225	EF	SFR-B	1.0	0.00016
1925403003	0.225	EF	SFR-B	1.0	0.00016
1925403006	0.225	EF	SFR-B	1.0	0.00016
1925403007	0.225	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925403008	0.225	EF	SFR-B	1.0	0.00016
1925403009	0.225	EF	SFR-B	1.0	0.00016
1925403010	0.225	EF	SFR-B	1.0	0.00016
1925403011	0.225	EF	SFR-B	1.0	0.00016
1925403012	0.225	EF	SFR-B	1.0	0.00016
1925403013	0.225	EF	SFR-B	1.0	0.00016
1925403014	0.225	EF	SFR-B	1.0	0.00016
1925403015	0.225	EF	SFR-B	1.0	0.00016
1925403016	0.225	EF	SFR-B	1.0	0.00016
1925403018	0.225	EF	SFR-B	1.0	0.00016
1925403019	0.225	EF	SFR-B	1.0	0.00016
1925404005	0.225	EF	SFR-B	1.0	0.00016
1925404006	0.225	EF	SFR-B	1.0	0.00016
1925404007	0.225	EF	SFR-B	1.0	0.00016
1925404008	0.225	EF	SFR-B	1.0	0.00016
1925404009	0.225	EF	SFR-B	1.0	0.00016
1925404010	0.225	EF	SFR-B	1.0	0.00016
1925404011	0.225	EF	SFR-B	1.0	0.00016
1925404012	0.225	EF	SFR-B	1.0	0.00016
1925404013	0.337	EF	SFR-C	1.6	0.00025
1925404014	0.337	EF	SFR-C	1.6	0.00025
1925404015	0.225	EF	SFR-B	1.0	0.00016
1925404016	0.225	EF	SFR-B	1.0	0.00016
1925404017	0.337	EF	SFR-C	1.6	0.00025
1925404018	0.337	EF	SFR-C	1.6	0.00025
1925405001	0.172	EF	SFR-B	1.0	0.00016
1925405002	0.172	EF	SFR-B	1.0	0.00016
1925405003	0.172	EF	SFR-B	1.0	0.00016
1925405004	0.172	EF	SFR-B	1.0	0.00016
1925405007	0.173	EF	SFR-B	1.0	0.00016
1925405008	0.173	EF	SFR-B	1.0	0.00016
1925405009	0.173	EF	SFR-B	1.0	0.00016
1925405010	0.192	EF	SFR-B	1.0	0.00016
1925426001	0.239	EF	SFR-B	1.0	0.00016
1925426002	0.242	EF	SFR-B	1.0	0.00016
1925426003	0.244	EF	SFR-B	1.0	0.00016
1925426004	0.246	EF	SFR-B	1.0	0.00016
1925426005	0.249	EF	SFR-B	1.0	0.00016
1925426006	0.251	EF	SFR-C	1.6	0.00025
1925426007	0.253	EF	SFR-C	1.6	0.00025
1925426008	0.256	EF	SFR-C	1.6	0.00025
1925426009	0.258	EF	SFR-C	1.6	0.00025
1925426010	0.260	EF	SFR-C	1.6	0.00025
1925426011	0.246	EF	SFR-B	1.0	0.00016
1925426012	0.248	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925426013	0.250	EF	SFR-B	1.0	0.00016
1925427001	0.244	EF	SFR-B	1.0	0.00016
1925427002	0.244	EF	SFR-B	1.0	0.00016
1925427003	0.244	EF	SFR-B	1.0	0.00016
1925427004	0.244	EF	SFR-B	1.0	0.00016
1925427005	0.244	EF	SFR-B	1.0	0.00016
1925427006	0.244	EF	SFR-B	1.0	0.00016
1925427007	0.257	EF	SFR-C	1.6	0.00025
1925427008	0.231	EF	SFR-B	1.0	0.00016
1925427009	0.244	EF	SFR-B	1.0	0.00016
1925427010	0.241	EF	SFR-B	1.0	0.00016
1925427011	0.241	EF	SFR-B	1.0	0.00016
1925427012	0.198	EF	SFR-B	1.0	0.00016
1925427013	0.244	EF	SFR-B	1.0	0.00016
1925427014	0.244	EF	SFR-B	1.0	0.00016
1925427015	0.244	EF	SFR-B	1.0	0.00016
1925427019	0.244	EF	SFR-B	1.0	0.00016
1925427020	0.244	EF	SFR-B	1.0	0.00016
1925427021	0.244	EF	SFR-B	1.0	0.00016
1925427022	0.241	EF	SFR-B	1.0	0.00016
1925427023	0.241	EF	SFR-B	1.0	0.00016
1925427024	0.243	EF	SFR-B	1.0	0.00016
1925427026	0.244	EF	SFR-B	1.0	0.00016
1925427027	0.489	EF	SFR-C	1.6	0.00025
1925428001	0.337	EF	SFR-C	1.6	0.00025
1925428002	0.402	EF	SFR-C	1.6	0.00025
1925428003	0.241	EF	SFR-B	1.0	0.00016
1925428004	0.241	EF	SFR-B	1.0	0.00016
1925428005	0.241	EF	SFR-B	1.0	0.00016
1925428006	0.241	EF	SFR-B	1.0	0.00016
1925428007	0.241	EF	SFR-B	1.0	0.00016
1925428008	0.225	EF	SFR-B	1.0	0.00016
1925428009	0.225	EF	SFR-B	1.0	0.00016
1925428010	0.225	EF	SFR-B	1.0	0.00016
1925428011	0.225	EF	SFR-B	1.0	0.00016
1925428012	0.209	EF	SFR-B	1.0	0.00016
1925428013	0.313	EF	SFR-C	1.6	0.00025
1925428014	0.265	EF	SFR-C	1.6	0.00025
1925428015	0.257	EF	SFR-C	1.6	0.00025
1925429001	0.273	EF	SFR-C	1.6	0.00025
1925429002	0.273	EF	SFR-C	1.6	0.00025
1925429003	0.271	EF	SFR-C	1.6	0.00025
1925429004	0.270	EF	SFR-C	1.6	0.00025
1925429005	0.270	EF	SFR-C	1.6	0.00025
1925429006	0.277	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925430001	0.209	EF	SFR-B	1.0	0.00016
1925430002	0.209	EF	SFR-B	1.0	0.00016
1925430003	0.209	EF	SFR-B	1.0	0.00016
1925430004	0.209	EF	SFR-B	1.0	0.00016
1925430005	0.173	EF	SFR-B	1.0	0.00016
1925430006	0.179	EF	SFR-B	1.0	0.00016
1925430007	0.167	EF	SFR-B	1.0	0.00016
1925430008	0.346	EF	SFR-C	1.6	0.00025
1925431001	0.209	EF	SFR-B	1.0	0.00016
1925431002	0.209	EF	SFR-B	1.0	0.00016
1925431003	0.209	EF	SFR-B	1.0	0.00016
1925431004	0.209	EF	SFR-B	1.0	0.00016
1925431005	0.173	EF	SFR-B	1.0	0.00016
1925431006	0.173	EF	SFR-B	1.0	0.00016
1925431007	0.173	EF	SFR-B	1.0	0.00016
1925431008	0.173	EF	SFR-B	1.0	0.00016
1925431009	0.173	EF	SFR-B	1.0	0.00016
1925432001	0.275	EF	SFR-C	1.6	0.00025
1925432002	0.272	EF	SFR-C	1.6	0.00025
1925432003	0.275	EF	SFR-C	1.6	0.00025
1925432004	0.170	EF	SFR-B	1.0	0.00016
1925432005	0.170	EF	SFR-B	1.0	0.00016
1925432006	0.170	EF	SFR-B	1.0	0.00016
1925432007	0.170	EF	SFR-B	1.0	0.00016
1925432008	0.170	EF	SFR-B	1.0	0.00016
1925433001	0.251	EF	SFR-C	1.6	0.00025
1925433002	0.251	EF	SFR-C	1.6	0.00025
1925433003	0.257	EF	SFR-C	1.6	0.00025
1925433004	0.161	EF	SFR-B	1.0	0.00016
1925433005	0.155	EF	SFR-B	1.0	0.00016
1925433006	0.155	EF	SFR-B	1.0	0.00016
1925433007	0.155	EF	SFR-B	1.0	0.00016
1925433008	0.161	EF	SFR-B	1.0	0.00016
1925451001	0.120	EF	SFR-A	0.7	0.00011
1925451002	0.124	EF	SFR-A	0.7	0.00011
1925451003	0.132	EF	SFR-B	1.0	0.00016
1925451008	0.146	EF	SFR-B	1.0	0.00016
1925451009	0.146	EF	SFR-B	1.0	0.00016
1925451012	0.147	EF	SFR-B	1.0	0.00016
1925451015	0.147	EF	SFR-B	1.0	0.00016
1925451016	0.143	EF	SFR-B	1.0	0.00016
1925451017	0.139	EF	SFR-B	1.0	0.00016
1925451021	0.274	EF	SFR-C	1.6	0.00025
1925451022	0.131	EF	SFR-B	1.0	0.00016
1925451023	0.158	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925451025	0.136	EF	SFR-B	1.0	0.00016
1925451026	0.136	EF	SFR-B	1.0	0.00016
1925451027	0.147	EF	SFR-B	1.0	0.00016
1925451028	0.139	EF	SFR-B	1.0	0.00016
1925451029	0.129	EF	SFR-B	1.0	0.00016
1925451030	0.134	EF	SFR-B	1.0	0.00016
1925451031	0.141	EF	SFR-B	1.0	0.00016
1925451032	0.135	EF	SFR-B	1.0	0.00016
1925452001	0.143	EF	SFR-B	1.0	0.00016
1925452002	0.143	EF	SFR-B	1.0	0.00016
1925452005	0.143	EF	SFR-B	1.0	0.00016
1925452008	0.143	EF	SFR-B	1.0	0.00016
1925452009	0.143	EF	SFR-B	1.0	0.00016
1925452010	0.143	EF	SFR-B	1.0	0.00016
1925452011	0.143	EF	SFR-B	1.0	0.00016
1925452012	0.143	EF	SFR-B	1.0	0.00016
1925452013	0.143	EF	SFR-B	1.0	0.00016
1925452014	0.143	EF	SFR-B	1.0	0.00016
1925452015	0.143	EF	SFR-B	1.0	0.00016
1925452018	0.172	EF	SFR-B	1.0	0.00016
1925452019	0.172	EF	SFR-B	1.0	0.00016
1925452020	0.172	EF	SFR-B	1.0	0.00016
1925452023	0.149	EF	SFR-B	1.0	0.00016
1925452024	0.138	EF	SFR-B	1.0	0.00016
1925452025	0.172	EF	SFR-B	1.0	0.00016
1925452026	0.172	EF	SFR-B	1.0	0.00016
1925452028	0.143	EF	SFR-B	1.0	0.00016
1925452029	0.143	EF	SFR-B	1.0	0.00016
1925452030	0.143	EF	SFR-B	1.0	0.00016
1925453010	0.630	EF	NR	5.0	0.00078
1925453011	0.837	EF	NR	7.6	0.00118
1925454004	1.412	EF	NR	12.1	0.00188
1925454005	0.252	EF	NR	2.3	0.00036
1925454006	0.057	EF	NR	0.5	0.00008
1925454007	0.055	EF	NR	0.5	0.00008
1925454008	0.060	EF	NR	0.5	0.00008
1925454009	0.075	EF	NR	0.7	0.00011
1925454011	0.430	EF	NR	3.4	0.00053
1925455002	0.145	EF	NR	1.3	0.00020
1925455015	0.279	EF	NR	2.5	0.00039
1925455016	0.662	EF	NR	5.5	0.00085
1925455017	0.458	EF	NR	4.1	0.00064
1925456001	0.146	EF	NR	1.3	0.00020
1925456002	0.154	EF	NR	1.4	0.00022
1925456007	0.255	EF	NR	2.3	0.00036

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925456009	0.121	EF	NR	1.1	0.00017
1925456010	0.060	EF	NR	0.5	0.00008
1925456011	0.056	EF	NR	0.5	0.00008
1925456014	0.104	EF	NR	0.9	0.00014
1925456017	0.068	EF	NR	0.6	0.00009
1925456018	0.097	EF	NR	0.9	0.00014
1925456019	0.069	EF	NR	0.6	0.00009
1925456020	0.047	EF	NR	0.4	0.00006
1925456023	0.152	EF	NR	1.4	0.00022
1925456024	0.079	EF	NR	0.7	0.00011
1925456027	0.051	EF	NR	0.5	0.00008
1925456029	0.128	EF	NR	1.1	0.00017
1925456034	0.092	EF	NR	0.8	0.00012
1925456035	0.148	EF	NR	1.3	0.00020
1925456039	0.206	EF	NR	1.9	0.00029
1925456040	0.013	EF	NR	0.1	0.00002
1925456041	0.100	EF	NR	0.9	0.00014
1925456042	0.102	EF	NR	0.8	0.00012
1925456043	0.078	EF	NR	0.7	0.00011
1925456044	0.122	EF	NR	1.1	0.00017
1925456050	0.051	EF	NR	0.5	0.00008
1925458001	0.218	EF	SFR-B	1.0	0.00016
1925458002	0.167	EF	SFR-B	1.0	0.00016
1925458003	0.167	EF	SFR-B	1.0	0.00016
1925458005	0.167	EF	SFR-B	1.0	0.00016
1925458006	0.167	EF	SFR-B	1.0	0.00016
1925458008	0.167	EF	SFR-B	1.0	0.00016
1925458009	0.167	EF	SFR-B	1.0	0.00016
1925458010	0.167	EF	SFR-B	1.0	0.00016
1925458011	0.167	EF	SFR-B	1.0	0.00016
1925458012	0.167	EF	SFR-B	1.0	0.00016
1925458013	0.155	EF	SFR-B	1.0	0.00016
1925458014	0.179	EF	SFR-B	1.0	0.00016
1925460001	0.155	EF	SFR-B	1.0	0.00016
1925460002	0.155	EF	SFR-B	1.0	0.00016
1925460003	0.155	EF	SFR-B	1.0	0.00016
1925460004	0.155	EF	SFR-B	1.0	0.00016
1925460005	0.155	EF	SFR-B	1.0	0.00016
1925460006	0.155	EF	SFR-B	1.0	0.00016
1925460007	0.155	EF	SFR-B	1.0	0.00016
1925460008	0.155	EF	SFR-B	1.0	0.00016
1925460015	0.155	EF	SFR-B	1.0	0.00016
1925460016	0.155	EF	SFR-B	1.0	0.00016
1925460017	0.155	EF	SFR-B	1.0	0.00016
1925460018	0.155	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925460019	0.648	EF	NR	5.8	0.00090
1925461001	0.572	EF	MFR	5.0	0.00078
1925476001	0.250	EF	SFR-B	1.0	0.00016
1925476002	0.250	EF	SFR-B	1.0	0.00016
1925476003	0.167	EF	SFR-B	1.0	0.00016
1925476004	0.167	EF	SFR-B	1.0	0.00016
1925476005	0.167	EF	SFR-B	1.0	0.00016
1925476006	0.167	EF	SFR-B	1.0	0.00016
1925476007	0.167	EF	SFR-B	1.0	0.00016
1925476008	0.167	EF	SFR-B	1.0	0.00016
1925476009	0.167	EF	SFR-B	1.0	0.00016
1925477001	0.167	EF	SFR-B	1.0	0.00016
1925477002	0.167	EF	SFR-B	1.0	0.00016
1925477003	0.167	EF	SFR-B	1.0	0.00016
1925477004	0.167	EF	SFR-B	1.0	0.00016
1925477005	0.167	EF	SFR-B	1.0	0.00016
1925477006	0.167	EF	SFR-B	1.0	0.00016
1925477007	0.167	EF	SFR-B	1.0	0.00016
1925478001	0.167	EF	SFR-B	1.0	0.00016
1925478002	0.167	EF	SFR-B	1.0	0.00016
1925478003	0.167	EF	SFR-B	1.0	0.00016
1925478004	0.167	EF	SFR-B	1.0	0.00016
1925478005	0.167	EF	SFR-B	1.0	0.00016
1925480001	0.155	EF	SFR-B	1.0	0.00016
1925480002	0.155	EF	SFR-B	1.0	0.00016
1925480003	0.155	EF	SFR-B	1.0	0.00016
1925480004	0.155	EF	SFR-B	1.0	0.00016
1925480005	0.153	EF	SFR-B	1.0	0.00016
1925480006	0.155	EF	SFR-B	1.0	0.00016
1925480007	0.155	EF	SFR-B	1.0	0.00016
1925480008	0.155	EF	SFR-B	1.0	0.00016
1925480009	0.155	EF	SFR-B	1.0	0.00016
1925480010	0.155	EF	SFR-B	1.0	0.00016
1925480011	0.152	EF	SFR-B	1.0	0.00016
1925480012	0.155	EF	SFR-B	1.0	0.00016
1925483004	0.155	EF	MFR	1.0	0.00016
1925483005	0.155	EF	SFR-B	1.0	0.00016
1925483010	0.232	EF	SFR-B	1.0	0.00016
1925483011	0.155	EF	SFR-B	1.0	0.00016
1925483012	0.155	EF	SFR-B	1.0	0.00016
1925483013	0.155	EF	SFR-B	1.0	0.00016
1925483014	0.152	EF	SFR-B	1.0	0.00016
1925483015	0.155	EF	SFR-B	1.0	0.00016
1925483019	0.107	EF	NR	1.0	0.00016
1925483021	0.307	EF	NR	1.7	0.00026

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925483026	0.317	EF	NR	2.5	0.00039
1925483029	0.232	EF	SFR-B	1.0	0.00016
1925483030	0.309	EF	SFR-C	1.6	0.00025
1925483031	0.862	EF	NR	7.4	0.00115
1925483033	0.050	EF	NR	0.5	0.00008
1925483034	0.029	EF	NR	0.2	0.00003
1926126008	1.404	EF	SFR-F	4.6	0.00071
1926126009	1.490	EF	SFR-F	4.6	0.00071
1926126010	1.491	EF	SFR-F	4.6	0.00071
1926126011	1.454	EF	SFR-F	4.6	0.00071
1926126012	1.424	EF	SFR-F	4.6	0.00071
1926126013	1.394	EF	SFR-F	4.6	0.00071
1926126014	1.592	EF	SFR-F	4.6	0.00071
1926126015	1.624	EF	SFR-F	4.6	0.00071
1926126016	1.569	EF	SFR-F	4.6	0.00071
1926127001	0.313	EF	SFR-C	1.6	0.00025
1926127004	0.393	EF	SFR-C	1.6	0.00025
1926127005	0.314	EF	SFR-C	1.6	0.00025
1926127006	0.304	EF	SFR-C	1.6	0.00025
1926127007	0.496	EF	SFR-C	1.6	0.00025
1926128001	0.261	EF	SFR-C	1.6	0.00025
1926128002	0.336	EF	SFR-C	1.6	0.00025
1926128003	0.328	EF	SFR-C	1.6	0.00025
1926128004	0.335	EF	SFR-C	1.6	0.00025
1926128005	0.358	EF	SFR-C	1.6	0.00025
1926128008	0.385	EF	SFR-C	1.6	0.00025
1926128009	0.319	EF	SFR-C	1.6	0.00025
1926128010	0.335	EF	SFR-C	1.6	0.00025
1926128011	0.365	EF	SFR-C	1.6	0.00025
1926128012	0.369	EF	SFR-C	1.6	0.00025
1926128013	0.364	EF	SFR-C	1.6	0.00025
1926128015	0.240	EF	SFR-B	1.0	0.00016
1926128016	0.229	EF	SFR-B	1.0	0.00016
1926129001	0.268	EF	SFR-C	1.6	0.00025
1926129002	0.325	EF	SFR-C	1.6	0.00025
1926129003	0.324	EF	SFR-C	1.6	0.00025
1926129004	0.318	EF	SFR-C	1.6	0.00025
1926129005	0.313	EF	SFR-C	1.6	0.00025
1926129006	0.331	EF	SFR-C	1.6	0.00025
1926129007	0.344	EF	SFR-C	1.6	0.00025
1926129008	0.527	EF	SFR-D	2.4	0.00037
1926129009	0.341	EF	SFR-C	1.6	0.00025
1926129010	0.323	EF	SFR-C	1.6	0.00025
1926129011	0.432	EF	SFR-C	1.6	0.00025
1926129012	0.337	EF	SFR-C	1.6	0.00025

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926129015	0.387	EF	SFR-C	1.6	0.00025
1926130001	0.393	EF	SFR-C	1.6	0.00025
1926130004	0.333	EF	SFR-C	1.6	0.00025
1926130005	0.436	EF	SFR-C	1.6	0.00025
1926130006	0.418	EF	SFR-C	1.6	0.00025
1926130007	0.436	EF	SFR-C	1.6	0.00025
1926130008	0.363	EF	SFR-C	1.6	0.00025
1926130009	0.359	EF	SFR-C	1.6	0.00025
1926130010	0.345	EF	SFR-C	1.6	0.00025
1926130011	0.314	EF	SFR-C	1.6	0.00025
1926130012	0.315	EF	SFR-C	1.6	0.00025
1926130013	0.323	EF	SFR-C	1.6	0.00025
1926130014	0.117	EF	SFR-A	0.7	0.00011
1926130015	0.356	EF	SFR-C	1.6	0.00025
1926130016	0.438	EF	SFR-C	1.6	0.00025
1926131001	0.503	EF	SFR-D	2.4	0.00037
1926131002	0.318	EF	SFR-C	1.6	0.00025
1926131003	0.313	EF	SFR-C	1.6	0.00025
1926131004	0.310	EF	SFR-C	1.6	0.00025
1926131005	0.336	EF	SFR-C	1.6	0.00025
1926131006	0.483	EF	SFR-C	1.6	0.00025
1926131009	0.316	EF	SFR-C	1.6	0.00025
1926131010	0.298	EF	SFR-C	1.6	0.00025
1926131011	0.300	EF	SFR-C	1.6	0.00025
1926131012	0.296	EF	SFR-C	1.6	0.00025
1926131013	0.298	EF	SFR-C	1.6	0.00025
1926131014	0.300	EF	SFR-C	1.6	0.00025
1926131015	0.329	EF	SFR-C	1.6	0.00025
1926131016	0.357	EF	SFR-C	1.6	0.00025
1926131017	0.363	EF	SFR-C	1.6	0.00025
1926131022	0.270	EF	SFR-C	1.6	0.00025
1926131023	0.363	EF	SFR-C	1.6	0.00025
1926176001	0.304	EF	SFR-C	1.6	0.00025
1926176002	0.246	EF	SFR-B	1.0	0.00016
1926176003	0.285	EF	SFR-C	1.6	0.00025
1926176004	0.410	EF	SFR-C	1.6	0.00025
1926176005	0.330	EF	SFR-C	1.6	0.00025
1926176006	0.341	EF	SFR-C	1.6	0.00025
1926176007	0.376	EF	SFR-C	1.6	0.00025
1926177001	0.347	EF	SFR-C	1.6	0.00025
1926177002	0.324	EF	SFR-C	1.6	0.00025
1926177003	0.333	EF	SFR-C	1.6	0.00025
1926177004	0.447	EF	SFR-C	1.6	0.00025
1926177005	0.233	EF	SFR-B	1.0	0.00016
1926177006	0.343	EF	SFR-C	1.6	0.00025

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926177007	0.417	EF	SFR-C	1.6	0.00025
1926177008	0.487	EF	SFR-C	1.6	0.00025
1926177009	0.379	EF	SFR-C	1.6	0.00025
1926177010	0.353	EF	SFR-C	1.6	0.00025
1926177011	0.348	EF	SFR-C	1.6	0.00025
1926177012	0.353	EF	SFR-C	1.6	0.00025
1926177013	0.356	EF	SFR-C	1.6	0.00025
1926177014	0.335	EF	SFR-C	1.6	0.00025
1926177015	0.307	EF	SFR-C	1.6	0.00025
1926177016	0.259	EF	SFR-C	1.6	0.00025
1926177017	0.256	EF	SFR-C	1.6	0.00025
1926177018	0.274	EF	SFR-C	1.6	0.00025
1926178003	0.333	EF	SFR-C	1.6	0.00025
1926178006	0.286	EF	SFR-C	1.6	0.00025
1926178007	0.241	EF	SFR-B	1.0	0.00016
1926178008	0.260	EF	SFR-C	1.6	0.00025
1926178009	0.264	EF	SFR-C	1.6	0.00025
1926178010	0.281	EF	SFR-C	1.6	0.00025
1926178017	0.337	EF	SFR-C	1.6	0.00025
1926178019	0.364	EF	SFR-C	1.6	0.00025
1926178020	0.408	EF	SFR-C	1.6	0.00025
1926178021	0.345	EF	SFR-C	1.6	0.00025
1926178022	0.292	EF	SFR-C	1.6	0.00025
1926178023	0.241	EF	SFR-B	1.0	0.00016
1926179001	0.508	EF	SFR-D	2.4	0.00037
1926179002	0.372	EF	SFR-C	1.6	0.00025
1926179004	0.355	EF	SFR-C	1.6	0.00025
1926179009	0.293	EF	SFR-C	1.6	0.00025
1926179010	0.301	EF	SFR-C	1.6	0.00025
1926179011	0.283	EF	SFR-C	1.6	0.00025
1926179012	0.280	EF	SFR-C	1.6	0.00025
1926179017	0.280	EF	SFR-C	1.6	0.00025
1926179018	0.278	EF	SFR-C	1.6	0.00025
1926179019	0.280	EF	SFR-C	1.6	0.00025
1926179022	0.334	EF	SFR-C	1.6	0.00025
1926179027	0.313	EF	SFR-C	1.6	0.00025
1926179028	0.232	EF	SFR-B	1.0	0.00016
1926179029	0.231	EF	SFR-B	1.0	0.00016
1926179030	0.234	EF	SFR-B	1.0	0.00016
1926179031	0.262	EF	SFR-C	1.6	0.00025
1926179032	0.282	EF	SFR-C	1.6	0.00025
1926179033	0.241	EF	SFR-B	1.0	0.00016
1926179034	0.247	EF	SFR-B	1.0	0.00016
1926179035	0.244	EF	SFR-B	1.0	0.00016
1926179036	0.247	EF	SFR-B	1.0	0.00016

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926179037	0.233	EF	SFR-B	1.0	0.00016
1926179038	0.250	EF	SFR-B	1.0	0.00016
1926179039	0.251	EF	SFR-C	1.6	0.00025
1926179040	0.280	EF	SFR-C	1.6	0.00025
1926179041	0.342	EF	SFR-C	1.6	0.00025
1926179043	0.290	EF	SFR-C	1.6	0.00025
1926179044	0.322	EF	SFR-C	1.6	0.00025
1926179047	0.999	EF	SFR-E	3.2	0.00050
1926179048	0.354	EF	SFR-C	1.6	0.00025
1926179049	0.337	EF	SFR-C	1.6	0.00025
1926179050	0.408	EF	SFR-C	1.6	0.00025
1926179051	0.367	EF	SFR-C	1.6	0.00025
1926179052	0.461	EF	SFR-C	1.6	0.00025
1926179053	0.337	EF	SFR-C	1.6	0.00025
1926179057	0.507	EF	SFR-D	2.4	0.00037
1926179058	0.471	EF	SFR-C	1.6	0.00025
1926179059	0.444	EF	SFR-C	1.6	0.00025
1926201001	0.817	EF	SFR-E	3.2	0.00050
1926201003	0.781	EF	SFR-E	3.2	0.00050
1926201004	0.816	EF	SFR-E	3.2	0.00050
1926201005	0.382	EF	SFR-C	1.6	0.00025
1926201006	0.233	EF	SFR-B	1.0	0.00016
1926201007	0.276	EF	SFR-C	1.6	0.00025
1926201008	0.344	EF	SFR-C	1.6	0.00025
1926201010	0.390	EF	SFR-C	1.6	0.00025
1926201011	0.405	EF	SFR-C	1.6	0.00025
1926201012	0.810	EF	SFR-E	3.2	0.00050
1926201013	0.463	EF	SFR-C	1.6	0.00025
1926202001	0.379	EF	SFR-C	1.6	0.00025
1926202002	0.281	EF	SFR-C	1.6	0.00025
1926202003	0.290	EF	SFR-C	1.6	0.00025
1926202004	0.379	EF	SFR-C	1.6	0.00025
1926202005	0.265	EF	SFR-C	1.6	0.00025
1926202006	0.279	EF	SFR-C	1.6	0.00025
1926203001	0.979	EF	SFR-E	3.2	0.00050
1926203002	1.101	EF	SFR-F	4.6	0.00071
1926203003	1.120	EF	SFR-F	4.6	0.00071
1926203004	0.285	EF	SFR-C	1.6	0.00025
1926203007	0.372	EF	SFR-C	1.6	0.00025
1926203008	0.304	EF	SFR-C	1.6	0.00025
1926203009	0.267	EF	SFR-C	1.6	0.00025
1926203010	0.244	EF	SFR-B	1.0	0.00016
1926203011	0.244	EF	SFR-B	1.0	0.00016
1926203012	0.373	EF	SFR-C	1.6	0.00025
1926204001	0.377	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926204002	0.396	EF	SFR-C	1.6	0.00025
1926204003	0.414	EF	SFR-C	1.6	0.00025
1926204004	0.396	EF	SFR-C	1.6	0.00025
1926204005	0.431	EF	SFR-C	1.6	0.00025
1926204006	0.414	EF	SFR-C	1.6	0.00025
1926204009	0.426	EF	SFR-C	1.6	0.00025
1926204010	0.308	EF	SFR-C	1.6	0.00025
1926204011	0.289	EF	SFR-C	1.6	0.00025
1926204012	0.370	EF	SFR-C	1.6	0.00025
1926204013	0.370	EF	SFR-C	1.6	0.00025
1926204014	0.386	EF	SFR-C	1.6	0.00025
1926204015	0.386	EF	SFR-C	1.6	0.00025
1926204016	0.257	EF	SFR-C	1.6	0.00025
1926204017	0.257	EF	SFR-C	1.6	0.00025
1926204018	0.257	EF	SFR-C	1.6	0.00025
1926204019	0.255	EF	SFR-C	1.6	0.00025
1926204020	0.534	EF	SFR-D	2.4	0.00037
1926205001	0.399	EF	SFR-C	1.6	0.00025
1926205002	0.402	EF	SFR-C	1.6	0.00025
1926205003	0.338	EF	SFR-C	1.6	0.00025
1926205004	0.338	EF	SFR-C	1.6	0.00025
1926205005	0.338	EF	SFR-C	1.6	0.00025
1926205006	0.257	EF	SFR-C	1.6	0.00025
1926205007	0.257	EF	SFR-C	1.6	0.00025
1926205008	0.257	EF	SFR-C	1.6	0.00025
1926205009	0.257	EF	SFR-C	1.6	0.00025
1926205010	0.257	EF	SFR-C	1.6	0.00025
1926205011	0.372	EF	SFR-C	1.6	0.00025
1926205012	0.386	EF	SFR-C	1.6	0.00025
1926205013	0.257	EF	SFR-C	1.6	0.00025
1926205014	0.257	EF	SFR-C	1.6	0.00025
1926205015	0.257	EF	SFR-C	1.6	0.00025
1926205016	0.257	EF	SFR-C	1.6	0.00025
1926205017	0.257	EF	SFR-C	1.6	0.00025
1926205018	0.257	EF	SFR-C	1.6	0.00025
1926205019	0.257	EF	SFR-C	1.6	0.00025
1926205020	0.257	EF	SFR-C	1.6	0.00025
1926205021	0.260	EF	SFR-C	1.6	0.00025
1926206001	0.261	EF	SFR-C	1.6	0.00025
1926206002	0.229	EF	SFR-B	1.0	0.00016
1926206003	0.248	EF	SFR-B	1.0	0.00016
1926206004	0.248	EF	SFR-B	1.0	0.00016
1926206005	0.248	EF	SFR-B	1.0	0.00016
1926206006	0.248	EF	SFR-B	1.0	0.00016
1926206009	0.328	EF	SFR-C	1.6	0.00025

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926206010	0.341	EF	SFR-C	1.6	0.00025
1926206011	0.285	EF	SFR-C	1.6	0.00025
1926206012	0.293	EF	SFR-C	1.6	0.00025
1926206013	0.274	EF	SFR-C	1.6	0.00025
1926206014	0.356	EF	SFR-C	1.6	0.00025
1926206015	0.314	EF	SFR-C	1.6	0.00025
1926206016	0.270	EF	SFR-C	1.6	0.00025
1926206017	0.267	EF	SFR-C	1.6	0.00025
1926206018	0.267	EF	SFR-C	1.6	0.00025
1926206019	0.242	EF	SFR-B	1.0	0.00016
1926206020	0.242	EF	SFR-B	1.0	0.00016
1926206021	0.326	EF	SFR-C	1.6	0.00025
1926206022	0.496	EF	SFR-C	1.6	0.00025
1926207001	0.312	EF	SFR-C	1.6	0.00025
1926207002	0.294	EF	SFR-C	1.6	0.00025
1926207003	0.294	EF	SFR-C	1.6	0.00025
1926207004	0.419	EF	SFR-C	1.6	0.00025
1926207005	0.364	EF	SFR-C	1.6	0.00025
1926207006	0.393	EF	SFR-C	1.6	0.00025
1926207007	0.459	EF	SFR-C	1.6	0.00025
1926207008	0.496	EF	SFR-C	1.6	0.00025
1926207009	0.376	EF	SFR-C	1.6	0.00025
1926207012	0.375	EF	SFR-C	1.6	0.00025
1926207016	0.294	EF	SFR-C	1.6	0.00025
1926207017	0.294	EF	SFR-C	1.6	0.00025
1926207018	0.294	EF	SFR-C	1.6	0.00025
1926207019	0.331	EF	SFR-C	1.6	0.00025
1926207020	0.404	EF	SFR-C	1.6	0.00025
1926207021	0.381	EF	SFR-C	1.6	0.00025
1926207022	0.415	EF	SFR-C	1.6	0.00025
1926207024	0.294	EF	SFR-C	1.6	0.00025
1926207025	0.294	EF	SFR-C	1.6	0.00025
1926226001	0.460	EF	SFR-C	1.6	0.00025
1926226002	0.675	EF	SFR-D	2.4	0.00037
1926226006	2.759	EF	SFR-F	4.6	0.00071
1926226007	0.305	EF	SFR-C	1.6	0.00025
1926226008	0.311	EF	SFR-C	1.6	0.00025
1926226009	0.416	EF	SFR-C	1.6	0.00025
1926226010	0.379	EF	SFR-C	1.6	0.00025
1926226011	0.496	EF	SFR-C	1.6	0.00025
1926226012	0.478	EF	SFR-C	1.6	0.00025
1926226013	0.482	EF	SFR-C	1.6	0.00025
1926226014	0.487	EF	SFR-C	1.6	0.00025
1926226015	0.458	EF	SFR-C	1.6	0.00025
1926226016	0.377	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926226017	0.349	EF	SFR-C	1.6	0.00025
1926226018	0.328	EF	SFR-C	1.6	0.00025
1926226019	0.384	EF	SFR-C	1.6	0.00025
1926226020	1.021	EF	SFR-F	4.6	0.00071
1926226022	0.927	EF	SFR-E	3.2	0.00050
1926226023	0.748	EF	SFR-D	2.4	0.00037
1926226024	0.870	EF	SFR-E	3.2	0.00050
1926226025	0.487	EF	SFR-C	1.6	0.00025
1926226026	0.682	EF	SFR-D	2.4	0.00037
1926226027	0.380	EF	SFR-C	1.6	0.00025
1926226031	0.893	EF	SFR-E	3.2	0.00050
1926226046	0.316	EF	SFR-C	1.6	0.00025
1926226047	0.317	EF	SFR-C	1.6	0.00025
1926227001	0.614	EF	SFR-D	2.4	0.00037
1926227002	0.466	EF	SFR-C	1.6	0.00025
1926227003	0.411	EF	SFR-C	1.6	0.00025
1926227004	0.372	EF	SFR-C	1.6	0.00025
1926227005	0.401	EF	SFR-C	1.6	0.00025
1926228001	0.313	EF	SFR-C	1.6	0.00025
1926228002	0.284	EF	SFR-C	1.6	0.00025
1926228003	0.288	EF	SFR-C	1.6	0.00025
1926228004	0.293	EF	SFR-C	1.6	0.00025
1926228005	0.298	EF	SFR-C	1.6	0.00025
1926228006	0.302	EF	SFR-C	1.6	0.00025
1926228007	0.307	EF	SFR-C	1.6	0.00025
1926228008	0.312	EF	SFR-C	1.6	0.00025
1926228009	0.316	EF	SFR-C	1.6	0.00025
1926228012	0.313	EF	SFR-C	1.6	0.00025
1926228013	0.284	EF	SFR-C	1.6	0.00025
1926228014	0.288	EF	SFR-C	1.6	0.00025
1926228015	0.293	EF	SFR-C	1.6	0.00025
1926228016	0.298	EF	SFR-C	1.6	0.00025
1926228017	0.302	EF	SFR-C	1.6	0.00025
1926228018	0.307	EF	SFR-C	1.6	0.00025
1926228019	0.312	EF	SFR-C	1.6	0.00025
1926228020	0.316	EF	SFR-C	1.6	0.00025
1926228021	0.321	EF	SFR-C	1.6	0.00025
1926228022	0.348	EF	SFR-C	1.6	0.00025
1926228024	0.321	EF	SFR-C	1.6	0.00025
1926228025	0.386	EF	SFR-C	1.6	0.00025
1926229001	0.372	EF	SFR-C	1.6	0.00025
1926229002	0.352	EF	SFR-C	1.6	0.00025
1926229003	0.352	EF	SFR-C	1.6	0.00025
1926229004	0.352	EF	SFR-C	1.6	0.00025
1926229009	0.327	EF	SFR-C	1.6	0.00025

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926229010	0.211	EF	SFR-B	1.0	0.00016
1926229011	0.586	EF	SFR-D	2.4	0.00037
1926229012	0.467	EF	SFR-C	1.6	0.00025
1926229013	0.117	EF	SFR-A	0.7	0.00011
1926229016	0.504	EF	SFR-D	2.4	0.00037
1926229017	0.269	EF	SFR-C	1.6	0.00025
1926229018	0.270	EF	SFR-C	1.6	0.00025
1926229019	0.249	EF	SFR-B	1.0	0.00016
1926229020	0.275	EF	SFR-C	1.6	0.00025
1926229021	0.387	EF	SFR-C	1.6	0.00025
1926229022	0.352	EF	SFR-C	1.6	0.00025
1926229023	0.536	EF	SFR-D	2.4	0.00037
1926230001	0.306	EF	SFR-C	1.6	0.00025
1926230002	0.468	EF	SFR-C	1.6	0.00025
1926230003	0.274	EF	SFR-C	1.6	0.00025
1926230013	0.327	EF	SFR-C	1.6	0.00025
1926230016	0.326	EF	SFR-C	1.6	0.00025
1926230017	0.217	EF	SFR-B	1.0	0.00016
1926230018	0.227	EF	SFR-B	1.0	0.00016
1926230019	0.223	EF	SFR-B	1.0	0.00016
1926230020	0.223	EF	SFR-B	1.0	0.00016
1926230021	0.336	EF	SFR-C	1.6	0.00025
1926230022	0.336	EF	SFR-C	1.6	0.00025
1926230023	0.225	EF	SFR-B	1.0	0.00016
1926230024	0.238	EF	SFR-B	1.0	0.00016
1926230025	0.734	EF	SFR-D	2.4	0.00037
1926230026	0.620	EF	SFR-D	2.4	0.00037
1926230027	0.409	EF	SFR-C	1.6	0.00025
1926251001	0.456	EF	SFR-C	1.6	0.00025
1926251004	0.416	EF	SFR-C	1.6	0.00025
1926251005	0.445	EF	SFR-C	1.6	0.00025
1926251006	0.523	EF	SFR-D	2.4	0.00037
1926251007	0.434	EF	SFR-C	1.6	0.00025
1926251008	0.347	EF	SFR-C	1.6	0.00025
1926251009	0.234	EF	SFR-B	1.0	0.00016
1926251010	0.272	EF	SFR-C	1.6	0.00025
1926251013	0.299	EF	SFR-C	1.6	0.00025
1926251014	0.439	EF	SFR-C	1.6	0.00025
1926251015	0.459	EF	SFR-C	1.6	0.00025
1926251016	0.332	EF	SFR-C	1.6	0.00025
1926251017	0.318	EF	SFR-C	1.6	0.00025
1926251018	0.311	EF	SFR-C	1.6	0.00025
1926251019	0.270	EF	SFR-C	1.6	0.00025
1926251020	0.535	EF	SFR-D	2.4	0.00037
1926251022	0.375	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926251023	0.340	EF	SFR-C	1.6	0.00025
1926252004	0.412	EF	SFR-C	1.6	0.00025
1926252005	0.362	EF	SFR-C	1.6	0.00025
1926252010	0.232	EF	SFR-B	1.0	0.00016
1926252011	0.251	EF	SFR-C	1.6	0.00025
1926252012	0.227	EF	SFR-B	1.0	0.00016
1926252013	0.223	EF	SFR-B	1.0	0.00016
1926252014	0.215	EF	SFR-B	1.0	0.00016
1926252015	0.213	EF	SFR-B	1.0	0.00016
1926252016	0.219	EF	SFR-B	1.0	0.00016
1926252017	0.232	EF	SFR-B	1.0	0.00016
1926252018	0.244	EF	SFR-B	1.0	0.00016
1926252019	0.377	EF	SFR-C	1.6	0.00025
1926252020	0.389	EF	SFR-C	1.6	0.00025
1926252021	0.259	EF	SFR-C	1.6	0.00025
1926252022	0.266	EF	SFR-C	1.6	0.00025
1926252024	0.355	EF	SFR-C	1.6	0.00025
1926252025	0.347	EF	SFR-C	1.6	0.00025
1926252028	0.460	EF	SFR-C	1.6	0.00025
1926252029	0.224	EF	SFR-B	1.0	0.00016
1926252030	0.232	EF	SFR-B	1.0	0.00016
1926253001	0.333	EF	SFR-C	1.6	0.00025
1926253002	0.330	EF	SFR-C	1.6	0.00025
1926253003	0.325	EF	SFR-C	1.6	0.00025
1926253004	0.334	EF	SFR-C	1.6	0.00025
1926253005	0.227	EF	SFR-B	1.0	0.00016
1926253006	0.228	EF	SFR-B	1.0	0.00016
1926253007	0.235	EF	SFR-B	1.0	0.00016
1926253008	0.369	EF	SFR-C	1.6	0.00025
1926253009	0.390	EF	SFR-C	1.6	0.00025
1926253010	0.247	EF	SFR-B	1.0	0.00016
1926253011	0.242	EF	SFR-B	1.0	0.00016
1926253012	0.237	EF	SFR-B	1.0	0.00016
1926253013	0.231	EF	SFR-B	1.0	0.00016
1926253014	0.235	EF	SFR-B	1.0	0.00016
1926253015	0.248	EF	SFR-B	1.0	0.00016
1926253016	0.259	EF	SFR-C	1.6	0.00025
1926253017	0.390	EF	SFR-C	1.6	0.00025
1926253018	0.382	EF	SFR-C	1.6	0.00025
1926253019	0.310	EF	SFR-C	1.6	0.00025
1926254001	0.341	EF	SFR-C	1.6	0.00025
1926254002	0.314	EF	SFR-C	1.6	0.00025
1926254003	0.307	EF	SFR-C	1.6	0.00025
1926254004	0.300	EF	SFR-C	1.6	0.00025
1926254005	0.276	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926254006	0.270	EF	SFR-C	1.6	0.00025
1926254007	0.300	EF	SFR-C	1.6	0.00025
1926254008	0.276	EF	SFR-C	1.6	0.00025
1926254009	0.275	EF	SFR-C	1.6	0.00025
1926254010	0.341	EF	SFR-C	1.6	0.00025
1926254011	0.324	EF	SFR-C	1.6	0.00025
1926254012	0.356	EF	SFR-C	1.6	0.00025
1926254013	0.357	EF	SFR-C	1.6	0.00025
1926254014	0.396	EF	SFR-C	1.6	0.00025
1926254017	0.343	EF	SFR-C	1.6	0.00025
1926254018	0.308	EF	SFR-C	1.6	0.00025
1926254019	0.291	EF	SFR-C	1.6	0.00025
1926254020	0.321	EF	SFR-C	1.6	0.00025
1926254021	0.247	EF	SFR-B	1.0	0.00016
1926276003	0.385	EF	SFR-C	1.6	0.00025
1926276004	0.347	EF	SFR-C	1.6	0.00025
1926276005	0.327	EF	SFR-C	1.6	0.00025
1926276006	0.317	EF	SFR-C	1.6	0.00025
1926276007	0.326	EF	SFR-C	1.6	0.00025
1926276012	0.366	EF	SFR-C	1.6	0.00025
1926276013	0.348	EF	SFR-C	1.6	0.00025
1926276014	0.470	EF	SFR-C	1.6	0.00025
1926276015	0.481	EF	SFR-C	1.6	0.00025
1926276016	0.574	EF	SFR-D	2.4	0.00037
1926276017	0.438	EF	SFR-C	1.6	0.00025
1926276018	0.559	EF	SFR-D	2.4	0.00037
1926276019	0.443	EF	SFR-C	1.6	0.00025
1926276020	0.605	EF	SFR-D	2.4	0.00037
1926276021	0.321	EF	SFR-C	1.6	0.00025
1926276022	0.450	EF	SFR-C	1.6	0.00025
1926276023	0.506	EF	SFR-D	2.4	0.00037
1926276024	0.636	EF	SFR-D	2.4	0.00037
1926277001	0.372	EF	SFR-C	1.6	0.00025
1926277007	0.300	EF	SFR-C	1.6	0.00025
1926277008	0.251	EF	SFR-C	1.6	0.00025
1926277009	0.246	EF	SFR-B	1.0	0.00016
1926277010	0.240	EF	SFR-B	1.0	0.00016
1926277011	0.224	EF	SFR-B	1.0	0.00016
1926277012	0.300	EF	SFR-C	1.6	0.00025
1926277014	0.232	EF	SFR-B	1.0	0.00016
1926277015	0.305	EF	SFR-C	1.6	0.00025
1926277016	0.328	EF	SFR-C	1.6	0.00025
1926278001	0.379	EF	SFR-C	1.6	0.00025
1926278002	0.241	EF	SFR-B	1.0	0.00016
1926278003	0.342	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926278004	0.226	EF	SFR-B	1.0	0.00016
1926278005	0.315	EF	SFR-C	1.6	0.00025
1926278008	0.351	EF	SFR-C	1.6	0.00025
1926279001	0.366	EF	SFR-C	1.6	0.00025
1926279005	0.411	EF	SFR-C	1.6	0.00025
1926279006	0.325	EF	SFR-C	1.6	0.00025
1926279007	0.332	EF	SFR-C	1.6	0.00025
1926279008	0.322	EF	SFR-C	1.6	0.00025
1926279009	0.317	EF	SFR-C	1.6	0.00025
1926279010	0.332	EF	SFR-C	1.6	0.00025
1926279012	0.490	EF	SFR-C	1.6	0.00025
1926279013	0.490	EF	SFR-C	1.6	0.00025
1926279015	0.599	EF	SFR-D	2.4	0.00037
1926279018	0.659	EF	SFR-D	2.4	0.00037
1926279020	0.391	EF	SFR-C	1.6	0.00025
1926279022	0.430	EF	SFR-C	1.6	0.00025
1926279023	0.488	EF	SFR-C	1.6	0.00025
1926279024	1.018	EF	SFR-F	4.6	0.00071
1926279025	0.443	EF	SFR-C	1.6	0.00025
1926279026	0.277	EF	SFR-C	1.6	0.00025
1926326001	0.351	EF	SFR-C	1.6	0.00025
1926326002	0.304	EF	SFR-C	1.6	0.00025
1926326003	0.230	EF	SFR-B	1.0	0.00016
1926326004	0.200	EF	SFR-B	1.0	0.00016
1926326007	0.228	EF	SFR-B	1.0	0.00016
1926326008	0.226	EF	SFR-B	1.0	0.00016
1926326009	0.233	EF	SFR-B	1.0	0.00016
1926326010	0.189	EF	SFR-B	1.0	0.00016
1926326011	0.195	EF	SFR-B	1.0	0.00016
1926326013	0.186	EF	SFR-B	1.0	0.00016
1926326014	0.248	EF	SFR-B	1.0	0.00016
1926326015	0.213	EF	SFR-B	1.0	0.00016
1926326016	0.196	EF	SFR-B	1.0	0.00016
1926326017	0.193	EF	SFR-B	1.0	0.00016
1926327001	0.519	EF	SFR-D	2.4	0.00037
1926327004	0.210	EF	SFR-B	1.0	0.00016
1926327005	0.210	EF	SFR-B	1.0	0.00016
1926327007	0.217	EF	SFR-B	1.0	0.00016
1926327008	0.223	EF	SFR-B	1.0	0.00016
1926327009	0.223	EF	SFR-B	1.0	0.00016
1926327010	0.223	EF	SFR-B	1.0	0.00016
1926327011	0.467	EF	SFR-C	1.6	0.00025
1926327012	0.212	EF	SFR-B	1.0	0.00016
1926327013	0.225	EF	SFR-B	1.0	0.00016
1926327014	0.225	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926327015	0.225	EF	SFR-B	1.0	0.00016
1926327016	0.225	EF	SFR-B	1.0	0.00016
1926327017	0.224	EF	SFR-B	1.0	0.00016
1926327018	0.211	EF	SFR-B	1.0	0.00016
1926327019	0.211	EF	SFR-B	1.0	0.00016
1926327020	0.212	EF	SFR-B	1.0	0.00016
1926327021	0.212	EF	SFR-B	1.0	0.00016
1926327022	0.212	EF	SFR-B	1.0	0.00016
1926327023	0.212	EF	SFR-B	1.0	0.00016
1926327024	0.219	EF	SFR-B	1.0	0.00016
1926327025	0.319	EF	SFR-C	1.6	0.00025
1926327026	0.210	EF	SFR-B	1.0	0.00016
1926327027	0.216	EF	SFR-B	1.0	0.00016
1926328001	0.425	EF	NR	3.3	0.00051
1926328002	0.345	EF	SFR-C	1.6	0.00025
1926328003	0.393	EF	SFR-C	1.6	0.00025
1926328004	0.247	EF	SFR-B	1.0	0.00016
1926328005	0.240	EF	SFR-B	1.0	0.00016
1926328006	0.233	EF	SFR-B	1.0	0.00016
1926328007	0.227	EF	SFR-B	1.0	0.00016
1926328008	0.225	EF	SFR-B	1.0	0.00016
1926328009	0.227	EF	SFR-B	1.0	0.00016
1926328010	0.214	EF	SFR-B	1.0	0.00016
1926328011	0.233	EF	SFR-B	1.0	0.00016
1926328012	5.919	EF	NR	24.7	0.00383
1926328013	0.378	EF	SFR-C	1.6	0.00025
1926328014	0.434	EF	SFR-C	1.6	0.00025
1926328016	0.741	EF	SFR-D	2.4	0.00037
1926328017	0.158	EF	SFR-B	1.0	0.00016
1926328018	0.139	EF	SFR-B	1.0	0.00016
1926328019	0.138	EF	SFR-B	1.0	0.00016
1926328020	0.137	EF	SFR-B	1.0	0.00016
1926328021	0.136	EF	SFR-B	1.0	0.00016
1926328022	0.135	EF	SFR-B	1.0	0.00016
1926328023	0.161	EF	SFR-B	1.0	0.00016
1926328024	0.167	EF	SFR-B	1.0	0.00016
1926328025	0.141	EF	SFR-B	1.0	0.00016
1926328026	0.141	EF	SFR-B	1.0	0.00016
1926328027	0.141	EF	SFR-B	1.0	0.00016
1926328028	0.141	EF	SFR-B	1.0	0.00016
1926328030	0.211	EF	SFR-B	1.0	0.00016
1926328031	0.211	EF	SFR-B	1.0	0.00016
1926328032	0.176	EF	SFR-B	1.0	0.00016
1926328033	0.176	EF	SFR-B	1.0	0.00016
1926328034	0.415	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926329001	0.143	EF	SFR-B	1.0	0.00016
1926329002	0.172	EF	SFR-B	1.0	0.00016
1926329003	0.136	EF	SFR-B	1.0	0.00016
1926329004	0.136	EF	SFR-B	1.0	0.00016
1926329005	0.136	EF	SFR-B	1.0	0.00016
1926329006	0.136	EF	SFR-B	1.0	0.00016
1926329007	0.143	EF	SFR-B	1.0	0.00016
1926329008	0.143	EF	SFR-B	1.0	0.00016
1926329009	0.214	EF	SFR-B	1.0	0.00016
1926329010	0.214	EF	SFR-B	1.0	0.00016
1926329011	0.214	EF	SFR-B	1.0	0.00016
1926329012	0.214	EF	SFR-B	1.0	0.00016
1926329013	0.143	EF	SFR-B	1.0	0.00016
1926329014	0.143	EF	SFR-B	1.0	0.00016
1926329015	0.175	EF	SFR-B	1.0	0.00016
1926329018	0.269	EF	SFR-C	1.6	0.00025
1926329019	0.271	EF	SFR-C	1.6	0.00025
1926330001	0.141	EF	SFR-B	1.0	0.00016
1926330002	0.143	EF	SFR-B	1.0	0.00016
1926330003	0.143	EF	SFR-B	1.0	0.00016
1926330004	0.143	EF	SFR-B	1.0	0.00016
1926330005	0.143	EF	SFR-B	1.0	0.00016
1926330006	0.143	EF	SFR-B	1.0	0.00016
1926330007	0.143	EF	SFR-B	1.0	0.00016
1926330008	0.143	EF	SFR-B	1.0	0.00016
1926330009	0.165	EF	SFR-B	1.0	0.00016
1926330013	0.144	EF	SFR-B	1.0	0.00016
1926330014	0.144	EF	SFR-B	1.0	0.00016
1926330015	0.144	EF	SFR-B	1.0	0.00016
1926330018	0.144	EF	SFR-B	1.0	0.00016
1926330019	0.144	EF	SFR-B	1.0	0.00016
1926330020	0.144	EF	SFR-B	1.0	0.00016
1926330021	0.148	EF	SFR-B	1.0	0.00016
1926330022	0.188	EF	SFR-B	1.0	0.00016
1926330023	0.185	EF	SFR-B	1.0	0.00016
1926330025	0.144	EF	SFR-B	1.0	0.00016
1926330026	0.144	EF	SFR-B	1.0	0.00016
1926378015	0.154	EF	SFR-B	1.0	0.00016
1926378016	0.172	EF	SFR-B	1.0	0.00016
1926378017	0.146	EF	SFR-B	1.0	0.00016
1926378018	0.144	EF	SFR-B	1.0	0.00016
1926378019	0.144	EF	SFR-B	1.0	0.00016
1926378020	0.144	EF	SFR-B	1.0	0.00016
1926378021	0.144	EF	SFR-B	1.0	0.00016
1926378022	0.145	EF	SFR-B	1.0	0.00016

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926378025	0.201	EF	SFR-B	1.0	0.00016
1926378028	0.215	EF	SFR-B	1.0	0.00016
1926378029	0.215	EF	SFR-B	1.0	0.00016
1926378030	0.143	EF	SFR-B	1.0	0.00016
1926378031	0.166	EF	SFR-B	1.0	0.00016
1926378032	0.158	EF	SFR-B	1.0	0.00016
1926378033	0.204	EF	SFR-B	1.0	0.00016
1926378034	0.159	EF	SFR-B	1.0	0.00016
1926378035	0.158	EF	SFR-B	1.0	0.00016
1926378038	0.158	EF	SFR-B	1.0	0.00016
1926378039	0.158	EF	SFR-B	1.0	0.00016
1926378040	0.158	EF	SFR-B	1.0	0.00016
1926378041	0.158	EF	SFR-B	1.0	0.00016
1926378042	0.158	EF	SFR-B	1.0	0.00016
1926378043	0.182	EF	SFR-B	1.0	0.00016
1926378044	0.180	EF	SFR-B	1.0	0.00016
1926378045	0.203	EF	SFR-B	1.0	0.00016
1926378046	0.158	EF	SFR-B	1.0	0.00016
1926378047	0.158	EF	SFR-B	1.0	0.00016
1926378048	0.158	EF	SFR-B	1.0	0.00016
1926378049	0.158	EF	SFR-B	1.0	0.00016
1926378050	0.158	EF	SFR-B	1.0	0.00016
1926378051	0.158	EF	SFR-B	1.0	0.00016
1926378052	0.316	EF	SFR-C	1.6	0.00025
1926378053	0.158	EF	SFR-B	1.0	0.00016
1926378054	0.178	EF	SFR-B	1.0	0.00016
1926378055	0.176	EF	SFR-B	1.0	0.00016
1926378058	0.060	EF	SFR-A	0.7	0.00011
1926378059	0.366	EF	SFR-C	1.6	0.00025
1926378060	0.358	EF	SFR-C	1.6	0.00025
1926378061	0.357	EF	SFR-C	1.6	0.00025
1926378062	0.337	EF	SFR-C	1.6	0.00025
1926378063	0.672	EF	NR	5.4	0.00084
1926378065	0.051	EF	NR	0.5	0.00008
1926378066	0.208	EF	NR	1.9	0.00029
1926378067	0.052	EF	NR	0.5	0.00008
1926378068	0.052	EF	NR	0.5	0.00008
1926378069	0.154	EF	NR	1.4	0.00022
1926378070	0.158	EF	SFR-B	1.0	0.00016
1926378071	0.215	EF	SFR-B	1.0	0.00016
1926378072	5.946	EF	NR	37.4	0.00581
1926378073	0.317	EF	SFR-C	1.6	0.00025
1926401001	0.392	EF	SFR-C	1.6	0.00025
1926401002	0.326	EF	SFR-C	1.6	0.00025
1926401003	0.312	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926401004	0.285	EF	SFR-C	1.6	0.00025
1926401005	0.277	EF	SFR-C	1.6	0.00025
1926401006	0.250	EF	SFR-B	1.0	0.00016
1926401007	0.244	EF	SFR-B	1.0	0.00016
1926401008	0.238	EF	SFR-B	1.0	0.00016
1926401009	0.253	EF	SFR-C	1.6	0.00025
1926401010	0.249	EF	SFR-B	1.0	0.00016
1926401011	0.245	EF	SFR-B	1.0	0.00016
1926401012	0.246	EF	SFR-B	1.0	0.00016
1926401013	0.245	EF	SFR-B	1.0	0.00016
1926401014	0.248	EF	SFR-B	1.0	0.00016
1926401015	0.241	EF	SFR-B	1.0	0.00016
1926401016	0.308	EF	SFR-C	1.6	0.00025
1926401017	0.378	EF	SFR-C	1.6	0.00025
1926401018	0.767	EF	SFR-E	3.2	0.00050
1926401019	0.390	EF	SFR-C	1.6	0.00025
1926401020	0.359	EF	SFR-C	1.6	0.00025
1926401021	0.367	EF	SFR-C	1.6	0.00025
1926401022	0.344	EF	SFR-C	1.6	0.00025
1926401023	0.337	EF	SFR-C	1.6	0.00025
1926401024	0.314	EF	SFR-C	1.6	0.00025
1926401025	0.310	EF	SFR-C	1.6	0.00025
1926401026	0.300	EF	SFR-C	1.6	0.00025
1926401027	0.295	EF	SFR-C	1.6	0.00025
1926401028	0.306	EF	SFR-C	1.6	0.00025
1926402001	0.352	EF	SFR-C	1.6	0.00025
1926402002	0.282	EF	SFR-C	1.6	0.00025
1926402003	0.282	EF	SFR-C	1.6	0.00025
1926402004	0.282	EF	SFR-C	1.6	0.00025
1926402005	0.282	EF	SFR-C	1.6	0.00025
1926402006	0.264	EF	SFR-C	1.6	0.00025
1926402007	0.270	EF	SFR-C	1.6	0.00025
1926402008	0.270	EF	SFR-C	1.6	0.00025
1926402009	0.270	EF	SFR-C	1.6	0.00025
1926402010	0.270	EF	SFR-C	1.6	0.00025
1926402011	0.270	EF	SFR-C	1.6	0.00025
1926402012	0.298	EF	SFR-C	1.6	0.00025
1926402013	0.243	EF	SFR-B	1.0	0.00016
1926402014	0.272	EF	SFR-C	1.6	0.00025
1926402015	0.270	EF	SFR-C	1.6	0.00025
1926402016	0.307	EF	SFR-C	1.6	0.00025
1926402017	0.307	EF	SFR-C	1.6	0.00025
1926402018	0.273	EF	SFR-C	1.6	0.00025
1926402019	0.273	EF	SFR-C	1.6	0.00025
1926402020	0.272	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926402021	0.272	EF	SFR-C	1.6	0.00025
1926402022	0.221	EF	SFR-B	1.0	0.00016
1926402023	0.346	EF	SFR-C	1.6	0.00025
1926402024	0.281	EF	SFR-C	1.6	0.00025
1926402025	0.281	EF	SFR-C	1.6	0.00025
1926402026	0.281	EF	SFR-C	1.6	0.00025
1926402027	0.563	EF	SFR-D	2.4	0.00037
1926403001	0.378	EF	SFR-C	1.6	0.00025
1926403002	0.314	EF	SFR-C	1.6	0.00025
1926403003	0.314	EF	SFR-C	1.6	0.00025
1926403004	0.279	EF	SFR-C	1.6	0.00025
1926403005	0.279	EF	SFR-C	1.6	0.00025
1926403006	0.279	EF	SFR-C	1.6	0.00025
1926403009	0.269	EF	SFR-C	1.6	0.00025
1926403010	0.269	EF	SFR-C	1.6	0.00025
1926403011	0.269	EF	SFR-C	1.6	0.00025
1926403012	0.270	EF	SFR-C	1.6	0.00025
1926403015	0.223	EF	SFR-B	1.0	0.00016
1926403016	0.204	EF	SFR-B	1.0	0.00016
1926403017	0.238	EF	SFR-B	1.0	0.00016
1926403018	0.238	EF	SFR-B	1.0	0.00016
1926403019	0.238	EF	SFR-B	1.0	0.00016
1926403024	0.241	EF	SFR-B	1.0	0.00016
1926403025	0.245	EF	SFR-B	1.0	0.00016
1926403026	0.248	EF	SFR-B	1.0	0.00016
1926403027	0.289	EF	SFR-C	1.6	0.00025
1926403028	0.293	EF	SFR-C	1.6	0.00025
1926403029	0.272	EF	SFR-C	1.6	0.00025
1926403030	0.247	EF	SFR-B	1.0	0.00016
1926403031	0.322	EF	SFR-C	1.6	0.00025
1926403032	0.356	EF	SFR-C	1.6	0.00025
1926403033	0.355	EF	SFR-C	1.6	0.00025
1926403034	0.548	EF	SFR-D	2.4	0.00037
1926403035	0.523	EF	SFR-D	2.4	0.00037
1926404001	0.290	EF	SFR-C	1.6	0.00025
1926404002	0.278	EF	SFR-C	1.6	0.00025
1926404003	0.281	EF	SFR-C	1.6	0.00025
1926404004	0.280	EF	SFR-C	1.6	0.00025
1926404005	0.348	EF	SFR-C	1.6	0.00025
1926404006	0.291	EF	SFR-C	1.6	0.00025
1926404007	0.410	EF	SFR-C	1.6	0.00025
1926404008	0.341	EF	SFR-C	1.6	0.00025
1926404009	0.299	EF	SFR-C	1.6	0.00025
1926404010	0.236	EF	SFR-B	1.0	0.00016
1926404011	0.231	EF	SFR-B	1.0	0.00016

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926404012	0.238	EF	SFR-B	1.0	0.00016
1926404013	0.229	EF	SFR-B	1.0	0.00016
1926404014	0.271	EF	SFR-C	1.6	0.00025
1926404015	0.302	EF	SFR-C	1.6	0.00025
1926404016	0.307	EF	SFR-C	1.6	0.00025
1926404017	0.315	EF	SFR-C	1.6	0.00025
1926404020	0.278	EF	SFR-C	1.6	0.00025
1926404021	0.275	EF	SFR-C	1.6	0.00025
1926404022	0.274	EF	SFR-C	1.6	0.00025
1926404023	0.241	EF	SFR-B	1.0	0.00016
1926404024	0.317	EF	SFR-C	1.6	0.00025
1926404025	0.279	EF	SFR-C	1.6	0.00025
1926404026	0.291	EF	SFR-C	1.6	0.00025
1926404027	0.283	EF	SFR-C	1.6	0.00025
1926404028	0.309	EF	SFR-C	1.6	0.00025
1926404030	0.298	EF	SFR-C	1.6	0.00025
1926404031	0.256	EF	SFR-C	1.6	0.00025
1926426001	0.514	EF	SFR-D	2.4	0.00037
1926426002	0.515	EF	SFR-D	2.4	0.00037
1926426003	0.498	EF	SFR-C	1.6	0.00025
1926426004	0.469	EF	SFR-C	1.6	0.00025
1926426005	0.421	EF	SFR-C	1.6	0.00025
1926426006	0.394	EF	SFR-C	1.6	0.00025
1926426007	0.368	EF	SFR-C	1.6	0.00025
1926426008	0.354	EF	SFR-C	1.6	0.00025
1926426009	0.320	EF	SFR-C	1.6	0.00025
1926426010	0.311	EF	SFR-C	1.6	0.00025
1926426011	0.307	EF	SFR-C	1.6	0.00025
1926426012	0.309	EF	SFR-C	1.6	0.00025
1926426013	0.308	EF	SFR-C	1.6	0.00025
1926426014	0.323	EF	SFR-C	1.6	0.00025
1926426015	0.501	EF	SFR-D	2.4	0.00037
1926426016	0.530	EF	SFR-D	2.4	0.00037
1926426017	0.569	EF	SFR-D	2.4	0.00037
1926426018	0.538	EF	SFR-D	2.4	0.00037
1926426019	0.514	EF	SFR-D	2.4	0.00037
1926426022	0.464	EF	SFR-C	1.6	0.00025
1926426023	0.424	EF	SFR-C	1.6	0.00025
1926426024	0.427	EF	SFR-C	1.6	0.00025
1926426025	0.362	EF	SFR-C	1.6	0.00025
1926426026	0.386	EF	SFR-C	1.6	0.00025
1926426027	0.917	EF	SFR-E	3.2	0.00050
1926427001	0.406	EF	SFR-C	1.6	0.00025
1926427002	0.312	EF	SFR-C	1.6	0.00025
1926427003	0.283	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926427004	0.270	EF	SFR-C	1.6	0.00025
1926427005	0.271	EF	SFR-C	1.6	0.00025
1926427006	0.297	EF	SFR-C	1.6	0.00025
1926427008	0.297	EF	SFR-C	1.6	0.00025
1926427009	0.307	EF	SFR-C	1.6	0.00025
1926427010	0.270	EF	SFR-C	1.6	0.00025
1926427011	0.274	EF	SFR-C	1.6	0.00025
1926427012	0.301	EF	SFR-C	1.6	0.00025
1926427013	0.264	EF	SFR-C	1.6	0.00025
1926427014	0.443	EF	SFR-C	1.6	0.00025
1926427015	0.261	EF	SFR-C	1.6	0.00025
1926427016	0.189	EF	SFR-B	1.0	0.00016
1926427017	0.189	EF	SFR-B	1.0	0.00016
1926427018	0.189	EF	SFR-B	1.0	0.00016
1926427019	0.189	EF	SFR-B	1.0	0.00016
1926427020	0.379	EF	SFR-C	1.6	0.00025
1926427023	0.189	EF	SFR-B	1.0	0.00016
1926427024	0.189	EF	SFR-B	1.0	0.00016
1926427025	0.189	EF	SFR-B	1.0	0.00016
1926427026	0.201	EF	SFR-B	1.0	0.00016
1926427027	0.178	EF	SFR-B	1.0	0.00016
1926427028	0.189	EF	SFR-B	1.0	0.00016
1926427029	0.189	EF	SFR-B	1.0	0.00016
1926427030	0.189	EF	SFR-B	1.0	0.00016
1926427031	0.189	EF	SFR-B	1.0	0.00016
1926427032	0.189	EF	SFR-B	1.0	0.00016
1926427033	0.189	EF	SFR-B	1.0	0.00016
1926427034	0.189	EF	SFR-B	1.0	0.00016
1926427035	0.114	EF	SFR-A	0.7	0.00011
1926427036	0.138	EF	SFR-B	1.0	0.00016
1926427037	0.132	EF	SFR-B	1.0	0.00016
1926427038	0.379	EF	SFR-C	1.6	0.00025
1926427039	0.219	EF	SFR-B	1.0	0.00016
1926427040	0.236	EF	SFR-B	1.0	0.00016
1926451001	0.245	EF	SFR-B	1.0	0.00016
1926451002	0.244	EF	SFR-B	1.0	0.00016
1926451003	0.244	EF	SFR-B	1.0	0.00016
1926451004	0.245	EF	SFR-B	1.0	0.00016
1926451005	0.245	EF	SFR-B	1.0	0.00016
1926451006	0.245	EF	SFR-B	1.0	0.00016
1926451007	0.245	EF	SFR-B	1.0	0.00016
1926451008	0.245	EF	SFR-B	1.0	0.00016
1926451009	0.245	EF	SFR-B	1.0	0.00016
1926451010	0.246	EF	SFR-B	1.0	0.00016
1926451011	0.246	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926451012	0.246	EF	SFR-B	1.0	0.00016
1926451013	0.246	EF	SFR-B	1.0	0.00016
1926451015	0.291	EF	SFR-C	1.6	0.00025
1926451016	0.259	EF	SFR-C	1.6	0.00025
1926451017	0.294	EF	SFR-C	1.6	0.00025
1926451018	0.294	EF	SFR-C	1.6	0.00025
1926451019	0.294	EF	SFR-C	1.6	0.00025
1926451020	0.294	EF	SFR-C	1.6	0.00025
1926451021	0.294	EF	SFR-C	1.6	0.00025
1926451022	0.294	EF	SFR-C	1.6	0.00025
1926451023	0.294	EF	SFR-C	1.6	0.00025
1926451024	0.294	EF	SFR-C	1.6	0.00025
1926451025	0.294	EF	SFR-C	1.6	0.00025
1926451026	0.294	EF	SFR-C	1.6	0.00025
1926451028	1.369	EF	NR	5.7	0.00088
1926452001	0.289	EF	SFR-C	1.6	0.00025
1926452002	0.254	EF	SFR-C	1.6	0.00025
1926452004	0.285	EF	SFR-C	1.6	0.00025
1926452005	0.287	EF	SFR-C	1.6	0.00025
1926452006	0.288	EF	SFR-C	1.6	0.00025
1926452007	0.290	EF	SFR-C	1.6	0.00025
1926452008	0.292	EF	SFR-C	1.6	0.00025
1926452009	0.293	EF	SFR-C	1.6	0.00025
1926452010	0.295	EF	SFR-C	1.6	0.00025
1926452011	0.297	EF	SFR-C	1.6	0.00025
1926452012	0.426	EF	SFR-C	1.6	0.00025
1926452014	0.267	EF	SFR-C	1.6	0.00025
1926452015	0.225	EF	SFR-B	1.0	0.00016
1926452016	0.279	EF	SFR-C	1.6	0.00025
1926452017	0.281	EF	SFR-C	1.6	0.00025
1926452018	0.283	EF	SFR-C	1.6	0.00025
1926452019	0.284	EF	SFR-C	1.6	0.00025
1926452025	0.294	EF	SFR-C	1.6	0.00025
1926452026	0.296	EF	SFR-C	1.6	0.00025
1926452031	0.437	EF	SFR-C	1.6	0.00025
1926452032	0.461	EF	SFR-C	1.6	0.00025
1926452033	0.286	EF	SFR-C	1.6	0.00025
1926452034	0.433	EF	SFR-C	1.6	0.00025
1926452035	0.282	EF	SFR-C	1.6	0.00025
1926452036	0.283	EF	SFR-C	1.6	0.00025
1926453001	0.272	EF	SFR-C	1.6	0.00025
1926453002	0.209	EF	SFR-B	1.0	0.00016
1926453003	0.280	EF	SFR-C	1.6	0.00025
1926453008	0.432	EF	SFR-C	1.6	0.00025
1926453009	0.436	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926453010	0.293	EF	SFR-C	1.6	0.00025
1926453011	0.295	EF	SFR-C	1.6	0.00025
1926453012	0.315	EF	SFR-C	1.6	0.00025
1926453013	0.493	EF	SFR-C	1.6	0.00025
1926453015	0.292	EF	SFR-C	1.6	0.00025
1926453016	0.277	EF	SFR-C	1.6	0.00025
1926453017	0.279	EF	SFR-C	1.6	0.00025
1926453018	0.281	EF	SFR-C	1.6	0.00025
1926453019	0.283	EF	SFR-C	1.6	0.00025
1926453020	0.239	EF	SFR-B	1.0	0.00016
1926453021	0.262	EF	SFR-C	1.6	0.00025
1926453022	0.252	EF	SFR-C	1.6	0.00025
1926453023	0.254	EF	SFR-C	1.6	0.00025
1926453024	0.255	EF	SFR-C	1.6	0.00025
1926453025	0.257	EF	SFR-C	1.6	0.00025
1926453026	0.258	EF	SFR-C	1.6	0.00025
1926453027	0.260	EF	SFR-C	1.6	0.00025
1926453028	0.261	EF	SFR-C	1.6	0.00025
1926453031	0.424	EF	SFR-C	1.6	0.00025
1926453032	0.428	EF	SFR-C	1.6	0.00025
1926454001	0.254	EF	SFR-C	1.6	0.00025
1926454002	0.207	EF	SFR-B	1.0	0.00016
1926454003	0.243	EF	SFR-B	1.0	0.00016
1926454004	0.245	EF	SFR-B	1.0	0.00016
1926454005	0.246	EF	SFR-B	1.0	0.00016
1926454006	0.248	EF	SFR-B	1.0	0.00016
1926454007	0.249	EF	SFR-B	1.0	0.00016
1926454008	0.251	EF	SFR-C	1.6	0.00025
1926454009	0.252	EF	SFR-C	1.6	0.00025
1926454010	0.254	EF	SFR-C	1.6	0.00025
1926454011	0.255	EF	SFR-C	1.6	0.00025
1926454012	0.257	EF	SFR-C	1.6	0.00025
1926454013	0.258	EF	SFR-C	1.6	0.00025
1926454014	0.260	EF	SFR-C	1.6	0.00025
1926454015	0.261	EF	SFR-C	1.6	0.00025
1926454020	0.276	EF	SFR-C	1.6	0.00025
1926454021	0.278	EF	SFR-C	1.6	0.00025
1926454022	0.280	EF	SFR-C	1.6	0.00025
1926454023	0.282	EF	SFR-C	1.6	0.00025
1926454024	0.285	EF	SFR-C	1.6	0.00025
1926454025	0.287	EF	SFR-C	1.6	0.00025
1926454026	0.289	EF	SFR-C	1.6	0.00025
1926454027	0.291	EF	SFR-C	1.6	0.00025
1926454028	0.293	EF	SFR-C	1.6	0.00025
1926454029	0.296	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926454030	0.298	EF	SFR-C	1.6	0.00025
1926454035	0.271	EF	SFR-C	1.6	0.00025
1926454036	0.279	EF	SFR-C	1.6	0.00025
1926476003	0.275	EF	SFR-C	1.6	0.00025
1926476004	0.275	EF	SFR-C	1.6	0.00025
1926476005	0.275	EF	SFR-C	1.6	0.00025
1926476006	0.275	EF	SFR-C	1.6	0.00025
1926476007	0.275	EF	SFR-C	1.6	0.00025
1926476008	0.275	EF	SFR-C	1.6	0.00025
1926476009	0.275	EF	SFR-C	1.6	0.00025
1926476010	0.275	EF	SFR-C	1.6	0.00025
1926476011	0.275	EF	SFR-C	1.6	0.00025
1926476016	0.360	EF	SFR-C	1.6	0.00025
1926476017	0.379	EF	SFR-C	1.6	0.00025
1926476018	0.379	EF	SFR-C	1.6	0.00025
1926476019	0.379	EF	SFR-C	1.6	0.00025
1926476020	0.379	EF	SFR-C	1.6	0.00025
1926476021	0.344	EF	SFR-C	1.6	0.00025
1926476022	0.344	EF	SFR-C	1.6	0.00025
1926476023	0.344	EF	SFR-C	1.6	0.00025
1926476024	0.344	EF	SFR-C	1.6	0.00025
1926476025	0.344	EF	SFR-C	1.6	0.00025
1926476026	0.257	EF	SFR-C	1.6	0.00025
1926476028	0.265	EF	SFR-C	1.6	0.00025
1926476029	0.424	EF	SFR-C	1.6	0.00025
1926476030	0.306	EF	SFR-C	1.6	0.00025
1926476031	0.276	EF	SFR-C	1.6	0.00025
1926477002	0.995	EF	SFR-E	3.2	0.00050
1926477003	0.604	EF	SFR-D	2.4	0.00037
1926477004	0.555	EF	SFR-D	2.4	0.00037
1926477005	0.640	EF	SFR-D	2.4	0.00037
1926477008	0.367	EF	SFR-C	1.6	0.00025
1926477009	0.542	EF	SFR-D	2.4	0.00037
1926477010	0.479	EF	SFR-C	1.6	0.00025
1926477012	0.624	EF	SFR-D	2.4	0.00037
1926477013	0.701	EF	SFR-D	2.4	0.00037
1926477014	0.464	EF	SFR-C	1.6	0.00025
1926477017	0.219	EF	SFR-B	1.0	0.00016
1926477018	0.576	EF	SFR-D	2.4	0.00037
1926477019	0.256	EF	SFR-C	1.6	0.00025
1926477021	0.945	EF	SFR-E	3.2	0.00050
1926477022	0.608	EF	SFR-D	2.4	0.00037
1926477023	1.408	EF	SFR-F	4.6	0.00071
1926478002	0.348	EF	SFR-C	1.6	0.00025
1926478007	0.512	EF	SFR-D	2.4	0.00037

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1926478008	0.451	EF	SFR-C	1.6	0.00025
1926478009	0.393	EF	SFR-C	1.6	0.00025
1926478010	0.317	EF	SFR-C	1.6	0.00025
1926478011	0.379	EF	SFR-C	1.6	0.00025
1926478012	0.375	EF	SFR-C	1.6	0.00025
1926478013	0.503	EF	SFR-D	2.4	0.00037
1926478014	0.335	EF	SFR-C	1.6	0.00025
1926478015	0.231	EF	SFR-B	1.0	0.00016
1926478016	1.027	EF	SFR-F	4.6	0.00071
1926480004	0.219	EF	SFR-B	1.0	0.00016
1926480005	0.209	EF	SFR-B	1.0	0.00016
1926480006	0.208	EF	SFR-B	1.0	0.00016
1926480007	0.208	EF	SFR-B	1.0	0.00016
1926480008	0.207	EF	SFR-B	1.0	0.00016
1935101001	0.419	EF	NR	3.8	0.00059
1935101003	0.320	EF	SFR-C	1.6	0.00025
1935101004	0.284	EF	SFR-C	1.6	0.00025
1935101005	0.260	EF	SFR-C	1.6	0.00025
1935101006	0.284	EF	SFR-C	1.6	0.00025
1935101007	0.275	EF	SFR-C	1.6	0.00025
1935101008	0.254	EF	SFR-C	1.6	0.00025
1935101009	0.303	EF	SFR-C	1.6	0.00025
1935101010	0.235	EF	SFR-B	1.0	0.00016
1935101011	0.265	EF	SFR-C	1.6	0.00025
1935102003	0.461	EF	SFR-C	1.6	0.00025
1935102006	0.241	EF	SFR-B	1.0	0.00016
1935102007	0.207	EF	SFR-B	1.0	0.00016
1935102008	0.194	EF	SFR-B	1.0	0.00016
1935102009	0.207	EF	SFR-B	1.0	0.00016
1935102010	0.276	EF	SFR-C	1.6	0.00025
1935102013	0.253	EF	SFR-C	1.6	0.00025
1935102014	0.242	EF	SFR-B	1.0	0.00016
1935102015	0.355	EF	SFR-C	1.6	0.00025
1935102019	0.221	EF	SFR-B	1.0	0.00016
1935102020	0.223	EF	SFR-B	1.0	0.00016
1935102021	0.052	EF	SFR-A	0.7	0.00011
1935102023	0.364	EF	SFR-C	1.6	0.00025
1935102025	0.505	EF	SFR-D	2.4	0.00037
1935102026	0.209	EF	SFR-B	1.0	0.00016
1935102027	0.633	EF	SFR-D	2.4	0.00037
1935102028	0.495	EF	SFR-C	1.6	0.00025
1935103001	0.441	EF	SFR-C	1.6	0.00025
1935103006	0.220	EF	SFR-B	1.0	0.00016
1935103007	0.275	EF	SFR-C	1.6	0.00025
1935103008	0.165	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935103009	0.262	EF	SFR-C	1.6	0.00025
1935103010	0.234	EF	SFR-B	1.0	0.00016
1935103015	0.325	EF	SFR-C	1.6	0.00025
1935103016	0.331	EF	SFR-C	1.6	0.00025
1935103017	0.292	EF	SFR-C	1.6	0.00025
1935103018	0.338	EF	SFR-C	1.6	0.00025
1935103022	0.289	EF	SFR-C	1.6	0.00025
1935103025	0.248	EF	SFR-B	1.0	0.00016
1935103026	0.220	EF	SFR-B	1.0	0.00016
1935103027	0.220	EF	SFR-B	1.0	0.00016
1935103028	0.234	EF	SFR-B	1.0	0.00016
1935103029	0.234	EF	SFR-B	1.0	0.00016
1935103030	0.242	EF	SFR-B	1.0	0.00016
1935103031	0.319	EF	SFR-C	1.6	0.00025
1935103032	0.234	EF	SFR-B	1.0	0.00016
1935103034	0.330	EF	SFR-C	1.6	0.00025
1935103035	0.289	EF	SFR-C	1.6	0.00025
1935103036	0.385	EF	SFR-C	1.6	0.00025
1935103037	0.290	EF	SFR-C	1.6	0.00025
1935103038	0.488	EF	SFR-C	1.6	0.00025
1935103039	0.258	EF	SFR-C	1.6	0.00025
1935103040	0.173	EF	SFR-B	1.0	0.00016
1935103041	0.220	EF	SFR-B	1.0	0.00016
1935103042	0.193	EF	SFR-B	1.0	0.00016
1935104001	0.317	EF	SFR-C	1.6	0.00025
1935104002	0.193	EF	SFR-B	1.0	0.00016
1935104003	0.509	EF	SFR-D	2.4	0.00037
1935104004	0.289	EF	SFR-C	1.6	0.00025
1935104005	0.226	EF	SFR-B	1.0	0.00016
1935104009	0.329	EF	SFR-C	1.6	0.00025
1935104010	0.205	EF	SFR-B	1.0	0.00016
1935104011	0.208	EF	SFR-B	1.0	0.00016
1935104012	0.211	EF	SFR-B	1.0	0.00016
1935104013	0.260	EF	SFR-C	1.6	0.00025
1935104014	0.321	EF	SFR-C	1.6	0.00025
1935104017	0.195	EF	SFR-B	1.0	0.00016
1935104018	0.201	EF	SFR-B	1.0	0.00016
1935104019	0.235	EF	SFR-B	1.0	0.00016
1935104023	0.398	EF	SFR-C	1.6	0.00025
1935104024	0.329	EF	SFR-C	1.6	0.00025
1935104025	0.458	EF	SFR-C	1.6	0.00025
1935104026	0.215	EF	SFR-B	1.0	0.00016
1935104028	0.440	EF	SFR-C	1.6	0.00025
1935104029	0.359	EF	SFR-C	1.6	0.00025
1935105001	0.220	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935105002	0.231	EF	SFR-B	1.0	0.00016
1935105003	0.231	EF	SFR-B	1.0	0.00016
1935105004	0.231	EF	SFR-B	1.0	0.00016
1935105005	0.231	EF	SFR-B	1.0	0.00016
1935105006	0.231	EF	SFR-B	1.0	0.00016
1935105007	0.207	EF	SFR-B	1.0	0.00016
1935105008	0.234	EF	SFR-B	1.0	0.00016
1935105009	0.523	EF	SFR-D	2.4	0.00037
1935105010	0.289	EF	SFR-C	1.6	0.00025
1935105011	0.289	EF	SFR-C	1.6	0.00025
1935105012	0.214	EF	SFR-B	1.0	0.00016
1935105013	0.245	EF	SFR-B	1.0	0.00016
1935105014	0.248	EF	SFR-B	1.0	0.00016
1935105015	0.413	EF	SFR-C	1.6	0.00025
1935105016	0.331	EF	SFR-C	1.6	0.00025
1935105017	0.220	EF	SFR-B	1.0	0.00016
1935105018	0.220	EF	SFR-B	1.0	0.00016
1935105019	0.220	EF	SFR-B	1.0	0.00016
1935105020	0.234	EF	SFR-B	1.0	0.00016
1935105021	0.262	EF	SFR-C	1.6	0.00025
1935105022	0.195	EF	SFR-B	1.0	0.00016
1935106006	0.500	EF	SFR-C	1.6	0.00025
1935106007	0.268	EF	SFR-C	1.6	0.00025
1935106008	0.425	EF	SFR-C	1.6	0.00025
1935107001	0.245	EF	SFR-B	1.0	0.00016
1935107002	0.193	EF	SFR-B	1.0	0.00016
1935107003	0.248	EF	SFR-B	1.0	0.00016
1935107004	0.248	EF	SFR-B	1.0	0.00016
1935107005	0.220	EF	SFR-B	1.0	0.00016
1935107006	0.220	EF	SFR-B	1.0	0.00016
1935107007	0.241	EF	SFR-B	1.0	0.00016
1935107011	0.242	EF	SFR-B	1.0	0.00016
1935107012	0.246	EF	SFR-B	1.0	0.00016
1935107013	0.326	EF	SFR-C	1.6	0.00025
1935107014	0.209	EF	SFR-B	1.0	0.00016
1935107015	0.317	EF	SFR-C	1.6	0.00025
1935107016	0.279	EF	SFR-C	1.6	0.00025
1935107017	0.331	EF	SFR-C	1.6	0.00025
1935107018	0.193	EF	SFR-B	1.0	0.00016
1935107019	0.240	EF	SFR-B	1.0	0.00016
1935107020	0.245	EF	SFR-B	1.0	0.00016
1935107021	0.256	EF	SFR-C	1.6	0.00025
1935107022	0.243	EF	SFR-B	1.0	0.00016
1935107023	0.251	EF	SFR-C	1.6	0.00025
1935107024	0.267	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935107025	0.286	EF	SFR-C	1.6	0.00025
1935107026	0.300	EF	SFR-C	1.6	0.00025
1935107027	0.289	EF	SFR-C	1.6	0.00025
1935107028	0.175	EF	SFR-B	1.0	0.00016
1935107029	0.243	EF	SFR-B	1.0	0.00016
1935107030	0.348	EF	SFR-C	1.6	0.00025
1935107031	0.163	EF	SFR-B	1.0	0.00016
1935107032	0.163	EF	SFR-B	1.0	0.00016
1935126001	0.236	EF	SFR-B	1.0	0.00016
1935126002	0.273	EF	SFR-C	1.6	0.00025
1935126003	0.422	EF	SFR-C	1.6	0.00025
1935126006	0.210	EF	SFR-B	1.0	0.00016
1935126007	0.210	EF	SFR-B	1.0	0.00016
1935126008	0.195	EF	SFR-B	1.0	0.00016
1935126009	0.201	EF	SFR-B	1.0	0.00016
1935126012	0.265	EF	SFR-C	1.6	0.00025
1935126013	0.300	EF	SFR-C	1.6	0.00025
1935126014	0.183	EF	SFR-B	1.0	0.00016
1935126015	0.221	EF	SFR-B	1.0	0.00016
1935126016	0.270	EF	SFR-C	1.6	0.00025
1935126017	0.327	EF	SFR-C	1.6	0.00025
1935126018	0.277	EF	SFR-C	1.6	0.00025
1935127005	0.244	EF	SFR-B	1.0	0.00016
1935127006	0.277	EF	SFR-C	1.6	0.00025
1935127007	0.194	EF	SFR-B	1.0	0.00016
1935127008	0.184	EF	SFR-B	1.0	0.00016
1935127009	0.353	EF	SFR-C	1.6	0.00025
1935127010	0.273	EF	SFR-C	1.6	0.00025
1935127011	0.297	EF	SFR-C	1.6	0.00025
1935127012	0.201	EF	SFR-B	1.0	0.00016
1935127013	0.199	EF	SFR-B	1.0	0.00016
1935127014	0.192	EF	SFR-B	1.0	0.00016
1935127015	0.176	EF	SFR-B	1.0	0.00016
1935127016	0.197	EF	SFR-B	1.0	0.00016
1935127018	0.255	EF	SFR-C	1.6	0.00025
1935127019	0.193	EF	SFR-B	1.0	0.00016
1935127020	0.193	EF	SFR-B	1.0	0.00016
1935127021	0.193	EF	SFR-B	1.0	0.00016
1935127022	0.193	EF	SFR-B	1.0	0.00016
1935127023	0.193	EF	SFR-B	1.0	0.00016
1935127024	0.193	EF	SFR-B	1.0	0.00016
1935127025	0.193	EF	SFR-B	1.0	0.00016
1935127026	0.193	EF	SFR-B	1.0	0.00016
1935127027	0.160	EF	SFR-B	1.0	0.00016
1935127028	0.219	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935127029	0.224	EF	SFR-B	1.0	0.00016
1935127030	0.245	EF	SFR-B	1.0	0.00016
1935127031	0.605	EF	SFR-D	2.4	0.00037
1935127032	0.239	EF	SFR-B	1.0	0.00016
1935127033	0.236	EF	SFR-B	1.0	0.00016
1935128001	0.231	EF	SFR-B	1.0	0.00016
1935128002	0.187	EF	SFR-B	1.0	0.00016
1935128003	0.194	EF	SFR-B	1.0	0.00016
1935128004	0.194	EF	SFR-B	1.0	0.00016
1935128005	0.194	EF	SFR-B	1.0	0.00016
1935128006	0.194	EF	SFR-B	1.0	0.00016
1935128008	0.290	EF	SFR-C	1.6	0.00025
1935128009	0.290	EF	SFR-C	1.6	0.00025
1935128010	0.227	EF	SFR-B	1.0	0.00016
1935128011	0.202	EF	SFR-B	1.0	0.00016
1935128012	0.226	EF	SFR-B	1.0	0.00016
1935128013	0.201	EF	SFR-B	1.0	0.00016
1935128014	0.350	EF	SFR-C	1.6	0.00025
1935128015	0.207	EF	SFR-B	1.0	0.00016
1935128016	0.276	EF	SFR-C	1.6	0.00025
1935128017	0.255	EF	SFR-C	1.6	0.00025
1935128018	0.235	EF	SFR-B	1.0	0.00016
1935128019	0.182	EF	SFR-B	1.0	0.00016
1935128020	0.182	EF	SFR-B	1.0	0.00016
1935128021	0.182	EF	SFR-B	1.0	0.00016
1935128022	0.182	EF	SFR-B	1.0	0.00016
1935128023	0.182	EF	SFR-B	1.0	0.00016
1935128024	0.187	EF	SFR-B	1.0	0.00016
1935128025	0.288	EF	SFR-C	1.6	0.00025
1935128026	0.271	EF	SFR-C	1.6	0.00025
1935128027	0.269	EF	SFR-C	1.6	0.00025
1935128028	0.269	EF	SFR-C	1.6	0.00025
1935128029	0.179	EF	SFR-B	1.0	0.00016
1935128030	0.248	EF	SFR-B	1.0	0.00016
1935128031	0.165	EF	SFR-B	1.0	0.00016
1935128032	0.248	EF	SFR-B	1.0	0.00016
1935128035	0.303	EF	SFR-C	1.6	0.00025
1935128036	0.165	EF	SFR-B	1.0	0.00016
1935128037	0.170	EF	SFR-B	1.0	0.00016
1935128038	0.193	EF	SFR-B	1.0	0.00016
1935128039	0.194	EF	SFR-B	1.0	0.00016
1935128040	0.194	EF	SFR-B	1.0	0.00016
1935129002	0.195	EF	SFR-B	1.0	0.00016
1935129003	0.237	EF	SFR-B	1.0	0.00016
1935129004	0.228	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935129005	0.228	EF	SFR-B	1.0	0.00016
1935129006	0.228	EF	SFR-B	1.0	0.00016
1935129007	0.196	EF	SFR-B	1.0	0.00016
1935129008	0.196	EF	SFR-B	1.0	0.00016
1935129009	0.196	EF	SFR-B	1.0	0.00016
1935129010	0.293	EF	SFR-C	1.6	0.00025
1935129011	0.298	EF	SFR-C	1.6	0.00025
1935129012	0.197	EF	SFR-B	1.0	0.00016
1935129013	0.198	EF	SFR-B	1.0	0.00016
1935129014	0.198	EF	SFR-B	1.0	0.00016
1935129015	0.198	EF	SFR-B	1.0	0.00016
1935129016	0.198	EF	SFR-B	1.0	0.00016
1935129017	0.198	EF	SFR-B	1.0	0.00016
1935129018	0.199	EF	SFR-B	1.0	0.00016
1935129019	0.199	EF	SFR-B	1.0	0.00016
1935129020	0.199	EF	SFR-B	1.0	0.00016
1935129021	0.199	EF	SFR-B	1.0	0.00016
1935129022	0.200	EF	SFR-B	1.0	0.00016
1935129023	0.200	EF	SFR-B	1.0	0.00016
1935129025	0.238	EF	SFR-B	1.0	0.00016
1935129026	0.233	EF	SFR-B	1.0	0.00016
1935129027	0.233	EF	SFR-B	1.0	0.00016
1935129030	0.308	EF	SFR-C	1.6	0.00025
1935129031	0.200	EF	SFR-B	1.0	0.00016
1935129032	0.200	EF	SFR-B	1.0	0.00016
1935129035	0.267	EF	SFR-C	1.6	0.00025
1935129039	0.267	EF	SFR-C	1.6	0.00025
1935129040	0.278	EF	SFR-C	1.6	0.00025
1935129041	0.325	EF	SFR-C	1.6	0.00025
1935129042	0.333	EF	SFR-C	1.6	0.00025
1935129043	0.341	EF	SFR-C	1.6	0.00025
1935129044	0.241	EF	SFR-B	1.0	0.00016
1935129045	0.214	EF	SFR-B	1.0	0.00016
1935129046	0.292	EF	SFR-C	1.6	0.00025
1935129047	0.259	EF	SFR-C	1.6	0.00025
1935129048	0.274	EF	SFR-C	1.6	0.00025
1935129049	0.447	EF	NR	3.4	0.00053
1935130001	0.278	EF	SFR-C	1.6	0.00025
1935130003	0.200	EF	SFR-B	1.0	0.00016
1935130006	0.301	EF	SFR-C	1.6	0.00025
1935130007	0.199	EF	SFR-B	1.0	0.00016
1935130008	0.399	EF	SFR-C	1.6	0.00025
1935130009	0.199	EF	SFR-B	1.0	0.00016
1935130010	0.200	EF	SFR-B	1.0	0.00016
1935130011	0.200	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935130012	0.200	EF	SFR-B	1.0	0.00016
1935130013	0.200	EF	SFR-B	1.0	0.00016
1935130014	0.200	EF	SFR-B	1.0	0.00016
1935130015	0.200	EF	SFR-B	1.0	0.00016
1935130016	0.298	EF	SFR-C	1.6	0.00025
1935130017	0.301	EF	SFR-C	1.6	0.00025
1935130018	0.298	EF	SFR-C	1.6	0.00025
1935130019	0.301	EF	SFR-C	1.6	0.00025
1935130020	0.298	EF	SFR-C	1.6	0.00025
1935130021	0.257	EF	SFR-C	1.6	0.00025
1935130022	0.233	EF	SFR-B	1.0	0.00016
1935151002	9.105	EF	NR	52.7	0.00818
1935151003	35.680	EF	NR	172.7	0.02681
1935152004	0.340	EF	SFR-C	1.6	0.00025
1935152005	0.333	EF	SFR-C	1.6	0.00025
1935152006	0.375	EF	SFR-C	1.6	0.00025
1935152007	0.220	EF	SFR-B	1.0	0.00016
1935152008	0.220	EF	SFR-B	1.0	0.00016
1935152009	0.220	EF	SFR-B	1.0	0.00016
1935152010	0.220	EF	SFR-B	1.0	0.00016
1935152011	0.220	EF	SFR-B	1.0	0.00016
1935152012	0.220	EF	SFR-B	1.0	0.00016
1935152013	0.211	EF	SFR-B	1.0	0.00016
1935152014	0.220	EF	SFR-B	1.0	0.00016
1935152015	0.243	EF	SFR-B	1.0	0.00016
1935176001	0.443	EF	SFR-C	1.6	0.00025
1935176002	0.430	EF	SFR-C	1.6	0.00025
1935176003	0.302	EF	SFR-C	1.6	0.00025
1935176004	0.241	EF	SFR-B	1.0	0.00016
1935176005	0.331	EF	SFR-C	1.6	0.00025
1935176006	0.301	EF	SFR-C	1.6	0.00025
1935176007	0.303	EF	SFR-C	1.6	0.00025
1935176008	0.210	EF	SFR-B	1.0	0.00016
1935176009	0.227	EF	SFR-B	1.0	0.00016
1935176010	0.220	EF	SFR-B	1.0	0.00016
1935176011	0.220	EF	SFR-B	1.0	0.00016
1935176012	0.220	EF	SFR-B	1.0	0.00016
1935176013	0.331	EF	SFR-C	1.6	0.00025
1935177001	0.323	EF	SFR-C	1.6	0.00025
1935177002	0.275	EF	SFR-C	1.6	0.00025
1935177003	0.288	EF	SFR-C	1.6	0.00025
1935177004	0.254	EF	SFR-C	1.6	0.00025
1935177008	0.311	EF	SFR-C	1.6	0.00025
1935177009	0.327	EF	SFR-C	1.6	0.00025
1935177010	0.308	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935177011	0.274	EF	SFR-C	1.6	0.00025
1935177012	0.220	EF	SFR-B	1.0	0.00016
1935177013	0.226	EF	SFR-B	1.0	0.00016
1935177014	0.215	EF	SFR-B	1.0	0.00016
1935177015	0.220	EF	SFR-B	1.0	0.00016
1935177016	0.220	EF	SFR-B	1.0	0.00016
1935177017	0.331	EF	SFR-C	1.6	0.00025
1935177018	0.227	EF	SFR-B	1.0	0.00016
1935177019	0.265	EF	SFR-C	1.6	0.00025
1935177020	0.369	EF	SFR-C	1.6	0.00025
1935177021	0.260	EF	SFR-C	1.6	0.00025
1935177022	0.215	EF	SFR-B	1.0	0.00016
1935177023	0.207	EF	SFR-B	1.0	0.00016
1935177024	0.220	EF	SFR-B	1.0	0.00016
1935177025	0.220	EF	SFR-B	1.0	0.00016
1935177026	0.220	EF	SFR-B	1.0	0.00016
1935177027	0.220	EF	SFR-B	1.0	0.00016
1935177028	0.220	EF	SFR-B	1.0	0.00016
1935177029	0.331	EF	SFR-C	1.6	0.00025
1935177030	0.314	EF	SFR-C	1.6	0.00025
1935177031	0.360	EF	SFR-C	1.6	0.00025
1935178001	0.175	EF	SFR-B	1.0	0.00016
1935178002	0.212	EF	SFR-B	1.0	0.00016
1935178003	0.202	EF	SFR-B	1.0	0.00016
1935178004	0.223	EF	SFR-B	1.0	0.00016
1935178005	0.216	EF	SFR-B	1.0	0.00016
1935178006	0.187	EF	SFR-B	1.0	0.00016
1935178007	0.331	EF	SFR-C	1.6	0.00025
1935178010	0.220	EF	SFR-B	1.0	0.00016
1935178011	0.220	EF	SFR-B	1.0	0.00016
1935178012	0.220	EF	SFR-B	1.0	0.00016
1935178013	0.220	EF	SFR-B	1.0	0.00016
1935178014	0.220	EF	SFR-B	1.0	0.00016
1935178015	0.220	EF	SFR-B	1.0	0.00016
1935178016	0.220	EF	SFR-B	1.0	0.00016
1935178017	0.331	EF	SFR-C	1.6	0.00025
1935178018	0.205	EF	SFR-B	1.0	0.00016
1935178019	0.207	EF	SFR-B	1.0	0.00016
1935178020	0.207	EF	SFR-B	1.0	0.00016
1935178021	0.198	EF	SFR-B	1.0	0.00016
1935178022	0.220	EF	SFR-B	1.0	0.00016
1935178023	0.207	EF	SFR-B	1.0	0.00016
1935178024	0.234	EF	SFR-B	1.0	0.00016
1935178025	0.220	EF	SFR-B	1.0	0.00016
1935178026	0.267	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935178027	0.284	EF	SFR-C	1.6	0.00025
1935178028	0.275	EF	SFR-C	1.6	0.00025
1935178029	0.220	EF	SFR-B	1.0	0.00016
1935178030	0.220	EF	SFR-B	1.0	0.00016
1935178031	0.220	EF	SFR-B	1.0	0.00016
1935178032	0.220	EF	SFR-B	1.0	0.00016
1935178033	0.331	EF	SFR-C	1.6	0.00025
1935178034	0.331	EF	SFR-C	1.6	0.00025
1935179001	0.399	EF	SFR-C	1.6	0.00025
1935179004	0.201	EF	SFR-B	1.0	0.00016
1935179005	0.286	EF	SFR-C	1.6	0.00025
1935179006	0.217	EF	SFR-B	1.0	0.00016
1935179007	0.202	EF	SFR-B	1.0	0.00016
1935179008	0.202	EF	SFR-B	1.0	0.00016
1935179009	0.203	EF	SFR-B	1.0	0.00016
1935179010	0.203	EF	SFR-B	1.0	0.00016
1935179011	0.203	EF	SFR-B	1.0	0.00016
1935179012	0.307	EF	SFR-C	1.6	0.00025
1935179013	0.304	EF	SFR-C	1.6	0.00025
1935179014	0.209	EF	SFR-B	1.0	0.00016
1935179017	0.239	EF	SFR-B	1.0	0.00016
1935179020	0.199	EF	SFR-B	1.0	0.00016
1935179021	0.216	EF	SFR-B	1.0	0.00016
1935179022	0.283	EF	SFR-C	1.6	0.00025
1935179023	0.300	EF	SFR-C	1.6	0.00025
1935179028	0.216	EF	SFR-B	1.0	0.00016
1935179029	0.216	EF	SFR-B	1.0	0.00016
1935179030	0.283	EF	SFR-C	1.6	0.00025
1935179031	0.283	EF	SFR-C	1.6	0.00025
1935179032	0.300	EF	SFR-C	1.6	0.00025
1935179033	0.300	EF	SFR-C	1.6	0.00025
1935179034	0.226	EF	SFR-B	1.0	0.00016
1935179035	0.226	EF	SFR-B	1.0	0.00016
1935179036	0.246	EF	SFR-B	1.0	0.00016
1935179037	0.401	EF	SFR-C	1.6	0.00025
1935179038	0.346	EF	SFR-C	1.6	0.00025
1935179039	0.304	EF	SFR-C	1.6	0.00025
1935179040	0.303	EF	SFR-C	1.6	0.00025
1935179041	0.269	EF	SFR-C	1.6	0.00025
1935179042	0.300	EF	SFR-C	1.6	0.00025
1935179043	0.399	EF	SFR-C	1.6	0.00025
1935179044	0.305	EF	SFR-C	1.6	0.00025
1935180001	0.198	EF	SFR-B	1.0	0.00016
1935180002	0.196	EF	SFR-B	1.0	0.00016
1935180003	0.198	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935180004	0.200	EF	SFR-B	1.0	0.00016
1935180005	0.300	EF	SFR-C	1.6	0.00025
1935180006	0.523	EF	SFR-D	2.4	0.00037
1935180007	0.300	EF	SFR-C	1.6	0.00025
1935180008	0.300	EF	SFR-C	1.6	0.00025
1935180010	0.250	EF	SFR-B	1.0	0.00016
1935180011	0.250	EF	SFR-B	1.0	0.00016
1935180012	0.290	EF	SFR-C	1.6	0.00025
1935180013	0.310	EF	SFR-C	1.6	0.00025
1935180014	0.300	EF	SFR-C	1.6	0.00025
1935180015	0.301	EF	SFR-C	1.6	0.00025
1935180016	0.275	EF	SFR-C	1.6	0.00025
1935180017	0.259	EF	SFR-C	1.6	0.00025
1935180018	0.419	EF	SFR-C	1.6	0.00025
1935201008	0.132	EF	SFR-B	1.0	0.00016
1935201009	0.132	EF	SFR-B	1.0	0.00016
1935201010	0.132	EF	SFR-B	1.0	0.00016
1935201011	0.132	EF	SFR-B	1.0	0.00016
1935201012	0.176	EF	SFR-B	1.0	0.00016
1935201013	0.179	EF	SFR-B	1.0	0.00016
1935201014	0.179	EF	SFR-B	1.0	0.00016
1935201015	0.235	EF	SFR-B	1.0	0.00016
1935201016	0.151	EF	SFR-B	1.0	0.00016
1935201017	0.234	EF	SFR-B	1.0	0.00016
1935201018	0.326	EF	SFR-C	1.6	0.00025
1935201019	0.935	EF	SFR-E	3.2	0.00050
1935201020	0.935	EF	SFR-E	3.2	0.00050
1935201021	0.316	EF	SFR-C	1.6	0.00025
1935201022	0.202	EF	SFR-B	1.0	0.00016
1935201023	0.178	EF	SFR-B	1.0	0.00016
1935201024	0.172	EF	SFR-B	1.0	0.00016
1935201025	0.172	EF	SFR-B	1.0	0.00016
1935201026	0.160	EF	SFR-B	1.0	0.00016
1935201027	0.248	EF	SFR-B	1.0	0.00016
1935201028	0.262	EF	SFR-C	1.6	0.00025
1935201029	0.142	EF	SFR-B	1.0	0.00016
1935201030	0.174	EF	SFR-B	1.0	0.00016
1935201031	0.174	EF	SFR-B	1.0	0.00016
1935201032	0.174	EF	SFR-B	1.0	0.00016
1935201033	0.185	EF	SFR-B	1.0	0.00016
1935201034	0.212	EF	SFR-B	1.0	0.00016
1935201035	0.212	EF	SFR-B	1.0	0.00016
1935201036	0.212	EF	SFR-B	1.0	0.00016
1935201037	0.212	EF	SFR-B	1.0	0.00016
1935201038	0.212	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935201039	0.300	EF	SFR-C	1.6	0.00025
1935201040	0.038	EF	SFR-A	0.7	0.00011
1935201041	0.139	EF	SFR-B	1.0	0.00016
1935201042	0.141	EF	SFR-B	1.0	0.00016
1935201043	0.192	EF	SFR-B	1.0	0.00016
1935201044	0.656	EF	SFR-D	2.4	0.00037
1935201045	0.939	EF	SFR-E	3.2	0.00050
1935201046	0.936	EF	SFR-E	3.2	0.00050
1935201047	0.752	EF	SFR-E	3.2	0.00050
1935201048	0.713	EF	SFR-D	2.4	0.00037
1935201049	1.170	EF	SFR-F	4.6	0.00071
1935201051	1.170	EF	SFR-F	4.6	0.00071
1935201052	1.156	EF	SFR-F	4.6	0.00071
1935201053	0.276	EF	SFR-C	1.6	0.00025
1935201054	0.191	EF	SFR-B	1.0	0.00016
1935201055	0.172	EF	SFR-B	1.0	0.00016
1935201056	0.180	EF	SFR-B	1.0	0.00016
1935201057	0.175	EF	SFR-B	1.0	0.00016
1935201058	0.234	EF	SFR-B	1.0	0.00016
1935201059	0.174	EF	SFR-B	1.0	0.00016
1935201060	0.151	EF	SFR-B	1.0	0.00016
1935201061	0.160	EF	SFR-B	1.0	0.00016
1935201062	0.163	EF	SFR-B	1.0	0.00016
1935201063	0.286	EF	SFR-C	1.6	0.00025
1935201064	0.185	EF	SFR-B	1.0	0.00016
1935201065	0.188	EF	SFR-B	1.0	0.00016
1935201066	0.193	EF	SFR-B	1.0	0.00016
1935201067	0.204	EF	SFR-B	1.0	0.00016
1935201068	0.179	EF	SFR-B	1.0	0.00016
1935201069	0.179	EF	SFR-B	1.0	0.00016
1935201070	0.187	EF	SFR-B	1.0	0.00016
1935201071	0.187	EF	SFR-B	1.0	0.00016
1935201072	0.261	EF	SFR-C	1.6	0.00025
1935201073	6.639	EF	NR	46.9	0.00728
1935201074	0.251	EF	SFR-C	1.6	0.00025
1935201075	1.050	EF	SFR-F	4.6	0.00071
1935202005	0.935	EF	SFR-E	3.2	0.00050
1935202006	0.935	EF	SFR-E	3.2	0.00050
1935202007	0.931	EF	SFR-E	3.2	0.00050
1935202008	0.930	EF	SFR-E	3.2	0.00050
1935202009	0.934	EF	SFR-E	3.2	0.00050
1935202010	0.934	EF	SFR-E	3.2	0.00050
1935202011	0.934	EF	SFR-E	3.2	0.00050
1935202012	0.934	EF	SFR-E	3.2	0.00050
1935202013	1.317	EF	SFR-F	4.6	0.00071

