



PORTLAND PARKS & RECREATION

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Urban Forestry Tree Planting Compliance Report

For permits issued in 2016

Urban Forestry Tree Planting Compliance Report for 2016 Permits

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Executive Summary

PP&R Urban Forestry (UF) periodically studies compliance with City tree permit requirements. The purpose of these studies is to provide staff and other interested parties with estimated rates of compliance, identify compliance challenges, aid in development and implementation of mechanisms to improve future permit compliance, and document compliance levels, issues, and improvement efforts. These studies are also undertaken because City resources do not allow for routine individual permit compliance checks and enforcement of tree permit requirements.

This report provides the results of UF's study of permits requiring a tree to be planted in 2016. A minimum 10% sample of both non-development Tree Removal and Replanting Permits and permits requiring street tree planting as a result of a development project were inspected during the summer of 2017 by UF staff. Staff confirmed the presence or absence of required trees as well as compliance with standards for planting and placement where trees were present. Findings and recommendations are summarized below.

Key Findings

Non-Development Permits

- Right-of-Way Trees: Rate of compliance with planting requirements continued to decline, dropping from 82% in 2015 to 74% in 2016. Compliance remains below the target rate of 90%.
- Private Trees: Overall compliance with planting requirements improved slightly, from 52% in 2015 to 53% in 2016, but remained well below the 2011 rate of 66%.
- An estimated 1,866 trees were not planted as a result of non-compliance with 2016 Tree Removal and Replanting Permits.
- There continues to be little difference in compliance rates between Tree Inspector and Tree Technician-issued Type A permits for private tree removals. While planting compliance rates are far below desired levels, the more limited interaction with UF staff that occurs in the Tree Technician-issued process does not have a significant effect on compliance rates.

Development Permits

- Compliance rates compared to 2015 levels increased for new construction permits while remaining unchanged for remodels. Rates in each category (84% for new construction, 51% for remodels) continue to fall short of the 90% target.
- Both new construction and remodels experienced improvement in the planting of appropriate species in 2016, however remained below target level, ranging from 41% – 82%. The majority of trees out of compliance with standards were species not on approved lists.
- An estimated 219 trees were not planted as required in permitted development projects in 2016.

Staffing limitations

- Staffing limitations at each bureau involved in implementing requirements of Title 11 (PP&R and Development Services) continue to be a barrier to improving compliance over the long-term. Currently, there are no regular follow up inspections of tree plantings required by development or non-development related permits outside of the ten-percent samples used in this periodic report, and no capacity to increase these inspections at either bureau.

Recommendations

The following is a list of recommended actions to improve planting compliance based on findings of the study. At the time of writing, some recommendations have already been implemented. Periodic updates to this study will determine the effect of these actions and provide guidance for future work to promote higher rates of planting compliance.

Completed

- Send annual notification of planting requirements to permittees of non-development Tree Removal and Replanting Permits during the planting season following permit issuance.
- Update Tree Removal and Replanting Permits to clarify responsibility, call attention to planting requirements and specifications, and to include basic information on tree planting and establishment basics.
- Develop outreach materials to communicate when a property has been inspected in development and non-development situations.
- Establish process for using monthly enforcement fees as a tool for getting non-compliant properties to plant required street trees.

Recommended Actions

- Add one additional Tree Technician and three additional Tree Inspectors to build capacity to more effectively enforce elements of the tree code, especially in development. *Funding approved by Council. Positions to be filled in FY 19.*
- Continue permit compliance monitoring program, publishing updated report every 3 years. Next report due in 2020.
- Update and streamline permitting processes in conjunction with transition to a new City online permitting system, expected in 2019. Expected improvements include:
 - Digital plan revision and streamlined contact with applicants and other infrastructure bureaus
 - Ability to incorporate planting site inspections prior to finaling of permits in development situations
 - Asset management database which allows for more detailed and accurate accounting of permitted activities and permit requirements, especially in development situations
- Conduct outreach to tree nurseries on desired stock sizes and species as part of the 5-year update to approved species lists.
- Develop list of recommended trees for private planting to encourage increased planting of large form and evergreen trees where appropriate.
- Explore ways to fund and conduct follow-up inspections and enforcement of Tree Removal and Replanting Permits in non-development situations.
- Explore the best method for providing a planting site inspection prior to finaling of permits in development situations, including funding and bureau responsibility.

The tables below summarize compliance rates from each permit category:

Table 1: Compliance rates for tree plantings required as a condition of a Tree Removal and Replanting Permit

	2011 Compliance rate	2015 Compliance rate	2016 Compliance rate	Trend
Permit Type Tree Removal and Replanting Non-Development	Required trees planted	Required trees planted	Required trees planted	
Right-of-Way (ROW)				
A Permits	-	84%	73%	Down
B Permits	-	76%	88%	Improved
Overall	90%	82%	74%	Down
Private				
A Permits, Tech issued	-	50%	50%	no change
A Permits, Inspector issued	-	52%	56%	Improved
B Permits, Inspector issued	-	60%	52%	Down
Overall	66%	52%	53%	Improved

Table 2: Compliance rates for right-of-way tree plantings required as a condition of a development permit

	2011 Compliance rate	2015 Compliance rate	2016 Compliance rate	Trend
Permit Type Development	Required trees planted	Required trees planted	Required trees planted	
New construction				
Residential	83%	59%	85%	Improved
Commercial	89%	75%	75%	no change
Overall	84%	63%	84%	Improved
Remodels				
Residential	41%	52%	52%	no change
Commercial	48%	52%	46%	Down
Overall	47%	51%	51%	no change

Background

Portland City Code requires tree planting as a condition of tree removal and development permits in order to mitigate the effects of tree loss and ensure that the services of the urban forest are sustained over time. This report investigates whether trees were planted when required as a condition of a permit issued in 2016. The intent of this report is to communicate compliance rates and to assist staff in setting goals and making policy changes that help permit holders meet tree planting requirements.