CITY OF BIRMINGHAM
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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935202014	1.015	EF	SFR-F	4.6	0.00071
1935202015	0.232	EF	SFR-B	1.0	0.00016
1935202016	1.073	EF	SFR-F	4.6	0.00071
1935202017	1.027	EF	SFR-F	4.6	0.00071
1935202018	1.073	EF	SFR-F	4.6	0.00071
1935202019	1.258	EF	SFR-F	4.6	0.00071
1935202020	0.466	EF	SFR-C	1.6	0.00025
1935202024	1.014	EF	SFR-F	4.6	0.00071
1935202025	1.026	EF	SFR-F	4.6	0.00071
1935202026	0.418	EF	SFR-C	1.6	0.00025
1935202027	0.313	EF	SFR-C	1.6	0.00025
1935202028	0.163	EF	SFR-B	1.0	0.00016
1935202029	0.160	EF	SFR-B	1.0	0.00016
1935202033	0.672	EF	SFR-D	2.4	0.00037
1935202034	0.686	EF	SFR-D	2.4	0.00037
1935202035	1.076	EF	SFR-F	4.6	0.00071
1935202036	1.122	EF	SFR-F	4.6	0.00071
1935202039	1.053	EF	SFR-F	4.6	0.00071
1935202040	1.082	EF	SFR-F	4.6	0.00071
1935202041	2.197	EF	SFR-F	4.6	0.00071
1935202042	0.936	EF	SFR-E	3.2	0.00050
1935202043	0.833	EF	SFR-E	3.2	0.00050
1935202044	0.729	EF	SFR-D	2.4	0.00037
1935202045	0.648	EF	SFR-D	2.4	0.00037
1935202046	0.552	EF	SFR-D	2.4	0.00037
1935202047	0.552	EF	SFR-D	2.4	0.00037
1935202048	0.469	EF	SFR-C	1.6	0.00025
1935202049	0.448	EF	SFR-C	1.6	0.00025
1935202050	0.447	EF	SFR-C	1.6	0.00025
1935202051	0.426	EF	SFR-C	1.6	0.00025
1935202052	0.461	EF	SFR-C	1.6	0.00025
1935202053	0.502	EF	SFR-D	2.4	0.00037
1935202054	0.560	EF	SFR-D	2.4	0.00037
1935202055	1.078	EF	SFR-F	4.6	0.00071
1935202058	0.464	EF	SFR-C	1.6	0.00025
1935202060	0.711	EF	SFR-D	2.4	0.00037
1935202063	0.461	EF	SFR-C	1.6	0.00025
1935202065	0.402	EF	SFR-C	1.6	0.00025
1935202066	0.405	EF	SFR-C	1.6	0.00025
1935202068	2.193	EF	SFR-F	4.6	0.00071
1935202069	9.420	EF	NR	57.8	0.00897
1935202070	0.156	EF	SFR-B	1.0	0.00016
1935202071	0.146	EF	SFR-B	1.0	0.00016
1935226001	0.606	EF	SFR-D	2.4	0.00037
1935226002	0.575	EF	SFR-D	2.4	0.00037

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935226003	0.534	EF	SFR-D	2.4	0.00037
1935226004	0.482	EF	SFR-C	1.6	0.00025
1935226005	0.825	EF	SFR-E	3.2	0.00050
1935226006	0.389	EF	SFR-C	1.6	0.00025
1935226008	0.670	EF	SFR-D	2.4	0.00037
1935226009	0.411	EF	SFR-C	1.6	0.00025
1935226010	0.340	EF	SFR-C	1.6	0.00025
1935226011	0.698	EF	SFR-D	2.4	0.00037
1935226012	0.723	EF	SFR-D	2.4	0.00037
1935226013	0.703	EF	SFR-D	2.4	0.00037
1935226014	0.504	EF	SFR-D	2.4	0.00037
1935226016	0.485	EF	SFR-C	1.6	0.00025
1935226017	0.554	EF	SFR-D	2.4	0.00037
1935227004	0.363	EF	SFR-C	1.6	0.00025
1935227005	0.646	EF	SFR-D	2.4	0.00037
1935227006	0.672	EF	SFR-D	2.4	0.00037
1935227008	0.819	EF	SFR-E	3.2	0.00050
1935227009	0.985	EF	SFR-E	3.2	0.00050
1935227010	0.929	EF	SFR-E	3.2	0.00050
1935227011	0.957	EF	SFR-E	3.2	0.00050
1935227012	0.889	EF	SFR-E	3.2	0.00050
1935227013	0.771	EF	SFR-E	3.2	0.00050
1935227015	0.347	EF	SFR-C	1.6	0.00025
1935227016	0.311	EF	SFR-C	1.6	0.00025
1935227017	0.288	EF	SFR-C	1.6	0.00025
1935227018	0.285	EF	SFR-C	1.6	0.00025
1935227022	0.254	EF	SFR-C	1.6	0.00025
1935227023	0.251	EF	SFR-C	1.6	0.00025
1935227024	0.249	EF	SFR-B	1.0	0.00016
1935227025	0.249	EF	SFR-B	1.0	0.00016
1935227027	0.400	EF	SFR-C	1.6	0.00025
1935227028	0.259	EF	SFR-C	1.6	0.00025
1935227029	0.266	EF	SFR-C	1.6	0.00025
1935227030	0.275	EF	SFR-C	1.6	0.00025
1935227032	0.306	EF	SFR-C	1.6	0.00025
1935227033	0.352	EF	SFR-C	1.6	0.00025
1935227034	0.366	EF	SFR-C	1.6	0.00025
1935227035	0.645	EF	SFR-D	2.4	0.00037
1935227036	0.825	EF	SFR-E	3.2	0.00050
1935227037	0.286	EF	SFR-C	1.6	0.00025
1935227038	0.314	EF	SFR-C	1.6	0.00025
1935227039	0.393	EF	SFR-C	1.6	0.00025
1935227040	0.461	EF	SFR-C	1.6	0.00025
1935227041	0.285	EF	SFR-C	1.6	0.00025
1935227042	0.297	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935229001	0.309	EF	SFR-C	1.6	0.00025
1935229002	0.277	EF	SFR-C	1.6	0.00025
1935229003	0.279	EF	SFR-C	1.6	0.00025
1935229004	0.233	EF	SFR-B	1.0	0.00016
1935229005	0.257	EF	SFR-C	1.6	0.00025
1935229006	0.254	EF	SFR-C	1.6	0.00025
1935229007	0.249	EF	SFR-B	1.0	0.00016
1935229008	0.250	EF	SFR-B	1.0	0.00016
1935229009	0.260	EF	SFR-C	1.6	0.00025
1935229010	0.268	EF	SFR-C	1.6	0.00025
1935229011	0.267	EF	SFR-C	1.6	0.00025
1935229012	0.272	EF	SFR-C	1.6	0.00025
1935229013	0.276	EF	SFR-C	1.6	0.00025
1935229014	0.270	EF	SFR-C	1.6	0.00025
1935229015	0.366	EF	SFR-C	1.6	0.00025
1935229016	0.266	EF	SFR-C	1.6	0.00025
1935229017	0.321	EF	SFR-C	1.6	0.00025
1935229018	0.289	EF	SFR-C	1.6	0.00025
1935229019	0.248	EF	SFR-B	1.0	0.00016
1935229020	0.241	EF	SFR-B	1.0	0.00016
1935229021	0.241	EF	SFR-B	1.0	0.00016
1935229022	0.234	EF	SFR-B	1.0	0.00016
1935229023	0.234	EF	SFR-B	1.0	0.00016
1935229024	0.361	EF	SFR-C	1.6	0.00025
1935229025	0.373	EF	SFR-C	1.6	0.00025
1935229026	0.261	EF	SFR-C	1.6	0.00025
1935229027	0.261	EF	SFR-C	1.6	0.00025
1935229029	0.332	EF	SFR-C	1.6	0.00025
1935229030	0.380	EF	SFR-C	1.6	0.00025
1935229032	0.231	EF	SFR-B	1.0	0.00016
1935229033	0.516	EF	SFR-D	2.4	0.00037
1935230001	0.282	EF	SFR-C	1.6	0.00025
1935230002	0.271	EF	SFR-C	1.6	0.00025
1935230003	0.257	EF	SFR-C	1.6	0.00025
1935230004	0.278	EF	SFR-C	1.6	0.00025
1935230005	0.265	EF	SFR-C	1.6	0.00025
1935230006	0.255	EF	SFR-C	1.6	0.00025
1935230007	0.246	EF	SFR-B	1.0	0.00016
1935230008	0.243	EF	SFR-B	1.0	0.00016
1935230009	0.234	EF	SFR-B	1.0	0.00016
1935230010	0.241	EF	SFR-B	1.0	0.00016
1935230015	0.252	EF	SFR-C	1.6	0.00025
1935230016	0.322	EF	SFR-C	1.6	0.00025
1935230017	0.302	EF	SFR-C	1.6	0.00025
1935230018	0.249	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935230019	0.248	EF	SFR-B	1.0	0.00016
1935230020	0.243	EF	SFR-B	1.0	0.00016
1935230021	0.247	EF	SFR-B	1.0	0.00016
1935230022	0.367	EF	SFR-C	1.6	0.00025
1935230023	0.388	EF	SFR-C	1.6	0.00025
1935230024	0.259	EF	SFR-C	1.6	0.00025
1935230025	0.213	EF	SFR-B	1.0	0.00016
1935230026	0.311	EF	SFR-C	1.6	0.00025
1935230028	0.242	EF	SFR-B	1.0	0.00016
1935230029	0.238	EF	SFR-B	1.0	0.00016
1935230030	0.722	EF	SFR-D	2.4	0.00037
1935231001	1.498	EF	MFR	9.7	0.00151
1935276001	0.579	EF	SFR-D	2.4	0.00037
1935276002	0.333	EF	SFR-C	1.6	0.00025
1935276003	0.687	EF	SFR-D	2.4	0.00037
1935276006	0.610	EF	SFR-D	2.4	0.00037
1935276007	0.685	EF	SFR-D	2.4	0.00037
1935276008	0.650	EF	SFR-D	2.4	0.00037
1935276009	0.817	EF	SFR-E	3.2	0.00050
1935276010	1.504	EF	SFR-F	4.6	0.00071
1935276011	0.947	EF	SFR-E	3.2	0.00050
1935276012	0.338	EF	SFR-C	1.6	0.00025
1935276013	0.520	EF	SFR-D	2.4	0.00037
1935276014	0.869	EF	SFR-E	3.2	0.00050
1935276015	0.537	EF	SFR-D	2.4	0.00037
1935276016	0.491	EF	SFR-C	1.6	0.00025
1935276017	0.452	EF	SFR-C	1.6	0.00025
1935276018	0.475	EF	SFR-C	1.6	0.00025
1935276021	1.313	EF	SFR-F	4.6	0.00071
1935276022	1.108	EF	SFR-F	4.6	0.00071
1935276023	0.694	EF	SFR-D	2.4	0.00037
1935276024	1.192	EF	SFR-F	4.6	0.00071
1935277001	0.599	EF	SFR-D	2.4	0.00037
1935277002	0.485	EF	SFR-C	1.6	0.00025
1935277003	0.506	EF	SFR-D	2.4	0.00037
1935277004	0.482	EF	SFR-C	1.6	0.00025
1935277005	0.408	EF	SFR-C	1.6	0.00025
1935277006	0.400	EF	SFR-C	1.6	0.00025
1935277010	0.391	EF	SFR-C	1.6	0.00025
1935277011	0.311	EF	SFR-C	1.6	0.00025
1935277012	0.285	EF	SFR-C	1.6	0.00025
1935277013	0.254	EF	SFR-C	1.6	0.00025
1935277014	0.252	EF	SFR-C	1.6	0.00025
1935277015	0.272	EF	SFR-C	1.6	0.00025
1935277016	0.361	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935277020	3.006	EF	SFR-F	4.6	0.00071
1935277023	1.313	EF	SFR-F	4.6	0.00071
1935277026	0.364	EF	SFR-C	1.6	0.00025
1935277027	0.415	EF	SFR-C	1.6	0.00025
1935277028	0.384	EF	SFR-C	1.6	0.00025
1935277029	0.338	EF	SFR-C	1.6	0.00025
1935277030	0.251	EF	SFR-C	1.6	0.00025
1935277031	0.363	EF	SFR-C	1.6	0.00025
1935277035	0.429	EF	SFR-C	1.6	0.00025
1935277036	0.261	EF	SFR-C	1.6	0.00025
1935277037	0.308	EF	SFR-C	1.6	0.00025
1935277038	0.363	EF	SFR-C	1.6	0.00025
1935277039	0.363	EF	SFR-C	1.6	0.00025
1935277040	0.363	EF	SFR-C	1.6	0.00025
1935277041	0.362	EF	SFR-C	1.6	0.00025
1935277042	0.506	EF	SFR-D	2.4	0.00037
1935277043	0.494	EF	SFR-C	1.6	0.00025
1935277044	0.425	EF	SFR-C	1.6	0.00025
1935277045	1.756	EF	SFR-F	4.6	0.00071
1935277050	0.405	EF	SFR-C	1.6	0.00025
1935277051	1.248	EF	SFR-F	4.6	0.00071
1935301002	0.434	EF	SFR-C	1.6	0.00025
1935301006	0.481	EF	SFR-C	1.6	0.00025
1935301007	0.559	EF	SFR-D	2.4	0.00037
1935301008	0.510	EF	SFR-D	2.4	0.00037
1935301009	0.484	EF	SFR-C	1.6	0.00025
1935301010	0.408	EF	SFR-C	1.6	0.00025
1935301011	0.511	EF	SFR-D	2.4	0.00037
1935301014	0.321	EF	SFR-C	1.6	0.00025
1935301015	0.321	EF	SFR-C	1.6	0.00025
1935301016	0.321	EF	SFR-C	1.6	0.00025
1935301017	0.321	EF	SFR-C	1.6	0.00025
1935301018	0.321	EF	SFR-C	1.6	0.00025
1935302001	0.342	EF	SFR-C	1.6	0.00025
1935302002	0.277	EF	SFR-C	1.6	0.00025
1935302003	0.254	EF	SFR-C	1.6	0.00025
1935302004	0.264	EF	SFR-C	1.6	0.00025
1935302005	0.326	EF	SFR-C	1.6	0.00025
1935303001	0.230	EF	SFR-B	1.0	0.00016
1935303002	0.220	EF	SFR-B	1.0	0.00016
1935303003	0.220	EF	SFR-B	1.0	0.00016
1935303004	0.220	EF	SFR-B	1.0	0.00016
1935303005	0.220	EF	SFR-B	1.0	0.00016
1935303006	0.396	EF	SFR-C	1.6	0.00025
1935303007	0.456	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935303008	0.371	EF	SFR-C	1.6	0.00025
1935303009	0.350	EF	SFR-C	1.6	0.00025
1935303010	0.393	EF	SFR-C	1.6	0.00025
1935303011	0.430	EF	SFR-C	1.6	0.00025
1935303012	0.390	EF	SFR-C	1.6	0.00025
1935303013	0.310	EF	SFR-C	1.6	0.00025
1935303014	0.310	EF	SFR-C	1.6	0.00025
1935303015	0.310	EF	SFR-C	1.6	0.00025
1935303016	0.310	EF	SFR-C	1.6	0.00025
1935303017	0.310	EF	SFR-C	1.6	0.00025
1935304001	0.231	EF	SFR-B	1.0	0.00016
1935304002	0.220	EF	SFR-B	1.0	0.00016
1935304003	0.220	EF	SFR-B	1.0	0.00016
1935304004	0.220	EF	SFR-B	1.0	0.00016
1935304005	0.220	EF	SFR-B	1.0	0.00016
1935304006	0.220	EF	SFR-B	1.0	0.00016
1935304007	0.220	EF	SFR-B	1.0	0.00016
1935304008	0.306	EF	SFR-C	1.6	0.00025
1935304009	0.310	EF	SFR-C	1.6	0.00025
1935304010	0.302	EF	SFR-C	1.6	0.00025
1935304011	0.379	EF	SFR-C	1.6	0.00025
1935304012	0.365	EF	SFR-C	1.6	0.00025
1935304013	0.286	EF	SFR-C	1.6	0.00025
1935305001	0.378	EF	SFR-C	1.6	0.00025
1935305002	0.268	EF	SFR-C	1.6	0.00025
1935305003	0.323	EF	SFR-C	1.6	0.00025
1935305004	0.306	EF	SFR-C	1.6	0.00025
1935305005	0.323	EF	SFR-C	1.6	0.00025
1935305006	0.378	EF	SFR-C	1.6	0.00025
1935305007	0.509	EF	SFR-D	2.4	0.00037
1935305008	0.465	EF	SFR-C	1.6	0.00025
1935305009	0.465	EF	SFR-C	1.6	0.00025
1935306001	0.465	EF	SFR-C	1.6	0.00025
1935306002	0.465	EF	SFR-C	1.6	0.00025
1935306003	0.310	EF	SFR-C	1.6	0.00025
1935306004	0.310	EF	SFR-C	1.6	0.00025
1935306005	0.310	EF	SFR-C	1.6	0.00025
1935306006	0.310	EF	SFR-C	1.6	0.00025
1935306007	0.310	EF	SFR-C	1.6	0.00025
1935306008	0.310	EF	SFR-C	1.6	0.00025
1935306009	0.368	EF	SFR-C	1.6	0.00025
1935306011	0.252	EF	SFR-C	1.6	0.00025
1935306012	0.310	EF	SFR-C	1.6	0.00025
1935307001	0.310	EF	SFR-C	1.6	0.00025
1935307002	0.310	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935307003	0.310	EF	SFR-C	1.6	0.00025
1935307004	0.310	EF	SFR-C	1.6	0.00025
1935307005	0.310	EF	SFR-C	1.6	0.00025
1935307006	0.353	EF	SFR-C	1.6	0.00025
1935307007	0.310	EF	SFR-C	1.6	0.00025
1935307008	0.310	EF	SFR-C	1.6	0.00025
1935307009	0.310	EF	SFR-C	1.6	0.00025
1935307010	0.310	EF	SFR-C	1.6	0.00025
1935307011	0.310	EF	SFR-C	1.6	0.00025
1935307012	0.353	EF	SFR-C	1.6	0.00025
1935326001	0.343	EF	SFR-C	1.6	0.00025
1935326004	0.301	EF	SFR-C	1.6	0.00025
1935326005	0.201	EF	SFR-B	1.0	0.00016
1935326006	0.201	EF	SFR-B	1.0	0.00016
1935326009	0.263	EF	SFR-C	1.6	0.00025
1935326010	2.239	EF	NR	6.3	0.00098
1935326012	0.194	EF	SFR-B	1.0	0.00016
1935326013	0.194	EF	SFR-B	1.0	0.00016
1935326014	0.257	EF	SFR-C	1.6	0.00025
1935326015	0.257	EF	SFR-C	1.6	0.00025
1935326016	0.257	EF	SFR-C	1.6	0.00025
1935326017	0.301	EF	SFR-C	1.6	0.00025
1935326018	0.299	EF	SFR-C	1.6	0.00025
1935326019	0.217	EF	SFR-B	1.0	0.00016
1935326020	0.208	EF	SFR-B	1.0	0.00016
1935326021	0.225	EF	SFR-B	1.0	0.00016
1935326022	0.225	EF	SFR-B	1.0	0.00016
1935326025	0.224	EF	SFR-B	1.0	0.00016
1935326026	0.210	EF	SFR-B	1.0	0.00016
1935326027	0.210	EF	SFR-B	1.0	0.00016
1935326028	0.210	EF	SFR-B	1.0	0.00016
1935326029	0.206	EF	SFR-B	1.0	0.00016
1935326030	0.210	EF	SFR-B	1.0	0.00016
1935326031	0.213	EF	SFR-B	1.0	0.00016
1935326032	0.285	EF	SFR-C	1.6	0.00025
1935326033	0.352	EF	SFR-C	1.6	0.00025
1935326034	0.209	EF	SFR-B	1.0	0.00016
1935326035	0.207	EF	SFR-B	1.0	0.00016
1935326037	0.207	EF	SFR-B	1.0	0.00016
1935326038	0.194	EF	SFR-B	1.0	0.00016
1935326040	0.257	EF	SFR-C	1.6	0.00025
1935326041	0.257	EF	SFR-C	1.6	0.00025
1935326042	0.257	EF	SFR-C	1.6	0.00025
1935326043	0.301	EF	SFR-C	1.6	0.00025
1935326044	0.314	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935326045	0.382	EF	SFR-C	1.6	0.00025
1935326046	0.315	EF	SFR-C	1.6	0.00025
1935326047	0.391	EF	SFR-C	1.6	0.00025
1935326048	0.328	EF	SFR-C	1.6	0.00025
1935326049	0.219	EF	SFR-B	1.0	0.00016
1935326050	0.219	EF	SFR-B	1.0	0.00016
1935327002	0.207	EF	SFR-B	1.0	0.00016
1935327004	0.346	EF	SFR-C	1.6	0.00025
1935327005	0.211	EF	SFR-B	1.0	0.00016
1935327006	0.207	EF	SFR-B	1.0	0.00016
1935327007	0.211	EF	SFR-B	1.0	0.00016
1935327009	0.363	EF	SFR-C	1.6	0.00025
1935327012	0.273	EF	SFR-C	1.6	0.00025
1935327013	0.266	EF	SFR-C	1.6	0.00025
1935327014	0.271	EF	SFR-C	1.6	0.00025
1935327016	0.207	EF	SFR-B	1.0	0.00016
1935327018	0.317	EF	SFR-C	1.6	0.00025
1935327019	0.209	EF	SFR-B	1.0	0.00016
1935327021	0.305	EF	SFR-C	1.6	0.00025
1935327027	0.207	EF	SFR-B	1.0	0.00016
1935327028	0.228	EF	SFR-B	1.0	0.00016
1935327029	0.339	EF	SFR-C	1.6	0.00025
1935327032	0.257	EF	SFR-C	1.6	0.00025
1935327033	0.257	EF	SFR-C	1.6	0.00025
1935327034	0.301	EF	SFR-C	1.6	0.00025
1935327035	0.204	EF	SFR-B	1.0	0.00016
1935327036	0.225	EF	SFR-B	1.0	0.00016
1935327037	0.310	EF	SFR-C	1.6	0.00025
1935327040	0.258	EF	SFR-C	1.6	0.00025
1935327041	0.258	EF	SFR-C	1.6	0.00025
1935327042	0.302	EF	SFR-C	1.6	0.00025
1935327043	0.250	EF	SFR-B	1.0	0.00016
1935327044	0.241	EF	SFR-B	1.0	0.00016
1935327045	0.238	EF	SFR-B	1.0	0.00016
1935327046	0.228	EF	SFR-B	1.0	0.00016
1935327047	0.467	EF	SFR-C	1.6	0.00025
1935327048	0.314	EF	SFR-C	1.6	0.00025
1935327049	0.207	EF	SFR-B	1.0	0.00016
1935327050	0.014	EF	SFR-A	0.7	0.00011
1935327051	0.282	EF	SFR-C	1.6	0.00025
1935327052	0.505	EF	SFR-D	2.4	0.00037
1935327053	0.261	EF	SFR-C	1.6	0.00025
1935327054	0.322	EF	SFR-C	1.6	0.00025
1935327055	0.321	EF	SFR-C	1.6	0.00025
1935327056	0.206	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935327057	0.209	EF	SFR-B	1.0	0.00016
1935327058	0.315	EF	SFR-C	1.6	0.00025
1935327059	0.371	EF	SFR-C	1.6	0.00025
1935327060	0.313	EF	SFR-C	1.6	0.00025
1935327061	0.381	EF	SFR-C	1.6	0.00025
1935327062	0.207	EF	SFR-B	1.0	0.00016
1935327063	0.205	EF	SFR-B	1.0	0.00016
1935327064	0.225	EF	SFR-B	1.0	0.00016
1935327065	0.224	EF	SFR-B	1.0	0.00016
1935401001	0.241	EF	SFR-B	1.0	0.00016
1935401002	0.241	EF	SFR-B	1.0	0.00016
1935401003	0.241	EF	SFR-B	1.0	0.00016
1935401004	0.235	EF	SFR-B	1.0	0.00016
1935401005	0.228	EF	SFR-B	1.0	0.00016
1935401006	0.228	EF	SFR-B	1.0	0.00016
1935401007	0.225	EF	SFR-B	1.0	0.00016
1935401010	0.321	EF	SFR-C	1.6	0.00025
1935401011	0.288	EF	SFR-C	1.6	0.00025
1935401012	0.288	EF	SFR-C	1.6	0.00025
1935401013	0.369	EF	SFR-C	1.6	0.00025
1935401014	0.241	EF	SFR-B	1.0	0.00016
1935401015	0.241	EF	SFR-B	1.0	0.00016
1935401016	0.241	EF	SFR-B	1.0	0.00016
1935401017	0.241	EF	SFR-B	1.0	0.00016
1935401018	0.225	EF	SFR-B	1.0	0.00016
1935401019	0.225	EF	SFR-B	1.0	0.00016
1935401020	0.225	EF	SFR-B	1.0	0.00016
1935401021	0.220	EF	SFR-B	1.0	0.00016
1935401022	0.220	EF	SFR-B	1.0	0.00016
1935401023	0.220	EF	SFR-B	1.0	0.00016
1935401024	0.220	EF	SFR-B	1.0	0.00016
1935401025	0.221	EF	SFR-B	1.0	0.00016
1935401026	0.222	EF	SFR-B	1.0	0.00016
1935401027	0.233	EF	SFR-B	1.0	0.00016
1935401028	0.285	EF	SFR-C	1.6	0.00025
1935402001	0.289	EF	SFR-C	1.6	0.00025
1935402002	0.257	EF	SFR-C	1.6	0.00025
1935402003	0.257	EF	SFR-C	1.6	0.00025
1935402004	0.257	EF	SFR-C	1.6	0.00025
1935402005	0.257	EF	SFR-C	1.6	0.00025
1935402006	0.257	EF	SFR-C	1.6	0.00025
1935402007	0.284	EF	SFR-C	1.6	0.00025
1935402008	0.219	EF	SFR-B	1.0	0.00016
1935402009	0.218	EF	SFR-B	1.0	0.00016
1935402010	0.218	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935402011	0.218	EF	SFR-B	1.0	0.00016
1935402012	0.213	EF	SFR-B	1.0	0.00016
1935402013	0.290	EF	SFR-C	1.6	0.00025
1935402014	0.258	EF	SFR-C	1.6	0.00025
1935402015	0.258	EF	SFR-C	1.6	0.00025
1935402016	0.258	EF	SFR-C	1.6	0.00025
1935402017	0.275	EF	SFR-C	1.6	0.00025
1935402018	0.369	EF	SFR-C	1.6	0.00025
1935402021	0.227	EF	SFR-B	1.0	0.00016
1935402022	0.267	EF	SFR-C	1.6	0.00025
1935402023	0.275	EF	SFR-C	1.6	0.00025
1935402024	0.218	EF	SFR-B	1.0	0.00016
1935402025	0.597	EF	SFR-D	2.4	0.00037
1935404001	0.199	EF	SFR-B	1.0	0.00016
1935404002	0.245	EF	SFR-B	1.0	0.00016
1935404003	0.319	EF	SFR-C	1.6	0.00025
1935404004	0.280	EF	SFR-C	1.6	0.00025
1935404005	0.246	EF	SFR-B	1.0	0.00016
1935404006	0.242	EF	SFR-B	1.0	0.00016
1935404007	0.319	EF	SFR-C	1.6	0.00025
1935426001	0.620	EF	SFR-D	2.4	0.00037
1935426002	0.527	EF	SFR-D	2.4	0.00037
1935426003	0.510	EF	SFR-D	2.4	0.00037
1935426005	0.570	EF	SFR-D	2.4	0.00037
1935426008	0.374	EF	SFR-C	1.6	0.00025
1935426009	0.544	EF	SFR-D	2.4	0.00037
1935426010	0.573	EF	SFR-D	2.4	0.00037
1935426011	0.575	EF	SFR-D	2.4	0.00037
1935426012	0.568	EF	SFR-D	2.4	0.00037
1935426014	0.630	EF	SFR-D	2.4	0.00037
1935426015	0.319	EF	SFR-C	1.6	0.00025
1935426016	0.388	EF	SFR-C	1.6	0.00025
1935426017	0.327	EF	SFR-C	1.6	0.00025
1935426018	0.238	EF	SFR-B	1.0	0.00016
1935426019	0.209	EF	SFR-B	1.0	0.00016
1935426020	0.690	EF	SFR-D	2.4	0.00037
1935426021	0.372	EF	SFR-C	1.6	0.00025
1935426022	0.424	EF	SFR-C	1.6	0.00025
1935427001	0.185	EF	SFR-B	1.0	0.00016
1935427002	0.198	EF	SFR-B	1.0	0.00016
1935427006	0.243	EF	SFR-B	1.0	0.00016
1935427007	0.269	EF	SFR-C	1.6	0.00025
1935427011	0.209	EF	SFR-B	1.0	0.00016
1935427013	0.433	EF	SFR-C	1.6	0.00025
1935427014	0.361	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935427015	0.303	EF	SFR-C	1.6	0.00025
1935427016	0.484	EF	SFR-C	1.6	0.00025
1935427017	0.485	EF	SFR-C	1.6	0.00025
1935427018	0.461	EF	SFR-C	1.6	0.00025
1935427019	0.509	EF	SFR-D	2.4	0.00037
1935427020	0.374	EF	SFR-C	1.6	0.00025
1935427021	0.286	EF	SFR-C	1.6	0.00025
1935427022	0.389	EF	SFR-C	1.6	0.00025
1935428004	0.223	EF	SFR-B	1.0	0.00016
1935428005	0.177	EF	SFR-B	1.0	0.00016
1935428006	0.180	EF	SFR-B	1.0	0.00016
1935428007	0.327	EF	SFR-C	1.6	0.00025
1935428008	0.193	EF	SFR-B	1.0	0.00016
1935428009	0.190	EF	SFR-B	1.0	0.00016
1935428010	0.285	EF	SFR-C	1.6	0.00025
1935428011	0.683	EF	MFR	3.0	0.00047
1935428012	0.262	EF	SFR-C	1.6	0.00025
1935428013	0.158	EF	SFR-B	1.0	0.00016
1935428014	0.154	EF	SFR-B	1.0	0.00016
1935428015	0.172	EF	SFR-B	1.0	0.00016
1935428016	0.155	EF	SFR-B	1.0	0.00016
1935428017	0.154	EF	SFR-B	1.0	0.00016
1935428018	0.154	EF	SFR-B	1.0	0.00016
1935428019	0.154	EF	SFR-B	1.0	0.00016
1935428020	0.153	EF	SFR-B	1.0	0.00016
1935428021	0.155	EF	SFR-B	1.0	0.00016
1935428022	0.202	EF	SFR-B	1.0	0.00016
1935428024	0.358	EF	SFR-C	1.6	0.00025
1935429002	0.769	EF	SFR-E	3.2	0.00050
1935429003	0.572	EF	SFR-D	2.4	0.00037
1935429004	0.417	EF	SFR-C	1.6	0.00025
1935429006	0.177	EF	SFR-B	1.0	0.00016
1935429007	0.141	EF	SFR-B	1.0	0.00016
1935429008	0.422	EF	SFR-C	1.6	0.00025
1935429009	0.250	EF	SFR-B	1.0	0.00016
1935429010	0.374	EF	SFR-C	1.6	0.00025
1935429011	0.510	EF	SFR-D	2.4	0.00037
1935429012	0.864	EF	SFR-E	3.2	0.00050
1935429015	0.292	EF	SFR-C	1.6	0.00025
1935429019	0.665	EF	SFR-D	2.4	0.00037
1935429020	0.457	EF	SFR-C	1.6	0.00025
1935429021	0.496	EF	SFR-C	1.6	0.00025
1935429022	0.264	EF	SFR-C	1.6	0.00025
1935429023	0.364	EF	SFR-C	1.6	0.00025
1935429024	0.446	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935429025	0.322	EF	SFR-C	1.6	0.00025
1935430001	0.328	EF	SFR-C	1.6	0.00025
1935430002	0.353	EF	SFR-C	1.6	0.00025
1935430003	0.363	EF	SFR-C	1.6	0.00025
1935430004	0.399	EF	SFR-C	1.6	0.00025
1935430005	0.411	EF	SFR-C	1.6	0.00025
1935430006	0.279	EF	SFR-C	1.6	0.00025
1935430007	0.284	EF	SFR-C	1.6	0.00025
1935430008	0.289	EF	SFR-C	1.6	0.00025
1935430009	0.364	EF	SFR-C	1.6	0.00025
1935430010	1.237	EF	MFR	5.7	0.00088
1935430011	0.436	EF	SFR-C	1.6	0.00025
1935430012	0.382	EF	SFR-C	1.6	0.00025
1935430013	0.394	EF	SFR-C	1.6	0.00025
1935430014	0.415	EF	SFR-C	1.6	0.00025
1935430015	0.372	EF	SFR-C	1.6	0.00025
1935430016	0.366	EF	SFR-C	1.6	0.00025
1935476003	0.224	EF	SFR-B	1.0	0.00016
1935476004	0.145	EF	SFR-B	1.0	0.00016
1935476005	0.154	EF	SFR-B	1.0	0.00016
1935476006	0.159	EF	SFR-B	1.0	0.00016
1935476007	0.160	EF	SFR-B	1.0	0.00016
1935476008	0.160	EF	SFR-B	1.0	0.00016
1935476009	0.160	EF	SFR-B	1.0	0.00016
1935476012	0.184	EF	SFR-B	1.0	0.00016
1935476013	0.188	EF	SFR-B	1.0	0.00016
1935476014	0.155	EF	SFR-B	1.0	0.00016
1935476016	0.316	EF	SFR-C	1.6	0.00025
1935476017	0.160	EF	SFR-B	1.0	0.00016
1935476019	0.226	EF	SFR-B	1.0	0.00016
1935476020	0.168	EF	SFR-B	1.0	0.00016
1935476021	0.158	EF	SFR-B	1.0	0.00016
1935476022	0.158	EF	SFR-B	1.0	0.00016
1935476023	0.160	EF	SFR-B	1.0	0.00016
1935476024	0.191	EF	SFR-B	1.0	0.00016
1935477001	0.222	EF	SFR-B	1.0	0.00016
1935477002	0.160	EF	SFR-B	1.0	0.00016
1935477003	0.160	EF	SFR-B	1.0	0.00016
1935477004	0.150	EF	SFR-B	1.0	0.00016
1935477005	0.215	EF	SFR-B	1.0	0.00016
1935477006	0.243	EF	SFR-B	1.0	0.00016
1935477007	0.146	EF	SFR-B	1.0	0.00016
1935477008	0.217	EF	SFR-B	1.0	0.00016
1935477009	0.181	EF	SFR-B	1.0	0.00016
1935477010	0.155	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935477011	0.184	EF	SFR-B	1.0	0.00016
1935477012	0.143	EF	SFR-B	1.0	0.00016
1935477013	0.143	EF	SFR-B	1.0	0.00016
1935477014	0.193	EF	SFR-B	1.0	0.00016
1935477015	0.530	EF	MFR	2.6	0.00040
1935478001	0.151	EF	SFR-B	1.0	0.00016
1935478002	0.157	EF	SFR-B	1.0	0.00016
1935478003	0.165	EF	SFR-B	1.0	0.00016
1935478004	0.175	EF	SFR-B	1.0	0.00016
1935478005	0.148	EF	SFR-B	1.0	0.00016
1935478006	0.151	EF	SFR-B	1.0	0.00016
1935478007	0.148	EF	SFR-B	1.0	0.00016
1935478008	0.176	EF	SFR-B	1.0	0.00016
1935478009	0.209	EF	SFR-B	1.0	0.00016
1935478010	0.164	EF	SFR-B	1.0	0.00016
1935478011	0.173	EF	SFR-B	1.0	0.00016
1935478012	0.194	EF	SFR-B	1.0	0.00016
1935478013	0.186	EF	SFR-B	1.0	0.00016
1935478014	0.198	EF	SFR-B	1.0	0.00016
1935478015	0.244	EF	SFR-B	1.0	0.00016
1935478016	0.316	EF	SFR-C	1.6	0.00025
1935478017	0.316	EF	SFR-C	1.6	0.00025
1935479001	0.318	EF	SFR-C	1.6	0.00025
1935479002	0.282	EF	SFR-C	1.6	0.00025
1935479003	0.279	EF	SFR-C	1.6	0.00025
1935479004	0.319	EF	SFR-C	1.6	0.00025
1935479005	0.267	EF	SFR-C	1.6	0.00025
1935479006	0.215	EF	SFR-B	1.0	0.00016
1935479007	0.247	EF	SFR-B	1.0	0.00016
1935479008	0.164	EF	SFR-B	1.0	0.00016
1935479009	0.182	EF	SFR-B	1.0	0.00016
1935479010	0.190	EF	SFR-B	1.0	0.00016
1935479011	0.227	EF	SFR-B	1.0	0.00016
1935479012	0.209	EF	SFR-B	1.0	0.00016
1935479013	0.229	EF	SFR-B	1.0	0.00016
1935479014	0.230	EF	SFR-B	1.0	0.00016
1935479015	0.244	EF	SFR-B	1.0	0.00016
1935479016	0.215	EF	SFR-B	1.0	0.00016
1935479017	0.254	EF	SFR-C	1.6	0.00025
1935479018	0.467	EF	NR	1.0	0.00016
1935479019	0.114	EF	NR	1.0	0.00016
1935480001	0.403	EF	SFR-C	1.6	0.00025
1935480002	0.190	EF	SFR-B	1.0	0.00016
1935480003	0.294	EF	SFR-C	1.6	0.00025
1935480005	0.292	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1935480006	0.225	EF	SFR-B	1.0	0.00016
1935480007	0.215	EF	SFR-B	1.0	0.00016
1935480008	0.143	EF	SFR-B	1.0	0.00016
1935480009	0.145	EF	SFR-B	1.0	0.00016
1935480010	0.201	EF	SFR-B	1.0	0.00016
1935480011	0.158	EF	SFR-B	1.0	0.00016
1935480012	0.158	EF	SFR-B	1.0	0.00016
1935480013	0.201	EF	SFR-B	1.0	0.00016
1935480014	0.143	EF	SFR-B	1.0	0.00016
1935480015	0.146	EF	SFR-B	1.0	0.00016
1935481001	0.215	EF	SFR-B	1.0	0.00016
1935481002	0.216	EF	SFR-B	1.0	0.00016
1935481003	0.209	EF	SFR-B	1.0	0.00016
1935481004	0.205	EF	SFR-B	1.0	0.00016
1935481005	0.205	EF	SFR-B	1.0	0.00016
1935481006	0.197	EF	SFR-B	1.0	0.00016
1935481007	0.196	EF	SFR-B	1.0	0.00016
1935481008	0.196	EF	SFR-B	1.0	0.00016
1935481009	0.196	EF	SFR-B	1.0	0.00016
1935481010	0.196	EF	SFR-B	1.0	0.00016
1935481013	0.197	EF	SFR-B	1.0	0.00016
1935481014	0.195	EF	SFR-B	1.0	0.00016
1935481015	0.246	EF	SFR-B	1.0	0.00016
1935481016	0.230	EF	SFR-B	1.0	0.00016
1935481017	0.218	EF	SFR-B	1.0	0.00016
1935481018	0.207	EF	SFR-B	1.0	0.00016
1935481019	0.193	EF	SFR-B	1.0	0.00016
1935481020	0.216	EF	SFR-B	1.0	0.00016
1935481021	0.204	EF	SFR-B	1.0	0.00016
1935481024	0.172	EF	NR	0.4	0.00006
1935481029	0.176	EF	NR	1.2	0.00019
1935481030	0.310	EF	NR	2.8	0.00043
1935481031	0.261	EF	SFR-C	1.6	0.00025
1935481032	0.150	EF	SFR-B	1.0	0.00016
1935481033	0.205	EF	SFR-B	1.0	0.00016
1936101004	0.488	EF	SFR-C	1.6	0.00025
1936101005	0.309	EF	SFR-C	1.6	0.00025
1936102001	0.281	EF	SFR-C	1.6	0.00025
1936102002	0.288	EF	SFR-C	1.6	0.00025
1936102004	0.256	EF	SFR-C	1.6	0.00025
1936102005	0.307	EF	SFR-C	1.6	0.00025
1936103001	0.242	EF	SFR-B	1.0	0.00016
1936103002	0.173	EF	SFR-B	1.0	0.00016
1936103003	0.172	EF	SFR-B	1.0	0.00016
1936103005	0.243	EF	SFR-B	1.0	0.00016

CITY OF BIRMINGHAM
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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936103008	0.128	EF	SFR-B	1.0	0.00016
1936103009	0.280	EF	SFR-C	1.6	0.00025
1936103010	0.550	EF	SFR-D	2.4	0.00037
1936103011	0.836	EF	SFR-E	3.2	0.00050
1936103028	0.243	EF	SFR-B	1.0	0.00016
1936103029	0.214	EF	SFR-B	1.0	0.00016
1936103031	0.324	EF	SFR-C	1.6	0.00025
1936103036	0.243	EF	SFR-B	1.0	0.00016
1936103037	0.243	EF	SFR-B	1.0	0.00016
1936103039	0.324	EF	SFR-C	1.6	0.00025
1936103040	0.184	EF	SFR-B	1.0	0.00016
1936103041	0.203	EF	SFR-B	1.0	0.00016
1936103042	0.162	EF	SFR-B	1.0	0.00016
1936103043	0.390	EF	SFR-C	1.6	0.00025
1936103045	0.261	EF	SFR-C	1.6	0.00025
1936103047	0.207	EF	SFR-B	1.0	0.00016
1936103048	0.300	EF	SFR-C	1.6	0.00025
1936103050	1.258	EF	MFR	7.4	0.00115
1936103057	0.209	EF	SFR-B	1.0	0.00016
1936103058	0.344	EF	MFR	3.1	0.00048
1936103070	1.327	EF	SFR-F	4.6	0.00071
1936103071	0.288	EF	SFR-C	1.6	0.00025
1936103072	0.369	EF	SFR-C	1.6	0.00025
1936103073	0.287	EF	MFR	2.0	0.00031
1936103085	0.178	EF	MFR	1.4	0.00022
1936103109	0.243	EF	SFR-B	1.0	0.00016
1936103110	0.441	EF	SFR-C	1.6	0.00025
1936103113	0.880	EF	MFR	6.5	0.00101
1936103137	1.841	EF	MFR	11.9	0.00185
1936126006	0.193	EF	MFR	1.5	0.00023
1936126011	0.304	EF	MFR	2.3	0.00036
1936126016	2.061	EF	NR	16.3	0.00253
1936126017	0.248	EF	NR	2.2	0.00034
1936126018	0.894	EF	NR	7.9	0.00123
1936126019	1.357	EF	MFR	9.9	0.00154
1936131005	0.141	EF	MFR	1.2	0.00019
1936131008	0.163	EF	MFR	1.3	0.00020
1936131009	0.111	EF	MFR	1.0	0.00016
1936131017	0.185	EF	MFR	1.0	0.00016
1936131019	0.163	EF	MFR	1.2	0.00019
1936131025	0.142	EF	MFR	1.0	0.00016
1936131028	0.306	EF	MFR	2.7	0.00042
1936131032	0.231	EF	MFR	1.8	0.00028
1936131035	0.490	EF	MFR	4.3	0.00067
1936131042	0.326	EF	MFR	3.0	0.00047

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936131061	0.287	EF	MFR	2.5	0.00039
1936131064	0.350	EF	MFR	2.7	0.00042
1936131066	0.350	EF	MFR	2.9	0.00045
1936132008	0.468	EF	MFR	3.9	0.00061
1936135007	0.162	EF	MFR	1.2	0.00019
1936135008	0.163	EF	MFR	1.4	0.00022
1936135009	0.162	EF	MFR	1.2	0.00019
1936135016	0.161	EF	MFR	1.0	0.00016
1936135017	0.327	EF	MFR	2.6	0.00040
1936135020	0.215	EF	MFR	1.6	0.00025
1936135025	0.329	EF	MFR	2.8	0.00043
1936135033	1.215	EF	MFR	9.2	0.00143
1936135075	0.900	EF	MFR	6.3	0.00098
1936135099	0.326	EF	MFR	3.0	0.00047
1936136004	0.089	EF	SFR-A	0.7	0.00011
1936136005	0.094	EF	SFR-A	0.7	0.00011
1936151001	0.826	EF	NR	3.6	0.00056
1936151002	0.216	EF	SFR-B	1.0	0.00016
1936151003	0.222	EF	SFR-B	1.0	0.00016
1936151004	0.421	EF	SFR-C	1.6	0.00025
1936151006	0.137	EF	SFR-B	1.0	0.00016
1936151007	0.123	EF	SFR-A	0.7	0.00011
1936151008	0.123	EF	SFR-A	0.7	0.00011
1936151009	0.183	EF	SFR-B	1.0	0.00016
1936151010	0.238	EF	SFR-B	1.0	0.00016
1936151011	0.227	EF	SFR-B	1.0	0.00016
1936151012	0.180	EF	SFR-B	1.0	0.00016
1936151013	0.194	EF	SFR-B	1.0	0.00016
1936151014	0.152	EF	SFR-B	1.0	0.00016
1936151015	0.152	EF	SFR-B	1.0	0.00016
1936151016	0.152	EF	SFR-B	1.0	0.00016
1936151017	0.152	EF	SFR-B	1.0	0.00016
1936151018	0.152	EF	SFR-B	1.0	0.00016
1936151019	0.152	EF	SFR-B	1.0	0.00016
1936151020	0.152	EF	SFR-B	1.0	0.00016
1936151021	0.842	EF	MFR	4.0	0.00062
1936152001	0.241	EF	MFR	1.6	0.00025
1936152002	0.140	EF	SFR-B	1.0	0.00016
1936152003	0.142	EF	MFR	1.0	0.00016
1936152006	0.244	EF	SFR-B	1.0	0.00016
1936152007	0.220	EF	SFR-B	1.0	0.00016
1936152008	0.171	EF	SFR-B	1.0	0.00016
1936152010	0.269	EF	SFR-C	1.6	0.00025
1936152012	0.142	EF	SFR-B	1.0	0.00016
1936152013	0.186	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936152016	0.168	EF	SFR-B	1.0	0.00016
1936152017	0.170	EF	SFR-B	1.0	0.00016
1936152018	0.172	EF	SFR-B	1.0	0.00016
1936152019	0.174	EF	SFR-B	1.0	0.00016
1936152020	0.176	EF	SFR-B	1.0	0.00016
1936152021	0.195	EF	SFR-B	1.0	0.00016
1936152022	0.147	EF	SFR-B	1.0	0.00016
1936152023	0.152	EF	SFR-B	1.0	0.00016
1936152024	0.152	EF	SFR-B	1.0	0.00016
1936152027	0.152	EF	SFR-B	1.0	0.00016
1936152028	0.122	EF	SFR-A	0.7	0.00011
1936152029	0.121	EF	SFR-A	0.7	0.00011
1936152030	0.207	EF	SFR-B	1.0	0.00016
1936152031	0.198	EF	SFR-B	1.0	0.00016
1936152032	0.225	EF	SFR-B	1.0	0.00016
1936152033	0.145	EF	SFR-B	1.0	0.00016
1936152034	0.304	EF	SFR-C	1.6	0.00025
1936152039	0.283	EF	SFR-C	1.6	0.00025
1936153003	0.143	EF	SFR-B	1.0	0.00016
1936153004	0.144	EF	SFR-B	1.0	0.00016
1936153005	0.144	EF	SFR-B	1.0	0.00016
1936153006	0.145	EF	SFR-B	1.0	0.00016
1936153007	0.145	EF	SFR-B	1.0	0.00016
1936153008	0.145	EF	SFR-B	1.0	0.00016
1936153009	0.146	EF	SFR-B	1.0	0.00016
1936153010	0.275	EF	SFR-C	1.6	0.00025
1936153011	0.178	EF	SFR-B	1.0	0.00016
1936153012	0.140	EF	SFR-B	1.0	0.00016
1936153013	0.197	EF	SFR-B	1.0	0.00016
1936153014	0.164	EF	SFR-B	1.0	0.00016
1936153015	0.164	EF	SFR-B	1.0	0.00016
1936153017	0.165	EF	SFR-B	1.0	0.00016
1936153018	0.149	EF	SFR-B	1.0	0.00016
1936153019	0.150	EF	SFR-B	1.0	0.00016
1936153020	0.150	EF	SFR-B	1.0	0.00016
1936153021	0.252	EF	SFR-C	1.6	0.00025
1936153023	0.164	EF	SFR-B	1.0	0.00016
1936153024	0.165	EF	SFR-B	1.0	0.00016
1936153025	0.357	EF	SFR-C	1.6	0.00025
1936154001	0.142	EF	SFR-B	1.0	0.00016
1936154002	0.147	EF	SFR-B	1.0	0.00016
1936154003	0.148	EF	SFR-B	1.0	0.00016
1936154006	0.149	EF	SFR-B	1.0	0.00016
1936154007	0.120	EF	SFR-A	0.7	0.00011
1936154008	0.120	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936154009	0.181	EF	SFR-B	1.0	0.00016
1936154010	0.179	EF	SFR-B	1.0	0.00016
1936154011	0.179	EF	SFR-B	1.0	0.00016
1936154012	0.179	EF	SFR-B	1.0	0.00016
1936154013	0.179	EF	SFR-B	1.0	0.00016
1936154014	0.179	EF	SFR-B	1.0	0.00016
1936154015	0.179	EF	SFR-B	1.0	0.00016
1936154016	0.297	EF	SFR-C	1.6	0.00025
1936155001	0.216	EF	SFR-B	1.0	0.00016
1936155002	0.196	EF	SFR-B	1.0	0.00016
1936155006	0.207	EF	SFR-B	1.0	0.00016
1936155008	0.211	EF	SFR-B	1.0	0.00016
1936155012	0.146	EF	SFR-B	1.0	0.00016
1936155013	0.146	EF	SFR-B	1.0	0.00016
1936155014	0.146	EF	SFR-B	1.0	0.00016
1936155015	0.147	EF	SFR-B	1.0	0.00016
1936155020	0.125	EF	SFR-A	0.7	0.00011
1936155021	0.227	EF	SFR-B	1.0	0.00016
1936155022	0.257	EF	SFR-C	1.6	0.00025
1936155024	0.355	EF	SFR-C	1.6	0.00025
1936155025	0.218	EF	SFR-B	1.0	0.00016
1936155029	0.219	EF	SFR-B	1.0	0.00016
1936155030	0.219	EF	SFR-B	1.0	0.00016
1936155031	0.219	EF	SFR-B	1.0	0.00016
1936155032	0.220	EF	SFR-B	1.0	0.00016
1936155034	0.151	EF	SFR-B	1.0	0.00016
1936155035	0.179	EF	SFR-B	1.0	0.00016
1936155036	0.180	EF	SFR-B	1.0	0.00016
1936155037	0.148	EF	SFR-B	1.0	0.00016
1936155038	0.148	EF	SFR-B	1.0	0.00016
1936155039	0.258	EF	SFR-C	1.6	0.00025
1936155041	0.187	EF	SFR-B	1.0	0.00016
1936155043	0.200	EF	SFR-B	1.0	0.00016
1936155044	0.245	EF	SFR-B	1.0	0.00016
1936155045	0.139	EF	SFR-B	1.0	0.00016
1936155046	0.148	EF	SFR-B	1.0	0.00016
1936155047	0.144	EF	SFR-B	1.0	0.00016
1936155048	0.431	EF	SFR-C	1.6	0.00025
1936155049	0.210	EF	SFR-B	1.0	0.00016
1936155050	0.327	EF	SFR-C	1.6	0.00025
1936155051	0.328	EF	SFR-C	1.6	0.00025
1936155052	0.131	EF	SFR-B	1.0	0.00016
1936155053	0.131	EF	SFR-B	1.0	0.00016
1936156001	0.159	EF	SFR-B	1.0	0.00016
1936156002	0.158	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936156003	0.158	EF	SFR-B	1.0	0.00016
1936156004	0.158	EF	SFR-B	1.0	0.00016
1936156005	0.158	EF	SFR-B	1.0	0.00016
1936156006	0.158	EF	SFR-B	1.0	0.00016
1936156007	0.158	EF	SFR-B	1.0	0.00016
1936156008	0.218	EF	SFR-B	1.0	0.00016
1936156009	0.182	EF	SFR-B	1.0	0.00016
1936156010	0.217	EF	SFR-B	1.0	0.00016
1936156011	0.226	EF	SFR-B	1.0	0.00016
1936156012	0.182	EF	SFR-B	1.0	0.00016
1936156013	0.217	EF	SFR-B	1.0	0.00016
1936156017	0.144	EF	SFR-B	1.0	0.00016
1936156018	0.144	EF	SFR-B	1.0	0.00016
1936156019	0.144	EF	SFR-B	1.0	0.00016
1936156020	0.147	EF	SFR-B	1.0	0.00016
1936156022	0.147	EF	SFR-B	1.0	0.00016
1936156023	0.144	EF	SFR-B	1.0	0.00016
1936156024	0.144	EF	SFR-B	1.0	0.00016
1936156025	0.143	EF	SFR-B	1.0	0.00016
1936157001	0.179	EF	SFR-B	1.0	0.00016
1936157002	0.121	EF	SFR-A	0.7	0.00011
1936157003	0.121	EF	SFR-A	0.7	0.00011
1936157004	0.152	EF	SFR-B	1.0	0.00016
1936157005	0.157	EF	SFR-B	1.0	0.00016
1936157006	0.152	EF	SFR-B	1.0	0.00016
1936157007	0.152	EF	SFR-B	1.0	0.00016
1936157008	0.152	EF	SFR-B	1.0	0.00016
1936157009	0.212	EF	SFR-B	1.0	0.00016
1936157010	0.159	EF	SFR-B	1.0	0.00016
1936157011	0.159	EF	SFR-B	1.0	0.00016
1936157012	0.106	EF	SFR-A	0.7	0.00011
1936157013	0.106	EF	SFR-A	0.7	0.00011
1936157014	0.106	EF	SFR-A	0.7	0.00011
1936157015	0.106	EF	SFR-A	0.7	0.00011
1936157016	0.123	EF	SFR-A	0.7	0.00011
1936157019	0.148	EF	SFR-B	1.0	0.00016
1936157020	0.174	EF	SFR-B	1.0	0.00016
1936157021	0.169	EF	SFR-B	1.0	0.00016
1936157022	0.169	EF	SFR-B	1.0	0.00016
1936157023	0.154	EF	SFR-B	1.0	0.00016
1936157024	0.149	EF	SFR-B	1.0	0.00016
1936157025	0.154	EF	SFR-B	1.0	0.00016
1936157026	0.154	EF	SFR-B	1.0	0.00016
1936157029	0.108	EF	SFR-A	0.7	0.00011
1936157030	0.108	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936157031	0.108	EF	SFR-A	0.7	0.00011
1936157032	0.123	EF	SFR-A	0.7	0.00011
1936157033	0.200	EF	SFR-B	1.0	0.00016
1936157034	0.216	EF	SFR-B	1.0	0.00016
1936157035	0.175	EF	SFR-B	1.0	0.00016
1936157036	0.148	EF	SFR-B	1.0	0.00016
1936157037	0.148	EF	SFR-B	1.0	0.00016
1936157040	0.154	EF	SFR-B	1.0	0.00016
1936157042	0.108	EF	SFR-A	0.7	0.00011
1936157043	0.108	EF	SFR-A	0.7	0.00011
1936157044	0.306	EF	SFR-C	1.6	0.00025
1936158001	0.148	EF	SFR-B	1.0	0.00016
1936158002	0.145	EF	SFR-B	1.0	0.00016
1936158003	0.145	EF	SFR-B	1.0	0.00016
1936158004	0.145	EF	SFR-B	1.0	0.00016
1936158007	0.145	EF	SFR-B	1.0	0.00016
1936158008	0.148	EF	SFR-B	1.0	0.00016
1936158009	0.148	EF	SFR-B	1.0	0.00016
1936158010	0.145	EF	SFR-B	1.0	0.00016
1936158011	0.145	EF	SFR-B	1.0	0.00016
1936158012	0.145	EF	SFR-B	1.0	0.00016
1936158013	0.145	EF	SFR-B	1.0	0.00016
1936158014	0.145	EF	SFR-B	1.0	0.00016
1936158015	0.145	EF	SFR-B	1.0	0.00016
1936158016	0.148	EF	SFR-B	1.0	0.00016
1936158018	0.145	EF	SFR-B	1.0	0.00016
1936158019	0.145	EF	SFR-B	1.0	0.00016
1936176001	0.119	EF	SFR-A	0.7	0.00011
1936176005	0.095	EF	NR	0.9	0.00014
1936176006	0.134	EF	SFR-B	1.0	0.00016
1936176008	0.126	EF	SFR-B	1.0	0.00016
1936176009	0.096	EF	SFR-A	0.7	0.00011
1936176010	0.088	EF	SFR-A	0.7	0.00011
1936176011	0.094	EF	SFR-A	0.7	0.00011
1936176012	0.170	EF	SFR-B	1.0	0.00016
1936176013	0.145	EF	SFR-B	1.0	0.00016
1936176014	0.156	EF	SFR-B	1.0	0.00016
1936176015	0.162	EF	SFR-B	1.0	0.00016
1936176016	0.196	EF	SFR-B	1.0	0.00016
1936176017	0.195	EF	SFR-B	1.0	0.00016
1936176018	0.203	EF	SFR-B	1.0	0.00016
1936176019	0.214	EF	SFR-B	1.0	0.00016
1936176020	0.163	EF	SFR-B	1.0	0.00016
1936176021	0.093	EF	SFR-A	0.7	0.00011
1936176022	0.093	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936176023	0.113	EF	SFR-A	0.7	0.00011
1936176024	0.132	EF	SFR-B	1.0	0.00016
1936176025	0.132	EF	SFR-B	1.0	0.00016
1936176026	0.336	EF	MFR	2.9	0.00045
1936177007	0.140	EF	SFR-B	1.0	0.00016
1936177008	0.185	EF	SFR-B	1.0	0.00016
1936177009	0.135	EF	SFR-B	1.0	0.00016
1936177012	0.138	EF	SFR-B	1.0	0.00016
1936177013	0.320	EF	SFR-C	1.6	0.00025
1936177014	0.182	EF	SFR-B	1.0	0.00016
1936177015	0.142	EF	SFR-B	1.0	0.00016
1936177016	0.365	EF	SFR-C	1.6	0.00025
1936177018	0.182	EF	SFR-B	1.0	0.00016
1936177021	0.062	EF	MFR	0.5	0.00008
1936177022	0.042	EF	MFR	0.4	0.00006
1936177023	0.042	EF	MFR	0.4	0.00006
1936177024	0.042	EF	MFR	0.4	0.00006
1936177025	0.042	EF	MFR	0.4	0.00006
1936177026	0.050	EF	MFR	0.5	0.00008
1936177027	0.229	EF	MFR	2.0	0.00031
1936177032	0.127	EF	SFR-B	1.0	0.00016
1936177033	0.134	EF	SFR-B	1.0	0.00016
1936178004	0.194	EF	SFR-B	1.0	0.00016
1936178005	0.140	EF	SFR-B	1.0	0.00016
1936178006	0.149	EF	SFR-B	1.0	0.00016
1936178007	0.122	EF	SFR-A	0.7	0.00011
1936178008	0.121	EF	SFR-A	0.7	0.00011
1936178010	0.400	EF	SFR-C	1.6	0.00025
1936178011	0.172	EF	SFR-B	1.0	0.00016
1936178012	0.118	EF	SFR-A	0.7	0.00011
1936178013	0.125	EF	SFR-A	0.7	0.00011
1936178014	0.125	EF	SFR-A	0.7	0.00011
1936178015	0.111	EF	SFR-A	0.7	0.00011
1936178016	0.121	EF	SFR-A	0.7	0.00011
1936178017	0.121	EF	SFR-A	0.7	0.00011
1936178018	0.140	EF	SFR-B	1.0	0.00016
1936178019	0.115	EF	SFR-A	0.7	0.00011
1936178020	0.135	EF	SFR-B	1.0	0.00016
1936178022	0.121	EF	SFR-A	0.7	0.00011
1936178023	0.121	EF	SFR-A	0.7	0.00011
1936178026	0.121	EF	SFR-A	0.7	0.00011
1936178027	0.122	EF	SFR-A	0.7	0.00011
1936179005	0.103	EF	SFR-A	0.7	0.00011
1936179006	0.113	EF	SFR-A	0.7	0.00011
1936179007	0.108	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936179008	0.108	EF	SFR-A	0.7	0.00011
1936179009	0.108	EF	SFR-A	0.7	0.00011
1936179010	0.108	EF	SFR-A	0.7	0.00011
1936179011	0.113	EF	SFR-A	0.7	0.00011
1936179012	0.138	EF	SFR-B	1.0	0.00016
1936179013	0.155	EF	SFR-B	1.0	0.00016
1936179014	0.165	EF	SFR-B	1.0	0.00016
1936179015	0.180	EF	SFR-B	1.0	0.00016
1936179016	0.258	EF	SFR-C	1.6	0.00025
1936179017	0.190	EF	SFR-B	1.0	0.00016
1936179018	0.126	EF	SFR-B	1.0	0.00016
1936179019	0.200	EF	SFR-B	1.0	0.00016
1936179020	0.165	EF	SFR-B	1.0	0.00016
1936179021	0.150	EF	SFR-B	1.0	0.00016
1936179022	0.175	EF	SFR-B	1.0	0.00016
1936179023	0.182	EF	SFR-B	1.0	0.00016
1936179024	0.159	EF	SFR-B	1.0	0.00016
1936180001	0.168	EF	SFR-B	1.0	0.00016
1936180006	0.168	EF	SFR-B	1.0	0.00016
1936180007	0.170	EF	SFR-B	1.0	0.00016
1936180008	0.186	EF	SFR-B	1.0	0.00016
1936180009	0.253	EF	SFR-C	1.6	0.00025
1936180010	0.250	EF	SFR-B	1.0	0.00016
1936180011	0.166	EF	SFR-B	1.0	0.00016
1936180012	0.176	EF	SFR-B	1.0	0.00016
1936181001	0.105	EF	SFR-A	0.7	0.00011
1936181002	0.114	EF	SFR-A	0.7	0.00011
1936181003	0.141	EF	SFR-B	1.0	0.00016
1936181004	0.141	EF	SFR-B	1.0	0.00016
1936181005	0.167	EF	SFR-B	1.0	0.00016
1936181006	0.167	EF	SFR-B	1.0	0.00016
1936181007	0.164	EF	SFR-B	1.0	0.00016
1936181008	0.164	EF	SFR-B	1.0	0.00016
1936181009	0.200	EF	SFR-B	1.0	0.00016
1936181010	0.141	EF	SFR-B	1.0	0.00016
1936181011	0.141	EF	SFR-B	1.0	0.00016
1936181012	0.140	EF	SFR-B	1.0	0.00016
1936182002	0.167	EF	SFR-B	1.0	0.00016
1936182003	0.167	EF	SFR-B	1.0	0.00016
1936182004	0.156	EF	SFR-B	1.0	0.00016
1936182005	0.179	EF	SFR-B	1.0	0.00016
1936182007	0.093	EF	SFR-A	0.7	0.00011
1936182008	0.092	EF	SFR-A	0.7	0.00011
1936182009	0.092	EF	SFR-A	0.7	0.00011
1936182010	0.116	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936182011	0.118	EF	SFR-A	0.7	0.00011
1936182012	0.118	EF	SFR-A	0.7	0.00011
1936182013	0.131	EF	SFR-B	1.0	0.00016
1936182014	0.098	EF	SFR-A	0.7	0.00011
1936182015	0.095	EF	SFR-A	0.7	0.00011
1936182016	0.124	EF	SFR-A	0.7	0.00011
1936182017	0.125	EF	SFR-A	0.7	0.00011
1936182018	0.126	EF	SFR-B	1.0	0.00016
1936182019	0.129	EF	SFR-B	1.0	0.00016
1936182020	0.115	EF	SFR-A	0.7	0.00011
1936182021	0.115	EF	SFR-A	0.7	0.00011
1936182022	0.209	EF	SFR-B	1.0	0.00016
1936182023	0.120	EF	SFR-A	0.7	0.00011
1936182024	0.121	EF	SFR-A	0.7	0.00011
1936182025	0.166	EF	SFR-B	1.0	0.00016
1936182026	0.141	EF	SFR-B	1.0	0.00016
1936182027	0.106	EF	SFR-A	0.7	0.00011
1936182028	0.103	EF	SFR-A	0.7	0.00011
1936182029	0.103	EF	SFR-A	0.7	0.00011
1936182030	0.103	EF	SFR-A	0.7	0.00011
1936182031	0.256	EF	SFR-C	1.6	0.00025
1936183001	0.186	EF	SFR-B	1.0	0.00016
1936183002	0.160	EF	SFR-B	1.0	0.00016
1936183003	0.121	EF	SFR-A	0.7	0.00011
1936183006	0.121	EF	SFR-A	0.7	0.00011
1936183009	0.123	EF	SFR-A	0.7	0.00011
1936183010	0.122	EF	SFR-A	0.7	0.00011
1936183011	0.125	EF	SFR-A	0.7	0.00011
1936183012	0.095	EF	SFR-A	0.7	0.00011
1936183013	0.113	EF	SFR-A	0.7	0.00011
1936183014	0.113	EF	SFR-A	0.7	0.00011
1936183015	0.092	EF	SFR-A	0.7	0.00011
1936183016	0.092	EF	SFR-A	0.7	0.00011
1936183017	0.098	EF	SFR-A	0.7	0.00011
1936183018	0.386	EF	SFR-C	1.6	0.00025
1936183019	0.172	EF	SFR-B	1.0	0.00016
1936183020	0.140	EF	SFR-B	1.0	0.00016
1936183021	0.140	EF	SFR-B	1.0	0.00016
1936183022	0.209	EF	SFR-B	1.0	0.00016
1936183023	0.123	EF	SFR-A	0.7	0.00011
1936183024	0.123	EF	SFR-A	0.7	0.00011
1936183025	0.123	EF	SFR-A	0.7	0.00011
1936183028	0.138	EF	SFR-B	1.0	0.00016
1936183029	0.151	EF	SFR-B	1.0	0.00016
1936183030	0.130	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936183031	0.146	EF	SFR-B	1.0	0.00016
1936183032	0.152	EF	SFR-B	1.0	0.00016
1936183034	0.121	EF	SFR-A	0.7	0.00011
1936183035	0.123	EF	SFR-A	0.7	0.00011
1936183036	0.121	EF	SFR-A	0.7	0.00011
1936184001	0.302	EF	SFR-C	1.6	0.00025
1936184002	0.181	EF	SFR-B	1.0	0.00016
1936184003	0.115	EF	SFR-A	0.7	0.00011
1936184004	0.115	EF	SFR-A	0.7	0.00011
1936184005	0.172	EF	SFR-B	1.0	0.00016
1936184006	0.149	EF	SFR-B	1.0	0.00016
1936184007	0.149	EF	SFR-B	1.0	0.00016
1936184008	0.149	EF	SFR-B	1.0	0.00016
1936184009	0.147	EF	SFR-B	1.0	0.00016
1936184010	0.138	EF	SFR-B	1.0	0.00016
1936184011	0.138	EF	SFR-B	1.0	0.00016
1936184012	0.137	EF	SFR-B	1.0	0.00016
1936184013	0.152	EF	SFR-B	1.0	0.00016
1936184014	0.138	EF	SFR-B	1.0	0.00016
1936184015	0.138	EF	SFR-B	1.0	0.00016
1936184016	0.138	EF	SFR-B	1.0	0.00016
1936184017	0.152	EF	SFR-B	1.0	0.00016
1936184018	0.152	EF	SFR-B	1.0	0.00016
1936184019	0.118	EF	SFR-A	0.7	0.00011
1936184020	0.115	EF	SFR-A	0.7	0.00011
1936184021	0.132	EF	SFR-B	1.0	0.00016
1936184022	0.131	EF	SFR-B	1.0	0.00016
1936184023	0.319	EF	SFR-C	1.6	0.00025
1936184024	0.111	EF	SFR-A	0.7	0.00011
1936184025	0.189	EF	SFR-B	1.0	0.00016
1936184026	0.141	EF	SFR-B	1.0	0.00016
1936184027	0.141	EF	SFR-B	1.0	0.00016
1936184028	0.123	EF	SFR-A	0.7	0.00011
1936184029	0.146	EF	SFR-B	1.0	0.00016
1936184030	0.132	EF	SFR-B	1.0	0.00016
1936184031	0.131	EF	SFR-B	1.0	0.00016
1936184032	0.131	EF	SFR-B	1.0	0.00016
1936184033	0.143	EF	SFR-B	1.0	0.00016
1936184034	0.142	EF	SFR-B	1.0	0.00016
1936184035	0.129	EF	SFR-B	1.0	0.00016
1936184036	0.104	EF	SFR-A	0.7	0.00011
1936184037	0.124	EF	SFR-A	0.7	0.00011
1936184041	0.116	EF	SFR-A	0.7	0.00011
1936184042	0.113	EF	SFR-A	0.7	0.00011
1936185001	0.147	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936185002	0.147	EF	SFR-B	1.0	0.00016
1936185003	0.147	EF	SFR-B	1.0	0.00016
1936185004	0.148	EF	SFR-B	1.0	0.00016
1936185005	0.146	EF	SFR-B	1.0	0.00016
1936185006	0.146	EF	SFR-B	1.0	0.00016
1936185007	0.146	EF	SFR-B	1.0	0.00016
1936185008	0.147	EF	SFR-B	1.0	0.00016
1936185009	0.148	EF	SFR-B	1.0	0.00016
1936185010	0.148	EF	SFR-B	1.0	0.00016
1936185011	0.138	EF	SFR-B	1.0	0.00016
1936185012	0.282	EF	SFR-C	1.6	0.00025
1936185013	0.187	EF	SFR-B	1.0	0.00016
1936185014	0.187	EF	SFR-B	1.0	0.00016
1936185015	0.125	EF	SFR-A	0.7	0.00011
1936185018	0.113	EF	SFR-A	0.7	0.00011
1936185019	0.111	EF	SFR-A	0.7	0.00011
1936185020	0.167	EF	SFR-B	1.0	0.00016
1936185021	0.151	EF	SFR-B	1.0	0.00016
1936185022	0.158	EF	SFR-B	1.0	0.00016
1936185023	0.159	EF	SFR-B	1.0	0.00016
1936185024	0.167	EF	SFR-B	1.0	0.00016
1936185027	0.159	EF	SFR-B	1.0	0.00016
1936185041	0.215	EF	SFR-B	1.0	0.00016
1936185042	0.117	EF	SFR-A	0.7	0.00011
1936185043	0.204	EF	SFR-B	1.0	0.00016
1936185044	0.291	EF	SFR-C	1.6	0.00025
1936185045	0.240	EF	SFR-B	1.0	0.00016
1936185046	0.174	EF	SFR-B	1.0	0.00016
1936186001	0.371	EF	SFR-C	1.6	0.00025
1936203003	0.330	EF	SFR-C	1.6	0.00025
1936203004	0.225	EF	SFR-B	1.0	0.00016
1936203005	0.225	EF	SFR-B	1.0	0.00016
1936203006	0.246	EF	SFR-B	1.0	0.00016
1936203007	0.265	EF	SFR-C	1.6	0.00025
1936203008	0.231	EF	SFR-B	1.0	0.00016
1936203024	0.460	EF	NR	3.1	0.00048
1936301002	0.298	EF	SFR-C	1.6	0.00025
1936301003	0.298	EF	SFR-C	1.6	0.00025
1936301004	0.298	EF	SFR-C	1.6	0.00025
1936301005	0.298	EF	SFR-C	1.6	0.00025
1936301006	0.298	EF	SFR-C	1.6	0.00025
1936301007	0.298	EF	SFR-C	1.6	0.00025
1936301009	0.298	EF	SFR-C	1.6	0.00025
1936301010	0.298	EF	SFR-C	1.6	0.00025
1936301011	0.298	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936301012	0.298	EF	SFR-C	1.6	0.00025
1936301013	0.298	EF	SFR-C	1.6	0.00025
1936301014	0.298	EF	SFR-C	1.6	0.00025
1936301016	0.298	EF	SFR-C	1.6	0.00025
1936301017	0.298	EF	SFR-C	1.6	0.00025
1936302001	0.298	EF	SFR-C	1.6	0.00025
1936302002	0.298	EF	SFR-C	1.6	0.00025
1936302003	0.298	EF	SFR-C	1.6	0.00025
1936302004	0.298	EF	SFR-C	1.6	0.00025
1936302005	0.298	EF	SFR-C	1.6	0.00025
1936302006	0.298	EF	SFR-C	1.6	0.00025
1936302007	0.298	EF	SFR-C	1.6	0.00025
1936302008	0.298	EF	SFR-C	1.6	0.00025
1936302009	0.298	EF	SFR-C	1.6	0.00025
1936302010	0.298	EF	SFR-C	1.6	0.00025
1936302011	0.298	EF	SFR-C	1.6	0.00025
1936302012	0.298	EF	SFR-C	1.6	0.00025
1936302013	0.298	EF	SFR-C	1.6	0.00025
1936302014	0.298	EF	SFR-C	1.6	0.00025
1936303001	0.298	EF	SFR-C	1.6	0.00025
1936303002	0.298	EF	SFR-C	1.6	0.00025
1936303003	0.298	EF	SFR-C	1.6	0.00025
1936303004	0.298	EF	SFR-C	1.6	0.00025
1936303005	0.298	EF	SFR-C	1.6	0.00025
1936303006	0.298	EF	SFR-C	1.6	0.00025
1936303007	0.298	EF	SFR-C	1.6	0.00025
1936303008	0.298	EF	SFR-C	1.6	0.00025
1936303009	0.298	EF	SFR-C	1.6	0.00025
1936303010	0.298	EF	SFR-C	1.6	0.00025
1936303011	0.298	EF	SFR-C	1.6	0.00025
1936303012	0.298	EF	SFR-C	1.6	0.00025
1936303013	0.298	EF	SFR-C	1.6	0.00025
1936303014	0.298	EF	SFR-C	1.6	0.00025
1936304001	0.298	EF	SFR-C	1.6	0.00025
1936304002	0.298	EF	SFR-C	1.6	0.00025
1936304003	0.298	EF	SFR-C	1.6	0.00025
1936304004	0.298	EF	SFR-C	1.6	0.00025
1936304005	0.298	EF	SFR-C	1.6	0.00025
1936304006	0.298	EF	SFR-C	1.6	0.00025
1936304007	0.298	EF	SFR-C	1.6	0.00025
1936304008	0.301	EF	SFR-C	1.6	0.00025
1936304009	0.300	EF	SFR-C	1.6	0.00025
1936304010	0.300	EF	SFR-C	1.6	0.00025
1936304011	0.300	EF	SFR-C	1.6	0.00025
1936304012	0.299	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936304013	0.299	EF	SFR-C	1.6	0.00025
1936304014	0.299	EF	SFR-C	1.6	0.00025
1936305001	0.298	EF	SFR-C	1.6	0.00025
1936305002	0.224	EF	SFR-B	1.0	0.00016
1936305003	0.224	EF	SFR-B	1.0	0.00016
1936305004	0.224	EF	SFR-B	1.0	0.00016
1936305005	0.298	EF	SFR-C	1.6	0.00025
1936305006	0.224	EF	SFR-B	1.0	0.00016
1936305007	0.224	EF	SFR-B	1.0	0.00016
1936305008	0.224	EF	SFR-B	1.0	0.00016
1936305009	3.581	EF	NR	7.7	0.00120
1936306001	0.298	EF	SFR-C	1.6	0.00025
1936306002	0.224	EF	SFR-B	1.0	0.00016
1936306003	0.224	EF	SFR-B	1.0	0.00016
1936306004	0.224	EF	SFR-B	1.0	0.00016
1936306005	0.224	EF	SFR-B	1.0	0.00016
1936306006	0.224	EF	SFR-B	1.0	0.00016
1936306007	0.224	EF	SFR-B	1.0	0.00016
1936306008	0.224	EF	SFR-B	1.0	0.00016
1936306009	0.224	EF	SFR-B	1.0	0.00016
1936306010	0.224	EF	SFR-B	1.0	0.00016
1936306011	0.224	EF	SFR-B	1.0	0.00016
1936306012	0.224	EF	SFR-B	1.0	0.00016
1936306013	0.298	EF	SFR-C	1.6	0.00025
1936306014	0.224	EF	SFR-B	1.0	0.00016
1936306015	0.224	EF	SFR-B	1.0	0.00016
1936306016	0.224	EF	SFR-B	1.0	0.00016
1936306017	0.224	EF	SFR-B	1.0	0.00016
1936306018	0.224	EF	SFR-B	1.0	0.00016
1936306019	0.224	EF	SFR-B	1.0	0.00016
1936306020	0.224	EF	SFR-B	1.0	0.00016
1936306021	0.224	EF	SFR-B	1.0	0.00016
1936306022	0.224	EF	SFR-B	1.0	0.00016
1936306023	0.224	EF	SFR-B	1.0	0.00016
1936306024	0.224	EF	SFR-B	1.0	0.00016
1936307001	0.298	EF	SFR-C	1.6	0.00025
1936307002	0.224	EF	SFR-B	1.0	0.00016
1936307003	0.224	EF	SFR-B	1.0	0.00016
1936307004	0.224	EF	SFR-B	1.0	0.00016
1936307005	0.224	EF	SFR-B	1.0	0.00016
1936307006	0.224	EF	SFR-B	1.0	0.00016
1936307007	0.224	EF	SFR-B	1.0	0.00016
1936307008	0.224	EF	SFR-B	1.0	0.00016
1936307009	0.224	EF	SFR-B	1.0	0.00016
1936307010	0.224	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936307011	0.224	EF	SFR-B	1.0	0.00016
1936307012	0.224	EF	SFR-B	1.0	0.00016
1936307013	0.224	EF	SFR-B	1.0	0.00016
1936307014	0.149	EF	SFR-B	1.0	0.00016
1936307015	0.149	EF	SFR-B	1.0	0.00016
1936307016	0.149	EF	SFR-B	1.0	0.00016
1936307017	0.149	EF	SFR-B	1.0	0.00016
1936307018	0.149	EF	SFR-B	1.0	0.00016
1936307019	0.149	EF	SFR-B	1.0	0.00016
1936307020	0.149	EF	SFR-B	1.0	0.00016
1936307021	0.149	EF	SFR-B	1.0	0.00016
1936307022	0.149	EF	SFR-B	1.0	0.00016
1936307023	0.149	EF	SFR-B	1.0	0.00016
1936307024	0.149	EF	SFR-B	1.0	0.00016
1936307025	0.149	EF	SFR-B	1.0	0.00016
1936307026	0.149	EF	SFR-B	1.0	0.00016
1936307027	0.149	EF	SFR-B	1.0	0.00016
1936307028	0.149	EF	SFR-B	1.0	0.00016
1936307029	0.149	EF	SFR-B	1.0	0.00016
1936307030	0.149	EF	SFR-B	1.0	0.00016
1936308001	0.224	EF	SFR-B	1.0	0.00016
1936308002	0.149	EF	SFR-B	1.0	0.00016
1936308003	0.149	EF	SFR-B	1.0	0.00016
1936308004	0.149	EF	SFR-B	1.0	0.00016
1936308005	0.149	EF	SFR-B	1.0	0.00016
1936308006	0.155	EF	SFR-B	1.0	0.00016
1936308007	0.155	EF	SFR-B	1.0	0.00016
1936308008	0.155	EF	SFR-B	1.0	0.00016
1936308009	0.218	EF	SFR-B	1.0	0.00016
1936308012	0.149	EF	SFR-B	1.0	0.00016
1936308013	0.149	EF	SFR-B	1.0	0.00016
1936308014	0.149	EF	SFR-B	1.0	0.00016
1936308015	0.149	EF	SFR-B	1.0	0.00016
1936308016	0.149	EF	SFR-B	1.0	0.00016
1936308017	0.149	EF	SFR-B	1.0	0.00016
1936308018	0.149	EF	SFR-B	1.0	0.00016
1936308019	0.223	EF	SFR-B	1.0	0.00016
1936308020	0.149	EF	SFR-B	1.0	0.00016
1936308021	0.149	EF	SFR-B	1.0	0.00016
1936308022	0.149	EF	SFR-B	1.0	0.00016
1936308023	0.149	EF	SFR-B	1.0	0.00016
1936308024	0.149	EF	SFR-B	1.0	0.00016
1936308025	0.148	EF	SFR-B	1.0	0.00016
1936308026	0.148	EF	SFR-B	1.0	0.00016
1936308027	0.148	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936308028	0.148	EF	SFR-B	1.0	0.00016
1936308029	0.148	EF	SFR-B	1.0	0.00016
1936308030	0.148	EF	SFR-B	1.0	0.00016
1936308031	0.148	EF	SFR-B	1.0	0.00016
1936308032	0.148	EF	SFR-B	1.0	0.00016
1936308033	0.148	EF	SFR-B	1.0	0.00016
1936308034	0.148	EF	SFR-B	1.0	0.00016
1936308035	0.148	EF	SFR-B	1.0	0.00016
1936308036	0.148	EF	SFR-B	1.0	0.00016
1936308037	0.212	EF	SFR-B	1.0	0.00016
1936326001	0.135	EF	SFR-B	1.0	0.00016
1936326002	0.137	EF	SFR-B	1.0	0.00016
1936326003	0.143	EF	SFR-B	1.0	0.00016
1936326004	0.137	EF	SFR-B	1.0	0.00016
1936326005	0.140	EF	SFR-B	1.0	0.00016
1936326006	0.140	EF	SFR-B	1.0	0.00016
1936326007	0.137	EF	SFR-B	1.0	0.00016
1936326008	0.140	EF	SFR-B	1.0	0.00016
1936326009	0.140	EF	SFR-B	1.0	0.00016
1936326010	0.137	EF	SFR-B	1.0	0.00016
1936326011	0.140	EF	SFR-B	1.0	0.00016
1936326012	0.140	EF	SFR-B	1.0	0.00016
1936326013	0.137	EF	SFR-B	1.0	0.00016
1936326014	0.140	EF	SFR-B	1.0	0.00016
1936326015	0.140	EF	SFR-B	1.0	0.00016
1936326016	0.137	EF	SFR-B	1.0	0.00016
1936326017	0.137	EF	SFR-B	1.0	0.00016
1936326018	0.142	EF	SFR-B	1.0	0.00016
1936326019	0.137	EF	SFR-B	1.0	0.00016
1936326020	0.140	EF	SFR-B	1.0	0.00016
1936326021	0.140	EF	SFR-B	1.0	0.00016
1936326022	0.137	EF	SFR-B	1.0	0.00016
1936326023	0.140	EF	SFR-B	1.0	0.00016
1936326024	0.140	EF	SFR-B	1.0	0.00016
1936326025	0.137	EF	SFR-B	1.0	0.00016
1936326026	0.140	EF	SFR-B	1.0	0.00016
1936326027	0.140	EF	SFR-B	1.0	0.00016
1936326028	0.137	EF	SFR-B	1.0	0.00016
1936326029	0.140	EF	SFR-B	1.0	0.00016
1936326030	0.140	EF	SFR-B	1.0	0.00016
1936327001	0.142	EF	SFR-B	1.0	0.00016
1936327002	0.150	EF	SFR-B	1.0	0.00016
1936327003	0.142	EF	SFR-B	1.0	0.00016
1936327004	0.149	EF	SFR-B	1.0	0.00016
1936327005	0.194	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936327006	0.194	EF	SFR-B	1.0	0.00016
1936327007	0.194	EF	SFR-B	1.0	0.00016
1936327008	0.194	EF	SFR-B	1.0	0.00016
1936327009	0.191	EF	SFR-B	1.0	0.00016
1936327010	0.179	EF	SFR-B	1.0	0.00016
1936327011	0.178	EF	SFR-B	1.0	0.00016
1936327012	0.180	EF	SFR-B	1.0	0.00016
1936327016	0.184	EF	SFR-B	1.0	0.00016
1936327017	0.183	EF	SFR-B	1.0	0.00016
1936327018	0.183	EF	SFR-B	1.0	0.00016
1936327019	0.201	EF	SFR-B	1.0	0.00016
1936327020	0.200	EF	SFR-B	1.0	0.00016
1936327021	0.184	EF	SFR-B	1.0	0.00016
1936327022	0.183	EF	SFR-B	1.0	0.00016
1936327023	0.182	EF	SFR-B	1.0	0.00016
1936327024	0.182	EF	SFR-B	1.0	0.00016
1936327025	0.201	EF	SFR-B	1.0	0.00016
1936327028	0.201	EF	SFR-B	1.0	0.00016
1936327029	0.238	EF	SFR-B	1.0	0.00016
1936327030	0.237	EF	SFR-B	1.0	0.00016
1936328001	0.138	EF	SFR-B	1.0	0.00016
1936328002	0.137	EF	SFR-B	1.0	0.00016
1936328003	0.138	EF	SFR-B	1.0	0.00016
1936328004	0.138	EF	SFR-B	1.0	0.00016
1936328005	0.138	EF	SFR-B	1.0	0.00016
1936328006	0.138	EF	SFR-B	1.0	0.00016
1936328007	0.138	EF	SFR-B	1.0	0.00016
1936328008	0.138	EF	SFR-B	1.0	0.00016
1936328009	0.138	EF	SFR-B	1.0	0.00016
1936328010	0.138	EF	SFR-B	1.0	0.00016
1936328011	0.138	EF	SFR-B	1.0	0.00016
1936328012	0.138	EF	SFR-B	1.0	0.00016
1936328013	0.138	EF	SFR-B	1.0	0.00016
1936328014	0.139	EF	SFR-B	1.0	0.00016
1936328015	0.137	EF	SFR-B	1.0	0.00016
1936328016	0.137	EF	SFR-B	1.0	0.00016
1936328017	0.137	EF	SFR-B	1.0	0.00016
1936328018	0.137	EF	SFR-B	1.0	0.00016
1936328019	0.137	EF	SFR-B	1.0	0.00016
1936328020	0.137	EF	SFR-B	1.0	0.00016
1936328021	0.137	EF	SFR-B	1.0	0.00016
1936328022	0.137	EF	SFR-B	1.0	0.00016
1936328023	0.137	EF	SFR-B	1.0	0.00016
1936328024	0.137	EF	SFR-B	1.0	0.00016
1936328025	0.137	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936328026	0.137	EF	SFR-B	1.0	0.00016
1936328027	0.137	EF	SFR-B	1.0	0.00016
1936328028	0.137	EF	SFR-B	1.0	0.00016
1936329002	0.182	EF	SFR-B	1.0	0.00016
1936329003	0.182	EF	SFR-B	1.0	0.00016
1936329004	0.164	EF	SFR-B	1.0	0.00016
1936329005	0.164	EF	SFR-B	1.0	0.00016
1936329006	0.161	EF	SFR-B	1.0	0.00016
1936329007	0.160	EF	SFR-B	1.0	0.00016
1936329008	0.160	EF	SFR-B	1.0	0.00016
1936329009	0.161	EF	SFR-B	1.0	0.00016
1936329011	0.172	EF	SFR-B	1.0	0.00016
1936329012	0.172	EF	SFR-B	1.0	0.00016
1936329013	0.172	EF	SFR-B	1.0	0.00016
1936329014	0.172	EF	SFR-B	1.0	0.00016
1936329015	0.172	EF	SFR-B	1.0	0.00016
1936329016	0.172	EF	SFR-B	1.0	0.00016
1936329017	0.172	EF	SFR-B	1.0	0.00016
1936329018	0.172	EF	SFR-B	1.0	0.00016
1936329021	0.157	EF	SFR-B	1.0	0.00016
1936329022	0.152	EF	SFR-B	1.0	0.00016
1936329023	0.152	EF	SFR-B	1.0	0.00016
1936329024	0.319	EF	SFR-C	1.6	0.00025
1936329025	0.165	EF	SFR-B	1.0	0.00016
1936329026	0.172	EF	SFR-B	1.0	0.00016
1936329027	0.172	EF	SFR-B	1.0	0.00016
1936329028	0.173	EF	SFR-B	1.0	0.00016
1936329029	0.195	EF	SFR-B	1.0	0.00016
1936329030	0.164	EF	SFR-B	1.0	0.00016
1936330001	0.148	EF	SFR-B	1.0	0.00016
1936330002	0.149	EF	SFR-B	1.0	0.00016
1936330003	0.140	EF	SFR-B	1.0	0.00016
1936330004	0.149	EF	SFR-B	1.0	0.00016
1936330005	0.137	EF	SFR-B	1.0	0.00016
1936330006	0.149	EF	SFR-B	1.0	0.00016
1936330007	0.149	EF	SFR-B	1.0	0.00016
1936330008	0.140	EF	SFR-B	1.0	0.00016
1936330009	0.149	EF	SFR-B	1.0	0.00016
1936330010	0.140	EF	SFR-B	1.0	0.00016
1936330011	0.149	EF	SFR-B	1.0	0.00016
1936330012	0.149	EF	SFR-B	1.0	0.00016
1936330013	0.149	EF	SFR-B	1.0	0.00016
1936330014	0.137	EF	SFR-B	1.0	0.00016
1936330015	0.140	EF	SFR-B	1.0	0.00016
1936330016	0.149	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936330017	0.137	EF	SFR-B	1.0	0.00016
1936330018	0.149	EF	SFR-B	1.0	0.00016
1936330019	0.148	EF	SFR-B	1.0	0.00016
1936330020	0.148	EF	SFR-B	1.0	0.00016
1936330021	0.149	EF	SFR-B	1.0	0.00016
1936330022	0.140	EF	SFR-B	1.0	0.00016
1936330023	0.149	EF	SFR-B	1.0	0.00016
1936330024	0.137	EF	SFR-B	1.0	0.00016
1936330025	0.149	EF	SFR-B	1.0	0.00016
1936330026	0.149	EF	SFR-B	1.0	0.00016
1936330027	0.140	EF	SFR-B	1.0	0.00016
1936330028	0.149	EF	SFR-B	1.0	0.00016
1936330029	0.140	EF	SFR-B	1.0	0.00016
1936330030	0.149	EF	SFR-B	1.0	0.00016
1936330031	0.149	EF	SFR-B	1.0	0.00016
1936330032	0.149	EF	SFR-B	1.0	0.00016
1936330033	0.137	EF	SFR-B	1.0	0.00016
1936330034	0.140	EF	SFR-B	1.0	0.00016
1936330035	0.149	EF	SFR-B	1.0	0.00016
1936330036	0.137	EF	SFR-B	1.0	0.00016
1936330037	0.149	EF	SFR-B	1.0	0.00016
1936330038	0.148	EF	SFR-B	1.0	0.00016
1936331001	0.201	EF	SFR-B	1.0	0.00016
1936331002	0.149	EF	SFR-B	1.0	0.00016
1936331003	0.149	EF	SFR-B	1.0	0.00016
1936331004	0.149	EF	SFR-B	1.0	0.00016
1936331005	0.149	EF	SFR-B	1.0	0.00016
1936331006	0.149	EF	SFR-B	1.0	0.00016
1936331007	0.140	EF	SFR-B	1.0	0.00016
1936331008	0.142	EF	SFR-B	1.0	0.00016
1936331009	0.136	EF	SFR-B	1.0	0.00016
1936331010	0.141	EF	SFR-B	1.0	0.00016
1936331011	0.138	EF	SFR-B	1.0	0.00016
1936331012	0.140	EF	SFR-B	1.0	0.00016
1936331013	0.137	EF	SFR-B	1.0	0.00016
1936331014	0.140	EF	SFR-B	1.0	0.00016
1936331015	0.140	EF	SFR-B	1.0	0.00016
1936331016	0.140	EF	SFR-B	1.0	0.00016
1936331017	0.137	EF	SFR-B	1.0	0.00016
1936331018	0.140	EF	SFR-B	1.0	0.00016
1936331019	0.142	EF	SFR-B	1.0	0.00016
1936331020	0.172	EF	SFR-B	1.0	0.00016
1936331021	0.182	EF	SFR-B	1.0	0.00016
1936331022	0.174	EF	SFR-B	1.0	0.00016
1936331023	0.174	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936331024	0.174	EF	SFR-B	1.0	0.00016
1936331025	0.174	EF	SFR-B	1.0	0.00016
1936331026	0.174	EF	SFR-B	1.0	0.00016
1936331027	0.173	EF	SFR-B	1.0	0.00016
1936331028	0.166	EF	SFR-B	1.0	0.00016
1936331029	0.173	EF	SFR-B	1.0	0.00016
1936331030	0.154	EF	SFR-B	1.0	0.00016
1936331031	0.163	EF	SFR-B	1.0	0.00016
1936331032	0.162	EF	SFR-B	1.0	0.00016
1936331033	0.162	EF	SFR-B	1.0	0.00016
1936331034	0.162	EF	SFR-B	1.0	0.00016
1936331035	0.162	EF	SFR-B	1.0	0.00016
1936331036	0.162	EF	SFR-B	1.0	0.00016
1936331037	0.162	EF	SFR-B	1.0	0.00016
1936331038	0.162	EF	SFR-B	1.0	0.00016
1936331039	0.154	EF	SFR-B	1.0	0.00016
1936332001	0.139	EF	SFR-B	1.0	0.00016
1936332002	0.137	EF	SFR-B	1.0	0.00016
1936332003	0.138	EF	SFR-B	1.0	0.00016
1936332004	0.138	EF	SFR-B	1.0	0.00016
1936332005	0.138	EF	SFR-B	1.0	0.00016
1936332006	0.138	EF	SFR-B	1.0	0.00016
1936332007	0.138	EF	SFR-B	1.0	0.00016
1936332008	0.138	EF	SFR-B	1.0	0.00016
1936332009	0.138	EF	SFR-B	1.0	0.00016
1936332010	0.190	EF	SFR-B	1.0	0.00016
1936332011	0.111	EF	SFR-A	0.7	0.00011
1936332012	0.111	EF	SFR-A	0.7	0.00011
1936332013	0.111	EF	SFR-A	0.7	0.00011
1936332014	0.111	EF	SFR-A	0.7	0.00011
1936332015	0.111	EF	SFR-A	0.7	0.00011
1936332016	0.111	EF	SFR-A	0.7	0.00011
1936332017	0.111	EF	SFR-A	0.7	0.00011
1936332022	0.138	EF	SFR-B	1.0	0.00016
1936332023	0.136	EF	SFR-B	1.0	0.00016
1936332024	0.137	EF	SFR-B	1.0	0.00016
1936332025	0.137	EF	SFR-B	1.0	0.00016
1936332026	0.137	EF	SFR-B	1.0	0.00016
1936332027	0.137	EF	SFR-B	1.0	0.00016
1936332028	0.137	EF	SFR-B	1.0	0.00016
1936332029	0.137	EF	SFR-B	1.0	0.00016
1936332030	0.138	EF	SFR-B	1.0	0.00016
1936332031	0.187	EF	SFR-B	1.0	0.00016
1936332032	0.109	EF	SFR-A	0.7	0.00011
1936332033	0.109	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936332034	0.109	EF	SFR-A	0.7	0.00011
1936332035	0.109	EF	SFR-A	0.7	0.00011
1936332036	0.109	EF	SFR-A	0.7	0.00011
1936332037	0.154	EF	SFR-B	1.0	0.00016
1936332038	0.137	EF	SFR-B	1.0	0.00016
1936332039	0.137	EF	SFR-B	1.0	0.00016
1936332040	0.136	EF	SFR-B	1.0	0.00016
1936332041	0.225	EF	SFR-B	1.0	0.00016
1936332042	0.123	EF	SFR-A	0.7	0.00011
1936333001	0.151	EF	SFR-B	1.0	0.00016
1936333002	0.151	EF	SFR-B	1.0	0.00016
1936333003	0.151	EF	SFR-B	1.0	0.00016
1936333004	0.151	EF	SFR-B	1.0	0.00016
1936333005	0.150	EF	SFR-B	1.0	0.00016
1936333006	0.150	EF	SFR-B	1.0	0.00016
1936333007	0.150	EF	SFR-B	1.0	0.00016
1936333008	0.150	EF	SFR-B	1.0	0.00016
1936333009	0.150	EF	SFR-B	1.0	0.00016
1936333010	0.206	EF	SFR-B	1.0	0.00016
1936333011	0.161	EF	SFR-B	1.0	0.00016
1936333012	0.161	EF	SFR-B	1.0	0.00016
1936333013	0.160	EF	SFR-B	1.0	0.00016
1936333014	0.161	EF	SFR-B	1.0	0.00016
1936333015	0.161	EF	SFR-B	1.0	0.00016
1936333016	0.161	EF	SFR-B	1.0	0.00016
1936333017	0.161	EF	SFR-B	1.0	0.00016
1936333018	0.181	EF	SFR-B	1.0	0.00016
1936333019	0.172	EF	SFR-B	1.0	0.00016
1936333020	0.172	EF	SFR-B	1.0	0.00016
1936333021	0.172	EF	SFR-B	1.0	0.00016
1936333022	0.172	EF	SFR-B	1.0	0.00016
1936333023	0.172	EF	SFR-B	1.0	0.00016
1936333024	0.172	EF	SFR-B	1.0	0.00016
1936333025	0.172	EF	SFR-B	1.0	0.00016
1936333026	0.172	EF	SFR-B	1.0	0.00016
1936333027	0.172	EF	SFR-B	1.0	0.00016
1936333028	0.236	EF	SFR-B	1.0	0.00016
1936333029	0.149	EF	SFR-B	1.0	0.00016
1936333030	0.149	EF	SFR-B	1.0	0.00016
1936333031	0.147	EF	SFR-B	1.0	0.00016
1936333032	0.180	EF	SFR-B	1.0	0.00016
1936333033	0.160	EF	SFR-B	1.0	0.00016
1936333034	0.157	EF	SFR-B	1.0	0.00016
1936333035	0.158	EF	SFR-B	1.0	0.00016
1936333036	0.107	EF	SFR-A	0.7	0.00011

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936351014	0.342	EF	NR	3.1	0.00048
1936351015	0.155	EF	SFR-B	1.0	0.00016
1936351016	0.155	EF	SFR-B	1.0	0.00016
1936351017	0.155	EF	SFR-B	1.0	0.00016
1936351018	0.155	EF	SFR-B	1.0	0.00016
1936351019	0.155	EF	SFR-B	1.0	0.00016
1936351020	0.149	EF	SFR-B	1.0	0.00016
1936351021	0.149	EF	SFR-B	1.0	0.00016
1936351022	0.154	EF	SFR-B	1.0	0.00016
1936351023	0.154	EF	SFR-B	1.0	0.00016
1936351024	0.154	EF	SFR-B	1.0	0.00016
1936351025	0.154	EF	SFR-B	1.0	0.00016
1936351026	0.154	EF	SFR-B	1.0	0.00016
1936351027	0.154	EF	SFR-B	1.0	0.00016
1936351028	0.154	EF	SFR-B	1.0	0.00016
1936351029	0.155	EF	SFR-B	1.0	0.00016
1936351030	0.154	EF	SFR-B	1.0	0.00016
1936351031	0.597	EF	NR	5.1	0.00079
1936351042	1.522	EF	MFR	8.5	0.00132
1936352001	0.179	EF	SFR-B	1.0	0.00016
1936352002	0.149	EF	SFR-B	1.0	0.00016
1936352003	0.149	EF	SFR-B	1.0	0.00016
1936352004	0.149	EF	SFR-B	1.0	0.00016
1936352005	0.149	EF	SFR-B	1.0	0.00016
1936352006	0.154	EF	SFR-B	1.0	0.00016
1936352007	0.154	EF	SFR-B	1.0	0.00016
1936352008	0.154	EF	SFR-B	1.0	0.00016
1936352009	0.154	EF	SFR-B	1.0	0.00016
1936352010	0.154	EF	SFR-B	1.0	0.00016
1936352011	0.154	EF	SFR-B	1.0	0.00016
1936352012	0.154	EF	SFR-B	1.0	0.00016
1936352013	0.154	EF	SFR-B	1.0	0.00016
1936352014	0.154	EF	SFR-B	1.0	0.00016
1936352015	0.138	EF	SFR-B	1.0	0.00016
1936352016	0.159	EF	SFR-B	1.0	0.00016
1936352017	0.179	EF	SFR-B	1.0	0.00016
1936352018	0.149	EF	SFR-B	1.0	0.00016
1936352019	0.149	EF	SFR-B	1.0	0.00016
1936352020	0.149	EF	SFR-B	1.0	0.00016
1936352021	0.149	EF	SFR-B	1.0	0.00016
1936352022	0.149	EF	SFR-B	1.0	0.00016
1936352023	0.149	EF	SFR-B	1.0	0.00016
1936352024	0.149	EF	SFR-B	1.0	0.00016
1936352025	0.149	EF	SFR-B	1.0	0.00016
1936352026	0.149	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936352027	0.149	EF	SFR-B	1.0	0.00016
1936352028	0.149	EF	SFR-B	1.0	0.00016
1936352029	0.149	EF	SFR-B	1.0	0.00016
1936352030	0.149	EF	SFR-B	1.0	0.00016
1936352031	0.149	EF	SFR-B	1.0	0.00016
1936352032	0.187	EF	SFR-B	1.0	0.00016
1936353001	0.173	EF	SFR-B	1.0	0.00016
1936353002	0.149	EF	SFR-B	1.0	0.00016
1936353003	0.155	EF	SFR-B	1.0	0.00016
1936353004	0.149	EF	SFR-B	1.0	0.00016
1936353005	0.149	EF	SFR-B	1.0	0.00016
1936353006	0.149	EF	SFR-B	1.0	0.00016
1936353007	0.149	EF	SFR-B	1.0	0.00016
1936353008	0.149	EF	SFR-B	1.0	0.00016
1936353009	0.298	EF	SFR-C	1.6	0.00025
1936353010	0.149	EF	SFR-B	1.0	0.00016
1936353011	0.149	EF	SFR-B	1.0	0.00016
1936353012	0.149	EF	SFR-B	1.0	0.00016
1936353015	0.270	EF	SFR-C	1.6	0.00025
1936353016	0.179	EF	SFR-B	1.0	0.00016
1936353017	0.149	EF	SFR-B	1.0	0.00016
1936353018	0.149	EF	SFR-B	1.0	0.00016
1936353019	0.149	EF	SFR-B	1.0	0.00016
1936353020	0.149	EF	SFR-B	1.0	0.00016
1936353021	0.149	EF	SFR-B	1.0	0.00016
1936353022	0.149	EF	SFR-B	1.0	0.00016
1936353023	0.149	EF	SFR-B	1.0	0.00016
1936353024	0.149	EF	SFR-B	1.0	0.00016
1936353025	0.149	EF	SFR-B	1.0	0.00016
1936353026	0.149	EF	SFR-B	1.0	0.00016
1936353027	0.149	EF	SFR-B	1.0	0.00016
1936353028	0.149	EF	SFR-B	1.0	0.00016
1936353029	0.149	EF	SFR-B	1.0	0.00016
1936353030	0.149	EF	SFR-B	1.0	0.00016
1936353031	0.182	EF	SFR-B	1.0	0.00016
1936353032	0.212	EF	SFR-B	1.0	0.00016
1936354001	0.179	EF	SFR-B	1.0	0.00016
1936354002	0.149	EF	SFR-B	1.0	0.00016
1936354003	0.149	EF	SFR-B	1.0	0.00016
1936354004	0.149	EF	SFR-B	1.0	0.00016
1936354005	0.149	EF	SFR-B	1.0	0.00016
1936354006	0.149	EF	SFR-B	1.0	0.00016
1936354007	0.149	EF	SFR-B	1.0	0.00016
1936354008	0.149	EF	SFR-B	1.0	0.00016
1936354009	0.149	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936354010	0.149	EF	SFR-B	1.0	0.00016
1936354011	0.149	EF	SFR-B	1.0	0.00016
1936354012	0.149	EF	SFR-B	1.0	0.00016
1936354013	0.149	EF	SFR-B	1.0	0.00016
1936354014	0.149	EF	SFR-B	1.0	0.00016
1936354015	0.149	EF	SFR-B	1.0	0.00016
1936354016	0.180	EF	SFR-B	1.0	0.00016
1936354017	0.177	EF	SFR-B	1.0	0.00016
1936354018	0.147	EF	SFR-B	1.0	0.00016
1936354019	0.147	EF	SFR-B	1.0	0.00016
1936354020	0.147	EF	SFR-B	1.0	0.00016
1936354021	0.147	EF	SFR-B	1.0	0.00016
1936354022	0.147	EF	SFR-B	1.0	0.00016
1936354023	0.147	EF	SFR-B	1.0	0.00016
1936354024	0.147	EF	SFR-B	1.0	0.00016
1936354025	0.147	EF	SFR-B	1.0	0.00016
1936354026	0.147	EF	SFR-B	1.0	0.00016
1936354027	0.146	EF	SFR-B	1.0	0.00016
1936354028	0.146	EF	SFR-B	1.0	0.00016
1936354029	0.146	EF	SFR-B	1.0	0.00016
1936354030	0.146	EF	SFR-B	1.0	0.00016
1936354031	0.146	EF	SFR-B	1.0	0.00016
1936354032	0.174	EF	SFR-B	1.0	0.00016
1936376001	0.148	EF	SFR-B	1.0	0.00016
1936376002	0.143	EF	SFR-B	1.0	0.00016
1936376003	0.149	EF	SFR-B	1.0	0.00016
1936376004	0.137	EF	SFR-B	1.0	0.00016
1936376005	0.149	EF	SFR-B	1.0	0.00016
1936376006	0.137	EF	SFR-B	1.0	0.00016
1936376007	0.137	EF	SFR-B	1.0	0.00016
1936376008	0.149	EF	SFR-B	1.0	0.00016
1936376009	0.137	EF	SFR-B	1.0	0.00016
1936376010	0.149	EF	SFR-B	1.0	0.00016
1936376011	0.143	EF	SFR-B	1.0	0.00016
1936376012	0.146	EF	SFR-B	1.0	0.00016
1936376013	0.146	EF	SFR-B	1.0	0.00016
1936376014	0.137	EF	SFR-B	1.0	0.00016
1936376015	0.148	EF	SFR-B	1.0	0.00016
1936376016	0.137	EF	SFR-B	1.0	0.00016
1936376017	0.149	EF	SFR-B	1.0	0.00016
1936376018	0.148	EF	SFR-B	1.0	0.00016
1936376019	0.143	EF	SFR-B	1.0	0.00016
1936376020	0.149	EF	SFR-B	1.0	0.00016
1936376021	0.137	EF	SFR-B	1.0	0.00016
1936376022	0.149	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936376023	0.137	EF	SFR-B	1.0	0.00016
1936376024	0.137	EF	SFR-B	1.0	0.00016
1936376025	0.149	EF	SFR-B	1.0	0.00016
1936376026	0.137	EF	SFR-B	1.0	0.00016
1936376027	0.149	EF	SFR-B	1.0	0.00016
1936376028	0.143	EF	SFR-B	1.0	0.00016
1936376029	0.146	EF	SFR-B	1.0	0.00016
1936376030	0.146	EF	SFR-B	1.0	0.00016
1936376031	0.137	EF	SFR-B	1.0	0.00016
1936376032	0.148	EF	SFR-B	1.0	0.00016
1936376033	0.137	EF	SFR-B	1.0	0.00016
1936376034	0.149	EF	SFR-B	1.0	0.00016
1936377001	0.136	EF	SFR-B	1.0	0.00016
1936377002	0.134	EF	SFR-B	1.0	0.00016
1936377003	0.137	EF	SFR-B	1.0	0.00016
1936377004	0.134	EF	SFR-B	1.0	0.00016
1936377005	0.134	EF	SFR-B	1.0	0.00016
1936377006	0.137	EF	SFR-B	1.0	0.00016
1936377007	0.134	EF	SFR-B	1.0	0.00016
1936377008	0.137	EF	SFR-B	1.0	0.00016
1936377009	0.134	EF	SFR-B	1.0	0.00016
1936377010	0.137	EF	SFR-B	1.0	0.00016
1936377011	0.134	EF	SFR-B	1.0	0.00016
1936377012	0.137	EF	SFR-B	1.0	0.00016
1936377013	0.134	EF	SFR-B	1.0	0.00016
1936377014	0.137	EF	SFR-B	1.0	0.00016
1936377015	0.137	EF	SFR-B	1.0	0.00016
1936377016	0.136	EF	SFR-B	1.0	0.00016
1936377017	0.134	EF	SFR-B	1.0	0.00016
1936377018	0.137	EF	SFR-B	1.0	0.00016
1936377019	0.159	EF	SFR-B	1.0	0.00016
1936377020	0.157	EF	SFR-B	1.0	0.00016
1936377021	0.157	EF	SFR-B	1.0	0.00016
1936377022	0.157	EF	SFR-B	1.0	0.00016
1936377023	0.157	EF	SFR-B	1.0	0.00016
1936377024	0.157	EF	SFR-B	1.0	0.00016
1936377025	0.157	EF	SFR-B	1.0	0.00016
1936377026	0.156	EF	SFR-B	1.0	0.00016
1936377027	0.156	EF	SFR-B	1.0	0.00016
1936377028	0.156	EF	SFR-B	1.0	0.00016
1936377029	0.156	EF	SFR-B	1.0	0.00016
1936377030	0.156	EF	SFR-B	1.0	0.00016
1936377031	0.156	EF	SFR-B	1.0	0.00016
1936377032	0.156	EF	SFR-B	1.0	0.00016
1936377033	0.156	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936377034	0.159	EF	SFR-B	1.0	0.00016
1936377035	0.156	EF	SFR-B	1.0	0.00016
1936377036	0.156	EF	SFR-B	1.0	0.00016
1936377037	0.160	EF	SFR-B	1.0	0.00016
1936378003	0.138	EF	SFR-B	1.0	0.00016
1936378004	0.138	EF	SFR-B	1.0	0.00016
1936378005	0.138	EF	SFR-B	1.0	0.00016
1936378006	0.138	EF	SFR-B	1.0	0.00016
1936378007	0.138	EF	SFR-B	1.0	0.00016
1936378008	0.138	EF	SFR-B	1.0	0.00016
1936378009	0.138	EF	SFR-B	1.0	0.00016
1936378010	0.138	EF	SFR-B	1.0	0.00016
1936378011	0.138	EF	SFR-B	1.0	0.00016
1936378012	0.138	EF	SFR-B	1.0	0.00016
1936378013	0.151	EF	SFR-B	1.0	0.00016
1936378014	0.149	EF	SFR-B	1.0	0.00016
1936378015	0.177	EF	SFR-B	1.0	0.00016
1936378016	0.124	EF	SFR-A	0.7	0.00011
1936378017	0.117	EF	SFR-A	0.7	0.00011
1936378018	0.137	EF	SFR-B	1.0	0.00016
1936378019	0.137	EF	SFR-B	1.0	0.00016
1936378020	0.137	EF	SFR-B	1.0	0.00016
1936378021	0.137	EF	SFR-B	1.0	0.00016
1936378022	0.137	EF	SFR-B	1.0	0.00016
1936378023	0.137	EF	SFR-B	1.0	0.00016
1936378024	0.137	EF	SFR-B	1.0	0.00016
1936378025	0.137	EF	SFR-B	1.0	0.00016
1936378026	0.137	EF	SFR-B	1.0	0.00016
1936378027	0.137	EF	SFR-B	1.0	0.00016
1936378028	0.137	EF	SFR-B	1.0	0.00016
1936378029	0.137	EF	SFR-B	1.0	0.00016
1936378030	0.137	EF	SFR-B	1.0	0.00016
1936378031	0.177	EF	SFR-B	1.0	0.00016
1936378032	0.123	EF	SFR-A	0.7	0.00011
1936378034	0.122	EF	SFR-A	0.7	0.00011
1936378035	0.110	EF	SFR-A	0.7	0.00011
1936379001	0.156	EF	SFR-B	1.0	0.00016
1936379002	0.151	EF	SFR-B	1.0	0.00016
1936379006	0.129	EF	SFR-B	1.0	0.00016
1936379007	0.129	EF	SFR-B	1.0	0.00016
1936379008	0.129	EF	SFR-B	1.0	0.00016
1936379011	0.193	EF	SFR-B	1.0	0.00016
1936379012	0.161	EF	SFR-B	1.0	0.00016
1936379013	0.161	EF	SFR-B	1.0	0.00016
1936379014	0.161	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936379015	0.161	EF	SFR-B	1.0	0.00016
1936379016	0.159	EF	SFR-B	1.0	0.00016
1936379017	0.182	EF	SFR-B	1.0	0.00016
1936379018	0.129	EF	SFR-B	1.0	0.00016
1936379020	0.242	EF	NR	2.1	0.00033
1936379023	0.069	EF	NR	0.6	0.00009
1936379024	0.046	EF	NR	0.4	0.00006
1936379025	0.126	EF	NR	1.1	0.00017
1936379026	0.094	EF	NR	0.8	0.00012
1936379027	0.183	EF	SFR-B	1.0	0.00016
1936379028	0.161	EF	SFR-B	1.0	0.00016
1936379029	0.193	EF	SFR-B	1.0	0.00016
1936379030	0.181	EF	SFR-B	1.0	0.00016
1936379031	0.119	EF	SFR-A	0.7	0.00011
1936379032	0.119	EF	SFR-A	0.7	0.00011
1936379033	0.178	EF	SFR-B	1.0	0.00016
1936379034	0.119	EF	SFR-A	0.7	0.00011
1936379035	0.119	EF	SFR-A	0.7	0.00011
1936379036	0.178	EF	SFR-B	1.0	0.00016
1936379037	0.119	EF	SFR-A	0.7	0.00011
1936379038	0.119	EF	SFR-A	0.7	0.00011
1936379039	0.178	EF	SFR-B	1.0	0.00016
1936379040	0.119	EF	SFR-A	0.7	0.00011
1936379041	0.119	EF	SFR-A	0.7	0.00011
1936379042	0.119	EF	SFR-A	0.7	0.00011
1936401006	0.120	EF	SFR-A	0.7	0.00011
1936401007	0.160	EF	SFR-B	1.0	0.00016
1936401008	0.160	EF	SFR-B	1.0	0.00016
1936401009	0.160	EF	SFR-B	1.0	0.00016
1936401013	0.160	EF	SFR-B	1.0	0.00016
1936401014	0.160	EF	SFR-B	1.0	0.00016
1936401015	0.160	EF	SFR-B	1.0	0.00016
1936401016	0.160	EF	SFR-B	1.0	0.00016
1936401017	0.160	EF	SFR-B	1.0	0.00016
1936401018	0.160	EF	SFR-B	1.0	0.00016
1936401019	0.160	EF	SFR-B	1.0	0.00016
1936401020	0.224	EF	SFR-B	1.0	0.00016
1936401021	0.254	EF	SFR-C	1.6	0.00025
1936401039	0.160	EF	SFR-B	1.0	0.00016
1936401040	0.128	EF	SFR-B	1.0	0.00016
1936401041	0.128	EF	SFR-B	1.0	0.00016
1936401042	0.184	EF	SFR-B	1.0	0.00016
1936401043	0.152	EF	SFR-B	1.0	0.00016
1936401044	0.153	EF	SFR-B	1.0	0.00016
1936401046	0.160	EF	SFR-B	1.0	0.00016

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936401047	0.160	EF	SFR-B	1.0	0.00016
1936401048	0.160	EF	SFR-B	1.0	0.00016
1936401049	0.160	EF	SFR-B	1.0	0.00016
1936401050	0.160	EF	SFR-B	1.0	0.00016
1936402042	0.155	EF	SFR-B	1.0	0.00016
1936402043	0.158	EF	SFR-B	1.0	0.00016
1936402044	0.157	EF	SFR-B	1.0	0.00016
1936402045	0.155	EF	SFR-B	1.0	0.00016
1936402047	0.162	EF	SFR-B	1.0	0.00016
1936402048	0.152	EF	SFR-B	1.0	0.00016
1936404013	0.235	EF	SFR-B	1.0	0.00016
1936404014	0.242	EF	SFR-B	1.0	0.00016
1936404015	0.161	EF	SFR-B	1.0	0.00016
1936404016	0.160	EF	SFR-B	1.0	0.00016
1936404017	0.159	EF	SFR-B	1.0	0.00016
1936404018	0.164	EF	SFR-B	1.0	0.00016
1936404019	0.157	EF	SFR-B	1.0	0.00016
1936404020	0.160	EF	SFR-B	1.0	0.00016
1936404021	0.148	EF	SFR-B	1.0	0.00016
1936404022	0.142	EF	SFR-B	1.0	0.00016
1936451001	0.140	EF	SFR-B	1.0	0.00016
1936451002	0.138	EF	SFR-B	1.0	0.00016
1936451003	0.137	EF	SFR-B	1.0	0.00016
1936451007	0.189	EF	SFR-B	1.0	0.00016
1936451008	0.157	EF	SFR-B	1.0	0.00016
1936451009	0.157	EF	SFR-B	1.0	0.00016
1936451010	0.157	EF	SFR-B	1.0	0.00016
1936451011	0.153	EF	SFR-B	1.0	0.00016
1936451012	0.152	EF	SFR-B	1.0	0.00016
1936451013	0.158	EF	SFR-B	1.0	0.00016
1936451014	0.155	EF	SFR-B	1.0	0.00016
1936451015	0.157	EF	SFR-B	1.0	0.00016
1936451016	0.168	EF	SFR-B	1.0	0.00016
1936451017	0.140	EF	SFR-B	1.0	0.00016
1936451018	0.124	EF	SFR-A	0.7	0.00011
1936451019	0.124	EF	SFR-A	0.7	0.00011
1936451020	0.124	EF	SFR-A	0.7	0.00011
1936451021	0.124	EF	SFR-A	0.7	0.00011
1936451022	0.124	EF	SFR-A	0.7	0.00011
1936451023	0.124	EF	SFR-A	0.7	0.00011
1936451024	0.124	EF	SFR-A	0.7	0.00011
1936451025	0.124	EF	SFR-A	0.7	0.00011
1936451026	0.124	EF	SFR-A	0.7	0.00011
1936451027	0.124	EF	SFR-A	0.7	0.00011
1936451028	0.372	EF	SFR-C	1.6	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936452001	0.154	EF	SFR-B	1.0	0.00016
1936452002	0.160	EF	SFR-B	1.0	0.00016
1936452003	0.162	EF	SFR-B	1.0	0.00016
1936452004	0.157	EF	SFR-B	1.0	0.00016
1936452005	0.162	EF	SFR-B	1.0	0.00016
1936452006	0.163	EF	SFR-B	1.0	0.00016
1936452007	0.160	EF	SFR-B	1.0	0.00016
1936452008	0.157	EF	SFR-B	1.0	0.00016
1936452009	0.158	EF	SFR-B	1.0	0.00016
1936452010	0.151	EF	SFR-B	1.0	0.00016
1936452011	0.137	EF	SFR-B	1.0	0.00016
1936452012	0.124	EF	SFR-A	0.7	0.00011
1936452013	0.124	EF	SFR-A	0.7	0.00011
1936452014	0.124	EF	SFR-A	0.7	0.00011
1936452015	0.124	EF	SFR-A	0.7	0.00011
1936452016	0.124	EF	SFR-A	0.7	0.00011
1936452017	0.124	EF	SFR-A	0.7	0.00011
1936452018	0.124	EF	SFR-A	0.7	0.00011
1936452019	0.124	EF	SFR-A	0.7	0.00011
1936452020	0.124	EF	SFR-A	0.7	0.00011
1936452021	0.124	EF	SFR-A	0.7	0.00011
1936452022	0.124	EF	SFR-A	0.7	0.00011
1936452023	0.124	EF	SFR-A	0.7	0.00011
1936453004	10.895	EF	NR	47.3	0.00734
1936454001	0.134	EF	SFR-B	1.0	0.00016
1936454002	0.118	EF	SFR-A	0.7	0.00011
1936454003	0.121	EF	SFR-A	0.7	0.00011
1936454004	0.121	EF	SFR-A	0.7	0.00011
1936454005	0.121	EF	SFR-A	0.7	0.00011
1936454006	0.121	EF	SFR-A	0.7	0.00011
1936454007	0.121	EF	SFR-A	0.7	0.00011
1936454008	0.121	EF	SFR-A	0.7	0.00011
1936454009	0.121	EF	SFR-A	0.7	0.00011
1936454010	0.121	EF	SFR-A	0.7	0.00011
1936454011	0.126	EF	SFR-B	1.0	0.00016
1936454012	0.123	EF	SFR-A	0.7	0.00011
1936454013	1.822	EF	MFR	11.9	0.00185
1936454014	0.124	EF	SFR-A	0.7	0.00011
1936454015	0.110	EF	SFR-A	0.7	0.00011
1936454016	0.110	EF	SFR-A	0.7	0.00011
1936454017	0.110	EF	SFR-A	0.7	0.00011
1936454018	0.110	EF	SFR-A	0.7	0.00011
1936454019	0.110	EF	SFR-A	0.7	0.00011
1936454020	0.110	EF	SFR-A	0.7	0.00011
1936454021	0.110	EF	SFR-A	0.7	0.00011

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936454022	0.110	EF	SFR-A	0.7	0.00011
1936454023	0.110	EF	SFR-A	0.7	0.00011
1936454024	0.124	EF	SFR-A	0.7	0.00011
1936454025	0.116	EF	SFR-A	0.7	0.00011
1936455001	0.124	EF	SFR-A	0.7	0.00011
1936455002	0.124	EF	SFR-A	0.7	0.00011
1936455003	0.110	EF	SFR-A	0.7	0.00011
1936455004	0.110	EF	SFR-A	0.7	0.00011
1936455005	0.110	EF	SFR-A	0.7	0.00011
1936455006	0.110	EF	SFR-A	0.7	0.00011
1936455007	0.110	EF	SFR-A	0.7	0.00011
1936455008	0.110	EF	SFR-A	0.7	0.00011
1936455009	0.110	EF	SFR-A	0.7	0.00011
1936455010	0.110	EF	SFR-A	0.7	0.00011
1936455011	0.110	EF	SFR-A	0.7	0.00011
1936455012	0.131	EF	SFR-B	1.0	0.00016
1936455013	0.124	EF	SFR-A	0.7	0.00011
1936455014	0.124	EF	SFR-A	0.7	0.00011
1936455015	0.110	EF	SFR-A	0.7	0.00011
1936455016	0.110	EF	SFR-A	0.7	0.00011
1936455017	0.110	EF	SFR-A	0.7	0.00011
1936455018	0.110	EF	SFR-A	0.7	0.00011
1936455019	0.110	EF	SFR-A	0.7	0.00011
1936455020	0.110	EF	SFR-A	0.7	0.00011
1936455021	0.110	EF	SFR-A	0.7	0.00011
1936455022	0.124	EF	SFR-A	0.7	0.00011
1936455023	0.124	EF	SFR-A	0.7	0.00011
1936455024	0.114	EF	SFR-A	0.7	0.00011
1936456002	0.119	EF	SFR-A	0.7	0.00011
1936456003	0.119	EF	SFR-A	0.7	0.00011
1936456004	0.119	EF	SFR-A	0.7	0.00011
1936456005	0.119	EF	SFR-A	0.7	0.00011
1936456006	0.119	EF	SFR-A	0.7	0.00011
1936456007	0.119	EF	SFR-A	0.7	0.00011
1936456008	0.119	EF	SFR-A	0.7	0.00011
1936456009	0.119	EF	SFR-A	0.7	0.00011
1936456010	0.119	EF	SFR-A	0.7	0.00011
1936456011	0.134	EF	SFR-B	1.0	0.00016
1936456012	0.128	EF	SFR-B	1.0	0.00016
1936456013	0.303	EF	NR	2.7	0.00042
1936456016	0.152	EF	MFR	0.8	0.00012
1936456017	0.152	EF	MFR	1.0	0.00016
1936456018	0.470	EF	MFR	3.4	0.00053
1936456019	1.254	EF	MFR	7.7	0.00120
1936456047	0.152	EF	MFR	1.0	0.00016

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936457001	0.134	EF	SFR-B	1.0	0.00016
1936457002	0.134	EF	SFR-B	1.0	0.00016
1936457003	0.134	EF	SFR-B	1.0	0.00016
1936457004	0.134	EF	SFR-B	1.0	0.00016
1936457005	0.119	EF	SFR-A	0.7	0.00011
1936457006	0.119	EF	SFR-A	0.7	0.00011
1936457007	0.119	EF	SFR-A	0.7	0.00011
1936457008	0.119	EF	SFR-A	0.7	0.00011
1936457009	0.119	EF	SFR-A	0.7	0.00011
1936457010	0.119	EF	SFR-A	0.7	0.00011
1936457011	0.119	EF	SFR-A	0.7	0.00011
1936457012	0.140	EF	SFR-B	1.0	0.00016
1936457013	0.440	EF	MFR	3.0	0.00047
1936457014	0.427	EF	MFR	3.0	0.00047
1936457015	0.423	EF	MFR	2.6	0.00040
			Total for EF District	6442.1	1.00000

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STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925456037	0.317	SO	NR	0.5	0.00010
1925477008	0.167	SO	SFR-B	1.0	0.00019
1925477009	0.167	SO	SFR-B	1.0	0.00019
1925477010	0.167	SO	SFR-B	1.0	0.00019
1925478006	0.167	SO	SFR-B	1.0	0.00019
1925478007	0.167	SO	SFR-B	1.0	0.00019
1925478008	0.334	SO	SFR-C	1.6	0.00031
1925478009	0.167	SO	SFR-B	1.0	0.00019
1925479003	2.024	SO	NR	13.5	0.00260
1925479004	1.454	SO	NR	3.4	0.00065
1925481001	0.167	SO	SFR-B	1.0	0.00019
1925481002	0.167	SO	SFR-B	1.0	0.00019
1925481003	0.167	SO	SFR-B	1.0	0.00019
1925481004	0.167	SO	SFR-B	1.0	0.00019
1925481005	0.167	SO	SFR-B	1.0	0.00019
1925481006	0.167	SO	SFR-B	1.0	0.00019
1925481007	0.167	SO	SFR-B	1.0	0.00019
1925481008	0.167	SO	SFR-B	1.0	0.00019
1925481009	0.167	SO	SFR-B	1.0	0.00019
1925481010	0.167	SO	SFR-B	1.0	0.00019
1925481011	0.167	SO	SFR-B	1.0	0.00019
1925481012	0.167	SO	SFR-B	1.0	0.00019
1925481013	0.167	SO	SFR-B	1.0	0.00019
1925481014	0.167	SO	SFR-B	1.0	0.00019
1925481015	0.167	SO	SFR-B	1.0	0.00019
1925481016	0.167	SO	SFR-B	1.0	0.00019
1925481017	0.167	SO	SFR-B	1.0	0.00019
1925481018	0.167	SO	SFR-B	1.0	0.00019
1925483016	0.137	SO	SFR-B	1.0	0.00019
1925483017	0.166	SO	SFR-B	1.0	0.00019
1925483018	0.166	SO	SFR-B	1.0	0.00019
1925483032	3.801	SO	NR	32.9	0.00632
1925484001	0.167	SO	SFR-B	1.0	0.00019
1925484002	0.167	SO	SFR-B	1.0	0.00019
1925484003	0.167	SO	SFR-B	1.0	0.00019
1925484004	0.167	SO	SFR-B	1.0	0.00019
1925484005	0.167	SO	SFR-B	1.0	0.00019
1925484006	0.167	SO	SFR-B	1.0	0.00019
1925484007	0.167	SO	SFR-B	1.0	0.00019
1925484008	0.167	SO	SFR-B	1.0	0.00019
1925484009	0.167	SO	SFR-B	1.0	0.00019
1925484010	0.166	SO	SFR-B	1.0	0.00019
1925484011	0.166	SO	SFR-B	1.0	0.00019
1925484012	0.166	SO	SFR-B	1.0	0.00019
1925484013	0.166	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1925484014	0.166	SO	SFR-B	1.0	0.00019
1925484015	0.166	SO	SFR-B	1.0	0.00019
1925484016	0.210	SO	SFR-B	1.0	0.00019
1925484017	0.138	SO	SFR-B	1.0	0.00019
1925485001	0.155	SO	SFR-B	1.0	0.00019
1925485002	0.155	SO	SFR-B	1.0	0.00019
1925485003	0.155	SO	SFR-B	1.0	0.00019
1925485004	0.155	SO	SFR-B	1.0	0.00019
1925485005	0.161	SO	SFR-B	1.0	0.00019
1925485006	0.143	SO	SFR-B	1.0	0.00019
1925485007	0.139	SO	SFR-B	1.0	0.00019
1925485008	0.138	SO	SFR-B	1.0	0.00019
1925485009	0.138	SO	SFR-B	1.0	0.00019
1925485010	0.137	SO	SFR-B	1.0	0.00019
1925486001	0.220	SO	SFR-B	1.0	0.00019
1925486002	0.220	SO	SFR-B	1.0	0.00019
1925486003	0.220	SO	SFR-B	1.0	0.00019
1925486004	0.220	SO	SFR-B	1.0	0.00019
1925486005	0.220	SO	SFR-B	1.0	0.00019
1925486006	0.221	SO	SFR-B	1.0	0.00019
1925486007	0.168	SO	SFR-B	1.0	0.00019
1925486008	0.145	SO	SFR-B	1.0	0.00019
1925486009	0.145	SO	SFR-B	1.0	0.00019
1925486013	0.220	SO	NR	1.8	0.00035
1925486014	0.220	SO	NR	1.7	0.00033
1925486017	0.224	SO	NR	2.0	0.00038
1925486018	0.660	SO	NR	5.8	0.00111
1925486019	0.466	SO	NR	4.0	0.00077
1925487001	0.143	SO	SFR-B	1.0	0.00019
1925487002	0.143	SO	SFR-B	1.0	0.00019
1925487003	0.174	SO	SFR-B	1.0	0.00019
1925487004	0.170	SO	SFR-B	1.0	0.00019
1925487005	0.145	SO	SFR-B	1.0	0.00019
1925487006	0.145	SO	SFR-B	1.0	0.00019
1925487007	0.469	SO	NR	4.0	0.00077
1925487008	0.091	SO	NR	0.8	0.00015
1925487009	0.378	SO	NR	3.4	0.00065
1936127001	0.567	SO	NR	4.5	0.00087
1936127004	0.567	SO	NR	4.4	0.00085
1936128001	0.083	SO	NR	0.8	0.00015
1936128002	0.083	SO	NR	0.8	0.00015
1936128003	0.145	SO	NR	1.3	0.00025
1936128004	0.323	SO	NR	2.9	0.00056
1936128006	0.060	SO	NR	0.5	0.00010
1936128008	0.171	SO	NR	1.6	0.00031

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936128013	0.188	SO	NR	1.7	0.00033
1936129001	0.086	SO	NR	0.8	0.00015
1936129002	0.086	SO	NR	0.8	0.00015
1936129003	0.086	SO	NR	0.8	0.00015
1936129004	0.115	SO	NR	1.0	0.00019
1936129005	0.124	SO	NR	1.1	0.00021
1936129006	0.041	SO	NR	0.4	0.00008
1936129010	0.312	SO	NR	2.5	0.00048
1936129012	0.156	SO	NR	1.3	0.00025
1936130001	3.405	SO	NR	21.7	0.00417
1936132007	0.816	SO	NR	6.3	0.00121
1936133001	1.135	SO	NR	6.5	0.00125
1936134001	0.114	SO	NR	1.0	0.00019
1936134006	1.021	SO	NR	9.2	0.00177
1936136006	0.188	SO	MFR	1.1	0.00021
1936136009	0.095	SO	MFR	0.8	0.00015
1936136012	0.274	SO	MFR	2.4	0.00046
1936136016	0.189	SO	MFR	1.6	0.00031
1936137001	0.282	SO	MFR	2.3	0.00044
1936137003	0.175	SO	MFR	1.1	0.00021
1936137007	0.095	SO	SFR-A	0.7	0.00013
1936137009	0.382	SO	MFR	3.3	0.00063
1936137015	0.095	SO	MFR	0.8	0.00015
1936137017	0.053	SO	MFR	0.5	0.00010
1936137018	0.052	SO	MFR	0.4	0.00008
1936138001	0.105	SO	NR	1.0	0.00019
1936138002	0.126	SO	NR	1.1	0.00021
1936138003	0.269	SO	NR	2.4	0.00046
1936138007	0.513	SO	NR	4.6	0.00088
1936177028	0.240	SO	MFR	1.6	0.00031
1936177034	0.331	SO	MFR	2.7	0.00052
1936178002	0.183	SO	MFR	1.6	0.00031
1936178024	0.176	SO	MFR	1.5	0.00029
1936179003	0.090	SO	NR	0.7	0.00013
1936179004	0.235	SO	NR	2.0	0.00038
1936179025	0.265	SO	NR	2.3	0.00044
1936185030	0.211	SO	SFR-B	1.0	0.00019
1936185031	0.189	SO	SFR-B	1.0	0.00019
1936185032	0.172	SO	SFR-B	1.0	0.00019
1936185033	0.172	SO	SFR-B	1.0	0.00019
1936185034	0.237	SO	SFR-B	1.0	0.00019
1936185035	0.247	SO	SFR-B	1.0	0.00019
1936185040	0.133	SO	SFR-B	1.0	0.00019
1936187001	0.212	SO	MFR	1.9	0.00037
1936201001	0.073	SO	NR	0.7	0.00013

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936201005	0.050	SO	NR	0.5	0.00010
1936201006	0.127	SO	NR	1.2	0.00023
1936201009	0.089	SO	NR	0.8	0.00015
1936201010	0.111	SO	NR	1.0	0.00019
1936201011	0.146	SO	NR	1.3	0.00025
1936201012	0.038	SO	NR	0.3	0.00006
1936201013	0.132	SO	NR	1.2	0.00023
1936201014	0.105	SO	NR	1.0	0.00019
1936201015	0.136	SO	NR	1.2	0.00023
1936201018	0.146	SO	NR	1.3	0.00025
1936201019	0.678	SO	NR	6.2	0.00119
1936201020	0.176	SO	NR	1.6	0.00031
1936201021	0.095	SO	NR	0.9	0.00017
1936201022	0.122	SO	NR	1.1	0.00021
1936202001	1.857	SO	NR	14.5	0.00279
1936202008	0.236	SO	NR	2.1	0.00040
1936202009	0.076	SO	NR	0.7	0.00013
1936202015	0.730	SO	NR	6.6	0.00127
1936202016	0.554	SO	NR	5.0	0.00096
1936202017	0.312	SO	NR	2.6	0.00050
1936202018	0.606	SO	NR	5.4	0.00104
1936203011	0.207	SO	NR	1.9	0.00037
1936203012	0.126	SO	NR	0.7	0.00013
1936203013	0.090	SO	SFR-A	0.7	0.00013
1936203014	0.139	SO	SFR-B	1.0	0.00019
1936203022	0.089	SO	SFR-A	0.7	0.00013
1936203023	0.083	SO	SFR-A	0.7	0.00013
1936203026	0.147	SO	SFR-B	1.0	0.00019
1936203027	0.161	SO	SFR-B	1.0	0.00019
1936203028	0.313	SO	SFR-C	1.6	0.00031
1936203029	0.139	SO	SFR-B	1.0	0.00019
1936203030	0.264	SO	SFR-C	1.6	0.00031
1936203031	0.909	SO	MFR	6.7	0.00129
1936204001	0.113	SO	NR	1.0	0.00019
1936204006	0.300	SO	NR	2.7	0.00052
1936204007	0.113	SO	NR	0.8	0.00015
1936204008	0.100	SO	NR	0.8	0.00015
1936204014	0.186	SO	NR	1.7	0.00033
1936204016	0.240	SO	NR	2.0	0.00038
1936204021	0.747	SO	NR	6.1	0.00117
1936204025	0.566	SO	NR	4.9	0.00094
1936205003	0.088	SO	NR	0.5	0.00010
1936205004	0.099	SO	NR	0.8	0.00015
1936205005	0.509	SO	MFR	3.9	0.00075
1936205006	0.128	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936205007	0.145	SO	SFR-B	1.0	0.00019
1936205008	0.130	SO	SFR-B	1.0	0.00019
1936205011	0.126	SO	SFR-B	1.0	0.00019
1936205012	0.095	SO	SFR-A	0.7	0.00013
1936205013	0.119	SO	SFR-A	0.7	0.00013
1936205014	0.124	SO	SFR-A	0.7	0.00013
1936205015	0.101	SO	SFR-A	0.7	0.00013
1936205021	0.142	SO	NR	1.1	0.00021
1936205026	0.456	SO	NR	4.1	0.00079
1936205034	0.149	SO	SFR-B	1.0	0.00019
1936205037	0.093	SO	NR	0.7	0.00013
1936205038	0.170	SO	NR	1.1	0.00021
1936205039	0.140	SO	NR	1.0	0.00019
1936205040	0.393	SO	NR	3.1	0.00060
1936205041	1.023	SO	NR	9.2	0.00177
1936205043	0.165	SO	NR	1.5	0.00029
1936206001	0.441	SO	NR	4.0	0.00077
1936206002	0.195	SO	NR	1.8	0.00035
1936206005	0.339	SO	NR	3.1	0.00060
1936206006	0.409	SO	NR	3.7	0.00071
1936206007	0.529	SO	NR	4.8	0.00092
1936206008	0.165	SO	NR	1.5	0.00029
1936206015	0.296	SO	NR	2.7	0.00052
1936206016	0.121	SO	NR	1.1	0.00021
1936206018	0.146	SO	NR	1.3	0.00025
1936206020	0.227	SO	NR	2.1	0.00040
1936206021	0.482	SO	NR	4.4	0.00085
1936206023	0.105	SO	NR	1.0	0.00019
1936206024	0.569	SO	NR	5.1	0.00098
1936207001	0.344	SO	NR	3.1	0.00060
1936207004	0.040	SO	NR	0.4	0.00008
1936207008	0.538	SO	NR	4.8	0.00092
1936207009	0.525	SO	NR	4.8	0.00092
1936208004	0.605	SO	NR	5.5	0.00106
1936208011	0.145	SO	NR	1.3	0.00025
1936208012	0.276	SO	NR	2.5	0.00048
1936208015	0.253	SO	NR	1.8	0.00035
1936208016	0.979	SO	NR	8.9	0.00171
1936208017	1.624	SO	NR	13.7	0.00263
1936210001	1.550	SO	NR	13.0	0.00250
1936210003	0.058	SO	NR	0.1	0.00002
1936210005	0.095	SO	NR	0.9	0.00017
1936211001	0.415	SO	NR	3.4	0.00065
1936226002	1.249	SO	NR	3.6	0.00069
1936226003	0.302	SO	NR	2.7	0.00052

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936226007	0.148	SO	NR	1.3	0.00025
1936226009	0.250	SO	NR	2.1	0.00040
1936226012	0.266	SO	NR	2.4	0.00046
1936226013	0.197	SO	NR	1.8	0.00035
1936226020	0.560	SO	NR	5.0	0.00096
1936226021	0.096	SO	NR	0.9	0.00017
1936226022	0.542	SO	NR	4.9	0.00094
1936227002	0.928	SO	NR	8.4	0.00161
1936227003	0.540	SO	NR	4.3	0.00083
1936227005	0.405	SO	NR	3.5	0.00067
1936227006	0.202	SO	NR	1.8	0.00035
1936227007	0.101	SO	NR	0.9	0.00017
1936227008	0.152	SO	NR	1.3	0.00025
1936227009	0.148	SO	SFR-B	1.0	0.00019
1936227010	0.149	SO	SFR-B	1.0	0.00019
1936227011	0.149	SO	SFR-B	1.0	0.00019
1936227012	0.150	SO	SFR-B	1.0	0.00019
1936227013	0.151	SO	SFR-B	1.0	0.00019
1936227014	0.151	SO	SFR-B	1.0	0.00019
1936227015	0.152	SO	SFR-B	1.0	0.00019
1936227016	0.151	SO	SFR-B	1.0	0.00019
1936227017	0.149	SO	SFR-B	1.0	0.00019
1936227024	1.242	SO	NR	10.1	0.00194
1936227025	0.230	SO	SFR-B	1.0	0.00019
1936227026	0.212	SO	SFR-B	1.0	0.00019
1936227028	0.359	SO	NR	2.8	0.00054
1936227029	1.839	SO	NR	15.7	0.00302
1936228001	0.619	SO	NR	5.1	0.00098
1936228002	0.187	SO	NR	1.7	0.00033
1936228003	0.126	SO	NR	1.1	0.00021
1936228004	0.177	SO	NR	1.6	0.00031
1936228005	0.490	SO	NR	4.2	0.00081
1936229001	0.152	SO	SFR-B	1.0	0.00019
1936229002	0.152	SO	SFR-B	1.0	0.00019
1936229003	0.163	SO	SFR-B	1.0	0.00019
1936229004	0.138	SO	SFR-B	1.0	0.00019
1936229006	0.138	SO	SFR-B	1.0	0.00019
1936229007	0.138	SO	SFR-B	1.0	0.00019
1936229008	0.138	SO	SFR-B	1.0	0.00019
1936229009	0.138	SO	SFR-B	1.0	0.00019
1936229010	0.138	SO	SFR-B	1.0	0.00019
1936229011	0.138	SO	SFR-B	1.0	0.00019
1936229012	0.152	SO	SFR-B	1.0	0.00019
1936229013	0.152	SO	SFR-B	1.0	0.00019
1936229014	0.163	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936229015	0.138	SO	SFR-B	1.0	0.00019
1936229016	0.138	SO	SFR-B	1.0	0.00019
1936229017	0.138	SO	SFR-B	1.0	0.00019
1936229018	0.138	SO	SFR-B	1.0	0.00019
1936229019	0.138	SO	SFR-B	1.0	0.00019
1936229020	0.138	SO	SFR-B	1.0	0.00019
1936229021	0.138	SO	SFR-B	1.0	0.00019
1936229022	0.138	SO	SFR-B	1.0	0.00019
1936229023	0.138	SO	SFR-B	1.0	0.00019
1936229024	0.210	SO	SFR-B	1.0	0.00019
1936229025	0.211	SO	SFR-B	1.0	0.00019
1936229026	0.212	SO	SFR-B	1.0	0.00019
1936229027	0.212	SO	SFR-B	1.0	0.00019
1936229028	0.138	SO	SFR-B	1.0	0.00019
1936229029	0.138	SO	SFR-B	1.0	0.00019
1936230003	0.867	SO	NR	7.8	0.00150
1936230004	0.537	SO	NR	4.4	0.00085
1936231001	0.165	SO	SFR-B	1.0	0.00019
1936231002	0.165	SO	SFR-B	1.0	0.00019
1936231003	0.165	SO	SFR-B	1.0	0.00019
1936231004	0.138	SO	SFR-B	1.0	0.00019
1936231006	0.138	SO	SFR-B	1.0	0.00019
1936231007	0.138	SO	SFR-B	1.0	0.00019
1936231008	0.138	SO	SFR-B	1.0	0.00019
1936231009	0.138	SO	SFR-B	1.0	0.00019
1936231010	0.138	SO	SFR-B	1.0	0.00019
1936231011	0.138	SO	SFR-B	1.0	0.00019
1936231012	0.214	SO	SFR-B	1.0	0.00019
1936231013	0.214	SO	SFR-B	1.0	0.00019
1936231014	0.165	SO	SFR-B	1.0	0.00019
1936231015	0.165	SO	SFR-B	1.0	0.00019
1936231016	0.165	SO	SFR-B	1.0	0.00019
1936231017	0.138	SO	SFR-B	1.0	0.00019
1936231018	0.138	SO	SFR-B	1.0	0.00019
1936231019	0.138	SO	SFR-B	1.0	0.00019
1936231021	0.138	SO	SFR-B	1.0	0.00019
1936231022	0.138	SO	SFR-B	1.0	0.00019
1936231023	0.138	SO	SFR-B	1.0	0.00019
1936231024	0.138	SO	SFR-B	1.0	0.00019
1936231025	0.183	SO	SFR-B	1.0	0.00019
1936231026	0.248	SO	SFR-B	1.0	0.00019
1936231027	0.154	SO	SFR-B	1.0	0.00019
1936231028	0.121	SO	SFR-A	0.7	0.00013
1936231029	0.138	SO	SFR-B	1.0	0.00019
1936231030	0.138	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936232001	0.350	SO	NR	3.1	0.00060
1936232005	0.478	SO	NR	4.3	0.00083
1936233001	0.165	SO	SFR-B	1.0	0.00019
1936233002	0.165	SO	SFR-B	1.0	0.00019
1936233003	0.165	SO	SFR-B	1.0	0.00019
1936233004	0.138	SO	SFR-B	1.0	0.00019
1936233005	0.138	SO	SFR-B	1.0	0.00019
1936233006	0.138	SO	SFR-B	1.0	0.00019
1936233007	0.138	SO	SFR-B	1.0	0.00019
1936233008	0.138	SO	SFR-B	1.0	0.00019
1936233009	0.138	SO	SFR-B	1.0	0.00019
1936233010	0.138	SO	SFR-B	1.0	0.00019
1936233011	0.138	SO	SFR-B	1.0	0.00019
1936233012	0.138	SO	SFR-B	1.0	0.00019
1936233013	0.138	SO	SFR-B	1.0	0.00019
1936233014	0.297	SO	MFR	2.0	0.00038
1936233021	1.066	SO	NR	8.7	0.00167
1936233022	1.314	SO	NR	10.8	0.00208
1936234002	0.169	SO	NR	1.5	0.00029
1936235003	0.286	SO	NR	2.6	0.00050
1936251015	0.109	SO	SFR-A	0.7	0.00013
1936251016	0.109	SO	SFR-A	0.7	0.00013
1936251019	0.138	SO	SFR-B	1.0	0.00019
1936251020	0.172	SO	SFR-B	1.0	0.00019
1936251021	0.214	SO	SFR-B	1.0	0.00019
1936251022	0.217	SO	SFR-B	1.0	0.00019
1936251023	0.147	SO	SFR-B	1.0	0.00019
1936251024	0.161	SO	SFR-B	1.0	0.00019
1936251028	8.999	SO	NR	24.8	0.00477
1936252001	0.185	SO	SFR-B	1.0	0.00019
1936252002	0.085	SO	SFR-A	0.7	0.00013
1936252003	0.128	SO	SFR-B	1.0	0.00019
1936252004	0.127	SO	SFR-B	1.0	0.00019
1936252005	0.126	SO	SFR-B	1.0	0.00019
1936252006	0.125	SO	SFR-A	0.7	0.00013
1936252007	0.124	SO	SFR-A	0.7	0.00013
1936252008	0.176	SO	SFR-B	1.0	0.00019
1936252009	0.164	SO	SFR-B	1.0	0.00019
1936252010	0.163	SO	SFR-B	1.0	0.00019
1936252011	0.144	SO	SFR-B	1.0	0.00019
1936252012	0.143	SO	SFR-B	1.0	0.00019
1936252013	0.145	SO	SFR-B	1.0	0.00019
1936252014	0.144	SO	SFR-B	1.0	0.00019
1936252016	0.091	SO	SFR-A	0.7	0.00013
1936252017	0.181	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936252024	0.176	SO	SFR-B	1.0	0.00019
1936252025	0.157	SO	SFR-B	1.0	0.00019
1936252026	0.234	SO	SFR-B	1.0	0.00019
1936252027	0.138	SO	SFR-B	1.0	0.00019
1936252028	0.152	SO	SFR-B	1.0	0.00019
1936252029	0.665	SO	MFR	4.8	0.00092
1936252030	0.259	SO	MFR	1.7	0.00033
1936252038	0.138	SO	SFR-B	1.0	0.00019
1936252042	0.126	SO	SFR-B	1.0	0.00019
1936252043	0.172	SO	SFR-B	1.0	0.00019
1936253001	0.138	SO	SFR-B	1.0	0.00019
1936253002	0.138	SO	NR	0.9	0.00017
1936253003	0.073	SO	NR	0.6	0.00012
1936253004	0.138	SO	SFR-B	1.0	0.00019
1936253005	0.138	SO	SFR-B	1.0	0.00019
1936253006	0.138	SO	SFR-B	1.0	0.00019
1936253007	0.138	SO	SFR-B	1.0	0.00019
1936253008	0.138	SO	SFR-B	1.0	0.00019
1936253009	0.138	SO	SFR-B	1.0	0.00019
1936253010	0.138	SO	SFR-B	1.0	0.00019
1936253011	0.138	SO	SFR-B	1.0	0.00019
1936253012	0.138	SO	SFR-B	1.0	0.00019
1936253013	0.138	SO	SFR-B	1.0	0.00019
1936253014	0.138	SO	SFR-B	1.0	0.00019
1936253015	0.138	SO	SFR-B	1.0	0.00019
1936253016	0.138	SO	SFR-B	1.0	0.00019
1936253025	0.132	SO	NR	1.0	0.00019
1936253026	0.132	SO	NR	1.1	0.00021
1936253028	0.396	SO	NR	3.5	0.00067
1936253029	0.264	SO	NR	2.4	0.00046
1936253030	0.191	SO	NR	1.7	0.00033
1936253034	0.396	SO	NR	3.6	0.00069
1936253035	0.396	SO	NR	3.6	0.00069
1936254001	0.173	SO	SFR-B	1.0	0.00019
1936254002	0.164	SO	SFR-B	1.0	0.00019
1936254003	0.164	SO	SFR-B	1.0	0.00019
1936254004	0.163	SO	SFR-B	1.0	0.00019
1936254005	0.163	SO	SFR-B	1.0	0.00019
1936254006	0.163	SO	SFR-B	1.0	0.00019
1936254008	0.124	SO	SFR-A	0.7	0.00013
1936254009	0.142	SO	SFR-B	1.0	0.00019
1936254010	0.139	SO	SFR-B	1.0	0.00019
1936254011	0.139	SO	SFR-B	1.0	0.00019
1936254012	0.136	SO	SFR-B	1.0	0.00019
1936254013	0.159	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936254014	0.122	SO	SFR-A	0.7	0.00013
1936254015	0.123	SO	SFR-A	0.7	0.00013
1936254016	0.124	SO	SFR-A	0.7	0.00013
1936254017	0.139	SO	SFR-B	1.0	0.00019
1936254018	0.126	SO	SFR-B	1.0	0.00019
1936254019	0.125	SO	SFR-A	0.7	0.00013
1936255001	0.127	SO	SFR-B	1.0	0.00019
1936255002	0.110	SO	SFR-A	0.7	0.00013
1936255003	0.109	SO	SFR-A	0.7	0.00013
1936255004	0.097	SO	SFR-A	0.7	0.00013
1936255005	0.097	SO	SFR-A	0.7	0.00013
1936255006	0.102	SO	SFR-A	0.7	0.00013
1936255007	0.097	SO	SFR-A	0.7	0.00013
1936255008	0.096	SO	SFR-A	0.7	0.00013
1936255009	0.133	SO	SFR-B	1.0	0.00019
1936255010	0.130	SO	SFR-B	1.0	0.00019
1936255011	0.130	SO	SFR-B	1.0	0.00019
1936255012	0.130	SO	SFR-B	1.0	0.00019
1936255013	0.117	SO	SFR-A	0.7	0.00013
1936255014	0.102	SO	SFR-A	0.7	0.00013
1936255015	0.102	SO	SFR-A	0.7	0.00013
1936255016	0.164	SO	SFR-B	1.0	0.00019
1936255017	0.140	SO	SFR-B	1.0	0.00019
1936255018	0.193	SO	SFR-B	1.0	0.00019
1936255020	0.161	SO	SFR-B	1.0	0.00019
1936255021	0.142	SO	SFR-B	1.0	0.00019
1936255022	0.117	SO	SFR-A	0.7	0.00013
1936255023	0.116	SO	SFR-A	0.7	0.00013
1936255024	0.116	SO	SFR-A	0.7	0.00013
1936255025	0.094	SO	SFR-A	0.7	0.00013
1936255026	0.094	SO	SFR-A	0.7	0.00013
1936255027	0.094	SO	SFR-A	0.7	0.00013
1936255028	0.094	SO	SFR-A	0.7	0.00013
1936255031	0.095	SO	SFR-A	0.7	0.00013
1936255032	0.095	SO	SFR-A	0.7	0.00013
1936255033	0.095	SO	SFR-A	0.7	0.00013
1936255034	0.095	SO	SFR-A	0.7	0.00013
1936255036	0.094	SO	SFR-A	0.7	0.00013
1936255037	0.095	SO	SFR-A	0.7	0.00013
1936256001	0.176	SO	SFR-B	1.0	0.00019
1936256002	0.103	SO	SFR-A	0.7	0.00013
1936256003	0.140	SO	SFR-B	1.0	0.00019
1936256004	0.156	SO	SFR-B	1.0	0.00019
1936256005	0.124	SO	SFR-A	0.7	0.00013
1936256006	0.144	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936256007	0.230	SO	SFR-B	1.0	0.00019
1936256008	0.136	SO	SFR-B	1.0	0.00019
1936256009	0.144	SO	SFR-B	1.0	0.00019
1936256010	0.141	SO	SFR-B	1.0	0.00019
1936256011	0.144	SO	SFR-B	1.0	0.00019
1936256012	0.142	SO	SFR-B	1.0	0.00019
1936256013	0.146	SO	SFR-B	1.0	0.00019
1936256016	0.185	SO	SFR-B	1.0	0.00019
1936256018	0.281	SO	MFR	2.2	0.00042
1936257002	0.088	SO	SFR-A	0.7	0.00013
1936257003	0.107	SO	SFR-A	0.7	0.00013
1936257004	0.097	SO	SFR-A	0.7	0.00013
1936257006	0.118	SO	SFR-A	0.7	0.00013
1936257007	0.113	SO	SFR-A	0.7	0.00013
1936257008	0.112	SO	SFR-A	0.7	0.00013
1936257009	0.115	SO	SFR-A	0.7	0.00013
1936257010	0.139	SO	SFR-B	1.0	0.00019
1936257011	0.126	SO	SFR-B	1.0	0.00019
1936257013	0.137	SO	SFR-B	1.0	0.00019
1936257018	0.193	SO	SFR-B	1.0	0.00019
1936257019	0.110	SO	SFR-A	0.7	0.00013
1936257020	0.109	SO	SFR-A	0.7	0.00013
1936257021	0.094	SO	SFR-A	0.7	0.00013
1936257022	0.094	SO	SFR-A	0.7	0.00013
1936257023	0.106	SO	SFR-A	0.7	0.00013
1936257024	0.095	SO	SFR-A	0.7	0.00013
1936257025	0.095	SO	SFR-A	0.7	0.00013
1936257026	0.099	SO	SFR-A	0.7	0.00013
1936257030	0.203	SO	SFR-B	1.0	0.00019
1936257041	0.883	SO	MFR	6.1	0.00117
1936257045	0.401	SO	MFR	3.0	0.00058
1936257046	0.108	SO	SFR-A	0.7	0.00013
1936257047	0.168	SO	SFR-B	1.0	0.00019
1936257049	0.715	SO	MFR	4.0	0.00077
1936257058	0.244	SO	MFR	1.9	0.00037
1936257062	0.112	SO	SFR-A	0.7	0.00013
1936257063	0.111	SO	SFR-A	0.7	0.00013
1936257064	0.111	SO	SFR-A	0.7	0.00013
1936278001	0.120	SO	SFR-A	0.7	0.00013
1936278002	0.116	SO	SFR-A	0.7	0.00013
1936278003	0.062	SO	SFR-A	0.7	0.00013
1936278004	0.127	SO	SFR-B	1.0	0.00019
1936278005	0.131	SO	SFR-B	1.0	0.00019
1936278006	0.131	SO	SFR-B	1.0	0.00019
1936278007	0.131	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936278008	0.131	SO	SFR-B	1.0	0.00019
1936278009	0.131	SO	SFR-B	1.0	0.00019
1936278010	0.131	SO	SFR-B	1.0	0.00019
1936278011	0.134	SO	SFR-B	1.0	0.00019
1936278012	0.159	SO	NR	1.4	0.00027
1936278013	0.118	SO	NR	1.1	0.00021
1936278014	0.118	SO	NR	1.1	0.00021
1936278017	0.390	SO	NR	3.5	0.00067
1936278018	0.440	SO	NR	4.0	0.00077
1936279002	0.391	SO	NR	3.4	0.00065
1936279003	0.478	SO	NR	4.3	0.00083
1936279004	0.105	SO	NR	1.0	0.00019
1936279005	0.210	SO	NR	1.9	0.00037
1936279008	0.554	SO	NR	4.9	0.00094
1936280002	0.097	SO	NR	0.9	0.00017
1936281003	0.282	SO	NR	2.5	0.00048
1936281004	0.134	SO	NR	1.2	0.00023
1936281005	0.130	SO	NR	1.2	0.00023
1936281017	0.422	SO	NR	3.8	0.00073
1936281022	0.575	SO	NR	5.2	0.00100
1936281028	0.300	SO	NR	2.6	0.00050
1936281029	0.767	SO	NR	6.7	0.00129
1936281030	0.419	SO	NR	3.8	0.00073
1936281031	0.676	SO	NR	5.2	0.00100
1936282005	1.672	SO	NR	14.8	0.00285
1936282006	1.852	SO	NR	14.8	0.00285
1936282007	0.255	SO	NR	2.0	0.00038
1936283009	0.610	SO	NR	5.5	0.00106
1936283014	0.378	SO	NR	3.4	0.00065
1936283016	0.636	SO	NR	5.5	0.00106
1936283019	0.129	SO	NR	1.2	0.00023
1936283020	0.128	SO	NR	1.2	0.00023
1936283021	0.278	SO	NR	2.5	0.00048
1936283022	0.265	SO	NR	2.4	0.00046
1936283024	1.393	SO	NR	10.4	0.00200
1936283025	0.260	SO	NR	2.4	0.00046
1936284001	0.078	SO	NR	0.7	0.00013
1936284002	0.043	SO	NR	0.4	0.00008
1936284009	0.368	SO	NR	3.1	0.00060
1936284010	0.252	SO	NR	0.9	0.00017
1936285001	1.307	SO	NR	11.3	0.00217
1936285002	0.131	SO	NR	1.2	0.00023
1936285006	0.135	SO	NR	1.2	0.00023
1936285007	0.134	SO	NR	1.2	0.00023
1936285008	0.264	SO	NR	2.4	0.00046

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936285009	0.264	SO	NR	2.4	0.00046
1936285010	0.132	SO	NR	1.2	0.00023
1936285012	0.120	SO	NR	1.1	0.00021
1936285013	0.359	SO	NR	3.3	0.00063
1936401001	0.220	SO	SFR-B	1.0	0.00019
1936401002	0.147	SO	SFR-B	1.0	0.00019
1936401003	0.147	SO	SFR-B	1.0	0.00019
1936401004	0.147	SO	SFR-B	1.0	0.00019
1936401005	0.163	SO	SFR-B	1.0	0.00019
1936401022	0.124	SO	SFR-A	0.7	0.00013
1936401023	0.145	SO	SFR-B	1.0	0.00019
1936401024	0.146	SO	SFR-B	1.0	0.00019
1936401025	0.147	SO	SFR-B	1.0	0.00019
1936401026	0.148	SO	SFR-B	1.0	0.00019
1936401027	0.149	SO	SFR-B	1.0	0.00019
1936401028	0.150	SO	SFR-B	1.0	0.00019
1936401029	0.152	SO	SFR-B	1.0	0.00019
1936401030	0.153	SO	SFR-B	1.0	0.00019
1936401031	0.154	SO	SFR-B	1.0	0.00019
1936401032	0.155	SO	SFR-B	1.0	0.00019
1936401033	0.156	SO	SFR-B	1.0	0.00019
1936401034	0.157	SO	SFR-B	1.0	0.00019
1936401035	0.158	SO	SFR-B	1.0	0.00019
1936401036	0.159	SO	SFR-B	1.0	0.00019
1936401038	0.317	SO	SFR-C	1.6	0.00031
1936401051	0.160	SO	SFR-B	1.0	0.00019
1936401052	0.161	SO	SFR-B	1.0	0.00019
1936402001	0.367	SO	SFR-C	1.6	0.00031
1936402002	0.234	SO	SFR-B	1.0	0.00019
1936402003	0.130	SO	SFR-B	1.0	0.00019
1936402004	0.194	SO	SFR-B	1.0	0.00019
1936402005	0.143	SO	SFR-B	1.0	0.00019
1936402006	0.146	SO	SFR-B	1.0	0.00019
1936402007	0.162	SO	SFR-B	1.0	0.00019
1936402008	0.163	SO	SFR-B	1.0	0.00019
1936402009	0.167	SO	SFR-B	1.0	0.00019
1936402010	0.162	SO	SFR-B	1.0	0.00019
1936402011	0.170	SO	SFR-B	1.0	0.00019
1936402012	0.162	SO	SFR-B	1.0	0.00019
1936402013	0.167	SO	SFR-B	1.0	0.00019
1936402014	0.169	SO	SFR-B	1.0	0.00019
1936402015	0.164	SO	SFR-B	1.0	0.00019
1936402016	0.168	SO	SFR-B	1.0	0.00019
1936402017	0.165	SO	SFR-B	1.0	0.00019
1936402018	0.167	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936402019	0.170	SO	SFR-B	1.0	0.00019
1936402023	0.144	SO	SFR-B	1.0	0.00019
1936402024	0.145	SO	SFR-B	1.0	0.00019
1936402025	0.136	SO	SFR-B	1.0	0.00019
1936402026	0.134	SO	SFR-B	1.0	0.00019
1936402027	0.157	SO	SFR-B	1.0	0.00019
1936402028	0.156	SO	SFR-B	1.0	0.00019
1936402029	0.160	SO	SFR-B	1.0	0.00019
1936402030	0.158	SO	SFR-B	1.0	0.00019
1936402031	0.161	SO	SFR-B	1.0	0.00019
1936402032	0.160	SO	SFR-B	1.0	0.00019
1936402033	0.166	SO	SFR-B	1.0	0.00019
1936402034	0.164	SO	SFR-B	1.0	0.00019
1936402035	0.159	SO	SFR-B	1.0	0.00019
1936402036	0.165	SO	SFR-B	1.0	0.00019
1936402037	0.160	SO	SFR-B	1.0	0.00019
1936402038	0.166	SO	SFR-B	1.0	0.00019
1936402039	0.167	SO	SFR-B	1.0	0.00019
1936402049	0.903	SO	NR	6.5	0.00125
1936403003	0.118	SO	NR	1.0	0.00019
1936403004	0.122	SO	NR	1.0	0.00019
1936403011	0.234	SO	NR	1.8	0.00035
1936403013	0.137	SO	NR	1.2	0.00023
1936403016	5.984	SO	NR	14.4	0.00277
1936403017	0.150	SO	SFR-B	1.0	0.00019
1936403018	0.141	SO	SFR-B	1.0	0.00019
1936403019	0.141	SO	SFR-B	1.0	0.00019
1936403020	0.133	SO	SFR-B	1.0	0.00019
1936403021	0.133	SO	SFR-B	1.0	0.00019
1936403022	0.183	SO	SFR-B	1.0	0.00019
1936403023	0.189	SO	SFR-B	1.0	0.00019
1936403024	0.141	SO	SFR-B	1.0	0.00019
1936403025	0.141	SO	SFR-B	1.0	0.00019
1936403026	0.150	SO	SFR-B	1.0	0.00019
1936403027	0.150	SO	SFR-B	1.0	0.00019
1936403028	0.150	SO	SFR-B	1.0	0.00019
1936403029	0.350	SO	NR	3.1	0.00060
1936403030	0.169	SO	NR	1.5	0.00029
1936403031	0.489	SO	NR	4.3	0.00083
1936403032	1.515	SO	NR	12.3	0.00236
1936404001	0.113	SO	SFR-A	0.7	0.00013
1936404002	0.111	SO	SFR-A	0.7	0.00013
1936404003	0.110	SO	SFR-A	0.7	0.00013
1936404004	0.110	SO	SFR-A	0.7	0.00013
1936404005	0.109	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936404006	0.109	SO	SFR-A	0.7	0.00013
1936404007	0.109	SO	SFR-A	0.7	0.00013
1936404008	0.108	SO	SFR-A	0.7	0.00013
1936404009	0.108	SO	SFR-A	0.7	0.00013
1936404010	0.107	SO	SFR-A	0.7	0.00013
1936404011	0.107	SO	SFR-A	0.7	0.00013
1936404012	0.107	SO	SFR-A	0.7	0.00013
1936426002	0.115	SO	SFR-A	0.7	0.00013
1936426003	0.115	SO	SFR-A	0.7	0.00013
1936426004	0.114	SO	SFR-A	0.7	0.00013
1936426005	0.114	SO	SFR-A	0.7	0.00013
1936426006	0.114	SO	SFR-A	0.7	0.00013
1936426007	0.114	SO	SFR-A	0.7	0.00013
1936426008	0.114	SO	SFR-A	0.7	0.00013
1936426009	0.113	SO	SFR-A	0.7	0.00013
1936426010	0.113	SO	SFR-A	0.7	0.00013
1936426011	0.113	SO	SFR-A	0.7	0.00013
1936426012	0.113	SO	SFR-A	0.7	0.00013
1936426013	0.113	SO	SFR-A	0.7	0.00013
1936426014	0.112	SO	SFR-A	0.7	0.00013
1936426015	0.112	SO	SFR-A	0.7	0.00013
1936426016	0.189	SO	NR	1.7	0.00033
1936426017	0.114	SO	SFR-A	0.7	0.00013
1936426021	0.110	SO	SFR-A	0.7	0.00013
1936426022	0.110	SO	SFR-A	0.7	0.00013
1936426023	0.110	SO	SFR-A	0.7	0.00013
1936426024	0.110	SO	SFR-A	0.7	0.00013
1936426025	0.110	SO	SFR-A	0.7	0.00013
1936426026	0.110	SO	SFR-A	0.7	0.00013
1936426027	0.110	SO	SFR-A	0.7	0.00013
1936426028	0.110	SO	SFR-A	0.7	0.00013
1936426029	0.110	SO	SFR-A	0.7	0.00013
1936426030	0.110	SO	SFR-A	0.7	0.00013
1936426031	0.110	SO	SFR-A	0.7	0.00013
1936426032	0.110	SO	SFR-A	0.7	0.00013
1936426033	0.110	SO	SFR-A	0.7	0.00013
1936426034	0.095	SO	SFR-A	0.7	0.00013
1936426035	0.090	SO	SFR-A	0.7	0.00013
1936426038	0.073	SO	NR	0.7	0.00013
1936426039	0.037	SO	NR	0.3	0.00006
1936426042	0.183	SO	NR	1.7	0.00033
1936426044	0.082	SO	NR	0.7	0.00013
1936426046	0.156	SO	NR	1.4	0.00027
1936426047	0.110	SO	SFR-A	0.7	0.00013
1936426048	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936426049	0.110	SO	SFR-A	0.7	0.00013
1936426050	0.128	SO	SFR-B	1.0	0.00019
1936427001	0.428	SO	NR	3.7	0.00071
1936428001	0.123	SO	SFR-A	0.7	0.00013
1936428002	0.110	SO	SFR-A	0.7	0.00013
1936428003	0.110	SO	SFR-A	0.7	0.00013
1936428004	0.110	SO	SFR-A	0.7	0.00013
1936428005	0.110	SO	SFR-A	0.7	0.00013
1936428006	0.110	SO	SFR-A	0.7	0.00013
1936428007	0.110	SO	SFR-A	0.7	0.00013
1936428008	0.110	SO	SFR-A	0.7	0.00013
1936428009	0.110	SO	SFR-A	0.7	0.00013
1936428010	0.110	SO	SFR-A	0.7	0.00013
1936428011	0.110	SO	SFR-A	0.7	0.00013
1936428012	0.110	SO	SFR-A	0.7	0.00013
1936428013	0.110	SO	SFR-A	0.7	0.00013
1936428014	0.110	SO	SFR-A	0.7	0.00013
1936428015	0.110	SO	SFR-A	0.7	0.00013
1936428016	0.110	SO	SFR-A	0.7	0.00013
1936428017	0.110	SO	SFR-A	0.7	0.00013
1936428018	0.110	SO	SFR-A	0.7	0.00013
1936428019	0.110	SO	SFR-A	0.7	0.00013
1936428020	0.096	SO	SFR-A	0.7	0.00013
1936428021	0.157	SO	NR	1.4	0.00027
1936428022	0.114	SO	SFR-A	0.7	0.00013
1936428023	0.110	SO	SFR-A	0.7	0.00013
1936428028	0.110	SO	SFR-A	0.7	0.00013
1936428029	0.110	SO	SFR-A	0.7	0.00013
1936428032	0.110	SO	SFR-A	0.7	0.00013
1936428033	0.110	SO	SFR-A	0.7	0.00013
1936428034	0.110	SO	SFR-A	0.7	0.00013
1936428035	0.110	SO	SFR-A	0.7	0.00013
1936428036	0.110	SO	SFR-A	0.7	0.00013
1936428037	0.110	SO	SFR-A	0.7	0.00013
1936428038	0.110	SO	SFR-A	0.7	0.00013
1936428039	0.110	SO	SFR-A	0.7	0.00013
1936428040	0.110	SO	SFR-A	0.7	0.00013
1936428041	0.110	SO	SFR-A	0.7	0.00013
1936428042	0.110	SO	SFR-A	0.7	0.00013
1936428043	0.110	SO	SFR-A	0.7	0.00013
1936428044	0.141	SO	NR	1.0	0.00019
1936428047	0.074	SO	NR	0.7	0.00013
1936428053	0.074	SO	NR	0.7	0.00013
1936428054	0.191	SO	NR	1.7	0.00033
1936428055	0.191	SO	NR	1.7	0.00033

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936428056	0.220	SO	SFR-B	1.0	0.00019
1936428058	0.110	SO	SFR-A	0.7	0.00013
1936428059	0.110	SO	SFR-A	0.7	0.00013
1936428060	0.110	SO	SFR-A	0.7	0.00013
1936428061	0.110	SO	SFR-A	0.7	0.00013
1936429001	0.123	SO	SFR-A	0.7	0.00013
1936429002	0.110	SO	SFR-A	0.7	0.00013
1936429003	0.110	SO	SFR-A	0.7	0.00013
1936429004	0.110	SO	SFR-A	0.7	0.00013
1936429007	0.110	SO	SFR-A	0.7	0.00013
1936429008	0.110	SO	SFR-A	0.7	0.00013
1936429009	0.110	SO	SFR-A	0.7	0.00013
1936429010	0.110	SO	SFR-A	0.7	0.00013
1936429011	0.110	SO	SFR-A	0.7	0.00013
1936429012	0.110	SO	SFR-A	0.7	0.00013
1936429013	0.110	SO	SFR-A	0.7	0.00013
1936429014	0.110	SO	SFR-A	0.7	0.00013
1936429015	0.110	SO	SFR-A	0.7	0.00013
1936429016	0.110	SO	SFR-A	0.7	0.00013
1936429017	0.110	SO	SFR-A	0.7	0.00013
1936429018	0.110	SO	SFR-A	0.7	0.00013
1936429019	0.110	SO	SFR-A	0.7	0.00013
1936429020	0.110	SO	SFR-A	0.7	0.00013
1936429024	0.209	SO	NR	1.8	0.00035
1936429025	0.114	SO	SFR-A	0.7	0.00013
1936429026	0.110	SO	SFR-A	0.7	0.00013
1936429027	0.110	SO	SFR-A	0.7	0.00013
1936429028	0.110	SO	SFR-A	0.7	0.00013
1936429029	0.110	SO	SFR-A	0.7	0.00013
1936429030	0.110	SO	SFR-A	0.7	0.00013
1936429031	0.110	SO	SFR-A	0.7	0.00013
1936429032	0.110	SO	SFR-A	0.7	0.00013
1936429033	0.110	SO	SFR-A	0.7	0.00013
1936429034	0.110	SO	SFR-A	0.7	0.00013
1936429035	0.110	SO	SFR-A	0.7	0.00013
1936429036	0.110	SO	SFR-A	0.7	0.00013
1936429037	0.110	SO	SFR-A	0.7	0.00013
1936429038	0.110	SO	SFR-A	0.7	0.00013
1936429039	0.110	SO	SFR-A	0.7	0.00013
1936429040	0.110	SO	SFR-A	0.7	0.00013
1936429041	0.110	SO	SFR-A	0.7	0.00013
1936429042	0.110	SO	SFR-A	0.7	0.00013
1936429043	0.110	SO	SFR-A	0.7	0.00013
1936429044	0.110	SO	SFR-A	0.7	0.00013
1936429045	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936429046	0.110	SO	SFR-A	0.7	0.00013
1936429049	0.110	SO	SFR-A	0.7	0.00013
1936429050	0.110	SO	SFR-A	0.7	0.00013
1936429051	0.207	SO	NR	1.9	0.00037
1936429052	0.081	SO	NR	0.7	0.00013
1936429053	0.037	SO	NR	0.3	0.00006
1936429059	0.220	SO	SFR-B	1.0	0.00019
1936429060	0.265	SO	NR	2.4	0.00046
1936429062	0.147	SO	NR	1.3	0.00025
1936429064	0.110	SO	SFR-A	0.7	0.00013
1936429065	0.110	SO	SFR-A	0.7	0.00013
1936429068	0.110	SO	SFR-A	0.7	0.00013
1936429069	0.110	SO	SFR-A	0.7	0.00013
1936429070	0.220	SO	SFR-B	1.0	0.00019
1936430005	0.110	SO	SFR-A	0.7	0.00013
1936430006	0.110	SO	SFR-A	0.7	0.00013
1936430013	0.110	SO	SFR-A	0.7	0.00013
1936430014	0.110	SO	SFR-A	0.7	0.00013
1936430015	0.110	SO	SFR-A	0.7	0.00013
1936430016	0.110	SO	SFR-A	0.7	0.00013
1936430017	0.110	SO	SFR-A	0.7	0.00013
1936430018	0.110	SO	SFR-A	0.7	0.00013
1936430019	0.110	SO	SFR-A	0.7	0.00013
1936430020	0.110	SO	SFR-A	0.7	0.00013
1936430021	0.110	SO	SFR-A	0.7	0.00013
1936430022	0.110	SO	SFR-A	0.7	0.00013
1936430023	0.110	SO	SFR-A	0.7	0.00013
1936430024	0.110	SO	SFR-A	0.7	0.00013
1936430025	0.110	SO	SFR-A	0.7	0.00013
1936430026	0.110	SO	SFR-A	0.7	0.00013
1936430027	0.108	SO	SFR-A	0.7	0.00013
1936430028	0.110	SO	SFR-A	0.7	0.00013
1936430029	0.110	SO	SFR-A	0.7	0.00013
1936430030	0.110	SO	SFR-A	0.7	0.00013
1936430031	0.110	SO	SFR-A	0.7	0.00013
1936430032	0.110	SO	SFR-A	0.7	0.00013
1936430033	0.110	SO	SFR-A	0.7	0.00013
1936430034	0.110	SO	SFR-A	0.7	0.00013
1936430035	0.110	SO	SFR-A	0.7	0.00013
1936430036	0.110	SO	SFR-A	0.7	0.00013
1936430037	0.110	SO	SFR-A	0.7	0.00013
1936430038	0.110	SO	SFR-A	0.7	0.00013
1936430039	0.110	SO	SFR-A	0.7	0.00013
1936430040	0.110	SO	SFR-A	0.7	0.00013
1936430041	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936430042	0.110	SO	SFR-A	0.7	0.00013
1936430043	0.110	SO	SFR-A	0.7	0.00013
1936430044	0.165	SO	SFR-B	1.0	0.00019
1936430045	0.165	SO	SFR-B	1.0	0.00019
1936430046	0.110	SO	SFR-A	0.7	0.00013
1936430047	0.110	SO	SFR-A	0.7	0.00013
1936430048	0.110	SO	SFR-A	0.7	0.00013
1936430049	0.110	SO	SFR-A	0.7	0.00013
1936430050	0.110	SO	SFR-A	0.7	0.00013
1936430052	0.165	SO	SFR-B	1.0	0.00019
1936430053	0.165	SO	SFR-B	1.0	0.00019
1936430055	0.116	SO	SFR-A	0.7	0.00013
1936430056	0.110	SO	SFR-A	0.7	0.00013
1936430057	0.110	SO	SFR-A	0.7	0.00013
1936430058	0.110	SO	SFR-A	0.7	0.00013
1936430059	0.220	SO	SFR-B	1.0	0.00019
1936431001	0.110	SO	SFR-A	0.7	0.00013
1936431002	0.110	SO	SFR-A	0.7	0.00013
1936431003	0.254	SO	NR	2.1	0.00040
1936431004	0.110	SO	SFR-A	0.7	0.00013
1936431005	0.110	SO	SFR-A	0.7	0.00013
1936431006	0.110	SO	SFR-A	0.7	0.00013
1936432001	0.159	SO	SFR-B	1.0	0.00019
1936432002	0.157	SO	SFR-B	1.0	0.00019
1936432003	0.110	SO	SFR-A	0.7	0.00013
1936432004	0.110	SO	SFR-A	0.7	0.00013
1936432005	0.110	SO	SFR-A	0.7	0.00013
1936432006	0.110	SO	SFR-A	0.7	0.00013
1936432007	0.110	SO	SFR-A	0.7	0.00013
1936432008	0.110	SO	SFR-A	0.7	0.00013
1936432009	0.110	SO	SFR-A	0.7	0.00013
1936432010	0.110	SO	SFR-A	0.7	0.00013
1936432011	0.110	SO	SFR-A	0.7	0.00013
1936432012	0.110	SO	SFR-A	0.7	0.00013
1936432013	0.110	SO	SFR-A	0.7	0.00013
1936432014	0.110	SO	SFR-A	0.7	0.00013
1936432015	0.110	SO	SFR-A	0.7	0.00013
1936432016	0.110	SO	SFR-A	0.7	0.00013
1936432017	0.110	SO	SFR-A	0.7	0.00013
1936432018	0.110	SO	SFR-A	0.7	0.00013
1936432019	0.110	SO	SFR-A	0.7	0.00013
1936432020	0.110	SO	SFR-A	0.7	0.00013
1936432021	0.110	SO	SFR-A	0.7	0.00013
1936432022	0.110	SO	SFR-A	0.7	0.00013
1936432023	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936432024	0.110	SO	SFR-A	0.7	0.00013
1936432029	0.110	SO	SFR-A	0.7	0.00013
1936432030	0.110	SO	SFR-A	0.7	0.00013
1936432031	0.110	SO	SFR-A	0.7	0.00013
1936432034	0.110	SO	SFR-A	0.7	0.00013
1936432037	0.110	SO	SFR-A	0.7	0.00013
1936432038	0.110	SO	SFR-A	0.7	0.00013
1936432040	0.110	SO	SFR-A	0.7	0.00013
1936432041	0.110	SO	SFR-A	0.7	0.00013
1936432042	0.110	SO	SFR-A	0.7	0.00013
1936432043	0.110	SO	SFR-A	0.7	0.00013
1936432044	0.220	SO	SFR-B	1.0	0.00019
1936432045	0.110	SO	SFR-A	0.7	0.00013
1936432046	0.110	SO	SFR-A	0.7	0.00013
1936432047	0.110	SO	SFR-A	0.7	0.00013
1936432048	0.197	SO	SFR-B	1.0	0.00019
1936432052	0.110	SO	SFR-A	0.7	0.00013
1936432053	0.110	SO	SFR-A	0.7	0.00013
1936432054	0.110	SO	SFR-A	0.7	0.00013
1936432055	0.110	SO	SFR-A	0.7	0.00013
1936432056	0.110	SO	SFR-A	0.7	0.00013
1936432057	0.110	SO	SFR-A	0.7	0.00013
1936432058	0.110	SO	SFR-A	0.7	0.00013
1936432059	0.110	SO	SFR-A	0.7	0.00013
1936433001	0.110	SO	SFR-A	0.7	0.00013
1936433002	0.110	SO	SFR-A	0.7	0.00013
1936433003	0.110	SO	SFR-A	0.7	0.00013
1936433004	0.110	SO	SFR-A	0.7	0.00013
1936433005	0.110	SO	SFR-A	0.7	0.00013
1936433006	0.110	SO	SFR-A	0.7	0.00013
1936476003	0.110	SO	SFR-A	0.7	0.00013
1936476004	0.110	SO	SFR-A	0.7	0.00013
1936476005	0.110	SO	SFR-A	0.7	0.00013
1936476006	0.110	SO	SFR-A	0.7	0.00013
1936476007	0.110	SO	SFR-A	0.7	0.00013
1936476008	0.110	SO	SFR-A	0.7	0.00013
1936476009	0.110	SO	SFR-A	0.7	0.00013
1936476010	0.110	SO	SFR-A	0.7	0.00013
1936476011	0.110	SO	SFR-A	0.7	0.00013
1936476012	0.110	SO	SFR-A	0.7	0.00013
1936476013	0.110	SO	SFR-A	0.7	0.00013
1936476014	0.110	SO	SFR-A	0.7	0.00013
1936476015	0.110	SO	SFR-A	0.7	0.00013
1936476016	0.110	SO	SFR-A	0.7	0.00013
1936476017	0.142	SO	SFR-B	1.0	0.00019