Title 11 and increasing permit volumes

Two prior studies of planting compliance were conducted for permits issued 2011 and 2015, and results included in this report are compared to those findings where applicable. With the adoption of Title 11 in January 2015, a dramatic increase in permit volume has resulted, both as a result of an increase in the overall number of regulated properties and trees in non-development situations, and because of the increased profile of trees as a result of Title 11—i.e. more people now know they need a permit to remove a tree. While the new tree code did not significantly alter the number of trees required to be planted as a result of development, the number of applications for private and street tree removals in non-development is up 983% and 76% over pre-Title 11 levels, respectively.

The increase in permit volumes also increases the importance of the compliance rates reported in this study. For instance, while less than 400 trees were estimated to have gone unplanted in 2011 as a result of non-compliance, this study finds that number has increased to over 2,000 trees not planted in 2016. The loss this represents in potential benefits to Portland's residents is significant, and will hinder efforts to meet tree canopy goals, as set by the *Urban Forest Management Plan* and *Climate Action Plan*.

Increasing planting compliance

A central premise of Title 11 is that trees are replaced as they are removed in non-development situations, and that tree planting is incorporated into development plans where appropriate. This report assists staff in assessing the extent to which the code meets these objectives, and guides strategies to move rates closer to 100% compliance with planting requirements.

Strategies to increase planting compliance rates will vary depending upon permit type. A number of changes to business practices were enacted in 2016 that were expected to increase planting compliance in non-development situations, however their impact is not evident in this report. Low rates of ~~private~~ tree planting compliance in non-development, especially on private property, will ultimately require a variety of changes to business practices, outreach efforts, as well as a greater number of follow-up inspections by UF staff, (which is currently too limited to take on such additional work). Increasing planting compliance rates for development permits will require a much greater effort and will involve increased collaboration between PP&R and the Bureau of Development Services (BDS), along with funding to conduct site inspections and enforcement work.

City Auditor recommendations

In September 2017 Portland's City Auditor released an audit of the City's implementation of its new tree code, Title 11. This report includes an analysis and recommendations for improving

implementation of the tree code to better match the goals of the code as well as those set in other documents including Portland's *Urban Forest Management Plan*, *Climate Action Plan*, and *Comprehensive Plan*. The Auditor's findings largely match those mentioned in this report, including the need to address staffing limitations, identify new sources of funding, and replace outdated permitting software which does not allow for adequate tracking of trees in all situations. This report specifically calls for PP&R Urban Forestry and Bureau of Development Services to "develop additional measures to ensure tree planting regulations are followed," some of which are included in this report's recommendations.

Methods

A sample of all permits issued in 2016 that required tree planting was inspected for tree planting compliance, using a target of 10%, or 25 cases when a 10% sample would be less than 25 cases. Two permit types, commercial new construction and remodels, have a sample size of less than 25 cases because there were fewer than 25 total cases where replacement trees were required as a condition of the permit. See Table 4 for a list of permit types reported on in this study.

A trained staff member first examined digital permit files for each case in the City's permitting database (TRACS) prior to conducting a site visit. Sites were then inspected for removal of permitted trees, where applicable, and planting of required trees.

In addition to recording the presence of required trees, all plantings were inspected to determine whether trees met planting standards for species, size at time of planting, location, and planting depth. For trees in the right-of-way (also referred to as "street trees"), standards also include selecting a species with the appropriate mature form for the planting site, meeting minimum distance requirements from trees and other infrastructure, and planting the required caliper size. For private trees, the species cannot be listed on the *Portland Plant List* of nuisance species, and must be the correct size at time of planting (minimum 1.5" caliper or 5' tall for conifers). See Appendix A for more detail on planting and location standards. Table 3, below, summarizes data collected for this study.

Where applicable, data is also reported from compliance checks conducted previously in order to provide a comparison to 2016 findings. Due to changes associated with the implementation of Title 11 in 2015, a number of new types of information were collected beginning in 2015 that were not collected in 2011. Tables note where no information was recorded on 2011 permits.

Table 3: Data collected

Item	Answer
Tree planted?	Yes/No
If no, was the old tree removed?	Yes/No
Tree genus and species	Genus and species
Is the species mature form appropriate for the site?	Yes/No
If no, why	Mature form too big Mature form too small Species not on approved list
Planting site size (feet)	To nearest 0.1 foot
Overhead wires present?	High voltage/other wires/no wires
Tree caliper size (inches)	To nearest 0.1 inch
If conifer, height to standard?	Yes/No
Does tree meet minimum size standard?	Yes/No
Does planting depth meet standards?	Yes/No
Does planting location meet standards?	Yes/No
If no, why	See Appendix A

Table 4: Permitting types reported in this study

Permit Type
Tree Removal and Replanting Permits, Non-Development
Right-of-Way (ROW)
A Permits
B Permits
Private
A Permits, Tech issued
A Permits, Inspector issued
B Permits, Inspector issued
Development Reviews, Right-of-Way (ROW)
New construction
Residential
Commercial
Remodels
Residential
Commercial

Right-of-Way Tree Removal and Replanting Permits

Permit Process

Tree Removal and Replanting Permits for trees in the public right-of-way are requested by the adjacent property owner through an application process. Under Title 11, permits granted fall under two categories, A or B. Type A Permits are granted if the tree is dead, dying, or dangerous, while Type B permits may be granted in cases where trees are healthy but inappropriate for their location or are negatively impacting other more valuable trees. In the absence of extraordinary circumstances, the removal of healthy, functioning street trees is not permitted; therefore B permits are relatively rare. Under a Type A permit, City code requires one-to-one tree replacement if adequate space for planting exists. Under some Type B permits, mitigation requirements may increase to inch for inch replacement.