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936476018	0.145	SO	SFR-B	1.0	0.00019
1936476019	0.110	SO	SFR-A	0.7	0.00013
1936476020	0.110	SO	SFR-A	0.7	0.00013
1936476021	0.110	SO	SFR-A	0.7	0.00013
1936476022	0.110	SO	SFR-A	0.7	0.00013
1936476023	0.110	SO	SFR-A	0.7	0.00013
1936476024	0.110	SO	SFR-A	0.7	0.00013
1936476025	0.110	SO	SFR-A	0.7	0.00013
1936476026	0.110	SO	SFR-A	0.7	0.00013
1936476030	0.110	SO	SFR-A	0.7	0.00013
1936476031	1.782	SO	NR	3.0	0.00058
1936476032	0.110	SO	SFR-A	0.7	0.00013
1936476033	0.110	SO	SFR-A	0.7	0.00013
1936476035	0.185	SO	SFR-B	1.0	0.00019
1936476036	0.110	SO	SFR-A	0.7	0.00013
1936476037	0.110	SO	SFR-A	0.7	0.00013
1936477001	0.110	SO	SFR-A	0.7	0.00013
1936477002	0.110	SO	SFR-A	0.7	0.00013
1936477003	0.110	SO	SFR-A	0.7	0.00013
1936477004	0.110	SO	SFR-A	0.7	0.00013
1936477008	0.165	SO	SFR-B	1.0	0.00019
1936478003	0.110	SO	SFR-A	0.7	0.00013
1936478004	0.110	SO	SFR-A	0.7	0.00013
1936478007	0.165	SO	SFR-B	1.0	0.00019
1936478008	0.110	SO	SFR-A	0.7	0.00013
1936478009	0.165	SO	SFR-B	1.0	0.00019
1936478010	0.165	SO	SFR-B	1.0	0.00019
1936478013	0.110	SO	SFR-A	0.7	0.00013
1936478014	0.110	SO	SFR-A	0.7	0.00013
1936478015	0.110	SO	SFR-A	0.7	0.00013
1936478016	0.110	SO	SFR-A	0.7	0.00013
1936478019	0.110	SO	SFR-A	0.7	0.00013
1936478020	0.110	SO	SFR-A	0.7	0.00013
1936478022	0.156	SO	SFR-B	1.0	0.00019
1936478023	0.110	SO	SFR-A	0.7	0.00013
1936478024	0.110	SO	SFR-A	0.7	0.00013
1936478027	0.110	SO	SFR-A	0.7	0.00013
1936478030	0.110	SO	SFR-A	0.7	0.00013
1936478031	0.110	SO	SFR-A	0.7	0.00013
1936478032	0.110	SO	SFR-A	0.7	0.00013
1936478033	0.110	SO	SFR-A	0.7	0.00013
1936478034	0.110	SO	SFR-A	0.7	0.00013
1936478035	0.110	SO	SFR-A	0.7	0.00013
1936478036	0.110	SO	SFR-A	0.7	0.00013
1936478037	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936478038	0.110	SO	SFR-A	0.7	0.00013
1936478039	0.110	SO	SFR-A	0.7	0.00013
1936478040	0.110	SO	SFR-A	0.7	0.00013
1936478041	0.110	SO	SFR-A	0.7	0.00013
1936478042	0.110	SO	SFR-A	0.7	0.00013
1936478043	0.110	SO	SFR-A	0.7	0.00013
1936478046	0.137	SO	SFR-B	1.0	0.00019
1936478047	0.138	SO	SFR-B	1.0	0.00019
1936478051	0.110	SO	SFR-A	0.7	0.00013
1936478052	0.165	SO	SFR-B	1.0	0.00019
1936478056	0.110	SO	SFR-A	0.7	0.00013
1936478057	0.110	SO	SFR-A	0.7	0.00013
1936478058	0.110	SO	SFR-A	0.7	0.00013
1936478059	0.110	SO	SFR-A	0.7	0.00013
1936478060	0.110	SO	SFR-A	0.7	0.00013
1936478061	0.110	SO	SFR-A	0.7	0.00013
1936478062	0.110	SO	SFR-A	0.7	0.00013
1936478063	0.110	SO	SFR-A	0.7	0.00013
1936478064	0.110	SO	SFR-A	0.7	0.00013
1936478065	0.110	SO	SFR-A	0.7	0.00013
1936478066	0.110	SO	SFR-A	0.7	0.00013
1936478067	0.110	SO	SFR-A	0.7	0.00013
1936479003	0.110	SO	SFR-A	0.7	0.00013
1936479004	0.110	SO	SFR-A	0.7	0.00013
1936479005	0.110	SO	SFR-A	0.7	0.00013
1936479006	0.110	SO	SFR-A	0.7	0.00013
1936479008	0.110	SO	SFR-A	0.7	0.00013
1936479009	0.110	SO	SFR-A	0.7	0.00013
1936480007	0.110	SO	SFR-A	0.7	0.00013
1936480008	0.110	SO	SFR-A	0.7	0.00013
1936480009	0.110	SO	SFR-A	0.7	0.00013
1936480010	0.110	SO	SFR-A	0.7	0.00013
1936480011	0.110	SO	SFR-A	0.7	0.00013
1936480012	0.110	SO	SFR-A	0.7	0.00013
1936480013	0.110	SO	SFR-A	0.7	0.00013
1936480016	0.110	SO	SFR-A	0.7	0.00013
1936480017	0.110	SO	SFR-A	0.7	0.00013
1936480018	0.110	SO	SFR-A	0.7	0.00013
1936480019	0.110	SO	SFR-A	0.7	0.00013
1936480020	0.110	SO	SFR-A	0.7	0.00013
1936480021	0.110	SO	SFR-A	0.7	0.00013
1936480022	0.110	SO	SFR-A	0.7	0.00013
1936480023	0.110	SO	SFR-A	0.7	0.00013
1936480026	0.135	SO	SFR-B	1.0	0.00019
1936480027	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936480030	0.110	SO	SFR-A	0.7	0.00013
1936480031	0.110	SO	SFR-A	0.7	0.00013
1936480033	0.165	SO	SFR-B	1.0	0.00019
1936480034	0.165	SO	SFR-B	1.0	0.00019
1936480038	0.110	SO	SFR-A	0.7	0.00013
1936480039	0.110	SO	SFR-A	0.7	0.00013
1936480042	0.110	SO	SFR-A	0.7	0.00013
1936480043	0.110	SO	SFR-A	0.7	0.00013
1936480044	0.110	SO	SFR-A	0.7	0.00013
1936480045	0.110	SO	SFR-A	0.7	0.00013
1936480046	0.110	SO	SFR-A	0.7	0.00013
1936480047	0.110	SO	SFR-A	0.7	0.00013
1936480048	0.199	SO	SFR-B	1.0	0.00019
1936480049	0.165	SO	SFR-B	1.0	0.00019
1936480052	0.110	SO	SFR-A	0.7	0.00013
1936480053	0.110	SO	SFR-A	0.7	0.00013
1936480059	0.110	SO	SFR-A	0.7	0.00013
1936480060	0.110	SO	SFR-A	0.7	0.00013
1936480061	0.110	SO	SFR-A	0.7	0.00013
1936480062	0.110	SO	SFR-A	0.7	0.00013
1936480063	0.110	SO	SFR-A	0.7	0.00013
1936480064	0.110	SO	SFR-A	0.7	0.00013
1936480065	0.110	SO	SFR-A	0.7	0.00013
1936480066	0.110	SO	SFR-A	0.7	0.00013
1936480067	0.110	SO	SFR-A	0.7	0.00013
1936480068	0.110	SO	SFR-A	0.7	0.00013
1936480069	0.110	SO	SFR-A	0.7	0.00013
1936480070	0.110	SO	SFR-A	0.7	0.00013
1936480071	0.110	SO	SFR-A	0.7	0.00013
1936481002	0.110	SO	SFR-A	0.7	0.00013
1936481003	0.110	SO	SFR-A	0.7	0.00013
1936481004	0.110	SO	SFR-A	0.7	0.00013
1936481005	0.110	SO	SFR-A	0.7	0.00013
1936481006	0.110	SO	SFR-A	0.7	0.00013
1936481007	0.110	SO	SFR-A	0.7	0.00013
1936482001	0.123	SO	SFR-A	0.7	0.00013
1936482002	0.110	SO	SFR-A	0.7	0.00013
1936482003	0.110	SO	SFR-A	0.7	0.00013
1936482004	0.110	SO	SFR-A	0.7	0.00013
1936482005	0.110	SO	SFR-A	0.7	0.00013
1936482006	0.110	SO	SFR-A	0.7	0.00013
1936482007	0.110	SO	SFR-A	0.7	0.00013
1936482008	0.110	SO	SFR-A	0.7	0.00013
1936482009	0.110	SO	SFR-A	0.7	0.00013
1936482010	0.110	SO	SFR-A	0.7	0.00013

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
1936482015	0.110	SO	SFR-A	0.7	0.00013
1936482016	0.110	SO	SFR-A	0.7	0.00013
1936482017	0.110	SO	SFR-A	0.7	0.00013
1936482018	0.110	SO	SFR-A	0.7	0.00013
1936482019	0.110	SO	SFR-A	0.7	0.00013
1936482020	0.110	SO	SFR-A	0.7	0.00013
1936482021	0.110	SO	SFR-A	0.7	0.00013
1936482022	0.110	SO	SFR-A	0.7	0.00013
1936482023	0.114	SO	SFR-A	0.7	0.00013
1936482027	0.110	SO	SFR-A	0.7	0.00013
1936482028	0.110	SO	SFR-A	0.7	0.00013
1936482029	0.110	SO	SFR-A	0.7	0.00013
1936482030	0.110	SO	SFR-A	0.7	0.00013
1936482031	0.110	SO	SFR-A	0.7	0.00013
1936482035	0.110	SO	SFR-A	0.7	0.00013
1936482036	0.110	SO	SFR-A	0.7	0.00013
1936482037	0.110	SO	SFR-A	0.7	0.00013
1936482038	0.110	SO	SFR-A	0.7	0.00013
1936482039	0.110	SO	SFR-A	0.7	0.00013
1936482040	0.110	SO	SFR-A	0.7	0.00013
1936482041	0.110	SO	SFR-A	0.7	0.00013
1936482042	0.110	SO	SFR-A	0.7	0.00013
1936482043	0.110	SO	SFR-A	0.7	0.00013
1936482044	0.110	SO	SFR-A	0.7	0.00013
1936482045	0.110	SO	SFR-A	0.7	0.00013
1936482046	0.110	SO	SFR-A	0.7	0.00013
1936482047	0.110	SO	SFR-A	0.7	0.00013
1936482048	0.110	SO	SFR-A	0.7	0.00013
1936482053	0.110	SO	SFR-A	0.7	0.00013
1936482054	0.110	SO	SFR-A	0.7	0.00013
1936482055	0.110	SO	SFR-A	0.7	0.00013
1936482057	0.110	SO	SFR-A	0.7	0.00013
1936482060	0.220	SO	SFR-B	1.0	0.00019
1936482061	0.110	SO	SFR-A	0.7	0.00013
1936482062	0.110	SO	SFR-A	0.7	0.00013
1936482063	0.110	SO	SFR-A	0.7	0.00013
1936482064	0.110	SO	SFR-A	0.7	0.00013
1936483001	0.110	SO	SFR-A	0.7	0.00013
1936483002	0.110	SO	SFR-A	0.7	0.00013
1936483003	0.110	SO	SFR-A	0.7	0.00013
1936483004	0.110	SO	SFR-A	0.7	0.00013
1936483005	0.110	SO	SFR-A	0.7	0.00013
1936483006	0.110	SO	SFR-A	0.7	0.00013
2030101028	0.159	SO	SFR-B	1.0	0.00019
2030101029	0.236	SO	SFR-B	1.0	0.00019

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Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030151001	0.312	SO	MFR	1.9	0.00037
2030151002	1.087	SO	MFR	8.4	0.00161
2030151007	7.564	SO	MFR	39.2	0.00754
2030153031	0.175	SO	SFR-B	1.0	0.00019
2030153032	0.299	SO	SFR-C	1.6	0.00031
2030153033	0.296	SO	SFR-C	1.6	0.00031
2030153034	0.293	SO	SFR-C	1.6	0.00031
2030153035	0.276	SO	SFR-C	1.6	0.00031
2030153036	0.267	SO	SFR-C	1.6	0.00031
2030153037	0.268	SO	SFR-C	1.6	0.00031
2030153038	0.268	SO	SFR-C	1.6	0.00031
2030153039	0.268	SO	SFR-C	1.6	0.00031
2030153040	0.268	SO	SFR-C	1.6	0.00031
2030153041	0.275	SO	SFR-C	1.6	0.00031
2030176010	0.275	SO	SFR-C	1.6	0.00031
2030176011	0.261	SO	SFR-C	1.6	0.00031
2030176012	0.264	SO	SFR-C	1.6	0.00031
2030176013	0.204	SO	SFR-B	1.0	0.00019
2030176014	0.265	SO	SFR-C	1.6	0.00031
2030176015	0.259	SO	SFR-C	1.6	0.00031
2030176016	0.268	SO	SFR-C	1.6	0.00031
2030176017	0.286	SO	SFR-C	1.6	0.00031
2030301002	0.233	SO	SFR-B	1.0	0.00019
2030301003	0.233	SO	SFR-B	1.0	0.00019
2030301004	0.233	SO	SFR-B	1.0	0.00019
2030301005	0.229	SO	SFR-B	1.0	0.00019
2030301006	0.660	SO	SFR-D	2.4	0.00046
2030301007	0.330	SO	SFR-C	1.6	0.00031
2030301008	0.330	SO	SFR-C	1.6	0.00031
2030301011	0.271	SO	SFR-C	1.6	0.00031
2030301012	0.332	SO	SFR-C	1.6	0.00031
2030301013	0.277	SO	SFR-C	1.6	0.00031
2030301014	0.277	SO	SFR-C	1.6	0.00031
2030301015	0.277	SO	SFR-C	1.6	0.00031
2030301016	0.277	SO	SFR-C	1.6	0.00031
2030301022	0.436	SO	SFR-C	1.6	0.00031
2030301023	0.266	SO	SFR-C	1.6	0.00031
2030301024	0.264	SO	SFR-C	1.6	0.00031
2030301025	0.258	SO	SFR-C	1.6	0.00031
2030301026	0.264	SO	SFR-C	1.6	0.00031
2030301027	0.253	SO	SFR-C	1.6	0.00031
2030301028	0.262	SO	SFR-C	1.6	0.00031
2030301029	0.259	SO	SFR-C	1.6	0.00031
2030301030	0.260	SO	SFR-C	1.6	0.00031
2030301031	0.355	SO	NR	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030301032	0.090	SO	SFR-A	0.7	0.00013
2030301033	21.435	SO	NR	82.2	0.01580
2030301034	0.277	SO	SFR-C	1.6	0.00031
2030301035	0.246	SO	SFR-B	1.0	0.00019
2030301038	0.541	SO	SFR-D	2.4	0.00046
2030301039	0.271	SO	SFR-C	1.6	0.00031
2030302006	0.267	SO	SFR-C	1.6	0.00031
2030302007	0.267	SO	SFR-C	1.6	0.00031
2030302008	0.267	SO	SFR-C	1.6	0.00031
2030302009	0.266	SO	SFR-C	1.6	0.00031
2030302011	0.289	SO	SFR-C	1.6	0.00031
2030302012	0.266	SO	SFR-C	1.6	0.00031
2030302013	0.265	SO	SFR-C	1.6	0.00031
2030302014	0.266	SO	SFR-C	1.6	0.00031
2030302015	0.262	SO	SFR-C	1.6	0.00031
2030302016	0.266	SO	SFR-C	1.6	0.00031
2030302017	0.262	SO	SFR-C	1.6	0.00031
2030302018	0.262	SO	SFR-C	1.6	0.00031
2030302019	0.270	SO	SFR-C	1.6	0.00031
2030302020	0.384	SO	SFR-C	1.6	0.00031
2030302021	0.276	SO	SFR-C	1.6	0.00031
2030302022	0.294	SO	SFR-C	1.6	0.00031
2030302023	0.261	SO	SFR-C	1.6	0.00031
2030302024	0.295	SO	SFR-C	1.6	0.00031
2030302025	0.267	SO	SFR-C	1.6	0.00031
2030302026	0.267	SO	SFR-C	1.6	0.00031
2030302027	0.267	SO	SFR-C	1.6	0.00031
2030302028	0.267	SO	SFR-C	1.6	0.00031
2030326001	3.568	SO	NR	6.4	0.00123
2030326002	0.278	SO	SFR-C	1.6	0.00031
2030326003	0.353	SO	SFR-C	1.6	0.00031
2030326004	0.324	SO	SFR-C	1.6	0.00031
2030326005	0.270	SO	SFR-C	1.6	0.00031
2030326006	0.284	SO	SFR-C	1.6	0.00031
2030326007	0.257	SO	SFR-C	1.6	0.00031
2030326008	0.464	SO	SFR-C	1.6	0.00031
2030326009	0.312	SO	SFR-C	1.6	0.00031
2030326010	0.304	SO	SFR-C	1.6	0.00031
2030326011	0.301	SO	SFR-C	1.6	0.00031
2030326012	0.305	SO	SFR-C	1.6	0.00031
2030326013	0.244	SO	SFR-B	1.0	0.00019
2030326014	0.307	SO	SFR-C	1.6	0.00031
2030326015	0.314	SO	SFR-C	1.6	0.00031
2030326016	0.304	SO	SFR-C	1.6	0.00031
2030326017	0.344	SO	SFR-C	1.6	0.00031

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030326098	0.245	SO	MFR	1.5	0.00029
2030327001	0.292	SO	SFR-C	1.6	0.00031
2030327002	0.251	SO	SFR-C	1.6	0.00031
2030327003	0.252	SO	SFR-C	1.6	0.00031
2030327004	0.230	SO	SFR-B	1.0	0.00019
2030327005	0.345	SO	SFR-C	1.6	0.00031
2030327006	0.251	SO	SFR-C	1.6	0.00031
2030327007	0.245	SO	SFR-B	1.0	0.00019
2030327008	0.243	SO	SFR-B	1.0	0.00019
2030327009	0.218	SO	SFR-B	1.0	0.00019
2030327010	0.291	SO	SFR-C	1.6	0.00031
2030327011	0.262	SO	SFR-C	1.6	0.00031
2030327012	0.273	SO	SFR-C	1.6	0.00031
2030327013	0.221	SO	SFR-B	1.0	0.00019
2030327014	0.271	SO	SFR-C	1.6	0.00031
2030327015	0.264	SO	SFR-C	1.6	0.00031
2030327016	0.254	SO	SFR-C	1.6	0.00031
2030327017	0.258	SO	SFR-C	1.6	0.00031
2030327018	0.254	SO	SFR-C	1.6	0.00031
2030327019	0.207	SO	SFR-B	1.0	0.00019
2030328001	0.256	SO	SFR-C	1.6	0.00031
2030328002	0.275	SO	SFR-C	1.6	0.00031
2030328003	0.287	SO	SFR-C	1.6	0.00031
2030328004	0.291	SO	SFR-C	1.6	0.00031
2030328005	0.288	SO	SFR-C	1.6	0.00031
2030328006	0.303	SO	SFR-C	1.6	0.00031
2030328007	0.297	SO	SFR-C	1.6	0.00031
2030328008	0.295	SO	SFR-C	1.6	0.00031
2030328009	0.281	SO	SFR-C	1.6	0.00031
2030328010	0.303	SO	SFR-C	1.6	0.00031
2030328018	4.145	SO	MFR	22.0	0.00423
2030328058	11.903	SO	MFR	64.9	0.01248
2030351001	0.281	SO	SFR-C	1.6	0.00031
2030351002	0.263	SO	SFR-C	1.6	0.00031
2030351003	0.262	SO	SFR-C	1.6	0.00031
2030351004	0.259	SO	SFR-C	1.6	0.00031
2030351005	0.261	SO	SFR-C	1.6	0.00031
2030351006	0.259	SO	SFR-C	1.6	0.00031
2030351007	0.260	SO	SFR-C	1.6	0.00031
2030351008	0.258	SO	SFR-C	1.6	0.00031
2030351009	0.267	SO	SFR-C	1.6	0.00031
2030351010	0.286	SO	SFR-C	1.6	0.00031
2030351011	0.280	SO	SFR-C	1.6	0.00031
2030351012	0.263	SO	SFR-C	1.6	0.00031
2030351013	0.260	SO	SFR-C	1.6	0.00031

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030351014	0.257	SO	SFR-C	1.6	0.00031
2030351015	0.259	SO	SFR-C	1.6	0.00031
2030351016	0.256	SO	SFR-C	1.6	0.00031
2030351017	0.257	SO	SFR-C	1.6	0.00031
2030351018	0.257	SO	SFR-C	1.6	0.00031
2030351019	0.261	SO	SFR-C	1.6	0.00031
2030351020	0.281	SO	SFR-C	1.6	0.00031
2030352001	0.287	SO	SFR-C	1.6	0.00031
2030352002	0.269	SO	SFR-C	1.6	0.00031
2030352003	0.262	SO	SFR-C	1.6	0.00031
2030352004	0.264	SO	SFR-C	1.6	0.00031
2030352005	0.260	SO	SFR-C	1.6	0.00031
2030352006	0.266	SO	SFR-C	1.6	0.00031
2030352007	0.260	SO	SFR-C	1.6	0.00031
2030352008	0.262	SO	SFR-C	1.6	0.00031
2030352009	0.292	SO	SFR-C	1.6	0.00031
2030352010	0.265	SO	SFR-C	1.6	0.00031
2030352011	0.282	SO	SFR-C	1.6	0.00031
2030352012	0.262	SO	SFR-C	1.6	0.00031
2030352013	0.260	SO	SFR-C	1.6	0.00031
2030352014	0.258	SO	SFR-C	1.6	0.00031
2030352015	0.255	SO	SFR-C	1.6	0.00031
2030352016	0.262	SO	SFR-C	1.6	0.00031
2030352017	0.257	SO	SFR-C	1.6	0.00031
2030352018	0.258	SO	SFR-C	1.6	0.00031
2030352019	0.265	SO	SFR-C	1.6	0.00031
2030352020	0.284	SO	SFR-C	1.6	0.00031
2030353001	0.283	SO	SFR-C	1.6	0.00031
2030353002	0.271	SO	SFR-C	1.6	0.00031
2030353003	0.262	SO	SFR-C	1.6	0.00031
2030353004	0.267	SO	SFR-C	1.6	0.00031
2030353005	0.264	SO	SFR-C	1.6	0.00031
2030353006	0.263	SO	SFR-C	1.6	0.00031
2030353007	0.262	SO	SFR-C	1.6	0.00031
2030353008	0.264	SO	SFR-C	1.6	0.00031
2030353009	0.272	SO	SFR-C	1.6	0.00031
2030353010	0.291	SO	SFR-C	1.6	0.00031
2030353011	0.281	SO	SFR-C	1.6	0.00031
2030353012	0.269	SO	SFR-C	1.6	0.00031
2030353013	0.258	SO	SFR-C	1.6	0.00031
2030353014	0.265	SO	SFR-C	1.6	0.00031
2030353015	0.259	SO	SFR-C	1.6	0.00031
2030353016	0.261	SO	SFR-C	1.6	0.00031
2030353017	0.258	SO	SFR-C	1.6	0.00031
2030353018	0.259	SO	SFR-C	1.6	0.00031

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030353019	0.268	SO	SFR-C	1.6	0.00031
2030353020	0.285	SO	SFR-C	1.6	0.00031
2030354001	0.281	SO	SFR-C	1.6	0.00031
2030354002	0.260	SO	SFR-C	1.6	0.00031
2030354003	0.258	SO	SFR-C	1.6	0.00031
2030354004	0.258	SO	SFR-C	1.6	0.00031
2030354005	0.258	SO	SFR-C	1.6	0.00031
2030354006	0.245	SO	SFR-B	1.0	0.00019
2030354007	0.260	SO	SFR-C	1.6	0.00031
2030354008	0.258	SO	SFR-C	1.6	0.00031
2030354009	0.259	SO	SFR-C	1.6	0.00031
2030354010	0.279	SO	SFR-C	1.6	0.00031
2030354011	0.279	SO	SFR-C	1.6	0.00031
2030354012	0.261	SO	SFR-C	1.6	0.00031
2030354013	0.259	SO	SFR-C	1.6	0.00031
2030354014	0.258	SO	SFR-C	1.6	0.00031
2030354015	0.256	SO	SFR-C	1.6	0.00031
2030354016	0.244	SO	SFR-B	1.0	0.00019
2030354017	0.257	SO	SFR-C	1.6	0.00031
2030354018	0.256	SO	SFR-C	1.6	0.00031
2030354019	0.254	SO	SFR-C	1.6	0.00031
2030354020	0.277	SO	SFR-C	1.6	0.00031
2030355001	0.275	SO	SFR-C	1.6	0.00031
2030355002	0.279	SO	SFR-C	1.6	0.00031
2030355003	0.258	SO	SFR-C	1.6	0.00031
2030355004	0.263	SO	SFR-C	1.6	0.00031
2030355005	0.264	SO	SFR-C	1.6	0.00031
2030355006	0.254	SO	SFR-C	1.6	0.00031
2030355007	0.264	SO	SFR-C	1.6	0.00031
2030355008	0.264	SO	SFR-C	1.6	0.00031
2030355009	0.263	SO	SFR-C	1.6	0.00031
2030355010	0.290	SO	SFR-C	1.6	0.00031
2030355011	0.283	SO	SFR-C	1.6	0.00031
2030355012	0.267	SO	SFR-C	1.6	0.00031
2030355013	0.256	SO	SFR-C	1.6	0.00031
2030355014	0.264	SO	SFR-C	1.6	0.00031
2030355015	0.260	SO	SFR-C	1.6	0.00031
2030355016	0.255	SO	SFR-C	1.6	0.00031
2030355017	0.261	SO	SFR-C	1.6	0.00031
2030355018	0.261	SO	SFR-C	1.6	0.00031
2030355019	0.259	SO	SFR-C	1.6	0.00031
2030355020	0.288	SO	SFR-C	1.6	0.00031
2030356001	0.285	SO	SFR-C	1.6	0.00031
2030356002	0.269	SO	SFR-C	1.6	0.00031
2030356003	0.260	SO	SFR-C	1.6	0.00031

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030356004	0.265	SO	SFR-C	1.6	0.00031
2030356005	0.260	SO	SFR-C	1.6	0.00031
2030356006	0.259	SO	SFR-C	1.6	0.00031
2030356007	0.260	SO	SFR-C	1.6	0.00031
2030356008	0.261	SO	SFR-C	1.6	0.00031
2030356009	0.261	SO	SFR-C	1.6	0.00031
2030356010	0.288	SO	SFR-C	1.6	0.00031
2030356011	0.281	SO	SFR-C	1.6	0.00031
2030356012	0.263	SO	SFR-C	1.6	0.00031
2030356013	0.255	SO	SFR-C	1.6	0.00031
2030356014	0.263	SO	SFR-C	1.6	0.00031
2030356015	0.256	SO	SFR-C	1.6	0.00031
2030356016	0.274	SO	SFR-C	1.6	0.00031
2030356017	0.238	SO	SFR-B	1.0	0.00019
2030356018	0.258	SO	SFR-C	1.6	0.00031
2030356019	0.258	SO	SFR-C	1.6	0.00031
2030356020	0.286	SO	SFR-C	1.6	0.00031
2030376001	0.496	SO	SFR-C	1.6	0.00031
2030376002	0.285	SO	SFR-C	1.6	0.00031
2030376005	0.481	SO	SFR-C	1.6	0.00031
2030377001	0.287	SO	SFR-C	1.6	0.00031
2030377002	0.266	SO	SFR-C	1.6	0.00031
2030377003	0.261	SO	SFR-C	1.6	0.00031
2030377004	0.263	SO	SFR-C	1.6	0.00031
2030377008	0.263	SO	SFR-C	1.6	0.00031
2030377009	0.268	SO	SFR-C	1.6	0.00031
2030377010	0.268	SO	SFR-C	1.6	0.00031
2030377012	0.560	SO	SFR-D	2.4	0.00046
2030377013	0.189	SO	SFR-B	1.0	0.00019
2030377014	0.302	SO	SFR-C	1.6	0.00031
2030378001	0.290	SO	SFR-C	1.6	0.00031
2030378002	0.269	SO	SFR-C	1.6	0.00031
2030378003	0.261	SO	SFR-C	1.6	0.00031
2030378004	0.266	SO	SFR-C	1.6	0.00031
2030378005	0.261	SO	SFR-C	1.6	0.00031
2030378006	0.266	SO	SFR-C	1.6	0.00031
2030378007	0.261	SO	SFR-C	1.6	0.00031
2030378009	0.281	SO	SFR-C	1.6	0.00031
2030378010	0.264	SO	SFR-C	1.6	0.00031
2030378011	0.255	SO	SFR-C	1.6	0.00031
2030378012	0.262	SO	SFR-C	1.6	0.00031
2030378013	0.254	SO	SFR-C	1.6	0.00031
2030378014	0.262	SO	SFR-C	1.6	0.00031
2030378015	0.255	SO	SFR-C	1.6	0.00031
2030378016	0.254	SO	SFR-C	1.6	0.00031

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030378018	0.601	SO	NR	1.0	0.00019
2030379002	1.746	SO	MFR	11.0	0.00211
2030379043	1.108	SO	NR	9.6	0.00185
2030380001	5.086	SO	MFR	34.3	0.00659
2030381001	1.134	SO	MFR	8.1	0.00156
2030401001	0.160	SO	SFR-B	1.0	0.00019
2030401002	0.150	SO	SFR-B	1.0	0.00019
2030401003	0.150	SO	SFR-B	1.0	0.00019
2030401004	0.150	SO	SFR-B	1.0	0.00019
2030401005	0.150	SO	SFR-B	1.0	0.00019
2030401006	0.149	SO	SFR-B	1.0	0.00019
2030401007	0.149	SO	SFR-B	1.0	0.00019
2030401008	0.149	SO	SFR-B	1.0	0.00019
2030401009	0.149	SO	SFR-B	1.0	0.00019
2030401010	0.149	SO	SFR-B	1.0	0.00019
2030401011	0.149	SO	SFR-B	1.0	0.00019
2030401012	0.149	SO	SFR-B	1.0	0.00019
2030401013	0.149	SO	SFR-B	1.0	0.00019
2030401014	0.149	SO	SFR-B	1.0	0.00019
2030401015	0.149	SO	SFR-B	1.0	0.00019
2030401016	0.159	SO	SFR-B	1.0	0.00019
2030401017	0.175	SO	SFR-B	1.0	0.00019
2030401018	0.158	SO	SFR-B	1.0	0.00019
2030401019	0.161	SO	SFR-B	1.0	0.00019
2030401020	0.161	SO	SFR-B	1.0	0.00019
2030401021	0.161	SO	SFR-B	1.0	0.00019
2030401022	0.161	SO	SFR-B	1.0	0.00019
2030401023	0.161	SO	SFR-B	1.0	0.00019
2030401024	0.161	SO	SFR-B	1.0	0.00019
2030401025	0.161	SO	SFR-B	1.0	0.00019
2030401026	0.161	SO	SFR-B	1.0	0.00019
2030401027	0.161	SO	SFR-B	1.0	0.00019
2030401028	0.161	SO	SFR-B	1.0	0.00019
2030401029	0.161	SO	SFR-B	1.0	0.00019
2030401030	0.161	SO	SFR-B	1.0	0.00019
2030401031	0.161	SO	SFR-B	1.0	0.00019
2030401032	0.172	SO	SFR-B	1.0	0.00019
2030402001	0.183	SO	SFR-B	1.0	0.00019
2030402002	0.171	SO	SFR-B	1.0	0.00019
2030402003	0.171	SO	SFR-B	1.0	0.00019
2030402004	0.171	SO	SFR-B	1.0	0.00019
2030402005	0.171	SO	SFR-B	1.0	0.00019
2030402006	0.171	SO	SFR-B	1.0	0.00019
2030402007	0.171	SO	SFR-B	1.0	0.00019
2030402008	0.171	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030402013	0.171	SO	SFR-B	1.0	0.00019
2030402014	0.171	SO	SFR-B	1.0	0.00019
2030402015	0.171	SO	SFR-B	1.0	0.00019
2030402016	0.171	SO	SFR-B	1.0	0.00019
2030402017	0.183	SO	SFR-B	1.0	0.00019
2030402018	0.183	SO	SFR-B	1.0	0.00019
2030402019	0.171	SO	SFR-B	1.0	0.00019
2030402020	0.171	SO	SFR-B	1.0	0.00019
2030402021	0.171	SO	SFR-B	1.0	0.00019
2030402022	0.171	SO	SFR-B	1.0	0.00019
2030402023	0.171	SO	SFR-B	1.0	0.00019
2030402024	0.171	SO	SFR-B	1.0	0.00019
2030402025	0.171	SO	SFR-B	1.0	0.00019
2030402026	0.171	SO	SFR-B	1.0	0.00019
2030402027	0.171	SO	SFR-B	1.0	0.00019
2030402028	0.171	SO	SFR-B	1.0	0.00019
2030402029	0.171	SO	SFR-B	1.0	0.00019
2030402030	0.171	SO	SFR-B	1.0	0.00019
2030402031	0.171	SO	SFR-B	1.0	0.00019
2030402032	0.171	SO	SFR-B	1.0	0.00019
2030402033	0.183	SO	SFR-B	1.0	0.00019
2030402034	0.257	SO	SFR-C	1.6	0.00031
2030402035	0.257	SO	SFR-C	1.6	0.00031
2030403001	0.197	SO	SFR-B	1.0	0.00019
2030403002	0.171	SO	SFR-B	1.0	0.00019
2030403003	0.171	SO	SFR-B	1.0	0.00019
2030403004	0.171	SO	SFR-B	1.0	0.00019
2030403005	0.171	SO	SFR-B	1.0	0.00019
2030403006	0.171	SO	SFR-B	1.0	0.00019
2030403007	0.171	SO	SFR-B	1.0	0.00019
2030403008	0.171	SO	SFR-B	1.0	0.00019
2030403009	0.171	SO	SFR-B	1.0	0.00019
2030403010	0.171	SO	SFR-B	1.0	0.00019
2030403011	0.171	SO	SFR-B	1.0	0.00019
2030403012	0.171	SO	SFR-B	1.0	0.00019
2030403013	0.171	SO	SFR-B	1.0	0.00019
2030403014	0.171	SO	SFR-B	1.0	0.00019
2030403015	0.171	SO	SFR-B	1.0	0.00019
2030403016	0.197	SO	SFR-B	1.0	0.00019
2030403017	0.197	SO	SFR-B	1.0	0.00019
2030403018	0.171	SO	SFR-B	1.0	0.00019
2030403019	0.171	SO	SFR-B	1.0	0.00019
2030403020	0.171	SO	SFR-B	1.0	0.00019
2030403021	0.171	SO	SFR-B	1.0	0.00019
2030403022	0.171	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030403023	0.171	SO	SFR-B	1.0	0.00019
2030403024	0.171	SO	SFR-B	1.0	0.00019
2030403025	0.171	SO	SFR-B	1.0	0.00019
2030403026	0.171	SO	SFR-B	1.0	0.00019
2030403027	0.171	SO	SFR-B	1.0	0.00019
2030403028	0.171	SO	SFR-B	1.0	0.00019
2030403029	0.171	SO	SFR-B	1.0	0.00019
2030403030	0.171	SO	SFR-B	1.0	0.00019
2030403031	0.171	SO	SFR-B	1.0	0.00019
2030403032	0.197	SO	SFR-B	1.0	0.00019
2030404001	0.183	SO	SFR-B	1.0	0.00019
2030404002	0.171	SO	SFR-B	1.0	0.00019
2030404003	0.171	SO	SFR-B	1.0	0.00019
2030404004	0.171	SO	SFR-B	1.0	0.00019
2030404005	0.171	SO	SFR-B	1.0	0.00019
2030404006	0.171	SO	SFR-B	1.0	0.00019
2030404007	0.171	SO	SFR-B	1.0	0.00019
2030404008	0.171	SO	SFR-B	1.0	0.00019
2030404009	0.171	SO	SFR-B	1.0	0.00019
2030404010	0.171	SO	SFR-B	1.0	0.00019
2030404011	0.171	SO	SFR-B	1.0	0.00019
2030404012	0.171	SO	SFR-B	1.0	0.00019
2030404013	0.171	SO	SFR-B	1.0	0.00019
2030404014	0.171	SO	SFR-B	1.0	0.00019
2030404015	0.171	SO	SFR-B	1.0	0.00019
2030404016	0.183	SO	SFR-B	1.0	0.00019
2030404017	0.183	SO	SFR-B	1.0	0.00019
2030404018	0.171	SO	SFR-B	1.0	0.00019
2030404019	0.171	SO	SFR-B	1.0	0.00019
2030404020	0.171	SO	SFR-B	1.0	0.00019
2030404021	0.171	SO	SFR-B	1.0	0.00019
2030404022	0.171	SO	SFR-B	1.0	0.00019
2030404023	0.171	SO	SFR-B	1.0	0.00019
2030404024	0.171	SO	SFR-B	1.0	0.00019
2030404025	0.171	SO	SFR-B	1.0	0.00019
2030404026	0.171	SO	SFR-B	1.0	0.00019
2030404027	0.171	SO	SFR-B	1.0	0.00019
2030404028	0.171	SO	SFR-B	1.0	0.00019
2030404029	0.171	SO	SFR-B	1.0	0.00019
2030404030	0.171	SO	SFR-B	1.0	0.00019
2030404031	0.178	SO	SFR-B	1.0	0.00019
2030404032	0.176	SO	SFR-B	1.0	0.00019
2030405001	0.197	SO	SFR-B	1.0	0.00019
2030405002	0.171	SO	SFR-B	1.0	0.00019
2030405003	0.171	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030405004	0.171	SO	SFR-B	1.0	0.00019
2030405005	0.171	SO	SFR-B	1.0	0.00019
2030405006	0.171	SO	SFR-B	1.0	0.00019
2030405007	0.171	SO	SFR-B	1.0	0.00019
2030405008	0.171	SO	SFR-B	1.0	0.00019
2030405009	0.171	SO	SFR-B	1.0	0.00019
2030405010	0.171	SO	SFR-B	1.0	0.00019
2030405011	0.171	SO	SFR-B	1.0	0.00019
2030405012	0.171	SO	SFR-B	1.0	0.00019
2030405013	0.171	SO	SFR-B	1.0	0.00019
2030405014	0.171	SO	SFR-B	1.0	0.00019
2030405015	0.171	SO	SFR-B	1.0	0.00019
2030405016	0.197	SO	SFR-B	1.0	0.00019
2030405017	0.197	SO	SFR-B	1.0	0.00019
2030405018	0.171	SO	SFR-B	1.0	0.00019
2030405019	0.171	SO	SFR-B	1.0	0.00019
2030405020	0.171	SO	SFR-B	1.0	0.00019
2030405021	0.171	SO	SFR-B	1.0	0.00019
2030405022	0.171	SO	SFR-B	1.0	0.00019
2030405023	0.171	SO	SFR-B	1.0	0.00019
2030405024	0.171	SO	SFR-B	1.0	0.00019
2030405025	0.171	SO	SFR-B	1.0	0.00019
2030405026	0.171	SO	SFR-B	1.0	0.00019
2030405027	0.171	SO	SFR-B	1.0	0.00019
2030405028	0.171	SO	SFR-B	1.0	0.00019
2030405029	0.171	SO	SFR-B	1.0	0.00019
2030405030	0.171	SO	SFR-B	1.0	0.00019
2030405031	0.171	SO	SFR-B	1.0	0.00019
2030405032	0.197	SO	SFR-B	1.0	0.00019
2030406001	5.298	SO	NR	10.7	0.00206
2030406002	0.188	SO	SFR-B	1.0	0.00019
2030406003	0.164	SO	SFR-B	1.0	0.00019
2030406004	0.164	SO	SFR-B	1.0	0.00019
2030406005	0.164	SO	SFR-B	1.0	0.00019
2030406006	0.164	SO	SFR-B	1.0	0.00019
2030406007	0.164	SO	SFR-B	1.0	0.00019
2030406008	0.164	SO	SFR-B	1.0	0.00019
2030406009	0.164	SO	SFR-B	1.0	0.00019
2030406010	0.164	SO	SFR-B	1.0	0.00019
2030406011	0.164	SO	SFR-B	1.0	0.00019
2030406012	0.164	SO	SFR-B	1.0	0.00019
2030406013	0.164	SO	SFR-B	1.0	0.00019
2030406014	0.164	SO	SFR-B	1.0	0.00019
2030406015	0.164	SO	SFR-B	1.0	0.00019
2030406016	0.164	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030406017	0.188	SO	SFR-B	1.0	0.00019
2030406018	0.188	SO	SFR-B	1.0	0.00019
2030406019	0.164	SO	SFR-B	1.0	0.00019
2030406020	0.164	SO	SFR-B	1.0	0.00019
2030406021	0.164	SO	SFR-B	1.0	0.00019
2030406022	0.164	SO	SFR-B	1.0	0.00019
2030406023	0.164	SO	SFR-B	1.0	0.00019
2030406024	0.164	SO	SFR-B	1.0	0.00019
2030406025	0.164	SO	SFR-B	1.0	0.00019
2030406026	0.164	SO	SFR-B	1.0	0.00019
2030406027	0.164	SO	SFR-B	1.0	0.00019
2030406028	0.164	SO	SFR-B	1.0	0.00019
2030406029	0.164	SO	SFR-B	1.0	0.00019
2030406030	0.164	SO	SFR-B	1.0	0.00019
2030406031	0.164	SO	SFR-B	1.0	0.00019
2030406032	0.164	SO	SFR-B	1.0	0.00019
2030406033	0.188	SO	SFR-B	1.0	0.00019
2030426001	0.170	SO	SFR-B	1.0	0.00019
2030426002	0.148	SO	SFR-B	1.0	0.00019
2030426003	0.148	SO	SFR-B	1.0	0.00019
2030426004	0.148	SO	SFR-B	1.0	0.00019
2030426005	0.148	SO	SFR-B	1.0	0.00019
2030426006	0.148	SO	SFR-B	1.0	0.00019
2030426007	0.148	SO	SFR-B	1.0	0.00019
2030426008	0.148	SO	SFR-B	1.0	0.00019
2030426009	0.148	SO	SFR-B	1.0	0.00019
2030426010	0.148	SO	SFR-B	1.0	0.00019
2030426011	0.147	SO	SFR-B	1.0	0.00019
2030426012	0.147	SO	SFR-B	1.0	0.00019
2030426013	0.147	SO	SFR-B	1.0	0.00019
2030426014	0.147	SO	SFR-B	1.0	0.00019
2030426015	0.147	SO	SFR-B	1.0	0.00019
2030426016	0.169	SO	SFR-B	1.0	0.00019
2030426017	0.176	SO	SFR-B	1.0	0.00019
2030426018	0.158	SO	SFR-B	1.0	0.00019
2030426019	0.147	SO	SFR-B	1.0	0.00019
2030426020	0.147	SO	SFR-B	1.0	0.00019
2030426021	0.146	SO	SFR-B	1.0	0.00019
2030426022	0.146	SO	SFR-B	1.0	0.00019
2030426023	0.146	SO	SFR-B	1.0	0.00019
2030426024	0.146	SO	SFR-B	1.0	0.00019
2030426025	0.146	SO	SFR-B	1.0	0.00019
2030426026	0.146	SO	SFR-B	1.0	0.00019
2030426027	0.146	SO	SFR-B	1.0	0.00019
2030426028	0.146	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030426029	0.146	SO	SFR-B	1.0	0.00019
2030426030	0.157	SO	SFR-B	1.0	0.00019
2030426031	0.185	SO	SFR-B	1.0	0.00019
2030426032	0.161	SO	SFR-B	1.0	0.00019
2030426033	0.161	SO	SFR-B	1.0	0.00019
2030426034	0.161	SO	SFR-B	1.0	0.00019
2030426035	0.161	SO	SFR-B	1.0	0.00019
2030426036	0.161	SO	SFR-B	1.0	0.00019
2030426037	0.161	SO	SFR-B	1.0	0.00019
2030426038	0.161	SO	SFR-B	1.0	0.00019
2030426039	0.161	SO	SFR-B	1.0	0.00019
2030426040	0.161	SO	SFR-B	1.0	0.00019
2030426041	0.161	SO	SFR-B	1.0	0.00019
2030426042	0.161	SO	SFR-B	1.0	0.00019
2030426043	0.161	SO	SFR-B	1.0	0.00019
2030426044	0.161	SO	SFR-B	1.0	0.00019
2030426045	0.161	SO	SFR-B	1.0	0.00019
2030426046	0.282	SO	SFR-C	1.6	0.00031
2030426047	0.248	SO	SFR-B	1.0	0.00019
2030426048	0.152	SO	SFR-B	1.0	0.00019
2030426049	0.152	SO	SFR-B	1.0	0.00019
2030426050	0.152	SO	SFR-B	1.0	0.00019
2030426051	0.152	SO	SFR-B	1.0	0.00019
2030426052	0.152	SO	SFR-B	1.0	0.00019
2030426053	0.194	SO	SFR-B	1.0	0.00019
2030426054	0.194	SO	SFR-B	1.0	0.00019
2030426056	0.152	SO	SFR-B	1.0	0.00019
2030426057	0.152	SO	SFR-B	1.0	0.00019
2030426058	0.177	SO	SFR-B	1.0	0.00019
2030426059	0.192	SO	SFR-B	1.0	0.00019
2030426060	0.192	SO	SFR-B	1.0	0.00019
2030426061	0.142	SO	SFR-B	1.0	0.00019
2030426062	0.142	SO	SFR-B	1.0	0.00019
2030426063	0.142	SO	SFR-B	1.0	0.00019
2030426064	0.173	SO	SFR-B	1.0	0.00019
2030426065	0.173	SO	SFR-B	1.0	0.00019
2030427001	0.161	SO	SFR-B	1.0	0.00019
2030427002	0.161	SO	SFR-B	1.0	0.00019
2030427003	0.161	SO	SFR-B	1.0	0.00019
2030427004	0.161	SO	SFR-B	1.0	0.00019
2030427005	0.161	SO	SFR-B	1.0	0.00019
2030427006	0.161	SO	SFR-B	1.0	0.00019
2030427007	0.161	SO	SFR-B	1.0	0.00019
2030427008	0.161	SO	SFR-B	1.0	0.00019
2030427009	0.161	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030427010	0.161	SO	SFR-B	1.0	0.00019
2030427011	0.161	SO	SFR-B	1.0	0.00019
2030427012	0.161	SO	SFR-B	1.0	0.00019
2030427013	0.161	SO	SFR-B	1.0	0.00019
2030427014	0.161	SO	SFR-B	1.0	0.00019
2030427015	0.161	SO	SFR-B	1.0	0.00019
2030427016	0.161	SO	SFR-B	1.0	0.00019
2030427017	0.161	SO	SFR-B	1.0	0.00019
2030427018	0.161	SO	SFR-B	1.0	0.00019
2030427019	0.161	SO	SFR-B	1.0	0.00019
2030427020	0.161	SO	SFR-B	1.0	0.00019
2030427021	0.161	SO	SFR-B	1.0	0.00019
2030427022	0.161	SO	SFR-B	1.0	0.00019
2030427023	0.161	SO	SFR-B	1.0	0.00019
2030427024	0.161	SO	SFR-B	1.0	0.00019
2030427025	0.161	SO	SFR-B	1.0	0.00019
2030427026	0.161	SO	SFR-B	1.0	0.00019
2030427027	0.161	SO	SFR-B	1.0	0.00019
2030427028	0.161	SO	SFR-B	1.0	0.00019
2030427029	0.152	SO	SFR-B	1.0	0.00019
2030427030	0.153	SO	SFR-B	1.0	0.00019
2030427031	0.151	SO	SFR-B	1.0	0.00019
2030427032	0.151	SO	SFR-B	1.0	0.00019
2030427033	0.153	SO	SFR-B	1.0	0.00019
2030427034	0.153	SO	SFR-B	1.0	0.00019
2030428001	0.161	SO	SFR-B	1.0	0.00019
2030428002	0.161	SO	SFR-B	1.0	0.00019
2030428003	0.161	SO	SFR-B	1.0	0.00019
2030428004	0.161	SO	SFR-B	1.0	0.00019
2030428005	0.161	SO	SFR-B	1.0	0.00019
2030428006	0.161	SO	SFR-B	1.0	0.00019
2030428007	0.161	SO	SFR-B	1.0	0.00019
2030428008	0.161	SO	SFR-B	1.0	0.00019
2030428009	0.161	SO	SFR-B	1.0	0.00019
2030428010	0.161	SO	SFR-B	1.0	0.00019
2030428011	0.161	SO	SFR-B	1.0	0.00019
2030428012	0.161	SO	SFR-B	1.0	0.00019
2030428013	0.161	SO	SFR-B	1.0	0.00019
2030428014	0.161	SO	SFR-B	1.0	0.00019
2030428015	0.161	SO	SFR-B	1.0	0.00019
2030428016	0.161	SO	SFR-B	1.0	0.00019
2030428017	0.161	SO	SFR-B	1.0	0.00019
2030428018	0.161	SO	SFR-B	1.0	0.00019
2030428019	0.161	SO	SFR-B	1.0	0.00019
2030428020	0.161	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030428021	0.161	SO	SFR-B	1.0	0.00019
2030428022	0.161	SO	SFR-B	1.0	0.00019
2030428023	0.161	SO	SFR-B	1.0	0.00019
2030428024	0.161	SO	SFR-B	1.0	0.00019
2030428025	0.161	SO	SFR-B	1.0	0.00019
2030428026	0.161	SO	SFR-B	1.0	0.00019
2030428027	0.161	SO	SFR-B	1.0	0.00019
2030428028	0.161	SO	SFR-B	1.0	0.00019
2030428029	0.153	SO	SFR-B	1.0	0.00019
2030428030	0.154	SO	SFR-B	1.0	0.00019
2030428031	0.152	SO	SFR-B	1.0	0.00019
2030428032	0.152	SO	SFR-B	1.0	0.00019
2030428035	0.308	SO	SFR-C	1.6	0.00031
2030429001	0.154	SO	SFR-B	1.0	0.00019
2030429002	0.154	SO	SFR-B	1.0	0.00019
2030429003	0.154	SO	SFR-B	1.0	0.00019
2030429004	0.154	SO	SFR-B	1.0	0.00019
2030429005	0.154	SO	SFR-B	1.0	0.00019
2030429006	0.154	SO	SFR-B	1.0	0.00019
2030429007	0.154	SO	SFR-B	1.0	0.00019
2030429008	0.154	SO	SFR-B	1.0	0.00019
2030429009	0.154	SO	SFR-B	1.0	0.00019
2030429010	0.154	SO	SFR-B	1.0	0.00019
2030429011	0.154	SO	SFR-B	1.0	0.00019
2030429012	0.154	SO	SFR-B	1.0	0.00019
2030429013	0.154	SO	SFR-B	1.0	0.00019
2030429014	0.154	SO	SFR-B	1.0	0.00019
2030429015	0.177	SO	SFR-B	1.0	0.00019
2030429016	0.164	SO	SFR-B	1.0	0.00019
2030429017	0.164	SO	SFR-B	1.0	0.00019
2030429018	0.164	SO	SFR-B	1.0	0.00019
2030429019	0.164	SO	SFR-B	1.0	0.00019
2030429020	0.164	SO	SFR-B	1.0	0.00019
2030429021	0.164	SO	SFR-B	1.0	0.00019
2030429022	0.164	SO	SFR-B	1.0	0.00019
2030429023	0.164	SO	SFR-B	1.0	0.00019
2030429024	0.164	SO	SFR-B	1.0	0.00019
2030429025	0.164	SO	SFR-B	1.0	0.00019
2030429026	0.164	SO	SFR-B	1.0	0.00019
2030429027	0.177	SO	SFR-B	1.0	0.00019
2030429028	0.154	SO	SFR-B	1.0	0.00019
2030429029	0.155	SO	SFR-B	1.0	0.00019
2030429030	0.133	SO	SFR-B	1.0	0.00019
2030429031	0.133	SO	SFR-B	1.0	0.00019
2030429032	0.155	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030429033	0.155	SO	SFR-B	1.0	0.00019
2030451001	0.183	SO	SFR-B	1.0	0.00019
2030451002	0.206	SO	SFR-B	1.0	0.00019
2030451003	0.206	SO	SFR-B	1.0	0.00019
2030451004	0.206	SO	SFR-B	1.0	0.00019
2030451005	0.206	SO	SFR-B	1.0	0.00019
2030451006	0.206	SO	SFR-B	1.0	0.00019
2030451007	0.206	SO	SFR-B	1.0	0.00019
2030451008	0.206	SO	SFR-B	1.0	0.00019
2030451009	0.206	SO	SFR-B	1.0	0.00019
2030451010	0.206	SO	SFR-B	1.0	0.00019
2030451011	0.206	SO	SFR-B	1.0	0.00019
2030451012	0.206	SO	SFR-B	1.0	0.00019
2030451013	0.320	SO	SFR-C	1.6	0.00031
2030451014	0.183	SO	SFR-B	1.0	0.00019
2030451015	0.171	SO	SFR-B	1.0	0.00019
2030451016	0.343	SO	SFR-C	1.6	0.00031
2030451017	0.171	SO	SFR-B	1.0	0.00019
2030451018	0.171	SO	SFR-B	1.0	0.00019
2030451019	0.171	SO	SFR-B	1.0	0.00019
2030451020	0.171	SO	SFR-B	1.0	0.00019
2030451021	0.171	SO	SFR-B	1.0	0.00019
2030451022	0.171	SO	SFR-B	1.0	0.00019
2030451023	0.171	SO	SFR-B	1.0	0.00019
2030451024	0.171	SO	SFR-B	1.0	0.00019
2030451025	0.171	SO	SFR-B	1.0	0.00019
2030451026	0.171	SO	SFR-B	1.0	0.00019
2030451027	0.171	SO	SFR-B	1.0	0.00019
2030451028	0.183	SO	SFR-B	1.0	0.00019
2030452001	0.197	SO	SFR-B	1.0	0.00019
2030452002	0.171	SO	SFR-B	1.0	0.00019
2030452003	0.171	SO	SFR-B	1.0	0.00019
2030452004	0.171	SO	SFR-B	1.0	0.00019
2030452005	0.171	SO	SFR-B	1.0	0.00019
2030452006	0.171	SO	SFR-B	1.0	0.00019
2030452007	0.171	SO	SFR-B	1.0	0.00019
2030452008	0.171	SO	SFR-B	1.0	0.00019
2030452009	0.171	SO	SFR-B	1.0	0.00019
2030452010	0.171	SO	SFR-B	1.0	0.00019
2030452011	0.171	SO	SFR-B	1.0	0.00019
2030452012	0.171	SO	SFR-B	1.0	0.00019
2030452013	0.171	SO	SFR-B	1.0	0.00019
2030452014	0.171	SO	SFR-B	1.0	0.00019
2030452015	0.171	SO	SFR-B	1.0	0.00019
2030452016	0.197	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030452017	0.197	SO	SFR-B	1.0	0.00019
2030452018	0.171	SO	SFR-B	1.0	0.00019
2030452019	0.171	SO	SFR-B	1.0	0.00019
2030452020	0.171	SO	SFR-B	1.0	0.00019
2030452021	0.171	SO	SFR-B	1.0	0.00019
2030452022	0.343	SO	SFR-C	1.6	0.00031
2030452026	0.171	SO	SFR-B	1.0	0.00019
2030452027	0.171	SO	SFR-B	1.0	0.00019
2030452028	0.171	SO	SFR-B	1.0	0.00019
2030452029	0.171	SO	SFR-B	1.0	0.00019
2030452030	0.171	SO	SFR-B	1.0	0.00019
2030452031	0.197	SO	SFR-B	1.0	0.00019
2030452032	0.257	SO	SFR-C	1.6	0.00031
2030452033	0.257	SO	SFR-C	1.6	0.00031
2030453001	0.249	SO	SFR-B	1.0	0.00019
2030453002	0.223	SO	SFR-B	1.0	0.00019
2030453003	0.216	SO	SFR-B	1.0	0.00019
2030453004	0.219	SO	SFR-B	1.0	0.00019
2030453005	0.217	SO	SFR-B	1.0	0.00019
2030453006	0.226	SO	SFR-B	1.0	0.00019
2030453007	0.217	SO	SFR-B	1.0	0.00019
2030453008	0.224	SO	SFR-B	1.0	0.00019
2030453009	0.222	SO	SFR-B	1.0	0.00019
2030453010	0.216	SO	SFR-B	1.0	0.00019
2030453011	0.223	SO	SFR-B	1.0	0.00019
2030453012	0.242	SO	SFR-B	1.0	0.00019
2030453013	0.268	SO	SFR-C	1.6	0.00031
2030453014	0.263	SO	SFR-C	1.6	0.00031
2030453015	0.261	SO	SFR-C	1.6	0.00031
2030453016	0.265	SO	SFR-C	1.6	0.00031
2030453017	0.269	SO	SFR-C	1.6	0.00031
2030453018	0.261	SO	SFR-C	1.6	0.00031
2030453019	0.269	SO	SFR-C	1.6	0.00031
2030453020	0.265	SO	SFR-C	1.6	0.00031
2030453021	0.263	SO	SFR-C	1.6	0.00031
2030453022	0.267	SO	SFR-C	1.6	0.00031
2030454001	0.220	SO	SFR-B	1.0	0.00019
2030454002	0.215	SO	SFR-B	1.0	0.00019
2030454003	0.214	SO	SFR-B	1.0	0.00019
2030454004	0.218	SO	SFR-B	1.0	0.00019
2030454005	0.218	SO	SFR-B	1.0	0.00019
2030454006	0.221	SO	SFR-B	1.0	0.00019
2030454007	0.244	SO	SFR-B	1.0	0.00019
2030454008	0.222	SO	SFR-B	1.0	0.00019
2030454009	0.247	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030454010	0.216	SO	SFR-B	1.0	0.00019
2030454011	0.244	SO	SFR-B	1.0	0.00019
2030454012	0.266	SO	SFR-C	1.6	0.00031
2030454013	0.262	SO	SFR-C	1.6	0.00031
2030454014	0.261	SO	SFR-C	1.6	0.00031
2030454015	0.265	SO	SFR-C	1.6	0.00031
2030454016	0.266	SO	SFR-C	1.6	0.00031
2030454017	0.269	SO	SFR-C	1.6	0.00031
2030454018	0.247	SO	SFR-B	1.0	0.00019
2030454019	0.265	SO	SFR-C	1.6	0.00031
2030454020	0.244	SO	SFR-B	1.0	0.00019
2030454021	0.256	SO	SFR-C	1.6	0.00031
2030454022	0.239	SO	SFR-B	1.0	0.00019
2030455001	0.232	SO	SFR-B	1.0	0.00019
2030455002	0.261	SO	SFR-C	1.6	0.00031
2030455003	0.258	SO	SFR-C	1.6	0.00031
2030455004	0.260	SO	SFR-C	1.6	0.00031
2030455005	0.262	SO	SFR-C	1.6	0.00031
2030455006	0.264	SO	SFR-C	1.6	0.00031
2030455007	0.254	SO	SFR-C	1.6	0.00031
2030455008	0.259	SO	SFR-C	1.6	0.00031
2030455009	0.263	SO	SFR-C	1.6	0.00031
2030455010	0.260	SO	SFR-C	1.6	0.00031
2030455011	0.260	SO	SFR-C	1.6	0.00031
2030455013	0.482	SO	MFR	3.1	0.00060
2030455014	0.495	SO	MFR	3.8	0.00073
2030455018	0.693	SO	MFR	4.2	0.00081
2030455029	0.731	SO	MFR	5.2	0.00100
2030456001	0.259	SO	SFR-C	1.6	0.00031
2030456002	0.255	SO	SFR-C	1.6	0.00031
2030456003	0.257	SO	SFR-C	1.6	0.00031
2030456004	0.259	SO	SFR-C	1.6	0.00031
2030456005	0.261	SO	SFR-C	1.6	0.00031
2030456006	0.260	SO	SFR-C	1.6	0.00031
2030456007	0.261	SO	SFR-C	1.6	0.00031
2030456008	0.261	SO	SFR-C	1.6	0.00031
2030456009	0.260	SO	SFR-C	1.6	0.00031
2030456010	0.254	SO	SFR-C	1.6	0.00031
2030456011	0.255	SO	SFR-C	1.6	0.00031
2030456018	0.243	SO	MFR	2.0	0.00038
2030456019	0.243	SO	MFR	1.8	0.00035
2030456020	0.241	SO	MFR	1.9	0.00037
2030456021	0.237	SO	MFR	1.8	0.00035
2030456022	0.237	SO	MFR	1.8	0.00035
2030456023	1.444	SO	MFR	9.8	0.00188

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030476001	0.161	SO	SFR-B	1.0	0.00019
2030476002	0.161	SO	SFR-B	1.0	0.00019
2030476003	0.161	SO	SFR-B	1.0	0.00019
2030476004	0.161	SO	SFR-B	1.0	0.00019
2030476005	0.161	SO	SFR-B	1.0	0.00019
2030476006	0.161	SO	SFR-B	1.0	0.00019
2030476007	0.161	SO	SFR-B	1.0	0.00019
2030476008	0.161	SO	SFR-B	1.0	0.00019
2030476009	0.161	SO	SFR-B	1.0	0.00019
2030476010	0.161	SO	SFR-B	1.0	0.00019
2030476011	0.161	SO	SFR-B	1.0	0.00019
2030476012	0.161	SO	SFR-B	1.0	0.00019
2030476013	0.161	SO	SFR-B	1.0	0.00019
2030476014	0.161	SO	SFR-B	1.0	0.00019
2030476015	0.155	SO	SFR-B	1.0	0.00019
2030476016	0.155	SO	SFR-B	1.0	0.00019
2030476017	0.153	SO	SFR-B	1.0	0.00019
2030476018	0.161	SO	SFR-B	1.0	0.00019
2030476019	0.161	SO	SFR-B	1.0	0.00019
2030476020	0.161	SO	SFR-B	1.0	0.00019
2030476021	0.161	SO	SFR-B	1.0	0.00019
2030476022	0.161	SO	SFR-B	1.0	0.00019
2030476023	0.161	SO	SFR-B	1.0	0.00019
2030476024	0.161	SO	SFR-B	1.0	0.00019
2030476025	0.161	SO	SFR-B	1.0	0.00019
2030476026	0.161	SO	SFR-B	1.0	0.00019
2030476027	0.161	SO	SFR-B	1.0	0.00019
2030476028	0.161	SO	SFR-B	1.0	0.00019
2030476029	0.161	SO	SFR-B	1.0	0.00019
2030476030	0.161	SO	SFR-B	1.0	0.00019
2030476031	0.161	SO	SFR-B	1.0	0.00019
2030476032	0.157	SO	SFR-B	1.0	0.00019
2030476033	0.154	SO	SFR-B	1.0	0.00019
2030476034	0.154	SO	SFR-B	1.0	0.00019
2030477001	0.168	SO	SFR-B	1.0	0.00019
2030477002	0.158	SO	SFR-B	1.0	0.00019
2030477003	0.162	SO	SFR-B	1.0	0.00019
2030477004	0.161	SO	SFR-B	1.0	0.00019
2030477005	0.165	SO	SFR-B	1.0	0.00019
2030477006	0.158	SO	SFR-B	1.0	0.00019
2030477007	0.173	SO	SFR-B	1.0	0.00019
2030477008	0.147	SO	SFR-B	1.0	0.00019
2030477009	0.165	SO	SFR-B	1.0	0.00019
2030477010	0.188	SO	SFR-B	1.0	0.00019
2030477011	0.193	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2030477012	0.192	SO	SFR-B	1.0	0.00019
2030477013	0.198	SO	SFR-B	1.0	0.00019
2030477014	0.187	SO	SFR-B	1.0	0.00019
2030477015	0.182	SO	SFR-B	1.0	0.00019
2030477017	0.246	SO	SFR-B	1.0	0.00019
2030477018	0.239	SO	SFR-B	1.0	0.00019
2030477019	0.241	SO	SFR-B	1.0	0.00019
2030477020	0.242	SO	SFR-B	1.0	0.00019
2030477021	0.224	SO	SFR-B	1.0	0.00019
2030477022	0.260	SO	SFR-C	1.6	0.00031
2030477023	0.242	SO	SFR-B	1.0	0.00019
2030477024	0.239	SO	SFR-B	1.0	0.00019
2030477025	0.244	SO	SFR-B	1.0	0.00019
2030477026	0.243	SO	SFR-B	1.0	0.00019
2030477027	0.233	SO	SFR-B	1.0	0.00019
2030478001	0.259	SO	SFR-C	1.6	0.00031
2030478002	0.256	SO	SFR-C	1.6	0.00031
2030478003	0.259	SO	SFR-C	1.6	0.00031
2030478006	0.252	SO	SFR-C	1.6	0.00031
2030478008	0.252	SO	SFR-C	1.6	0.00031
2030478009	0.240	SO	SFR-B	1.0	0.00019
2030478013	0.241	SO	MFR	1.9	0.00037
2030478017	0.732	SO	MFR	5.2	0.00100
2030478037	0.256	SO	SFR-C	1.6	0.00031
2030478038	0.253	SO	SFR-C	1.6	0.00031
2030478039	0.258	SO	SFR-C	1.6	0.00031
2030478044	0.732	SO	MFR	5.3	0.00102
2030478064	0.476	SO	MFR	3.5	0.00067
2030478072	0.256	SO	SFR-C	1.6	0.00031
2030478073	0.258	SO	SFR-C	1.6	0.00031
2030478074	0.488	SO	MFR	3.8	0.00073
2031101001	0.643	SO	SFR-D	2.4	0.00046
2031101002	0.212	SO	SFR-B	1.0	0.00019
2031101003	0.431	SO	SFR-C	1.6	0.00031
2031101004	0.321	SO	SFR-C	1.6	0.00031
2031101005	0.321	SO	SFR-C	1.6	0.00031
2031101006	0.401	SO	SFR-C	1.6	0.00031
2031101007	0.402	SO	SFR-C	1.6	0.00031
2031101008	0.321	SO	SFR-C	1.6	0.00031
2031101009	0.321	SO	SFR-C	1.6	0.00031
2031101010	0.321	SO	SFR-C	1.6	0.00031
2031101011	0.321	SO	SFR-C	1.6	0.00031
2031101012	0.402	SO	SFR-C	1.6	0.00031
2031101013	0.274	SO	SFR-C	1.6	0.00031
2031101014	0.161	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031101015	0.161	SO	SFR-B	1.0	0.00019
2031101016	0.241	SO	SFR-B	1.0	0.00019
2031101017	0.241	SO	SFR-B	1.0	0.00019
2031101018	0.161	SO	SFR-B	1.0	0.00019
2031101019	0.161	SO	SFR-B	1.0	0.00019
2031101020	0.161	SO	SFR-B	1.0	0.00019
2031101021	0.170	SO	SFR-B	1.0	0.00019
2031101022	0.188	SO	SFR-B	1.0	0.00019
2031101023	0.321	SO	SFR-C	1.6	0.00031
2031101024	0.321	SO	SFR-C	1.6	0.00031
2031101025	0.321	SO	SFR-C	1.6	0.00031
2031101026	0.322	SO	SFR-C	1.6	0.00031
2031101027	0.321	SO	SFR-C	1.6	0.00031
2031101028	0.321	SO	SFR-C	1.6	0.00031
2031101029	0.402	SO	SFR-C	1.6	0.00031
2031101030	0.402	SO	SFR-C	1.6	0.00031
2031101031	0.321	SO	SFR-C	1.6	0.00031
2031101032	0.321	SO	SFR-C	1.6	0.00031
2031101033	0.321	SO	SFR-C	1.6	0.00031
2031101034	0.321	SO	SFR-C	1.6	0.00031
2031101035	0.402	SO	SFR-C	1.6	0.00031
2031101036	0.273	SO	SFR-C	1.6	0.00031
2031101037	0.219	SO	SFR-B	1.0	0.00019
2031101038	0.212	SO	SFR-B	1.0	0.00019
2031101039	0.212	SO	SFR-B	1.0	0.00019
2031101040	0.199	SO	SFR-B	1.0	0.00019
2031101041	0.202	SO	SFR-B	1.0	0.00019
2031101042	0.202	SO	SFR-B	1.0	0.00019
2031101043	0.199	SO	SFR-B	1.0	0.00019
2031101044	0.198	SO	SFR-B	1.0	0.00019
2031102001	0.340	SO	SFR-C	1.6	0.00031
2031102002	0.340	SO	SFR-C	1.6	0.00031
2031102003	0.340	SO	SFR-C	1.6	0.00031
2031102004	0.340	SO	SFR-C	1.6	0.00031
2031102005	0.340	SO	SFR-C	1.6	0.00031
2031102006	0.340	SO	SFR-C	1.6	0.00031
2031102007	0.425	SO	SFR-C	1.6	0.00031
2031102008	0.425	SO	SFR-C	1.6	0.00031
2031102009	0.340	SO	SFR-C	1.6	0.00031
2031102010	0.340	SO	SFR-C	1.6	0.00031
2031102011	0.340	SO	SFR-C	1.6	0.00031
2031102012	0.340	SO	SFR-C	1.6	0.00031
2031102013	0.340	SO	SFR-C	1.6	0.00031
2031102014	0.153	SO	SFR-B	1.0	0.00019
2031102017	0.153	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031102018	0.153	SO	SFR-B	1.0	0.00019
2031102019	0.153	SO	SFR-B	1.0	0.00019
2031102020	0.153	SO	SFR-B	1.0	0.00019
2031102021	0.153	SO	SFR-B	1.0	0.00019
2031102022	0.153	SO	SFR-B	1.0	0.00019
2031102023	0.153	SO	SFR-B	1.0	0.00019
2031102024	0.153	SO	SFR-B	1.0	0.00019
2031102025	0.153	SO	SFR-B	1.0	0.00019
2031102026	0.153	SO	SFR-B	1.0	0.00019
2031102027	0.229	SO	SFR-B	1.0	0.00019
2031102028	0.229	SO	SFR-B	1.0	0.00019
2031102031	0.153	SO	SFR-B	1.0	0.00019
2031102032	0.153	SO	SFR-B	1.0	0.00019
2031102033	0.153	SO	SFR-B	1.0	0.00019
2031102034	0.214	SO	SFR-B	1.0	0.00019
2031102035	0.183	SO	SFR-B	1.0	0.00019
2031102039	0.260	SO	SFR-C	1.6	0.00031
2031102040	0.305	SO	SFR-C	1.6	0.00031
2031102041	0.260	SO	SFR-C	1.6	0.00031
2031102043	0.153	SO	SFR-B	1.0	0.00019
2031102044	0.153	SO	SFR-B	1.0	0.00019
2031103001	0.143	SO	SFR-B	1.0	0.00019
2031103002	0.143	SO	SFR-B	1.0	0.00019
2031103003	0.143	SO	SFR-B	1.0	0.00019
2031103004	0.143	SO	SFR-B	1.0	0.00019
2031103005	0.143	SO	SFR-B	1.0	0.00019
2031103008	0.143	SO	SFR-B	1.0	0.00019
2031103009	0.143	SO	SFR-B	1.0	0.00019
2031103010	0.143	SO	SFR-B	1.0	0.00019
2031103011	0.143	SO	SFR-B	1.0	0.00019
2031103012	0.144	SO	SFR-B	1.0	0.00019
2031103013	0.158	SO	SFR-B	1.0	0.00019
2031103014	0.201	SO	SFR-B	1.0	0.00019
2031103015	0.216	SO	SFR-B	1.0	0.00019
2031103016	0.144	SO	SFR-B	1.0	0.00019
2031103017	0.144	SO	SFR-B	1.0	0.00019
2031103018	0.144	SO	SFR-B	1.0	0.00019
2031103019	0.144	SO	SFR-B	1.0	0.00019
2031103020	0.144	SO	SFR-B	1.0	0.00019
2031103021	0.144	SO	SFR-B	1.0	0.00019
2031103022	0.144	SO	SFR-B	1.0	0.00019
2031103023	0.144	SO	SFR-B	1.0	0.00019
2031103024	0.144	SO	SFR-B	1.0	0.00019
2031103025	0.144	SO	SFR-B	1.0	0.00019
2031103026	0.201	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031103028	0.231	SO	SFR-B	1.0	0.00019
2031103029	0.144	SO	SFR-B	1.0	0.00019
2031103030	0.144	SO	SFR-B	1.0	0.00019
2031103031	0.144	SO	SFR-B	1.0	0.00019
2031103032	0.144	SO	SFR-B	1.0	0.00019
2031103033	0.144	SO	SFR-B	1.0	0.00019
2031103034	0.217	SO	SFR-B	1.0	0.00019
2031103035	0.216	SO	SFR-B	1.0	0.00019
2031103036	0.144	SO	SFR-B	1.0	0.00019
2031103037	0.177	SO	SFR-B	1.0	0.00019
2031103039	0.693	SO	NR	6.0	0.00115
2031103040	2.152	SO	NR	18.6	0.00358
2031103041	0.205	SO	SFR-B	1.0	0.00019
2031103042	0.184	SO	SFR-B	1.0	0.00019
2031103043	0.208	SO	SFR-B	1.0	0.00019
2031103044	0.236	SO	SFR-B	1.0	0.00019
2031103045	0.291	SO	SFR-C	1.6	0.00031
2031103046	0.338	SO	SFR-C	1.6	0.00031
2031103047	0.288	SO	SFR-C	1.6	0.00031
2031103048	0.231	SO	SFR-B	1.0	0.00019
2031103049	0.201	SO	SFR-B	1.0	0.00019
2031103050	0.201	SO	SFR-B	1.0	0.00019
2031103051	0.201	SO	SFR-B	1.0	0.00019
2031103052	0.201	SO	SFR-B	1.0	0.00019
2031103053	0.201	SO	SFR-B	1.0	0.00019
2031103054	0.199	SO	SFR-B	1.0	0.00019
2031103055	0.183	SO	SFR-B	1.0	0.00019
2031103056	0.181	SO	SFR-B	1.0	0.00019
2031103057	0.181	SO	SFR-B	1.0	0.00019
2031103058	0.182	SO	SFR-B	1.0	0.00019
2031103059	0.182	SO	SFR-B	1.0	0.00019
2031103060	0.182	SO	SFR-B	1.0	0.00019
2031103061	0.182	SO	SFR-B	1.0	0.00019
2031103062	0.189	SO	SFR-B	1.0	0.00019
2031103063	0.189	SO	SFR-B	1.0	0.00019
2031103064	0.207	SO	SFR-B	1.0	0.00019
2031103066	0.143	SO	SFR-B	1.0	0.00019
2031103067	0.143	SO	SFR-B	1.0	0.00019
2031104001	0.214	SO	SFR-B	1.0	0.00019
2031104002	0.151	SO	SFR-B	1.0	0.00019
2031104003	0.160	SO	SFR-B	1.0	0.00019
2031104004	0.170	SO	SFR-B	1.0	0.00019
2031104005	0.167	SO	SFR-B	1.0	0.00019
2031104006	0.167	SO	SFR-B	1.0	0.00019
2031104007	0.167	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031104008	0.167	SO	SFR-B	1.0	0.00019
2031104009	0.170	SO	SFR-B	1.0	0.00019
2031104010	0.170	SO	SFR-B	1.0	0.00019
2031104011	0.167	SO	SFR-B	1.0	0.00019
2031104012	0.167	SO	SFR-B	1.0	0.00019
2031104013	0.182	SO	SFR-B	1.0	0.00019
2031104014	0.182	SO	SFR-B	1.0	0.00019
2031104015	0.182	SO	SFR-B	1.0	0.00019
2031104016	0.186	SO	SFR-B	1.0	0.00019
2031104017	0.167	SO	SFR-B	1.0	0.00019
2031104018	0.167	SO	SFR-B	1.0	0.00019
2031104019	0.167	SO	SFR-B	1.0	0.00019
2031104020	0.167	SO	SFR-B	1.0	0.00019
2031104021	0.173	SO	SFR-B	1.0	0.00019
2031104022	0.212	SO	SFR-B	1.0	0.00019
2031104023	0.233	SO	SFR-B	1.0	0.00019
2031104024	0.159	SO	SFR-B	1.0	0.00019
2031104025	0.147	SO	SFR-B	1.0	0.00019
2031104026	0.146	SO	SFR-B	1.0	0.00019
2031104027	0.170	SO	SFR-B	1.0	0.00019
2031104028	0.167	SO	SFR-B	1.0	0.00019
2031104029	0.167	SO	SFR-B	1.0	0.00019
2031104030	0.167	SO	SFR-B	1.0	0.00019
2031104031	0.167	SO	SFR-B	1.0	0.00019
2031104032	0.170	SO	SFR-B	1.0	0.00019
2031104033	0.170	SO	SFR-B	1.0	0.00019
2031104034	0.167	SO	SFR-B	1.0	0.00019
2031104035	0.167	SO	SFR-B	1.0	0.00019
2031104036	0.182	SO	SFR-B	1.0	0.00019
2031104037	0.182	SO	SFR-B	1.0	0.00019
2031104038	0.182	SO	SFR-B	1.0	0.00019
2031104039	0.186	SO	SFR-B	1.0	0.00019
2031104040	0.167	SO	SFR-B	1.0	0.00019
2031104041	0.167	SO	SFR-B	1.0	0.00019
2031104042	0.167	SO	SFR-B	1.0	0.00019
2031104043	0.167	SO	SFR-B	1.0	0.00019
2031104044	0.173	SO	SFR-B	1.0	0.00019
2031105001	0.821	SO	MFR	5.2	0.00100
2031126001	0.952	SO	MFR	5.3	0.00102
2031126002	2.285	SO	MFR	12.4	0.00238
2031127001	0.204	SO	SFR-B	1.0	0.00019
2031127002	0.255	SO	SFR-C	1.6	0.00031
2031127007	0.255	SO	SFR-C	1.6	0.00031
2031127010	0.170	SO	SFR-B	1.0	0.00019
2031127011	0.209	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031127012	0.183	SO	SFR-B	1.0	0.00019
2031127013	0.153	SO	SFR-B	1.0	0.00019
2031127014	0.153	SO	SFR-B	1.0	0.00019
2031127015	0.153	SO	SFR-B	1.0	0.00019
2031127016	0.153	SO	SFR-B	1.0	0.00019
2031127017	0.153	SO	SFR-B	1.0	0.00019
2031127018	0.153	SO	SFR-B	1.0	0.00019
2031127019	0.153	SO	SFR-B	1.0	0.00019
2031127020	0.153	SO	SFR-B	1.0	0.00019
2031127021	0.153	SO	SFR-B	1.0	0.00019
2031127022	0.188	SO	SFR-B	1.0	0.00019
2031127023	0.255	SO	SFR-C	1.6	0.00031
2031127024	0.255	SO	SFR-C	1.6	0.00031
2031127026	0.170	SO	SFR-B	1.0	0.00019
2031127027	0.170	SO	SFR-B	1.0	0.00019
2031128001	3.233	SO	MFR	17.2	0.00331
2031128002	0.272	SO	NR	2.4	0.00046
2031128003	0.130	SO	MFR	0.7	0.00013
2031129014	0.156	SO	SFR-B	1.0	0.00019
2031129015	0.146	SO	SFR-B	1.0	0.00019
2031129016	0.146	SO	SFR-B	1.0	0.00019
2031129017	0.146	SO	SFR-B	1.0	0.00019
2031129018	0.143	SO	SFR-B	1.0	0.00019
2031129019	0.143	SO	SFR-B	1.0	0.00019
2031129020	0.143	SO	SFR-B	1.0	0.00019
2031129021	0.143	SO	SFR-B	1.0	0.00019
2031129022	0.143	SO	SFR-B	1.0	0.00019
2031129023	0.143	SO	SFR-B	1.0	0.00019
2031129024	0.143	SO	SFR-B	1.0	0.00019
2031129025	0.133	SO	SFR-B	1.0	0.00019
2031129026	0.133	SO	SFR-B	1.0	0.00019
2031129027	1.609	SO	MFR	9.0	0.00173
2031130002	0.156	SO	SFR-B	1.0	0.00019
2031130003	0.146	SO	SFR-B	1.0	0.00019
2031130004	0.146	SO	SFR-B	1.0	0.00019
2031130005	0.143	SO	SFR-B	1.0	0.00019
2031130006	0.143	SO	SFR-B	1.0	0.00019
2031130007	0.143	SO	SFR-B	1.0	0.00019
2031130008	0.143	SO	SFR-B	1.0	0.00019
2031130009	0.143	SO	SFR-B	1.0	0.00019
2031130010	0.143	SO	SFR-B	1.0	0.00019
2031130011	0.143	SO	SFR-B	1.0	0.00019
2031130012	0.143	SO	SFR-B	1.0	0.00019
2031130013	0.133	SO	SFR-B	1.0	0.00019
2031130014	0.133	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031130016	0.163	SO	SFR-B	1.0	0.00019
2031130017	0.143	SO	SFR-B	1.0	0.00019
2031130018	0.143	SO	SFR-B	1.0	0.00019
2031130019	0.143	SO	SFR-B	1.0	0.00019
2031130020	0.143	SO	SFR-B	1.0	0.00019
2031130021	0.143	SO	SFR-B	1.0	0.00019
2031130022	0.143	SO	SFR-B	1.0	0.00019
2031130023	0.143	SO	SFR-B	1.0	0.00019
2031130024	0.143	SO	SFR-B	1.0	0.00019
2031130025	0.143	SO	SFR-B	1.0	0.00019
2031130026	0.143	SO	SFR-B	1.0	0.00019
2031130027	0.133	SO	SFR-B	1.0	0.00019
2031130028	0.133	SO	SFR-B	1.0	0.00019
2031151001	1.800	SO	NR	16.0	0.00308
2031151002	5.077	SO	NR	46.1	0.00886
2031151003	0.246	SO	SFR-B	1.0	0.00019
2031151004	0.208	SO	SFR-B	1.0	0.00019
2031151005	0.227	SO	SFR-B	1.0	0.00019
2031151006	0.273	SO	SFR-C	1.6	0.00031
2031151007	0.228	SO	SFR-B	1.0	0.00019
2031151008	0.301	SO	SFR-C	1.6	0.00031
2031151009	0.301	SO	SFR-C	1.6	0.00031
2031151010	0.299	SO	SFR-C	1.6	0.00031
2031151011	0.281	SO	SFR-C	1.6	0.00031
2031151012	0.235	SO	SFR-B	1.0	0.00019
2031151013	0.272	SO	SFR-C	1.6	0.00031
2031151014	0.228	SO	SFR-B	1.0	0.00019
2031151015	0.207	SO	SFR-B	1.0	0.00019
2031151016	0.173	SO	SFR-B	1.0	0.00019
2031151017	0.170	SO	SFR-B	1.0	0.00019
2031151018	0.169	SO	SFR-B	1.0	0.00019
2031151019	0.172	SO	SFR-B	1.0	0.00019
2031151020	0.174	SO	SFR-B	1.0	0.00019
2031151021	0.207	SO	NR	1.6	0.00031
2031151022	0.103	SO	NR	0.8	0.00015
2031151023	0.103	SO	SFR-A	0.7	0.00013
2031151024	0.103	SO	SFR-A	0.7	0.00013
2031151025	0.103	SO	SFR-A	0.7	0.00013
2031151026	0.103	SO	SFR-A	0.7	0.00013
2031151027	0.103	SO	SFR-A	0.7	0.00013
2031151028	0.103	SO	SFR-A	0.7	0.00013
2031151029	0.103	SO	SFR-A	0.7	0.00013
2031151030	0.103	SO	SFR-A	0.7	0.00013
2031151031	0.103	SO	SFR-A	0.7	0.00013
2031151032	0.103	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031151033	0.103	SO	SFR-A	0.7	0.00013
2031151034	0.103	SO	SFR-A	0.7	0.00013
2031151035	0.103	SO	SFR-A	0.7	0.00013
2031151036	0.103	SO	SFR-A	0.7	0.00013
2031151037	0.103	SO	SFR-A	0.7	0.00013
2031151038	0.103	SO	SFR-A	0.7	0.00013
2031151039	0.103	SO	SFR-A	0.7	0.00013
2031151040	0.103	SO	SFR-A	0.7	0.00013
2031151041	0.103	SO	SFR-A	0.7	0.00013
2031151047	0.154	SO	SFR-B	1.0	0.00019
2031151048	0.134	SO	SFR-B	1.0	0.00019
2031151049	0.206	SO	SFR-B	1.0	0.00019
2031151051	0.103	SO	SFR-A	0.7	0.00013
2031151052	0.103	SO	SFR-A	0.7	0.00013
2031151053	0.103	SO	SFR-A	0.7	0.00013
2031151054	0.103	SO	SFR-A	0.7	0.00013
2031152001	0.304	SO	SFR-C	1.6	0.00031
2031152002	0.209	SO	SFR-B	1.0	0.00019
2031152003	0.202	SO	SFR-B	1.0	0.00019
2031152004	0.177	SO	SFR-B	1.0	0.00019
2031152005	0.173	SO	SFR-B	1.0	0.00019
2031152006	0.173	SO	SFR-B	1.0	0.00019
2031152007	0.173	SO	SFR-B	1.0	0.00019
2031152008	0.173	SO	SFR-B	1.0	0.00019
2031152009	0.170	SO	SFR-B	1.0	0.00019
2031152010	0.173	SO	SFR-B	1.0	0.00019
2031152011	0.170	SO	SFR-B	1.0	0.00019
2031152012	0.170	SO	SFR-B	1.0	0.00019
2031152013	0.170	SO	SFR-B	1.0	0.00019
2031152014	0.170	SO	SFR-B	1.0	0.00019
2031152015	0.170	SO	SFR-B	1.0	0.00019
2031152016	0.170	SO	SFR-B	1.0	0.00019
2031152017	0.164	SO	SFR-B	1.0	0.00019
2031152018	0.167	SO	SFR-B	1.0	0.00019
2031152019	0.167	SO	SFR-B	1.0	0.00019
2031152020	0.167	SO	SFR-B	1.0	0.00019
2031152021	0.167	SO	SFR-B	1.0	0.00019
2031152022	0.167	SO	SFR-B	1.0	0.00019
2031152023	0.145	SO	SFR-B	1.0	0.00019
2031152024	0.173	SO	SFR-B	1.0	0.00019
2031152025	0.182	SO	SFR-B	1.0	0.00019
2031152026	0.165	SO	SFR-B	1.0	0.00019
2031152027	0.161	SO	SFR-B	1.0	0.00019
2031152028	0.176	SO	SFR-B	1.0	0.00019
2031152029	0.176	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031152030	0.176	SO	SFR-B	1.0	0.00019
2031152031	0.176	SO	SFR-B	1.0	0.00019
2031152032	0.176	SO	SFR-B	1.0	0.00019
2031152033	0.101	SO	MFR	0.5	0.00010
2031152034	0.101	SO	MFR	0.6	0.00012
2031152035	0.201	SO	MFR	1.3	0.00025
2031152036	0.100	SO	MFR	0.6	0.00012
2031152037	0.098	SO	MFR	0.4	0.00008
2031152040	0.097	SO	MFR	0.7	0.00013
2031152041	0.097	SO	MFR	0.6	0.00012
2031152044	0.195	SO	MFR	1.4	0.00027
2031152045	0.198	SO	MFR	1.2	0.00023
2031152046	0.097	SO	MFR	0.7	0.00013
2031152047	0.097	SO	MFR	0.8	0.00015
2031152050	0.189	SO	MFR	1.2	0.00023
2031152051	0.220	SO	MFR	1.7	0.00033
2031152052	0.198	SO	MFR	1.4	0.00027
2031152053	0.198	SO	MFR	1.1	0.00021
2031153003	0.106	SO	SFR-A	0.7	0.00013
2031153004	0.106	SO	SFR-A	0.7	0.00013
2031153005	0.106	SO	SFR-A	0.7	0.00013
2031153006	0.106	SO	SFR-A	0.7	0.00013
2031153007	0.106	SO	SFR-A	0.7	0.00013
2031153008	0.106	SO	SFR-A	0.7	0.00013
2031153009	0.106	SO	SFR-A	0.7	0.00013
2031153010	0.106	SO	SFR-A	0.7	0.00013
2031153011	0.106	SO	SFR-A	0.7	0.00013
2031153012	0.106	SO	SFR-A	0.7	0.00013
2031153013	0.106	SO	SFR-A	0.7	0.00013
2031153014	0.106	SO	SFR-A	0.7	0.00013
2031153015	0.106	SO	SFR-A	0.7	0.00013
2031153016	0.106	SO	SFR-A	0.7	0.00013
2031153017	0.106	SO	SFR-A	0.7	0.00013
2031153018	0.106	SO	SFR-A	0.7	0.00013
2031153019	0.106	SO	SFR-A	0.7	0.00013
2031153020	0.106	SO	SFR-A	0.7	0.00013
2031153021	0.106	SO	SFR-A	0.7	0.00013
2031153022	0.106	SO	SFR-A	0.7	0.00013
2031153023	0.106	SO	SFR-A	0.7	0.00013
2031153024	0.106	SO	SFR-A	0.7	0.00013
2031153025	0.106	SO	SFR-A	0.7	0.00013
2031153026	0.106	SO	SFR-A	0.7	0.00013
2031153027	0.106	SO	SFR-A	0.7	0.00013
2031153028	0.106	SO	SFR-A	0.7	0.00013
2031153034	0.106	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031153035	0.106	SO	SFR-A	0.7	0.00013
2031153036	0.106	SO	SFR-A	0.7	0.00013
2031153037	0.106	SO	SFR-A	0.7	0.00013
2031153038	0.106	SO	SFR-A	0.7	0.00013
2031153039	0.106	SO	SFR-A	0.7	0.00013
2031153040	0.106	SO	SFR-A	0.7	0.00013
2031153041	0.106	SO	SFR-A	0.7	0.00013
2031153042	0.106	SO	SFR-A	0.7	0.00013
2031153043	0.106	SO	SFR-A	0.7	0.00013
2031153044	0.106	SO	SFR-A	0.7	0.00013
2031153045	0.106	SO	SFR-A	0.7	0.00013
2031153046	0.106	SO	SFR-A	0.7	0.00013
2031153047	0.106	SO	SFR-A	0.7	0.00013
2031153048	0.106	SO	SFR-A	0.7	0.00013
2031153049	0.106	SO	SFR-A	0.7	0.00013
2031153050	0.106	SO	SFR-A	0.7	0.00013
2031153051	0.159	SO	SFR-B	1.0	0.00019
2031153054	0.106	SO	SFR-A	0.7	0.00013
2031153055	0.106	SO	SFR-A	0.7	0.00013
2031153056	0.159	SO	SFR-B	1.0	0.00019
2031153061	0.146	SO	SFR-B	1.0	0.00019
2031153062	0.310	SO	NR	2.7	0.00052
2031153063	0.158	SO	SFR-B	1.0	0.00019
2031153064	0.159	SO	SFR-B	1.0	0.00019
2031153065	0.171	SO	SFR-B	1.0	0.00019
2031153066	0.315	SO	NR	2.8	0.00054
2031153067	0.202	SO	SFR-B	1.0	0.00019
2031154001	0.117	SO	NR	0.9	0.00017
2031154002	0.110	SO	NR	0.7	0.00013
2031154003	0.110	SO	NR	1.0	0.00019
2031154004	0.110	SO	SFR-A	0.7	0.00013
2031154005	0.110	SO	SFR-A	0.7	0.00013
2031154006	0.110	SO	SFR-A	0.7	0.00013
2031154007	0.110	SO	SFR-A	0.7	0.00013
2031154008	0.110	SO	SFR-A	0.7	0.00013
2031154009	0.110	SO	SFR-A	0.7	0.00013
2031154010	0.110	SO	SFR-A	0.7	0.00013
2031154012	0.110	SO	SFR-A	0.7	0.00013
2031154013	0.110	SO	SFR-A	0.7	0.00013
2031154014	0.110	SO	SFR-A	0.7	0.00013
2031154015	0.110	SO	SFR-A	0.7	0.00013
2031154016	0.165	SO	SFR-B	1.0	0.00019
2031154017	0.165	SO	SFR-B	1.0	0.00019
2031154018	0.110	SO	SFR-A	0.7	0.00013
2031154019	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031154020	0.110	SO	SFR-A	0.7	0.00013
2031154021	0.110	SO	SFR-A	0.7	0.00013
2031154022	0.110	SO	SFR-A	0.7	0.00013
2031154023	0.165	SO	SFR-B	1.0	0.00019
2031154024	0.165	SO	SFR-B	1.0	0.00019
2031154025	0.110	SO	SFR-A	0.7	0.00013
2031154026	0.160	SO	SFR-B	1.0	0.00019
2031154027	0.165	SO	SFR-B	1.0	0.00019
2031154028	0.113	SO	NR	0.7	0.00013
2031154029	0.110	SO	NR	0.6	0.00012
2031154030	0.110	SO	NR	1.0	0.00019
2031154031	0.110	SO	SFR-A	0.7	0.00013
2031154032	0.110	SO	SFR-A	0.7	0.00013
2031154033	0.110	SO	SFR-A	0.7	0.00013
2031154034	0.110	SO	SFR-A	0.7	0.00013
2031154035	0.110	SO	SFR-A	0.7	0.00013
2031154036	0.110	SO	SFR-A	0.7	0.00013
2031154037	0.110	SO	SFR-A	0.7	0.00013
2031154038	0.110	SO	SFR-A	0.7	0.00013
2031154039	0.110	SO	SFR-A	0.7	0.00013
2031154040	0.110	SO	SFR-A	0.7	0.00013
2031154041	0.109	SO	SFR-A	0.7	0.00013
2031154042	0.110	SO	SFR-A	0.7	0.00013
2031154043	0.110	SO	SFR-A	0.7	0.00013
2031154044	0.110	SO	SFR-A	0.7	0.00013
2031154045	0.110	SO	SFR-A	0.7	0.00013
2031154046	0.110	SO	SFR-A	0.7	0.00013
2031154047	0.110	SO	SFR-A	0.7	0.00013
2031154048	0.110	SO	SFR-A	0.7	0.00013
2031154049	0.110	SO	SFR-A	0.7	0.00013
2031154050	0.110	SO	SFR-A	0.7	0.00013
2031154051	0.110	SO	SFR-A	0.7	0.00013
2031154052	0.110	SO	SFR-A	0.7	0.00013
2031154053	0.110	SO	SFR-A	0.7	0.00013
2031154054	0.110	SO	SFR-A	0.7	0.00013
2031154055	0.110	SO	SFR-A	0.7	0.00013
2031154056	0.110	SO	SFR-A	0.7	0.00013
2031154057	0.110	SO	SFR-A	0.7	0.00013
2031154058	0.114	SO	SFR-A	0.7	0.00013
2031154059	0.110	SO	SFR-A	0.7	0.00013
2031154060	0.110	SO	SFR-A	0.7	0.00013
2031155003	0.110	SO	SFR-A	0.7	0.00013
2031155007	0.165	SO	SFR-B	1.0	0.00019
2031155008	0.165	SO	SFR-B	1.0	0.00019
2031155009	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031155010	0.220	SO	SFR-B	1.0	0.00019
2031155011	0.110	SO	SFR-A	0.7	0.00013
2031155012	0.110	SO	SFR-A	0.7	0.00013
2031155013	0.110	SO	SFR-A	0.7	0.00013
2031155014	0.110	SO	SFR-A	0.7	0.00013
2031155015	0.110	SO	SFR-A	0.7	0.00013
2031155016	0.110	SO	SFR-A	0.7	0.00013
2031155017	0.110	SO	SFR-A	0.7	0.00013
2031155018	0.110	SO	SFR-A	0.7	0.00013
2031155019	0.110	SO	SFR-A	0.7	0.00013
2031155020	0.110	SO	SFR-A	0.7	0.00013
2031155021	0.110	SO	SFR-A	0.7	0.00013
2031155022	0.110	SO	SFR-A	0.7	0.00013
2031155023	0.110	SO	SFR-A	0.7	0.00013
2031155024	0.110	SO	SFR-A	0.7	0.00013
2031155025	0.110	SO	SFR-A	0.7	0.00013
2031155026	0.110	SO	SFR-A	0.7	0.00013
2031155027	0.117	SO	SFR-A	0.7	0.00013
2031155028	0.223	SO	NR	2.0	0.00038
2031155029	0.110	SO	NR	1.0	0.00019
2031155030	0.110	SO	SFR-A	0.7	0.00013
2031155031	0.110	SO	SFR-A	0.7	0.00013
2031155032	0.110	SO	SFR-A	0.7	0.00013
2031155033	0.110	SO	SFR-A	0.7	0.00013
2031155034	0.110	SO	SFR-A	0.7	0.00013
2031155037	0.110	SO	SFR-A	0.7	0.00013
2031155038	0.110	SO	SFR-A	0.7	0.00013
2031155039	0.109	SO	SFR-A	0.7	0.00013
2031155040	0.110	SO	SFR-A	0.7	0.00013
2031155041	0.110	SO	SFR-A	0.7	0.00013
2031155042	0.110	SO	SFR-A	0.7	0.00013
2031155043	0.110	SO	SFR-A	0.7	0.00013
2031155044	0.110	SO	SFR-A	0.7	0.00013
2031155045	0.110	SO	SFR-A	0.7	0.00013
2031155046	0.110	SO	SFR-A	0.7	0.00013
2031155047	0.110	SO	SFR-A	0.7	0.00013
2031155048	0.110	SO	SFR-A	0.7	0.00013
2031155049	0.110	SO	SFR-A	0.7	0.00013
2031155050	0.110	SO	SFR-A	0.7	0.00013
2031155051	0.110	SO	SFR-A	0.7	0.00013
2031155052	0.110	SO	SFR-A	0.7	0.00013
2031155053	0.110	SO	SFR-A	0.7	0.00013
2031155054	0.110	SO	SFR-A	0.7	0.00013
2031155055	0.110	SO	SFR-A	0.7	0.00013
2031155056	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031155057	0.128	SO	SFR-B	1.0	0.00019
2031155058	0.110	SO	SFR-A	0.7	0.00013
2031155059	0.110	SO	SFR-A	0.7	0.00013
2031155062	0.338	SO	NR	3.1	0.00060
2031155063	0.110	SO	SFR-A	0.7	0.00013
2031155064	0.110	SO	SFR-A	0.7	0.00013
2031155065	0.110	SO	SFR-A	0.7	0.00013
2031155066	0.110	SO	SFR-A	0.7	0.00013
2031176001	0.157	SO	SFR-B	1.0	0.00019
2031176002	0.143	SO	SFR-B	1.0	0.00019
2031176003	0.143	SO	SFR-B	1.0	0.00019
2031176004	0.143	SO	SFR-B	1.0	0.00019
2031176005	0.143	SO	SFR-B	1.0	0.00019
2031176006	0.143	SO	SFR-B	1.0	0.00019
2031176007	0.143	SO	SFR-B	1.0	0.00019
2031176008	0.143	SO	SFR-B	1.0	0.00019
2031176009	0.143	SO	SFR-B	1.0	0.00019
2031176010	0.143	SO	SFR-B	1.0	0.00019
2031176011	0.143	SO	SFR-B	1.0	0.00019
2031176012	0.133	SO	SFR-B	1.0	0.00019
2031176013	0.133	SO	SFR-B	1.0	0.00019
2031176015	0.154	SO	SFR-B	1.0	0.00019
2031176016	0.143	SO	SFR-B	1.0	0.00019
2031176017	0.143	SO	SFR-B	1.0	0.00019
2031176018	0.143	SO	SFR-B	1.0	0.00019
2031176019	0.143	SO	SFR-B	1.0	0.00019
2031176020	0.143	SO	SFR-B	1.0	0.00019
2031176021	0.143	SO	SFR-B	1.0	0.00019
2031176022	0.143	SO	SFR-B	1.0	0.00019
2031176023	0.143	SO	SFR-B	1.0	0.00019
2031176024	0.143	SO	SFR-B	1.0	0.00019
2031176025	0.143	SO	SFR-B	1.0	0.00019
2031176026	0.133	SO	SFR-B	1.0	0.00019
2031176027	0.133	SO	SFR-B	1.0	0.00019
2031177001	0.170	SO	SFR-B	1.0	0.00019
2031177002	0.174	SO	SFR-B	1.0	0.00019
2031177003	0.162	SO	SFR-B	1.0	0.00019
2031177004	0.175	SO	SFR-B	1.0	0.00019
2031177005	0.162	SO	SFR-B	1.0	0.00019
2031177006	0.175	SO	SFR-B	1.0	0.00019
2031177007	0.163	SO	SFR-B	1.0	0.00019
2031177008	0.198	SO	MFR	1.3	0.00025
2031177010	0.198	SO	MFR	0.9	0.00017
2031177011	0.196	SO	MFR	1.0	0.00019
2031177012	0.236	SO	MFR	1.4	0.00027

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031177013	0.129	SO	SFR-B	1.0	0.00019
2031177014	0.114	SO	SFR-A	0.7	0.00013
2031177015	0.114	SO	SFR-A	0.7	0.00013
2031177016	0.114	SO	SFR-A	0.7	0.00013
2031177017	0.114	SO	SFR-A	0.7	0.00013
2031177018	0.114	SO	SFR-A	0.7	0.00013
2031177019	0.115	SO	SFR-A	0.7	0.00013
2031177020	0.115	SO	SFR-A	0.7	0.00013
2031177021	0.115	SO	SFR-A	0.7	0.00013
2031177022	0.115	SO	SFR-A	0.7	0.00013
2031177023	0.115	SO	SFR-A	0.7	0.00013
2031177024	0.102	SO	SFR-A	0.7	0.00013
2031177025	0.102	SO	SFR-A	0.7	0.00013
2031177026	0.134	SO	SFR-B	1.0	0.00019
2031177027	0.103	SO	SFR-A	0.7	0.00013
2031177028	0.103	SO	SFR-A	0.7	0.00013
2031177029	0.103	SO	SFR-A	0.7	0.00013
2031177030	0.102	SO	SFR-A	0.7	0.00013
2031177031	0.103	SO	SFR-A	0.7	0.00013
2031177032	0.103	SO	SFR-A	0.7	0.00013
2031177033	0.103	SO	SFR-A	0.7	0.00013
2031177034	0.103	SO	SFR-A	0.7	0.00013
2031177035	0.103	SO	SFR-A	0.7	0.00013
2031177036	0.103	SO	SFR-A	0.7	0.00013
2031177037	0.103	SO	SFR-A	0.7	0.00013
2031177038	0.103	SO	SFR-A	0.7	0.00013
2031177039	0.103	SO	SFR-A	0.7	0.00013
2031177040	0.103	SO	SFR-A	0.7	0.00013
2031177041	0.103	SO	SFR-A	0.7	0.00013
2031177042	0.105	SO	SFR-A	0.7	0.00013
2031177043	0.134	SO	SFR-B	1.0	0.00019
2031177044	0.116	SO	SFR-A	0.7	0.00013
2031177045	0.116	SO	SFR-A	0.7	0.00013
2031177046	0.116	SO	SFR-A	0.7	0.00013
2031177047	0.116	SO	SFR-A	0.7	0.00013
2031177048	0.116	SO	SFR-A	0.7	0.00013
2031177049	0.115	SO	SFR-A	0.7	0.00013
2031177050	0.116	SO	SFR-A	0.7	0.00013
2031177051	0.117	SO	SFR-A	0.7	0.00013
2031177052	0.115	SO	SFR-A	0.7	0.00013
2031177053	0.115	SO	SFR-A	0.7	0.00013
2031177054	0.103	SO	SFR-A	0.7	0.00013
2031177055	0.103	SO	SFR-A	0.7	0.00013
2031177056	0.097	SO	MFR	0.7	0.00013
2031177057	0.098	SO	MFR	0.5	0.00010

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031178001	0.120	SO	SFR-A	0.7	0.00013
2031178002	0.106	SO	SFR-A	0.7	0.00013
2031178003	0.106	SO	SFR-A	0.7	0.00013
2031178004	0.106	SO	SFR-A	0.7	0.00013
2031178005	0.106	SO	SFR-A	0.7	0.00013
2031178006	0.106	SO	SFR-A	0.7	0.00013
2031178007	0.106	SO	SFR-A	0.7	0.00013
2031178008	0.106	SO	SFR-A	0.7	0.00013
2031178009	0.106	SO	SFR-A	0.7	0.00013
2031178010	0.106	SO	SFR-A	0.7	0.00013
2031178011	0.106	SO	SFR-A	0.7	0.00013
2031178012	0.106	SO	SFR-A	0.7	0.00013
2031178013	0.106	SO	SFR-A	0.7	0.00013
2031178014	0.106	SO	SFR-A	0.7	0.00013
2031178015	0.106	SO	SFR-A	0.7	0.00013
2031178016	0.106	SO	SFR-A	0.7	0.00013
2031178017	0.099	SO	SFR-A	0.7	0.00013
2031178018	0.152	SO	SFR-B	1.0	0.00019
2031178019	0.132	SO	SFR-B	1.0	0.00019
2031178020	0.106	SO	SFR-A	0.7	0.00013
2031178021	0.106	SO	SFR-A	0.7	0.00013
2031178022	0.106	SO	SFR-A	0.7	0.00013
2031178023	0.106	SO	SFR-A	0.7	0.00013
2031178024	0.106	SO	SFR-A	0.7	0.00013
2031178025	0.106	SO	SFR-A	0.7	0.00013
2031178026	0.106	SO	SFR-A	0.7	0.00013
2031178027	0.106	SO	SFR-A	0.7	0.00013
2031178028	0.106	SO	SFR-A	0.7	0.00013
2031178029	0.106	SO	SFR-A	0.7	0.00013
2031178030	0.106	SO	SFR-A	0.7	0.00013
2031178031	0.106	SO	SFR-A	0.7	0.00013
2031178036	0.158	SO	SFR-B	1.0	0.00019
2031178037	0.158	SO	SFR-B	1.0	0.00019
2031178038	0.172	SO	SFR-B	1.0	0.00019
2031178041	0.132	SO	SFR-B	1.0	0.00019
2031178042	0.132	SO	SFR-B	1.0	0.00019
2031178043	0.132	SO	SFR-B	1.0	0.00019
2031178044	0.132	SO	SFR-B	1.0	0.00019
2031178045	0.132	SO	SFR-B	1.0	0.00019
2031178046	0.133	SO	SFR-B	1.0	0.00019
2031178047	0.132	SO	SFR-B	1.0	0.00019
2031178048	0.132	SO	SFR-B	1.0	0.00019
2031178050	0.198	SO	SFR-B	1.0	0.00019
2031178051	0.132	SO	SFR-B	1.0	0.00019
2031178052	0.132	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031178055	0.106	SO	SFR-A	0.7	0.00013
2031178056	0.105	SO	SFR-A	0.7	0.00013
2031178058	0.172	SO	SFR-B	1.0	0.00019
2031178060	0.106	SO	SFR-A	0.7	0.00013
2031178061	0.106	SO	SFR-A	0.7	0.00013
2031178062	0.106	SO	SFR-A	0.7	0.00013
2031178063	0.105	SO	SFR-A	0.7	0.00013
2031178064	0.106	SO	SFR-A	0.7	0.00013
2031178065	0.106	SO	SFR-A	0.7	0.00013
2031178066	0.110	SO	SFR-A	0.7	0.00013
2031178067	0.106	SO	SFR-A	0.7	0.00013
2031178068	0.106	SO	SFR-A	0.7	0.00013
2031179004	0.138	SO	SFR-B	1.0	0.00019
2031179005	0.138	SO	SFR-B	1.0	0.00019
2031179006	0.138	SO	SFR-B	1.0	0.00019
2031179007	0.138	SO	SFR-B	1.0	0.00019
2031179008	0.138	SO	SFR-B	1.0	0.00019
2031179009	0.138	SO	SFR-B	1.0	0.00019
2031179010	0.138	SO	SFR-B	1.0	0.00019
2031179011	0.138	SO	SFR-B	1.0	0.00019
2031179012	0.138	SO	SFR-B	1.0	0.00019
2031179013	0.138	SO	SFR-B	1.0	0.00019
2031179014	0.172	SO	SFR-B	1.0	0.00019
2031179015	0.138	SO	SFR-B	1.0	0.00019
2031179016	0.138	SO	SFR-B	1.0	0.00019
2031179017	0.138	SO	SFR-B	1.0	0.00019
2031179018	0.138	SO	SFR-B	1.0	0.00019
2031179019	0.138	SO	SFR-B	1.0	0.00019
2031179020	0.138	SO	SFR-B	1.0	0.00019
2031179021	0.138	SO	SFR-B	1.0	0.00019
2031179022	0.138	SO	SFR-B	1.0	0.00019
2031179023	0.138	SO	SFR-B	1.0	0.00019
2031179027	0.144	SO	SFR-B	1.0	0.00019
2031179028	0.120	SO	SFR-A	0.7	0.00013
2031179029	0.110	SO	SFR-A	0.7	0.00013
2031179030	0.110	SO	SFR-A	0.7	0.00013
2031179031	0.110	SO	SFR-A	0.7	0.00013
2031179032	0.111	SO	SFR-A	0.7	0.00013
2031179033	0.110	SO	SFR-A	0.7	0.00013
2031179034	0.110	SO	SFR-A	0.7	0.00013
2031179035	0.110	SO	SFR-A	0.7	0.00013
2031179036	0.110	SO	SFR-A	0.7	0.00013
2031179037	0.110	SO	SFR-A	0.7	0.00013
2031179038	0.110	SO	SFR-A	0.7	0.00013
2031179039	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031179040	0.110	SO	SFR-A	0.7	0.00013
2031179041	0.110	SO	SFR-A	0.7	0.00013
2031179042	0.116	SO	SFR-A	0.7	0.00013
2031179043	0.111	SO	SFR-A	0.7	0.00013
2031179044	0.111	SO	SFR-A	0.7	0.00013
2031179045	0.110	SO	SFR-A	0.7	0.00013
2031179046	0.110	SO	SFR-A	0.7	0.00013
2031179047	0.110	SO	SFR-A	0.7	0.00013
2031179048	0.110	SO	SFR-A	0.7	0.00013
2031179049	0.110	SO	SFR-A	0.7	0.00013
2031179050	0.110	SO	SFR-A	0.7	0.00013
2031179051	0.110	SO	SFR-A	0.7	0.00013
2031179052	0.110	SO	SFR-A	0.7	0.00013
2031179053	0.110	SO	SFR-A	0.7	0.00013
2031179054	0.110	SO	SFR-A	0.7	0.00013
2031179055	0.110	SO	SFR-A	0.7	0.00013
2031179056	0.110	SO	SFR-A	0.7	0.00013
2031179057	0.110	SO	SFR-A	0.7	0.00013
2031179058	0.138	SO	SFR-B	1.0	0.00019
2031179059	0.127	SO	SFR-B	1.0	0.00019
2031179060	0.121	SO	SFR-A	0.7	0.00013
2031179061	0.152	SO	SFR-B	1.0	0.00019
2031179062	0.152	SO	SFR-B	1.0	0.00019
2031180001	0.167	SO	SFR-B	1.0	0.00019
2031180002	0.153	SO	SFR-B	1.0	0.00019
2031180003	0.154	SO	SFR-B	1.0	0.00019
2031180004	0.154	SO	SFR-B	1.0	0.00019
2031180005	0.155	SO	SFR-B	1.0	0.00019
2031180006	0.194	SO	SFR-B	1.0	0.00019
2031180007	0.194	SO	SFR-B	1.0	0.00019
2031180008	0.195	SO	SFR-B	1.0	0.00019
2031180009	0.195	SO	SFR-B	1.0	0.00019
2031180010	0.196	SO	SFR-B	1.0	0.00019
2031180011	0.197	SO	SFR-B	1.0	0.00019
2031180012	0.197	SO	SFR-B	1.0	0.00019
2031180013	0.198	SO	SFR-B	1.0	0.00019
2031180014	0.169	SO	SFR-B	1.0	0.00019
2031180015	0.187	SO	SFR-B	1.0	0.00019
2031180016	0.159	SO	SFR-B	1.0	0.00019
2031180017	0.160	SO	SFR-B	1.0	0.00019
2031180018	0.160	SO	SFR-B	1.0	0.00019
2031180019	0.160	SO	SFR-B	1.0	0.00019
2031180020	0.161	SO	SFR-B	1.0	0.00019
2031180021	0.161	SO	SFR-B	1.0	0.00019
2031180022	0.161	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031180023	0.162	SO	SFR-B	1.0	0.00019
2031180024	0.162	SO	SFR-B	1.0	0.00019
2031180025	0.162	SO	SFR-B	1.0	0.00019
2031180026	0.163	SO	SFR-B	1.0	0.00019
2031180027	0.163	SO	SFR-B	1.0	0.00019
2031180028	0.163	SO	SFR-B	1.0	0.00019
2031180029	0.164	SO	SFR-B	1.0	0.00019
2031202001	4.866	SO	NR	24.1	0.00463
2031203004	0.260	SO	NR	1.4	0.00027
2031203009	1.245	SO	NR	10.7	0.00206
2031203010	1.276	SO	NR	11.6	0.00223
2031203018	0.115	SO	NR	1.0	0.00019
2031203019	0.168	SO	NR	1.5	0.00029
2031203024	1.493	SO	NR	2.3	0.00044
2031203025	2.551	SO	NR	23.2	0.00446
2031203027	0.886	SO	NR	7.9	0.00152
2031203034	6.108	SO	NR	45.3	0.00871
2031203035	0.713	SO	NR	1.1	0.00021
2031203036	1.523	SO	NR	11.7	0.00225
2031204001	2.150	SO	NR	16.9	0.00325
2031206001	3.675	SO	NR	26.1	0.00502
2031206115	0.295	SO	NR	1.0	0.00019
2031207001	0.648	SO	NR	4.3	0.00083
2031207002	0.308	SO	NR	2.8	0.00054
2031207003	0.589	SO	NR	5.2	0.00100
2031207004	0.463	SO	NR	2.1	0.00040
2031207006	0.036	SO	NR	0.3	0.00006
2031208001	0.627	SO	NR	5.2	0.00100
2031251001	4.003	SO	NR	33.7	0.00648
2031251002	2.047	SO	NR	17.0	0.00327
2031251006	0.231	SO	NR	2.1	0.00040
2031251007	0.257	SO	NR	2.3	0.00044
2031251008	0.799	SO	NR	7.2	0.00138
2031251011	1.443	SO	NR	13.0	0.00250
2031251012	1.279	SO	NR	11.6	0.00223
2031251013	0.950	SO	NR	8.4	0.00161
2031251014	0.828	SO	NR	7.3	0.00140
2031251016	0.734	SO	NR	6.6	0.00127
2031251018	0.732	SO	NR	6.6	0.00127
2031251023	0.322	SO	NR	2.9	0.00056
2031251024	0.255	SO	NR	2.3	0.00044
2031251025	1.088	SO	NR	9.5	0.00183
2031251026	0.991	SO	NR	7.2	0.00138
2031251038	0.496	SO	NR	4.1	0.00079
2031251039	0.333	SO	NR	2.1	0.00040

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031251040	0.274	SO	NR	0.4	0.00008
2031252006	0.476	SO	NR	3.5	0.00067
2031252007	0.841	SO	NR	6.8	0.00131
2031252008	0.395	SO	NR	3.1	0.00060
2031252010	0.791	SO	NR	6.0	0.00115
2031252011	0.268	SO	NR	2.1	0.00040
2031252012	0.344	SO	NR	2.7	0.00052
2031252013	0.250	SO	NR	2.2	0.00042
2031301001	0.732	SO	NR	6.7	0.00129
2031301004	0.108	SO	SFR-A	0.7	0.00013
2031301005	0.108	SO	SFR-A	0.7	0.00013
2031301006	0.107	SO	SFR-A	0.7	0.00013
2031301007	0.107	SO	SFR-A	0.7	0.00013
2031301008	0.112	SO	SFR-A	0.7	0.00013
2031301009	0.101	SO	SFR-A	0.7	0.00013
2031301010	0.107	SO	SFR-A	0.7	0.00013
2031301011	0.106	SO	SFR-A	0.7	0.00013
2031301014	0.106	SO	SFR-A	0.7	0.00013
2031301015	0.106	SO	SFR-A	0.7	0.00013
2031301016	0.105	SO	SFR-A	0.7	0.00013
2031301017	0.105	SO	SFR-A	0.7	0.00013
2031301018	0.105	SO	SFR-A	0.7	0.00013
2031301019	0.105	SO	SFR-A	0.7	0.00013
2031301020	0.105	SO	SFR-A	0.7	0.00013
2031301021	0.104	SO	SFR-A	0.7	0.00013
2031301022	0.104	SO	SFR-A	0.7	0.00013
2031301023	0.104	SO	SFR-A	0.7	0.00013
2031301024	0.104	SO	SFR-A	0.7	0.00013
2031301025	0.104	SO	SFR-A	0.7	0.00013
2031301026	0.103	SO	SFR-A	0.7	0.00013
2031301027	0.103	SO	SFR-A	0.7	0.00013
2031301028	0.095	SO	SFR-A	0.7	0.00013
2031301029	0.099	SO	SFR-A	0.7	0.00013
2031301030	0.110	SO	SFR-A	0.7	0.00013
2031301031	0.110	SO	SFR-A	0.7	0.00013
2031301032	0.110	SO	SFR-A	0.7	0.00013
2031301033	0.110	SO	SFR-A	0.7	0.00013
2031301034	0.110	SO	SFR-A	0.7	0.00013
2031301035	0.110	SO	SFR-A	0.7	0.00013
2031301036	0.112	SO	SFR-A	0.7	0.00013
2031301037	0.109	SO	SFR-A	0.7	0.00013
2031301038	0.110	SO	SFR-A	0.7	0.00013
2031301039	0.110	SO	SFR-A	0.7	0.00013
2031301040	0.110	SO	SFR-A	0.7	0.00013
2031301041	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031301042	0.110	SO	SFR-A	0.7	0.00013
2031301043	0.110	SO	SFR-A	0.7	0.00013
2031301044	0.110	SO	SFR-A	0.7	0.00013
2031301045	0.110	SO	SFR-A	0.7	0.00013
2031301046	0.110	SO	SFR-A	0.7	0.00013
2031301047	0.110	SO	SFR-A	0.7	0.00013
2031301048	0.110	SO	SFR-A	0.7	0.00013
2031301049	0.110	SO	SFR-A	0.7	0.00013
2031301050	0.110	SO	SFR-A	0.7	0.00013
2031301051	0.110	SO	SFR-A	0.7	0.00013
2031301052	0.110	SO	SFR-A	0.7	0.00013
2031301053	0.110	SO	SFR-A	0.7	0.00013
2031301054	0.110	SO	SFR-A	0.7	0.00013
2031301055	0.110	SO	SFR-A	0.7	0.00013
2031301056	0.110	SO	SFR-A	0.7	0.00013
2031301057	0.106	SO	SFR-A	0.7	0.00013
2031301060	0.106	SO	SFR-A	0.7	0.00013
2031301061	0.106	SO	SFR-A	0.7	0.00013
2031301062	0.108	SO	SFR-A	0.7	0.00013
2031301063	0.108	SO	SFR-A	0.7	0.00013
2031302001	0.296	SO	NR	2.7	0.00052
2031302002	0.046	SO	NR	0.4	0.00008
2031302003	0.184	SO	NR	1.7	0.00033
2031302005	0.107	SO	SFR-A	0.7	0.00013
2031302006	0.098	SO	SFR-A	0.7	0.00013
2031302007	0.110	SO	SFR-A	0.7	0.00013
2031302008	0.110	SO	SFR-A	0.7	0.00013
2031302009	0.110	SO	SFR-A	0.7	0.00013
2031302010	0.110	SO	SFR-A	0.7	0.00013
2031302011	0.110	SO	SFR-A	0.7	0.00013
2031302012	0.110	SO	SFR-A	0.7	0.00013
2031302013	0.110	SO	SFR-A	0.7	0.00013
2031302014	0.110	SO	SFR-A	0.7	0.00013
2031302015	0.110	SO	SFR-A	0.7	0.00013
2031302016	0.110	SO	SFR-A	0.7	0.00013
2031302017	0.110	SO	SFR-A	0.7	0.00013
2031302018	0.110	SO	SFR-A	0.7	0.00013
2031302019	0.110	SO	SFR-A	0.7	0.00013
2031302020	0.110	SO	SFR-A	0.7	0.00013
2031302021	0.110	SO	SFR-A	0.7	0.00013
2031302022	0.110	SO	SFR-A	0.7	0.00013
2031302023	0.110	SO	SFR-A	0.7	0.00013
2031302024	0.110	SO	SFR-A	0.7	0.00013
2031302025	0.110	SO	SFR-A	0.7	0.00013
2031302026	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031302027	0.110	SO	SFR-A	0.7	0.00013
2031302028	0.110	SO	SFR-A	0.7	0.00013
2031302029	0.110	SO	SFR-A	0.7	0.00013
2031302030	0.110	SO	SFR-A	0.7	0.00013
2031302031	0.110	SO	SFR-A	0.7	0.00013
2031302032	0.116	SO	SFR-A	0.7	0.00013
2031302033	0.212	SO	NR	1.8	0.00035
2031302034	0.110	SO	SFR-A	0.7	0.00013
2031302035	0.110	SO	SFR-A	0.7	0.00013
2031302036	0.110	SO	SFR-A	0.7	0.00013
2031302037	0.110	SO	SFR-A	0.7	0.00013
2031302038	0.110	SO	SFR-A	0.7	0.00013
2031302039	0.110	SO	SFR-A	0.7	0.00013
2031302040	0.110	SO	SFR-A	0.7	0.00013
2031302041	0.110	SO	SFR-A	0.7	0.00013
2031302042	0.110	SO	SFR-A	0.7	0.00013
2031302043	0.110	SO	SFR-A	0.7	0.00013
2031302044	0.110	SO	SFR-A	0.7	0.00013
2031302045	0.110	SO	SFR-A	0.7	0.00013
2031302046	0.110	SO	SFR-A	0.7	0.00013
2031302047	0.110	SO	SFR-A	0.7	0.00013
2031302048	0.110	SO	SFR-A	0.7	0.00013
2031302049	0.110	SO	SFR-A	0.7	0.00013
2031302050	0.110	SO	SFR-A	0.7	0.00013
2031302051	0.110	SO	SFR-A	0.7	0.00013
2031302052	0.110	SO	SFR-A	0.7	0.00013
2031302053	0.110	SO	SFR-A	0.7	0.00013
2031302054	0.110	SO	SFR-A	0.7	0.00013
2031302055	0.110	SO	SFR-A	0.7	0.00013
2031302056	0.110	SO	SFR-A	0.7	0.00013
2031302057	0.123	SO	SFR-A	0.7	0.00013
2031302058	0.046	SO	NR	0.4	0.00008
2031302059	0.055	SO	NR	0.5	0.00010
2031304001	0.056	SO	NR	0.5	0.00010
2031304002	0.092	SO	NR	0.8	0.00015
2031304003	0.092	SO	NR	0.8	0.00015
2031304005	0.137	SO	NR	1.0	0.00019
2031304006	0.110	SO	SFR-A	0.7	0.00013
2031304007	0.110	SO	SFR-A	0.7	0.00013
2031304008	0.110	SO	SFR-A	0.7	0.00013
2031304009	0.110	SO	SFR-A	0.7	0.00013
2031304010	0.110	SO	SFR-A	0.7	0.00013
2031304011	0.110	SO	SFR-A	0.7	0.00013
2031304012	0.110	SO	SFR-A	0.7	0.00013
2031304013	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031304014	0.110	SO	SFR-A	0.7	0.00013
2031304015	0.110	SO	SFR-A	0.7	0.00013
2031304016	0.110	SO	SFR-A	0.7	0.00013
2031304017	0.110	SO	SFR-A	0.7	0.00013
2031304018	0.110	SO	SFR-A	0.7	0.00013
2031304019	0.110	SO	SFR-A	0.7	0.00013
2031304020	0.110	SO	SFR-A	0.7	0.00013
2031304021	0.110	SO	SFR-A	0.7	0.00013
2031304022	0.110	SO	SFR-A	0.7	0.00013
2031304023	0.110	SO	SFR-A	0.7	0.00013
2031304024	0.110	SO	SFR-A	0.7	0.00013
2031304025	0.110	SO	SFR-A	0.7	0.00013
2031304026	0.110	SO	SFR-A	0.7	0.00013
2031304027	0.117	SO	SFR-A	0.7	0.00013
2031304028	0.138	SO	NR	1.1	0.00021
2031304029	0.110	SO	SFR-A	0.7	0.00013
2031304030	0.110	SO	SFR-A	0.7	0.00013
2031304031	0.110	SO	SFR-A	0.7	0.00013
2031304032	0.110	SO	SFR-A	0.7	0.00013
2031304033	0.110	SO	SFR-A	0.7	0.00013
2031304034	0.110	SO	SFR-A	0.7	0.00013
2031304035	0.110	SO	SFR-A	0.7	0.00013
2031304036	0.110	SO	SFR-A	0.7	0.00013
2031304037	0.110	SO	SFR-A	0.7	0.00013
2031304038	0.110	SO	SFR-A	0.7	0.00013
2031304039	0.110	SO	SFR-A	0.7	0.00013
2031304040	0.110	SO	SFR-A	0.7	0.00013
2031304041	0.110	SO	SFR-A	0.7	0.00013
2031304042	0.110	SO	SFR-A	0.7	0.00013
2031304043	0.110	SO	SFR-A	0.7	0.00013
2031304044	0.110	SO	SFR-A	0.7	0.00013
2031304045	0.110	SO	SFR-A	0.7	0.00013
2031304046	0.110	SO	SFR-A	0.7	0.00013
2031304047	0.110	SO	SFR-A	0.7	0.00013
2031304048	0.124	SO	SFR-A	0.7	0.00013
2031304049	0.230	SO	NR	2.1	0.00040
2031304050	0.197	SO	NR	1.8	0.00035
2031305001	0.110	SO	SFR-A	0.7	0.00013
2031305002	0.110	SO	SFR-A	0.7	0.00013
2031305003	0.141	SO	SFR-B	1.0	0.00019
2031305012	0.055	SO	NR	0.5	0.00010
2031305013	0.458	SO	NR	4.1	0.00079
2031305014	0.147	SO	NR	1.3	0.00025
2031306001	0.145	SO	NR	1.3	0.00025
2031306002	0.046	SO	NR	0.4	0.00008

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031306008	0.045	SO	NR	0.4	0.00008
2031306009	0.149	SO	NR	1.4	0.00027
2031306010	0.181	SO	NR	0.7	0.00013
2031306011	0.109	SO	SFR-A	0.7	0.00013
2031306012	0.109	SO	SFR-A	0.7	0.00013
2031306013	0.109	SO	SFR-A	0.7	0.00013
2031306014	0.109	SO	SFR-A	0.7	0.00013
2031306015	0.109	SO	SFR-A	0.7	0.00013
2031306016	0.109	SO	SFR-A	0.7	0.00013
2031306017	0.109	SO	SFR-A	0.7	0.00013
2031306018	0.109	SO	SFR-A	0.7	0.00013
2031306019	0.109	SO	SFR-A	0.7	0.00013
2031306020	0.109	SO	SFR-A	0.7	0.00013
2031306021	0.109	SO	SFR-A	0.7	0.00013
2031306022	0.109	SO	SFR-A	0.7	0.00013
2031306023	0.109	SO	SFR-A	0.7	0.00013
2031306024	0.109	SO	SFR-A	0.7	0.00013
2031306025	0.109	SO	SFR-A	0.7	0.00013
2031306026	0.109	SO	SFR-A	0.7	0.00013
2031306027	0.116	SO	SFR-A	0.7	0.00013
2031306028	0.186	SO	SFR-B	1.0	0.00019
2031306029	0.110	SO	SFR-A	0.7	0.00013
2031306030	0.110	SO	SFR-A	0.7	0.00013
2031306031	0.110	SO	SFR-A	0.7	0.00013
2031306032	0.110	SO	SFR-A	0.7	0.00013
2031306033	0.110	SO	SFR-A	0.7	0.00013
2031306034	0.110	SO	SFR-A	0.7	0.00013
2031306035	0.109	SO	SFR-A	0.7	0.00013
2031306036	0.110	SO	SFR-A	0.7	0.00013
2031306037	0.110	SO	SFR-A	0.7	0.00013
2031306038	0.110	SO	SFR-A	0.7	0.00013
2031306039	0.110	SO	SFR-A	0.7	0.00013
2031306040	0.107	SO	SFR-A	0.7	0.00013
2031306041	0.112	SO	SFR-A	0.7	0.00013
2031306042	0.110	SO	SFR-A	0.7	0.00013
2031306043	0.123	SO	SFR-A	0.7	0.00013
2031306044	0.137	SO	NR	1.2	0.00023
2031306045	0.139	SO	NR	1.3	0.00025
2031326003	8.555	SO	NR	34.4	0.00661
2031327001	0.155	SO	SFR-B	1.0	0.00019
2031327002	0.139	SO	SFR-B	1.0	0.00019
2031327003	0.154	SO	SFR-B	1.0	0.00019
2031327004	0.145	SO	SFR-B	1.0	0.00019
2031327005	0.143	SO	SFR-B	1.0	0.00019
2031327006	0.144	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031327007	0.144	SO	SFR-B	1.0	0.00019
2031327008	0.144	SO	SFR-B	1.0	0.00019
2031327009	0.144	SO	SFR-B	1.0	0.00019
2031327010	0.144	SO	SFR-B	1.0	0.00019
2031327011	0.144	SO	SFR-B	1.0	0.00019
2031328001	0.148	SO	SFR-B	1.0	0.00019
2031328002	0.145	SO	SFR-B	1.0	0.00019
2031328003	0.144	SO	SFR-B	1.0	0.00019
2031328004	0.134	SO	SFR-B	1.0	0.00019
2031328005	0.127	SO	SFR-B	1.0	0.00019
2031328006	0.135	SO	SFR-B	1.0	0.00019
2031328007	0.160	SO	SFR-B	1.0	0.00019
2031328008	0.145	SO	SFR-B	1.0	0.00019
2031328009	0.159	SO	SFR-B	1.0	0.00019
2031328010	0.158	SO	SFR-B	1.0	0.00019
2031328011	0.156	SO	SFR-B	1.0	0.00019
2031328012	0.156	SO	SFR-B	1.0	0.00019
2031328013	0.159	SO	SFR-B	1.0	0.00019
2031328014	0.262	SO	SFR-C	1.6	0.00031
2031328015	0.248	SO	SFR-B	1.0	0.00019
2031328016	0.252	SO	SFR-C	1.6	0.00031
2031328017	0.292	SO	SFR-C	1.6	0.00031
2031328018	0.336	SO	SFR-C	1.6	0.00031
2031328019	0.275	SO	SFR-C	1.6	0.00031
2031328020	0.222	SO	SFR-B	1.0	0.00019
2031328021	0.145	SO	SFR-B	1.0	0.00019
2031328022	0.235	SO	SFR-B	1.0	0.00019
2031328023	0.203	SO	SFR-B	1.0	0.00019
2031329001	0.175	SO	SFR-B	1.0	0.00019
2031329002	0.217	SO	SFR-B	1.0	0.00019
2031329004	0.220	SO	SFR-B	1.0	0.00019
2031329005	0.215	SO	SFR-B	1.0	0.00019
2031329006	0.241	SO	SFR-B	1.0	0.00019
2031329007	0.242	SO	SFR-B	1.0	0.00019
2031329008	0.244	SO	SFR-B	1.0	0.00019
2031329009	0.249	SO	SFR-B	1.0	0.00019
2031329010	0.227	SO	SFR-B	1.0	0.00019
2031329011	0.175	SO	SFR-B	1.0	0.00019
2031329012	0.165	SO	SFR-B	1.0	0.00019
2031329013	0.163	SO	SFR-B	1.0	0.00019
2031329014	0.167	SO	SFR-B	1.0	0.00019
2031329015	0.166	SO	SFR-B	1.0	0.00019
2031329016	0.204	SO	SFR-B	1.0	0.00019
2031329017	0.186	SO	SFR-B	1.0	0.00019
2031329018	0.135	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031329019	0.130	SO	SFR-B	1.0	0.00019
2031329020	0.157	SO	SFR-B	1.0	0.00019
2031329021	0.136	SO	SFR-B	1.0	0.00019
2031329022	0.124	SO	SFR-A	0.7	0.00013
2031329023	0.143	SO	SFR-B	1.0	0.00019
2031330001	0.150	SO	SFR-B	1.0	0.00019
2031330002	0.149	SO	SFR-B	1.0	0.00019
2031330003	0.148	SO	SFR-B	1.0	0.00019
2031330004	0.147	SO	SFR-B	1.0	0.00019
2031330005	0.149	SO	SFR-B	1.0	0.00019
2031330006	0.150	SO	SFR-B	1.0	0.00019
2031330007	0.150	SO	SFR-B	1.0	0.00019
2031330008	0.155	SO	SFR-B	1.0	0.00019
2031330009	0.144	SO	SFR-B	1.0	0.00019
2031330010	0.168	SO	SFR-B	1.0	0.00019
2031330011	0.164	SO	SFR-B	1.0	0.00019
2031330012	0.228	SO	SFR-B	1.0	0.00019
2031330013	0.165	SO	SFR-B	1.0	0.00019
2031330014	0.148	SO	SFR-B	1.0	0.00019
2031330015	0.161	SO	SFR-B	1.0	0.00019
2031330016	0.167	SO	SFR-B	1.0	0.00019
2031330017	0.159	SO	SFR-B	1.0	0.00019
2031330018	0.170	SO	SFR-B	1.0	0.00019
2031330019	0.159	SO	SFR-B	1.0	0.00019
2031330020	0.163	SO	SFR-B	1.0	0.00019
2031330021	0.166	SO	SFR-B	1.0	0.00019
2031330022	0.168	SO	SFR-B	1.0	0.00019
2031330023	0.181	SO	SFR-B	1.0	0.00019
2031331001	0.140	SO	SFR-B	1.0	0.00019
2031331002	0.153	SO	SFR-B	1.0	0.00019
2031331003	0.150	SO	SFR-B	1.0	0.00019
2031331004	0.141	SO	SFR-B	1.0	0.00019
2031331005	0.160	SO	SFR-B	1.0	0.00019
2031331006	0.139	SO	SFR-B	1.0	0.00019
2031331007	0.154	SO	SFR-B	1.0	0.00019
2031331008	0.145	SO	SFR-B	1.0	0.00019
2031331009	0.162	SO	SFR-B	1.0	0.00019
2031331010	0.144	SO	SFR-B	1.0	0.00019
2031331011	0.142	SO	SFR-B	1.0	0.00019
2031331012	0.157	SO	SFR-B	1.0	0.00019
2031331013	0.141	SO	SFR-B	1.0	0.00019
2031331014	0.177	SO	SFR-B	1.0	0.00019
2031331015	0.206	SO	SFR-B	1.0	0.00019
2031331016	0.147	SO	SFR-B	1.0	0.00019
2031331017	0.190	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031331018	0.181	SO	SFR-B	1.0	0.00019
2031331019	0.173	SO	SFR-B	1.0	0.00019
2031331020	0.179	SO	SFR-B	1.0	0.00019
2031331021	0.176	SO	SFR-B	1.0	0.00019
2031331022	0.180	SO	SFR-B	1.0	0.00019
2031331023	0.097	SO	SFR-A	0.7	0.00013
2031331024	0.159	SO	SFR-B	1.0	0.00019
2031331025	0.163	SO	SFR-B	1.0	0.00019
2031331026	0.168	SO	SFR-B	1.0	0.00019
2031331027	0.140	SO	SFR-B	1.0	0.00019
2031331028	0.153	SO	SFR-B	1.0	0.00019
2031332001	0.144	SO	SFR-B	1.0	0.00019
2031332002	0.138	SO	SFR-B	1.0	0.00019
2031332003	0.134	SO	SFR-B	1.0	0.00019
2031332004	0.147	SO	SFR-B	1.0	0.00019
2031332005	0.144	SO	SFR-B	1.0	0.00019
2031332006	0.145	SO	SFR-B	1.0	0.00019
2031332007	0.148	SO	SFR-B	1.0	0.00019
2031332008	0.145	SO	SFR-B	1.0	0.00019
2031332009	0.150	SO	SFR-B	1.0	0.00019
2031332010	0.142	SO	SFR-B	1.0	0.00019
2031332011	0.175	SO	SFR-B	1.0	0.00019
2031332012	0.176	SO	SFR-B	1.0	0.00019
2031332013	0.172	SO	SFR-B	1.0	0.00019
2031332014	0.170	SO	SFR-B	1.0	0.00019
2031332015	0.163	SO	SFR-B	1.0	0.00019
2031332016	0.169	SO	SFR-B	1.0	0.00019
2031332017	0.195	SO	SFR-B	1.0	0.00019
2031351001	0.110	SO	SFR-A	0.7	0.00013
2031351002	0.110	SO	SFR-A	0.7	0.00013
2031351003	0.110	SO	SFR-A	0.7	0.00013
2031351004	0.110	SO	SFR-A	0.7	0.00013
2031351005	0.230	SO	NR	1.9	0.00037
2031351006	0.110	SO	SFR-A	0.7	0.00013
2031351007	0.110	SO	SFR-A	0.7	0.00013
2031351008	0.110	SO	SFR-A	0.7	0.00013
2031351009	0.110	SO	SFR-A	0.7	0.00013
2031351010	0.110	SO	SFR-A	0.7	0.00013
2031351011	0.110	SO	SFR-A	0.7	0.00013
2031351012	0.110	SO	SFR-A	0.7	0.00013
2031351013	0.118	SO	NR	1.0	0.00019
2031351014	0.239	SO	NR	2.2	0.00042
2031351020	0.423	SO	NR	3.8	0.00073
2031352001	0.329	SO	NR	3.0	0.00058
2031352007	0.124	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031352008	0.109	SO	SFR-A	0.7	0.00013
2031352009	0.109	SO	SFR-A	0.7	0.00013
2031352010	0.109	SO	SFR-A	0.7	0.00013
2031352011	0.109	SO	SFR-A	0.7	0.00013
2031352012	0.110	SO	SFR-A	0.7	0.00013
2031352013	0.109	SO	SFR-A	0.7	0.00013
2031352014	0.109	SO	SFR-A	0.7	0.00013
2031352015	0.109	SO	SFR-A	0.7	0.00013
2031352016	0.109	SO	SFR-A	0.7	0.00013
2031352017	0.109	SO	SFR-A	0.7	0.00013
2031352018	0.110	SO	SFR-A	0.7	0.00013
2031352019	0.110	SO	SFR-A	0.7	0.00013
2031352020	0.119	SO	SFR-A	0.7	0.00013
2031352021	0.238	SO	NR	1.5	0.00029
2031352022	0.110	SO	SFR-A	0.7	0.00013
2031352023	0.110	SO	SFR-A	0.7	0.00013
2031352024	0.110	SO	SFR-A	0.7	0.00013
2031352025	0.110	SO	SFR-A	0.7	0.00013
2031352027	0.110	SO	SFR-A	0.7	0.00013
2031352028	0.110	SO	SFR-A	0.7	0.00013
2031352029	0.110	SO	SFR-A	0.7	0.00013
2031352030	0.126	SO	SFR-B	1.0	0.00019
2031352031	0.331	SO	NR	3.0	0.00058
2031352032	0.110	SO	SFR-A	0.7	0.00013
2031352033	0.111	SO	SFR-A	0.7	0.00013
2031353001	0.110	SO	SFR-A	0.7	0.00013
2031353004	0.110	SO	SFR-A	0.7	0.00013
2031353005	0.110	SO	SFR-A	0.7	0.00013
2031353006	0.110	SO	SFR-A	0.7	0.00013
2031353007	0.110	SO	SFR-A	0.7	0.00013
2031353008	0.110	SO	SFR-A	0.7	0.00013
2031353009	0.110	SO	SFR-A	0.7	0.00013
2031353010	0.207	SO	NR	1.4	0.00027
2031353012	0.110	SO	SFR-A	0.7	0.00013
2031353013	0.110	SO	SFR-A	0.7	0.00013
2031353014	0.110	SO	SFR-A	0.7	0.00013
2031353015	0.110	SO	SFR-A	0.7	0.00013
2031353016	0.110	SO	SFR-A	0.7	0.00013
2031353017	0.110	SO	SFR-A	0.7	0.00013
2031353018	0.110	SO	SFR-A	0.7	0.00013
2031353019	0.110	SO	SFR-A	0.7	0.00013
2031353020	0.110	SO	SFR-A	0.7	0.00013
2031353021	0.110	SO	SFR-A	0.7	0.00013
2031353022	0.204	SO	SFR-B	1.0	0.00019
2031353023	0.239	SO	NR	2.2	0.00042

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031353033	0.138	SO	NR	1.3	0.00025
2031353035	0.165	SO	SFR-B	1.0	0.00019
2031353036	0.229	SO	NR	2.1	0.00040
2031353037	0.055	SO	NR	0.5	0.00010
2031353039	0.110	SO	SFR-A	0.7	0.00013
2031353040	0.110	SO	SFR-A	0.7	0.00013
2031354001	0.138	SO	NR	1.3	0.00025
2031354002	0.069	SO	NR	0.6	0.00012
2031354003	0.069	SO	NR	0.6	0.00012
2031354007	0.139	SO	NR	1.3	0.00025
2031354008	0.076	SO	NR	0.7	0.00013
2031354009	0.064	SO	NR	0.6	0.00012
2031354010	0.073	SO	NR	0.7	0.00013
2031354011	0.278	SO	NR	2.5	0.00048
2031354040	0.150	SO	SFR-B	1.0	0.00019
2031354041	0.148	SO	SFR-B	1.0	0.00019
2031354042	0.144	SO	SFR-B	1.0	0.00019
2031354043	0.141	SO	SFR-B	1.0	0.00019
2031354044	0.138	SO	SFR-B	1.0	0.00019
2031354045	0.136	SO	SFR-B	1.0	0.00019
2031354046	0.141	SO	SFR-B	1.0	0.00019
2031354047	0.206	SO	SFR-B	1.0	0.00019
2031354048	0.177	SO	SFR-B	1.0	0.00019
2031354049	0.170	SO	SFR-B	1.0	0.00019
2031354050	0.170	SO	SFR-B	1.0	0.00019
2031354051	0.173	SO	SFR-B	1.0	0.00019
2031354052	0.131	SO	SFR-B	1.0	0.00019
2031354053	0.139	SO	NR	1.3	0.00025
2031354054	0.230	SO	SFR-B	1.0	0.00019
2031355001	0.110	SO	SFR-A	0.7	0.00013
2031355002	0.110	SO	SFR-A	0.7	0.00013
2031355003	0.110	SO	SFR-A	0.7	0.00013
2031355004	0.110	SO	SFR-A	0.7	0.00013
2031355005	0.110	SO	SFR-A	0.7	0.00013
2031355006	0.110	SO	SFR-A	0.7	0.00013
2031355007	0.110	SO	SFR-A	0.7	0.00013
2031355008	0.110	SO	SFR-A	0.7	0.00013
2031355009	0.110	SO	SFR-A	0.7	0.00013
2031355010	0.110	SO	SFR-A	0.7	0.00013
2031355011	0.110	SO	SFR-A	0.7	0.00013
2031355012	0.110	SO	SFR-A	0.7	0.00013
2031355013	0.110	SO	SFR-A	0.7	0.00013
2031355014	0.110	SO	SFR-A	0.7	0.00013
2031355015	0.183	SO	MFR	1.5	0.00029
2031355016	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031355017	0.110	SO	SFR-A	0.7	0.00013
2031355018	0.110	SO	SFR-A	0.7	0.00013
2031355019	0.110	SO	SFR-A	0.7	0.00013
2031355020	0.110	SO	SFR-A	0.7	0.00013
2031355021	0.110	SO	SFR-A	0.7	0.00013
2031355022	0.110	SO	SFR-A	0.7	0.00013
2031355023	0.110	SO	SFR-A	0.7	0.00013
2031355026	0.110	SO	SFR-A	0.7	0.00013
2031355031	0.110	SO	SFR-A	0.7	0.00013
2031355032	0.110	SO	SFR-A	0.7	0.00013
2031355033	0.423	SO	NR	3.7	0.00071
2031355035	0.165	SO	SFR-B	1.0	0.00019
2031355036	0.165	SO	SFR-B	1.0	0.00019
2031355037	0.181	SO	NR	1.4	0.00027
2031355038	0.239	SO	NR	2.2	0.00042
2031355040	0.110	SO	SFR-A	0.7	0.00013
2031355041	0.110	SO	SFR-A	0.7	0.00013
2031356001	1.116	SO	NR	10.1	0.00194
2031356002	0.103	SO	NR	0.9	0.00017
2031356003	0.128	SO	SFR-B	1.0	0.00019
2031356004	0.134	SO	SFR-B	1.0	0.00019
2031356005	0.173	SO	SFR-B	1.0	0.00019
2031356006	0.124	SO	SFR-A	0.7	0.00013
2031356007	0.114	SO	SFR-A	0.7	0.00013
2031356008	0.104	SO	SFR-A	0.7	0.00013
2031356009	0.104	SO	SFR-A	0.7	0.00013
2031356010	0.116	SO	SFR-A	0.7	0.00013
2031356011	0.127	SO	SFR-B	1.0	0.00019
2031356012	0.112	SO	SFR-A	0.7	0.00013
2031356013	0.127	SO	SFR-B	1.0	0.00019
2031356014	0.152	SO	SFR-B	1.0	0.00019
2031357001	0.110	SO	SFR-A	0.7	0.00013
2031357002	0.110	SO	SFR-A	0.7	0.00013
2031357003	0.110	SO	SFR-A	0.7	0.00013
2031357004	0.110	SO	SFR-A	0.7	0.00013
2031357007	0.110	SO	SFR-A	0.7	0.00013
2031357008	0.110	SO	SFR-A	0.7	0.00013
2031357009	0.110	SO	SFR-A	0.7	0.00013
2031357010	0.110	SO	SFR-A	0.7	0.00013
2031357011	0.110	SO	SFR-A	0.7	0.00013
2031357012	0.110	SO	SFR-A	0.7	0.00013
2031357013	0.110	SO	SFR-A	0.7	0.00013
2031357014	0.110	SO	SFR-A	0.7	0.00013
2031357015	0.110	SO	SFR-A	0.7	0.00013
2031357016	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031357017	0.110	SO	SFR-A	0.7	0.00013
2031357018	0.110	SO	SFR-A	0.7	0.00013
2031357019	0.110	SO	SFR-A	0.7	0.00013
2031357020	0.159	SO	MFR	0.6	0.00012
2031357021	0.110	SO	SFR-A	0.7	0.00013
2031357022	0.110	SO	SFR-A	0.7	0.00013
2031357023	0.110	SO	SFR-A	0.7	0.00013
2031357024	0.110	SO	SFR-A	0.7	0.00013
2031357025	0.110	SO	SFR-A	0.7	0.00013
2031357026	0.110	SO	SFR-A	0.7	0.00013
2031357027	0.110	SO	SFR-A	0.7	0.00013
2031357028	0.110	SO	SFR-A	0.7	0.00013
2031357029	0.110	SO	SFR-A	0.7	0.00013
2031357030	0.110	SO	SFR-A	0.7	0.00013
2031357031	0.110	SO	SFR-A	0.7	0.00013
2031357032	0.110	SO	SFR-A	0.7	0.00013
2031357033	0.110	SO	SFR-A	0.7	0.00013
2031357035	0.110	SO	SFR-A	0.7	0.00013
2031357036	0.165	SO	SFR-B	1.0	0.00019
2031357037	0.165	SO	SFR-B	1.0	0.00019
2031357038	0.110	SO	SFR-A	0.7	0.00013
2031357039	0.110	SO	SFR-A	0.7	0.00013
2031357040	0.157	SO	MFR	1.0	0.00019
2031357043	0.046	SO	NR	0.4	0.00008
2031357045	0.230	SO	NR	2.1	0.00040
2031357046	0.055	SO	NR	0.5	0.00010
2031357047	0.193	SO	NR	1.7	0.00033
2031357050	0.046	SO	NR	0.4	0.00008
2031357051	0.110	SO	SFR-A	0.7	0.00013
2031357052	0.110	SO	SFR-A	0.7	0.00013
2031357053	0.110	SO	SFR-A	0.7	0.00013
2031357054	0.110	SO	SFR-A	0.7	0.00013
2031357055	0.046	SO	NR	0.4	0.00008
2031357056	0.046	SO	NR	0.4	0.00008
2031358001	0.110	SO	SFR-A	0.7	0.00013
2031358004	0.110	SO	SFR-A	0.7	0.00013
2031358005	0.110	SO	SFR-A	0.7	0.00013
2031358006	0.110	SO	SFR-A	0.7	0.00013
2031358007	0.110	SO	SFR-A	0.7	0.00013
2031358008	0.110	SO	SFR-A	0.7	0.00013
2031358009	0.110	SO	SFR-A	0.7	0.00013
2031358010	0.110	SO	SFR-A	0.7	0.00013
2031358011	0.110	SO	SFR-A	0.7	0.00013
2031358012	0.110	SO	SFR-A	0.7	0.00013
2031358015	0.110	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031358016	0.110	SO	SFR-A	0.7	0.00013
2031358017	0.110	SO	SFR-A	0.7	0.00013
2031358018	0.110	SO	SFR-A	0.7	0.00013
2031358019	0.110	SO	SFR-A	0.7	0.00013
2031358020	0.110	SO	SFR-A	0.7	0.00013
2031358021	0.110	SO	SFR-A	0.7	0.00013
2031358022	0.110	SO	SFR-A	0.7	0.00013
2031358023	0.110	SO	SFR-A	0.7	0.00013
2031358024	0.110	SO	SFR-A	0.7	0.00013
2031358025	0.110	SO	SFR-A	0.7	0.00013
2031358026	0.110	SO	SFR-A	0.7	0.00013
2031358027	0.110	SO	SFR-A	0.7	0.00013
2031358028	0.110	SO	SFR-A	0.7	0.00013
2031358029	0.110	SO	SFR-A	0.7	0.00013
2031358030	0.110	SO	SFR-A	0.7	0.00013
2031358031	0.110	SO	SFR-A	0.7	0.00013
2031358032	0.220	SO	SFR-B	1.0	0.00019
2031358033	0.110	SO	SFR-A	0.7	0.00013
2031358034	0.110	SO	SFR-A	0.7	0.00013
2031358035	0.110	SO	SFR-A	0.7	0.00013
2031358037	0.110	SO	SFR-A	0.7	0.00013
2031358038	0.110	SO	SFR-A	0.7	0.00013
2031358039	0.110	SO	SFR-A	0.7	0.00013
2031358040	0.110	SO	SFR-A	0.7	0.00013
2031358041	0.110	SO	SFR-A	0.7	0.00013
2031358042	0.110	SO	SFR-A	0.7	0.00013
2031358043	0.110	SO	SFR-A	0.7	0.00013
2031358044	0.110	SO	SFR-A	0.7	0.00013
2031358049	0.241	SO	NR	2.2	0.00042
2031358052	0.881	SO	NR	6.9	0.00133
2031358053	0.110	SO	SFR-A	0.7	0.00013
2031358054	0.110	SO	SFR-A	0.7	0.00013
2031358055	0.220	SO	MFR	1.7	0.00033
2031358056	0.110	SO	SFR-A	0.7	0.00013
2031358057	0.110	SO	SFR-A	0.7	0.00013
2031358058	0.110	SO	SFR-A	0.7	0.00013
2031358059	0.110	SO	SFR-A	0.7	0.00013
2031376001	0.196	SO	SFR-B	1.0	0.00019
2031376002	0.161	SO	SFR-B	1.0	0.00019
2031376003	0.166	SO	SFR-B	1.0	0.00019
2031376004	0.153	SO	SFR-B	1.0	0.00019
2031376005	0.156	SO	SFR-B	1.0	0.00019
2031376006	0.162	SO	SFR-B	1.0	0.00019
2031376007	0.169	SO	SFR-B	1.0	0.00019
2031376008	0.173	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031376009	0.167	SO	SFR-B	1.0	0.00019
2031376010	0.164	SO	SFR-B	1.0	0.00019
2031376011	0.172	SO	SFR-B	1.0	0.00019
2031376012	0.176	SO	SFR-B	1.0	0.00019
2031376013	0.152	SO	SFR-B	1.0	0.00019
2031376014	0.212	SO	SFR-B	1.0	0.00019
2031376015	0.221	SO	SFR-B	1.0	0.00019
2031376016	0.234	SO	SFR-B	1.0	0.00019
2031376017	0.146	SO	SFR-B	1.0	0.00019
2031376018	0.153	SO	SFR-B	1.0	0.00019
2031376019	0.186	SO	SFR-B	1.0	0.00019
2031376020	0.150	SO	SFR-B	1.0	0.00019
2031376021	0.145	SO	SFR-B	1.0	0.00019
2031377001	0.211	SO	SFR-B	1.0	0.00019
2031377002	0.201	SO	SFR-B	1.0	0.00019
2031377003	0.130	SO	SFR-B	1.0	0.00019
2031377004	0.144	SO	SFR-B	1.0	0.00019
2031377005	0.145	SO	SFR-B	1.0	0.00019
2031377006	0.158	SO	SFR-B	1.0	0.00019
2031377007	0.166	SO	SFR-B	1.0	0.00019
2031377008	0.173	SO	SFR-B	1.0	0.00019
2031377009	0.173	SO	SFR-B	1.0	0.00019
2031377010	0.158	SO	SFR-B	1.0	0.00019
2031377011	0.147	SO	SFR-B	1.0	0.00019
2031377012	0.168	SO	SFR-B	1.0	0.00019
2031377013	0.174	SO	SFR-B	1.0	0.00019
2031377014	0.170	SO	SFR-B	1.0	0.00019
2031377015	0.189	SO	SFR-B	1.0	0.00019
2031377016	0.239	SO	SFR-B	1.0	0.00019
2031378001	0.181	SO	SFR-B	1.0	0.00019
2031378002	0.173	SO	SFR-B	1.0	0.00019
2031378003	0.210	SO	SFR-B	1.0	0.00019
2031378004	0.194	SO	SFR-B	1.0	0.00019
2031378005	0.179	SO	SFR-B	1.0	0.00019
2031378006	0.210	SO	SFR-B	1.0	0.00019
2031378007	0.135	SO	SFR-B	1.0	0.00019
2031378008	0.131	SO	SFR-B	1.0	0.00019
2031378009	0.140	SO	SFR-B	1.0	0.00019
2031378010	0.208	SO	SFR-B	1.0	0.00019
2031378011	0.178	SO	SFR-B	1.0	0.00019
2031378012	0.139	SO	SFR-B	1.0	0.00019
2031378013	0.124	SO	SFR-A	0.7	0.00013
2031379001	0.191	SO	SFR-B	1.0	0.00019
2031379002	0.211	SO	SFR-B	1.0	0.00019
2031379003	0.161	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031379004	0.191	SO	SFR-B	1.0	0.00019
2031379005	0.169	SO	SFR-B	1.0	0.00019
2031379006	0.141	SO	SFR-B	1.0	0.00019
2031379007	0.165	SO	SFR-B	1.0	0.00019
2031379008	0.175	SO	SFR-B	1.0	0.00019
2031379009	0.152	SO	SFR-B	1.0	0.00019
2031379010	0.171	SO	SFR-B	1.0	0.00019
2031379011	0.148	SO	SFR-B	1.0	0.00019
2031379012	0.128	SO	SFR-B	1.0	0.00019
2031379013	0.134	SO	SFR-B	1.0	0.00019
2031379014	0.182	SO	SFR-B	1.0	0.00019
2031379015	0.176	SO	SFR-B	1.0	0.00019
2031379016	0.191	SO	SFR-B	1.0	0.00019
2031379019	0.206	SO	SFR-B	1.0	0.00019
2031379020	0.300	SO	SFR-C	1.6	0.00031
2031380001	0.170	SO	SFR-B	1.0	0.00019
2031380002	0.133	SO	SFR-B	1.0	0.00019
2031380003	0.175	SO	SFR-B	1.0	0.00019
2031380004	0.196	SO	SFR-B	1.0	0.00019
2031380005	0.220	SO	SFR-B	1.0	0.00019
2031380006	0.169	SO	SFR-B	1.0	0.00019
2031380007	0.192	SO	SFR-B	1.0	0.00019
2031380010	0.224	SO	SFR-B	1.0	0.00019
2031381001	0.136	SO	SFR-B	1.0	0.00019
2031381002	0.183	SO	SFR-B	1.0	0.00019
2031381003	0.139	SO	SFR-B	1.0	0.00019
2031381004	0.187	SO	SFR-B	1.0	0.00019
2031381005	0.141	SO	SFR-B	1.0	0.00019
2031381006	0.113	SO	SFR-A	0.7	0.00013
2031381007	0.114	SO	SFR-A	0.7	0.00013
2031381008	0.127	SO	SFR-B	1.0	0.00019
2031381009	0.126	SO	SFR-B	1.0	0.00019
2031381010	0.137	SO	SFR-B	1.0	0.00019
2031381011	0.142	SO	SFR-B	1.0	0.00019
2031381012	0.135	SO	SFR-B	1.0	0.00019
2031381013	0.133	SO	SFR-B	1.0	0.00019
2031381014	0.153	SO	SFR-B	1.0	0.00019
2031381015	0.164	SO	SFR-B	1.0	0.00019
2031381016	0.154	SO	SFR-B	1.0	0.00019
2031381017	0.146	SO	SFR-B	1.0	0.00019
2031382001	0.157	SO	SFR-B	1.0	0.00019
2031382002	0.143	SO	SFR-B	1.0	0.00019
2031382003	0.160	SO	SFR-B	1.0	0.00019
2031382004	0.159	SO	SFR-B	1.0	0.00019
2031382005	0.188	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031382006	0.157	SO	SFR-B	1.0	0.00019
2031382007	0.128	SO	SFR-B	1.0	0.00019
2031382008	0.189	SO	SFR-B	1.0	0.00019
2031382009	0.180	SO	SFR-B	1.0	0.00019
2031382010	0.169	SO	SFR-B	1.0	0.00019
2031382011	0.182	SO	SFR-B	1.0	0.00019
2031382012	0.169	SO	SFR-B	1.0	0.00019
2031382013	0.171	SO	SFR-B	1.0	0.00019
2031382014	0.169	SO	SFR-B	1.0	0.00019
2031382015	0.193	SO	SFR-B	1.0	0.00019
2031382016	0.146	SO	SFR-B	1.0	0.00019
2031382017	0.154	SO	SFR-B	1.0	0.00019
2031382018	0.174	SO	SFR-B	1.0	0.00019
2031382019	0.147	SO	SFR-B	1.0	0.00019
2031382020	0.137	SO	SFR-B	1.0	0.00019
2031382021	0.170	SO	SFR-B	1.0	0.00019
2031382022	0.129	SO	SFR-B	1.0	0.00019
2031382023	0.223	SO	SFR-B	1.0	0.00019
2031382024	0.207	SO	SFR-B	1.0	0.00019
2031382025	0.209	SO	SFR-B	1.0	0.00019
2031382026	0.216	SO	SFR-B	1.0	0.00019
2031383002	0.145	SO	SFR-B	1.0	0.00019
2031383003	0.178	SO	SFR-B	1.0	0.00019
2031383004	0.411	SO	SFR-C	1.6	0.00031
2031383005	0.145	SO	SFR-B	1.0	0.00019
2031383006	0.181	SO	SFR-B	1.0	0.00019
2031383007	0.207	SO	SFR-B	1.0	0.00019
2031383008	0.195	SO	SFR-B	1.0	0.00019
2031383009	0.133	SO	SFR-B	1.0	0.00019
2031383010	0.119	SO	SFR-A	0.7	0.00013
2031383011	0.125	SO	SFR-A	0.7	0.00013
2031383012	0.128	SO	SFR-B	1.0	0.00019
2031383017	1.510	SO	MFR	10.7	0.00206
2031383065	0.128	SO	SFR-B	1.0	0.00019
2031383066	0.342	SO	NR	3.1	0.00060
2031383067	0.760	SO	NR	6.7	0.00129
2031384003	1.171	SO	NR	8.3	0.00160
2031385001	0.154	SO	SFR-B	1.0	0.00019
2031385002	0.134	SO	SFR-B	1.0	0.00019
2031385003	0.162	SO	SFR-B	1.0	0.00019
2031385004	0.140	SO	SFR-B	1.0	0.00019
2031385005	0.157	SO	SFR-B	1.0	0.00019
2031385006	0.304	SO	NR	2.6	0.00050
2031385010	0.109	SO	NR	1.0	0.00019
2031385011	0.138	SO	NR	1.3	0.00025

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031401001	0.602	SO	NR	1.0	0.00019
2031401003	1.240	SO	NR	10.7	0.00206
2031401007	0.883	SO	NR	7.5	0.00144
2031401008	0.805	SO	NR	7.3	0.00140
2031402001	1.401	SO	NR	7.5	0.00144
2031402002	0.510	SO	NR	4.3	0.00083
2031403001	0.124	SO	SFR-A	0.7	0.00013
2031403002	0.124	SO	SFR-A	0.7	0.00013
2031403003	0.124	SO	SFR-A	0.7	0.00013
2031403004	0.124	SO	SFR-A	0.7	0.00013
2031403005	0.124	SO	SFR-A	0.7	0.00013
2031403006	0.124	SO	SFR-A	0.7	0.00013
2031403007	0.124	SO	SFR-A	0.7	0.00013
2031403008	0.124	SO	SFR-A	0.7	0.00013
2031403009	0.124	SO	SFR-A	0.7	0.00013
2031403010	0.117	SO	SFR-A	0.7	0.00013
2031403011	0.131	SO	SFR-B	1.0	0.00019
2031403012	0.129	SO	SFR-B	1.0	0.00019
2031403013	0.130	SO	SFR-B	1.0	0.00019
2031403014	0.128	SO	SFR-B	1.0	0.00019
2031403015	0.128	SO	SFR-B	1.0	0.00019
2031403016	0.128	SO	SFR-B	1.0	0.00019
2031403017	0.128	SO	SFR-B	1.0	0.00019
2031403018	0.128	SO	SFR-B	1.0	0.00019
2031403019	0.128	SO	SFR-B	1.0	0.00019
2031403020	0.128	SO	SFR-B	1.0	0.00019
2031403021	0.128	SO	SFR-B	1.0	0.00019
2031403022	0.142	SO	SFR-B	1.0	0.00019
2031403023	0.144	SO	SFR-B	1.0	0.00019
2031403024	0.146	SO	SFR-B	1.0	0.00019
2031403025	0.143	SO	SFR-B	1.0	0.00019
2031403026	0.140	SO	SFR-B	1.0	0.00019
2031403027	0.141	SO	SFR-B	1.0	0.00019
2031403028	21.076	SO	NR	74.5	0.01432
2031404001	0.248	SO	SFR-B	1.0	0.00019
2031404002	0.118	SO	SFR-A	0.7	0.00013
2031404003	0.114	SO	SFR-A	0.7	0.00013
2031404004	0.114	SO	SFR-A	0.7	0.00013
2031404005	0.114	SO	SFR-A	0.7	0.00013
2031404006	0.114	SO	SFR-A	0.7	0.00013
2031404007	0.114	SO	SFR-A	0.7	0.00013
2031404008	0.114	SO	SFR-A	0.7	0.00013
2031404009	0.140	SO	SFR-B	1.0	0.00019
2031404010	0.175	SO	SFR-B	1.0	0.00019
2031404011	0.164	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031404012	0.122	SO	SFR-A	0.7	0.00013
2031404013	0.151	SO	SFR-B	1.0	0.00019
2031404014	0.177	SO	SFR-B	1.0	0.00019
2031404015	0.105	SO	SFR-A	0.7	0.00013
2031404016	0.108	SO	SFR-A	0.7	0.00013
2031404017	0.110	SO	SFR-A	0.7	0.00013
2031405001	0.158	SO	SFR-B	1.0	0.00019
2031405002	0.132	SO	SFR-B	1.0	0.00019
2031405003	0.131	SO	SFR-B	1.0	0.00019
2031405004	0.131	SO	SFR-B	1.0	0.00019
2031405005	0.132	SO	SFR-B	1.0	0.00019
2031405006	0.131	SO	SFR-B	1.0	0.00019
2031405007	0.131	SO	SFR-B	1.0	0.00019
2031405008	0.133	SO	SFR-B	1.0	0.00019
2031405009	0.134	SO	SFR-B	1.0	0.00019
2031405010	0.159	SO	SFR-B	1.0	0.00019
2031426006	1.669	SO	NR	10.0	0.00192
2031426007	2.638	SO	NR	11.9	0.00229
2031426010	1.438	SO	NR	11.6	0.00223
2031426011	0.538	SO	NR	4.4	0.00085
2031426014	0.257	SO	NR	2.3	0.00044
2031426018	1.209	SO	NR	2.3	0.00044
2031426019	2.566	SO	NR	3.9	0.00075
2031426020	0.995	SO	NR	1.6	0.00031
2031451001	0.151	SO	SFR-B	1.0	0.00019
2031451002	0.139	SO	SFR-B	1.0	0.00019
2031451003	0.177	SO	SFR-B	1.0	0.00019
2031451004	0.147	SO	SFR-B	1.0	0.00019
2031451005	0.195	SO	SFR-B	1.0	0.00019
2031451006	0.143	SO	SFR-B	1.0	0.00019
2031451007	0.133	SO	SFR-B	1.0	0.00019
2031451008	0.139	SO	SFR-B	1.0	0.00019
2031451009	0.150	SO	SFR-B	1.0	0.00019
2031451010	0.210	SO	SFR-B	1.0	0.00019
2031451011	0.189	SO	SFR-B	1.0	0.00019
2031451012	0.186	SO	SFR-B	1.0	0.00019
2031451013	0.204	SO	SFR-B	1.0	0.00019
2031451014	0.125	SO	SFR-A	0.7	0.00013
2031451015	0.151	SO	SFR-B	1.0	0.00019
2031451016	0.153	SO	SFR-B	1.0	0.00019
2031451017	0.132	SO	SFR-B	1.0	0.00019
2031451018	0.140	SO	SFR-B	1.0	0.00019
2031451019	0.217	SO	SFR-B	1.0	0.00019
2031452001	0.139	SO	SFR-B	1.0	0.00019
2031452002	0.106	SO	SFR-A	0.7	0.00013

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031452003	0.107	SO	SFR-A	0.7	0.00013
2031452004	0.100	SO	SFR-A	0.7	0.00013
2031452005	0.105	SO	SFR-A	0.7	0.00013
2031452006	0.115	SO	SFR-A	0.7	0.00013
2031452007	0.113	SO	SFR-A	0.7	0.00013
2031452008	0.108	SO	SFR-A	0.7	0.00013
2031452009	0.121	SO	SFR-A	0.7	0.00013
2031452010	0.121	SO	SFR-A	0.7	0.00013
2031452011	0.121	SO	SFR-A	0.7	0.00013
2031452012	0.138	SO	SFR-B	1.0	0.00019
2031452013	0.134	SO	SFR-B	1.0	0.00019
2031452014	0.142	SO	SFR-B	1.0	0.00019
2031452015	0.154	SO	SFR-B	1.0	0.00019
2031452016	0.136	SO	SFR-B	1.0	0.00019
2031452017	0.137	SO	SFR-B	1.0	0.00019
2031452018	0.139	SO	SFR-B	1.0	0.00019
2031452019	0.155	SO	SFR-B	1.0	0.00019
2031452020	0.151	SO	SFR-B	1.0	0.00019
2031452021	0.120	SO	SFR-A	0.7	0.00013
2031452022	0.130	SO	SFR-B	1.0	0.00019
2031452023	0.123	SO	SFR-A	0.7	0.00013
2031452024	0.134	SO	SFR-B	1.0	0.00019
2031452025	0.130	SO	SFR-B	1.0	0.00019
2031452026	0.133	SO	SFR-B	1.0	0.00019
2031452027	0.134	SO	SFR-B	1.0	0.00019
2031452028	0.133	SO	SFR-B	1.0	0.00019
2031452029	0.132	SO	SFR-B	1.0	0.00019
2031452030	0.132	SO	SFR-B	1.0	0.00019
2031452031	0.133	SO	SFR-B	1.0	0.00019
2031452032	0.133	SO	SFR-B	1.0	0.00019
2031452033	0.132	SO	SFR-B	1.0	0.00019
2031452034	0.140	SO	SFR-B	1.0	0.00019
2031452035	0.142	SO	SFR-B	1.0	0.00019
2031452036	0.142	SO	SFR-B	1.0	0.00019
2031453001	0.130	SO	SFR-B	1.0	0.00019
2031453002	0.137	SO	SFR-B	1.0	0.00019
2031453003	0.138	SO	SFR-B	1.0	0.00019
2031453004	0.145	SO	SFR-B	1.0	0.00019
2031453005	0.145	SO	SFR-B	1.0	0.00019
2031453006	0.129	SO	SFR-B	1.0	0.00019
2031453007	0.129	SO	SFR-B	1.0	0.00019
2031453008	0.129	SO	SFR-B	1.0	0.00019
2031453009	0.129	SO	SFR-B	1.0	0.00019
2031453010	0.129	SO	SFR-B	1.0	0.00019
2031453011	0.129	SO	SFR-B	1.0	0.00019

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031453012	0.129	SO	SFR-B	1.0	0.00019
2031453013	0.129	SO	SFR-B	1.0	0.00019
2031453014	0.129	SO	SFR-B	1.0	0.00019
2031453015	0.129	SO	SFR-B	1.0	0.00019
2031453016	0.129	SO	SFR-B	1.0	0.00019
2031453017	0.129	SO	SFR-B	1.0	0.00019
2031453018	0.129	SO	SFR-B	1.0	0.00019
2031453019	0.129	SO	SFR-B	1.0	0.00019
2031453020	0.163	SO	SFR-B	1.0	0.00019
2031453021	0.139	SO	SFR-B	1.0	0.00019
2031453022	0.138	SO	SFR-B	1.0	0.00019
2031453023	0.139	SO	SFR-B	1.0	0.00019
2031453024	0.145	SO	SFR-B	1.0	0.00019
2031453025	0.153	SO	SFR-B	1.0	0.00019
2031453026	0.152	SO	SFR-B	1.0	0.00019
2031453027	0.154	SO	SFR-B	1.0	0.00019
2031453028	0.150	SO	SFR-B	1.0	0.00019
2031453029	0.150	SO	SFR-B	1.0	0.00019
2031453030	0.135	SO	SFR-B	1.0	0.00019
2031453031	0.135	SO	SFR-B	1.0	0.00019
2031453032	0.135	SO	SFR-B	1.0	0.00019
2031453033	0.135	SO	SFR-B	1.0	0.00019
2031453034	0.135	SO	SFR-B	1.0	0.00019
2031453035	0.135	SO	SFR-B	1.0	0.00019
2031453036	0.134	SO	SFR-B	1.0	0.00019
2031453037	0.134	SO	SFR-B	1.0	0.00019
2031453038	0.134	SO	SFR-B	1.0	0.00019
2031453039	0.131	SO	SFR-B	1.0	0.00019
2031453040	0.131	SO	SFR-B	1.0	0.00019
2031453041	0.131	SO	SFR-B	1.0	0.00019
2031453042	0.131	SO	SFR-B	1.0	0.00019
2031453043	0.131	SO	SFR-B	1.0	0.00019
2031453044	0.133	SO	SFR-B	1.0	0.00019
2031453045	0.140	SO	SFR-B	1.0	0.00019
2031453046	0.140	SO	SFR-B	1.0	0.00019
2031453047	0.140	SO	SFR-B	1.0	0.00019
2031454001	0.160	SO	SFR-B	1.0	0.00019
2031454002	0.150	SO	SFR-B	1.0	0.00019
2031454003	0.150	SO	SFR-B	1.0	0.00019
2031454004	0.150	SO	SFR-B	1.0	0.00019
2031454005	0.150	SO	SFR-B	1.0	0.00019
2031454006	0.150	SO	SFR-B	1.0	0.00019
2031454007	0.472	SO	NR	4.2	0.00081
2031454008	0.220	SO	NR	1.8	0.00035
2031455001	0.150	SO	SFR-B	1.0	0.00019

CITY OF BIRMINGHAM
STORM WATER UTILITY FEE APPORTIONMENT

Parcel ID	Total Area (acre)	District	Property Type	ESWU	SW Share
2031455002	0.150	SO	SFR-B	1.0	0.00019
2031455003	0.150	SO	SFR-B	1.0	0.00019
2031455006	0.341	SO	NR	3.1	0.00060
2031455007	0.418	SO	SFR-C	1.6	0.00031
2031455008	0.372	SO	NR	3.1	0.00060
2031456002	5.335	SO	NR	31.0	0.00596
2031456005	0.145	SO	SFR-B	1.0	0.00019
2031456006	0.141	SO	SFR-B	1.0	0.00019
2031456007	0.138	SO	SFR-B	1.0	0.00019
2031456008	0.138	SO	SFR-B	1.0	0.00019
2031456009	0.138	SO	SFR-B	1.0	0.00019
2031456010	0.139	SO	SFR-B	1.0	0.00019
2031456011	0.138	SO	SFR-B	1.0	0.00019
2031456012	0.138	SO	SFR-B	1.0	0.00019
2031456013	0.145	SO	SFR-B	1.0	0.00019
2031456014	0.138	SO	SFR-B	1.0	0.00019
2031456015	0.141	SO	SFR-B	1.0	0.00019
2031456016	0.141	SO	SFR-B	1.0	0.00019
2031456017	0.138	SO	SFR-B	1.0	0.00019
2031456018	0.138	SO	SFR-B	1.0	0.00019
2031456019	0.138	SO	SFR-B	1.0	0.00019
2031456020	0.138	SO	SFR-B	1.0	0.00019
2031456021	0.138	SO	SFR-B	1.0	0.00019
2031456022	0.163	SO	SFR-B	1.0	0.00019
2031456023	0.194	SO	SFR-B	1.0	0.00019
2031456024	0.168	SO	SFR-B	1.0	0.00019
2031456026	1.827	SO	NR	13.4	0.00258
2031456027	0.368	SO	SFR-C	1.6	0.00031
2031456028	4.425	SO	NR	20.3	0.00390
				5201.8	1.00000

Appendix C

Low Impact Development Guidelines & Details

(excerpts from Low Impact Development Manual for Michigan – published by SEMCOG http://semcog.org/Reports/LID/index.html)

Each fact sheet includes:

BMP Fact Sheet

Title

Short definition of BMP

Applications – Indicates in what type of land use BMP is applicable or feasible (**Yes, No,** or **Limited**).

Stormwater Quantity Functions – Indicates how well the BMP functions in mitigating stormwater management criteria (**High, Medium,** or **Low**).

Stormwater Quality Functions – Indicates how well the BMP performs in terms of pollutant removal (**High, Medium,** or **Low**).

Applications		Stormwater Quantity Functions	
Residential		**Volume**	
Commercial		**Groundwater Recharge**	
Ultra Urban		**Peak Rate**	
Industrial		**Stormwater Quality Functions**	
Retrofit		**TSS** – Total Suspended Solids	
Highway/Road		**TP** – Total Phosphorus	
Recreational		**TN** or **NO3** – Total Nitrogen/Nitrate	
		Temperature	

Additional Considerations

Cost – Indicate whether cost is high, medium or low by the following categories

- **High** – => adds more than 5% to total project cost
- **Medium** – adds 1–5% to total project cost
- **Low** – =< adds less than 1% to total project cost

Maintenance – Indicates level of maintenance required to maintain BMP (**High, Medium,** or **Low**).

- **High** – Maintenance intensive (i.e., year-round maintenance)
- **Medium** – Several times per year
- **Low** – One time per year

Winter Performance – Indicates if BMP provides equivalent performance throughout the winter (**High, Medium,** or **Low**)

- **High** – BMP performs very well in winter conditions
- **Medium** – BMP has reduced performance in winter conditions
- **Low** – BMP still performs in winter conditions, but performance is significantly reduced.

Variations (optional)

List of variations to the BMP if applicable

Key Design Features

Bulleted list of information that is key to the design of BMP

Site Factors (optional)

List of specific factors that relate to BMP performance:

- Water table/bedrock separation distance
- Soil type
- Feasibility on steeper slopes
- Applicability on potential hotspots (e.g., brownfields)

Benefits

List of benefits directly related to implementing the BMP

Limitations

List of site constraints associated with implementation

BMP Fact Sheet

Bioretention (Rain Gardens)

Bioretention areas (often called rain gardens) are shallow surface depressions planted with specially selected native vegetation to capture and treat stormwater runoff from rooftops, streets, and parking lots.

Formal Rain Garden, Traverse City, MI

Applications		Stormwater Quantity Functions	
Residential	Yes	**Volume**	Med/High
Commercial	Yes	**Groundwater Recharge**	Med/High
Ultra Urban	Limited	**Peak Rate**	Medium
Industrial	Yes	**Stormwater Quality Functions**	
Retrofit	Yes	**TSS**	High
Highway/Road	Yes	**TP**	Medium
Recreational	Yes	**TN**	Medium
		Temperature	High

Additional Considerations	
Cost	Medium
Maintenance	Medium
Winter Performance	Medium

Variations

- Subsurface storage/ infiltration bed
- Use of underdrain
- Use of impervious liner

Key Design Features

- Flexible in size and infiltration
- Ponding depths 6-18 inches for drawdown within 48 hours
- Native plants
- Amend soil as needed
- Provide positive overflow for extreme storm events

Site Factors

- Water table/bedrock separation: two-foot minimum, four foot recommended
- Soils: HSG A and B preferred; C & D may require an underdrain (see Infiltration BMP)
- Feasibility on steeper slopes: Medium
- Potential hotspots: Yes with pretreatment and/or impervious liner
- Max. drainage area: 5:1, not more than 1 acre to one area

Benefits

- Volume control and groundwater recharge, moderate peak rate control, filtration
- Versatile with broad applicability
- Enhance site aesthetics, habitat
- Potential air quality and climate benefits

Limitations

- Higher maintenance until vegetation is established
- Limited impervious drainage area
- Requires careful selection and establishment of plants

Case Study: Grayling Stormwater Project

The Grayling Stormwater Project is an example of a hybrid project that combines LID with end-of-pipe treatment. This project demonstrates that a small community is capable of making the fundamental shift in management towards LID and providing leadership for other communities to make similar changes.

The measures taken will eliminate approximately 80 percent of the water pollution from the city.

Typical Grayling Rain Garden, July 2007
Source: Huron Pines

This large-scale project includes 86 rain gardens along with installation of an "end-of-the-pipe" detention basin and seven underground Vortechnic oil-grit separator units. Several of the rain gardens that are smaller or that need to accommodate higher volumes of water were installed with underdrains, but most use the natural infiltration capacity of the area's sandy soils.

Currently, all major outfalls of stormwater from the City of Grayling are being treated by one or more of these measures. Future plans for the project include a maintenance program with incentives for landowners who water and weed their rain gardens, and an outreach program to educate the public and help other communities voluntarily integrate LID into their stormwater management.

Case Study Site Considerations	
Project Type	Protect sensitive/special value features, rain gardens/bioretention, detention/extended detention, filters (specifically oil-grease separators)
Soil Conditions	Sandy and extremely well drained
Estimated Total Project Cost	$1.2 million
Maintenance Responsibility	City of Grayling – maintenance of Vortechnic Units, Huron Pines – establishment of plants
Project Contact	Jennifer Muladore, 989-344-0753 ext 30, Jennifer@huronpines.org

Lessons Learned

The rain gardens were planted with seed and a few shrubs. The seed did not grow well, most likely due to the harsh cold winters and hot, dry summers in the Grayling area, where plants take a lot longer to establish in the extremely well-drained, sandy soils.

Plants that thrive in dry soils do need frequent watering to survive (project contracted out to a local landscaping company for watering).

In addition, many of the residents in the neighborhood are not happy with the "wild" seeded look and would rather have had more manicured gardens. In future phases, the City of Grayling will plant fewer gardens with larger plant stock and try to locate them where homeowners are more interested in helping to maintain them.

Description and Function

Bioretention is a method of managing stormwater by pooling water within a planting area and allowing the water to infiltrate the garden. In addition to managing runoff volume and reducing peak discharge rates, this process filters suspended solids and related pollutants from stormwater runoff. Bioretention can be implemented in small, residential applications (Figure 7.3) or as part of a management strategy in larger applications (Figure 7.4).

Figure 7.3
Residential Rain Garden

Source: Rain Gardens of West Michigan

Figure 7.4
Commercial Rain Garden

Source: Rain Gardens of West Michigan

Bioretention is designed into a landscape as a typical garden feature, to improve water quality while reducing runoff quantity. Rain gardens can be integrated into a site with a high degree of flexibility and can integrate nicely with other structural management systems including porous pavement parking lots, infiltration trenches, and other *non-structural* stormwater BMPs.

Bioretention vegetation serves to filter (water quality) and transpire (water quantity) runoff, and enhance infiltration. Plants absorb pollutants while microbes associated with the plant roots and soil break them down. The soil medium filters out pollutants and allows storage and infiltration of stormwater runoff, providing volume control. In addition, engineered soil media may serve as a bonding surface for nutrients to enhance pollutant removal.

Properly designed bioretention techniques provide a layer of compost that acts like a sponge to absorb and hold runoff. Vegetation in the rain garden can be diverse, through the use of many plant species and types, resulting in a system tolerant to insects, diseases, pollution, and climatic stresses.

The term "rain garden" is used to refer to smaller-scale bioretention facilities typically found on residential properties.

Bioretention can Accomplish the Following:

- Reduce runoff volume
- Filter pollutants, through both soil particles (which trap pollutants) and plant material (which take up pollutants)
- Provide habitat
- Recharge groundwater (if no underdrain is placed underneath)
- Reduce stormwater temperature impacts
- Enhance site aesthetics

Figure 7.5 illustrates a schematic of a relatively simple bioretention area (or rain garden). Figure 7.6 illustrates a schematic of a bioretention area that is a more technically engineered structure, designed to complete specific stormwater management goals. Pond depth, soil mixture, infiltration bed, perforated underdrains, domed risers, and positive overflow structures may be designed according to the specific, required stormwater management functions.

Figure 7.5
Schematic of a small residential rain garden

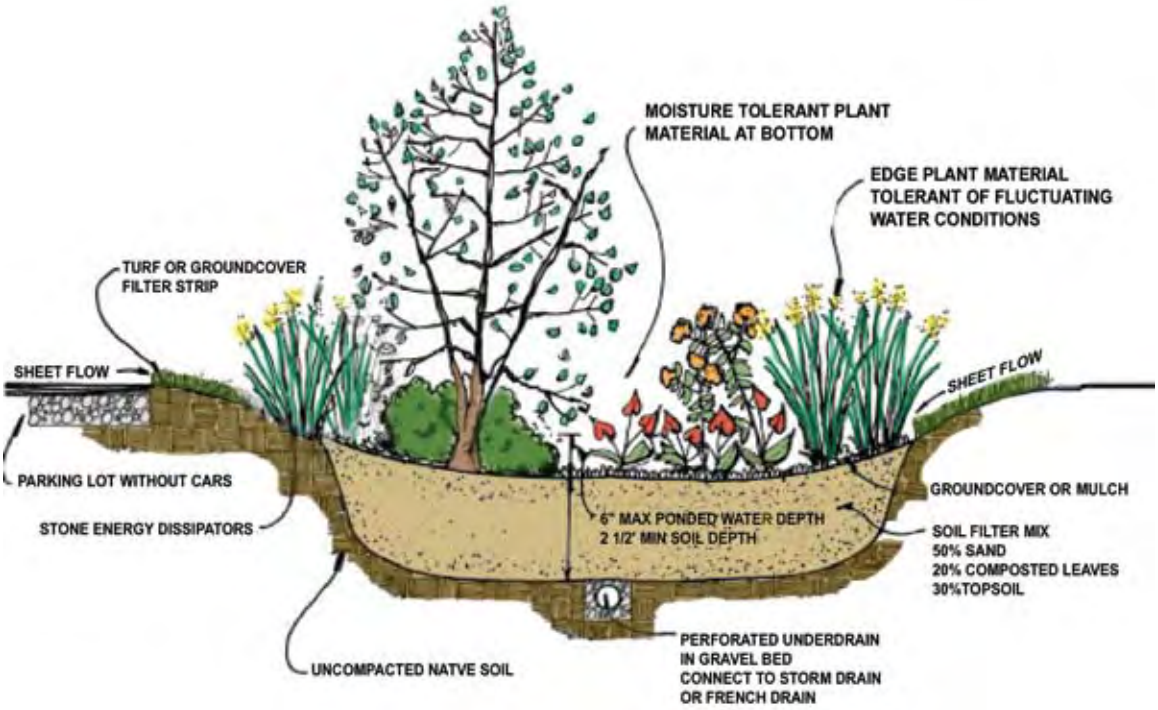
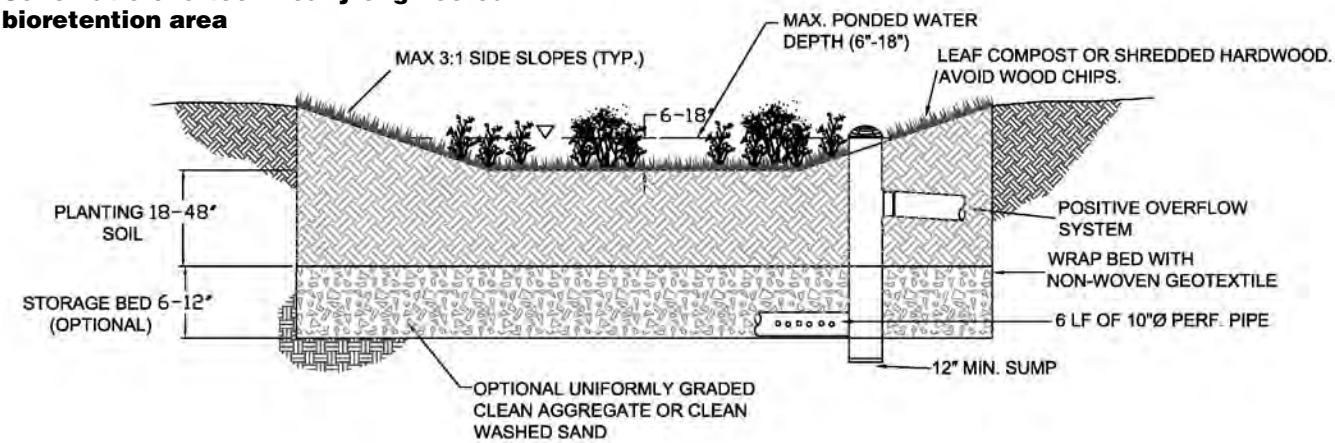


Figure 7.6
Schematic of a technically engineered bioretention area



Source: Prince George's County Bioretention Manual with modifications by Cahill Associates, 2004

Variations

A bioretention system is a depression in the ground planted like a garden that provides for the storage and infiltration of relatively small volumes of stormwater runoff, often managing stormwater on a lot-by-lot basis. This use of many small stormwater controls versus one large detention area promotes the low impact development goal of decentralized treatment of stormwater. But, if greater volumes of runoff must be managed or stored, a bioretention system can be designed with an expanded subsurface infiltration bed, or can be increased in size. Typically, the ratio of impervious area draining to the bioretention area should not exceed five-to-one, and the total impervious area draining to a single system should not be more than one acre. Variations noted relate to performance types, flow entrance, and positive overflow.

Performance types

Depending on varying site conditions, bioretention can be designed to allow for 1) complete infiltration, 2) infiltration/filtration, or 3) filtration. These variations will often determine the need for such design features as the gravel bed, underdrains, and impervious liners.

Bioretention using complete infiltration occurs in areas where groundwater recharge is beneficial and the soils have the permeability necessary to accommodate the inflow. This type of BMP is often less expensive to construct because there is no underdrain and the soils on site are often used.

The most common variation to this type of bioretention includes a gravel or sand bed underneath the planting bed and often accompanied by the use of an underdrain. This allows for additional storage or for areas with low permeability to use bioretention as infiltration, as well as, filtration (Figure 7.6). Some volume reduction will occur through infiltration, as well as evaporation and transpiration.

Signage at Rouge River rain garden

Another variation is to use bioretention primarily for filtration. This is often used in contaminated soils or hot spot locations using an impervious liner to prevent infiltration and groundwater contamination. The primary stormwater function then becomes filtration with some volume reduction through evaporation and transpiration.

For areas with low permeability, bioretention may achieve some infiltration while acting as detention with peak rate control for all storms up to the design storm.

Flow inlet

Pretreatment of runoff should be provided where sediment or pollutants entering the rain garden may cause concern or decreased BMP functionality. Soil erosion control mats, blankets, or rock must be used where runoff flows from impervious areas enter the rain garden.

Flow inlet: Trench drain

Trench drains can accept runoff from impervious surfaces and convey it to a rain garden (Figure 7.7). The trench drain may discharge to the surface of the rain garden or may connect directly to an aggregate infiltration bed beneath.

Figure 7.7
Trench drain and curb cut connected to bioretention area

Source: Macomb County Planning and Economic Development

Educational Signage

Once a bioretention area is established, installing signage will help the general public and maintenance crews recognize LID practices which can help promote sustainable stormwater management. Educational signs can incorporate LID goals, and maintenance objectives in addition to the type of LID project being employed.

Flow inlet: Curbs and curb cuts
Curbs can be used to direct runoff from an impervious surface along a gutter to a low point where it flows into the rain garden through a curb cut. Curb cuts may be depressed curbs (Figure 7.8), or may be full height curbs with openings cast or cut into them.

Figure 7.8
Curb cut into bioretention area/rain garden

Source: Huron Pines

Positive overflow

A positive overflow, via the surface or subsurface, is recommended to safely convey excessive runoff from extreme storm events.

Positive overflow: Domed riser
A domed riser may be installed to ensure positive, controlled overflow from the system (Figure 7.9). Once water ponds to a specified depth, it will begin to flow into the riser through a grate, which is typically domed to prevent clogging by debris.

Figure 7.9
Positive Overflow Device: Domed riser at Macomb County Public Works Office

Source: Macomb County Public Works Office

Positive overflow: Inlet structure
An inlet structure may also be installed to ensure positive, controlled overflow from the system. Once water ponds to a specified depth, it will begin to flow into the inlet.

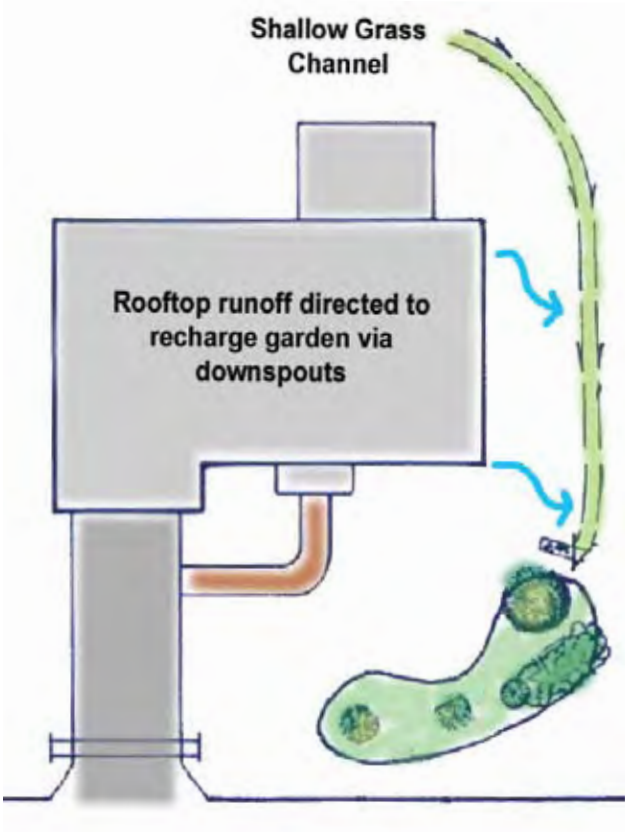
Applications

Bioretention areas can be used in a variety of applications, from small areas in residential lawns to extensive systems in commercial parking lots (incorporated into parking islands or perimeter areas). Industrial, retrofit, highway/road, and recreational areas can also readily incorporate bioretention. One key constraint in using bioretention in ultra-urban settings is space.

Residential

The residential property owner that wants to design and build a rain garden at home does not need to go through the engineering calculations listed under stormwater calculations and functions. Assistance with simple rain gardens is available from several sources listed under the Plant Selection portion of this BMP.

Figure 7.10
Single-family residential lot drainage schematic



Claytor and Schueler, 1995 with modifications by Cahill Associates

Figure 7.11
Residential rain garden

Source: Pokagon Band of Potawatomi Indians

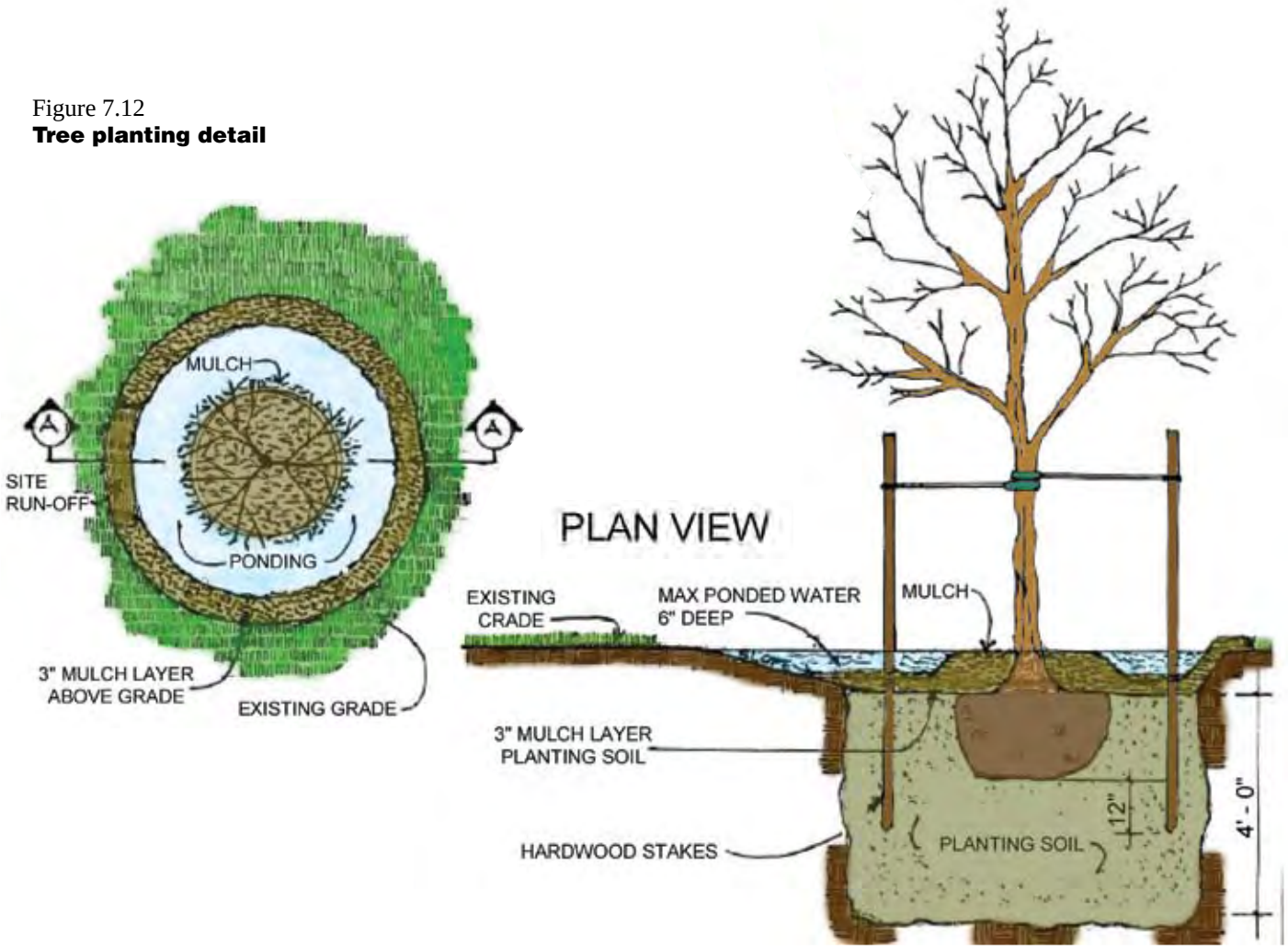
Figure 7.10 shows a typical rain garden configuration on a residential property. The rain garden shown in Figure 7.11 represents a simple design that incorporates a planting bed adjacent to an uncurbed road.

Another source of water for a small rain garden is connecting the roof leader from adjacent buildings. The stormwater may discharge to the surface of the bioretention area or may connect directly to an aggregate infiltration bed beneath.

Tree and shrub pits

Tree and shrub pits intercept runoff and provide shallow ponding in mulched areas around the tree or shrub (Figure 7.12). Mulched areas should typically extend to the tree's drip line.

Figure 7.12
Tree planting detail



Source: Prince George's County, Maryland, The Bioretention Manual with modifications by Cahill Associates, 2004

Roads and highways

Figure 7.13 shows a linear bioretention area feature along a highway. Runoff is conveyed along the concrete curb (bottom of photo) until it reaches the end of the gutter, where it spills into the vegetated area.

Figure 7.13
Linear Bioretention Area along Roadway

Source: Low Impact Development Center, Inc.

Parking lot island bioretention

In parking lots for commercial, industrial, institutional, and other uses, stormwater management and green space areas are limited. In these situations, bioretention areas for stormwater management and landscaping may provide multiple benefits (Figure 7.14).

A bioretention area in a parking lot can occur in parking lots with no curbs and with curbs. The no-curb alternative allows stormwater to sheet flow over the parking lot directly into the bioretention area.

In a curbed parking lot, runoff enters the bioretention area through a curb cut. If the runoff volume exceeds the ponding depth available, water overflows the bioretention area and enters a standard inlet (Figure 7.15).

A variation on this design is a direct underground connection to the standard inlet from the underground aggregate infiltration bed via an overflow pipe.

Figure 7.15
Standard inlet to allow for overflow from the bioretention area

Source: Low Impact Development Center, Inc.