Upon application receipt, a Tree Inspector inspects the tree and site, determines if removal can be granted, and marks the curb for replanting if required. If a sufficient mitigation plan was submitted with the application, the Tree Inspector then issues and mails the final permit. In cases where the mitigation plan provided is insufficient or incomplete, the Tree Inspector will notify the property owner of the decision with a letter of tentative approval which outlines replanting requirements. The property owner is given a list of approved street trees appropriate for the site and is instructed to select a tree from this list in order to receive the final permit. The Tree Inspector only issues and mails the final permit once the property owner contacts them with the selection of a replacement tree. If it is not planting season, planting may be deferred until the following planting season to ensure higher tree survival rates. If the tree does not meet the criteria for removal, a letter of denial will be sent to the property owner.

Where a property owner has been required to send an updated mitigation plan prior to permit issuance, and the property owner does not contact the Tree Inspector to inform them of their tree selection within 60 days of the permit decision, the permit request is considered expired. Past compliance studies have included inspections of these tentatively approved permits, as well as denied permits to verify whether trees were removed without a permit. The 2015 report showed that this was not a significant problem, and these inspections were not continued in 2016.

Beginning with 2016 permits, a planting reminder was sent to all property owners whose permits required tree planting. This letter included information on permit requirements, including the number and species of trees permitted for planting, as well as information on how to properly plant and care for young trees.

Findings

The following tables summarize permitting and compliance data collected on required plantings associated with Tree Removal and Replanting Permits for right-of-way trees issued in 2016.

Table 5: ROW Tree Removal and Replanting Permits applied for in 2016

Permit decision	Cases		Trees applied for removal	Trees required to plant
Type A, planting required	803	73%	1,283	1,305
Type B, planting required	91	8%	185	191
Approved, no planting required	72	7%	151	0
Tentatively approved, permit expired	56	5%	81	81
Denied	71	6%	120	n/a
<i>Total</i>	<i>1,093</i>	<i>100%</i>	<i>1,820</i>	<i>1,577</i>

Table 6: Study sample – 2016 issued ROW Tree Removal and Replanting Permits

Permit decision	Cases studied and % of total cases		Trees applied for removal	Trees required to plant
Issued Permits				
Type A, planting required	80	10%	128	126
Type B, planting required	25	27%	50	53

Table 7: Planting compliance – issued ROW Tree Removal and Replanting Permits

Permit decision	Required trees planted			Trend
	2011	2015	2016	
Type A	n/a	84%	73%	Down
Type B	n/a	76%	88%	Improved
Total compliance rate	90%	82%	74%	Down

Table 8: Compliance with street tree planting standards for ROW Tree Removal and Replanting Permits

Planting standard	% of trees planted				
	2011	2015 Type A	2015 Type B	2016 Type A	2016 Type B
Tree species appropriate for planting strip	83%	87%	88%	91%	89%
<i>Tree species too small for planting strip</i>	9%	4%	2%	1%	0%
<i>Tree species too large for planting strip</i>	8%	3%	10%	3%	4%
<i>Tree species is not on approved list</i>	n/a	6%	0%	5%	7%
Tree caliper/height meets size standards	92%	90%	76%	84%	72%
Planting depth standards met	n/a	67%	76%	85%	74%
<i>Planting depth too high</i>	n/a	11%	12%	10%	15%
<i>Planting depth too low</i>	n/a	22%	12%	4%	7%
Location standards met	n/a	75%	67%	78%	74%

Summary of findings: Right-of-way Tree Removal and Replanting Permits

- Rates of compliance with planting requirements have continued to decline, to 74% in 2016 from 90% in 2011, and are below the target level of 90%
- Rates of compliance with planting standards are generally good, but show some opportunities for improvement. Increased homeowner education on how to source and properly plant trees would likely increase compliance with planting standards.
- Planting reminders sent to 2016 permits do not appear to have had a substantial effect on compliance with planting requirements or tree planting standards.

Private Tree Removal and Replanting Permits

Permit Process

Prior to the adoption of Title 11 in 2015, Urban Forestry regulated the removal of certain healthy, non-nuisance private property trees on approximately one-third of the city's tax lots. Title 11 extended regulation to all city tax lots, requiring a permit for the removal of any tree 12" DBH (diameter at breast height) or greater, or 6" in some environmental zones and plan districts.

Like right-of-way Tree Removal and Replanting Permits, private property permits under Title 11 follow the Type A/B system. Type A permits are granted for dead, dying, dangerous, or nuisance species trees; trees within 10 feet of a building or attached structure; or for fewer than 5 healthy non-nuisance trees under 20" DBH in one year. Type B permits may be granted for healthy, non-nuisance species trees 20" or greater DBH, or for the removal of 5 or more healthy, non-nuisance species trees between 12" – 20" DBH. A Type B permit will only be granted in cases where a tree is inappropriate for its location or when a tree's structural development prevents continued healthy growth or is negatively impacting other more valuable trees. Trees removed under a Type A permit require tree-for-tree replacement, while trees removed under a Type B permit may be require up to inch-for-inch replacement.

Upon application receipt, an Urban Forestry Tree Technician ("Tree Tech") will review the permit for completeness and, where sufficient evidence is provided (e.g. photographs showing that the tree is within 10 feet of a building, or under 20" DBH), will issue a Type A permit without site inspection. In cases where there is insufficient evidence to issue a Type A permit, or where the tree's size and species would require a Type B review, a Tree Inspector is assigned to visit the site to inspect the tree(s). If the tree does not meet the criteria for removal, a letter of denial will be sent to the property owner. Where trees meet removal criteria and the mitigation plan provided is sufficient, the Tree Inspector will then issue and mail the final permit.

Where the mitigation plan provided is insufficient or incomplete, the Tree Inspector will mail a letter of tentative approval which outlines replanting requirements, only issuing and mailing the final permit once the property owner contacts them and informs them of the selection of a replacement tree. If it is not planting season, planting may be deferred until the following planting season to ensure higher tree survival rates. While prior reports inspected permits that were expired or denied for unpermitted tree removal, those inspections were not continued for 2016 permits, due insignificant and decreasing rates of these violations.

The findings for compliance with private property replanting requirements are reported both by permit type and by which type of staff issued the permit. Due to continuing increase in permit volume as well as limited staffing levels, in 2015 Urban Forestry created a process where not all permits require site inspection. Because Tree Tech-issued permits require less applicant interaction with UF staff and no onsite verification, monitoring compliance of these permits provides necessary information as to whether this process continues to result in compliance rates similar to Inspector-issued permits.

Inspecting private property lots for tree planting is challenging due to access, varying size of private lots, and existing vegetation. Due to these challenges, it was not always possible to determine if trees were removed or replanted. These are noted in the findings.

Findings

The following tables summarize permitting and compliance data collected on required plantings associated with Tree Removal and Replanting Permits for private trees issued in 2016.

Table 9: Private Tree Removal and Replanting Permits applied for in 2016

Permit decision	Cases		Trees applied for removal	Trees required to plant
Type A, Tech issued – planting required	1,125	44%	1,399	1,399
Type A, Inspector issued – planting required	954	38%	1,469	1,468
Type B, Inspector issued – planting required	105	4%	243	400
Approved, no planting required	242	10%	377	0
Tentatively approved, permit expired	25	1%	31	47
Denied	83	3%	95	n/a
<i>Total</i>	<i>2,534</i>	<i>100%</i>	<i>3,614</i>	<i>3,314</i>

Table 10: Study sample – 2016 issued private Tree Removal and Replanting Permits

Permit decision	Cases/ % of total		Trees applied for removal	Trees required to plant
Issued Permits				
Type A, Tech issued – planting required	113	10%	142	141
Type A, Inspector issued – planting required	95	10%	162	164
Type B, Inspector issued – planting required	25	24%	51	73

Table 11: Planting compliance – issued private Tree Removal and Replanting Permits

Permit decision	Required trees were planted			Trend
	2011	2015	2016	
Type A, Tech issued	n/a	50%	50%	no change
Type A, Inspector issued	n/a	52%	56%	Improved
Type B, Inspector issued	n/a	60%	52%	Down
Total compliance rate*	66%	52%	53%	Improved

* Because staff could not access all areas of each property, it could not be determined whether trees were planted in 14% of cases in 2011 and 11% of cases in 2015 and 2016.

Table 12: Compliance with planting standards for private Tree Removal and Replanting Permits

Planting standard	% of trees planted						
	2011	2015 Type A, Tech	2015 Type A, Inspector	2015 Type B	2016 Type A, Tech	2016 Type A, Inspector	2016 Type B
Tree species appropriate for site	n/a	97%	94%	97%	99%	99%	97%
Tree caliper/height meets size standards	n/a	66%	70%	61%	72%	79%	93%
Planting depth standards met*	n/a	85%	60%	90%	88%	84%	94%
<i>Planting depth too high</i>	n/a	6%	6%	2%	1%	5%	0%
<i>Planting depth too low</i>	n/a	5%	23%	3%	3%	2%	0%

* Because staff could not access all properties beyond a visual inspection from a distance, the percentage of permits where planting depth could not be determined was 5-11% in 2015 and 6-9% in 2016.

Summary of findings: Private Tree Removal and Replanting Permits

- At 53% in 2016, overall compliance with planting requirements remained steady after dropping from 66% in 2011 to 52% in 2015.
- Rates of compliance with species requirements and planting standards improved in 2016, and are comparable with rates found in non-development right-of-way plantings (see table 8).
- Inspections continue to find little difference in compliance rates between Inspector and Tech issued Type A permits, suggesting that while compliance rates are far below desired levels, the more limited interaction with UF staff that occurs in the Tech issued process does not have a significant effect on compliance rates.

Development Permits for New Construction and Remodels

Permit Process

During development, all new construction and remodeling projects with a valuation over \$25,000 require a street tree review. During a review, building plans, aerial photos, and/or sites are inspected by Urban Forestry staff and street trees are required to be planted in all available spaces or according to accepted street standards as a condition of the building permit. Planting requirements are stamped on approved building plans and appropriate approved street tree species lists attached. Development permits are divided into two categories: residential and commercial. The residential category includes single family residences and duplexes. The commercial category includes all other building types.

If trees are required to be planted, Urban Forestry staff will stamp requirements onto building plans, attach approved street tree species lists, and make comments on the digital permit file. Applicants are instructed to complete planting prior to the finaling of the permit.

Past versions of this report reported on remodeling permits based on the process by which the permit was acquired. In prior years, and “over-the-counter” process allowed permits to be purchased and finalized in one day without a building inspection. For over-the-counter permits, applicants were notified that street tree planting may be required as a condition of their permit, however street tree reviews often occurred several weeks after the permit process was complete. Staffing resources now allow for most street tree inspections to be completed prior to the finaling of permits, therefore compliance rates for over-the-counter permits are not reported here.

After issuing planting requirements, Urban Forestry staff has no further role in ensuring that required trees are planted. All further inspections are conducted by BDS building inspectors, who final all development permits.

In approximately 10% of development permits, tree planting requirements are postponed until right-of-way improvements are completed by Portland Bureau of Transportation (PBOT). The number of properties that fall under this category is not currently tracked in the City’s permitting database, and are categorized instead as permits where tree planting was not required. Because some of these properties will eventually be required to plant trees, the actual percentage of cases where tree planting is required is likely higher than reported in Table 13 below.