Figure 7.14
Bioretention area within parking lot

Source: City of Rochester Hills

Primary Components of a Bioretention System

1. Pretreatment (may be necessary to help prevent clogging)

- Sediment removal through a vegetated buffer strip, cleanout, stabilized inlet, water quality inlet, or sediment trap prior to runoff entry into the bioretention area

2. Flow inlet

- Varies with site use (e.g., parking island versus residential lot applications – see Figures 7.11 through 7.14)
- Entering velocities must be non-erosive – use erosion control mats, blankets, or rock where concentrated runoff enters the bioretention area

3. Ponding area

- Provides temporary surface storage of runoff and allows sediment to settle
- Provides evaporation for a portion of runoff
- Depth no more than 6-18 inches for aesthetics, functionality, and safety

4. Plant material (see Appendix C for recommended plant lists)

- Absorbs stormwater through transpiration
- Root development creates pathways for infiltration
- Bacteria community resides within the root system creating healthy soil structure with water quality benefits
- Can improve aesthetics for site
- Provides habitat for animals and insects
- Reinforces long-term performance of subsurface infiltration
- Ensures plants are salt tolerant if in a location that would receive snowmelt chemicals
- Should be native plant species and placed according to drought and water tolerance

5. Organic layer or mulch

- Acts as a filter for pollutants in runoff
- Protects underlying soil from drying and eroding
- Simulates leaf litter by providing environment for microorganisms to degrade organic material
- Provides a medium for biological growth, decomposition of organic material, adsorption and bonding of heavy metals
- Wood mulch should be shredded – compost or leaf mulch is preferred

6. Planting soil/volume storage bed

- Provides water/nutrients to plants
- Enhances biological activity and encourages root growth
- Provides storage of stormwater by the voids within the soil particles
- Provides surface for adsorption of nutrients

7. Positive overflow

- Provides for the direct discharge of runoff during large storm events when the subsurface/surface storage capacity is exceeded
- Examples of outlet controls include domed risers, inlet structures, and weirs

Design Considerations

Bioretention is flexible in design and can vary in complexity according to site conditions and runoff volume requirements. Design and installation procedures may vary from very simple for "backyard" rain gardens to highly engineered bioretention areas in ultra-urban areas.

Infiltration BMPs should be sited so that they minimize risk to groundwater quality and present no threat to subsurface structures. Table 7.4 provides recommended setback distances of bioretetnion areas to various lot elements.

Table 7.4
Setback distances

Setback from	Minimum distance (feet)
Property line	10
Building foundation*	10
Private well	50
Public water supply well**	50
Septic system drainfield***	100

* minimum with slopes directed away from building

** At least 200 feet from Type I or IIa wells, 75 feet from Type IIb and III wells (MDEQ Safe Drinking Water Act, PA 399)

*** 50 feet for septic systems with a design flow of less than 1,000 gallons per day

The distance from the bottom of the infilration BMP to the seasonal high groundwater level or bedrock is recommended to be four feet. Two feet is allowable, but may reduce the performance of the BMP.

Bioretention is best suited for areas with at least moderate infiltration rates (more than 0.25 inches per hour) – see Infiltration BMP. In extreme situations where permeability is less than 0.25 inches per hour, special variations may apply, such as using amended subsoils or underdrains (or using constructed wetlands instead). The following procedures should be considered when designing bioretention areas:

1. The **flow entrance** must be designed to prevent erosion in the bioretention area. Some alternatives include flared end sections, erosion control mats, sheet flow into the facility over grassed areas, rock at entrance to bioretention area, curb cuts with grading for sheet flow, and roof leaders with direct surface connection.
2. **A positive overflow system** should be designed to safely convey away excess runoff. The overflow can be routed to the surface in a non-erosive manner or to another stormwater system. Some alternatives include domed risers, inlet structures, weirs, and berms.
3. Sizing criteria
   a. **Surface area** is dependent upon storage volume requirements, but should generally not exceed a maximum loading ratio of 5:1 impervious drainage area to bioretention area and no more than one acre drainage area to one bioretention cell. However, for design purposes, the total volume of water generated from the contributing drainage area must be used, not just the impervious portion. See Infiltration BMP for additional guidance on loading ratios.

      The required bioretention surface area is determined by taking the volume of runoff to be controlled according to LID criteria, maintaining the maximum ponding depth, the loading rate, and the emptying time. Infiltration and evapotranspiration are increased by increasing the surface area of the bioretention area. The total surface area needed may be divided into multiple cells. This configuration may be useful to collect runoff from both the front and back of a building.
   b. Surface side slopes should be gradual. For most areas, maximum 3:1 side slopes are recommended.
   c. The recommended surface ponding depth is six inches. Up to 18 inches may be used if plant selection is adjusted to tolerate water depth. Drain within 24-48 hours.
   d. **Ponding area** should provide sufficient surface area to meet required storage volume without exceeding the design ponding depth. The

Preparing bed with planting soil
Source: City of Troy

subsurface infiltration bed is used to supplement surface storage where appropriate.

4. **Planting soil depth** should generally be between 18 and 48 inches where only herbaceous plant species will be used. If trees and woody shrubs will be used, soil media depth may be increased, depending on plant species. Native soils can be used as planting soil or modified to be suitable on many sites. Small, backyard rain gardens can generally use existing soils without a specialized depth. Planting soil should be approximately four inches deeper than the bottom of the largest root ball.
5. **Planting soil** should be capable of supporting a healthy vegetative cover. Soils should be amended with a composted organic material. A recommended range of a soil mixture is 20-40 percent organic material (compost), 30-50 percent sand, and 20-30 percent topsoil, although any soil with sufficient drainage may be used for bioretention.

   Soils should also have a pH of between 5.5 and 6.5 (better pollutant adsorption and microbial activity), a clay content less than 10 percent (a small amount of clay is beneficial to adsorb pollutants and retain water although no clay is necessary if pollutant loadings are not an issue), be free of toxic substances and unwanted plant material, and have a 5-10 percent organic matter content. Additional organic matter can be added to the soil to increase water holding capacity.

   If brought from off site, **sand** should be clean, coarse, and conform to ASTM C-33 (Standard Specification for Concrete Aggregates).

   If the void space within an amended soil mix will be used in calculating runoff volume capacity in the system, tests should be conducted on the soil's porosity to determine the available storage capacity.
6. Proper **plant selection** is essential for bioretention areas to be effective. Typically, native floodplain or wet meadow plant species are best suited to the variable environmental conditions encountered in a bioretention area. Suggested species may include Cardinal Flower (*Lobelia cardinalis*), Blue Lobelia (*Lobelia siphilitica*), New England Aster (*Aster novae-angliae*), and Brown Fox Sedge (*Carex vulpinoidea*) (See recommended Plant List in Appendix C for a detailed list).

   In most cases, seed is not the preferred method for establishing plants in a bioretention area. The fluctuating water levels make it difficult for the seed to readily establish, while the random nature of seeding produces a look previous experience indicates is unacceptably "wild." Therefore, it is strongly recommended that live plant material in plug or gallon-potted form be used and installed on 1-2 foot centers for a more formal appearance. Shrubs and trees are also recommended to be included in a bioretention area.

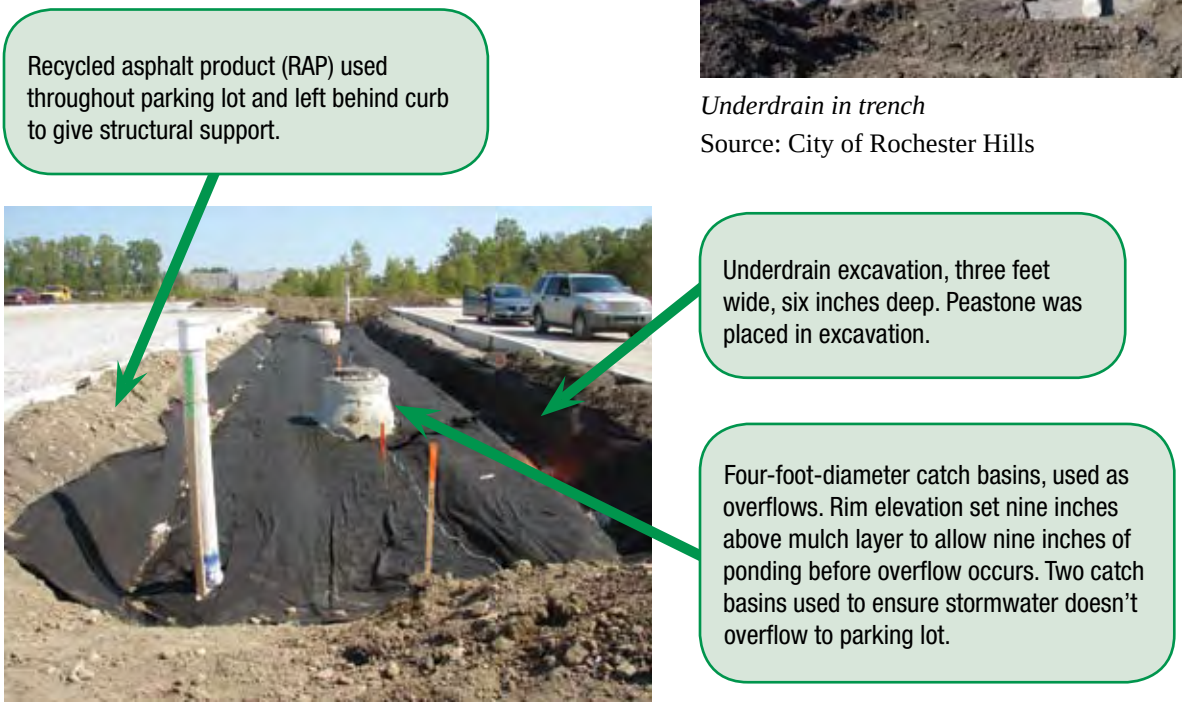
   A landscape architect can be used to design a native planting layout. Additional resources for planting layouts are Rain Gardens for West Michigan (www.raingardens.org), Washtenaw County Free Designs, Wild Ones Natural Landscapers, and MDEQ Landscaping for Water Quality booklets.

Selecting proper plants
Source: City of Troy

7. **Planting periods** will vary but, in general, trees and shrubs should be planted from mid-April through early June, or mid-September through mid-November. Native seed should be installed between October 1 and June 1. Live plant material (plugs or gallon pots) should be installed between May 1 and June 15. Planting dates may be lengthened if a regular water source can be provided. Likewise, planting should be ceased at an earlier date in the event of a drought year.
8. A maximum of 2-3 inches of shredded hardwood **mulch** aged at least six months to one year or leaf compost (or other comparable product) should be uniformly applied immediately after shrubs and trees are planted to prevent erosion, enhance metal removals, and simulate leaf litter in a natural forest system. Wood chips should be avoided as they tend to float during inundation periods. Mulch or compost should not exceed three inches in depth or be placed directly against the stems or trunks of plants to maintain oxygen flow.
9. When working in areas with **steeper slopes**, bioretention areas should be terraced laterally along slope contours to minimize earthwork and provide level areas for infiltration.
10. A subsurface **storage/infiltration bed**, if used, should be at least six inches deep and constructed of clean gravel with a significant void space for runoff storage (typically 40 percent) and wrapped in geotextile fabric.
11. **Underdrains** are often not needed unless in-situ soils are expected to cause ponding lasting longer than 48 hours. If used, underdrains are typically small diameter (6-12-inches) perforated pipes in a clean gravel trench wrapped in geotextile fabric (or in the storage/infiltration bed). Underdrains should have a flow capacity greater than the total planting soil infiltration rate and should have at least 18 inches of soil/gravel cover. They can daylight to the surface or connect to another stormwater system. A method to inspect and clean underdrains should be provided (via cleanouts, inlet, overflow structure, etc.)

Underdrain in trench

Source: City of Rochester Hills



Source: City of Rochester Hills

Stormwater Functions and Calculations

When designing a bioretention area, it is recommended to follow a two-step process:

1. Initial sizing of the bioretention area based on the principles of Darcy's Law.
2. Verify that the loading ratio and the necessary volume reductions are being met.

Initial sizing of the bioretention area

Bioretention areas can be sized based on the principles of Darcy's Law, as follows:

With an underdrain:

$A_f = V \times d_f / [k \times (h_f + d_f) \times t_f]$

Without an underdrain:

$A_f = V \times d_f / [i \times (h_f + d_f) \times t_f]$

Where:

A_f = surface area of filter bed (ft^2)

V = required storage volume (ft^3)

d_f = filter bed depth (ft)

k = coefficient of permeability of filter media (ft/day)

i = infiltration rate of underlying soils (ft/day)

h_f = average height of water above filter bed (ft)

t_f = design filter bed drain time (days)

A "quick check" for sizing the bioretention area is to ignore the infiltration rate and calculate the storage volume capacity of the bioretention area as follows:

A_{inf} = (Area of bioretention area at ponding depth + Bottom area of bioretention area) divided by two = Infiltration area (average area)

The size of the infiltration area is determined by the volume of water necessary to remove as determined by LID criteria, depth of the ponded area (not to exceed 18 inches), infiltration rate of the soil, loading ratio, and, if applicable, any subsurface storage in the amended soil or gravel.

This volume can be considered removed if the bioretention is not underdrained. If the bioretention cell is underdrained, consider the bioretention cell as a detention device with the volume calculated above discharged to a surface water over time t_f.

Verification of meeting volume reduction requirements

The bioretention facility should be sized to accommodate the desired volume reductions (see Chapter 9 for Volume Control Criteria). This can be based on water quality volume (e.g., first inch of runoff from the site) or based on size storm event (e.g., no net increase based on presettlement conditions of the two-year, 24-hour event).

The volume of a bioretention area can have three components: surface storage volume, soil storage volume, and infiltration bed volume. These three components should be calculated separately and added together. The goal is that this total volume is larger than the required volume reduction that is often included in local ordinances. If the total volume is less than the required volume, another adjustment may be needed to the bioretention area (e.g., increased filter bed depth).

Total volume calculation:

1. Surface storage volume (ft^3) = Average bed area (ft^2) x Maximum design water depth (ft)
2. Soil storage volume (ft^3) = Infiltration area (ft^2) x Depth of amended soil (ft) x Void ratio of amended soil.
3. Subsurface storage/Infiltration bed volume (ft^3) = Infiltration area (ft^2) x Depth of underdrain material (ft) x Void ratio of storage material

Total bioretention volume = Surface storage volume + Soil storage volume (if applicable) + Infiltration bed volume (if applicable).

Peak rate mitigation

Chapter 9 provides information on peak rate mitigation methodology and addresses links between volume reduction and peak rate control. Underdrained bioretention acts as a detention practice with a discharge rate roughly equal to the infiltration rate of the soil x the average bed area.

Water Quality Improvement

The reported water quality benefits of bioretention can be expected to remove a high amount of total suspended solids (typically 70-90 percent), a medium amount of total phosphorus (approximately 60 percent), and a medium amount of total nitrogen (often 40-50 percent). In areas with high sediment loading, pretreatment of runoff can significantly reduce the amount of bioretention maintenance required (See Chapter 9 for water quality calculation procedures).

Construction Guidelines

The following is a typical construction sequence (Note for all construction steps: Erosion and sediment control methods need to adhere to the latest requirements of MDEQ's Soil Erosion and Sedimentation Control Program and local standards).

1. Complete site grading, minimizing compaction as much as possible. If applicable, construct curb cuts or other inflow entrance, but provide protection so that drainage is prohibited from entering the bioretention construction area. Construct pre-treatment devices (filter strips, swales, etc.) if applicable.
2. Subgrade preparation
   a Existing subgrade in rain gardens should not be compacted or subject to excessive construction equipment traffic. Loads on the subgrade should not exceed four pounds per square inch.
   b. Initial excavation can be performed during rough site grading, but should not be carried to within one foot of the final bottom elevation. Final excavation should not take place until all disturbed areas in the drainage area have been stabilized.
   c. Where erosion of subgrade has caused accumulation of fine materials and/or surface ponding in the graded bottom, this material should be removed with light equipment and the underlying soils scarified to a minimum depth of six inches with a york rake or equivalent by light tractor.
   d. Bring subgrade of bioretention area to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction. All bioretention areas should be level grade on the bottom.
3. Stabilize grading except within the bioretention area. Bioretention areas may be used as temporary sediment traps provided the proposed finish elevation of the bed is at least 12 inches lower than the bottom elevation of the sediment trap (if used as such, all accumulated material and at least 12 inches of soil should be removed).
4. Excavate bioretention area to proposed invert depth and scarify the existing soil surfaces. Do not compact soils.
5. Backfill bioretention area with amended soil as shown on plans and specifications. Overfilling is recommended to account for settling. Light hand tamping is acceptable if necessary.
6. Complete final grading to achieve proposed design elevations, leaving space for upper layer of compost, mulch, or topsoil as specified on plans.
7. Bioretention area/rain garden installation
   a. Upon completing subgrade work, notify the engineer to inspect at his/her discretion before proceeding with bioretention installation.
   b. For the subsurface storage/infiltration bed installation, amended soils should be placed on the bottom to the specified depth.
   c. Planting soil should be placed immediately after approval of subgrade preparation/bed installation. Any accumulation of debris or sediment that takes place after approval of subgrade should be removed prior to installation of planting soil at no extra cost to the owner.
   d. If called for in the design, install approved planting soil in 18-inch maximum lifts and lightly compact (tamp with backhoe bucket or by hand). Keep equipment movement over planting soil to a minimum — **do not over-compact**. Install planting soil to grades indicated on the drawings. Loads on the soil should not exceed four pounds per square inch.
   e. Presoak the planting soil at least 24 hours prior to planting vegetation to aid in settlement.
   f. Plant trees and shrubs according to supplier's recommendations and only from mid-March through the end of June or from mid-September through mid-November.
   g. Install two or three inches of shredded hardwood mulch (minimum age six months) or compost mulch evenly as shown on plans. Do not apply mulch in areas where ground cover is to be grass or where cover will be established by seeding.
   h. Protect rain gardens from sediment at all times during construction. Compost socks, diversion berms, and/or other appropriate measures should be used at the toe of slopes that are adjacent to rain gardens to prevent sediment from washing into these areas during site development.
   i. When the site is fully vegetated and the soil mantle stabilized, notify the plan designer to inspect the rain garden drainage area at his/her discretion before the area is brought online and sediment control devices removed.
8. Mulch and install erosion protection at surface flow entrances where necessary.

Marking planting area
Source: City of Troy

Maintenance

Properly designed and installed bioretention areas require some regular maintenance, most within the first year or two of establishment. Less maintenance is required when the native perennial vegetation becomes established.

1. Water vegetation at the end of each day for two weeks after planting is completed. Newly established plants should continue to receive approximately one inch of water per week throughout the first season, or as determined by the landscape architect.
2. While vegetation is being established, pruning and weeding may be required. Weeds should be removed by hand.
3. Organic material may also need to be removed approximately twice per year (typically by hand).
4. Perennial plantings may be cut down at the end of the growing season to enhance root establishment.
5. Mulch should be re-spread when erosion is evident and replenished once every one to two years or until the plants begin to fill in the area and the space between plants is minimized.

Watering newly established vegetation
Source: City of Troy

Planting Tip

When planting your bioretention area, it is usually helpful to mark the different planting areas. An effective method is using spray paint and flags to mark designated areas. This is especially helpful when utilizing volunteers.

6. Bioretention area should be inspected at least two times per year for sediment buildup, erosion, and to evaluate the health of the vegetation. If sediment buildup reaches 25 percent of the ponding depth, it should be removed. If erosion is noticed within the bioretention area, additional soil stabilization measures should be applied. If vegetation appears to be in poor health with no obvious cause, a landscape specialist should be consulted.
7. Bioretention vegetation may require watering, especially during the first year of planting. Ensure the maintenance plan includes a watering schedule for the first year, and in times of extreme drought after plants have been established.
8. Bioretention areas should not be mowed on a regular basis. Trim vegetation as necessary to maintain healthy plant growth.

Winter Considerations

Use salt-tolerant vegetation where significant snowmelt containing deicing chemicals is expected. The use of sand, cinders, and other winter abrasives should be minimized. If abrasives are used, additional maintenance may be required to remove them in the spring. Bioretention soils can be expected to resist freezing and remain functioning for most of the year (although biological pollutant removal processes will be reduced during winter). Bioretention areas can even be used for snow storage assuming this will not harm the vegetation. Pipes, inlets, overflow devices, and other stormwater structures associated with bioretention should be designed according to general guidance on cold climate construction.

Cost

Bioretention areas often replace areas that were intensively landscaped and require high maintenance. In addition, bioretention areas can decrease the cost for stormwater conveyance systems on a site. Bioretention areas cost approximately $5-7 per cubic foot of storage to construct.

Designer/Reviewer Checklist for Rain Gardens/Bioretention

Item	Yes	No	N/A	Notes
Was Appendix E: *Soil infiltration Testing Protocol followed?**				
Appropriate areas of the site evaluated?				
Infiltration rates measured?				
Were the bioretention design guidelines followed?				
Minimum 2-foot separation between the bed bottom and bedrock/SHWT?				
Soil permeability acceptable?				
If not, appropriate underdrain provided?				
Natural, uncompacted soils?				
Level infiltration area (bed bottom)?				
Excavation in rain garden areas minimized?				
Hotspots/pretreatment considered?				
Loading ratio below 5:1 (described in infiltration BMP)?				
Ponding depth limited to 18 inches?				
Drawdown time less than 48 hours?				
Positive overflow from system?				
Erosion and Sedimentation control?				
Feasible construction process and sequence?				
Entering flow velocities non-erosive or erosion control devices?				
Acceptable planting soil specified?				
Appropriate native plants selected?				
Maintenance accounted for and plan provided? Review of treatment volume? Review of calculations?				

* In general, the protocol should be followed as much as possible.

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BMP Fact Sheet

Capture Reuse

Structures designed to intercept and store runoff from rooftops allow for its reuse, reducing volume and overall water quality impairment. Stormwater is contained in the structures and typically reused for irrigation or other water needs.

Cistern at Fairlane Green shopping center, Allen Park, MI

Applications		Stormwater Quantity Functions	
Residential	Yes	**Volume**	High
Commercial	Yes	**Groundwater Recharge**	Low
Ultra Urban	Yes	**Peak Rate**	Low*
Industrial	Yes	**Stormwater Quality Functions**	
Retrofit	Yes	**TSS**	Med
Highway/Road	No	**TP**	Med
Recreational	Yes	**NO_3**	Med
		Temperature	Med

Additional Considerations	
Cost • Rain Barrel • Cistern • Manufactured porduct	 Low Med Varies
Maintenance	Med
Winter Performance	Med

Variations

- Rain barrels
- Cisterns, both underground and above ground
- Tanks
- Storage beneath a surface (using manufactured products)

Key Design Features

- Small storm events are captured with most structures
- Provide overflow for large storm events
- Discharge water before next storm event
- Consider site topography, placing structure up-gradient in order to eliminate pumping needs

Site Factors

- Water table to bedrock depth – N/A (although must be considered for subsurface systems)
- Soils – N/A
- Slope – N/A
- Potential hotspots – Yes with treatment
- Max. drainage area – N/A

Benefits

- Provides supplemental water supply
- Wide applicability
- Reduces potable water use
- Related cost savings and environmental benefits

Limitations

- Manages only relatively small storm events which requires additional management and use for the stored water.

* Depends on site design

Case Study: Stormwater Capture with an Underground Cistern

Fairmount Square, Grand Rapids, MI

All of the stormwater that falls onto Fairmount Square is handled onsite rather than at the municipal storm sewer. This four-acre site consists of a building, a new four-bay commercial building, and 37 town homes.

Several different LID techniques are used to manage all stormwater onsite, including rainwater capture, porous pavement, and rain gardens. The stormwater from the roofs of two buildings on Cherry Street in Fairmount Square is captured in an underground cistern and used to water the formal gardens and parking lot landscape. The cistern holds 30,000 gallons of water (up to two weeks of rainfall) and is 10’ x 15’ x 15’9” in size. A pump inside the cistern pumps rainwater to the formal garden area at the entrance to the Inner City Christian Federation building. The estimated savings using this cistern instead of standard irrigation is 1,340.3 cubic feet of water per year.

Maintenance activities and associated costs are minimal, as the cistern only requires periodic pump maintenance, which is contracted out as needed.

Underground cistern tank
Source: Fishbeck, Thompson, Carr, & Huber, Inc.

Case Study Site Considerations	
Project Type	Underground cistern
Estimated Total Project Cost	$40,269
Maintenance Responsibility	Contracted out as needed
Project Contact	Deb Sypien, Rockford Construction Company 616-285-8100 Rick Pulaski, Nederveld Inc. 616-575-5190

Description and Function

Capture reuse is the practice of collecting rainwater in a container and reusing it in the future. Other terms for this BMP include *storage/reuse, rainwater harvesting, and rainwater catchment system*.

This structural BMP reduces potable water needs while simultaneously reducing stormwater discharges. When rain barrels or cisterns are full, rooftop runoff should be directed to drywells, planters, or bioretention areas where it will be infiltrated.

Variations

Rain barrel

Commonly, rooftop downspouts are connected to a rain barrel that collects runoff and stores water until needed for a specific use. Rain barrels are often used at individual homes where water is reused for garden irrigation, including landscaped beds, trees, or other vegetated areas. Other uses include commercial and institutional facilities where the capacity of stormwater can be captured in smaller volume rain barrels.

Residential rain barrel

Source: Harley Ellis Devereaux

Cisterns

A cistern is a container or tank that has a greater storage capacity than a rain barrel. Typically, cisterns are used to supplement greywater needs (i.e., toilet flushing, or some other sanitary sewer use) though they can also be used for irrigation. Cisterns may be comprised of fiberglass, concrete, plastic, brick, or other materials and can be located either above or below ground. The storage capacity of cisterns can range from 200 gallons to 10,000 gallons. Very large cisterns, essentially constructed like an underground parking level, can also be used. Figure 7.16 highlights the typical components of a cistern.

Figure 7.16
Typical cistern components

Source: This image generously provided by www.rainkeeper.us

Figure Description:

1. Filter/screening mechanism to filter runoff
2. Inflow into cistern
3. Intake for water use
4. Cistern overflow
5. Subsequent stormwater system (infiltration system in this case) for cistern overflow
6. Optional level gauge

Ford Rouge Plant cistern

Vertical storage

A vertical storage container is a structure designed to hold a large volume of stormwater drained from a large impervious area and is the largest of the capture reuse containers. The use of these structures is a function of drainage area and water needs. Vertical structures are best used for intensive irrigation needs or even fire suppression requirements, and should be designed by a licensed professional. These storage systems can be integrated into commercial sites where water needs may be high.

Storage beneath structure

Stormwater runoff can be stored below ground under pavement and landscaped surfaces through the use of structural plastic storage units and can supplement onsite irrigation needs. These structures can provide large storage volumes without the need for additional structural support from the building.

Designing a capture reuse system in which the storage unit is underground is best used in institutional or commercial settings. This type of subsurface storage is larger, more elaborate, typically designed by a licensed professional, and requires pumps to connect to the irrigation system.

Applications

Capture reuse containers can be used in urbanized areas where the need for supplemental onsite irrigation or other high water use exists. Areas that would benefit from using a capture reuse container include:

- Parking garage,
- Office building,
- Residential home or building, and
- Other building use (commercial, light industrial, institutional, etc.).

Vertical storage units for vegetated roof plaza maintenance are common in Germany

Underground cistern at Lawrence Technological University
Source: Lawrence Technological University

Rainstore™ cistern beneath brick pavers on a vegetated roof-top plaza at University of North Carolina – Chapel Hill

Design Considerations

Design and installation procedures for capture reuse containers can vary from simple residential rain barrels to highly engineered underground systems in ultra-urban areas. Table 7.5 provides general information on cistern holding capacity. The following procedures should be considered when designing sites with capture reuse containers.

1. Identify opportunities where water can be reused for irrigation or indoor greywater reuse and then calculate the water need for the intended uses. For example, if a 2,000 square foot landscaped area requires irrigation for four months in the summer at a rate of one inch per week, the designer must determine how much water will be needed to achieve this goal (1,250 gallons per week, approximately 22,000 gallons for the season), and how often the storage unit will be refilled with precipitation. The usage requirements and the expected rainfall volume and frequency must be determined.

Table 7.5
Round cistern capacity (Gallons)

Height (feet)	6-foot Diameter	12-foot Diameter	18-foot Diameter
6	1,269	5,076	11,421
8	1,692	6,768	15,227
10	2,115	8,460	19,034
12	2,538	10,152	22,841
14	2,961	11,844	26,648
16	3,384	13,535	30,455
18	3,807	15,227	34,262
20	4,230	16,919	38,069

Source: The Texas Manual on Rainwater Harvesting

2. Rain barrels and cisterns should be positioned to receive rooftop runoff.
3. If cisterns are used to supplement greywater needs, a parallel conveyance system must be installed to separate greywater from other potable water piping systems. Do not connect to domestic or commercial potable water system.
4. Consider household water demands (Table 7.6) when sizing a system to supplementing residential greywater use.

Table 7.6.
Household water demand chart

Fixture	Use	Flow Rate
Toilet	# flushes per person per day	1.6 gallons per flush (new toilet)
Shower	# minutes per person per day (5 minutes suggested max.)	2.75 gallons per minute (restricted flow head)
Bath	# baths per person per day	50 gallons per bath (average)
Faucets	Bathroom and kitchen sinks	10 gallons per day
Washing Machine	# loads per day	50 gallons per load (average)
Dishwasher	# loads per day	9.5 gallons per load

Source: Philadelphia Stormwater Manual

5. Discharge points and storage units should be clearly marked “Caution: Untreated Rainwater, Do Not Drink.”
6. Screens should be used to filter debris from runoff flowing into the storage units. Screens should be made of a durable, non-corrodible material and be easily maintainable.
7. Protect storage elements from direct sunlight by positioning and landscaping. Limit light into devices to minimize algae growth.
8. The proximity to building foundations should be considered for overflow conditions. The minimum setback distance for capture and reuse systems is 10 feet.
9. If the capture and reuse system or any elements of the system are exposed to freezing temperatures, then it should be emptied during the winter months to prevent ice damage.
10. Cisterns should be watertight (joints sealed with nontoxic waterproof material) with a smooth interior surface.
11. Covers and lids should have a tight fit to keep out surface water, insects (mosquitoes), animals, dust, and light.

12. Release stored water between storm events for the necessary storage volume to be available.
13. Positive outlet for overflow should be provided a few inches from the top of the cistern and sized to safely discharge the appropriate design storms when the cistern is full.
14. Rain barrels require a release mechanism in order to drain empty between storm events. Connect a soaker hose to slowly release stored water to a landscaped area.
15. Observation risers should be at least six inches above grade for buried cisterns.
16. Reuse may require pressurization. Water stored has a pressure of 0.43 psi per foot of water elevation. A 10-foot tank when full would have a pressure of 4.3 psi (0.43*10). Most irrigation systems require at least 15 psi. To add pressure, a pump, pressure tank, and fine mesh filter can be used, while this adds to the cost of the system, it makes the system more versatile and therefore practical.
17. Capture/reuse can also be achieved using a subsurface storage reservoir which provides temporary storage of stormwater runoff for reuse. The stormwater storage reservoir may consist of clean uniformly graded aggregate and a waterproof liner or pre-manufactured structural stormwater storage units.

Stormwater Functions and Calculations

Volume reduction

In order to keep storage costs to a minimum, it makes sense to size the storage tank so that it does not greatly exceed the water need. Where this is done, especially where a high-volume demand greatly exceeds runoff (e.g., irrigation or industrial makeup water), then runoff volume reduction for a particular storm can be assumed to equal the total volume of storage.

Where the captured water is the sole source for a particular operation (e.g., flushing toilets) the user does not want the stored water to be depleted before the next runoff event that replenishes it. In that case, the appropriate volume to store will be relatively easy to calculate based on the daily water need. After water need is determined, use the table below to choose which structure will be large enough to contain the amount of water needed. The amount replenished by a particular storm is equal to the volume reduction.

Additional Volume Reduction Considerations

For storage vessels that are not drained down completely before the next runoff event, the volume available to be filled by a particular storm may be difficult to calculate. Typical LID sizing criteria is based on the volume that goes to storage during a particular storm. That volume can be subtracted from the runoff volume, and the designer/developer can size the storage unit to achieve the targeted volume reduction. But sizing criteria under these capture and reuse circumstances may become need based. The designer/builder may estimate the volume removal for a particular storm, but estimates should be realistic given the use rate and storm runoff frequency. The estimate can be based on an average available storage capacity or preferably on a water balance analysis based on actual rainfall statistics.

Available Volume for Capture (gallons) = Runoff Coefficient (unitless) x Precip (inches) x Area (SF) x 1 foot/12 inches x 7.4805 gallons/1 cubic foot

OR

$$V = 0.62 \times C \times P \times A$$

Where

V = available volume for capture (gallons)

0.62 = unit conversion (gal/in./square foot)

C = volumetric runoff coefficient (unitless), typically 0.9 to 0.95 for impervious areas

P = precipitation amount (inches)

A = drainage area to cistern (square feet)

Sizing the tank is a mathematical exercise that balances the available collection (roof) area, annual rainfall, intended use of rainwater and cost. In other words, balance what can be collected against how the rainwater will be used and the financial and spatial costs of storing it. In most areas of the country, it's possible to collect 80 percent of the rain that falls on the available roof area. (The 20 percent reduction accounts for loss due to mist and heavy storms that release more rain than

the tank can accommodate.) (www.starkenvironmental.com/downloads/Interface_Engineering.pdf) That level of capture would yield approximately 500 gallons per inch of rain per 1000 SF of capture area. Table 7.7 includes available capture volumes based on drainage area and annual rainfall.

Peak rate mitigation

Overall, capture and reuse takes a volume of water out of site runoff and puts it back into the ground. This reduction in volume will translate to a lower overall peak rate for the site.

Water quality improvement

Pollutant removal takes place through filtration of recycled primary storage, and/or natural filtration through soil and vegetation for overflow discharge. Quantifying pollutant removal will depend on design. Sedimentation will depend on the area below the outlet that is designed for sediment accumulation, time in storage, and maintenance frequency. Filtration through soil will depend on flow draining to an area of soil, the type of soil (infiltration capacity), and design specifics (stone bed, etc.).

Maintenance

Rain barrels

- Inspect rain barrels four times per year, and after major storm events.
- Remove debris from screen as needed.
- Replace screens, spigots, downspouts, and leaders as needed.
- To avoid damage, drain container prior to winter, so that water is not allowed to freeze in devices.

Table 7.7
Annual rainfall yield (in gallons) for impervious surfaces

Annual Rainfall Yield in Gallons for Various Impervious Surface Sizes and Rainfall Amounts								
Impervious Surface Area (sf)	Rainfall (inches)							
	26	28	30	32	34	36	38	40
200	3,079	3,316	3,553	3,790	4,027	4,264	4,501	4,738
400	6,159	6,633	7,106	7,580	8,054	8,528	9,002	9,475
600	9,238	9,949	10,660	11,370	12,081	12,792	13,502	14,213
800	12,318	13,265	14,213	15,160	16,108	17,056	18,003	18,951
1,000	15,397	16,582	17,766	18,951	20,135	21,319	22,504	23,688
1,200	18,477	19,898	21,319	22,741	24,162	25,583	27,005	28,426
1,400	21,556	23,214	24,873	26,531	28,189	29,847	31,505	33,164
1,600	24,636	26,531	28,426	30,321	32,216	34,111	36,006	37,901
1,800	27,715	29,847	31,979	34,111	36,243	38,375	40,507	42,639
2,000	30,795	33,164	35,532	37,901	40,270	42,639	45,008	47,377
2,200	33,874	36,480	39,086	41,691	44,297	46,903	49,508	52,114
2,400	36,954	39,796	42,639	45,481	48,324	51,167	54,009	56,852
2,600	40,033	43,113	46,192	49,272	52,351	55,431	58,510	61,589
2,800	43,113	46,429	49,745	53,062	56,378	59,694	63,011	66,327
3,000	46,192	49,745	53,299	56,852	60,405	63,958	67,512	71,065
3,200	49,272	53,062	56,852	60,642	64,432	68,222	72,012	75,802
3,400	52,351	56,378	60,405	64,432	68,459	72,486	76,513	80,540
3,600	55,431	59,694	63,958	68,222	72,486	76,750	81,014	85,278
3,800	58,510	63,011	67,512	72,012	76,513	81,014	85,515	90,015

* Values represent the following percentage of precipitation (i.e., runoff coefficient) to account for losses: 95%

Cisterns

- Flush cisterns annually to remove sediment.
- Brush the inside surfaces and thoroughly disinfect twice per year.
- To avoid damage, drain container prior to winter, so that water is not allowed to freeze in devices.

Cost

Both rain barrels and cisterns are assumed to have a life span of 25 years.

	Capacity	Cost Range
Rain barrel	40-75 gal.	$100-$250
Cistern	200-10,000 gal.	Varies by manufacturer and material
Vertical storage	64-12,000 gal	$100-$11,000

Residential rain barrel with soaker hose

Source: http://www.urbangardencenter.com/products/rain-barrel/urb/index.html

Designer/Reviewer Checklist for Capture Reuse

Type and size (gallons) of storage system provided: _____

ITEM*	YES	NO	N/A	NOTES
Capture area defined and calculations performed?				
Pretreatment provided to prevent debris/sediment from entering storage system?				
Water use identified and calculations performed?				
If the use is seasonal, has off-season operation been considered?				
Draw-down time considered?				
Is storage system located optimally for the use?				
Is a pump required?				
If so, has an adequate pump system been developed?				
Acceptable overflow provided?				
Winter operation (protection from freezing) considered?				
Observation/clean-out port provided?				
Maintenance accounted for and plan provided?				

* These items primarily relate to larger systems, not residential rain barrels.

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BMP Fact Sheet

Infiltration Practices

Infiltration practices are natural or constructed land areas located in permeable soils that capture, store, and infiltrate the volume of stormwater runoff into surrounding soil.

Infiltration Trench, City of Grayling, MI
Source: Huron Pines

Variations

- **Dry wells**, also referred to as seepage pits, French drains or Dutch drains, are a subsurface storage facility (structural chambers or excavated pits, backfilled with a coarse stone aggregate) that temporarily store and infiltrate stormwater runoff from rooftop structures. Due to their size, dry wells are typically designed to handle stormwater runoff from smaller drainage areas, less than one acre in size.
- **Infiltration basins** are shallow surface impoundments that temporarily store, capture, and infiltrate runoff over a period of several days on a level and uncompacted surface. Infiltration basins are typically used for drainage areas of 5 to 50 acres with land slopes that are less than 20 percent.
- **Infiltration berms** use a site's topography to manage stormwater and prevent erosion. Berms may function independently in grassy areas or may be incorporated into the design of other stormwater control facilities such as Bioretention and Constructed Wetlands. Berms may also serve various stormwater drainage functions including: creating a barrier to flow, retaining flow for volume control, and directing flows.
- **Infiltration trenches** are linear subsurface infiltration structures typically composed of a stone trench wrapped with geotextile which is designed for both stormwater infiltration and conveyance in drainage areas less than five acres in size.
- **Subsurface infiltration beds** generally consist of a rock storage (or alternative) bed below other surfaces such as parking lots, lawns, and playfields for temporary storage and infiltration of stormwater runoff with a maximum drainage area of 10 acres.
- **Bioretention** can be an infiltration practice and is discussed in the Bioretention BMP.
- **Level spreaders** can be an infiltration practice and is discussed in the Level Spreader BMP.

Key Design Features

- Depth to water table or bedrock
- Pretreatment is often needed to prevent clogging
- Often requires level infiltration surface
- Proximity to buildings, drinking water supplies, karst features, and other sensitive areas
- Soil types
- Provide positive overflow in most uses

Site Factors

- Maximum Site Slope: 20 percent
- Minimum depth to bedrock: Two feet
- Minimum depth to seasonally high water table: Two feet
- Potential Hotspots: Yes with pretreatment and/or impervious liner
- NRCS Soil type: A, B, C*, D*

*C & D soils have limited infiltration ability and may require an underdrain.

Infiltration BMP	Max. Drainage Area
Berming	5 acres
Dry Well	1 acre
Infiltration Basin	10 acres
Infiltration Trench	2 acres
Subsurface Infiltration Bed	5 acres

Benefits

- Reduces volume of stormwater runoff
- Reduces peak rate runoff
- Increases groundwater recharge
- Provides thermal benefits

Limitations

- Pretreatment requirements to prevent clogging
- Not recommended for areas with steep slopes

Erosion control matting and rock can be used at surface flow entrances

Bioretention is one variation of an infiltration BMP, such as this rain garden at the Macomb County Public Works Building

Applications

	Residential	Commercial	Ultra Urban	Industrial	Retrofit	Highway/Road	Recreational
Dry well	Yes	Yes	Yes	Limited	Yes	No	No
Infiltration basin	Yes	Yes	Limited	Yes	Limited	Limited	No
Infiltration berm	Yes	Yes	Limited	Yes	Yes	Yes	No
Infiltration trench	Yes	Yes	Yes	Yes	Yes	Yes	No
Subsurface infiltration bed	Yes	Yes	Yes	Yes	Yes	Limited	No

Stormwater Quantity Functions

	Volume	Groundwater Recharge	Peak Rate
Dry well	Medium	High	Medium
Infiltration basin	High	High	High
Infiltration berm	Low/Medium	Low/Medium	Medium
Infiltration trench	Medium	High	Low/Medium
Subsurface infiltration bed	High	High	High

Stormwater Quality Functions

	TSS	TP	NO3	Temperature
Dry well	High	High/Medium	Medium/Low	High
Infiltration basin	High	Medium/High	Medium	High
Infiltration berm	Medium/High	Medium	TN-Medium	Medium
Infiltration trench	High	High/Medium	Medium/Low	High
Subsurface infiltration bed	High	Medium/High	Low	High

Case Study: Saugatuck Center for the Arts

The Saugatuck Center for the Arts (SCA), in conjunction with the City of Saugatuck, Michigan Department of Environmental Quality, and private donors, constructed a public garden that treats rain water that falls on the SCA roof. The original design was modified to accommodate rain water that would otherwise have entered Kalamazoo Lake untreated. The resulting design for the garden absorbs and infiltrates 100 percent of the rain water from the SCA roof, resulting in zero discharge to the nearby lake.

Subsurface Infiltration
Source: JFNew

In addition to the garden at the Saugatuck Center for the Arts, the revised design incorporated a series of alternative stormwater Best Management Practices on City of Saugatuck property, including subsurface infiltration under porous pavers in the adjacent city parking lot and a rain garden/vegetated swale series at Coghlin Park to treat rain water from the city parking lot. The design incorporated native plants to address management in an urban setting while visually integrating with the contemporary social fabric of Saugatuck. The design also incorporated an innovative oil-and-grit separator to remove over 80 percent of sediment and nutrients draining from approximately nine acres of urban land surrounding the SCA and city parking lot. Through this series, or "treatment techniques," the SCA and City of Saugatuck are able to demonstrate a variety of innovative and unique alternatives for treatment and reduction of stormwater.

Case Study Site Considerations	
Project Type	Subsurface infiltration, rain gardens, porous pavers, native plants, water quality device
Estimated Total Project Cost	$200,000
Maintenance Responsibility	City of Saugatuck
Project Contact	Kirk Harrier, City Manager, 269-857-2603

Description and Function

Infiltration practices are designed to store, capture, and infiltrate stormwater runoff into the surrounding soils. During periods of rainfall, infiltration BMPs reduce the volume of runoff and help to mitigate potential flooding events, downstream erosion, and channel morphology changes. This recharged water serves to provide baseflow to streams and maintain stream water quality.

Infiltration BMPs provide excellent pollutant removal effectiveness because of the combination of a variety of natural functions occurring within the soil mantle, complemented by existing vegetation (where this vegetation is preserved). Soil functions include physical filtering, chemical interactions (e.g., ion exchange, adsorption), as well as a variety of forms of biological processing, conversion, and uptake. The inclusion of appropriate vegetation for some infiltration basins reinforces the work of the soil by reducing velocity and erosive forces, soil anchoring, and further uptake of nonpoint source pollutants. In many cases, even the more difficult-to-remove soluble nitrates can be reduced as well. It should be noted that infiltration BMPs tend to be excellent for removal of many pollutants, especially those that are in particulate form. However, there are limitations to the removal of highly soluble pollutants, such as nitrate, which can be transmitted through the soil.

Infiltration basin

In addition to the removal of chemical pollutants, infiltration can address thermal pollution. Maintaining natural temperatures in stream systems is recognized as an issue of increasing importance for protection of overall stream ecology. While detention facilities tend to discharge heated runoff flows, the return of runoff to the groundwater through use of infiltration BMPs guarantees that these waters will be returned at natural groundwater temperatures, considerably cooler than ambient air in summer and warmer in winter. As a result, seasonal extreme fluctuations in stream water temperature are minimized. Fish, macro-invertebrates, and a variety of other biota will benefit as the result.

Infiltration Limitations

The use of sediment pretreatment with infiltration BMPs is required for many infiltration BMPs to prevent clogging of the infiltration surface area. Sediment pretreatment can take the form of a water quality filtering device, a settling basin, filter strips, sediment trap, or a combination of these practices upstream of the infiltration practice. Pretreatment practices should be inspected and maintained at least once per year. Before entering an infiltration practice, stormwater should first enter a pretreatment practice sized to treat a minimum volume of 25% of the water quality volume (Vwq).

Sites that include hot spots, such as gasoline stations, vehicle maintenance areas, and high intensity commercial uses, may need additional pretreatment practices to prevent impairment of groundwater supplies. Infiltration may occur in areas of hot spots provided pretreatment is suitable to address concerns.

Pretreatment devices that operate effectively in conjunction with infiltration include grass swales, vegetated filter strips, bioretention, settling chambers, oil/grit separators, constructed wetlands, sediment sumps, and water quality inserts. Selection of pretreatment practices should be guided by the pollutants of greatest concern, and the extent of the land development under consideration.

Selection of pretreatment techniques will vary depending upon whether the pollutants are of a particulate (sediment, phosphorus, metals, etc.) versus a soluble (nitrogen and others) nature.

Applications

Infiltration systems can be used in a variety of applications, from small areas in residential properties to extensive systems under commercial parking lots or large basins in open space. Industrial, retrofit, highway/road, and recreational areas can also readily incorporate infiltration to varying degrees. The use of infiltration basins and berming in ultra urban and redevelopment settings is limited primarily due to space constraints.

Dry wells have limited applicability in industrial settings as they are designed for runoff from relatively small roof areas (therefore they are also not applicable to transportation corridors).

Infiltration basins, subsurface infiltration beds, and berming are also limited for transportation projects due to space constraints and grading requirements (however berming can be used to some degree — especially along the edge of the right of way — to capture runoff).

Variations

Subsurface infiltration

A subsurface infiltration bed generally consists of a rock storage (or alternative) bed below other surfaces such as parking lots, lawns and playfields for temporary storage and infiltration of stormwater runoff. Often subsurface storage is enhanced with perforated or open bottom piping. Subsurface infiltration beds can be stepped or terraced down sloping terrain provided that the base of the bed remains level. Stormwater runoff from nearby impervious areas is conveyed to the subsurface storage media, receives necessary pretreatment and is then distributed via a network of perforated piping.

The storage media for subsurface infiltration beds typically consists of clean-washed, uniformly graded aggregate. However, other storage media alternatives are available. These alternatives are generally variations

Subsurface infiltration at Saugatuck Performing Arts Center.
Source: JFNew

on plastic cells that can more than double the storage capacity of aggregate beds. Storage media alternatives are ideally suited for sites where potential infiltration area is limited.

If designed, constructed, and maintained using the following guidelines, subsurface infiltration features can stand alone as significant stormwater runoff volume, rate, and quality control practices. These systems can also provide some aquifer recharge, while preserving or creating valuable open space and recreation areas. They have the added benefit of functioning year-round, because the infiltration surface is typically below the frost line.

Various methods can be utilized to connect to subsurface infiltration areas:

- **Connection of roof leaders**

  Runoff from nearby roofs can be directly conveyed to subsurface beds via roof leader connections to perforated piping. Roof runoff generally has relatively low sediment levels, making it ideally suited for connection to an infiltration bed.

- **Connection of inlets**

  Catch basins, inlets, and area drains may be connected to subsurface infiltration beds. However, sediment, oil and grease, and debris removal must be provided. Storm structures should include sediment trap areas below the inverts of discharge pipes to trap solids and debris. Parking lots and roadways must provide for the removal of oil and grease and other similar constituents through appropriate treatment. In areas of high traffic or excessive generation of sediment, litter, and other similar materials, a water quality insert or other pretreatment device may be required.

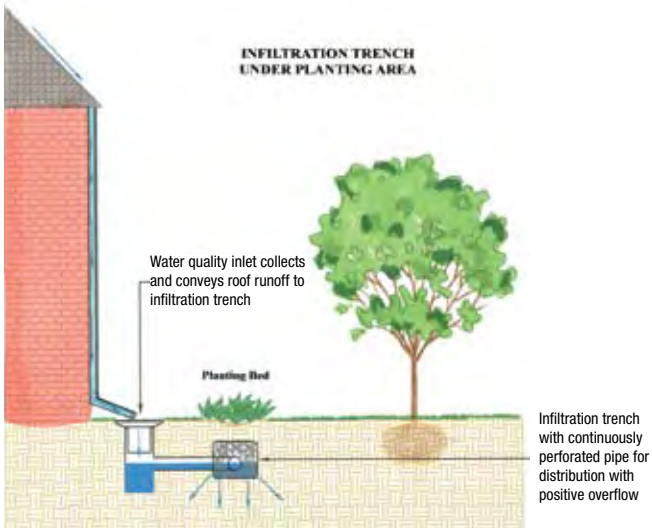
Infiltration trench

An infiltration trench is a linear stormwater BMP consisting of a continuously perforated pipe within a sub-surface stone-filled trench wrapped with geotextile. Usually, an infiltration trench is part of a conveyance system and is designed so that large storm events are conveyed through the pipe with some runoff volume reduction. During small storm events, volume reduction may be significant and there may be little or no discharge.

All infiltration trenches should be designed with a positive overflow. Sediment pretreatment of runoff from impervious areas should be considered to prevent clogging within the trench, particularly when conveying runoff from roadways and parking areas.

An infiltration trench differs from an infiltration bed in that it may be constructed in more confined areas. The designer must still consider the impervious area to infiltration area loading rate. It can be located beneath or within roadways or impervious areas (Figure 7.22) and can also be located down a mild slope by "stepping" the sections between control structures.

Figure 7.22
Residential rain garden with surface connection to subsurface infiltration bed under garden.



Infiltration basin

Infiltration basins (Figure 7.23) are shallow, impounded areas designed to temporarily store and infiltrate stormwater runoff. The size and shape can vary from one large basin to multiple, smaller basins throughout a site.

Infiltration basins use the existing soil and native vegetation to reduce the volume of stormwater runoff by infiltration and evapotranspiration. Therefore, the use of sediment pretreatment is imperative to prevent clogging of the infiltration surface area within the basin. Sediment pretreatment can take the form of a water quality filtering device, vegetative filter strips, a settling basin, or a sediment trap. The key to promoting infiltration is to provide enough surface area for the volume of runoff to be absorbed within 72 hours.

An engineered overflow structure must be provided for the larger storms and can be designed for peak rate attenuation. With the use of a properly designed outlet structure, infiltration basins can be designed to mitigate volume and water quality for small frequent storms, while managing peak rates for large design storms.

Dry well

A dry well (Figure 7.24) is a subsurface storage facility that temporarily stores and infiltrates stormwater runoff from rooftops. Roof leaders usually connect directly into the dry well, which may be either an excavated pit filled with uniformly graded aggregate wrapped in geotextile or a prefabricated storage chamber or pipe segment. For structures without gutters or downspouts, runoff can be designed to sheet flow off a pitched roof surface and onto a stabilized ground cover that is then directed toward a dry well via stormwater pipes or swales.

Dry wells discharge the stored runoff via infiltration into the surrounding soils. In the event that the dry well is overwhelmed in an intense storm event, an overflow mechanism (e.g., surcharge pipe, connection to larger infiltration area, etc.) will ensure that additional runoff is safely conveyed downstream.

Figure 7.23
Schematic of infiltration basin

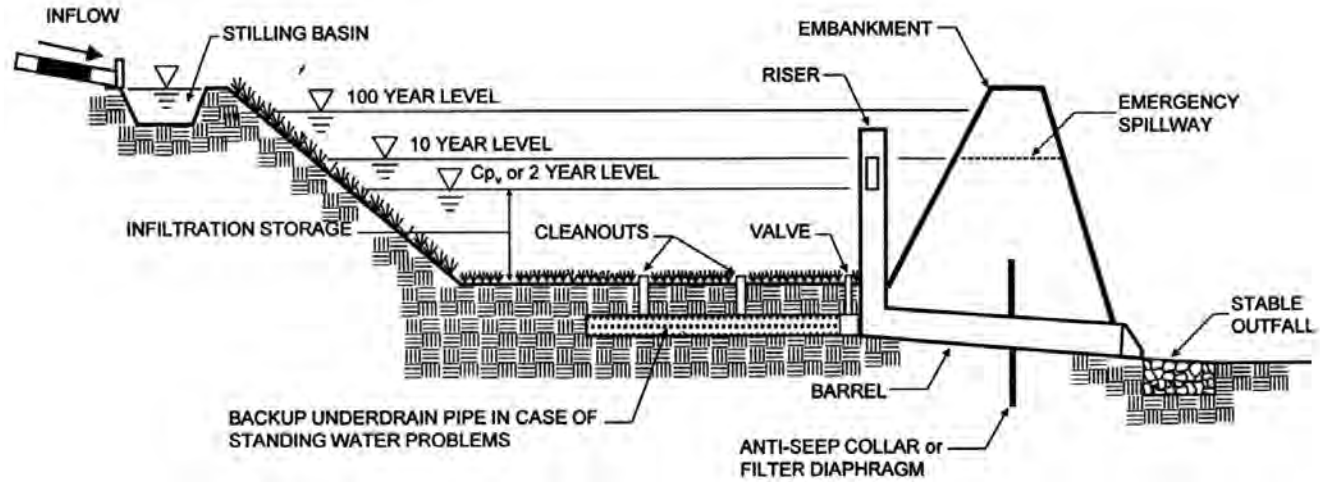
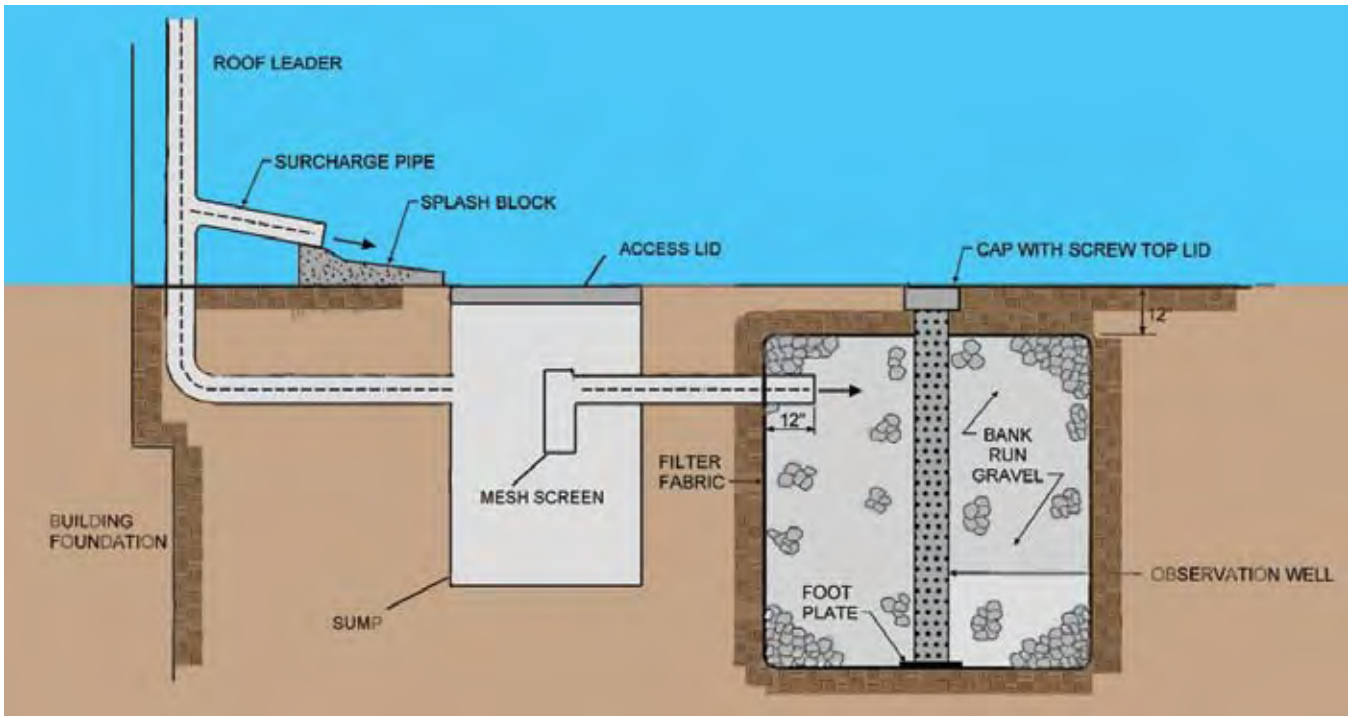


Figure 7.24
Cross-section of dry well with "sumped" catch basin for sediment pretreatment



Infiltration berm

Infiltration berms are linear vegetation features located along (i.e. parallel to) existing site contours in a moderately sloping area. They are built-up earthen embankments with sloping sides, which function to retain, slow down, or divert stormwater flows. Infiltration berms also have shallow depressions created by generally small earthen embankments that collect and temporarily store stormwater runoff allowing it to infiltrate into the ground and recharge groundwater.

Infiltration berms can be constructed in various areas on the site, including:

- **Diversion berms**

  Diversion berms can be used to protect slopes from erosion and to slow runoff rate. Like swales, berms may divert concentrated discharge from a developed area away from the sloped area. Additionally, berms may be installed in series down the slope to retain flow and spread it out along multiple, level berms to discourage concentrated flow.

- Diversion berms can also be used to direct stormwater flow in order to promote longer flow pathways, thus increasing the time of concentration. For example, berms can be installed such that vegetated stormwater flow pathways are allowed to "meander" so that stormwater travel time is increased.

Prefabricated dry wells

There are a variety of prefabricated, predominantly plastic subsurface storage chambers on the market today that can replace aggregate dry wells. Since these systems have significantly greater storage capacity than aggregate, space requirements are reduced and associated costs may be defrayed. If the following design guidelines are followed and infiltration is still encouraged, prefabricated chambers can prove just as effective as standard aggregate dry wells.

- **Meadow/woodland infiltration berms**

  Woodland infiltration berms can be installed within existing wooded areas for additional stormwater management. Berms in wooded areas can even improve the health of existing vegetation, through enhanced groundwater recharge. Care should be taken during construction to ensure minimum disturbance to existing vegetation, especially tree roots.

Berms are also utilized for a variety of reasons independent of stormwater management, such as to add aesthetic value to a flat landscape, create a noise or wind barrier, separate land uses, screen undesirable views or to enhance or emphasize landscape designs. Berms are often used in conjunction with recreational features,

such as pathways through woodlands. In summary, even when used for stormwater management, berms can be designed to serve multifunctional purposes and are easily incorporated into the landscape.

Design Considerations

The following general design considerations are for all BMPs utilizing infiltration. These include: site conditions and constraints, as well as general design considerations. Specific design considerations for each BMP follow these same considerations.

Site conditions and constraints for all infiltration BMPs

- **Depth to seasonal high water table**. A four-foot clearance above the seasonally high water table is recommended. A two-foot clearance can be used, but may reduce the performance of the BMP. This reduces the likelihood that temporary groundwater mounding will affect the system, and allows sufficient distance of water movement through the soil to assure adequate pollutant removal. In special circumstances, filter media may be employed to remove pollutants if adequate soil layers do not exist.
- **Depth to bedrock**. A four-foot minimum depth to bedrock is recommended to assure adequate pollutant removal and infiltration. A two-foot depth can be used, but may reduce the performance of the BMP. In special circumstances, filter media may be employed to remove pollutants if adequate soil mantle does not exist.
- **Soil infiltration**. Soils underlying infiltration devices should have infiltration rates between 0.1 and 10 inches per hour, which in most development programs should result in reasonably sized infiltration systems. Where soil permeability is extremely low, infiltration may still be possible, but the surface area required could be large, and other volume reduction methods may be warranted. Undisturbed Hydrologic Soil Groups A, B, and C often fall within this range and cover most of the state. Type D soils may require the use of an underdrain.

  Soils with rates in excess of six inches per hour may require an additional soil buffer (such as an organic layer over the bed bottom) if the Cation Exchange Capacity (CEC) is less than 10 and pollutant loading is expected to be significant. In carbonate soils, excessively rapid drainage may increase the risk of sinkhole formation, and some compaction or additional measures may be appropriate.
- **Setbacks**. Infiltration BMPs should be sited so that any risk to groundwater quality is minimized and they present no threat to sub-surface structures such as foundations and septic systems. (Table 7.11)

Table 7.11
Setback Distances

Setback from	Minimum Distance (feet)
Property Line	10
Building Foundation*	10
Private Well	50
Public Water Supply Well**	50
Septic System Drainfield***	100

* minimum with slopes directed away from building. 100 feet upgradient from basement foundations.

** At least 200 feet from Type I or IIa wells, 75 feet from Type IIb and III wells (MDEQ Safe Drinking Water Act, PA 399)

*** 50 feet for septic systems with a design flow of less than 1,000 gallons per day

General design considerations for all infiltration BMPs

- **Do not infiltrate in compacted fill**. Infiltration in native soil without prior fill or disturbance is preferred but not always possible**.** Areas that have experienced historic disturbance or fill are suitable for infiltration provided sufficient time has elapsed and the soil testing indicates the infiltration is feasible. In disturbed areas it may be necessary to infiltrate at a depth that is beneath soils that have previously been compacted by construction methods or long periods of mowing, often 18 inches or more. If site grading requires placement of an infiltration BMP on fill, compaction should be minimal to prevent excess settlement and the infiltration capacity of the compacted fill should be measured in the field to ensure the design values used are valid.
- **A level infiltration area (one percent or less slope) is preferred**. Bed bottoms should always be graded into the existing soil mantle, with terracing as required to construct flat structures. Sloped bottoms tend to pool and concentrate water in small areas, reducing the overall rate of infiltration and longevity of the BMP. The longitudinal slope may range only from the preferred zero percent up to one percent, and that lateral slopes are held at zero percent. It is highly recommended that the maximum side slopes for an infiltration practice be 1:3 (V: H).

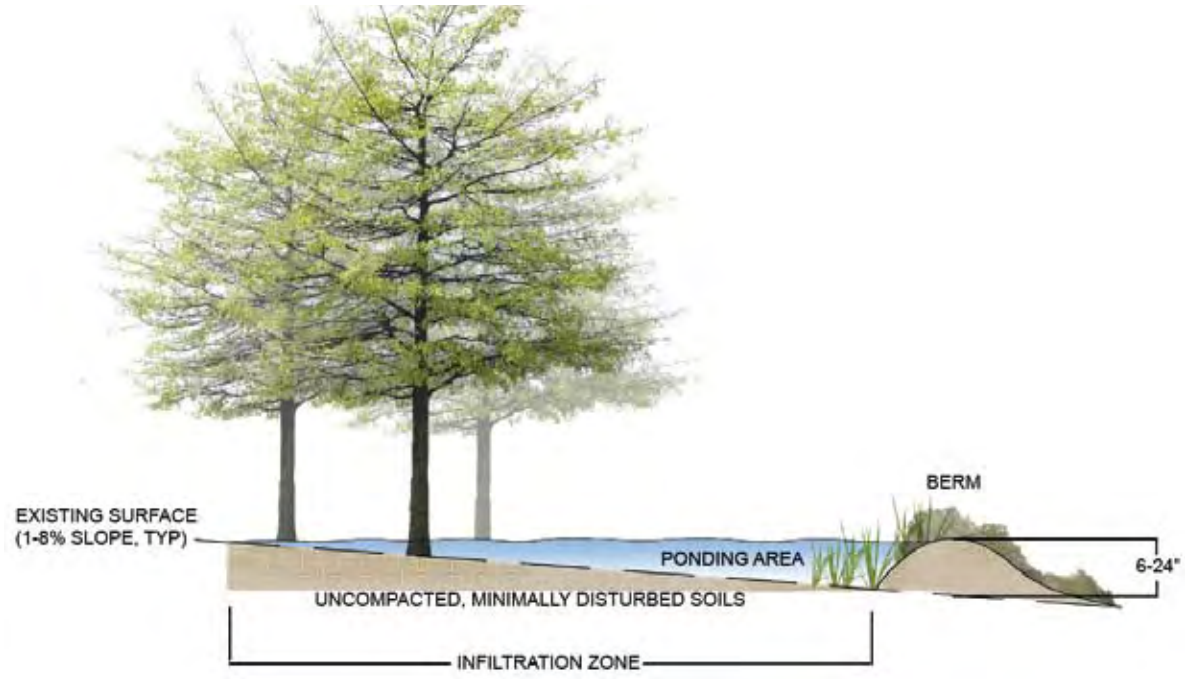
- **The soil mantle should be preserved for surface infiltration BMPs** and excavation should be minimized. Those soils that do not need to be disturbed for the building program should be left undisturbed. Macropores can provide a significant mechanism for water movement in surface infiltration systems, and the extent of macropores often decreases with depth. Maximizing the soil mantle also increases the pollutant removal capacity and reduces concerns about groundwater mounding. Therefore, excessive excavation for the construction of infiltration systems is strongly discouraged.
- **Isolate hot spot areas**. Site plans that include infiltration in hot spots need to be reviewed carefully. Hot spots are most often associated with some industrial uses and high traffic – gasoline stations, vehicle maintenance areas, and high intensity commercial uses (fast food restaurants, convenience stores, etc.). Infiltration may occur in areas of hot spots provided pretreatment is suitable to address concerns.
- **Utilize pretreatment**. Pretreatment should be utilized for most infiltration BMPs, especially for hot spots and areas that produce high sediment loading. Pretreatment devices that operate effectively in conjunction with infiltration include grass swales, vegetated filter strips, settling chambers, oil/grit separators, constructed wetlands, sediment sumps, and water quality inserts. Selection of pretreatment should be guided by the pollutants of greatest concern, site by site, depending upon the nature and extent of the land development under consideration. Selection of pretreatment techniques will vary depending upon whether the pollutants are of a particulate (sediment, phosphorus, metals, etc.) versus soluble (nitrogen and others) nature. Types of pretreatment (i.e., filters) should be matched with the nature of the pollutants expected to be generated.
- **The loading ratio of impervious area to bed bottom area must be considered**. One of the more common reasons for infiltration system failure is the design of a system that attempts to infiltrate a substantial volume of water in a very small area. Infiltration systems work best when the water is "spread out". The loading ratio describes the ratio of imperious drainage area to infiltration area, or the ratio of total drainage area to infiltration area. In general, the following loading ratios are recommended (some situations, such as highly permeable soils, may allow for higher loading ratios):
  - Maximum impervious loading ratio of 5:1 relating impervious drainage area to infiltration area.
  - Maximum total loading ratio of 8:1 relating total drainage area to infiltration area.
- **The hydraulic head or depth of water should be limited**. The total effective depth of water within the infiltration BMP should generally not be greater than two feet to avoid excessive pressure and potential sealing of the bed bottom. Typically the water depth is limited by the loading ratio and drawdown time and is not an issue.
- **Drawdown time must be considered**. In general, infiltration BMPs should be designed so that they completely empty within a 72-hour period in most situations (a 48-hour period is preferred).
- **All infiltration BMPs should be designed with a positive overflow** that discharges excess volume in a non-erosive manner, and allows for controlled discharge during extreme rainfall events or frozen bed conditions. Infiltration BMPs should never be closed systems dependent entirely upon infiltration in all storm frequency situations.
- **Geotextiles should be incorporated into the design as necessary**. Infiltration BMPs that are subject to soil movement into the stone medium or excessive sediment deposition must be constructed with suitably permeable non-woven geotextiles to prevent the movement of fines and sediment into the infiltration system. The designer is encouraged to err on the side of caution and use geotextiles as necessary within the BMP structure.
- **Aggregates used in construction should be washed**. In general, bank run material will contain fines that will wash off and clog the infiltration surface.
- **Infiltration utilizing vegetation**. Adequate soil cover (generally 12 to 18 inches) must be maintained above the infiltration bed to allow for a healthy vegetative cover. Vegetation over infiltration beds can be native grasses, meadow mix, or other low-growing, dense species (Appendix C). These plants have longer roots than traditional grass and will likely benefit from

Infiltration trench with geotextile

the moisture in the infiltration bed, improving the growth of these plantings and, potentially increasing evapotranspiration.

- **Using underdrains in poor draining soils**. Underdrains can be used in infiltration BMPs where in-situ soils are expected to cause ponding lasting longer than 48 hours. If used, underdrains are typically small diameter (6 to 12 inches) perforated pipes in a clean gravel trench wrapped in geotextile fabric (or in the storage/infiltration bed). Underdrains should have a flow capacity greater than the total planting soil infiltration rate and should have at least 18 inches of soil/gravel cover. They can daylight to the surface or connect to another stormwater system. A method to inspect and clean underdrains should be provided (via cleanouts, inlet, overflow structure, etc.)
- **Freeboard**. It is recommended that two feet of freeboard be provided from the 100-year flood elevation of the infiltration practice to the lowest basement floor elevation of residential, commercial, industrial, and institutional buildings located adjacent to the BMP, unless local requirements recommend or stipulate otherwise.

Figure 7.25
Typical components of a berm



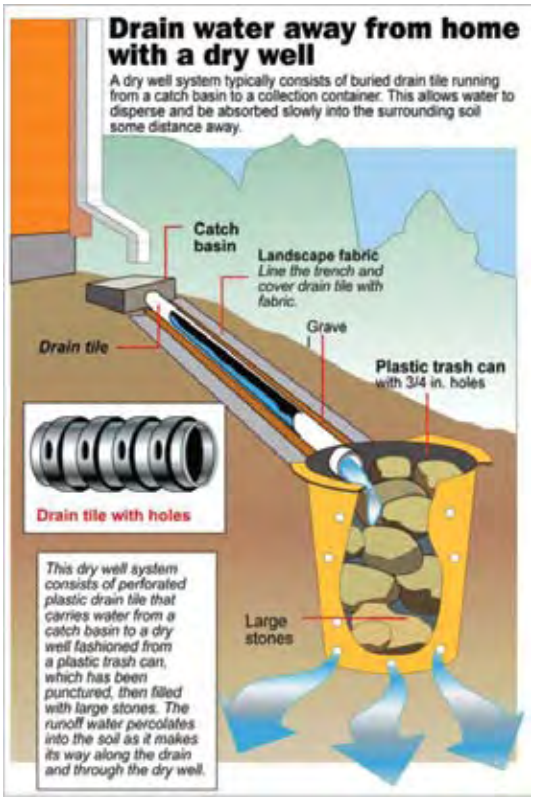
Additional design considerations for infiltration berms

- Sizing criteria (Figure 7.25) are dependent on berm function, location, and storage volume requirements.
  - Low **berm height** (less than or equal to 24 inches) is recommended to encourage maximum infiltration and to prevent excessive ponding behind the berm. Greater heights may be used where berms are being used to divert flow or to create "meandering" or lengthened flow pathways. In these cases, stormwater is designed to flow adjacent to (parallel to), rather than over the crest of the berm. Generally, more berms of smaller size are preferable to fewer berms of larger size.
  - **Berm length** is dependent on functional need and site size. Berms installed along the contours should be level and located across the slope. Maximum length will depend on width of the slope.
- Infiltration berms should be constructed along (parallel to) contours at a **constant level elevation**.
- **Soil**. The top one foot of a berm needs to consist of high quality topsoil, with well-drained, stable fill material making up the remainder of the berm. A berm may also consist entirely of high quality topsoil, but this the more expensive option.

  The use of gravel is not recommended in the layers directly underneath the topsoil because of the tendency of the soil to wash through the gravel. In some cases, the use of clay may be required due to its cohesive qualities (especially where the berm height is high or relatively steeply sloped). However, well-compacted soil is usually sufficient provided that the angle of repose, the angle at which the soil will rest and not be subject to slope failure (see #5 below), is adequate for the soil medium used.
- The **angle of repose of** any soil will vary with the texture, water content, compaction, and vegetative cover. Typical angles of repose are given below:
  - Non-compacted clay: 5 to 20 percent
  - Dry Sand: 33 percent
  - Loam: 35 to 40 percent
  - Compacted clay: 50 to 80 percent
- **Slope**. The angle of repose for the soil used in the berm should determine the maximum slope of the berm with additional consideration to aesthetic, drainage, and maintenance needs. If a berm is to be mowed, the slope should not exceed a 4:1 ratio (horizontal to vertical) in order to avoid "scalping" by mower blades. If trees are to be planted on berms, the slope should not exceed a 5:1 to 7:1 ratio. Other herbaceous plants, which do not require mowing, can tolerate slopes of 3:1, though this slope ratio may promote increased runoff rate and erosive conditions. Berm side slopes should never exceed a 2:1 ratio.
- **Plant materials**. It is important to consider the function and form of the berm when selecting plant materials. When using native trees and shrubs, plant them in a pattern that appears natural and accentuates the form of the berm. Consider native species from a rolling prairie or upland forest habitat. If turf will be combined with woody and herbaceous plants, the turf should be placed to allow for easy maneuverability while mowing. Low maintenance native plantings, such as trees and meadow plants, rather than turf and formal landscaping, are encouraged and can be found in Appendix C.
- **Infiltration trench option**. Soil testing is required for infiltration berms that will utilize a subsurface infiltration trench. Infiltration trenches are not recommended in existing woodland areas as excavation and installation of subsurface trenches could damage tree root systems. See the infiltration trench section for information on infiltration trench design.
- **Aesthetics**. To the extent possible, berms should reflect the surrounding landscape. Berms should be graded so that the top of the berm is smoothly convex and the toes of the berms are smoothly concave. Natural, asymmetrical berms are usually more effective and attractive than symmetrical berms, which tend to look more artificial. The crest of the berm should be located near one end of the berm rather than in the middle.
- Pretreatment. The small depression created by an infiltration berm can act as a sediment forebay prior to stormwater entering a down slope BMP, such as a bioretention basin, a subsurface infiltration bed, or another such facility.

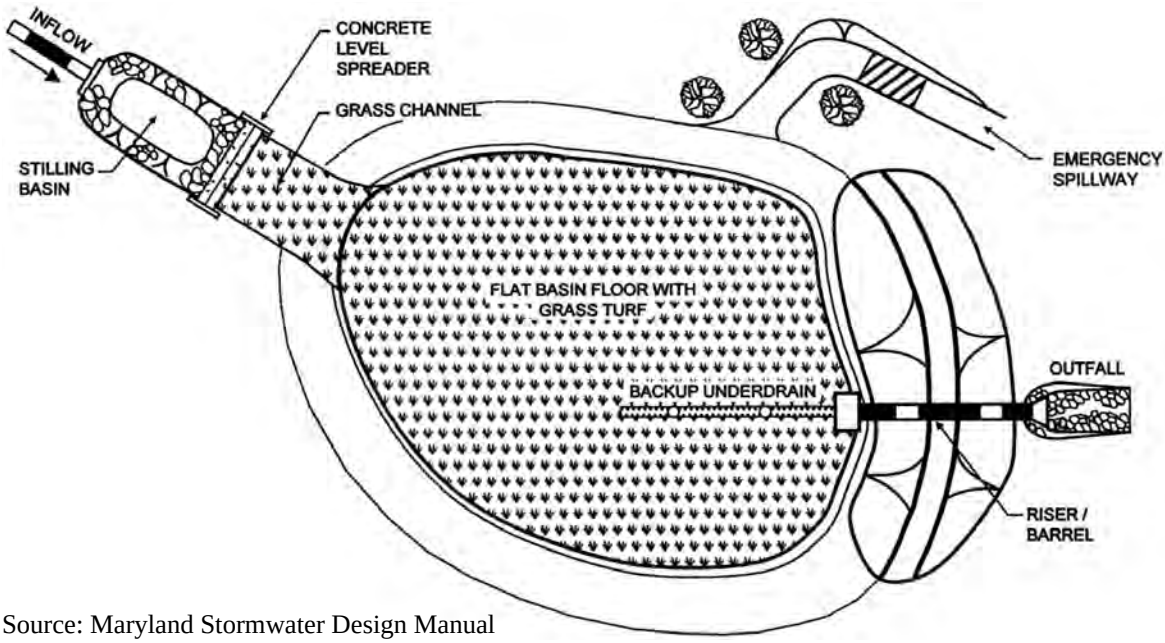
Additional design considerations for dry wells

- Dry wells typically consist of 18 to 48 inches of clean washed, uniformly graded aggregate with 40 percent void capacity (AASHTO No. 3, or similar). Dry well aggregate is wrapped in a nonwoven geotextile, which provides separation between the aggregate and the surrounding soil. Typically, dry wells will be covered in at least 12 inches of soil or six inches of gravel or riverstone. An alternative form of dry well is a subsurface, prefabricated chamber, a number of which are currently available on the market.
- All dry wells must be able to convey system overflows to downstream drainage systems. System overflows can be incorporated either as surcharge (or overflow) pipes extending from roof leaders or via connections from the dry well itself.
- The design depth of a dry well should take into account frost depth to prevent frost heave.
- A removable filter with a screened bottom should be installed in the roof leader below the surcharge pipe in order to screen out leaves and other debris.
- Inspection and maintenance access to the dry well should be provided. Observation wells not only provide the necessary access to the dry well, but they also provide a conduit through which pumping of stored runoff can be accomplished in case of slowed infiltration.



Residential dry well
Source - AP/Stan Kohler

Figure 7.26
Infiltration basin sketch



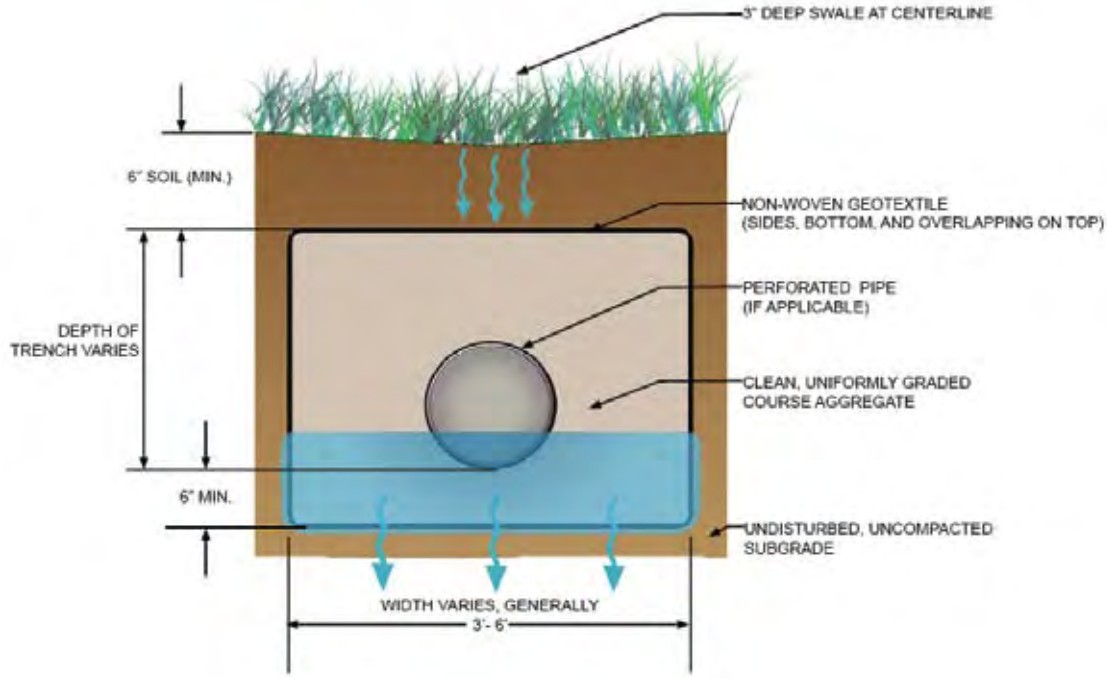
Source: Maryland Stormwater Design Manual

- Though roofs are generally not a significant source of runoff pollution, they can still be a source of particulates and organic matter, as well as sediment and debris during construction. Measures such as roof gutter guards, roof leader clean-outs with sump, or an intermediate sump box can provide pretreatment for dry wells by minimizing the amount of sediment and other particulates that enter it.

Additional Design Considerations for Infiltration Basins

- Infiltration basins are typically used for drainage areas of five to 50 acres with land slopes that are less than 20 percent.
- A six-inch layer of sand must be placed on the bottom of an infiltration basin (Figure 7.26). This sand layer can intercept silt, sediment, and debris that could otherwise clog the top layer of the soil below the basin.
- An infiltration basin does not normally have a structural outlet to discharge runoff from the stormwater quality design storm. Instead, outflow from an infiltration basin is through the surrounding soil. An infiltration basin may also be combined with an extended detention basin to provide additional runoff storage for both stormwater quality and quantity management. A structural outlet or emergency spillway is provided for storms that exceed the design of the infiltration basin.
- The berms surrounding the basin should be compacted earth with a slope of not less than 3:1, and a top width of at least two feet.
- The overflow from the infiltration basin must be properly designed for anticipated flows. Large infiltration basins may require multiple outlet control devices to effectively allow for overflow water during the larger storms. Emergency overflow systems can be constructed to direct large storm overflows.
- The sediment pre-treatment structure should be designed to provide for access and maintenance.
- In some cases, basins may be constructed where impermeable soils on the surface are removed and where more permeable underlying soils then are used for the basin bottom. Care should be taken in the excavation process to make sure that soil compaction does not occur.
- The inlets into the basin should have erosion protection.
- Use of a backup underdrain or low-flow orifice may be considered in the event that the water in the basin does not drain within 72 hours.

Figure 7.27
Infiltration trench cross section



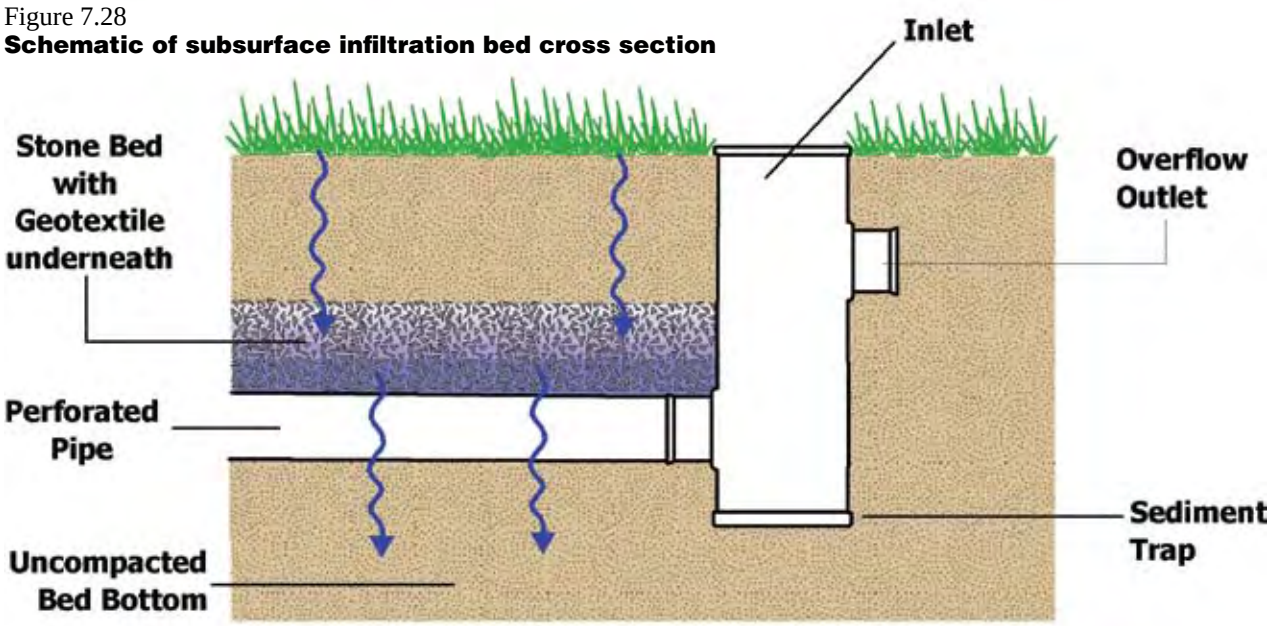
Additional design considerations for infiltration trenches

- The infiltration trench (Figure 7.27) is typically comprised of a section of uniformly graded aggregate, such as AASHTO No. 3, which ranges one to two inches in gradation. Depending on local aggregate availability, both larger and smaller size aggregate may be used. The critical requirements are that the aggregate be uniformly-graded, clean-washed, and contain at least 40 percent void space. The depth of the trench is a function of stormwater storage requirements, frost depth considerations, and site grading.
- Water quality inlets or catch basins with sumps are required for all surface inlets to prevent clogging of the infiltration trench with sediment and debris. Parking lot and street runoff must be treated by vegetated filter strips, bioretention, or water quality inlets capable of removing oil and grease and similar pollutants. Untreated parking lot and road runoff should never be directly discharged underground.
- Cleanouts, observation wells, or inlets must be installed at both ends of the infiltration trench and at appropriate intervals to allow access to the perforated pipe.
- When designed as part of a storm sewer system, a continuously perforated pipe that extends the length of the trench and has a positive flow connection may be include to allow high flows to be conveyed through the infiltration trench. Depending on size, these pipes may provide additional storage volume.
- Trees may be planted over the infiltration trench provided that adequate soil media is provided above the trench (a minimum of three feet).
- While most infiltration trenches areas consist of an aggregate storage bed, alternative subsurface storage products may also be employed. These include a variety of proprietary, interlocking plastic units that contain much greater storage capacity than aggregate, at an increased cost.

Additional design considerations for subsurface infiltration beds

- The infiltration bed must be wrapped in nonwoven geotextile filter fabric to prevent migration of the subsoils into the stone voids. (Bottom, top, and sides).
- The subsurface infiltration bed (Figure 7.28) is typically comprised of a 12 to 36-inch section of aggregate, such as AASHTO No.3, which ranges from one to two inches in gradation. Depending on local aggregate availability, both larger and smaller size aggregate has been used. The critical requirements are that the aggregate be uniformly-graded, clean-washed, and contain at least 40 percent void space. The depth of the bed is a function of stormwater storage requirements, frost depth considerations, and site grading. Infiltration beds are typically sized to mitigate the increased runoff volume from a two-year design storm.
- A water quality inlet or catch basin with sump is required for all surface inlets to avoid standing water for periods greater than 72 hours.

Figure 7.28
Schematic of subsurface infiltration bed cross section



Subsurface infiltration bed
Source: Driesenga & Associates, Inc.

- Perforated pipes along the bottom of the bed can be used to evenly distribute runoff over the entire bed bottom. Continuously perforated pipes should connect structures (such as cleanouts and inlet boxes). Pipes should lay flat along the bed bottom to provide for uniform distribution of water. Depending on size, these pipes may provide additional storage volume.
- Cleanouts or inlets should be installed at a few locations within the bed at appropriate intervals to allow access to the perforated piping network and storage media.
- Grading of adjacent contributing areas should be mildly sloped between one percent and three percent to facilitate drainage.
- In areas with poorly-draining soils, subsurface infiltration areas may be designed to slowly discharge to adjacent wetlands or bioretention areas.
- The subsurface bed and overflow may be designed and evaluated in the same manner as a detention basin to demonstrate the mitigation of peak flow rates. In this manner, detention basins may be eliminated or significantly reduced in size.
- During construction, the excavated bed may serve as a temporary sediment basin or trap, which can reduce overall site disturbance. The bed should be excavated to at least one foot above the final bed bottom elevation for use as a temporary sediment trap or basin. Following construction and site stabilization, sediment should be removed and final grades established.

Incorporating a Safety Factor into Infiltration BMP Design

For the purposes of site suitability, areas with tested soil infiltration rates as low as 0.1 inches per hour may be used for infiltration BMPs. However, in the design of these BMPs and the sizing of the BMP, the designer should incorporate a safety factor. Safety factors between 1 (no adjustment) and 10 have been used in the design of stormwater infiltration systems, with a factor of two being used in most cases. Therefore a measured infiltration rate of 0.5 inches per hour should generally be considered as a rate of 0.25 inches per hour in design. See the Soil Infiltration Testing Protocol in Appendix E for guidance on performing infiltration tests.

Modeling Infiltration Systems

As discussed in Chapter 9 of this manual, infiltration systems can be modeled similarly to traditional detention basins. The marked difference with modeling infiltration systems is the inclusion of the infiltration rate, which can be considered as another outlet. For modeling purposes, it is sometimes useful to develop infiltration rates that vary (based on the infiltration area provided as the system fills with runoff) for inclusion in the stage-storage-discharge table.

Table 7.12
Stormwater Functions by Infiltration BMP Type

	Volume	Peak Rate	Water Quality
Infiltration Berms	Can be used to reduce the volume of runoff and provide infiltration in accordance with LID stormwater goals. The volume reduction potential of berms is a function of the storage provided (surface and subsurface, if applicable) and the infiltration that will occur.	Can be used at mitigating peak rates for larger storms through two mechanisms: providing storage for detention (and on-going infiltration) behind them and, in some cases, elongating the flow path through a site, thereby extending the time of concentration.	Can be expected to achieve pollutant removals between 30% - 70% and in the upper ranges especially for smaller storms.
Infiltration Basins	Provides an excellent means of capturing and infiltrating runoff. Provides runoff volume storage during storm events, while the undisturbed vegetated surface allows infiltration of runoff into the underlying soil mantle. Can be sized to meet the entire channel protection volume recommended by LID criteria or sized smaller and used in conjunction with other LID practices.	Provides effective management of peak rates to meet the LID design criteria. The basin acts as a storage reservoir during large storm events, even while runoff infiltrates. Outlet structures can be designed to manage peak rates with the use of weir and orifice controls and systems can be designed to manage peak rates for storms up to and including the 100-year storm.	Effective in reducing total suspended solids, nutrients, metals, and oil and grease. Both the vegetative surface and the underlying soils allow pollutant filtration. When designed to capture and infiltrate runoff volumes from small storm events, they provide very high pollutant reductions.
Infiltration Trenches	Provides an excellent means of capturing and infiltrating runoff from small storms. The trench provides runoff volume storage and infiltration during small storm events, while the perforated pipe allows runoff conveyance during large design storms or more extreme events.	Provides limited management of peak rates. The trench may provide more peak rate benefit for small frequent storms, rather than large design storms. Because infiltration trenches help to provide a decentralized approach to stormwater management, they may benefit peak rate mitigation by contributing to increased stormwater travel time.	Effective in reducing total suspended solids, metals, and oil and grease. They provide very high pollutant reductions when designed to capture the volume from small storms because there is little if any discharge of runoff carrying the highest pollutant loads. Provide limited treatment of dissolved pollutants, such as nitrates.
Dry Wells	Dry wells are typically designed to capture and infiltrate runoff volumes from small storm events from roof area.	Provides limited management of peak rates. Provides some peak rate benefit by reducing direct connections of impervious area to storm sewer collection systems, and by contributing to increased stormwater travel time.	Effective at capturing and infiltrating the water quality volume or “first flush”. Provides very high pollutant reductions because there is little if any discharge of “first flush” runoff which carries the highest pollutant loads.
Subsurface Infiltration	Provides effective management of volume. A well-designed system is capable of infiltrating the majority of small frequent storms on an annual basis.	Can be designed to manage peak rates by utilizing the stormwater storage bed, including simple rate controls such as weirs and orifices in the overflow control structure. Capable of infiltrating the majority of small frequent storms, while managing peak rates for designs storms up to the 100-year frequency storm.	Very effective at reducing total suspended solids, phosphorus, metals, and oil and grease. Because many systems are designed to capture and infiltrate small, frequent storms, they provide effective water quality control by reducing pollutants associated with the “first-flush”.

Stormwater Functions and Calculations

Infiltration practices can provide excellent benefits for managing volume and water quality protection. While some BMPs are better than others in managing peak rates, all infiltration BMPs provide some peak rate benefit by removing direct connections from impervious surfaces and increasing time of travel. Table 7.12 provides a summary of the stormwater functions by BMP type.

Calculations for Infiltration BMPs

Infiltration area

The minimum infiltration area should be based on the following (according to the loading ratio):

> Minimum Surface Infiltration Area = [Contributing impervious area] / 5*
>
> *May be increased depending on soil infiltration capacity (e.g., where soils are Type A or rapidly draining). For carbonate, geologic areas may be decreased to three.

This actual infiltration area (Table 7.13) should be greater than the minimum infiltration area.

Protecting Groundwater Quality

The protection of groundwater quality is of utmost importance in any Michigan watershed. The potential to contaminate groundwater by infiltrating stormwater in properly designed and constructed BMPs with proper pretreatment is low.

Numerous studies have shown that stormwater infiltration BMPs have a minor risk of contaminating either groundwater or soil. The U.S. Environmental Protection Agency summarized in "Potential Groundwater Contamination from Intentional and Non-intentional Stormwater Infiltration" (Pitt et al., 1994) the potential of pollutants to contaminate groundwater as either low, low/moderate, moderate, or high. Of the 25 physical pollutants listed, one has a "high" potential (chloride), and two have "moderate" potential (fluoranthene and pyrene) for polluting groundwater through the use of shallow infiltration systems with some sediment pretreatment.

While chloride can be found in significant quantities due to winter salting, relatively high concentrations are generally safe for both humans and aquatic biota). Pentachlorophenol, cadmium, zinc, chromium, lead, and all the pesticides listed are classified as having a "low" contamination potential. Even nitrate which is soluble and mobile is only given a "low/moderate" potential.

Table 7.13
Definition of Infiltration Area for Infiltration BMPs

BMP	Infiltration Area Definition
Infiltration Berms	Total Infiltration Area (Ponding Area) = Length of Berm x Average Width of ponding behind berm.
Infiltration Basin	The Infiltration Area is the bottom area of the basin. This is the area to be considered when evaluating the Loading Ratio to the Infiltration basin.
Infiltration Trench	The Infiltration Area* is the bottom area of the trench. This is the area to be considered when evaluating the Loading Rate to the Infiltration basin. [Length of Trench] x [Width of Trench] = Infiltration Area (Bottom Area) * Some credit can be taken for the side area that is frequently inundated as appropriate.
Dry Well	A dry well may consider both bottom and side (lateral) infiltration according to design.
Subsurface Infiltration	The Infiltration Area is the bottom area of the bed. Some credit can be taken for the side area that is frequently inundated as appropriate.

Volume reduction

Infiltration BMPs can be used to reduce the volume of runoff and provide infiltration in accordance with LID stormwater goals. The volume reduction potential is a function of the storage provided (surface and subsurface, if applicable) and the infiltration that will occur. If a perforated pipe or underdrain is used in the design that discharges directly to surface water, the volume of water discharged must be subtracted from the volume reduction calculation.

Total Volume Reduced = Surface Storage Volume (if applicable) + Subsurface Volume (if applicable) + Infiltration Volume

Where,

Surface storage volume (ft^3) = Average bed area* (ft^2) x maximum design water depth (ft)

Subsurface storage/Infiltration bed volume (ft^3) = Infiltration area (ft^2) x Depth of underdrain material (ft) x Void ratio of storage material

*Depth is the depth of the water stored during a storm event, depending on the drainage area, conveyance to the bed, and outlet control.

Estimated Infiltration Volume (CF) = [Bed bottom area (SF)] x [Infiltration design rate (in/hr)] x [Infiltration period* (hr)] / 12 inches/ft.

*Infiltration Period is the time during the storm event when bed is receiving runoff and capable of infiltration at the design rate (typically 6 to 12 hours). See worksheet 5 in chapter 9.

Peak rate mitigation

The amount of peak rate control provided by infiltration practices is dependent on the cumulative runoff volume removed by all the infiltration practices applied to a site. Where sufficient infiltration is provided to control the runoff volume from any size storm, the corresponding peak runoff rate will also be restored and the peak runoff rate from larger, less frequent storms will be reduced. Where possible, reducing peak rate of runoff through volume control is generally more effective than fixed rate controls.

Some infiltration BMPs (e.g., infiltration basins) can manage peak rates better than others (e.g., infiltration berms). However, all infiltration BMPs provide some peak rate benefit (e.g., by removing direct connections from impervious surfaces and increasing time of travel). See Chapter 9 for more information.

Water quality improvement

Infiltration practices are effective in reducing pollutants such as total suspended solids, nutrients, metals, oil and grease. The vegetative surface and the underlying soils allow pollutant filtration and studies have shown that pollutants typically are bound to the soils and do not migrate deeply below the surface (i.e. greater than 30-inches). Infiltration practices should be used as part of a treatment train when capturing runoff from stormwater hot spots, such as industrial parking lots, due to the increased level of pollutants. Typical ranges of pollutant reduction efficiencies for infiltration practices are based on available literature data and listed below:

Subsurface infiltration at Mid Towne Village at the City of Grand Rapids, MI

Source: Driesenga & Associates, Inc.

- TSS – 75 to 90 percent
- TP – 60 to 75 percent
- TN – 55 to 70 percent
- NO_3 – 30 percent

Construction Guidelines

The following guidelines apply for all infiltration BMPs.

- **Do not compact soil infiltration beds during construction**. Prohibit all heavy equipment from the infiltration area and absolutely minimize all other traffic. Equipment should be limited to vehicles that will cause the least compaction, such as low ground pressure (maximum four pounds per square inch) tracked vehicles. Areas for Infiltration areas should be clearly marked before any site work begins to avoid soil disturbance and compaction during construction.

- **Protect the infiltration area from sediment by ensuring erosion and sediment control practices are implemented until the surrounding site is completely stabilized**. Methods to prevent sediment from washing into BMPs should be clearly shown on plans. Where geo-textile is used as a bed bottom liner, this should be extended several feet beyond the bed and folded over the edge to protect from sediment wash into the bed during construction, and then trimmed.

  Runoff from construction areas should never be allowed to drain to infiltration BMPs. This can usually be accomplished by diversion berms and immediate vegetative stabilization. The infiltration area may be used as a temporary sediment trap or basin during earlier stages of construction. However, if an infiltration area is also to be utilized as a temporary sediment basin, excavation should be limited to within one foot of the final bottom invert of the infiltration BMP to prevent clogging and compacting the soil horizon, and final grade removed when the contributing site is fully stabilized.