Table 13: Development permits issued in 2016

Permit Type	Planting required (cases/% of total)		Planting not required (cases/% of total)	
New Construction				
Residential	256	21%	718	79%
Commercial	4	2%	177	98%
<i>Total</i>	<i>260</i>	<i>23%</i>	<i>895</i>	<i>77%</i>
Remodels				
Residential standard	128	9%	1200	91%
Commercial standard	24	3%	705	97%
<i>Total</i>	<i>152</i>	<i>7%</i>	<i>1,905</i>	<i>93%</i>

Table 14: Sample size for 2016 development permits

Permit Type	Cases/% of total		Trees required
New Construction			
Residential	26	10%	36
Commercial	4	100%	22
Remodels			
Residential	25	20%	49
Commercial	24	100%	71

Table 15: Planting compliance – development permits

Permit Type	Required trees planted			Trend
	2011	2015	2016	
New Construction				
Residential	83%	59%	85%	Improved
Commercial	89%	75%	75%	no change
Total compliance rate	84%	63%	84%	Improved
Remodels				
Residential	41%	52%	52%	no change
Commercial	48%	52%	46%	Down
Total compliance rate	47%	51%	51%	no change

Table 16: Compliance with street tree planting standards for development permits

Planting standard	% of trees planted					
	Residential			Commercial		
	2011	2015	2016	2011	2015	2016
New Construction						
Tree species appropriate for planting strip	50%	31%	41%	100%	61%	62%
<i>Tree species too small for planting strip</i>	7%	8%	3%	0%	0%	0%
<i>Tree species too large for planting strip</i>	43%	23%	7%	0%	22%	38%
<i>Tree species is not on approved list</i>	n/a	38%	48%	n/a	17%	0%
Tree caliper/height meets size standards	93%	96%	90%	83%	50%	90%
Planting depth standards met	n/a	88%	90%	n/a	67%	90%
<i>Planting depth too high</i>	n/a	8%	7%	n/a	33%	10%
<i>Planting depth too low</i>	n/a	4%	3%	n/a	0%	0%
Location standards met	n/a	46%	31%	n/a	61%	38%
Remodels						
Tree species appropriate for planting strip	75%	45%	62%	100%	79%	82%
<i>Tree species too small for planting strip</i>	12%	11%	12%	0%	1%	0%
<i>Tree species too large for planting strip</i>	13%	19%	8%	0%	3%	9%
<i>Tree species is not on approved list</i>	n/a	25%	19%	n/a	17%	9%
Tree caliper/height meets size standards	80%	77%	77%	83%	76%	82%
Planting depth standards met	n/a	74%	77%	n/a	82%	73%
<i>Planting depth too high</i>	n/a	9%	19%	n/a	10%	27%
<i>Planting depth too low</i>	n/a	17%	4%	n/a	8%	0%
Location standards met	n/a	83%	69%	n/a	90%	76%

Summary of findings: Development permits

- Compliance rates increased for new construction permits while remaining unchanged for remodels. Rates in each category are below the 90% target, however the 51% compliance rate for remodels is particularly poor.
- Planting of appropriate species continues to be a major issue, with rates ranging from 41% - 82%. Planting appropriate species ensures that tree-related benefits are maximized with least impact to adjoining infrastructure. Rates are lowest in residential permits, which are responsible for the greatest number of trees required. The majority of trees out of compliance with standards were species not on approved lists, which were updated in 2013.
- The rates of compliance with location standards decreased across all permit types, and were lowest in new construction permits which only saw between 31% - 38% of trees planted in the appropriate space.

Composition of Trees Planted

Species and genus of trees permitted were recorded during compliance site visits. Totals reported are for the sample only.

Table 17: Street tree types planted, non-development

2011		2015		2016	
Genus	% of trees planted	Genus	% of trees planted	Genus	% of trees planted
<i>Acer</i>	38%	<i>Zelkova</i>	9%	<i>Styrax</i>	11%
<i>Quercus</i>	6%	<i>Cornus</i>	7%	<i>Cornus</i>	11%
<i>Nyssa</i>	5%	<i>Lagerstroemia</i>	7%	<i>Zelkova</i>	10%
<i>Prunus</i>	4%	<i>Prunus</i>	7%	<i>Cercidiphyllum</i>	6%
<i>Zelkova</i>	4%	<i>Cercis</i>	6%	<i>Ulmus</i>	6%
<i>Cornus</i>	3%	<i>Magnolia</i>	6%	<i>Magnolia</i>	6%
<i>Magnolia</i>	3%	<i>Acer</i>	5%	<i>Pyrus</i>	4%
<i>Parrotia</i>	3%	<i>Cercidiphyllum</i>	5%	<i>Ginkgo</i>	4%
<i>Fagus</i>	3%	<i>Fagus</i>	5%	<i>Quercus</i>	4%
<i>Gleditsia</i>	3%	<i>Quercus</i>	5%	<i>Nyssa</i>	4%
<i>Stewartia</i>	3%	<i>Syringa</i>	5%	<i>Amelanchier, Rhamnus</i>	3%
other	23%	other	34%	other	29%

Table 18: Street tree types planted, development

2011		2015		2016	
Genus	% of trees planted	Genus	% of trees planted	Genus	% of trees planted
<i>Acer</i>	51%	<i>Fraxinus</i>	20%	<i>Styrax</i>	15%
<i>Pyrus</i>	15%	<i>Acer</i>	15%	<i>Acer</i>	11%
<i>Prunus</i>	5%	<i>Carpinus</i>	14%	<i>Carpinus</i>	11%
<i>Betula</i>	3%	<i>Magnolia</i>	8%	<i>Cornus</i>	9%
<i>Fraxinus</i>	3%	<i>Parrotia</i>	7%	<i>Pyrus</i>	8%
<i>Malus</i>	3%	<i>Cornus</i>	6%	<i>Betula</i>	6%
<i>Cornus</i>	2%	<i>Pyrus</i>	6%	<i>Prunus</i>	6%
<i>Crataegus</i>	2%	<i>Prunus</i>	5%	<i>Rhamnus</i>	6%
<i>Magnolia</i>	2%	<i>Cercis</i>	4%	<i>Magnolia</i>	5%
<i>Quercus</i>	2%	<i>Styrax</i>	4%	4 genera tied	3%
other	13%	other	12%	other	12%

Table 19: Private tree types planted, non-development

2011		2015		2016	
Genus	% of trees planted	Genus	% of trees planted	Genus	% of trees planted
<i>Fagus</i>	15%	<i>Acer</i>	15%	<i>Acer</i>	20%
<i>Acer</i>	15%	<i>Cornus</i>	10%	<i>Cornus</i>	15%
<i>Styrax</i>	13%	<i>Prunus</i>	9%	<i>Thuja</i>	7%
<i>Prunus</i>	11%	<i>Malus</i>	7%	<i>Stewartia</i>	5%
<i>Malus</i>	7%	<i>Thuja</i>	7%	<i>Styrax</i>	5%
<i>Cornus</i>	6%	<i>Pyrus</i>	6%	<i>Chamaecyparis</i>	4%
<i>Cedrus</i>	6%	<i>Cupressus</i>	4%	<i>Ficus</i>	4%
<i>Pinus</i>	4%	<i>Cercis</i>	3%	<i>Pinus</i>	4%
<i>Picea</i>	4%	<i>Chamaecyparis</i>	3%	<i>Malus</i>	4%
<i>Ginkgo</i>	4%	<i>Pseudotsuga</i>	3%	<i>Pseudotsuga</i>	4%
<i>Alnus</i>	4%			<i>Lagerstroemia and Ginkgo</i>	3%
other	13%	other	30%	other	22%

Table 20: Summary of functional type and mature size of trees planted

Permit Type	Functional Type						Mature Size					
	Broadleaf Deciduous		Evergreen Conifer		Broadleaf Evergreen		Small		Medium		Large	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
ROW, non-development	93%	94%	4%	2%	2%	4%	41%	38%	46%	42%	13%	20%
ROW, development	94%	94%	1%	4%	3%	2%	30%	46%	67%	44%	3%	10%
Private, non-development	72%	76%	25%	21%	2%	3%	38%	52%	43%	24%	18%	24%

**data on functional type and mature size of trees planted in 2011 was not reported*

Summary of findings: Composition of trees planted

- Ideally, no tree genus would represent more than 10% of trees planted in any given category, in order to reduce risk of loss to pest or disease. Currently, no permit category meets this goal.
- Changes to the approved list of street trees in 2013 has resulted in a dramatic drop in the planting of maples (*Acer* genus), which are overrepresented in Portland's street tree population as a whole. Despite being excluded from approved lists, maples are still the second most popular genus in development related street tree plantings, however at a lower rate than in 2015.
- Despite the addition of more evergreen species to approved street tree planting lists in 2013, broadleaf deciduous trees continue to make up greater than 90% of all street tree plantings.
- An increase in large form plantings in the right-of-way in 2016 is an encouraging sign, as these trees will generate the most benefits over their lifetime, and suitable spaces to accommodate such large trees are relatively rare. In development, large form trees rose from 3% to 10% of plantings between 2015 and 2016, and in non-development, large form plantings rose from 13% to 20%.
- On private land, where fewer constraints to the growth of larger trees exist, large form tree plantings increased from 18% to 24%, but remained rare, at fewer than 1 in 4 trees planted.
- Between 2015 and 2016, planting of small form trees rose from 38% to 52% on private land. As these trees are required to mitigate removals of trees over 12" in diameter (therefore more commonly larger form trees), this may point to a long-term negative impact on canopy cover, replacing large trees with smaller, shorter-lived ornamentals.
- While no list of approved species currently exists for private tree planting, efforts to educate property owners of the benefits of large-form and evergreen trees, which often are not appropriate in the more constricted spaces offered in rights-of-way, would increase the number of these valuable species.

Analysis and Recommendations

This report documents compliance rates where tree planting is required by PP&R Urban Forestry. Findings reveal tree planting compliance varies greatly between permit types, however permitting volume in non-development is responsible for the majority of trees not planted due to non-compliance.

Table 21: 2016 tree planting compliance rates and estimated number of trees not planted

	2016 Total Cases	Compliance Rate	Estimated # cases out of compliance	Avg. # trees required per case	Estimated # trees not planted
Non-Development					
ROW, Type A	803	73%	217	1.6	347
ROW, Type B	91	88%	11	2.1	23
Private, Type A, Tech issued	1,125	50%	563	1.2	675
Private, Type A, inspector issued	954	56%	420	1.5	630
Private, Type B	105	52%	50	3.8	192
<i>Total, non-development</i>	<i>3,078</i>		<i>1,260</i>		<i>1,866</i>
Development (ROW)					
New construction, residential	256	85%	38	1.5	58
New construction, commercial	4	75%	1	5.5	6
Remodels, residential	128	52%	61	1.9	117
Remodels, commercial	24	46%	13	3	39
<i>Total, development</i>	<i>412</i>		<i>114</i>		<i>219</i>
Grand Total	3,490		1,374		2,085

This study estimates an overall compliance rate of 61% across all permit types, with 1,374 total permits out of compliance with planting requirements, totaling 2,085 trees not planted in 2016.

One hundred percent compliance with planting requirements, while desirable, would be unrealistic given current staffing constraints at both Urban Forestry and BDS. Therefore, a 90% compliance rate, which is presently not met by any permit type, is Urban Forestry's current goal. Table 22, below, shows the expected increase in number of trees planted in 2016 had planting met the 90% compliance rate.