  All infiltration BMPs should be finalized at the end of the construction process, when upstream soil areas have a dense vegetative cover. In addition, do not remove inlet protection or other erosion and sediment control measures until site is fully stabilized. Any sediment which enters inlets during construction is to be removed within 24 hours.
- **Provide thorough construction oversight**. Long-term performance of infiltration BMPs is dependent on the care taken during construction. Plans and specifications must generally be followed precisely. The designer is encouraged to meet with the contractor to review the plans and construction sequence prior to construction, and to inspect the construction at regular intervals and prior to final acceptance of the BMP.
- **Provide quality control of materials**. As with all BMPs, the final product is only as good as the materials and workmanship that went into it. The designer is encouraged to review and approve materials and workmanship, especially as related to aggregates, geotextiles, soil and topsoil, and vegetative materials.

Additional Construction Guidelines for Infiltration Berms

The following is a typical construction sequence for an infiltration berm without a subsurface infiltration trench, though alterations will be necessary depending on design variations.

- Lightly scarify (by hand) the soil in the area of the proposed berm before delivering soil to site (if required). Heavy equipment should not be used within the berm area.
- Bring in fill material to make up the major portion of the berm (as necessary) as soon as subgrade preparation is complete in order to avoid accumulation of debris. Soil should be added in eight-inch lifts and compacted after each addition according to design specifications. The slope and shape of the berm should graded out as soil is added.
- Protect the surface ponding area at the base of the berm from compaction. If compaction of this area does occur, scarify soil to a depth of at least 8 inches.
- After allowing for settlement, complete final grading within two inches of proposed design elevations. Tamp soil down lightly and smooth sides of the berm. The crest and base of the berm should be level along the contour.
- Seed and plant berm with turf, meadow plants, shrubs or trees, as desired. Water vegetation at the end of each day for two weeks after planting is completed. (Appendix C).
- Mulch planted and disturbed areas with compost to prevent erosion while plants become established.

Additional Construction Guidelines for Subsurface Infiltration

- Where erosion of subgrade has caused accumulation of fine materials and/or surface ponding, this material should be removed with light equipment and the underlying soils scarified to a minimum depth of six inches with a York rake (or equivalent) and light tractor. All fine grading should be done by hand. All bed bottoms are to be at level grade.
- Earthen berms (if used) between infiltration beds should be left in place during excavation.
- Geotextile and bed aggregate should be placed immediately after approval of subgrade preparation

and installation of structures. Adjacent strips of geotextile should overlap a minimum of 18 inches, and should also be secured at least four feet outside of the bed to prevent any runoff or sediment from entering the storage bed. This edge strip should remain in place until storage media is placed in the bed.

- Clean-washed, uniformly-graded aggregate should be placed in the bed in maximum eight-inch lifts. Each layer should be lightly compacted, with construction equipment kept off the bed bottom as much as possible.
- Once bed aggregate has been installed, geotextile can be folded over the top of the aggregate bed. Additional geotextile should be placed as needed to provide a minimum overlap of 18 inches between adjacent geotextile strips.
- Place approved engineered soil media over infiltration bed in maximum six-inch lifts.
- Seed and stabilize topsoil.

Additional Construction Guidelines for Infiltration Trenches

- Excavate infiltration trench bottom to a uniform, level uncompacted subgrade free from rocks and debris. Do NOT compact subgrade.
- Place nonwoven geotextile along bottom and sides of trench. Nonwoven geotextile rolls should overlap by a minimum of 16 inches within the trench. Fold back and secure excess geotextile during stone placement.
- Install upstream and downstream control structures, cleanouts, observation wells, etc.
- Place uniformly graded, clean-washed aggregate in 8-inch lifts, lightly compacting between lifts.
- Install continuously perforated pipe as indicated on plans. Backfill with uniformly graded, clean-washed aggregate in 8-inch lifts, lightly compacting between lifts.
- Fold and secure nonwoven geotextile over infiltration trench, with minimum overlap of 16-inches.
- If vegetated, place a minimum six-inch lift of approved topsoil over infiltration trench, as indicated on plans.
- Seed and stabilize topsoil.

Causes of Infiltration BMP Failure

With respect to stormwater infiltration BMPs, the result of "failure" is a reduction in the volume of runoff anticipated or the discharge of stormwater with excessive levels of some pollutants. Where the system includes built structures, such as porous pavements, failure may include loss of structural integrity for the wearing surface, whereas the infiltration function may continue uncompromised. For infiltration systems with vegetated surfaces, such as play fields or rain gardens, failure may include the inability to support surface vegetation, caused by too much or too little water.

The primary causes of reduced performance are:

- Poor construction techniques, especially soil compaction/smearing, which results in significantly reduced infiltration rates.
- A lack of site soil stabilization prior to the BMP receiving runoff, which greatly increases the potential for sediment clogging from contiguous land surfaces.
- Inadequate pretreatment, especially of sediment-laden runoff, which can cause a gradual reduction of infiltration rates.
- Lack of proper maintenance (erosion repair, re-vegetation, removal of detritus, catch basin cleaning, vacuuming of pervious pavement, etc.), which can reduce the longevity of infiltration BMPs.
- Inadequate design.
- Inappropriate use of geotextile.

Infiltration systems should always be designed such that failure of the infiltration component does not completely eliminate the peak rate attenuation capability of the BMP. Because infiltration BMPs are designed to infiltrate small, frequent storms, the loss or reduction of this capability may not significantly impact the storage and peak rate mitigation of the BMP during extreme events.

Additional Construction Guidelines for Infiltration Basins

- If necessary, excavate infiltration basin bottom to provide a level and uncompacted subgrade free from rocks and debris. Never compact subgrade.
- Install outlet control structures.
- Seed and stabilize topsoil (Planting with native species is preferred).

Additional Construction Guidelines for Dry Wells

- Excavate dry well bottom to a uniform, level uncompacted subgrade, free from rocks and debris. Do NOT compact subgrade. To the greatest extent possible, excavation should be performed with the lightest practical equipment. Excavation equipment should be placed outside the limits of the dry well.
- Completely wrap dry well with nonwoven geotextile. If sediment and/or debris have accumulated in dry well bottom, remove prior to geotextile placement. Geotextile rolls should overlap by a minimum of 18-24 inches within the trench. Fold back and secure excess geotextile during stone placement.
- Install continuously perforated pipe, observation wells, and all other dry well structures. Connect roof leaders to structures as indicated on plans.
- Place uniformly graded, clean-washed aggregate in 6-inch lifts, between lifts.
- Fold and secure nonwoven geotextile over trench, with minimum overlap of 12-inches.
- Place 12-inch lift of approved topsoil over trench, as indicated on plans.
- Seed and stabilize topsoil.
- Connect surcharge pipe to roof leader and position over splashboard.

Maintenance

There are a few general maintenance practices that should be followed for all infiltration BMPs. These include:

- All catch basins and inlets should be inspected and cleaned at least twice per year.
- The overlying vegetation of subsurface infiltration features should be maintained in good condition, and any bare spots revegetated as soon as possible.
- Vehicular access on subsurface infiltration areas should be prohibited (unless designed to allow vehicles), and care should be taken to avoid excessive compaction by mowers.

Additional Maintenance Information for Infiltration Berms

Infiltration berms have low to moderate maintenance requirements, depending on the design. Unless otherwise noted, the following maintenance actions are recommended on an as-needed basis.

Infiltration berms

- Regularly inspect to ensure they are infiltrating; monitor drawdown time after major storm events (total drawdown of the system should not exceed 72 hours; surface drawdown should not exceed 48 hours).
- Inspect any structural components, such as inlet structures to ensure proper functionality
- If planted in turf grass, maintain by mowing (maintain two to four-inch height); other vegetation will require less maintenance; trees and shrubs may require annual mulching, while meadow planting requires annual mowing and clippings removal
- Avoid running heavy equipment over the infiltration area at the base of the berms; the crest of the berm may be used as access for heavy equipment when necessary to limit disturbance.
- Do not apply pesticides or fertilizers in and around infiltration structures
- Routinely remove accumulated trash and debris
- Remove invasive plants as needed
- Inspect for signs of flow channelization and/or erosion; restore level spreading immediately after deficiencies are observed (monthly)

Diversion berms

- Regularly inspect for erosion or other failures (monthly)
- Regularly inspect structural components to ensure functionality
- Maintain turf grass and other vegetation by mowing and re-mulching
- Do not apply pesticides or fertilizers where stormwater will be conveyed
- Remove invasive plants as needed
- Routinely remove accumulated trash and debris

Additional Maintenance Information for Infiltration Basins

- Inspect the basin after major storm events and make sure that runoff drains down within 72 hours. Mosquito's should not be a problem if the water drains in 72 hours. Mosquitoes require a considerably long breeding period with relatively static water levels.
- Inspect for accumulation of sediment, damage to outlet control structures, erosion control measures, signs of water contamination/spills, and slope stability in the berms.
- Mow only as appropriate for vegetative cover species.
- Remove accumulated sediment from the sediment pretreatment device/forebay as needed. Inspect pretreatment forebay at least one time per year.
- If Infiltration basin bottom becomes clogged, scrape bottom and remove sediment and restore original cross section. Properly dispose of sediment.

Additional Maintenance Information for Dry Wells

- Inspect dry wells at least four times a year, as well as after every storm exceeding one inch.
- Remove sediment, debris/trash, and any other waste material from the dry well and dispose of at a suitable disposal/recycling site and in compliance with local, state, and federal waste regulations.
- Evaluate the drain-down time of the dry well to ensure the maximum time of 72 hours is not being exceeded. If drain down time exceeds the maximum, drain the dry well via pumping and clean out perforated piping, if included. If slow drainage persists, the system may need replacing.
- Regularly clean out gutters and ensure proper connections to facilitate the effectiveness of the dry well.
- Replace filter screen that intercepts roof runoff as necessary.
- If an intermediate sump box exists, clean it out at least once per year.

Winter Considerations

Most infiltration practices are typically located below the frost line and continue to function effectively throughout the winter. It is imperative to prevent salt, sand, cinder, and any other deicers from clogging the surface area of infiltration practices by avoiding piling snow in these areas. Sand and cinder deicers could clog infiltration devices and soluble deicers such as salt can damage the health of vegetation.

Cost

The construction cost of many infiltration BMPs can vary greatly depending on the configuration, location, site conditions, etc. Following is a summary of both construction and maintenance costs. This information should be strictly as guidance. More detailed cost information should be discerned for the specific site before assessing the applicability of the BMP.

	Construction Costs	Maintenance Costs
Dry well*	$4-9/ft3	5-10% of capital costs
Infiltration basin	Varies depending on excavation, plantings, and pipe configuration.	Disposal costs
Infiltration trench**	$20-30/ ft3	5-10% of capital costs
Subsurface infiltration bed	$13/ ft3	

*2003 dollars.
**City of Portland. 2006 dollars.

Designer/Reviewer Checklist for Infiltration Berms

ITEM	YES	NO	N/A	NOTES
Was the Soil Infiltration Testing Protocol followed?*				
Appropriate areas of the site evaluated?				
Infiltration rates measured?				
Was the Infiltration BMP followed?				
Two-foot separation from bedrock/SHWT?				
Soil permeability acceptable?				
Natural, uncompacted soils?				
Excavation in berm areas minimized?				
Loading ratio considered?				
Drawdown time less than 72 hours?				
Erosion and Sedimentation control?				
Feasible construction process and sequence?				
Entering flow velocities non-erosive?				
Berm height 6 to 24 inches?				
Berm designed for stability (temporary and permanent)?				
Acceptable berm side slopes?				
Are berm materials resistant to erosion?				
Located level, along contour?				
Acceptable soil for plants specified?				
Appropriate plants selected?				
Maintenance accounted for and plan provided?				

** In general, the protocol should be followed as much as possible (although there is more flexibility for berms than for other BMPs such as pervious pavement and subsurface infiltration that rely almost entirely on infiltration).*

Designer/Reviewer Checklist for Infiltration Trenches, Infiltration Basins, Dry Wells, and Subsurface Infiltration Beds

ITEM	YES	NO	N/A	NOTES
Was the Soil Infiltration Testing Protocol followed?				
Appropriate areas of the site evaluated?				
Infiltration rates measured?				
Was the Infiltration BMP followed?				
Two-foot separation between the bed bottom and bedrock/ SHWT?				
Soil permeability acceptable?				
If not, appropriate underdrain provided?				
Adequate separations from wells, structures, etc.?				
Natural, uncompacted soils?				
Level infiltration area (e.g., trench bottom, bed bottom)?				
Excavation in infiltration area minimized?				
Hotspots/pretreatment considered?				
Loading ratio below 5:1?				
Storage depth limited to two feet?				
Drawdown time less than 72 hours?				
Positive overflow from system?				
Erosion and sedimentation control?				
Feasible construction process and sequence?				
Geotextile specified?				
Pretreatment provided?				
Clean, washed, open-graded aggregate specified?				
Stable inflows provided (infiltration basin)?				
Appropriate perforated pipe, if applicable?				
Appropriate plants selected, if applicable?				
Observation well/clean out provided, if applicable?				
Maintenance accounted for and plan provided?				

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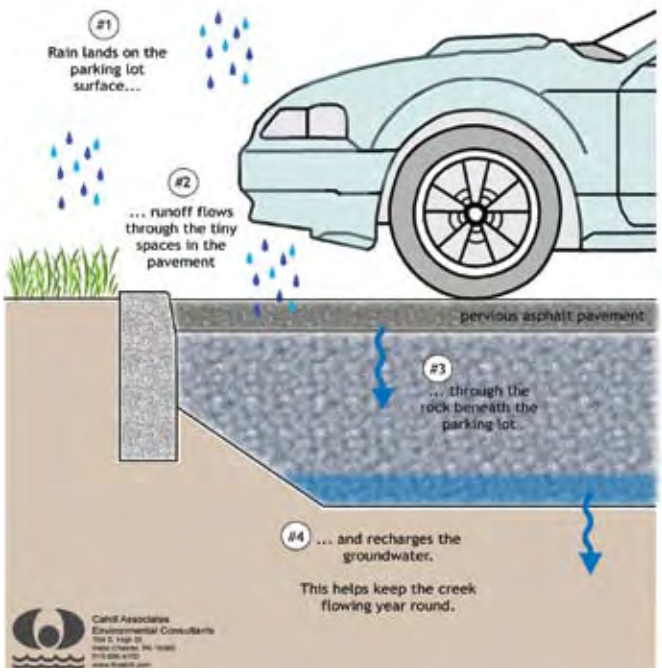
BMP Fact Sheet

Pervious Pavement with Infiltration

Pervious pavement is an infiltration technique that combines stormwater infiltration, storage, and structural pavement consisting of a permeable surface underlain by a storage reservoir. Pervious pavement is well suited for parking lots, walking paths, sidewalks, playgrounds, plazas, tennis courts, and other similar uses.



Pervious pavement with infiltration schematic

Applications		Stormwater Quantity Functions	
Residential	Yes**	**Volume**	High
Commercial	Yes	**Groundwater Recharge**	High
Ultra Urban	Yes	**Peak Rate**	Med/High
Industrial	Yes**	**Stormwater Quality Functions**	
Retrofit	Yes**	**TSS**	High***
Highway/Road	Limited	**TP**	Med/High
Recreational	Yes	**TN**	Medium
		Temperature	High

Additional Considerations	
Cost	Medium
Maintenance	High
Winter Performance	Medium

Variations

- Porous asphalt
- Pervious concrete
- Permeable paver blocks
- Reinforced turf/gravel

Key Design Features

- Follow soil infiltration testing protocol (Appendix E) and infiltration BMP guidelines
- Do not infiltrate on compacted soil
- Level storage bed bottoms
- Provide positive stormwater overflow from bed
- Surface permeability >20”/hr

Site Factors

- Water table/Bedrock separation: two-foot min*.
- Feasibility on steeper slopes: Low
- Potential hot spots: Not without design of pretreatment system

Benefits

- Volume control and groundwater recharge, moderate peak rate control
- Dual use for pavement structure and stormwater management

Limitations

- Pervious pavement not suitable for all uses
- High maintenance needs

* Four feet recommended, if possible

**Applicable with special design considerations.

***Pretreatment for TSS is recommended.

Case Study: Grand Valley State University Porous Pavement Parking Lots

A crucial project for Grand Valley State University (GVSU) to prevent the accelerated degradation of steep ravines, which had historically been used as a receptacle for untreated stormwater, was to construct two 180-car parking lots using porous asphalt pavement for student parking on the Allendale Campus. The site consists of heavy clay soils and, instead of using limited space for a detention basin, porous pavement was chosen to make the best use of available space. It is also one of the first best management practices adopted for campus use to move the university towards its goal of sustainable site design.

GVSU's clay soils don't allow for much infiltration so the goal of the porous pavement was primarily filtration and storage in the stone bed. Underdrains exist in the beds for just over half of one lot which outlet into a swale that has been planted with grasses. All other underdrains outlet directly to a storm sewer.

Project Highlights

The porous pavement has performed well, and there are no maintenance issues to date.

Since the project was completed in 2004, GVSU faculty has used the porous asphalt lots as an educational tool to demonstrate sustainable stormwater management concepts with students.

The pavement section consisted of 12 inches of MDOT 6A course aggregate over a nonwoven geotextile fabric, a four-inch underdrain, and three inches of porous asphalt.

Grand Valley State University Parking Lot
Source: Fishbeck, Thompson, Carr & Huber, Inc.

Water on Porous Asphalt
Source: Fishbeck, Thompson, Carr & Huber, Inc.

Case Study Site Considerations	
Project Type	Pervious pavement
Soil Conditions	Heavy clay soils
Estimated Total Project Cost	$240,000 per lot
Maintenance Responsibility	Grand Valley State University
Project Contact	Bob Brown, brownbo@gvsu.edu 616-331-3582, Kerri Miller, P.E., kamiller@ftch.com 616-464-3933

Description and Function

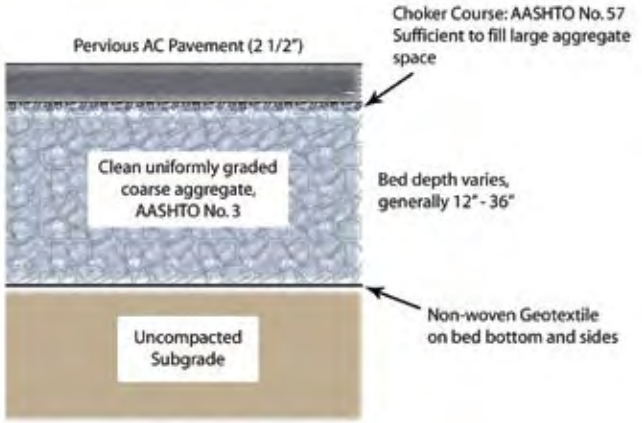
A pervious pavement system consists of a porous surface course underlain by a storage reservoir placed on uncompacted subgrade to facilitate stormwater infiltration (Figure 7.32). The storage reservoir may consist of a stone bed of uniformly graded, clean, and washed course aggregate with a void space of approximately 40 percent or other pre-manufactured structural storage units (see Infiltration BMP for detailed information on the use of structural storage units). The pervious pavement may consist of porous asphalt, pervious concrete, permeable paver blocks, or reinforced turf/gravel.

Stormwater drains through the surface course where it is temporarily held in the voids of the stone bed, and then slowly infiltrates into the underlying, uncompacted soil mantle (in some extreme cases, minimal compaction of the soil may be required). The stone bed can be designed with an overflow control structure so that during large storm events peak rates are controlled. At no time does the water level rise to the pavement level.

A layer of nonwoven geotextile filter fabric separates the aggregate from the underlying soil, preventing the migration of fines into the bed. The bed bottoms should be level and uncompacted to allow for even and distributed stormwater infiltration.

If new fill is required, it should consist of additional stone and not compacted soil. It is recommended that a fail safe be built into the system in the event that the pervious surface is adversely affected and suffers reduced performance. Many designs incorporate a riverstone/rock edge treatment (Figure 7.33) or inlets which are directly tied to the bed so that the stormwater system will continue to function despite the performance of the pervious pavement surface.

Figure 7.32
Example cross-section of porous asphalt system



Pervious pavement is well suited for parking lots, walking paths, sidewalks, playgrounds, plazas, tennis courts, and other similar uses. Pervious pavement can be used in driveways if the homeowner is aware of the stormwater functions of the pavement. Pervious pavement roadways have seen wider application in Europe and Japan than in the U.S., although at least one U.S. system has been constructed successfully. (In Japan and the U.S., applying an open-graded asphalt pavement of one inch or less on roadways has been used to provide lateral surface drainage and prevent hydroplaning, but these are applied over impervious pavement on compacted subgrade. This application is not considered a stormwater BMP.)

Properly installed and maintained pervious pavement has a significant life span. For example, existing systems that are more than 20 years old continue to function successfully. Because water drains through the surface course and into the subsurface bed, freeze-thaw cycles do not tend to adversely affect pervious pavement.

Pervious pavement is most susceptible to failure difficulties during construction and, therefore, it is important that construction be undertaken in such a way as to prevent:

- Compacted underlying soil (except in certain limited conditions),
- Contaminated stone subbase with sediment and fines,
- Tracking of sediment or any temporary storage of soil on the pavement surface, and
- Drainage of sediment-laden waters onto pervious surface or into constructed bed.

Figure 7.33
Riverstone edge serves as a backup inlet into the infiltration bed under the porous asphalt

Staging, construction practices, and erosion and sediment control must all be considered when using pervious pavements.

When properly designed, pervious pavement systems provide effective management of stormwater volume and peak rates. The storage reservoir below the pavement surface can be sized to manage both direct runoff and runoff generated by adjacent areas, such as rooftops. Because the stone bed provides storage, outlet structures can be designed to manage peak rates with the use of weir and orifice controls. A well-designed system can infiltrate the majority of frequent small storms on an annual basis while providing peak rate control for storms up to and including the 100-year frequency storm event.

Studies have shown that pervious systems have been very effective in reducing contaminants such as total suspended solids, metals, and oil and grease. Because pervious pavement systems often have zero net discharge of stormwater for small frequent storms, they provide effective water quality control. The pervious surface and underlying soils below the storage bed allow filtration of most pollutants.

However, care must be taken to prevent infiltration in areas where toxic/contaminated materials are present in the underlying soils or within the stormwater itself (see Infiltration Systems Guidelines for more information). When designed, constructed, and maintained according to the following guidelines, pervious pavement with underlying infiltration systems can dramatically reduce both the rate and volume of runoff, recharge the groundwater, and improve water quality.

In northern climates, pervious pavements have less of a tendency to form black ice and often require less plowing. Sand and other abrasives should never be used on pervious pavements, although salt may be used on pervious asphalt as long as it does not contain significant non-soluble particles. Commercial deicers may be used on pervious concrete. Pervious pavement surfaces often provide better traction for walking paths in rain or snow conditions.

Variations

Porous asphalt

Early work on porous asphalt pavement was conducted in the early 1970s by the Franklin Institute in Philadelphia. It consists of standard bituminous asphalt in which the fines have been screened and reduced, allowing water to pass through small voids. Pervious asphalt is typically placed directly on the stone subbase in a single 3½ to four-inch lift that is lightly rolled to a finished thickness of 2½ to three inches (Figures 7.34 and 7.35).

Because porous asphalt is standard asphalt with reduced fines, it is similar in appearance to standard asphalt. Newer open-graded mixes for highway application give improved performance through the use of additives and higher-grade binders. Porous asphalt is suitable for use in any climate where standard asphalt is appropriate.

Figure 7.34
Porous asphalt being placed at the University of Michigan in Ann Arbor

Figure 7.35
Porous asphalt on open-graded stone subbase

Pervious concrete

Pervious Portland Cement Concrete, or pervious concrete, was developed by the Florida Concrete Association. Like pervious asphalt, pervious concrete is produced by substantially reducing the number of fines in the mix in order to establish voids for drainage. In northern and mid-Atlantic climates such as Michigan, pervious concrete should always be underlain by a stone subbase designed for stormwater management and should never be placed directly onto a soil subbase.

While porous asphalt is very similar in appearance to standard asphalt, pervious concrete has a coarser appearance than conventional concrete. A clean, swept finish cannot be achieved. Care must be taken during placement to avoid working the surface and creating an impervious layer. Placement should be done by a contractor experienced with pervious concrete. Appropriately installed pervious concrete has proven to be an effective stormwater management BMP. Additional information pertaining to pervious concrete, including specifications, is available from the Michigan Concrete Association (www.miconcrete.org/).

Pervious and impervious concrete

Source: Michigan Department of Environmental Quality

Colored pervious concrete

Permeable paver blocks

Permeable paver blocks consist of interlocking units (often concrete) that provide some portion of surface area that may be filled with a pervious material such as gravel. These units are often very attractive and are especially well suited to plazas, patios, parking areas, and low-speed streets. As new products are always being developed, the designer is encouraged to evaluate the benefits of various products with respect to the specific application.

Permeable paver lot at Grand Rapids Environmental Services Building

Permeable paver blocks at Fairlane Green shopping center, Allen Park, MI

Reinforced turf/gravel

Reinforced turf consists of interlocking structural units that contain voids or areas for turf grass growth or gravel and suitable for traffic loads and parking. Reinforced turf units may consist of concrete or plastic and are underlain by a stone and/or sand drainage system for stormwater management.

Reinforced turf/gravel applications are excellent for fire access lanes, overflow parking (Figure 7.36), and occasional-use parking (such as at religious and athletic facilities). Reinforced turf is also an excellent application to reduce the required standard pavement width of paths and driveways that must occasionally provide for emergency vehicle access.

Figure 7.36
Reinforced turf used as overflow parking

Other

There are other proprietary products similar to pervious asphalt and concrete, but they use clear binders so that the beauty of the natural stone is visible. Material strength varies, so some of these products are not suitable for vehicular traffic Typical applications include tree pits, walkways, plazas, and playgrounds. There are also pervious pavements made using recycled tires.

Highly permeable paver
Source: Permapave

Applications

Pervious pavements have been widely applied in retrofit situations when existing standard pavements are being replaced. Care must be taken when using pervious pavements in industrial and commercial applications where pavement areas are used for material storage or the potential for surface clogging is high due to pavement use (see Infiltration BMP).

Parking areas

Porous asphalt lot with slow discharge to vegetated swale at Ford Motor Co., Dearborn, MI

Walkways

Pervious pavement, both asphalt and concrete, has been used in walkways and sidewalks. These installations typically consist of a shallow (eight-inch minimum) aggregate trench that is angled to follow the surface slope of the path. In the case of relatively mild surface slopes, the aggregate infiltration trench may be “terraced” into level reaches in order to maximize the infiltration capacity, at the expense of additional aggregate.

Porous asphalt pathway at Grey Towers National Historic Site, Milford, PA

Playgrounds/basketball/tennis

Porous asphalt street in Portland, OR

Streets and alleys

Permeable paver street in Dowagiac, MI
Source: Pokagon Band of Potawatomi Indians

Rooftop/impervious area connections

Pervious pavement systems are often used to provide total site stormwater management where rooftops and other impervious surfaces are tied into the infiltration bed below the pavement surface. This can be an effective means to manage stormwater for a development site, while reducing land disturbance for stormwater BMPs.

If pervious pavement systems receive runoff from adjacent areas, proper sediment pretreatment for that runoff must be considered to prevent clogging of the storage bed. Typical pretreatment can be achieved by the use of properly maintained cleanouts, inlet sediment traps, and water quality inserts or filter devices.

It is recommended that direct surface sheet flow conveyance of large impervious areas to the pervious pavement surface be avoided. High sheet flow loading to pervious pavement surfaces can lead to premature clogging of the pavement surface. To avoid this, it is recommended that adjacent impervious areas be drained and conveyed to the infiltration bed via inlets and trench drains with proper sediment pretreatment.

Design Considerations

While evaluating the following design considerations, there are also several additional resources to consider when implementing pervious pavement. These include the Site Design Process for LID (Chapter 5), Soil Infiltration Testing Protocol (Appendix E), the Recommendations for Materials are specific to porous asphalt and porous concrete (Appendix D), and additional steps set forth in the introduction to this chapter.

Siting

1. The overall site should be evaluated for potential pervious pavement/infiltration areas *early* in the design process because effective pervious pavement design requires consideration of grading.
2. A four foot clearance above the seasonally high water table and bedrock is recommended. A two foot clearance can be used but may reduce the performance of the infiltration BMP used.
3. Orientation of the parking bays along the existing contours will significantly reduce the need for cut and fill.

4. Pervious pavement and infiltration beds **should not be placed on areas of recent fill** or compacted fill. If fill is unavoidable, permeable stone subbase material should be used wherever possible (and applicable infiltration rates should be used in the design). Areas of historical fill (>5 years) may also be considered for pervious pavement.
5. In those areas where the threat of spills and groundwater contamination is likely, pretreatment systems, such as filters and wetlands, may be required before any infiltration occurs. In hot spot areas, such as truck stops and fueling stations, the appropriateness of pervious pavement must be carefully considered. A stone infiltration bed located beneath standard pavement, preceded by spill control and water quality treatment, may be more appropriate.
6. The use of pervious pavement must be carefully considered in areas where the pavement may be seal coated or paved over due to lack of awareness, such as individual home driveways. In those situations, a system that is not easily altered by the property owner may be more appropriate. An example would include an infiltration system constructed under a conventional driveway. Educational signage at pervious pavement installations can encourage proper maintenance and is recommended (Figure 7.34).
7. In areas with poorly draining soils, infiltration beds below pervious pavement may be designed to slowly discharge to adjacent swales, wetlands, or bioretention areas. Only in extreme cases (e.g., industrial sites with contaminated soils) will the aggregate bed need to be lined to prevent infiltration.

Design

1. Bed bottoms must be level (0 percent slope) or nearly level. Sloping bed bottoms will lead to areas of ponding and reduced stormwater distribution within the bed. However, beds may be placed on a slope by benching or terracing parking bays (Figure 7.37). Orienting parking bays along existing contours will reduce site disturbance and cut/fill requirements.
2. All systems should be designed with an overflow system. Water within the subsurface stone bed should typically never rise to the level of the pavement surface. Inlet boxes can be used for cost-effective overflow structures. All beds should empty within 72 hours, preferably within 48 hours.
3. While infiltration beds are typically sized to handle the increased volume from a two-year design storm, they must also be able to convey and mitigate the peak of the less-frequent, more-intense storms, such as the 100-year storm. Control in the beds is usually provided in the form of an outlet control structure. A modified inlet box with an internal weir and low-flow orifice is a common type of control structure (Figure 7.38). The specific design of these structures may vary, depending on factors such as rate and storage requirements, but it always must include positive overflow from the system to prevent surface ponding.
4. A weir plate or weir within an inlet or overflow control structure may be used to maximize the water level in the stone bed while providing sufficient cover for overflow pipes (Figure 7.38).
5. The subsurface bed and overflow may be designed and evaluated in the same manner as a detention basin to demonstrate the mitigation of peak flow rates. In this manner, the need for a detention basin may be eliminated or significantly reduced in size.
6. Pervious pavement installations should have a backup method for water to enter the stone storage bed in the event that the pavement fails or is altered. In uncurbed lots, this backup drainage may consist of an unpaved one-to-two foot wide stone edge drain connected directly to the bed (Figure 7.33). In curbed lots, inlets with sediment traps may be used at low spots. Backup drainage elements will ensure the functionality of the infiltration system if the pervious pavement is compromised.
7. Perforated pipes along the bottom of the bed may be used to evenly distribute runoff over the entire bed bottom (especially if runoff from adjacent areas is being brought into the bed). Continuously perforated pipes should connect structures (such as cleanouts and inlet boxes). Pipes may lay flat along the bed bottom and connect to the overflow structure (Figure 7.38). Depending on size, these pipes may provide additional storage volume.

8. Perforated pipes can also be used as underdrains where necessary. Underdrains can ultimately discharge to daylight or to another stormwater system. They should be accessible for inspection and maintenance via cleanouts, overflow devices (Figure 7.38), or other structures.

9. Sediment transport to pervious systems should be minimized as much as possible to reduce maintenance requirements and extend the life of these systems. If roof leaders and area inlets convey water from adjacent areas to the bed, then native vegetation, water quality inserts, and/or sumped inlets should be used to prevent the conveyance of sediment and debris into the bed. Areas of impervious pavement draining directly onto pervious pavements should also be minimized as they can lead to clogging near the impervious-pervious boundary.

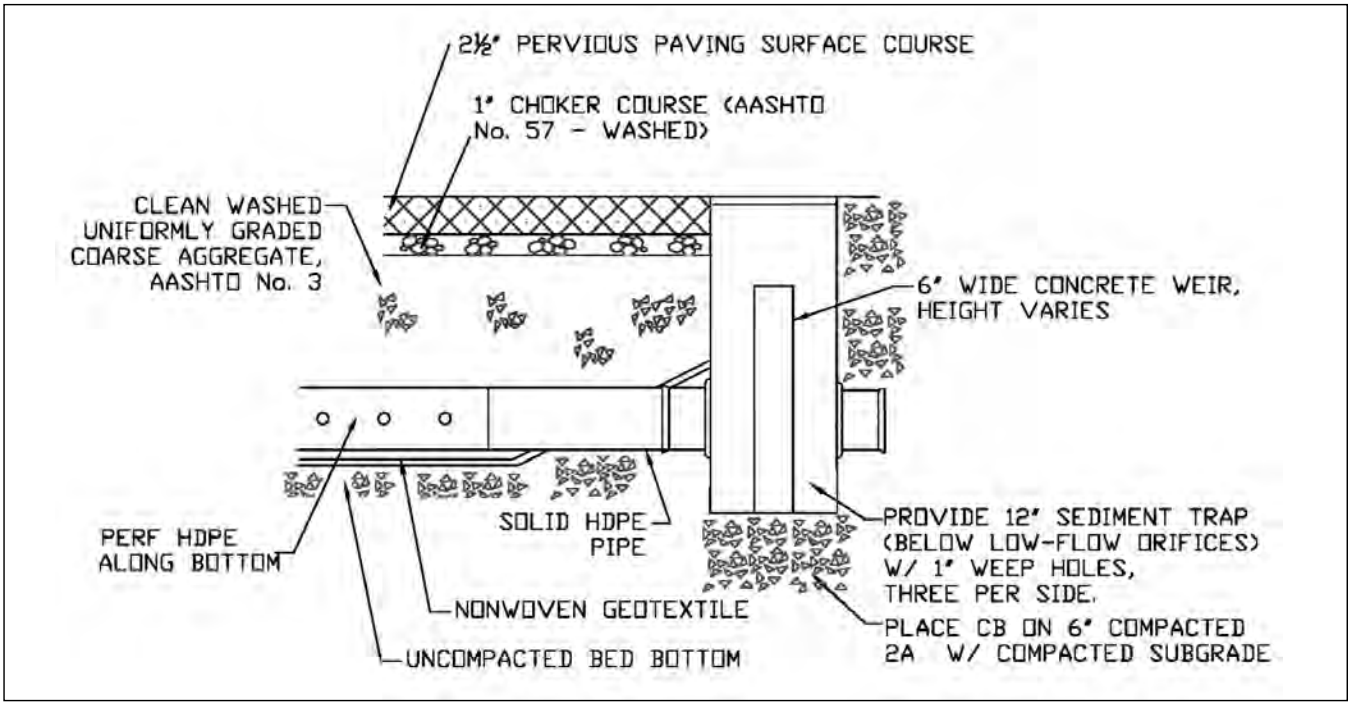
10. Infiltration areas should be located within the immediate project area in order to control runoff at its source. Expected use and traffic demands should also be considered in pervious pavement placement. An impervious water stop should be placed along infiltration bed edges where pervious pavement meets standard impervious pavements.

Figure 7.37
Slope stepping with berms

Source: Andropogon

11. The underlying infiltration bed is typically eight to 36 inches deep and comprised of clean, uniformly graded aggregate with approximately 40 percent void space. Local aggregate availability typically dictates the size of the aggregate used. The critical requirements are that the aggregate be uniformly graded, clean washed, and contain a significant void content. See the Specifications section for commonly used aggregates. The depth of the bed is a function of stormwater storage requirements, frost depth considerations, site grading, and structural needs.

Figure 7.38
Example detail of an overflow device from a pervious asphalt system



12. Proper pervious pavement applications are resistant to freeze-thaw problems because of their permeable and open-graded components (the pavement surface should not be saturated and the base has a high void content which allows for expansion). In somewhat frost susceptible soils, it may be necessary to increase the minimum bed depth to 14-22 inches (depending on loading and specific soil conditions). In extremely susceptible soils, the bed and/or improved soils can be placed down to the full frost depth (Smith, 2006).
13. While most pervious pavement installations are underlain by an aggregate bed, alternative subsurface storage products may also be used. These include a variety of proprietary plastic units that contain much greater storage capacity than aggregate, at an increased cost.

Stormwater Functions and Calculations

Infiltration area

The infiltration area is defined as the plan area of the storage reservoir under the pervious pavement. The minimum infiltration area should be based on the following equation:

Minimum infiltration area = Contributing impervious area (including pervious pavement) / 5*

*May be increased depending on soil infiltration capacity (where soils are Type A or rapidly draining).

Volume reduction

Pervious pavements with infiltration provide an excellent means of capturing and infiltrating runoff. The storage bed below the pavement provides runoff volume storage during storm events, while the undisturbed subgrade allows infiltration of runoff into the underlying soil mantle. The total volume reduction can be estimated by summing the storage and infiltration volumes described below.

Storage volume = Depth* (FT) x Area (SF) x Void space (i.e., 0.40 for aggregate)

*Depth is the depth of the water stored during a storm event, depending on the drainage area, conveyance to the bed, and outlet control.

Infiltration volume = Bed bottom area (SF) x Infiltration design rate (in/hr) x Infiltration period* (hr) x (1/12)

*Infiltration period is the time when bed is receiving runoff and capable of infiltrating at the design rate. Not to exceed 72 hours.

Peak rate mitigation

Properly designed pervious pavement systems provide effective management of peak rates. The infiltration bed below the pavement acts as a storage reservoir during large storm events, even while runoff exfiltrates through the soil mantle through the process of infiltration. Outlet structures can be designed to manage peak rates with the use of weir and orifice controls and carefully designed systems may be able to manage peak rates for storms up to and including the 100-year storm. For additional information relating to peak rate modeling and routing, refer to Chapter 9, LID Stormwater Calculations and Methodology.

Water quality improvement

Pervious pavement systems are effective in reducing pollutants such as total suspended solids, metals, and oil and grease. Both the pervious pavement surface and the underlying soils below the infiltration bed allow pollutant filtration.

When pervious pavement systems are designed to capture and infiltrate runoff volumes from small storm events, they provide very high pollutant reductions because there is little if any discharge of runoff carrying the highest pollutant loads. Pervious pavement systems require pretreatment of TSS when adjacent areas drain to them, resulting in a high reduction of TSS and other particulates. However, pervious pavement systems will provide limited treatment of dissolved pollutants, such as nitrates. Typical ranges of pollutant reduction efficiencies for pervious pavements are listed as follows:

- TSS* – 65-100%
- TP – 30-90%
- NO_3 – 30%

*Pretreatment for TSS is recommended if adjacent areas drain to pervious pavement

Construction Guidelines

1. Follow the Recommendations for Materials that are specific to porous asphalt and porous concrete in Appendix D.
2. Due to the nature of construction sites, pervious pavement and other infiltration measures should be installed toward the end of the construction

period, if possible. Infiltration beds under pervious pavement may be used as temporary sediment basins or traps provided that they are not excavated to within 12 inches of the designated bed bottom elevation. Once the site is stabilized and sediment storage is no longer required, the bed is excavated to its final grade and the pervious pavement system is installed.

3. The existing subgrade under the bed areas should **not** be compacted or subject to excessive construction equipment traffic prior to geotextile and stone bed placement. (Minor areas of unavoidable compaction can be partially remediated by scarifying the soil; see below.)

   Where erosion of subgrade has caused accumulation of fine materials and/or surface ponding, this material should be removed with light equipment and the underlying soils scarified to a minimum depth of six inches with a York rake (or equivalent) and light tractor. All fine grading should be done by hand. All bed bottoms are level grade.

4. Earthen berms (if used) between infiltration beds (Figure 7.39) may be left in place during excavation. These berms do not require compaction if proven stable during construction.

5. Geotextile and bed aggregate should be placed immediately after approval of subgrade preparation. Geotextile is to be placed in accordance with manufacturer's standards and recommendations.

   Adjacent strips of geotextile should overlap a minimum of 18 inches. It should also be secured at least four feet outside of bed in order to prevent any runoff or sediment from entering the storage bed. This edge strip should remain in place until all bare soils contiguous to beds are stabilized and vegetated. As the site is fully stabilized, excess geotextile along bed edges can be cut back to bed edge.

6. Clean (washed) uniformly graded aggregate (Figure 7.40) is placed in the bed in eight-inch lifts. Each layer should be lightly compacted, with construction equipment kept off the bed bottom. Once bed aggregate is installed to the desired grade, approximately one inch of choker base course crushed aggregate should be installed uniformly over the surface in order to provide an even surface for paving (if required).

Figure 7.39
Earthen berms separating terraced infiltration beds

7. Cement mix time: Mixtures should be produced in central mixers or in truck mixers. When concrete is delivered in agitating or non-agitating units, the concrete should be mixed in the central mixer for a minimum of 1.5 minutes or until a homogenous mix is achieved. Concrete mixed in truck mixers should be mixed at the speed designated as mixing speed by the manufacturer for 75-100 revolutions.

8. The Portland Cement aggregate mixture may be transported or mixed onsite and should be used within one hour of the introduction of mix water, unless otherwise approved by an engineer. This time can be increased to 90 minutes when using the specified hydration stabilizer. Each truck should not haul more than two loads before being cycled to another type concrete. Prior to placing concrete, the subbase should be moistened and in a wet condition. Failure to provide a moist subbase will result in reduced strength of the pavement.

9. A minimum of 30 revolutions at the manufacturer's designated mixing speed is required following any water added to the mix. Discharge should be a continuous operation and completed as quickly as possible. Concrete should be deposited as close to its final position as practicable and such that fresh concrete enters the mass of previously placed concrete.

10. Placing and finishing concrete equipment: The contractor should provide mechanical equipment of either slipform or form riding with a following compactive unit that will provide a minimum of 10 psi vertical force. The pervious concrete pavement will be placed to the required cross section and should not deviate more than +/- 3/8 inch in 10 feet from profile grade.

Figure 7.40
Open-graded, clean, coarse aggregate for infiltration beds

Placement should be continuous and spreading and strikeoff should be rapid. It is recommended to strike off about ½ to ¾ inch above the forms to allow for compaction. This can be accomplished by attaching a temporary wood strip above the top of the form to bring it to the desired height. After strikeoff, the strips are removed and the concrete is consolidated to the height of the forms.

11. Consolidation should be accomplished by rolling over the concrete with a steel roller, compacting the concrete to the height of the forms. Consolidation should be completed within 10 minutes of placement to prevent problems associated with rapid hardening and evaporation. After mechanical or other approved strike-off and compaction operation, no other finishing operation is needed. The contractor will be restricted to pavement placement widths of a maximum of 15 feet.
12. Jointing: Control (contraction) joints should be installed at maximum 20-foot intervals. They should be installed at a depth of ¼ the thickness of the pavement. These joints can be installed in the plastic concrete or saw cut. However, installing in the plastic concrete is recommended. Joints installed in the plastic concrete should be constructed using a small roller (salt or joint roller) to which a beveled fin with a minimum depth of ¼ the thickness of the slab has been welded around the circumference of a steel roller. When this option is used it should be performed immediately after roller compaction and prior to curing. If saw cut, the procedure should begin as soon as the pavement has hardened sufficiently to prevent raveling and uncontrolled cracking (normally just after curing).

    Transverse construction joints should be installed whenever placing is suspended a sufficient length of time that concrete may begin to harden. In order to assure aggregate bond at construction joints, a bonding agent suitable for bonding fresh concrete should be brushed, tolled, or sprayed on the existing pavement surface edge. Isolation (expansion) joints will not be used except when pavement is abutting slabs or other adjoining structures.
13. Curing procedures should begin within 15 minutes after placement. The pavement surface should be covered with a minimum six millimeter thick polyethylene sheet or other approved covering material. Prior to covering, a fog or light mist should be sprayed on the surface. The cover should overlap all exposed edges and should be completely secured (without using dirt) to prevent dislocation due to winds or adjacent traffic conditions.
14. Porous asphalt should not be installed on wet surfaces or when the ambient air temperature is below 50 degrees Fahrenheit. The temperature of the bituminous mix should be determined by the results of the Draindown test (ASTM D6390) but typically ranges between 275 degrees Fahrenheit and 325 degrees Fahrenheit (as determined by the testing and recommendations of the asphalt supplier).

    Pervious pavement should be laid in one lift directly over the storage bed and stone base course to a 2.5- to 3-inch finished thickness. Compaction of the surface course should take place when the surface is cool enough to resist a 10-ton roller. One or two passes is all that is required for proper compaction. More rolling could cause a reduction in the surface course porosity.
15. Do not place Portland Cement pervious pavement mixtures when the ambient temperature is 40 degrees Fahrenheit or lower, unless otherwise permitted in writing by the engineer.
16. Mixing, placement, jointing, finishing, and curing doesn't apply to permeable paver systems. A manual on Permeable Interlocking Concrete Pavements from the Interlocking Concrete Pavement Institute (Smith, 2006) offers detailed guidance on the design and construction of permeable paver systems.
17. After final pervious asphalt or concrete installation, no vehicular traffic of any kind should be permitted on the pavement surface until cooling and

hardening or curing has taken place, and not within the first 72 hours (many permeable paver systems can be used right away). The full permeability of the pavement surface should be tested by applying clean water at the rate of at least five gallons per minute over the surface using a hose or other distribution devise (Figure 7.41). All water should infiltrate directly without puddle formation or surface runoff.

Figure 7.41
Testing permeability with a high capacity hose

Maintenance

The primary goal of pervious pavement maintenance is to prevent the pavement surface and/or underlying infiltration bed from being clogged with fine sediments. To keep the system clean and prolong its life span, the pavement surface should be vacuumed twice per year with a commercial cleaning unit. Pavement washing systems or compressed air units are generally not recommended but may be acceptable for certain types of pavement. All inlet structures within or draining to the infiltration beds should also be cleaned out twice a year.

Planted areas adjacent to pervious pavement should be well maintained to prevent soil washout onto the pavement. If any washout does occur, immediately clean it off the pavement to prevent further clogging of the pores. Furthermore, if any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once. Planted areas should be inspected twice a year. All trash and other litter should be removed during these inspections.

Superficial dirt does not necessarily clog the pavement voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, trucks or other heavy vehicles should be prevented from tracking or spilling dirt onto the pavement. Furthermore, all construction or hazardous materials carriers should be prohibited from entering a pervious pavement lot.

Potholes in pervious pavement are unlikely, though settling might occur if a soft spot in the subgrade is not removed during construction. For damaged areas of less than 50 square feet, a depression could be patched by any means suitable with standard pavement, with the loss of porosity of that area being insignificant. The depression can also be filled with pervious mix.

If an area greater than 50 sq. ft. is in need of repair, approval of patch type must be sought from either the engineer or owner. If feasible, permeable pavers can be taken up and then simply re-installed (replacing damaged pavers if necessary). **Under no circumstance should the pavement surface ever be seal coated**. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.

Pervious pavement maintenance considerations are summarized below:

Prevent clogging of pavement surface with sediment

- Vacuum pavement twice a year,
- Maintain planted areas adjacent to pavement,
- Immediately clean any soil deposited on pavement,
- Do not allow construction staging, soil/mulch storage, etc., on unprotected pavement surface, and
- Clean inlets draining to the subsurface bed twice a year.

Snow/Ice removal

- Pervious pavement systems generally perform better and require less treatment than standard pavements,
- Do not apply abrasives such as sand or cinders on or adjacent to pervious pavement,
- Snow plowing is fine but should be done carefully (i.e., set the blade slightly higher than usual), and
- Salt application is acceptable, although alternative deicers are preferable.

Repairs

- Surface should never be seal-coated,
- Damaged areas less than 50 sq. ft. can be patched with pervious or standard pavement,
- Larger areas should be patched with an approved pervious pavement,
- Permeable pavers should be repaired/replaced with similar permeable paver block material, and
- Permeable pavers and gravel pavers may require the addition of aggregate on an annual basis or as needed, in order to replenish material used to fill in the open areas of the pavers. Turf pavers may require reseeding if bare areas appear.

Winter Considerations

Pervious pavement systems should perform equally well in the winter, provided that infiltration bed design considers the soil frost line, and proper snow removal and deicing procedures are followed. Winter maintenance for pervious pavement may be necessary but is sometimes less intensive than that required for a standard pavement (especially for pervious asphalt). The underlying stone bed tends to absorb and retain heat so that freezing rain and snow melt faster on pervious pavement. Therefore, ice and light snow accumulation are generally not as problematic. However, snow will accumulate during heavier storms.

Abrasives such as sand or cinders should not be applied on or adjacent to the pervious pavement. Snow plowing is fine, provided it is done carefully (i.e., by setting the blade slightly higher than usual, about an inch). Salt with low non-soluble solids content is acceptable for use as a deicer on the pervious pavement. Non-toxic, organic deicers applied either as blended, magnesium chloride-based liquid products or as pretreated salt, are preferred.

Cost

The majority of added cost of a pervious pavement/infiltration system lies in the underlying stone bed, which is generally deeper than a conventional subbase and wrapped in geotextile. Costs may also be higher in areas where experienced contractors are not readily available. However, these additional costs are often offset by the significant reduction in the required number of inlets and pipes. Also, since pervious pavement areas are often incorporated into the natural topography of a site, there is generally less earthwork and/or deep excavations involved. Furthermore, pervious pavement areas with subsurface infiltration beds often eliminate the need (and associated costs, space, etc.) for detention basins. When all of these factors are considered, pervious pavement with infiltration has often proven itself less expensive than impervious pavement with associated stormwater management.

- Porous asphalt, with additives, is generally 15 percent to 25 percent higher in cost than standard asphalt on a unit area basis. Unit costs for pervious asphalt (without infiltration bed) range from about $4/SF to $5/SF.
- Pervious concrete as a material is generally more expensive than asphalt and requires more labor and expertise to install. Unit cost of a six-inch-thick pervious concrete (without infiltration bed) section is about $4/SF to $6/SF.
- Permeable paver blocks vary in cost depending on type and manufacturer.

NOTE: The data provided are based on average market costs. For greater accuracy, a site- and market-specific cost estimate should be developed.

Designer/Reviewer Checklist for Pervious Pavement with Infiltration Bed

Type of pervious pavement(s) proposed: _____

Source of mix design or material source: _____

ITEM		YES	NO	N/A	NOTES
Appropriate application of pervious pavement (e.g., use, traffic loading, slopes)?					
Was the Soil Infiltration Testing Protocol followed?					
	Appropriate areas of the site evaluated?				
	Infiltration rates measured?				
Was the Infiltration BMP followed?					
	Two-foot minimum separation between the bed bottom and bedrock/SHWT?				
	Soil permeability acceptable?				
	If not, appropriate underdrain provided?				
	Adequate separations from wells, structures, etc.?				
	Natural, uncompacted soils?				
	Level infiltration area (bed bottom)?				
	Excavation in pervious pavement areas minimized?				
	Hotspots/pretreatment considered?				
	Loading ratio below 5:1?				
	Storage depth limited to two feet?				
	Drawdown time less than 48 hours?				
	Positive overflow from system?				
	Erosion and Sedimentation control?				
	Feasible construction process and sequence?				
	Geotextile specified?				
Clean, washed, open-graded aggregate specified?					
Properly designed/specified pervious pavement surface?					
Maintenance accounted for and plan provided?					
Signage provided?					

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BMP Fact Sheet

Vegetated Roof

Vegetated roofs, or green roofs, are conventional rooftops that include a thin covering of vegetation allowing the roof to function more like a vegetated surface. The overall thickness of the vegetated roof may range from 2 to 6 inches, typically containing multiple layers consisting of waterproofing, synthetic insulation, non-soil engineered growth media, fabrics, synthetic components, and foliage.

Green roof with sedum at Lawrence Technological University's Taubman Student Services Center

Source: Lawrence Technological University

Applications		Stormwater Quantity Functions	
Residential	Limited	**Volume**	Med/High
Commercial	Yes	**Groundwater Recharge**	Low*
Ultra Urban	Yes	**Peak Rate**	Medium
Industrial	Yes	**Stormwater Quality Functions**	
Retrofit	Yes	**TSS**	Medium
Highway/Road	N/A	**TP**	Medium
Recreational	Yes	**TN**	Medium
		Temperature	High

Additional Considerations	
Cost	High
Maintenance	Medium
Winter Performance	Medium

Variations

- Intensive
- Semi-intensive
- Extensive

Key Design Features

- Extensive roofs are most commonly used for rainfall runoff mitigation
- Roofs with pitches steeper than 2:12 (9.5 degrees) must incorporate supplemental measures

Benefits

- Good stormwater volume control
- Heating and cooling energy benefits
- Increased lifespan of roof
- Heat island reduction
- Enhance habitat value

Limitations

- Cost (intensive systems)
- Careful design and construction required
- Maintenance requirements until plants established
- Can't store or treat stormwater from other parts of the property

* Although vegetated roofs can be used very successfully in combination with infiltration systems.

Case Study: City of Battle Creek City Hall Runoff Project

City of Battle Creek, MI

The City of Battle Creek City Hall Runoff Project was designed to treat stormwater runoff from a municipal complex adjacent to the Battle Creek River, a tributary of the Kalamazoo River. The goal of the project was to treat one-half inch of rainstorm runoff by incorporating several best management techniques (BMPs) that promote infiltration and low impact development. The BMPs included a vegetated roof system on the Police Department roof; infiltration of runoff water from the impervious walkway in front of the Police Department building; and infiltration from the parking lots behind and adjacent to City Hall and the Police Department buildings.

Green roof on City of Battle Creek Police Department building
Source: City of Battle Creek

The green roof is primarily an extensive system with the exception of a band around the perimeter of the roof which is intensive. The load reductions on the roof have been revised to accommodate the additional system. The City of Battle Creek is responsible for the light maintenance needed for the vegetated roof. Keeping the native plants, mainly sedum, properly watered during establishment did pose a challenge. Replanting was required in some areas.

Case Study Site Considerations	
Project Type	Extensive Green Roof
Estimated Total Project Cost	$520,252 for roof reconstruction plus green roof; green roof materials alone were $121,635
Maintenance Responsibility	City of Battle Creek
Project Contact	Christine Kosmowski, 269-966-0712

Estimated Annual Pollutant Load Reductions:

- Sediment – 3.8 tons
- Nitrogen – 101 lbs.
- Phosphorous – 16 lbs.
- Volume – 68 percent

Another goal of the City of Battle Creek City Hall Runoff Project was to increase community awareness of low impact development techniques and their water quality protection benefits. The City is promoting the area as a demonstration site for local builders and homeowners.

Description and Function

Vegetated roofs involve growing plants on rooftops, thus replacing the vegetated footprint that was removed when the building was constructed. Vegetated roof covers are an "at source" measure for reducing the rate and volume of runoff released during rainfall events. The water retention and detention properties of vegetated roof covers can be enhanced through selection of the engineered media and plants. Depending on the plant material and planned usage for the roof area, modern vegetated roofs can be categorized as systems that are intensive, semi-intensive, or extensive (Table 7.16).

Intensive vegetated roofs utilize a wide variety of plant species that may include trees and shrubs, require deeper substrate layers (usually > four inches), are generally limited to flat roofs, require 'intense' maintenance, and are often park-like areas accessible to the general public.

Extensive vegetated roofs are limited to herbs, grasses, mosses, and drought tolerant succulents such as sedum, can be sustained in a shallow substrate layer (<four inches), require minimal maintenance once established, and are generally not designed for access by the public. These vegetated roofs are typically intended to achieve a specific environmental benefit, such as rainfall runoff mitigation. Extensive roofs are well suited to rooftops with little load bearing capacity and sites which are not meant to be used as roof gardens. The mineral substrate layer, containing little nutrients, is not very deep but suitable for less demanding and low-growing plant communities.

Semi-intensive vegetated roofs fall between intensive and extensive vegetated roof systems. More maintenance, higher costs and more weight are the characteristics for this intermediate system compared to that of the extensive vegetated roof.

Vegetated system layers

A proprietary system provides a growing environment on the roof which adequately compensates for the plant's natural environment. It ensures reliable technical and ecological functionality for decades. Vegetated roof systems contain the following functional layers (from bottom to top):

Root barrier: The root barrier protects the roof construction from being damaged by roots. If the waterproofing is not root resistant a separate root barrier has to be installed.

Extensive vegetated roof at Kresge Foundation Headquarters in Troy, MI

Source: Conservation Design Forum

Waterproof membrane: This layer protects the roof structure from moisture and can include a unique root-resistant compound to prevent roots from penetrating.

Protection layer: A specially designed perforation resistant protection mat prevents mechanical damage of the root barrier and roof construction during the installation phase. Depending on the thickness and the material the protection layer can also retain water and nutrients.

Drainage Layer: The drainage layer allows for excess water to run-off into the water outlets. Depending on the design and the material the drainage layer has additional functions such as water storage, enlargement of the root zone, space for aeration of the system and protection for the layers below it. Due to the weight constraints of the roof, the drainage layer is made of light-weight materials. Molded drainage elements made of rubber or plastic are used quite often. Other drainage layers are made of gravel, lava, expanded clay or clay tiles.

Filter layer: The filter layer separates the plant and substrate layers from the drainage layer below. Especially small particles, humic and organic materials, are retained by the filter sheet and are therefore available for the plants. In addition, the filter sheet ensures that the drainage layer and the water outlet are not clogged with silt. Filter layers are preferably made of geo-textiles such as fleece or other woven materials.

Table 7.16
Vegetated roof types

	Extensive Vegetated Roof	Semi-Intensive Vegetated Roof	Intensive Vegetated Roof
Maintenance	Low	Periodically	High
Irrigation (after plants are established)*	No	Periodically	Regularly
Plant Communities	Moss, Sedum, Herbs, and Grasses	Grass, Herbs, and Shrubs	Perennials, Shrubs, and Trees
System build-up height	60-200 mm	120-250 mm	150-400 mm Underground garages = > 1000 mm
Weight	60 - 150 kg/m2 13-30 lbs/sqft	120 - 200 kg/m2 25-40 lbs/sqft	180 - 500 kg/m2 35-100 lbs/sqft
Construction costs	Low	Medium	High
Desired use	Ecological protection layer	Designed vegetated roof	Park-like garden

*Irrigation is required regularly to establish plant communities, especially during the first season.
Source: Adapted from International Green Roof Association

Growing medium: The growing medium is the basis of the vegetated roof. A sufficient depth for the root zone has to be ensured as well as an adequate nutrient supply and a well balanced water-air relation. Depending on the type of vegetated roof and the construction requirements, a variety of different system substrates are available.

Light-weight mineral materials, with high water retention capacity and good water permeability, such as lava, pumice, expanded clay, expanded schist, and clay tiles, have proven to be reliable for many years. Untreated organic material and top soil have disadvantages in terms of weight and drainage function; they are only used as additions to mineral substrates.

Plant level: The plant selection depends on the growing medium as well as local conditions, available maintenance and the desired appearance. Low maintenance, durable and drought resistant plants are used for extensive vegetated roofs, versus, a nearly limitless plant selection for intensive vegetated roofs.

Variations

Some specialized vegetated roof companies offer installation using vegetated blankets/mats or trays. Pre-vegetated blankets/mats are grown off-site and brought to the site for installation (similar to the concept of sod for grass). They can provide an immediate vegetative coverage which can prevent erosion, reduce installation times, and reduce maintenance during what would otherwise be the establishment period for vegetation.

Frasier School District is testing both the tray system (foreground) and mat system (background} on their operations and maintenance building.

Modular systems are manufactured trays filled with various vegetated roof layers (often pre-vegetated as well) that are delivered to the site and installed on a prepared roof. Manufacturers of these systems claim that benefits include faster installation and easier access to the roof if maintenance or leak repairs are necessary (in addition to the potential benefits of a pre-vegetated system). Others argue that these benefits are not significant and that trays can have drawbacks such as increased cost, poor aesthetics (module edges being visible), and reduced performance (wet and dry spots resulting from the barriers between modules in the system).

Extensive vegetated roofs

Extensive vegetated roofs are the most commonly used systems due to their higher mitigation of stormwater runoff as well as their lower cost compared to the other systems. Extensive systems have three variations of assemblies that can be considered in design.

Single media assemblies

Single media assemblies (Figure 7.57) are commonly used for pitched roof applications and for thin and lightweight installations. These systems typically incorporate very drought tolerant plants and utilize coarse engineered media with high permeability. A typical profile would include the following layers:

1. Waterproofing membrane
2. Protection layer
3. Root barrier (optional, depending on the root-fastness of the waterproofing)

Installation of green roof at the Ford Rouge Plant in Dearborn, MI

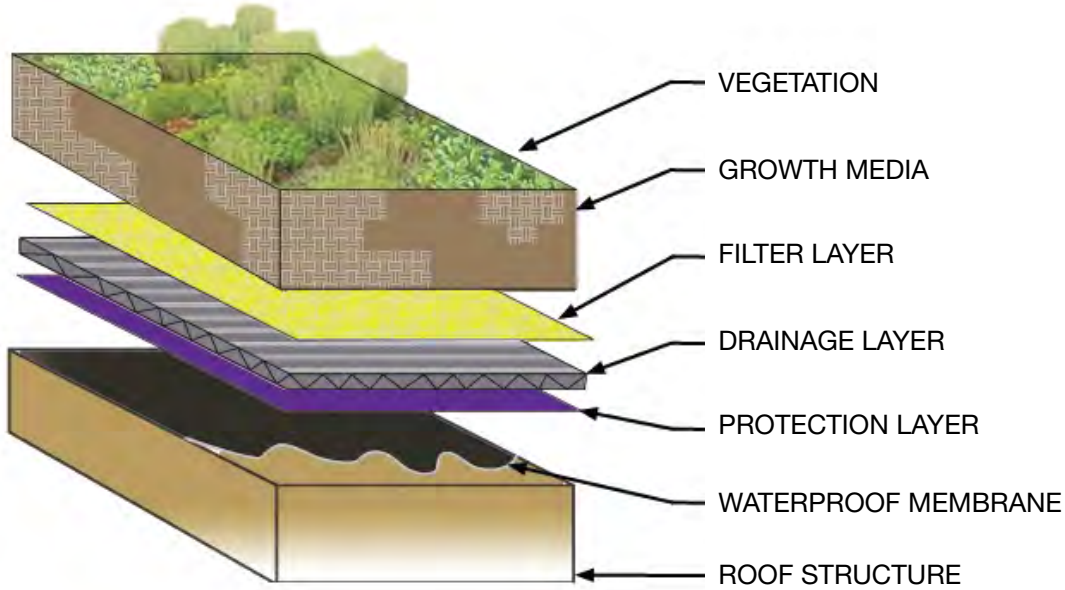
Source: Rouge River National Wet Weather Demonstration Project

4. Drainage layer
5. Filter layer
6. Growth media
7. Vegetation

Pitched roof applications may require the addition of slope bars, rigid slope stabilization panels, cribbing, reinforcing mesh, or similar method of preventing sliding instability.

Flat roof applications with mats as foundations typically require a network of perforated internal drainage conduit to enhance drainage of percolated rainfall to the deck drains or scuppers.

Figure 7.57
Single media assembly



Dual media assemblies
Dual media (Figure 7.58) assemblies utilize two types of non-soil growth media. In this case a finer-grained media with some organic content is placed over a base layer of coarse lightweight mineral aggregate. They do not include a geocomposite drain.

The objective is to improve drought resistance by replicating a natural alpine growing environment in which sandy topsoil overlies gravelly subsoil. These assemblies are typically 4 to 6 inches thick and include the following layers:

1. Waterproofing membrane
2. Root barrier/ protection layer
3. Coarse-grained drainage media
4. Filter layer
5. Growth media
6. Vegetation

These assemblies are suitable for roofs with pitches less than, or equal to about 1.5:12 (7.1 degrees). Large vegetated covers will generally incorporate a network of perforated internal drainage conduit located within the coarse grained drainage layer.

Dual media with synthetic retention/detention layer
These assemblies introduce impervious plastic panels with cup-like receptacles on their upper surface (i.e., a modified geocomposite drain sheet). The panels are in-filled with coarse lightweight mineral aggregate. The cups trap and retain water. They also introduce an air layer at the bottom of the assembly. A typical profile would include:

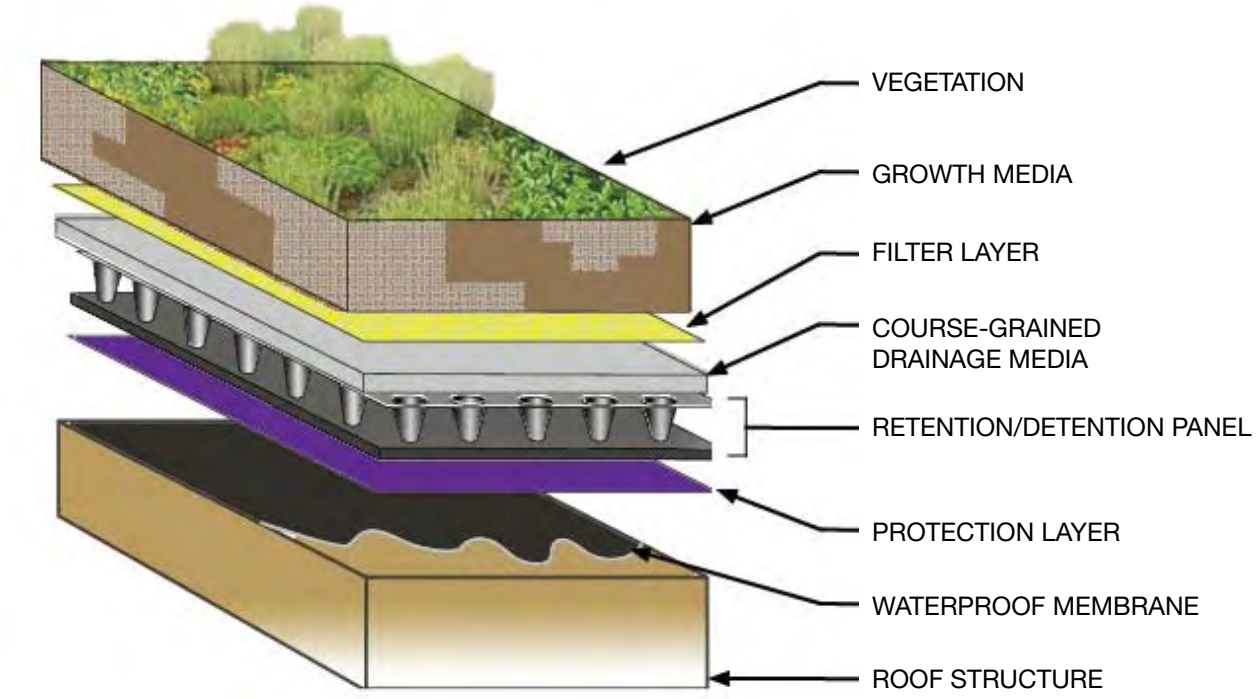
1. Waterproof membrane
2. Protection layer
3. Retention/detention panel
4. Coarse-grained drainage media
5. Filter layer
6. Growth media
7. Vegetation

These assemblies are suitable on roof with pitches less than or equal to 1:12 (4.8 degrees). Due to their complexity, these systems are usually a minimum of five inches deep. If required, irrigation can be provided via surface spray or mid-level drip.

Treatment Train

Vegetated roof covers are frequently combined with ground infiltration measures. This combination can be extremely effective for stormwater management and is one of the best ways to replicate the natural hydrologic cycle. Vegetated roofs evapotranspirate a significant fraction of annual rainfall and typically discharge larger

Figure 7.58
Dual media assembly



storm events relatively slowly. If overflow is directed to an infiltration system, the discharge can be infiltrated efficiently as the system has more time to absorb water as it is slowly released from the roof. Vegetated roof covers improve the efficiency of infiltration devices by:

- Reducing the peak runoff rate,
- Prolonging the runoff, and
- Filtering runoff to produce a cleaner effluent.

Benefits

Establishing plant material on rooftops provides numerous ecological and economic benefits including stormwater management, energy conservation, mitigation of the urban heat island effect, increased longevity of roofing membranes, as well as providing a more aesthetically pleasing environment to work and live. A major benefit of green roofs is their ability to absorb stormwater and release it slowly over a period of several hours, retaining 60-100 percent of the stormwater they receive, depending on the duration and the intensity of the storm.

In addition, green roofs have a longer life-span than standard roofs because they are protected from ultraviolet radiation and the extreme fluctuations in temperature that cause roof membranes to deteriorate. A vegetated roof has a life expectancy of 60 years — three times as long as a traditional roof.

As pervious surfaces are replaced with impervious surfaces due to urban development, the need to recover green space is becoming increasingly critical for the health of our environment. Vegetated roof covers have been used to create functional meadows and wetlands to mitigate the development of open space. This can be accomplished with assemblies as thin as six inches.

Design Considerations

Roof substructure

Wooden constructions, metal sheeting as well as reinforced concrete decks can be considered as appropriate roof substructures. The base for the vegetated roof is a waterproof roof construction with appropriate load bearing capacity.

Root barrier

Root barriers should be thermoplastic membranes with a thickness of at least 30 mils. Thermoplastic sheets can be bonded using hot-air fusion methods, rendering the seams safe from root penetration. Membranes that have been certified for use as root-barriers are recommended.

Green roof at the Ford Rouge Plant in Dearborn, MI

Recognized in 2004 by Guinness World Records as the largest green roof in the world, this green roof covers 454,000 square feet atop Ford's truck assembly plant in Dearborn, MI. The green roof is part of a comprehensive effort to revitalize the historic Ford Rouge complex as a model for 21st Century sustainable manufacturing and is a significant component of a site-wide 600-acre stormwater management system.

Over a period of time roots can damage the waterproofing and roof construction if there have been no corresponding protection measures taken. The root resistance of the waterproofing is determined from the "Procedure for investigating resistance to root penetration at green-roof sites" by the FLL (The Landscaping and Landscape Development Research Society). Over 70 different waterproofing products meet the requirements of this test. If the waterproofing is not root resistant, an additional root barrier has to be installed. Aside from the roof surface, the upstands, perimeters, joints and roof edges also have to be protected against root penetration.

Growth media

Growth media should be a soil-like mixture containing not more than 15 percent organic content. The appropriate grain-size distribution is essential for achieving the proper moisture content, permeability, nutrient management, and non-capillary porosity, and 'soil' structure. The grain-size guidelines vary for single and dual media vegetated cover assemblies.

Blowing media onto Mallet's Creek Library Roof, Ann Arbor, MI

Source: Mallet's Creek Library, Ann Arbor, MI

Separation fabric

Separation fabric should be readily penetrated by roots, but provide a durable separation between the drainage and growth media layers. (Only lightweight nonwoven geotextiles are recommended for this function.)

Roof penetrations

For vegetated roofs, the following upstand and perimeter heights have to be considered:

- Upstand height for adjacent building parts and penetrations: minimum of six inches.
- Upstand height for roof edges: minimum of four inches.

> Even though it is possible to build pitched green roofs with a slope of 45° it is not recommended to exceed 10° due to significant limited accessibility for upkeep and maintenance.

Important: The upstand height is always measured from the upper surface of the vegetated roof system build up or gravel strip. Clamping profiles guarantee reliable protection and a tight connection of the upstand areas. Roof penetrations (e.g. water connections, building parts for the usage of the roof area, etc.), when possible, should be grouped in order to keep roof penetration to a minimum.

Roof slope

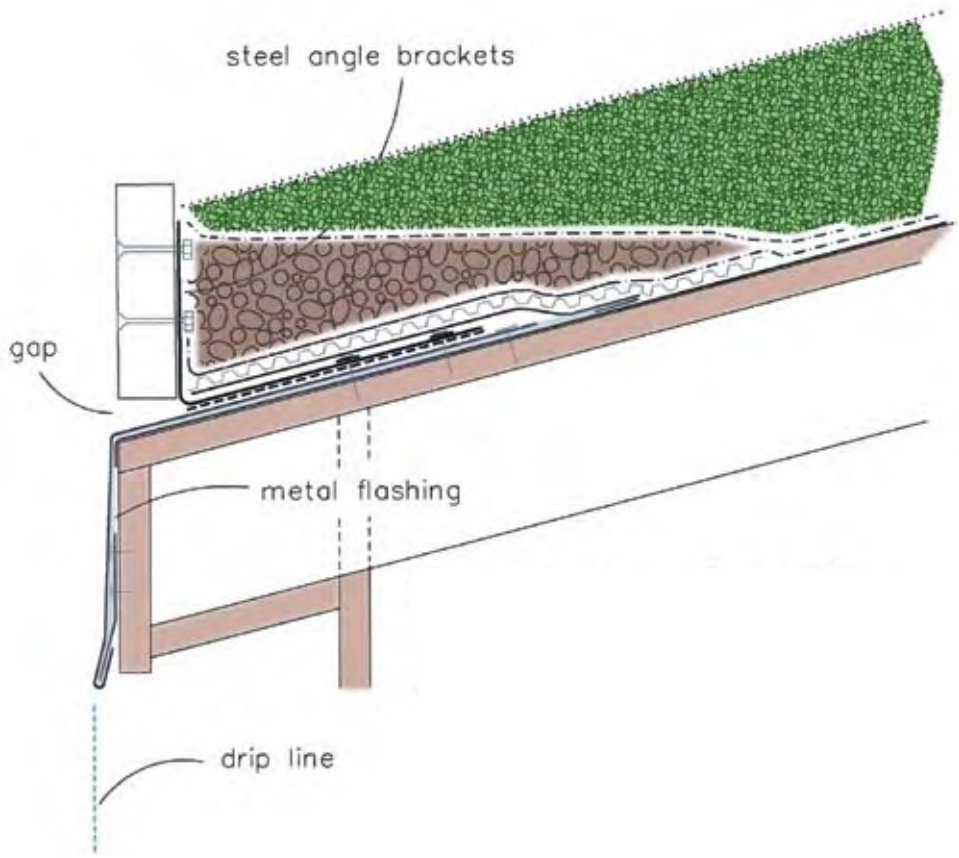
Using modern technologies it is possible to install a reliable vegetated roof system not only on conventional flat roofs, but also on saddle roofs, shed roofs and barrel roofs. Special technical precautions for the mitigation of existing shear forces and erosion are only necessary for a roof slope over 10°.

Roofs with a slope of more than 45° are normally not suitable for a vegetated roof system. Roofs with a slope of less than two percent are special roof constructions on which puddles often develop.

In order to avoid damage to extensive vegetated roofs by water retention, specific arrangements for the roof drainage are necessary. In contrast, it can be beneficial for intensive vegetated roofs to design the roof construction without slope to allow for dam up irrigation.

Load calculations

The maximum load bearing capacity of the roof construction must be considered when installing vegetated roofs. Therefore, the water saturated weight of



Example eave detail for sloped roof
Source: Roofscapes, Inc.

the green roof system, including vegetation must be calculated as permanent load. Extensive vegetated roofs weigh between 60-150 kg/m2 (13.0-30.0 lb/sq.ft.) depending on the thickness of the vegetated roof system build-up. Trees, shrubs, and construction elements such as pergolas and walkways cause high point loads and, therefore, have to be calculated accordingly.

Wind uplift

A vegetated roof must be tight to the roof, especially in cases of strong wind. When designing and installing the vegetated roof, safety measures against wind uplift are to be considered.

This is especially important when the vegetated roof provides the load for a loose laid waterproofing and root barrier. The actual influence from the wind depends on the local wind zone, height of the building, roof type, slope, and area (whether corner, middle or edge) and the substructure.

Roof drainage

Vegetated roof systems store a major part of the annual precipitation and release it to the atmosphere by transpiration. Depending on the thickness of the vegetated roof system build-up and rain intensity, surplus water may accumulate at certain times and must be drained off the roof area. The number of roof outlets and the penetrability factor, or more precisely, the water retaining capacity of the vegetated roof system build-up, has to be adjusted to the average local precipitation.

Roof outlets are to be kept free of substrate and vegetation and have to be controllable at all times. For this purpose “inspection chambers” are installed over the roof outlets. Due to safety precautions, roof areas with inlayed drainage must always have two drainage outlets or one outlet and one safety overflow. For facades and roof areas, gravel strips, gullies and grids provide fast drainage of rainwater into the drainage system.

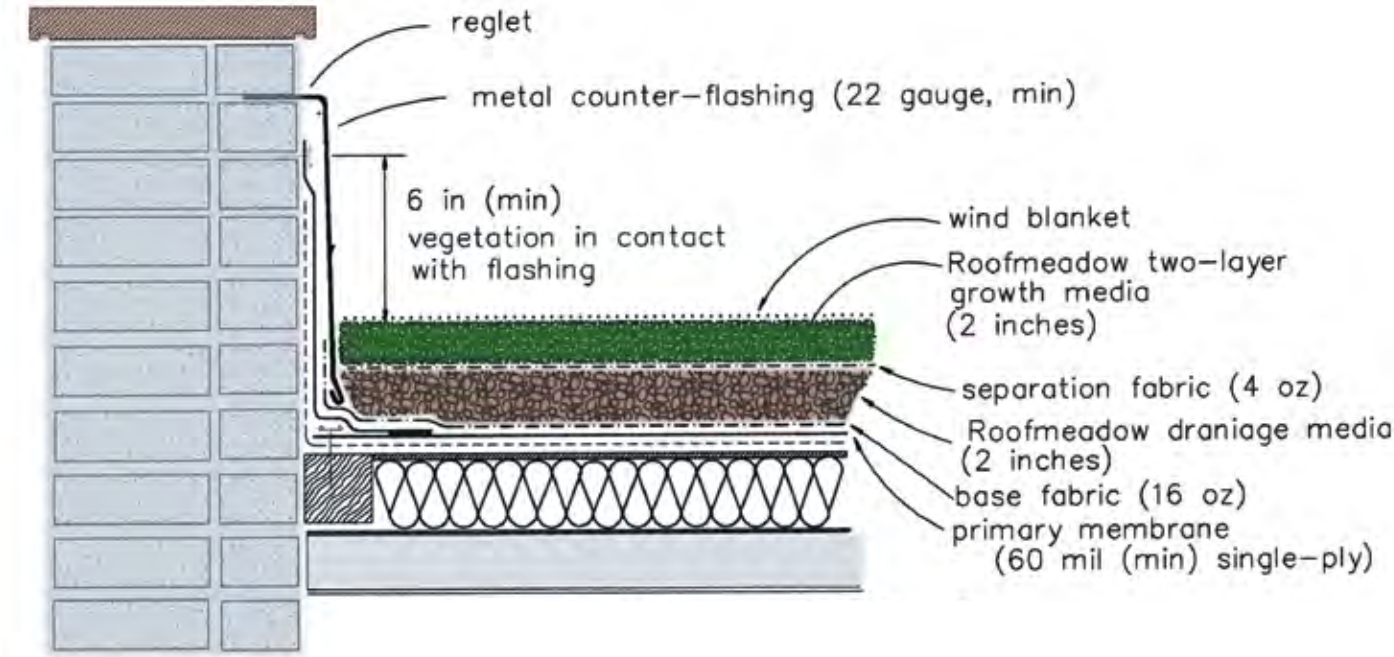
Pitched Vegetated Roofs

Technical requirements

Root resistant waterproofing is necessary for pitched vegetated roofs; installing an additional root barrier, requires much effort and increases the risk of slippage. Stable abutments have to be installed on the eaves edges to transfer shear forces from the vegetated roof system build-up and the additional snow load into the roof construction. Additional shear barriers may be necessary to transfer the shear forces depending on the roof slope and the roof length. It is recommended the design for the shear barriers and the eaves profiles be done by a structural engineer. With increasing slope, the vegetated roof system build-up is more complicated and the substrate has to be protected from erosion; plastic grid elements can be used for this purpose.

Plant selection

The success of the landscaping on pitched roofs depends on the plants. Fast surface coverage is the highest priority. A dense planting of root ball plants or pre-cultivated vegetation mats are used in cases of steep slopes and allow for rapid coverage. It is also important to consider the exposure of the roof area, the slope and the location of the building when selecting plants. Perennials and grasses can be used whereas Sedum is the most suitable for pitched roofs, due to the species' high water retention capacity and erosion protection. The water run-off is much faster on pitched roofs compared to a flat roof. It is advisable to plan for an additional irrigation system to provide water during dry periods. The irrigation can be provided either by drip irrigation or by sprinkler systems.



Example parapet flashing detail for a flat roof
Source: Roofscapes, Inc.

Irrigation

Extensive vegetated roofs with drought resistant plant species have to be irrigated only during planting and installation maintenance over the first two years. After its establishment, the annual rainfall is sufficient to sustain the vegetation. In contrast, the requirements are more involved for intensive vegetated roofs with lawn, shrubs, or trees. An adequate number of precisely dimensioned hoses with automatic irrigation units make plant maintenance during drought periods more manageable. The water supply for roof gardens with no slope can be increased through additional dam-up irrigation. Vegetated roofs can also be irrigated with cistern water.

Fire prevention

As a part of the "hard roof" classification, intensive vegetated roofs provide preventative fire protection in the case of sparks and radiating heat. The criteria that extensive vegetated roofs must meet in order to be considered fire resistant, are already met by most vegetated roof systems that are offered by suppliers. Openings within the vegetated roof (e.g. skylights) need to be installed with a vegetation free zone (approx. 20 in). On larger roof areas a vegetation free zone (e.g. gravel strip or concrete slabs) are to be installed at least every 130 feet.

Vegetation Considerations

Extensive vegetated roofs

Plants for extensive vegetated roofs have to survive intense solar radiation, wind exposure, drought, low nutrient supply, freezing temperatures and limited root area. Suitable plant varieties are those growing in severe locations with little moisture and nutrient supply, such as dry meadows. The main varieties are sedum, and delosperma. The plants are able to store high amounts of water in the leaves, are stress resistant and recover easily from periods of drought. Other varieties such as dianthus species, asteraceae and ornamental grasses are also suitable for these conditions.

Plugs prior to planting extensive vegetated roof
Source: Mallet's Creek Library, Ann Arbor, MI

Intensive green roofs

Having an appropriate vegetated roof system and sufficient growing medium (with higher root penetration volume, nutrients and water supply) growth of sophisticated plant varieties on the roof is possible. The selected plants need to be resistant to intense solar radiation and strong winds. Vegetation with various plant varieties such as perennials, herbs, grasses and trees allow for a natural character on the roof. Having a broader plant community increases the amount of maintenance required.

Conventional roof prior to retrofit

Extensive vegetated roof cover retrofit incorporating a patio for viewing

Stormwater Functions and Calculations

The performance of vegetated roof covers as stormwater best management practices cannot be represented by simple algebraic expressions used for surface runoff. In the analysis of vegetated roof covers, the water that is discharged from the roof is not surface runoff, but rather underflow, i.e., percolated water. The rate and quantity of water released during a particular storm can be predicted based on knowledge of key physical properties, including:

- Maximum media water retention
- Field capacity
- Plant cover type
- Saturated hydraulic conductivity
- Non-capillary porosity

The maximum media water retention is the maximum quantity of water that can be held against gravity under drained conditions. Standards that have been developed specifically for measuring this quantity in roof media are available from FLL and ASTM (E2399).

Conventional runoff coefficients, such as the NRCS **runoff curve number**, CN, can be back-calculated from computer simulation or measurements of vegetated roof cover assemblies. However, these coefficients will only apply for the specific design storm for which they have been determined.

Volume reduction

All vegetated roof covers have both a retention and a detention volume component. Benchmarks for these volumes can be developed from the physical properties described above.

Peak rate mitigation

Vegetated roof covers can exert a large influence on peak rate, especially in less extreme storms such as the 1-, 2-, and 5-year storms. Because volume is reduced, there is some peak rate reduction achieved for all storms. An evaluation of peak runoff rates requires either computer simulation or measurements made using prototype assemblies.

A general rule for vegetated roof covers is that rate of runoff from the covered roof surface will be less than or equal to that of open space (i.e., NRCS curve number of about 65) for storm events with total rainfall volumes up to three times the maximum media water retention of the assembly. For example, a representative vegetated roof cover with maximum moisture retention of one inch will react like open space for storms up to and including the three-inch magnitude storm.

Using computer simulations, municipalities could generate a table of CN values for specific design storms and green roof types. The table would relate maximum moisture capacity to the CN coefficients

Water quality improvement

Direct runoff from roofs is a contributor to pollutants in stormwater runoff. Vegetated roof covers can significantly reduce this source of pollution. Assemblies intended to produce water quality benefits will employ engineered media with almost 100 percent mineral content. Furthermore, following the plant establishment period (usually about 18 months), on-going fertilization of the cover is no longer needed. Experience indicates that it may take five or more years for a water quality vegetated cover to attain its maximum pollutant removal efficiency.

Dam-up Irrigation in Vegetated Roof

Intensive Vegetated Roofs depend mainly on additional irrigation. To install an irrigation system which does not use fresh water, a water dam-up irrigation unit is recommended.

Requirements of a dam-up irrigation unit:

- flat roof
- dam-up elements above roof outlets
- an appropriate drainage layer with the necessary height

In case of heavy rain the reservoir is filled primarily and any excess water is collected in the cistern. During dry periods the water on the roof is used first, then water is pumped from the cistern onto the roof and supplied to the plants.

This process can be carried out either manually or electronically. The water in the cistern can also be used for other purposes, provided the reservoir is big enough.

Maintenance

- Irrigation will be required as necessary during the plant establishment period and in times of drought.
- During the plant establishment period, three to four visits to conduct basic weeding, fertilization, and infill planting is recommended.
- The soluble nitrogen content (nitrate plus ammonium ion) of the soil should be adjusted to between one and five parts per million, based on soil test.
- Once plants are established, it is crucial to maintain the roof once or twice a year. Weeds and other unwanted plants on the entire roof, at the perimeters and at the upstands need to be removed. For grass and herb vegetation the organic buildup has to be removed once a year. Intensive vegetated roofs require higher maintenance and service throughout the year.

Winter Considerations

Applicable snow load must be considered in the design of the roof structure.

Cost

The construction cost of vegetated roof covers varies greatly, depending on factors such as:

- Height of the building
- Accessibility to the structure by large equipment such as cranes and trailers
- Depth and complexity of the assembly
- Remoteness of the project from sources of material supply
- Size of the project

Active growth on Fraser public school maintenance green roof during winter in Fraser, MI

However, under 2007 market conditions, extensive vegetated covers for roof will typically range between $8 and $16 per square foot, including design, installation, and warranty service (not including waterproofing). Basic maintenance for extensive vegetated covers typically requires about 2-3 person-hours per 1,000 square feet, annually.

Although vegetated roofs are relatively expensive compared to other BMPs in terms of stormwater management, they can have other significant benefits which serve to reduce their life-cycle costs. For example, the longevity of the roof system may be greatly increased. In addition, heating and cooling costs can be significantly reduced.

Designer/Reviewer Checklist for Vegetated Roofs

Type of vegetated roof(s) proposed: _____

ITEM	YES	NO	N/A	NOTES
Load and structural capacity analyzed?				
Waterproofing layer and protection adequate?				
Leak protection system provided?				
Internal drainage capacity for large storms?				
Appropriate growing medium?				
Appropriate drainage media and/or layer?				
Geotextile/filter fabric specified?				
Good detailing (flashings, penetrations, drains, gravel edges, etc.)?				
Slope stability provided, if necessary?				
Appropriate vegetation selected?				
Plant establishment (temporary irrigation/fertilization) procedures provided?				
Erosion control / wind protection provided?				
Maintenance accounted for and plan provided?				

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Appendix C

Recommended Plant Lists for Best Management Practices

This appendix contains recommended native and non-native (when appropriate) plant species for the Best Management Practices detailed throughout the manual. Species have been recommended based on hardiness, aesthetics, functionality, and commercial availability. It is certain that species exist outside the confines of this list that will perform in a comparable way to those listed; however, commercial availability is often a limiting factor in obtaining material for native plantings. Over time, and in certain locales, additional species will become available to supplement those listed below.

An array of planting zones is provided based on normal water levels (Figure C.1). Using these zones will provide the best chances for long-term success of native planting in the context of LID. While plants may naturally occur outside of the given ranges, these ranges are intended to be guidelines for plant installation. Whenever possible and practical in standing water conditions, native plants should be installed in live plant form (rather than seed). Seed or a combination of seed and live plants may be used in upland situations.

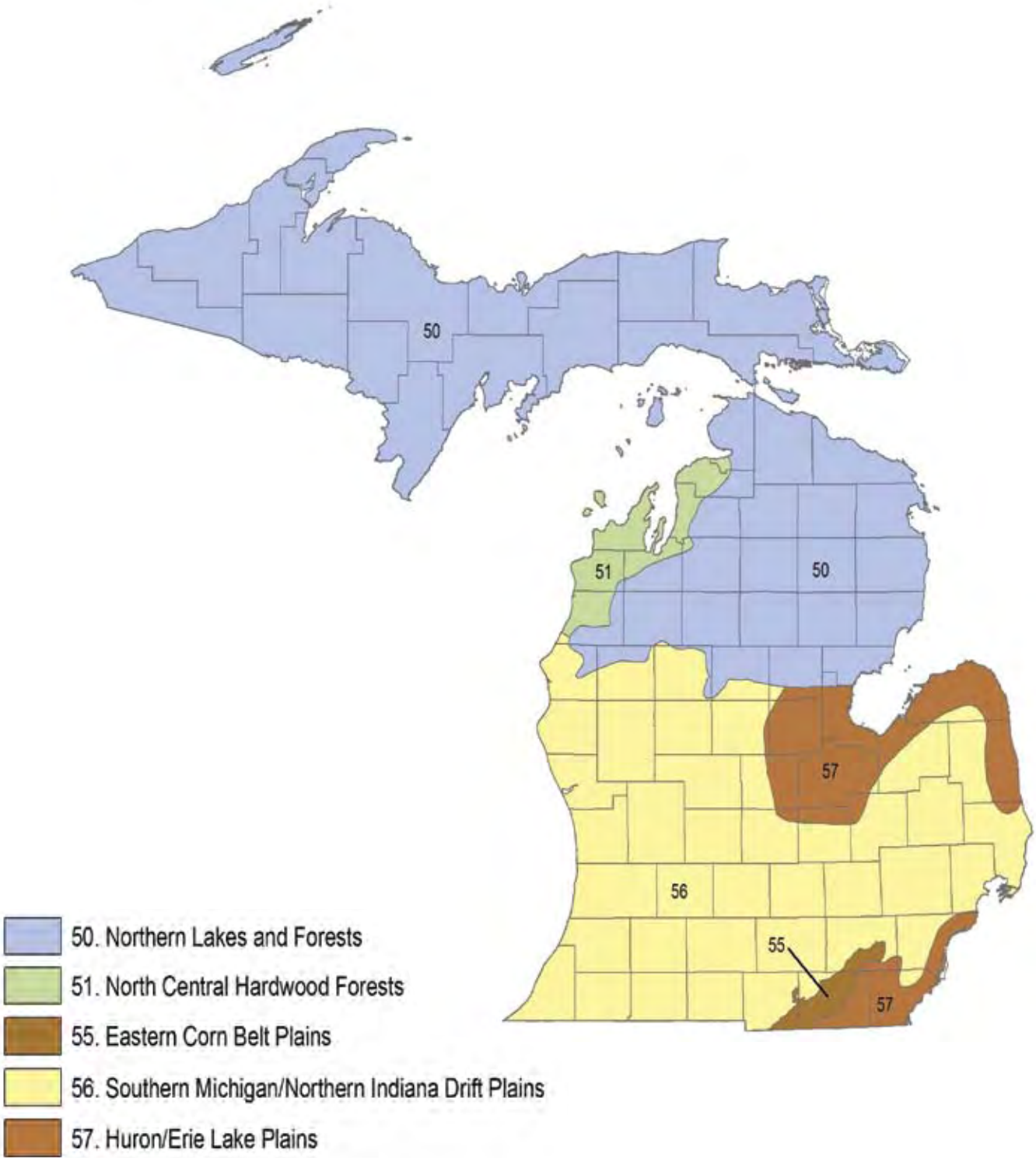
Recommendations are given for height, bloom color, bloom time, sun requirements, salt tolerance, and ecoregion. Please note that these are recommendations based on a range of situations, and a specific plant or population may vary from site-to-site. For sun requirements, F = Full sun required, P = Partial sun tolerated, and S = Shade tolerated. Salt tolerance is classified as Yes (Y) or No (N). This was determined through literature reviews and anecdotal evidence. If there is no information confirming tolerance, a "No" was listed.

Figure C.1
Planting Zone/BMP Matrix

	Zone A — 2"-4" Below Water Level	Zone B — 0"-2" Below Water Level	Zone C — 0"-2" Above Water Level	Zone D — 2"-4" Above Water Level	Zone E — 4"-18" Above Water Level	Zone F — 18"+ Above Water Level	Zone G — Planter Boxes	Zone H — Vegetated Roofs
Rain gardens/Bioretention	✤	✤	✤	✤	✤	✤		
Vegetated Filter Strips			✤	✤	✤	✤		
Vegetated Swales		✤	✤	✤				
Infiltration Basin		✤	✤					
Subsurface Infiltration Basins				✤	✤	✤		
Infiltration Trenches				✤	✤	✤		
Infiltration Berns	✤	✤	✤	✤	✤	✤		
Planter Boxes							✤	
Vegetated Roofs								✤
Constructed Wetlands	✤	✤	✤	✤				
Wet Ponds	✤	✤	✤					
Dry Extended Detention Basins			✤	✤	✤	✤		
Riparian Corridor Restoration			✤	✤				
Native Revegetation	✤	✤	✤	✤	✤	✤	✤	✤

Ecoregion recommendations are also provided for each species (Figure C.2). Whenever possible, the designer/installer should seek to use species that historically occurred in the same ecoregion as the project. When necessary, species occurring in an adjacent ecoregion may be used.

Figure C.2
EPA Level III Ecoregions for Michigan



Source: USEPA

Plant Installation

Native Seeding

Seasonal consideration: October 1-June 15 (note: seeds should not be planted on frozen ground).

Native seeding is generally recommended for areas above the water line or 1-2" below the water line. Live plant material should be used to establish vegetation at deeper water levels.

Broadcast seeding

Broadcast seeding is preferred over drill seeding on graded, bare soil sites. Apply the seed uniformly over the surface using a combination seeder/cultipacker unit such as a Brillion or Truax Trillion seeder. The Trillion seeder is preferred as it is designed to handle native seeds.

A cone seeder or other similar broadcasting equipment may also be used if the seed mix does not contain fluffy seeds in amounts sufficient to prevent free flowing without plugging. Seed should then be pressed into the surface using a cultipacker or roller.

Drill seeding

A rangeland-type no-till drill designed to plant native grasses and forbs may be used in bare soils although this equipment is specifically designed to plant through existing vegetation which is killed with an herbicide. Cultipacking or rolling before seeding may be required to prevent seed placement depths exceeding .25 inch, but cultipacking or rolling after seeding is not required.

All seeding equipment, whether broadcast or drill, should be calibrated to deliver the seed at the rates and proportions specified in the plans. Equipment should be operated to ensure complete coverage of the entire area to be seeded, and seed must be placed no deeper than .25 inch in the soil. No fertilizers or soil conditioners will be required or allowed.

Native Planting

Seasonal considerations: May 1-July 1

Plant plugs should be installed in holes drilled with an auger the same diameter and depth as the plug within +0.75 inch/- 0.25 inch. In wetland plantings where soil is soft and moist enough, a dibble bar or trowel may also be used. The planting layout should consider the requirements of the individual species regarding soil type, moisture, slope, shading, and other factors for the particular plant species.

Planting densities vary according to budget and project goals and can range from three-to-five foot spacing for plug supplements of seeded areas to six inches to two foot spacing for high visibility landscaping projects with large budgets. Groups of five-to-seven plugs of the same species planted approximately one foot apart is usually preferable to planting all species intermixed randomly across the site at a uniform density.

In wetland or shoreline areas with potential for high wave action or wildlife predation that may dislodge newly planted plugs, plugs should be secured with six inch or eight inch U-shaped wire erosion control blanket staples. Staple length is determined by the density of the planting substrate; softer substrates require longer length to hold plugs adequately.

In areas where potential for wildlife predation exists, such as retention basins or other planting areas adjacent to open water, waterfowl barriers should be installed around a minimum of 50 percent of the plugs. All plugs not protected by barriers should be stapled into the substrate as described above. Barriers may consist of plastic or wire mesh enclosures supported with wooden stakes, adequately constructed to inhibit access by waterfowl for one growing season. Enclosures should extend at least two feet above the plant tops. Methodology should be approved by the project designer with input from a restoration ecologist if necessary. Barriers may be removed after one growing season.

Maintenance and Management

Maintaining vegetated BMPs is typically most important during the first few years following installation. Supplemental irrigation may be needed to help establish plants in drought conditions. Plants may need to be replaced due to predation or other unseen factors. Most commonly, management includes removing invasive species via mowing, hand-pulling, or spot herbicide applications. In larger areas, broadcast herbicide applications may be appropriate. Over time in upland areas, controlled burning may be used as a way to invigorate the plantings and control certain invasive species. If not feasible for social or cultural reasons, an annual or biennial mowing may be used instead of fire.

Long-term management may be necessary, but is typically significantly less intensive. The site should be periodically checked for invasive species infestations. Any prairie or open area may need occasional (every three to five years) burning or mowing to remove woody vegetation that may encroach.