Table 22: Increase in trees planted by raising compliance rates to 90%

	Trees planted at 2016 compliance rate	Trees planted at 90% rate	Increase in trees planted by raising rate
Non-Development			
ROW, Type A	938	1,156	218
ROW, Type B	168	172	4
Private, Type A, Tech issued	675	1,215	540
Private, Type A, inspector issued	801	1,288	487
Private, Type B	207	359	152
<i>Total, non-development</i>	<i>2,790</i>	<i>4,190</i>	<i>1,400</i>
Development (ROW)			
New construction, residential	326	346	19
New construction, commercial	17	20	3
Remodels, residential standard	126	219	92
Remodels, commercial standard	33	65	32
<i>Total, development</i>	<i>502</i>	<i>649</i>	<i>147</i>
Grand Total	3,292	4,839	1,547

Meeting the 90% compliance goal would have resulted in 1,547 more trees planted in 2016. Ninety percent of trees not planted resulted from non-development requirements, however the 147 trees not planted in development also represent a significant lost opportunity in environmental and other benefits provided to the city's residents.

Process Challenges and Opportunities

While a variety of tools exist for increasing compliance, their consideration must take into account the relative benefits of, and constraints to, their adoption. Below is a summary of challenges, possible solutions, and opportunities for future improvement.

Non-development Tree Removal and Replanting Permits

- Enforcement actions available to UF include issuing a civil penalty of up to \$1,000 for each day the permit holder is out of compliance with requirements, initiating a proceeding before the Code Hearings Officer, charging a monthly enforcement fee until the violation is resolved, or charging for the cost of tree planting through the nuisance abatement process. Currently, these tools are only used in cases where there is a public complaint concerning a suspected violation. While these actions would certainly increase planting compliance rates, the staff resources and administrative burden of pursuing them would be costly (1,260 cases are estimated to be out of compliance in 2016). While a process for assessing monthly enforcement fees was established in 2018, a cost/benefit analysis is recommended before deciding to use enforcement as a primary tool for increasing compliance.
- A survey of permittees out of compliance with planting requirements in 2015 cited the most helpful tool for increasing planting would be a reminder letter, notifying property owners of their requirements to replant. Based on this recommendation, in February 2017 letters were sent to all 2016 Tree Removal and Replanting Permit holders. Compliance rates for these permits decreased overall (the small increase in private plantings was overwhelmed by the drop in ROW plantings), however letters will continue to be sent annually and periodic monitoring will measure the effectiveness of this action.
- Requiring proof of purchase of trees prior to permit issuance or requiring applicants to mail confirmation of planting to the Tree Inspector after permit issuance may improve planting compliance.
- Currently, there are not enough staff resources to conduct planting compliance inspections outside of the ten-percent samples used in this periodic report. Conducting follow-up inspections on the more than 3,000 Tree Removal and Replanting Permits issued in 2016 would have considerable cost in terms of staff time and program management. Additionally, over one-third of all permits are currently issued by Tree Techs, who do not carry out inspections in the field. Therefore, these would have to be allocated to Tree Inspectors, only increasing the burden on this limited number of staff. UF recommends exploring ways to fund and staff follow-up inspections on all required tree plantings if other actions fail to achieve desired compliance rates.
- Reducing any perceived barriers to planting is an important consideration for increasing compliance. Purchasing and planting trees as required may be viewed by permittees as burdensome extra steps after permit issuance. While planting and establishment information was included in planting reminders sent to 2016 permittees, including more information on where to purchase trees with permit materials at issuance may help to increase planting compliance.
- Rates of planting compliance between Tree Technician and Tree Inspector issued permits for private tree removals are comparable, indicating that while compliance rates for private

plantings are far below the program goal, there is not currently a need to require Tree Inspectors to visit every site—instead, the Tech issued process, which requires no site inspection and less interaction with applicants, results in similar rates of planting. UF will continue to monitor compliance rates of Tech and Inspector issued Tree Removal and Replanting Permits periodically for any changes to findings presented in this report.

- In a 2015 survey of permittees out of compliance with planting requirements, nearly 30% claimed not be aware that tree planting was a requirement of their Tree Removal and Replanting Permit. Many of these worked with a contractor to fill out and submit their permit, rather than read through and submit themselves. Beginning in 2017, changes to the permit issuance process resulted in every property owner being sent a copy of the permit, regardless of whether a third party applied on their behalf. Future studies will assess whether this change has led to an increase in planting.

Development permits

- Unlike the non-development context, where UF is solely responsible for enforcement of planting requirements, street tree plantings are required under development permits issued by BDS. BDS currently does not inspect required street tree plantings or enforce UF planting requirements by holding back approval of final inspections or certificates of occupancy. In 2018, a process for assessing monthly enforcement fees was established and will be utilized on a case by case basis.
- Current rates of compliance demonstrate a need to address tree planting. A revised approach that includes inspecting for tree planting during the building inspection process would be the most effective method for increasing planting compliance in development. Coordination between UF and BDS is needed to assess whether UF or BDS conduct inspections, and how best to minimize cost and delay to permittees.
- Compliance rates for remodels are lower than with new construction. This may be due to some confusion on the part of permit applicants as to why their project would lead to a requirement to plant a street tree. Also, unlike in new development, building contractors may not pay attention to requirements outside of the envelope of construction. Improvements in communication of permit requirements, in coordination with BDS, are needed to address this issue.
- The process for communicating required changes to site plans in new development and remodeling permits currently involves “redlining”, where UF staff will write in changes to species or planting locations, attach a list of approved street trees for that site, and approve the permit to move forward. Less often used due to the delay they can cause, a “check sheeting” process is used when required trees are not included in plans, where staff places a hold on the permit until required changes are made and the site plan is updated. The low rates of compliance with location standards in development permits suggest that clearer communication of requirements is necessary.
- A new online permitting system expected by BDS in 2019 will provide clearer lines of communication between UF staff and applicants, and will reduce confusion associated with redlining paper copies of plans. Plans for this new system will inform short-term actions taken to address planting compliance issues.

Recommendations

The following is a list of recommended actions to improve planting compliance based on findings of the study. At the time of writing, some recommendations have already been implemented. Periodic updates to this study will determine the effect of these actions and provide guidance for future work to promote higher rates of planting compliance.

Completed

- Send annual notification of planting requirements to permittees of non-development Tree Removal and Replanting Permits during the planting season following permit issuance.
- Update Tree Removal and Replanting Permits to clarify responsibility, call attention to planting requirements and specifications, and to include basic information on tree planting and establishment basics.
- Develop outreach materials to communicate when a property has been inspected in development and non-development situations.
- Establish process for using monthly enforcement fees as a tool for getting non-compliant properties to plant required trees.

Recommended Actions

- Add one additional Tree Technician and three additional Tree Inspectors to build capacity to more effectively enforce elements of the tree code, especially in development. *Funding approved by Council. Positions to be filled in FY 19.*
- Continue permit compliance monitoring program, publishing updated report every 3 years. Next report due in 2020.
- Update and streamline permitting processes in conjunction with transition to a new City online permitting system, expected in 2019. Expected improvements include:
 - Digital plan revision and streamlined contact with applicants and other infrastructure bureaus
 - Ability to incorporate planting site inspections prior to finaling of permits in development situations
 - Asset management database which allows for more detailed and accurate accounting of permitted activities and permit requirements, especially in development situations
- Conduct outreach to tree nurseries on desired stock sizes and species as part of the 5-year update to approved species lists.
- Develop list of recommended trees for private planting to encourage increased planting of large form and evergreen trees where appropriate.
- Explore ways to fund and conduct follow-up inspections and enforcement of Tree Removal and Replanting Permits in non-development situations.
- Explore the best method for providing a planting site inspection prior to finaling of permits in development situations, including funding and bureau responsibility.

Appendix A: Methods

Field inspections were conducted by trained Urban Forestry staff to assess whether required trees were planted and if appropriate standards were followed regarding planting, location, and species selection.

Planting standards were referenced from *PP&R Urban Forestry Street Tree Planting Standards*. The standards set by the City of Portland reflect industry standards and established best management practices for planting, as published in the American National Standards Institute's *ANSI A300 Part 6: Tree, Shrub, and Other Woody Plant Maintenance-Standard Practices (Planting and Transplanting)* (2012), the International Society of Arboriculture's *Best Management Practices: Tree Planting* (2005), and the American Nursery & Landscape Association's *American Standard for Nursery Stock* (ANSI Z60.1-2014). These standards require the root flare of the tree be level with existing soil grade. A 1" (+/-) tolerance was used for acceptable planting depth on all plantings.

Location standards were also referenced from *PP&R Urban Forestry Street Tree Planting Standards*. These standards outline specific distances that trees must be from different city infrastructure. Adequate spacing for trees is defined by at least 25' distance from adjacent trees in medium and large planting strips, and at least 18' distance for small strips. A 3' tolerance was allowed for both of these scenarios. Adequate spacing for trees from intersections and street lights is 25'; stop or yield signs 20'; fire hydrants and directional traffic signs 10'; driveways, alleys, utility poles and underground utilities 5'; and property lines 2'. A 1' tolerance was allowed for these location standards.

Right-of-Way Tree Removal and Replanting Permits

Staff first examined digital permit files for each ROW Tree Removal and Replanting Permits in TRACS to determine what tree species was removed and what species was permitted for replacement. Appropriate size standards were also assessed against Title 11 requirements for proper caliper size (minimum of 1.5" for one and two family residential, 2.0" for multi-dwelling residential, and 2.5" for all other development types), with a 0.25" tolerance for acceptability. Appropriate species was determined by inspector approved species (permitted) or by referencing City of Portland Approved Street Tree Planting Lists. A tree was determined not to be appropriate if the mature size did not match the appropriate planting strip width determined by the planting lists.

Development Permits

Development permits require street tree plantings depending on project size and scope and availability of planting space. UF staff examined permits and site plans to determine where, and how many, street trees were required. Above standards for planting, location, and species were used for all development permits.

Private Tree Removal and Replanting Permits

Private Tree Removal and Replanting Permits and mitigation plans were examined for species removed and intended replacement species and location. Letters were sent out a week in advance to property owners informing them that UF staff would inspect replacement trees for planting and size standards (minimum of 1.5" caliper, with a 0.25" tolerance). Trees were inspected by a staff member when access was available; otherwise a visual assessment was done if the tree was visible

from a distance. If a tree was not visible for inspection, a door hanger was left informing the property owner of the inspection attempt with a date of return. If on the second visit there was still no response from the property owner regarding access to their property, it was classified as an “undetermined planting”. These cases were kept in the dataset and reported as such.

Table 23: Tree Location Standards

Existing infrastructure	Minimum distance	Tolerance
Intersections and street lights	25'	1'
Adjacent trees (large and medium sites)	25'	3'
Stop or yield signs	20'	1'
Existing trees (small sites)	18'	3'
Fire hydrants and directional traffic signs	10'	1'
Driveways, alleys, utility poles, and underground utilities	5'	1'
Property lines	2'	1'

Table 24: Tree Planting Standards

		Tolerance
Depth	Bottom of root flare flush with grade	1" (+/-)
Caliper: (measured 6" above grade)		
One and two-family residence ROW, private property	1.5"	0.25"
Multi-family dwelling residence ROW	2"	0.25"
All other dwellings ROW	2.5"	0.25"