Zone A

Planting Zone = two-to-four inches below water level

These species require continual inundation within the given water depths in order to thrive. Although slight, short-term variances may be tolerated (+/-five inches for a period of 48 hours or less), water levels must remain in this range for a majority of the growing season for maximum plant growth and survival.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Cephalanthus occidentalis	Buttonbush	15’	White	Jun-Aug	F/P/S	N	51,55,56,57
Grasses/Sedges/Rushes:							
Acorus calamus	Sweet flag	1’-4’	Green	May-Jun	F/P	N	50,51,55,56,57
Scirpus acutus	Hard-stemmed bulrush	4’-6’	Brown	Apr-Aug	F	Y	50,51,55,56,57
Scirpus validus	Great bulrush	4’-8’	Brown	May-Aug	F	Y	50,51,55,56,57
Sparganium americanum	American bur reed	2’-5’	Green	Jun-Aug	F/P	N	50,51,55,56,57
Sparganium eurycarpum	Common bur reed	2’-6’	Green	May-Aug	F	N	50,51,55,56,57
Forbs:							
Asclepias incarnata	Swamp milkweed	3’-5’	Pink	Jun-Sep	F/P	N	50,51,55,56,57
Decodon verticillatus	Swamp loosestrife	2’-4’	Purple	Jul-Sep	F/P	N	51,55,56,57
Iris virginica	Blue flag iris	2’-3’	Purple	May-Jul	F/P/S	N	50,51,55,56,57
Peltandra virginica	Arrow arum	2’-5’	Green	Jun-Jul	F/P/S	N	55,56,57
Pontedaria cordata	Pickerelweed	1’-3’	Violet	Jun-Sep	F/P	N	50,51,55,56,57
Sagittaria latifolia	Arrowhead	1’-4’	White	Jun-Sep	F/P	N	50,51,55,56,57

Representative Zone A Species

Buttonbush

Pickerel Weed

Swamp Milkweed

Arrowhead

Blue Flag Iris

Source: JFNew

Zone B

Planting Zone = zero-to-two inches below water level

These species tolerate fluctuating water levels within this range. Although slight, short-term variances may be tolerated (+/-five inches for a period of 48 hours or less), water levels must remain in this range for most of the growing season for maximum plant growth and survival.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Cephalanthus occidentalis	Buttonbush	15’	White	Jun-Aug	F/P/S	N	51,55,56,57
Grasses/Sedges/Rushes:							
Acorus calamus	Sweet flag	1’-4’	Green	May-Jun	F/P	N	50,51,55,56,57
Carex comosa	Bristly sedge	2’-3’	Green	May-Jun	F	N	50,51,55,56,57
Carex lacustris	Lake sedge	2’-4’	Brown	May-Jun	F/P/S	N	50,51,55,56,57
Carex stricta	Tussock sedge	2’-3’	Brown	Apr-Jun	F/P	N	50,51,55,56,57
Eleocharis acicularis	Needle spike rush	6”	Green	May-Oct	F	N	50,51,55,56,57
Eleocharis obtusa	Blunt spike rush	1’-2’	Green	May-Sep	F/P	N	50,51,55,56,57
Glyceria striata	Fowl manna grass	1’-5’	Green	May-Jun	F/P/S	N	50,51,55,56,57
Juncus effusus	Soft rush	1’-4’	Brown	July	F/P	N	50,51,55,56,57
Scirpus acutus	Hard-stemmed bulrush	4’-6’	Brown	Apr-Aug	F	Y	50,51,55,56,57
Scirpus cyperinus	Wool grass	3’-5’	Tan	Jun-Sep	F	Y	50,51,55,56,57
Scirpus pendulus	Red bulrush	2’-4’	Brown	May-Jun	F	N	51,55,56,57
Scirpus validus	Great bulrush	4’-8’	Brown	May-Aug	F	Y	50,51,55,56,57
Sparganium americanum	American bur reed	2’-5’	Green	Jun-Aug	F/P	N	50,51,55,56,57
Sparganium eurycarpum	Common bur reed	2’-6’	Green	May-Aug	F	N	50,51,55,56,57
Forbs:							
Alisma plantago-aquatica	Water plantain	2’-4’	White	Jul-Sep	F	N	50,51,55,56,57
Asclepias incarnata	Swamp milkweed	3’-5’	Pink	Jun-Sep	F/P	N	50,51,55,56,57
Decodon verticillatus	Swamp loosestrife	2’-4’	Purple	Jul-Sep	F/P	N	51,55,56,57
Iris virginica	Blue flag iris	2’-3’	Purple	May-Jul	F/P/S	N	50,51,55,56,57
Peltandra virginica	Arrow arum	2’-5’	Green	Jun-Jul	F/P/S	N	55,56,57
Pontedaria cordata	Pickerelweed	1’-3’	Violet	Jun-Sep	F/P	N	50,51,55,56,57
Sagittaria latifolia	Arrowhead	1’-4’	White	Jun-Sep	F/P	N	50,51,55,56,57
Saururus cernuus	Lizard’s tail	2’-4’	White	Jun-Aug	P/S	N	55,56,57

Representative Zone B Species

Blue Flag Iris

Arrowhead

Bristly Sedge

Pickerel Weed

Swamp Milkweed

Source: JFNew

Zone C

Planting Zone = zero-to-two inches above water level

These plants are tolerant of fluctuating water levels within this range. They will also tolerate short periods of inundation, not to exceed 48 hours in most situations, making them appropriate for BMP settings.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Acer rubrum	Red maple	90’	Green/ red	Mar-May	F/P/S	N	50,51,55,56,57
Alnus rugosa	Speckled alder	25’	Brown	Mar-May	F/P	N	50,51,55,56,57
Amelanchier arborea	Downy serviceberry	40’	White	April	F/P/S	N	50,51,55,56,57
Aronia prunifolia	Purple chokeberry	10’	White	Apr-Jul	F/P	N	50,51,55,56,57
Betula alleghaniensis	Yellow birch	100’	Purple/ Yellow	Apr-May	P/S	N	50,51,55,56,57
Betula papyrifera	Paper birch	70’	Brown	Apr-May	F/P	N	50,51,55,56,57
Cephalanthus occidentalis	Buttonbush	15’	White	Jun/Aug	F/P/S	N	51,55,56,57
Cornus amomum	Silky dogwood	10’	White	May-Jul	F/P	N	51,55,56,57
Cornus sericea	Red-osier dogwood	10’	White	May-Sep	F/P	N	50,51,55,56,57
Ilex verticillata	Winterberry	10’	White	June	F/P/S	Y	50,51,55,56,57
Larix laricina	American larch	75’	Brown	May	F/P	N	50,51,55,56,57
Lindera benzoin	Spicebush	15’	Yellow	Apr-May	P/S	N	51,55,56,57
Morus rubra	Red mulberry	50’	Green	May-Jun	F/P/S	N	55,56,57
Nyssa sylvatica	Black gum	100’	Green	May-Jul	F/P/S	Y	51,55,56,57
Physocarpus opulifolius	Ninebark	10’	White	May-Jun	F/P	N	50,51,55,56,57
Picea mariana	Black spruce	60’	Brown	May-Jun	F/P/S	N	50,51,57
Quercus bicolor	Swamp white oak	70’	Green/ yellow	May	F/P/S	Y	55,56,57
Quercus palustris	Pin oak	90’	Green/ yellow	Apr-May	F/P/S	Y	55,56,57
Ribes americanum	Wild black currant	5’	Yellow	Apr-Jun	F/P/S	N	50,51,55,56,57
Rosa palustris	Swamp rose	2’-7’	Pink	Jun-Aug	F/P/S	N	50,51,55,56,57
Thuja occidentalis	White cedar	50’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Ulmus americana	American elm	100’	Brown	Mar-Apr	F/P/S	N	50,51,55,56,57
Ulmus rubra	Slippery elm	80’	Green	Mar-Apr	F/P/S	N	51,55,56,57
Viburnum lentago	Nannyberry	20’	White	Apr-Jun	P/S	Y	50,51,55,56,57
Grasses/Sedges/Rushes:							
Calamagrostis canadensis	Blue joint grass	2’-4’	Brown	June	F/P	N	50,51,55,56,57
Carex comosa	Bristly sedge	2’-3’	Green	May-June	F/P	N	50,51,55,56,57
Carex crinita	Fringed sedge	2’-5’	Green	May	F/P/S	N	50,51,55,56,57
Carex hystericina	Porcupine sedge	2’-3’	Green	May-June	F/P/S	N	50,51,55,56,57
Carex lupulina	Common hop sedge	2’-3’	Green/ Brown	May-June	F/P/S	N	50,51,55,56,57
Carex muskingumensis	Palm sedge	1’-2’	Brown	May-June	S	N	55,56,57
Carex stipata	Common fox sedge	1’-3’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Carex stricta	Tussock sedge	2’-3’	Brown	Apr-Jun	F/P	N	50,51,55,56,57
Carex vulpinoidea	Brown fox sedge	2’-3’	Brown	May-Jun	F/P	N	50,51,55,56,57
Cinna arundinacea	Common wood reed	3’-4’	Green	Aug-Sep	P/S	N	55,56,57
Eleocharis acicularis	Needle spike rush	6”	Green	May-Oct	F	N	50,51,55,56,57
Eleocharis obtusa	Blunt spike rush	1’-2’	Green	May-Sep	F/P	N	50,51,55,56,57
Glyceria striata	Fowl manna grass	1’-5’	Green	May-Jun	F/P/S	N	50,51,55,56,57
Juncus effusus	Soft rush	1’-4’	Brown	July	F/P	N	50,51,55,56,57
Juncus tenuis	Path rush	6”-2’	Brown	June	F/P/S	N	50,51,55,56,57
Juncus torreyi	Torrey’s rush	1’-2’	Brown	Jun-Sep	F	Y	51,55,56,57
Scirpus acutus	Hard-stemmed bulrush	4’-6’	Brown	Apr-Aug	F	Y	50,51,55,56,57
Scirpus atrovirens	Dark green rush	3’-5’	Brown	Jun-Aug	F	N	50,51,55,56,57
Scirpus cyperinus	Wool grass	3’-5’	Tan	Jun-Sep	F	Y	50,51,55,56,57
Scirpus pendulus	Red bulrush	2’-4’	Brown	May-Jun	F	N	51,55,56,57
Scirpus validus	Great bulrush	4’-8’	Brown	May-Aug	F	Y	50,51,55,56,57

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Forbs:							
Alisma plantago-aquatica	Water plantain	2’-4’	White	Jul-Sep	F	N	50,51,55,56,57
Anemone canadensis	Canada anemone	1’-2’	White	May-Sep	F/P	N	50,51,55,56,57
Angelica atropurpurea	Great angelica	6’-9’	White	May-Jun	F/P	N	55,56,57
Asclepias incarnata	Swamp milkweed	3’-5’	Pink	Jun-Sep	F/P	N	50,51,55,56,57
Aster novae-angliae	New England aster	3’-6’	Violet	Jul-Oct	F/P	N	50,51,55,56,57
Aster puniceus	Swamp aster	3’-6’	Lav/ White	Aug-Oct	F	Y	50,51,55,56,57
Aster umbellatus	Flat-topped aster	1’-4’	White	Jul-Oct	F/P	N	50,51,55,56,57
Cassia hebecarpa	Wild senna	3’-5’	Yellow	Jul-Aug	F/P	N	55,56
Chelone glabra	Turtlehead	2’-4’	Cream	Aug-Sep	F/P/S	N	50,51,55,56,57
Eupatorium maculatum	Spotted Joe-pye weed	4’-7’	Pink	Jun-Oct	F/P	N	50,51,55,56,57
Eupatorium perfoliatum	Boneset	3’-5’	White	Jul-Oct	F/P	Y	50,51,55,56,57
Euthamia graminifolia	Grass-leaved gold-enrod	1’-4’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
Gentiana andrewsii	Bottle gentian	1’-3’	Blue	Aug-Oct	F/P	N	50,51,55,56,57
Helenium autumnale	Sneezeweed	3’-5’	Yellow	Jul-Nov	F/P	Y	50,51,55,56,57
Helianthus giganteus	Tall sunflower	5’-12’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
Iris virginica	Blue flag iris	2’-3’	Purple	May-Jul	F/P/S	N	50,51,55,56,57
Liatris spicata	Marsh blazing star	3’-5’	Pink	Jul-Sep	F/P	N	55,56,57
Lilium michiganense	Michigan lily	3’-8’	Orange	Jul-Aug	P/S	N	55,56,57
Lobelia cardinalis	Cardinal flower	2’-5’	Red	Jul-Oct	F/P/S	N	50,51,55,56,57
Lobelia siphilitica	Great blue lobelia	1’-4’	Blue	Jul-Oct	F/P/S	N	50,51,55,56,57
Lobelia spicata	Pale spiked lobelia	1’-3’	Lavender	May-Aug	F/P	N	50,51,55,56,57
Mimulus ringens	Monkeyflower	2’-4’	Lavender	Jun-Sep	F/P	N	50,51,55,56,57
Physostegia virginiana	Obedient plant	2’-5’	Pink	Aug-Oct	F	Y	50,51,55,56,57
Pycnanthemum virginianum	Mountain mint	1’-3’	White	Jun-Oct	F/P	N	55,56,57
Rudbeckia laciniata	Cutleaf coneflower	3’-10’	Yellow	Jul-Nov	F/P/S	N	50,51,55,56,57
Sagittaria latifolila	Arrowhead	1’-4’	White	Jun-Sep	F/P	N	50,51,55,56,57
Saururus cernuus	Lizard’s tail	2’-4’	White	Jun-Aug	P/S	N	55,56,57
Sisyrinchium angustifolium	Stout blue-eyed grass	1’	Blue	May-Aug	F/P	N	55,56,57
Solidago ohiensis	Ohio goldenrod	2’-3’	Yellow	Jul-Oct	F/P	N	50,51,55,56,57
Solidago patula	Swamp goldenrod	3’-6’	Yellow	Aug-Oct	F/P/S	N	50,51,55,56,57
Solidago riddellii	Riddell’s goldenrod	2’-5’	Yellow	Sep-Nov	F	N	55,56,57
Spiraea alba	Meadowsweet	3’-6’	White	June-Sep	F/P	Y	50,51,55,56,57
Spiraea tomentosa	Steeplebush	2’-5’	Pink	Jul-Sep	F/P	Y	55,56,57
Thalictrum dasycarpum	Purple meadow-rue	3’-6’	Cream	May-Jul	F/P	N	50,51,55,56,57
Verbena hastata	Blue vervain	3’-6’	Violet	Jun-Sep	F	N	50,51,55,56,57
Vernonia missurica	Missouri ironweed	3’-5’	Purple	Jul-Sep	F	N	55,56,57
Zizia aurea	Golden Alexanders	1’-3’	Yellow	Apr-Jun	F/P/S	Y	55,56,57

Representative Zone C Species

Cardinal Flower

Swamp Milkweed

Blue-Eyed Grass

Path Rush

Joe-Pye Weed

Obedient Plant

Red-Osier Dogwood

Monkey Flower

Source: JFNew

Zone D

Planting Zone = two-to-four inches above water level

These plants tolerate fluctuating water levels within this range. They will also tolerate short periods of inundation, not to exceed 48 hours in most situations, making them appropriate for BMP settings.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Acer rubrum	Red maple	90’	Green/ red	Mar-May	F/P/S	N	50,51,55,56,57
Acer saccharinum	Silver Maple	100’	Yellow	Mar-Apr	F/P	N	50,51,55,56,57
Amelanchier arborea	Downy serviceberry	40’	White	April	F/P/S	N	50,51,55,56,57
Aronia prunifolia	Purple chokeberry	10’	White	Apr-Jul	F/P	N	50,51,55,56,57
Betula alleghaniensis	Yellow birch	100’	Purple/ Yellow	Apr-May	P/S	N	50,51,55,56,57
Betula papyrifera	Paper birch	70’	Brown	Apr-May	F/P	N	50,51,55,56,57
Celtis occidentalis	Hackberry	60’	Green	May	F/P/S	N	55,56,57
Cercis canadensis	Redbud	25’	Red	Apr-May	F/P/S	N	55,56,57
Cornus amomum	Silky dogwood	10’	White	May-Jul	F/P	N	51,55,56,57
Cornus sericea	Red-osier dogwood	10’	White	May-Sep	F/P	N	50,51,55,56,57
Corylus americana	American hazelnut	10’	Yellow	Apr-May	F/P	N	55,56,57
Ilex verticillata	Winterberry	10’	White	June	F/P/S	Y	50,51,55,56,57
Juglans nigra	Black walnut	90’	Green	May	F/P	N	51,55,56,57
Juniperus virginiana	Red-cedar	50’	Brown	Apr-May	F/P	N	55,56,57
Larix laricina	American larch	75’	Brown	May	F/P	N	50,51,55,56,57
Lindera benzoin	Spicebush	15’	Yellow	Apr-May	P/S	N	51,55,56,57
Liriodendron tulipifera	Tulip tree	110’	Green	May-Jun	F/P	N	55,56,57
Morus rubra	Red mulberry	50’	Green	May-Jun	F/P/S	N	55,56,57
Nyssa sylvatica	Black gum	100’	Green	May-Jul	F/P/S	Y	51,55,56,57
Physocarpus opulifolius	Ninebark	10’	White	May-Jun	F/P	N	50,51,55,56,57
Picea mariana	Black spruce	60’	Brown	May-Jun	F/P/S	N	50,51,57
Platanus occidentalis	Sycamore	100’	Green	May	F/P	N	55,56,57
Quercus bicolor	Swamp white oak	70’	Green/ yellow	May	F/P/S	N	55,56,57
Quercus macrocarpa	Bur oak	85’	Yellow	May-Jun	F/P/S	N	50,51,55,56,57
Quercus palustris	Pin oak	90’	Green/ yellow	Apr-May	F/P/S	Y	55,56,57
Ribes americanum	Wild black currant	5’	Yellow	Apr-Jun	F/P/S	N	50,51,55,56,57
Rosa carolina	Pasture rose	3’	Pink	Jun-Sep	F/P	N	55,56,57
Rosa palustris	Swamp rose	2’-7’	Pink	Jun-Aug	F/P/S	N	50,51,55,56,57
Thuja occidentalis	White cedar	50’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Tilia americana	Basswood	100’	White	Jun-Jul	F/P/S	N	50,51,55,56,57
Tsuga canadensis	Hemlock	100’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Ulmus americana	American elm	100’	Brown	Mar-Apr	F/P/S	N	50,51,55,56,57
Ulmus rubra	Slippery elm	80’	Green	Mar-Apr	F/P/S	N	51,55,56,57
Viburnum dentatum	Arrowwood	10’	White	May-Jun	F/P/S	N	51,55,56,57
Viburnum lentago	Nannyberry	20’	White	Apr-Jun	P/S	Y	50,51,55,56,57
Viburnum prunifolium	Black haw	10’	White	Apr-May	F/P	N	55
Viburnum trilobum	Cranberry Viburnum	10’	White	Apr-May	F/P/S	N	50,51,55,56,57
Grasses/Sedges/Rushes:							
Andropogon gerardii	Big bluestem	4’-8’	Purple	Jul-Sep	F	N	50,51,55,56,57
Calamagrostis canadensis	Blue joint grass	2’-4’	Brown	June	F/P	N	50,51,55,56,57
Carex comosa	Bristly sedge	2’-3’	Green	May-June	F/P	N	50,51,55,56,57
Carex crinita	Fringed sedge	2’-5’	Green	May	F/P/S	N	50,51,55,56,57
Carex hystericina	Porcupine sedge	2’-3’	Green	May-June	F/P/S	N	50,51,55,56,57
Carex lupulina	Common hop sedge	2’-3’	Green/ Brown	May-June	F/P/S	N	50,51,55,56,57
Carex muskingumensis	Palm sedge	1’-2’	Brown	May-June	S	N	55,56,57
Carex stipata	Common fox sedge	1’-3’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Carex stricta	Tussock sedge	2’-3’	Brown	Apr-Jun	F/P	N	50,51,55,56,57
Carex vulpinoidea	Brown fox sedge	2’-3’	Brown	May-Jun	F/P	N	50,51,55,56,57
Cinna arundinacea	Common wood reed	3’-4’	Green	Aug-Sep	P/S	N	55,56,57
Elymus canadensis	Canada wild rye	3’-6’	Green	Jun-Sep	F/P	N	50,51,55,56,57
Elymus hystrix	Bottlebrush Grass	3’-5’	Green	Jun-Jul	P/S	N	
Elymus virginicus	Virginia wild rye	2’-4’	Green	Jun	F/P/S	N	50,51,55,56,57

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Glyceria striata	Fowl manna grass	1’-5’	Green	May-Jun	F/P/S	N	50,51,55,56,57
Juncus tenuis	Path rush	6”-2’	Brown	June	F/P/S	N	50,51,55,56,57
Juncus torreyi	Torrey’s rush	1’-2’	Brown	Jun-Sep	F	Y	51,55,56,57
Panicum virgatum	Switch grass	3‘-5’	Green/ Purple	Jun-Oct	F/P	Y	51,55,56,57
Scirpus atrovirens	Dark green rush	3’-5’	Brown	Jun-Aug	F	N	50,51,55,56,57
Scirpus cyperinus	Wool grass	3’-5’	Tan	Jun-Sep	F	Y	50,51,55,56,57
Scirpus pendulus	Red bulrush	2’-4’	Brown	May-Jun	F	N	51,55,56,57
Spartina pectinata	Prairie cordgrass	6’-7’	Green	Jul-Aug	F	Y	50,51,55,56,57
Forbs:							
Anemone canadensis	Canada anemone	1’-2’	White	May-Sep	F/P	N	50,51,55,56,57
Angelica atropurpurea	Great angelica	6’-9’	White	May-Jun	F/P	N	55,56,57
Asclepias incarnata	Swamp milkweed	3’-5’	Pink	Jun-Sep	F/P	N	50,51,55,56,57
Aster novae-angliae	New England aster	3’-6’	Violet	Jul-Oct	F/P	N	50,51,55,56,57
Aster puniceus	Swamp aster	3’-6’	Lav/ White	Aug-Oct	F	Y	50,51,55,56,57
Aster umbellatus	Flat-topped aster	1’-4’	White	Jul-Oct	F/P	N	50,51,55,56,57
Cacalia atriplicifolia	Pale Indian plantain	3’-8’	White	Jun-Oct	F/P/S	N	55,56
Cassia hebecarpa	Wild senna	3’-5’	Yellow	Jul-Aug	F/P	N	55,56
Chelone glabra	Turtlehead	2’-4’	Cream	Aug-Sep	F/P/S	N	50,51,55,56,57
Coreopsis tripteris	Tall coreopsis	4’-8’	Yellow	Aug-Sep	F/P	N	55,56,57
Desmodium canadense	Showy tick-trefoil	2’-5’	Purple	Jun-Sep	F/P	N	51,55,56,57
Eryngium yuccifolium	Rattlesnake master	3’-5’	White	Jul-Sep	F	N	55
Eupatorium maculatum	Spotted Joe-pye weed	4’-7’	Pink	Jun-Oct	F/P	N	50,51,55,56,57
Eupatorium perfoliatum	Boneset	3’-5’	White	Jul-Oct	F/P	Y	50,51,55,56,57
Euthamia graminifolia	Grass-leaved gold-enrod	1’-4’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
Gentiana andrewsii	Bottle gentian	1’-3’	Blue	Aug-Oct	F/P	N	50,51,55,56,57
Helenium autumnale	Sneezeweed	3’-5’	Yellow	Jul-Nov	F/P	Y	50,51,55,56,57
Helianthus giganteus	Tall sunflower	5’-12’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
Heliopsis helianthoides	False sunflower	4’-6’	Yellow	Jun-Oct	F/P	N	50,51,55,56,57
Iris virginica	Blue flag iris	2’-3’	Purple	May-Jul	F/P/S	N	50,51,55,56,57
Liatris spicata	Marsh blazing star	3’-5’	Pink	Jul-Sep	F/P	N	55,56,57
Lilium michiganense	Michigan lily	3’-8’	Orange	Jul-Aug	P/S	N	55,56,57
Lobelia cardinalis	Cardinal flower	2’-5’	Red	Jul-Oct	F/P/S	N	50,51,55,56,57
Lobelia siphilitica	Great blue lobelia	1’-4’	Blue	Jul-Oct	F/P/S	N	50,51,55,56,57
Lobelia spicata	Pale spiked lobelia	1’-3’	Lavender	May-Aug	F/P	N	50,51,55,56,57
Mimulus ringens	Monkeyflower	2’-4’	Lavender	Jun-Sep	F/P	N	50,51,55,56,57
Monarda fistulosa	Wild bergamot	2’-5’	Lavender	Jul-Sep	F/P	N	50,51,55,56,57
Physostegia virginiana	Obedient plant	2’-5’	Pink	Aug-Oct	F	Y	50,51,55,56,57
Polygonatum biflorum	Solomon seal	1’-4’	Green/ White	May/Jul	P/S	N	55,56,57
Pycnanthemum virginianum	Mountain mint	1’-3’	White	Jun-Oct	F/P	N	55,56,57
Rudbeckia laciniata	Cutleaf coneflower	3’-10’	Yellow	Jul-Nov	F/P/S	N	50,51,55,56,57
Rudbeckia triloba	Three-lobed cone-flower	2‘-5’	Yellow	Aug-Oct	F/P	N	55,56,57
Solidago caesia	Bluestem goldenrod	1’-2’	Yellow	Sep-Oct	P/S	N	51,55,56,57
Solidago flexicaulis	Zigzag goldenrod	1’-3’	Yellow	Aug/Oct	P/S	N	50,51,55,56,57
Solidago ohiensis	Ohio goldenrod	2’-3’	Yellow	Jul-Oct	F/P	N	50,51,55,56,57
Solidago patula	Swamp goldenrod	3’-6’	Yellow	Aug-Oct	F/P/S	N	50,51,55,56,57
Solidago riddellii	Riddell’s goldenrod	2’-5’	Yellow	Sep-Nov	F	N	55,56,57
Spiraea alba	Meadowsweet	3’-6’	White	June-Sep	F/P	Y	50,51,55,56,57
Spiraea tomentosa	Steeplebush	2’-5’	Pink	Jul-Sep	F/P	Y	55,56,57
Thalictrum dasycarpum	Purple meadow-rue	3’-6’	Cream	May-Jul	F/P	N	50,51,55,56,57
Verbena hastata	Blue vervain	3’-6’	Violet	Jun-Sep	F	N	50,51,55,56,57
Vernonia missurica	Missouri ironweed	3’-5’	Purple	Jul-Sep	F	N	55,56,57
Veronicastrum virginicum	Culver’s root	3’-6’	White	Jun-Aug	F/P	N	55,56,57
Zizia aurea	Golden Alexanders	1’-3’	Yellow	Apr-Jun	F/P/S	Y	55,56,57

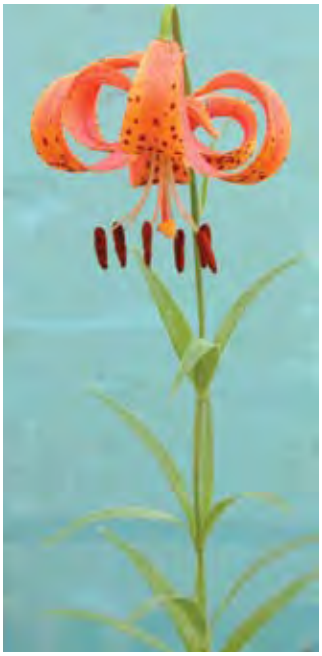
Representative Zone D Species

Big Bluestem

Marsh Blazing Star

Wild Columbine

Great Blue Lobelia



Michigan Lily

Virginia Mountain Mint

Meadowsweet

Blue Vervain

Source: JFNew

Zone E

Planting Zone = four-to-18 inches above water level

These plants tolerate fluctuating water levels within this range. They will also tolerate short periods of inundation, not to exceed 48 hours in most situations, making them appropriate for BMP settings.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Acer rubrum	Red maple	90’	Green/ red	Mar-May	F/P/S	N	50,51,55,56,57
Acer saccharum	Sugar maple	100’	Green	Apr-May	F/P/S	N	50,51,55,56,57
Acer saccharinum	Silver Maple	100’	Yellow	Mar-Apr	F/P	N	50,51,55,56,57
Amelanchier arborea	Downy serviceberry	40’	White	April	F/P/S	N	N
Aronia prunifolia	Purple chokeberry	10’	White	Apr-Jul	F/P	N	50,51,55,56,57
Betula papyrifera	Paper birch	70’	Brown	Apr-May	F/P	N	50,51,55,56,57
Carya ovata	Shagbark hickory	80’	Green	May-Jun	F/P/S	N	55,56,57
Ceanothus americanus	New Jersey tea	1’-3’	White	Jun-Oct	F/P	N	50,51,55,56,57
Celtis occidentalis	Hackberry	60’	Green	May	F/P/S	N	55,56,57
Cercis canadensis	Redbud	25’	Red	Apr-May	F/P/S	N	55,56,57
Cornus amomum	Silky dogwood	10’	White	May-Jul	F/P	N	51,55,56,57
Cornus florida	Flowering dogwood	30’	White	May-Jun	F/P/S	N	55,56,57
Cornus sericea	Red-osier dogwood	10’	White	May-Sep	F/P	N	50,51,55,56,57
Corylus americana	American hazelnut	10’	Yellow	Apr-May	F/P	N	55,56,57
Gymnocladus dioicus	Kentucky coffee tree	85’	White	Jun	F/P	N	55,56,57
Juglans nigra	Black walnut	90’	Green	May	F/P	N	51,55,56,57
Juniperus virginiana	Red-cedar	50’	Brown	Apr-May	F/P	N	55,56,57
Larix laricina	American larch	75’	Brown	May	F/P	N	50,51,55,56,57
Lindera benzoin	Spicebush	15’	Yellow	Apr-May	P/S	N	51,55,56,57
Liriodendron tulipifera	Tulip tree	110’	Green	May-Jun	F/P	N	55,56,57
Morus rubra	Red mulberry	50’	Green	May-Jun	F/P/S	N	55,56,57
Nyssa sylvatica	Black gum	100’	Green	May-Jul	F/P/S	Y	51,55,56,57
Physocarpus opulifolius	Ninebark	10’	White	May-Jun	F/P	N	50,51,55,56,57
Picea mariana	Black spruce	60’	Brown	May-Jun	F/P/S	N	50,51,57
Pinus banksiana	Jack pine	60’	Brown	May-Jun	F/P	N	50,51,55,57
Pinus resinosa	Red pine	100’	Brown	Apr-May	F/P	N	50,51,55,57
Pinus strobus	White pine	100’	Brown	Jun	F/P/S	N	50,51,55,56,57
Platanus occidentalis	Sycamore	100’	Green	May	F/P	N	55,56,57
Prunus americana	American plum	30’	Red	Apr-May	F/P	N	55,56,57
Prunus virginiana	Choke cherry	30’	White	May-Jun	F/P/S	N	50,51,55,56,57
Quercus bicolor	Swamp white oak	70’	Green/ yellow	May	F/P/S	N	55,56,57
Quercus macrocarpa	Bur oak	85’	Yellow	May-Jun	F/P/S	N	50,51,55,56,57
Quercus palustris	Pin oak	90’	Green/ yellow	Apr-May	F/P/S	Y	55,56,57
Quercus rubra	Red Oak	90’	Green	May-Jun	F/P/S	N	50,51,55,56,57
Ribes americanum	Wild black currant	5’	Yellow	Apr-Jun	F/P/S	N	50,51,55,56,57
Rosa carolina	Pasture rose	3’	Pink	Jun-Sep	F/P	N	55,56,57
Tilia americana	Basswood	100’	White	Jun-Jul	F/P/S	N	50,51,55,56,57
Thuja occidentalis	White cedar	50’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Tsuga canadensis	Hemlock	100’	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Ulmus americana	American elm	100’	Brown	Mar-Apr	F/P/S	N	50,51,55,56,57
Ulmus rubra	Slippery elm	80’	Green	Mar-Apr	F/P/S	N	51,55,56,57
Viburnum acerifolium	Maple-leaved Viburnum	7’	White	May-Aug	F/P	N	50,51,55,56,57
Viburnum dentatum	Arrowwood	10’	White	May-Jun	F/P/S	N	51,55,56,57
Viburnum prunifolium	Black haw	10’	White	Apr-May	F/P	N	55
Grasses/Sedges/Rushes:							
Andropogon gerardii	Big bluestem	4’-8’	Purple	Jul-Sep	F	N	50,51,55,56,57
Carex bicknellii	Copper-shouldered oval sedge	1’-2’	Brown	May-Jun	F	N	55,56
Carex muhlenbergii	Sand bracted sedge	1’-3’	Brown	May-Jun	F/P/S	N	51,55,56,57
Elymus canadensis	Canada wild rye	3’-6’	Green	Jun-Sep	F/P	N	50,51,55,56,57

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Elymus hystrix	Bottlebrush Grass	3’-5’	Green	Jun-Jul	P/S	N	
Elymus virginicus	Virginia wild rye	2’-4’	Green	Jun	F/P/S	N	50,51,55,56,57
Eragrostis spectabilis	Purple love grass	1’-2’	Purple	Aug-Oct	F	N	51,55,56,57
Juncus tenuis	Path rush	6”-2’	Brown	June	F/P/S	N	50,51,55,56,57
Panicum virgatum	Switch grass	3’-6’	Green/ Purple	Jun-Oct	F/P	Y	51,55,56,57
Schizachyrium scoparium	Little bluestem	2’-4’	Brown	Aug-Sep	F/P	Y	50,51,55,56,57
Sorghastrum nutans	Indian grass	4’-9’	Green	Aug-Sep	F	N	51,55,56,57
Spartina pectinata	Prairie cordgrass	6’-7’	Green	Jul-Aug	F	Y	50,51,55,56,57
Stipa spartea	Porcupine grass	2’-4’	Green	Aug-Sep	F	Y	55,56,57
Forbs:							
Allium cernuum	Nodding wild onion	1’-2’	Lavender	Jun-Oct	F/P	N	55,56
Aquilegia canadensis	Wild columbine	1’-3’	Red/ Yellow	Apr-Jun	F/P/S	Y	50,51,55,56,57
Asclepias syriaca	Common milkweed	2’-4’	Pink	Jun-Aug	F/P	N	50,51,55,56,57
Asclepias tuberosa	Butterflyweed	1’-3’	Orange	Jun-Sep	F/P	Y	51,55,56,57
Asclepias verticillata	Whorled milkweed	1’-2’	White	Jun-Sep	F/P	N	51,55,56,57
Aster cordifolius	Heart-leaved aster	2’-4’	Blue/ White	Sep-Oct	P/S	N	55,56,57
Aster laevis	Smooth aster	3’-5’	Blue	Aug-Oct	F	Y	50,51,55,56,57
Aster lateriflorus	Calico aster	1’-3’	White	Jul-Oct	F/P/S	N	50,51,55,56,57
Aster macrophyllus	Big-leaved aster	6”-2’	Lav/ White	Jul-Oct	P/S	N	50,51,55,56,57
Aster novae-angliae	New England aster	3’-6’	Violet	Jul-Oct	F/P	N	50,51,55,56,57
Aster oolentangiensis	Sky-blue aster	1’-4’	Blue	Jul-Nov	F/P	Y	55,56,57
Aster shortii	Short’s aster	1’-4’	Blue	Aug-Oct	P/S	N	55,56
Cacalia atriplicifolia	Pale Indian plantain	3’-8’	White	Jun-Oct	F/P/S	N	55,56
Campanula americana	Tall bellflower	2’-6’	Blue	Jul-Nov	P/S	N	55,56,57
Cassia hebecarpa	Wild senna	3’-5’	Yellow	Jul-Aug	F/P	N	55,56
Clematis virginiana	Virgin’s bower	9’ long	White	Jul-Aug	F/P	N	50,51,55,56,57
Coreopsis tripteris	Tall coreopsis	4’-8’	Yellow	Aug-Sep	F/P	N	55,56,57
Desmodium canadense	Showy tick-trefoil	2’-5’	Purple	Jun-Sep	F/P	N	55,56,57
Echinacea pallida	Purple coneflower	2’-5’	Lavender	May-Aug	F	N	55,56,57
Eryngium yuccifolium	Rattlesnake master	3’-5’	White	Jul-Sep	F	N	55
Eupatorium purpureum	Purple Joe-pye weed	3’-6’	Pink	Jul-Sep	P	N	55,56,57
Euphorbia corollata	Flowering spurge	2’-4’	White	May-Oct	F/P	N	51,55,56,57
Geranium maculatum	Wild geranium	1’-2’	Pink	Apr-Jul	F/P/S	N	55,56,57
Helianthus divaricatus	Woodland sunflower	2’-6’	Yellow	Jun-Sep	P/S	N	50,51,55,56,57
Helianthus giganteus	Tall sunflower	5’-12’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
elianthus pauciflorus	Prairie sunflower	3’-5’	Yellow	Jul-Oct	F	N	50,55,56,57
Heliopsis helianthoides	False sunflower	4’-6’	Yellow	Jun-Oct	F/P	N	50,51,55,56,57
Lespedeza capitata	Round-headed bush clover	2’-4’	Green	Jul-Sep	F/P	N	55,56,57
Liatris aspera	Rough blazing star	2’-3’	Violet	Jul-Nov	F/P	Y	50,55,56,57
Liatris spicata	Marsh blazing star	3’-5’	Pink	Jul-Sep	F/P/S	N	55,56,57
Liatris scariosa	Savanna blazing star	3’-5’	Violet	Aug-Oct	F/P	N	50,51,55,56,57
Monarda fistulosa	Wild bergamot	2’-5’	Lavender	Jul-Sep	F/P	N	50,51,55,56,57
Penstemon digitalis	Foxglove beardtongue	2’-4’	White	May-Jul	F/P	N	50,51,55,56,57
Penstemon hirsutus	Hairy beardtongue	1’-2’	Purple	May-Jul	F/P	N	55,56,57
Phlox divaricata	Wild blue phlox	1’-2’	Blue	Apr-Jun	P/S	N	51,55,56,57
Phlox pilosa	Sand prairie phlox	1’-2’	Pink	May-Aug	F/P	N	56
Physostegia virginiana	Obedient plant	2’-5’	Pink	Aug-Oct	F	Y	50,51,55,56,57
Polygonatum biflorum	Solomon seal	1’-4’	Green/ White	May/Jul	P/S	N	55,56,57
Polygonatum pubescens	Downy Solomon seal	1’-3’	White	May-Jul	P/S	N	50,51,55,56,57
Pycnanthemum virginianum	Mountain mint	1’-3’	White	Jun-Oct	F/P	N	55,56,57
Ratibida pinnata	Yellow coneflower	3’-6’	Yellow	Jul-Oct	F	N	55,56
Rudbeckia hirta	Black-eyed Susan	1’-3’	Yellow	May-Oct	F/P	Y	50,51,55,56,57
Rudbeckia triloba	Three-lobed cone-flower	2’-5’	Yellow	Aug-Oct	F/P	N	55,56,57
Silphium terebinthinaceum	Prairie-dock	3’-8’	Yellow	Jun-Sep	F	N	55,56,57
Smilacina racemosa	Feathery false Solo-mon’s seal	1’-3’	White	Apr-Jun	P/S	N	50,51,55,56,57
Smilacina stellata	Starry false Solomon’s seal	1’-2’	White	Apr-Jun	F/P	N	50,51,55,56,57
Solidago caesia	Bluestem goldenrod	1’-2’	Yellow	Sep-Oct	P/S	N	51,55,56,57
Solidago flexicaulis	Zigzag goldenrod	1’-3’	Yellow	Aug/Oct	P/S	N	50,51,55,56,57
Solidago juncea	Early goldenrod	2’-4’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
Solidago speciosa	Showy goldenrod	1’-3’	Yellow	Jul-Oct	F/P	Y	50,51,55,56,57
Thalictrum dioicum	Early meadow-rue	1’-3’	Green	Apr-May	P/S	N	50,51,55,56,57
Tradescantia ohiensis	Spiderwort	2’-4’	Blue	May-Oct	F/P	N	55,56,57
Vernonia missurica	Missouri ironweed	3’-5’	Purple	Jul-Sep	F	N	55,56,57

Representative Zone E Species

New England Aster

Wild Bergamot

Showy Goldenrod

Tall Bellflower

Wild Geranium

Tall Coreopsis

Redbud

Indian Grass

Source: JFNew

Zone F

Planting Zone = 18+inches above water level

These plants tolerate fluctuating water levels within this range, although they are generally less tolerant than most wetter species. They may tolerate short periods of inundation, not to exceed 48 hours in most situations, making them appropriate for upland BMP settings.

Veronicastrum virginicum	Culver's root	3'-6'	White	Jun-Aug	F/P	N	55,56,57

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Acer rubrum	Red maple	90'	Green/ red	Mar-May	F/P/S	N	50,51,55,56,57
Acer saccharum	Sugar maple	100'	Green	Apr-May	F/P/S	N	50,51,55,56,57
Acer saccharinum	Silver Maple	100'	Yellow	Mar-Apr	F/P	N	50,51,55,56,57
Betula papyrifera	Paper birch	70'	Brown	Apr-May	F/P	N	50,51,55,56,57
Carya ovata	Shagbark hickory	80'	Green	May-Jun	F/P/S	N	55,56,57
Ceanothus americanus	New Jersey tea	1'-3'	White	Jun-Oct	F/P	N	50,51,55,56,57
Celtis occidentalis	Hackberry	60'	Green	May	F/P/S	N	55,56,57
Cercis canadensis	Redbud	25'	Red	Apr-May	F/P/S	N	55,56,57
Cornus florida	Flowering dogwood	30'	White	May-Jun	F/P/S	N	55,56,57
Corylus americana	American hazelnut	10'	Yellow	Apr-May	F/P	N	55,56,57
Gymnocladus dioicus	Kentucky coffee tree	85'	White	Jun	F/P	N	55,56,57
Hamamelis virginiana	Witch hazel	30'	Yellow	Oct-Nov	F/P/S	N	50,51,55,56,57
Juglans nigra	Black walnut	90'	Green	May	F/P	N	51,55,56,57
Juniperus virginiana	Red-cedar	50'	Brown	Apr-May	F/P	N	55,56,57
Liriodendron tulipifera	Tulip tree	110'	Green	May-Jun	F/P	N	55,56,57
Morus rubra	Red mulberry	50'	Green	May-Jun	F/P/S	N	55,56,57
Nyssa sylvatica	Black gum	100'	Green	May-Jul	F/P/S	Y	51,55,56,57
Pinus banksiana	Jack pine	60'	Brown	May-Jun	F/P	N	50,51,55,57
Pinus resinosa	Red pine	100'	Brown	Apr-May	F/P	N	50,51,55,57
Pinus strobus	White pine	100'	Brown	Jun	F/P/S	N	50,51,55,56,57
Prunus americana	American plum	30'	Red	Apr-May	F/P	N	55,56,57
Prunus virginiana	Choke cherry	30'	White	May-Jun	F/P/S	N	50,51,55,56,57
Quercus macrocarpa	Bur oak	85'	Yellow	May-Jun	F/P/S	N	50,51,55,56,57
Quercus palustris	Pin oak	90'	Green/ yellow	Apr-May	F/P/S	Y	55,56,57
Quercus rubra	Red Oak	90'	Green	May-Jun	F/P/S	N	50,51,55,56,57
Rosa carolina	Pasture rose	3'	Pink	Jun-Sep	F/P	N	55,56,57
Tilia americana	Basswood	100'	Yellow	Jun-Jul	F/P/S	N	50,51,55,56,57
Tsuga canadensis	Hemlock	100'	Brown	Apr-May	F/P/S	N	50,51,55,56,57
Viburnum acerifolium	Maple-leaved Viburnum	7'	White	May-Aug	F/P	N	50,51,55,56,57
Viburnum dentatum	Arrowwood	10'	White	May-Jun	F/P/S	N	51,55,56,57
Grasses/Sedges/Rushes:							
Andropogon gerardii	Big bluestem	4'-8'	Purple	Jul-Sep	F	N	50,51,55,56,57
Carex bicknellii	Copper-shouldered oval sedge	1'-2'	Brown	May-Jun	F	N	55,56
Carex muhlenbergii	Sand bracted sedge	1'-3'	Brown	May-Jun	F/P/S	N	51,55,56,57
Elymus canadensis	Canada wild rye	3'-6'	Green	Jun-Sep	F/P	N	50,51,55,56,57
Elymus hystrix	Bottlebrush Grass	3'-5'	Green	Jun-Jul	P/S	N	50,51,55,56,57
Eragrostis spectabilis	Purple love grass	1'-2'	Purple	Aug-Oct	F	N	51,55,56,57
Koeleria macrantha	June grass	1'-2'	White	May-Jul	F/P	N	50,51,55,56,57
Panicum virgatum	Switch grass	3'-6'	Green/ Purple	Jun-Oct	F/P	Y	51,55,56,57
Schizachyrium scoparium	Little bluestem	2'-4'	Brown	Aug-Sep	F/P	Y	50,51,55,56,57
Sorghastrum nutans	Indian grass	4'-9'	Green	Aug-Sep	F	N	51,55,56,57
Spartina pectinata	Prairie cordgrass	6'-7'	Green	Jul-Aug	F	Y	50,51,55,56,57

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Stipa spartea	Porcupine grass	2’-4’	Green	Aug-Sep	F	Y	55,56,57
Forbs:							
Allium cernuum	Nodding wild onion	1’-2’	Lavender	Jun-Oct	F/P	N	55,56
Asclepias syriaca	Common milkweed	2’-4’	Pink	Jun-Aug	F/P	N	50,51,55,56,57
Asclepias tuberosa	Butterflyweed	1’-3’	Orange	Jun-Sep	F/P	Y	51,55,56,57
Asclepias verticillata	Whorled milkweed	1’-2’	White	Jun-Sep	F/P	N	51,55,56,57
Aster cordifolius	Heart-leaved aster	2’-4’	Blue/ White	Sep-Oct	P/S	N	55,56,57
Aster laevis	Smooth aster	3’-5’	Blue	Aug-Oct	F	Y	50,51,55,56,57
Aster oolentangiensis	Sky-blue aster	1’-4’	Blue	Jul-Nov	F/P	Y	55,56,57
Aster shortii	Short’s aster	1’-4’	Blue	Aug-Oct	P/S	N	55,56
Cacalia atriplicifolia	Pale Indian plantain	3’-8’	White	Jun-Oct	F/P/S	N	55,56
Campanulaa americana	Tall bellflower	2’-6’	Blue	Jul-Nov	P/S	N	55,56,57
Clematis virginiana	Virgin’s bower	9’ long	White	Jul-Aug	F/P	N	50,51,55,56,57
Coreopsis lanceolata	Sand coreopsis	1’-2’	Yellow	May-Aug	F/P	N	50,51,55
Coreopsis palmata	Prairie coreopsis	1’-2’	Yellow	Jun-Aug	F/P	N	55
Coreopsis tripteris	Tall coreopsis	4’-8’	Yellow	Aug-Sep	F/P	N	55,56,57
Echinacea pallida	Purple coneflower	2’-5’	Lavender	May-Aug	F	N	55,56,57
Eryngium yuccifolium	Rattlesnake master	3’-5’	White	Jul-Sep	F	N	55
Eupatorium purpureum	Purple Joe-pye weed	3’-6’	Pink	Jul-Sep	P	N	55,56,57
Euphorbia corollata	Flowering spurge	2’-4’	White	May-Oct	F/P	N	51,55,56,57
Geranium maculatum	Wild geranium	1’-2’	Pink	Apr-Jul	F/P/S	N	55,56,57
Helianthus divaricatus	Woodland sunflower	2’-6’	Yellow	Jun-Sep	P/S	N	50,51,55,56,57
Helianthus occidentalis	Western sunflower	2’-4’	Yellow	Aug-Sep	F/P	N	50,51,55,56,57
Helianthus pauciflorus	Prairie sunflower	3’-5’	Yellow	Jul-Oct	F	N	50,55,56,57
Heliopsis helianthoides	False sunflower	4’-6’	Yellow	Jun-Oct	F/P	N	50,51,55,56,57
Lespedeza capitata	Round-headed bush clover	2’-4’	Green	Jul-Sep	F/P	N	55,56,57
Liatris aspera	Rough blazing star	2’-3’	Violet	Jul-Nov	F/P	Y	50,55,56,57
Liatris cylindracea	Cylindrical blazing star	1’-2’	Violet	Jul-Oct	F/P	N	51,55,56,57
Liatris scariosa	Savanna blazing star	3’-5’	Violet	Aug-Oct	F/P	N	50,51,55,56,57
Lupinus perennis	Wild lupine	1’-2’	Purple	Apr-Jun	F/P	N	55,56,57
Monarda fistulosa	Wild bergamot	2’-5’	Lavender	Jul-Sep	F/P	N	50,51,55,56,57
Penstemon digitalis	Foxglove beardtongue	2’-4’	White	May-Jul	F/P	N	50,51,55,56,57
Penstemon hirsutus	Hairy beardtongue	1’-2’	Purple	May-Jul	F/P	N	55,56,57
Phlox pilosa	Sand prairie phlox	1’-2’	Pink	May-Aug	F/P	N	56
Polygonatum biflorum	Solomon seal	1’-4’	Green/ White	May/Jul	P/S	N	55,56,57
Polygonatum pubescens	Downy Solomon seal	1’-3’	White	May-Jul	P/S	N	50,51,55,56,57
Ratibida pinnata	Yellow coneflower	3’-6’	Yellow	Jul-Oct	F	N	55,56
Rudbeckia hirta	Black-eyed Susan	1’-3’	Yellow	May-Oct	F/P	Y	50,51,55,56,57
Silphium terebinthinaceum	Prairie-dock	3’-8’	Yellow	Jun-Sep	F	N	55,56,57
Smilacina racemosa	Feathery false Solomon’s seal	1’-3’	White	Apr-Jun	P/S	N	50,51,55,56,57
Smilacina stellata	Starry false Solomon’s seal	1’-2’	White	Apr-Jun	F/P	N	50,51,55,56,57
Solidago caesia	Bluestem goldenrod	1’-2’	Yellow	Sep-Oct	P/S	N	51,55,56,57
Solidago juncea	Early goldenrod	2’-4’	Yellow	Jul-Sep	F/P	N	50,51,55,56,57
Solidago speciosa	Showy goldenrod	1’-3’	Yellow	Jul-Oct	F/P	Y	50,51,55,56,57
Tradescantia ohiensis	Spiderwort	2’-4’	Blue	May-Oct	F/P	N	55,56,57
Veronicastrum virginicum	Culver’s root	3’-6’	White	Jun-Aug	F/P	N	55,56,57

Representative Zone F Species

Spiderwort

Butterfly Weed

Yellow Coneflower

Little Bluestem

Foxglove Beardtongue

Wild Lupine

Pale Purple Coneflower

Rattlesnake Master

Sand Coreopsis

Source: JFNew

Zone G

Planter Box Plantings

Although this manual typically recommends using native plants wherever possible, certain situations call for non-native plants due to particular site conditions. Because planter boxes traditionally have a short soil column and are exposed to drier conditions, non-native plants should be considered as long as they are considered non-invasive. Therefore, the list below contains both native and non-native species. Many planter boxes have traditionally used annual flowers. However, we recommend using perennial plants for establishing root systems and lowering maintenance in the long term. Many more species are available for planter boxes than are listed.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun
Ajuga reptans 'Bronze Beauty'	Bronze Beauty Ajuga	6"	Blue	May-Jun	F
Allium maximowiczii 'Alba'	White Flowered Ornamental Chive	6"-1'	White	May-Jun	F
Allium schoenoprasum 'Glaucum'	Blue Flowered Ornamental Chive	6"-1'	Blue	Jun-Jul	F
Allium senescens montanum	Mountain Garlic	6"-1'	Pink/Purple	Jun-Aug	F
Allium senescens glaucum	Curly Onion	6"-1'	Pink	Jul-Sep	F
Allium tanguticum 'Summer Beauty'	Summer Beauty Ornamental Chive	6"-1'	Pink	Jul-Aug	F
Aster 'Wood's Light Blue'	Wood's Light Blue Aster	1'-3'	Blue	Aug-Sep	F
Athryium filix-femina	Lady Fern	1'-3'	Green	NA	F/P/S
Blechnum spicant	Deer Fern	1'-2'	Green	NA	F/P/S
Dryopteris erythrosora	Autumn Fern	1'-2'	Green	NA	F/P/S
Euphorbia myrsinites	Mytle Spurge	6"-1'	Yellow	May-Jun	F
Dryopteris intermedia	Fancy Fern	1'-3'	Green	NA	F/P/S
Dyropteris marginalis	Leatherleaf Fern	1'-2'	Green	NA	F/P/S
Geranium x 'Rozanne'	Rozanne Gernaium	1'-2'	Violet	Jun-Sep	F/P
Hemerocallis 'Barbara Mitchell'	Barbara Mitchell Daylily	2'-3'	Pink	Jun-Aug	F/P
Hemerocallis 'Bill Norris'	Bill Norris Daylily	2'-3'	Yellow	Jun-Aug	F/P
Hemerocallis 'Chicago Apache'	Chicago Apache Daylily	2'-3'	Red	Jul-Sep	F/P
Hosta 'Francee'	Francee Hosta	1'-2'	Lavender	Jul-Aug	F/P/S
Hosta 'Guacamole'	Guacamole Hosta	1'-2'	Pink	Aug-Sep	F/P/S
Hosta 'Summer Fragrance'	Summer Fragrance Hosta	1'-2'	Lavender	Aug-Sep	F/P/S
Hosta sieboldiana 'Elegans'	Elegans Hosta	1'-2'	White	Jul-Aug	F/P/S
Sedum 'Autumn Charm'	Autumn Charm Sedum	6"-1'	Pink	Jun-Jul	F
Sedum 'Joyce Henderson'	Joyce Henderson Sedum	6"-1'	Pink	May-Jun	F
Sedum 'Mini Me'	Mini Me Sedum	6"-1'	Green	NA	F
Sedum acre 'Oktoberfest'	Oktoberfest Sedum	6"-1'	Yellow	Jul-Sep	F
Sedum album 'Athoum'	Jelly Bean Sedum	6"-1'	Pink	Aug-Sep	F
Sedum album 'Coral Carpet'	Coral Carpet Sedum	6"-1'	White	Jun-Aug	F
Sedum album 'Faro Island'	Faro Island Sedum	6"-1'	White	Jun-Aug	F
Sedum album 'Green Ice'	Green Ice Sedum	6"-1'	White	Jun-Jul	F
Sedum album 'Murale'	Wall Sedum	6"-1'	White	Jun-Jul	F
Sedum cauticola 'Sunset Cloud'	Sunset Cloud Sedum	6"-1'	Pink	Jul-Aug	F
Sedum divergens	Cascade Sedum	6"-1'	Yellow	Jun-Jul	F
Sedum ellacombianum	Ellacombe's Sedum	6"-1'	Yellow	May-Jun	F
Sedum ellacombianum 'Variegatum'	Variegated Ellacombe's Sedum	6"-1'	Yelow	May-Jun	F
Sedum floriferum 'Weihenstephaner Gold'	Weihenstephaner Gold Sedum	6"-1'	Yellow	Jun-Jul	F
Sedum grisbachii	Griseback Sedum	6"-1'	Yellow	Jul-Aug	F
Sedum hybridum 'Tekaridake'	Tekaridake Kamtschatka Sedum	6"-1'	Yellow	Jun	F
Sedum kamtschaticum 'Variegatum'	Variegated Kamtschatka Sedum	6"-1'	Orange	Jul-Aug	F
Sedum middendorfianum var. diffusum	Diffuse Middendorf's Sedum	6"-1'	Yellow	May-Jun	F

Representative Zone G Species

Guacamole Hosta

Mountain Garlic

Wall Sedum

Lady Fern

Source: JFNew

Zone H

Vegetated Roof Plantings

Research to-date shows that native plants do not typically thrive in vegetated roofs. Therefore, the list below reflects species that are known to thrive in green roof situations. All species listed below will generally grow to a height of six-to-18 inches.

Botanical Name	Common Name	Color	Bloom Time
Allium maximowiczii 'Alba'	White Flowered Ornamental Chive	White	May-Jun
Allium schoenoprasum 'Dwarf'	Dwarf Ornamental Chive	Pink	May-Jun
Allium schoenoprasum 'Glaucum'	Blue Flowered Ornamental Chive	Blue	Jun-Jul
Allium senescens montanum	Mountain Garlic	Pink/Purple	Jun-Aug
Allium senescens glaucum	Curly Onion	Pink	Jul-Sep
Allium tanguticum 'Summer Beauty'	Summer Beauty Ornamental Chive	Pink	Jul-Aug
Euphorbia myrsinites	Mytle Spurge	Yellow	May-Jun
Sedum 'Autumn Charm'	Autumn Charm Sedum	Pink	Jun-Jul
Sedum 'Joyce Henderson'	Joyce Henderson Sedum	Pink	May-Jun
Sedum 'Mini Me'	Mini Me Sedum	Green	NA
Sedum acre 'Aureum'	Gold Leaved Goldmoss Sedum	Yellow	May-Jun
Sedum acre 'Oktoberfest'	Oktoberfest Sedum	Yellow	Jul-Sep
Sedum album 'Athoum'	Jelly Bean Sedum	Pink	Aug-Sep
Sedum album 'Coral Carpet'	Coral Carpet Sedum	White	Jun-Aug
Sedum album 'Faro Island'	Faro Island Sedum	White	Jun-Aug
Sedum album 'Green Ice'	Green Ice Sedum	White	Jun-Jul
Sedum album 'Murale'	Wall Sedum	White	Jun-Jul
Sedum album 'Red Ice'	Red Ice Sedum	White	Jun-Jul
Sedum cautacola 'Bertram Anderson'	Bertram Anderson Sedum	Pink	Jul-Aug
Sedum cauticola 'Sunset Cloud'	Sunset Cloud Sedum	Pink	Jul-Aug
Sedum divergens	Cascade Sedum	Yellow	Jun-Jul
Sedum ellacombianum	Ellacombe's Sedum	Yellow	May-Jun
Sedum ellacombianum 'Variegatum'	Variegated Ellacombe's Sedum	Yelow	May-Jun
Sedum floriferum 'Weihenstephaner Gold'	Weihenstephaner Gold Sedum	Yellow	Jun-Jul
Sedum grisbachii	Griseback Sedum	Yellow	Jul-Aug
Sedum hispanicum 'Pinkie'	Pinkie Sedum	Pink	Jun-Jul
Sedum hybridum 'Immergunchen'	Evergreen Sedum	Yellow	Jun, Sep
Sedum hybridum 'Tekaridake'	Tekaridake Kamtschatka Sedum	Yellow	Jun
Sedum kamtschaticum 'Variegatum'	Variegated Kamtschatka Sedum	Orange	Jul-Aug
Sedum middendorfianum var. diffusum	Diffuse Middendorf's Sedum	Yellow	May-Jun

*List provided by Hortech, Inc.

Representative Zone H Species

Mountain Garlic

Cascade Sedum

Ellacombe's Sedum

Wall Sedum

Source: JFNew

Recommended Materials

Numerous BMPs in this manual have similar material needs. These BMPs are listed in the table below. Detailed information on each material requirement follows. In addition, Porous Pavement and Vegetated Roofs have significant material requirements that are listed according to their individual needs.

	Constructed Filters	Dry Well	Infiltration Trench	Planter Boxes	Porous Pavement	Subsurface Infiltration	Vegetated Filter Strip	Vegetated Swale
Check dams							X	X
Non-Woven Geotextile	X	X	X	X	X	X	X	
Pea Gravel							X	
Peat	X			X				
Pervious Berms							X	
Pipe – 8”	X	X	X	X	X	X	X	
Sand	X			X				X
Stone/Gravel	X			X				
Stone – 30%							X	
Stone – 40%			X		X			

Check dams (Vegetated Filter Strip, Vegetated Swale)

An earthen check dam shall be constructed of sand, gravel, and sandy loam to encourage grass cover. (Sand: ASTM C-33 fine aggregate concrete sand 0.02 in to 0.04 in, Gravel: AASHTO M-43 0.5 in to 1.0 in). A stone check dam shall be constructed of R-4 rip rap, or equivalent.

Non-Woven Geotextile (Constructed Filter, Dry Well, Infiltration Trench, Planter Boxes, Vegetated Filter Strip)

Should consist of needled nonwoven polypropylene fibers and meet the following properties:

a. Grab Tensile Strength (ASTM-D4632) 120 lbs min.

b. Mullen Burst Strength (ASTM-D3786) 225 psi min.

c. Flow Rate (ASTM-D4491) 110 gal/min/ft2 min.

d. UV Resistance after 500 hrs (ASTM-D4355) 70% min.

e. Puncture strength (ASTM D-4833-00) 90 lb. min.

f. Apparent opening size (ASTM D-4751-99A) 60-70 US Sieve

Heat-set or heat-calendared fabrics are not permitted. Acceptable types include Mirafi 140N, Amoco 4547, Geotex 451, or approved others.

Pea Gravel (Vegetated Filter Strip)

Clean bank-run gravel may also be used and should meet ASTM D 448 and be sized as per No.6 or 1/8” to 3/8”.

Peat (Constructed Filter, Planter Boxes)

Should have ash content <15%, pH range 3.3-5.2, loose bulk density range 0.12-0.14 g/cc.

Pervious Berms (Vegetated Filter Strip)

The berm shall have a height of 6-12 in and be constructed of sand, gravel, and sandy loam to encourage grass cover. (Sand: ASTM C-33 fine aggregate concrete sand 0.02”-0.04”, Gravel: AASHTO M-43 ½” to 1”)

Pipe - (Dry Well, Porous Pavement, Subsurface Infiltration, Constructed Filter, Infiltration Trench, Planter Boxes, Vegetated Filter Strip)

Should be continuously perforated, smooth interior, with a minimum inside diameter as required. High-density polyethylene (HDPE) pipe shall meet AASHTO M252, Type S or M294, Type S (12 gauge aluminum or pipe may also be used in seepage pits).

Sand (Constructed Filter, Planter Boxes, Vegetated Swale)

Should be ASTM-C-33 (or AASHTO M-6) size (0.02” – 0.04”), concrete sand, clean, medium to fine sand.

Stone/Gravel (Constructed Filter, Planter Boxes):

Should be uniformly graded coarse aggregate, 1 inch to ½ inch with a wash loss of no more than 0.5%, AASHTO size number 5 per AASHTO Specifications, Part I, 19th Ed., 1998, or later and have voids of 40% as measured by ASTM-C29.

Stone – 40% voids (Infiltration Trench, Porous Pavement, Subsurface Infiltration Bed,)

Infiltration trenches should have stone 2-inch to 1-inch uniformly graded coarse aggregate, with a wash loss of no more than 0.5%, AASHTO size number 3 per AASHTO Specifications, Part I, 19th Ed., 1998, or later and shall have voids 40% as measured by ASTM-C29.

Porous Pavement

General

Choker base course aggregate for beds shall be 3/8 inch to 3/4 inch clean, uniformly-graded, coarse, crushed aggregate AASHTO size number 57 per Table 4, AASHTO Specifications, Part I, 19th Ed., 1998 (p. 47).

Porous Asphalt

Bituminous surface course for porous paving shall be 2.5 to 3 inches thick with a bituminous mix of 5.75% to 6.75% by total weight as determined by testing below. Use neat asphalt binder modified with an elastomeric polymer to produce a binder meeting the requirements of PG 76-22P (in northern Michigan, use PG 76-28P as appropriate) as specified in AASHTO MP-1. The composite materials shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified asphalt binder shall be heat and storage stable.

Determination of optimal asphalt content should be determined according the following tests:

- Draindown Test (ASTM Method D6390)
- Moisture Susceptibility Test using the Modifed Lottman Method (AASHTO T283) with the following:
  - Compact using 50 gyrations of Superpave gyratory compactor
  - Apply partial vacuum of 26 inches of Hg for 10 minutes to whatever saturation is achieved.
  - Keep specimens submerged in water during freeze cycle.
  - Required retained tensile strength (TSR) >= 80%
- Air Voids Test (AASHTO T269/ASTM D3203)

Hydrated lime, if required, shall meet the requirements of AASHTO M 303 Type 1 and shall be blended with the damp aggregate at a rate of 1.0% by weight of the total dry aggregate. The additive must be able to prevent the separation of the asphalt binder from the aggregate and achieve a required tensile strength ratio (TSR) of at least 80% on the asphalt mix.

Fibers, if used, shall consist of either cellulose fibers or mineral fibers which are to be treated with a cationic sizing agent to enhance dispersement of the fiber as well as increase cohesion of the fiber to the bitumen. Fiber is to be added at a dosage rate between 0.2% and 0.4% by weight of total mix.

- Mineral fibers shall be from virgin, basalt, diabase, or slag with a maximum average fiber length of 6.35 mm and a maximum average fiber thickness of 0.005 mm.
- Cellulose fiber – Fiber length shall be 6.4 mm (max), Ash Content 18% non-volatiles (±5%), pH 7.5 (± 1), Oil absorption (times fiber weight) 5.0 (± 1), Moisture Content 5.0 (max).

Porous Concrete

The use of Installers or Craftsmen who have been certified by the NRMCA's Pervious Concrete Contractor Certification Program is strongly recommended. Contractor shall furnish a proposed mix design with all applicable information to the Engineer prior to commencement of work. Critical mix characteristics typically include the following:

- Cement Content: 550 to 650 lb/cy
- Fine aggregate, if used: maximum 3 cu. ft. per cu. yd.
- Admixtures: use in accordance with the manufacturer's instructions and recommendations
- An aggregate/cement (A/C) ratio: 4:1 to 4.5:1
- Water/cement (W/C) ratio: 0.27 to 0.34
- Curing: shall begin within 15 minutes after placement and continue for 7 days

The data shall include unit weights determined in accordance with ASTM C29 paragraph 11, jigging procedure.

Cement: Portland Cement Type II or V conforming to ASTM C150 or Portland Cement Type IP or IS conforming to ASTM C595. The total cementitious material shall be between 550 and 650 lb./cy.

Aggregate: Use No 8 coarse aggregate (3/8 to No. 16) per ASTM C33 or No. 89 coarse aggregate (3/8 to No. 50) per ASTM D 448. If other gradation of aggregate is to be used, submit data on proposed material to owner for approval. The volume of aggregate per cu. yd. shall be equal to 27 cu.ft. when calculated as a function of the unit weight determined in accordance with ASTM C 29 jigging procedure. Fine aggregate, if used, should not exceed 3 cu. ft. and shall be included in the total aggregate volume.

Air Entraining Agent: Shall comply with ASTM C 260 and shall be used to improve workability and resistance to freeze/thaw cycles.

Admixtures: The following admixtures shall be used:

- Type D Water Reducing/Retarding – ASTM C 494.
- A hydration stabilizer that also meets the requirements of ASTM C 494 Type B Retarding or Type D Water Reducing/Retarding admixtures may be used. This stabilizer suspends cement hydration by forming a protective barrier around the cementitious particles, which delays the particles from achieving initial set.

Water: Potable shall be used and shall comply with ASTM C1602. Mix water shall be such that the cement paste displays a wet metallic sheen without causing the paste to flow from the aggregate. (Mix water yielding a cement paste with a dull-dry appearance has insufficient water for hydration).

- Insufficient water results in inconsistency in the mix and poor bond strength.
- High water content results in the paste sealing the void system primarily at the bottom and poor surface bond.

An aggregate/cement (A/C) ratio range of 4:1 to 4.5:1 and a water/cement (W/C) ratio range of 0.27 to 0.34 should produce pervious pavement of satisfactory properties in regard to permeability, load carrying capacity, and durability characteristics.

Vegetated roofs

Some key components and associated performance-related properties are as follows:

Root-barriers should be thermoplastic membranes with a thickness of at least 30 mils. Thermoplastic sheets can be bonded using hot-air fusion methods, rendering the seams safe from root penetration. Membranes that have been certified for use as root-barriers are recommended. At present only FLL offers a recognized test for root-barriers. Several FLL-certified materials are available in the United States. Interested American manufactures can submit products for testing to FLL-certified labs.

Granular drainage media should be a non-carbonate mineral aggregate conforming to the following specifications:

- Saturated Hydraulic Conductivity >= 25 in/min
- Total Organic Matter, by Wet Combustion (MSA) <= 1%
- Abrasion Resistance (ASTM-C131-96) <= 25% loss
- Soundness (ASTM-C88 or T103 or T103-91) <= 5% loss
- Porosity (ASTM-C29) >= 25%
- Alkalinity, CaCO3 equivalents (MSA) <= 1 %
- Grain-Size Distribution (ASTM-C136)
  - Pct. Passing US#18 sieve <= 1%
  - Pct. Passing ¼-inch sieve <= 30%
  - Pct. Passing 3/8-inch sieve >= 80%

Growth media should be a soil-like mixture containing not more than 15% organic content (wet combustion or loss on ignition methods). The appropriate grain-size distribution is essential for achieving the proper moisture content, permeability, nutrient management, and non-capillary porosity, and 'soil' structure. The grain-size guidelines vary for single and dual media vegetated cover assemblies.

Non-capillary Pore Space at Field Capacity, 0.333 bar (TMECC 03.01, A)	>= 15% (vol)
Moisture Content at Field Capacity (TMECC 03.01, A)	>= 12% (vol)
Maximum Media Water Retention (FLL)	>= 30% (vol)
Alkalinity, Ca CO3 equivalents (MSA)	<= 2.5%
Total Organic Matter by Wet Combustion (MSA)	3-15% (dry wt.)
pH (RCSTP)	6.5-8.0
Soluble Salts (DTPA saturated media extraction)"(RCSTP)	<= 6 mmhos/cm
Cation exchange capacity (MSA)	>= 10 meq/100g
Saturated Hydraulic Conductivity for Single Media Assemblies (FLL)	>= 0.05 in/min
Saturated Hydraulic Conductivity for Dual Media Assemblies (FLL)	>= 0.30 in/min

Grain-size Distribution of the Mineral Fraction (ASTM-D422)

Single Media Assemblies:

Clay fraction (2 micron)	0
Pct. Passing US#200 sieve (i.e., silt fraction)	<= 5%
Pct. Passing US#60 sieve	<= 10%
Pct. Passing US#18 sieve	5 - 50%
Pct. Passing 1/8-inch sieve	0 - 70%
Pct. Passing 3/8-inch sieve	75 -100%

Dual Media Assemblies:

Clay fraction (2 micron)	0
Pct. Passing US#200 sieve (i.e., silt fraction)	5-15%
Pct. Passing US#60 sieve	10-25%
Pct. Passing US#18 sieve	20 - 50%
Pct. Passing 1/8-inch sieve	55 - 95%
Pct. Passing 3/8-inch sieve	90 -100%

Macro- and micro-nutrients shall be incorporated in the formulation in initial proportions suitable for support the specified planting.

Separation fabric should be readily penetrated by roots, but provide a durable separation between the drainage and growth media layers (Only lightweight nonwoven geotextiles are recommended for this function.

- Unit Weight (ASTM-D3776) <= 4.25 oz/yd2
- Grab tensile (ASTM-D4632) <= 90 lb
- Mullen Burst Strength (ASTM-D4632) >= 135 lb/in
- Permittivity (ASTM-D4491) >= 2 per second

Appendix E

Soil Infiltration Testing Protocol

Purpose of this Protocol

The soil infiltration testing protocol describes evaluation and field testing procedures to determine if infiltration BMPs are suitable at a site, as well as to obtain the required data for infiltration BMP design.

When to Conduct Testing

The Site Design Process for LID, outlined in Chapter 5 of this manual, describes a process for site development and application of nonstructural and structural BMPs. It is recommended that soil evaluation and investigation be conducted following development of a concept plan or early in the development of a preliminary plan.

Who Should Conduct Testing

Soil evaluation and investigation may be conducted by soil scientists, local health department sanitarians, design engineers, professional geologists, and other qualified professionals and technicians. The stormwater designer is *strongly* encouraged to directly observe the testing process to obtain a first-hand understanding of site conditions.

Importance of Stormwater BMP Areas

Sites are often defined as unsuitable for infiltration BMPs and soil-based BMPs due to proposed grade changes (excessive cut or fill) or lack of suitable areas. Many sites will be constrained and unsuitable for infiltration BMPs. However, if suitable areas exist, these areas should be identified early in the design process and should *not* be subject to a building program that precludes infiltration BMPs. Full build-out of site areas otherwise deemed to be suitable for infiltration should not provide an exemption or waiver for adequate stormwater volume control or groundwater recharge.

Safety

As with all field work and testing, attention to all applicable Occupational Safety and Health Administration (OSHA) regulations and local guidelines related to earthwork and excavation is required. Digging and excavation should never be conducted without adequate notification through the Michigan One Call system (Miss Dig www.missdig.net or 1-800-482-7171). Excavations should never be left unsecured and unmarked, and all applicable authorities should be notified prior to any work.

Infiltration Testing: A Multi-Step Process

Infiltration testing is a four-step process to obtain the necessary data for the design of the stormwater management plan. The four steps include:

1. Background evaluation
   - Based on available published and site specific data
   - Includes consideration of proposed development plan
   - Used to identify potential BMP locations and testing locations
   - Prior to field work (desktop)
2. Test pit (deep hole) observations
   - Includes multiple testing locations
   - Provides an understanding of sub-surface conditions
   - Identifies limiting conditions
3. Infiltration testing
   - Must be conducted onsite
   - Different testing methods available
4. Design considerations
   - Determine suitable infiltration rate for design calculations
   - Consider BMP drawdown
   - Consider peak rate attenuation

Step 1. Background evaluation

Prior to performing testing and developing a detailed site plan, existing conditions at the site should be inventoried and mapped including, but not limited to:

- Existing mapped soils and USDA Hydrologic Soil Group classifications.
- Existing geology, including depth to bedrock, karst conditions, or other features of note.
- Existing streams (perennial and intermittent, including intermittent swales), water bodies, wetlands, hydric soils, floodplains, alluvial soils, stream classifications, headwaters, and first order streams.
- Existing topography, slope, drainage patterns, and watershed boundaries.
- Existing land use conditions.
- Other natural or man-made features or conditions that may impact design, such as past uses of site, existing nearby structures (buildings, walls), abandoned wells, etc.
- A concept plan or preliminary layout plan for development should be evaluated, including:
    - Preliminary grading plan and areas of cut and fill,
    - Location of all existing and proposed water supply sources and wells,
    - Location of all former, existing, and proposed onsite wastewater systems,
    - Location of other features of note such as utility rights-of-way, water and sewer lines, etc.,
    - Existing data such as structural borings, and
    - Proposed location of development features (buildings, roads, utilities, walls, etc.).

In Step 1, the designer should determine the potential location of infiltration BMPs. The approximate location of these BMPs should be on the proposed development plan and serve as the basis for the location and number of tests to be performed onsite.

Important: If the proposed development is located on areas that may otherwise be a suitable BMP location, or if the proposed grading plan is such that potential BMP locations are eliminated, the designer is ***strongly*** encouraged to revisit the proposed layout and grading plan and adjust the development plan as necessary. Full build-out of areas suitable for infiltration BMPs should ***not*** preclude the use of BMPs for runoff volume reduction and groundwater recharge.

Step 2. Test pits (deep holes)

A test pit (deep hole) allows visual observation of the soil horizons and overall soil conditions both horizontally and vertically in that portion of the site. An extensive number of test pit observations can be made across a site at a relatively low cost and in a short time period. The use of soil borings as a substitute for test pits is strongly discouraged, as visual observation is narrowly limited in a soil boring and the soil horizons cannot be observed in-situ, but must be observed from the extracted borings.

A test pit (deep hole) consists of a backhoe-excavated trench, 2½-3 feet wide, to a depth of 6-7½ feet, or until bedrock or fully saturated conditions are encountered. The trench should be benched at a depth of 2-3 feet for access and/or infiltration testing.

At each test pit, the following conditions are to be noted and described. Depth measurements should be described as depth below the ground surface:

- Soil horizons (upper and lower boundary),
- Soil texture, structure, and color for each horizon,
- Color patterns (mottling) and observed depth,
- Depth to water table,
- Depth to bedrock,
- Observance of pores or roots (size, depth),
- Estimated type and percent coarse fragments,
- Hardpan or limiting layers,
- Strike and dip of horizons (especially lateral direction of flow at limiting layers), and
- Additional comments or observations.

The Sample Soil Log Form at the end of this protocol may be used for documenting each test pit.

At the designer's discretion, soil samples may be collected at various horizons for additional analysis. Following testing, the test pits should be refilled with the original soil and the topsoil replaced. A test pit should ***never*** be accessed if soil conditions are unsuitable or unstable for safe entry, or if site constraints preclude entry. OSHA regulations should always be observed.

It is important that the test pit provide information related to conditions at the bottom of the proposed infiltration BMP. If the BMP depth will be greater than 90 inches below existing grade, deeper excavation of the test pit will be required. The designer is cautioned regarding the proposal of systems that are significantly deeper than the existing topography, as the suitability for infiltration is likely to decrease. The design engineer is encouraged to consider reducing grading and earthwork as needed to reduce site disturbance and provide greater opportunity for stormwater management.

The number of test pits varies depending on site conditions and the proposed development plan. General guidelines are as follows:

- For single-family residential subdivisions with on-lot infiltration BMPs, one test pit per lot is recommended, preferably within 100 feet of the proposed BMP area.
- For multi-family and high-density residential developments, one test pit per BMP area or acre is recommended.
- For large infiltration areas (basins, commercial, institutional, industrial, and other proposed land uses), multiple test pits should be evenly distributed at the rate of four to six pits per acre of BMP area.

The recommendations above are guidelines. Additional tests should be conducted if local conditions indicate significant variability in soil types, geology, water table levels, depth and type of bedrock, topography, etc. Similarly, uniform site conditions may indicate that fewer test pits are required. Excessive testing and disturbance of the site prior to construction is not recommended.

Step 3. Infiltration tests

A variety of field tests exists for determining the infiltration capacity of a soil. Laboratory tests are not recommended, as a homogeneous laboratory sample does not represent field conditions. Infiltration tests should be conducted in the field. Infiltration tests should not be conducted in the rain, within 24 hours of significant rainfall events (>0.5 inches), or when the temperature is below freezing.

At least one test should be conducted at the proposed bottom elevation of an infiltration BMP, and a minimum of two tests per test pit are recommended. Based on observed field conditions, the designer may elect to modify the proposed bottom elevation of a BMP. Personnel conducting infiltration tests should be prepared to adjust test locations and depths depending on observed conditions.

Methodologies discussed in this protocol include:

- Double-ring infiltrometer tests.
- Percolation tests (such as for onsite wastewater systems).

There are differences between the two methods. A double-ring infiltrometer test estimates the vertical movement of water through the bottom of the test area. The outer ring helps to reduce the lateral movement of water in the soil from the inner ring. A percolation test allows water movement through both the bottom and sides of the test area. For this reason, the measured rate of water level drop in a percolation test must be adjusted to represent the discharge that is occurring on both the bottom and sides of the percolation test hole.

Other testing methodologies and standards that are available but not discussed in detail in this protocol include (but are not limited to):

- Constant head double-ring infiltrometer.
- Testing as described in the *Maryland Stormwater Manual*, Appendix D.1, using five-inch diameter casing.
- ASTM 2003 Volume 4.08, Soil and Rock (I): Designation D 3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using a Double-Ring Infiltrometer.
- ASTM 2002 Volume 4.09, Soil and Rock (II): Designation D 5093-90, Standard Test Method for Field Measurement of Infiltration Rate Using a Double-Ring Infiltrometer with a Sealed-Inner Ring.
- Guelph permeameter.
- Constant head permeameter (Amoozemeter).

Methodology for double-ring infiltrometer field test

A double-ring infiltrometer consists of two concentric metal rings. The rings are driven into the ground and filled with water. The outer ring helps to prevent divergent flow. The drop-in water level or volume in the inner ring is used to calculate an infiltration rate. The infiltration rate is the amount of water per surface area and time unit which penetrates the soils. The diameter of the inner ring should be approximately 50-70 percent of the diameter of the outer ring, with a minimum inner ring size of four inches. Double-ring infiltrometer testing equipment designed specifically for that purpose may be purchased. However, field testing for stormwater BMP design may also be conducted with readily available materials.

Equipment for double-ring infiltrometer test:
Two concentric cylinder rings six inches or greater in height. Inner ring diameter equal to 50-70 percent of outer ring diameter (i.e., an eight-inch ring and a 12-inch ring). Material typically available at a hardware store may be acceptable.

- Water supply,
- Stopwatch or timer,
- Ruler or metal measuring tape,
- Flat wooden board for driving cylinders uniformly into soil,
- Rubber mallet, and
- Log sheets for recording data.

Procedure for double-ring infiltrometer test

- Prepare level testing area.
- Place outer ring in place; place flat board on ring and drive ring into soil to a minimum depth of two inches.
- Place inner ring in center of outer ring; place flat board on ring and drive ring into soil a minimum of two inches. The bottom rim of both rings should be at the same level.
- The test area should be presoaked immediately prior to testing. Fill both rings with water to water level indicator mark or rim at 30-minute intervals for one hour. The minimum water depth should be four inches. The drop in the water level during the last 30 minutes of the presoaking period should be applied to the following standard to determine the time interval between readings:
    - If water level drop is two inches or more, use 10-minute measurement intervals.
    - If water level drop is less than two inches, use 30-minute measurement intervals.
- Obtain a reading of the drop in water level in the center ring at appropriate time intervals. After each reading, refill both rings to water level indicator mark or rim. Measurement to the water level in the center ring should be made from a fixed reference point and should continue at the interval determined until a minimum of eight readings are completed or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate of drop means a difference of ¼ inch or less of drop between the highest and lowest readings of four consecutive readings.
- The drop that occurs in the center ring during the final period or the average stabilized rate, expressed as inches per hour, should represent the infiltration rate for that test location.

Methodology for percolation test
Equipment for percolation test

- Post hole digger or auger,
- Water supply,
- Stopwatch or timer,
- Ruler or metal measuring tape,
- Log sheets for recording data,
- Knife blade or sharp-pointed instrument (for soil scarification),
- Course sand or fine gravel, and
- Object for fixed-reference point during measurement (nail, toothpick, etc.).

Procedure for percolation test

This percolation test methodology is based largely on the criteria for onsite sewage investigation of soils. A 24-hour pre-soak is generally not required as infiltration systems, unlike wastewater systems, will not be continuously saturated.

- Prepare level testing area.
- Prepare hole having a uniform diameter of 6-10 inches and a depth of 8-12 inches. The bottom and sides of the hole should be scarified with a knife blade or sharp-pointed instrument to completely remove any smeared soil surfaces and to provide a natural soil interface into which water may percolate. Loose material should be removed from the hole.
- (Optional) Two inches of coarse sand or fine gravel may be placed in the bottom of the hole to protect the soil from scouring and clogging of the pores.
- Test holes should be presoaked immediately prior to testing. Water should be placed in the hole to a minimum depth of six inches over the bottom and readjusted every 30 minutes for one hour.
- The drop in the water level during the last 30 minutes of the final presoaking period should be applied to the following standard to determine the time interval between readings for each percolation hole:
    - If water remains in the hole, the interval for readings during the percolation test should be 30 minutes.
    - If no water remains in the hole, the interval for readings during the percolation test may be reduced to 10 minutes.
- After the final presoaking period, water in the hole should again be adjusted to a minimum depth of six inches and readjusted when necessary after each reading. A nail or marker should be placed at a fixed reference point to indicate the water refill level. The water level depth and hole diameter should be recorded.
- Measurement to the water level in the individual percolation holes should be made from a fixed reference point and should continue at the interval determined from the previous step for each individual percolation hole until a minimum of eight readings are completed or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate of drop means a difference of ¼ inch or less of drop between the highest and lowest readings of four consecutive readings.
- The drop that occurs in the percolation hole during the final period, expressed as inches per hour, should represent the percolation rate for that test location.
- The average measured rate must be adjusted to account for the discharge of water from both the sides and bottom of the hole and to develop a representative infiltration rate. The average/final percolation rate should be adjusted for each percolation test according to the following formula:

Infiltration Rate = (Percolation Rate)/(Reduction Factor)

Where the Reduction Factor is given by**:

$$R_f = \frac{2d1 - \triangle d}{DIA} + 1$$

With:

d_1 = Initial Water Depth (in.)

$\triangle d$ = Average/Final Water Level Drop (in.)

DIA = Diameter of the Percolation Hole (in.)

The percolation rate is simply divided by the reduction factor as calculated above or shown in Table E.1 below to yield the representative infiltration rate. In most cases, the reduction factor varies from about two to four depending on the percolation hole dimensions and water level drop – wider and shallower tests have lower reduction factors because proportionately less water exfiltrates through the sides.

*** The area reduction factor accounts for the exfiltration occurring through the sides of percolation hole. It assumes that the percolation rate is affected by the depth of water in the hole and that the percolating surface of the hole is in uniform soil. If there are significant problems with either of these assumptions then other adjustments may be necessary.*

Step 4. Use design considerations provided in the infiltration BMP.

Table E.1
Sample Percolation Rate Adjustments

Perc. Hole Diameter, DIA (in.)	Initial Water Depth, D_1 (in.)	Ave./Final Water Level Drop, $\triangle d$ (in.)	Reduction Factor, R_f
6	6	0.1	3.0
		0.5	2.9
		2.5	2.6
	8	0.1	3.7
		0.5	3.6
		2.5	3.3
	10	0.1	4.3
		0.5	4.3
		2.5	3.9
8	6	0.1	2.5
		0.5	2.4
		2.5	2.2
	8	0.1	3.0
		0.5	2.9
		2.5	2.7
	10	0.1	3.5
		0.5	3.4
		2.5	3.2
10	6	0.1	2.2
		0.5	2.2
		2.5	2.0
	8	0.1	2.6
		0.5	2.6
		2.5	2.4
	10	0.1	3.0
		0.5	3.0
		2.5	2.8

Additional Potential Testing – Bulk Density

Bulk density tests measure the level of compaction of a soil, which is an indicator of a soil's ability to absorb rainfall. Developed and urbanized sites often have very high bulk densities and, therefore, possess limited ability to absorb rainfall (and have high rates of stormwater runoff). Vegetative and soil improvement programs can lower the soil bulk density and improve the site's ability to absorb rainfall and reduce runoff.

Macropores occur primarily in the upper soil horizons and are formed by plant roots (both living and decaying), soil fauna such as insects, the weathering processes caused by movement of water, the freeze-thaw cycle, soil shrinkage due to desiccation of clays, chemical processes, and other mechanisms. These macropores provide an important mechanism for infiltration prior to development, extending vertically and horizontally for considerable distances. It is the intent of good engineering and design practice to maintain these macropores when installing infiltration BMPs as much as possible. Bulk density tests can help determine the relative compaction of soils before and after site disturbance and/or restoration and should be used at the discretion of the designer/reviewer.

Soil Test Pit Log Sheet

Project: _____ **Date:** _____
Name: _____ **Soil Series:** _____
Location: _____ **Other:** _____
Test Pit # _____

Horizon	Depth (In.)	Color	Redox Features	Texture	Notes (if applicable)	Boundary

NOTES:

REDOX FEATURES

Abundance

Few ……. < 2%
Common.. 2 – 20%
Many …… > 20%

Contrast

faint
hue & chroma of matrix and redox are closely related.

distinct
matrix & redox features vary 1 – 2 units of hue and several unites of chroma & value.

prominent
Matrix & redox features vary several units in hue, value & chroma

COARSE FRAGMENTS (% of profile)

15-35% **35-65%** **>65%**
gravelly very gravelly extremely gravelly
channery very channery extremely channery
cobbly very cobbly extremely cobbly
flaggy very flaggy extremely flaggy
stony very stony extremely stony

BOUNDARY

Distinctness

abrupt…< 1" (thick) *gradual*..2.5 – 5"
clear…..1 – 2.5" *diffuse*….> 5

Topography

smooth – boundary is nearly level
wavy – pockets with width > than depth
irregular – pockets with depth > than width

HORIZONS

O - organic layers of decaying plant and animal tissue (must be greater than 12-18% organic carbon, excluding live roots).

A (topsoil) - mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

E – mineral horizon which the main feature is loss of silicate clay, iron, aluminum. Must be underlain by a B (alluvial) horizon.

B (subsoil) - mineral horizon with evidence of pedogenesis or Illuviation (movement into the horizon).

C (substratum) – the un-weathered geologic material the soil formed in. Shows little or no sign of soil formation.

CITY OF BIRMINGHAM
ORDINANCE NO. ___

AN ORDINANCE TO AMEND PART II OF THE CITY CODE, CHAPTER 114 UTILITIES, to ADD ARTICLE VI. STORM WATER TO ADD DIVISION 6. STORM WATER UTILITY FEE

THE CITY OF BIRMINGHAM ORDAINS:

Part II of the City Code, Chapter 114 Utilities, shall be amended to add Article VI. Storm water, Division 6. Storm Water User Fee, as follows:

ARTICLE VI. STORM WATER

DIVISION 6. STORM WATER UTILITY FEE

Sec. 114-400. - Definitions.

The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Runoff Potential: The runoff potential from a property is based on hydrologic principles for calculating runoff that use both the impervious surface area and the pervious surface area. Runoff potential is measured in square feet using the following formula:

Runoff Potential = 0.15x [Total Area – Impervious Area] +
0.9 x [Impervious Area]

Combined sewer system: Public sewers, drains, ditches, roads and retention ponds used for collecting and transporting storm water and non-storm water in the City.

Director: The City Engineer or such other person as the City Manager may designate.

Equivalent Storm Water Unit (ESWU): A subunit of measurement which relates the volume of storm water discharged from a lot based on the amount of total and impervious lot area, compared to the standard unit. The formula for an equivalent storm water unit (ESWU) is as follows:

$$1 \text{ ESWU} = \underline{(0.15\ (TA_S - IA_S) + (0.90\ (IA_S))}$$

where,

TA_S = total area of standard unit;

IA_S = impervious area of standard unit;

0.15 = runoff coefficient for pervious area;

0.90 = runoff coefficient for impervious area.

One ESWU in the City is equal to the average runoff potential of the standard unit.

Impervious lot area: Impervious area means a surface area that is resistant to permeation by surface water.

Industrial sites: Those sites that contain industrial activities which require wastewater discharge permits as set forth in Section 114-202 of this Code.

Nonstorm water: All flows to the combined sewer system not defined as storm water in Section 114-199, or as determined by the director.

Pervious lot area: All land area that is not impervious. Pervious lot area equals the total lot area, minus the impervious lot area. Pervious lot area has a runoff coefficient equal to 0.15.

Separated Storm Water sewer system: Public sewers, drains, channels, ditches, roads and retention ponds used for collecting and transporting storm water in the City.

Standard unit: Single family residential parcel in the City within a lot size between 0.126 and 0.250 acres.

Storm Water: Storm water runoff, snow melt runoff and surface runoff and drainage.

Storm Water utility fee: The fee imposed for the use of that portion of the combined system that transports storm water, based on the number of ESWU's for a lot or parcel of land determined as provided in Section 114-402.

Storm Water sewer system: That portion of the combined sewer system and separated storm water sewer system that is attributable to the transportation and treatment of storm water.

User: An owner of property which directly or indirectly contributes to the combined sewer system.

Sec. 114-401. – Storm Water Utility Fees.

(a) All users shall pay a storm water utility fee proportional to the volume of storm water which is projected to discharge into the combined sewer system and storm water sewer system from their property.

(b) The City Commission shall, by resolution, set storm water utility fees at a rate which will recover from each user its share of the costs of the storm water sewer system attributable to the discharge of storm water from the users' property to the storm water system. The City shall use the revenues of the storm water utility fees to pay the costs of the water treatment operation and maintenance of the storm water sewer system, and for necessary improvements and additions to the storm water sewer system.

(c) The City may also collect from users fees imposed to pay the implementation and operation of any of the following:

(1) Monitoring, inspection and surveillance procedures;

(2) Reviewing discharge procedures and construction;

(3) Discharge permit applications; or

(4) Other fees as the City may deem necessary to operate the storm water sewer system.

Sec. 114-402. - Calculation of fees and appeals.

(a) Single Family Residential ESWU. All single family residential properties in each of the lot-size categories are assigned the same ESWU for that category. The ESWU values for the single-family residential categories are summarized in the fee schedule.

PROPERTY TYPE	SFR CLASS
Single-Family Residential, 0.125 acres or less	Class A
Single-Family Residential, 0.126 acres to 0.250 acres	Class B
Single-Family Residential, 0.251 acres to 0.500 acres	Class C
Single-Family Residential, 0.501 acres to 0.750 acres	Class D
Single-Family Residential, 0.751 acres to 1.000 acres	Class E
Single Family Residential, 1.001 acres or larger	Class F

(b) Non-Single Family ESWU. The storm water utility fee for non-single family lots shall equal the number of ESWU's for a given lot, multiplied by the annual rate established by the City Commission per ESWU per year. The formula for determining the number of ESWU's per non-single family lot shall be calculated from the amount of pervious and impervious lot area as follows:

$$\text{Number of ESWU's} = \frac{0.15\,(TA - IA) + 0.90\,(IA)}{\text{Average runoff potential of the standard unit/ESWU}}$$

where,

TA = total area of each lot (reported in square feet);

IA = impervious area of each lot (reported in square feet).

(c) Any property owner liable for a storm water utility fee may appeal the determination that the property utilizes the storm water system or the amount of a storm water utility fee, including a determination on a reduction in or the elimination of the fee under Section 114-402(a) and (b). An appeal may be based on the quantity of storm water runoff generated, the reductions established, the reductions allocated, or any other matter relating to the determination of the storm water utility fee.

(d) An appeal under subdivision (c) shall be heard by a storm water utility appeals board appointed by the local unit of government. The appeals board shall consist of 3 members, 2 of whom shall be licensed professional engineers not employed by the local unit of government.

(e) An appeal of a storm water utility fee shall not be brought more than 1 year after the fee was billed.

(f) To prevail in an appeal of a storm water utility fee, the appellant shall demonstrate in accordance with the requirements of the plan that the use of the system by the property is less than the amount used by the local unit of government in the calculation of that property's storm water utility fee, or the classification of the property type is in error, or there was a mathematical error in the calculation of the fee.

(g) The sole remedy for a property owner who prevails in an appeal of a storm water utility fee is a prospective correct recalculation of the storm water utility fee.

(h) If in an appeal of a storm water utility fee the appeals board finds that the requirements of subdivision (f) have not been met, that finding is conclusive until the property is modified to either increase or decrease the utilization of the system. The property owner remains eligible for reduction or elimination of fees under the storm water utility ordinance.

(i) A property owner making an appeal shall provide the appeals board with information necessary to make a determination.

(j) A person aggrieved by a decision of the appeals board on an appeal under this section may appeal to the circuit court in which the property is located. An appeal to the Circuit Court must be filed within thirty (30) days of the appeals board's decision.

Sec. 114-403. Credits.

(a) The purpose of this section is to provide for each property owner's control over contributions of storm flows to the storm water utility system and the related storm water utility fees and to advance protection of the public health, safety, and welfare.

(b) The City shall offer credits on an annual basis that will enable any property owner, through voluntary action, to reduce the storm water utility fees calculated for that property owner's property and will provide a meaningful reduction in the cost of

service to the storm water system, or that shall be reasonably related to a benefit to the storm water system;

(1) Credits will only be applied if requirements outlined in this Chapter and other applicable sections of the City Code are met, including, but not limited to: completion of ongoing maintenance, guaranteed right-of-entry for inspections, and submittal of annual self-certification reports.
(2) Credits will be defined as either set fee reduction or percent (%) reductions applied as a credit adjustment to the fee calculation equation.
(3) Credits are additive to each credit category.
(4) As long as the storm water facilities or management practices are functioning as approved, the credit reduction will be applied to the fee. If the approved practice is not functioning as approved or is terminated, the credit reduction will be cancelled and the fee will return to the baseline calculation. Once the credit reduction has been cancelled, a customer may not reapply for credit for a period of 12 months and only then if the deficiency has been corrected, as determined by City inspection.
(5) Credits will be applied to the next complete billing cycle after the application has been approved.

(c) The director shall define a method for applying and granting credits on an annual basis, as well as criteria for determining the credits a property owner may receive. The director may, by regulation, establish credits for 1 or more of the following:

(1) Installation and maintenance of rain barrels, rain gardens, bioswales, cisterns, dry wells, infiltration trenches, porous pavement or pavers, or disconnecting footing drains;
(2) Installation and maintenance of a storm water control facility, or other water quantity controls; and
(3) Other actions of the property owner that, in the judgment of the director, result in a measurable reduction in storm water runoff.

Sec. 114-404. - Billing.

The billing for the storm water utility may be combined with the billing for other utility services. Final determinations on measurements per ESWU will be determined by the director.

Sec. 114-405. - Collection.

Unpaid storm water utility fees shall constitute a lien against the property affected. Fees which have remained unpaid for a period of six months prior to April 30 may be certified to the City Treasurer who shall place the fees on the next tax roll of the City. In the alternative, the City Commission may direct the City Attorney to take appropriate legal action to collect unpaid fees.

Ordained this _____ day of _____, 2016. Effective upon publication.

_____
Rackeline J. Hoff, Mayor

_____
Laura M. Pierce, City Clerk

I, Laura M. Pierce, City Clerk of the City of Birmingham, do hereby certify that the foregoing ordinance was passed by the Commission of the City of Birmingham, Michigan at a regular meeting held _____, 2016 and that a summary was published _____, 2016.

_____
Laura M. Pierce, City Clerk

FEE SCHEDULE

PROPERTY TYPE	SFR CLASS	AVERAGE RUNOFF POTENTIAL	ESWU
Single-Family Residential, 0.125 acres or less	Class A	3,166	0.7
Single-Family Residential, 0.126 acres to 0.250 acres	Class B	4,317	1.0
Single-Family Residential, 0.251 acres to 0.500 acres	Class C	6,716	1.6
Single-Family Residential, 0.501 acres to 0.750 acres	Class D	10,552	2.4
Single-Family Residential, 0.751 acres to 1.000 acres	Class E	13,094	3.2
Single Family Residential, 1.001 acres or larger	Class F	20,496	4.6

Non-Single Family ESWU. The storm water utility fee for non-single family lots shall equal the number of ESWU'S for a given lot, multiplied by the annual rate established by the City Commission per ESWU per year. The formula for determining the number of ESWU'S per non-single family lot shall be calculated from the amount of pervious and impervious lot area as follows:

$$\text{Number of ESWU's} = \frac{0.15\,(TA - IA) + 0.90\,(IA)}{4317 \text{ square feet/ESWU}}$$

where,

TA = total area of each lot (reported in square feet);

IA = impervious area of each lot (reported in square feet).