

# Cambridge Urban Forest Master Plan

## Task Force Technical Report Review

December 5, 2019



CAMBRIDGE  
DEPARTMENT  
OF PUBLIC  
**THE  
WORKS**





## REFLECTIONS

*what did you find most eye opening?*

*what is your largest remaining question?*

## ACTION

*which 5 strategies do you think should be highest priority?*

*what strategies are still missing?*

*what steps should we take to further advance  
the goals of the MP?*

*what is your impression of the ordinance approach?*

*what are the largest hurdles to getting it approved and  
accepted by city residents / owners?*



## INTENTIONS OF THE ORDINANCE

### **Trees are a shared resource**

Everyone is subject to the Tree Ordinance

### **Trees provide tangible benefits to the City**

Voluntary removals necessitate a fee that reflects the value of the lost resource

### **Large trees provide greater benefits and take longer to regrow**

Mitigation requirements are proportionately higher for larger trees, and  
The City's largest trees receive special protection

### **The process should be simple and objective**

Homeowners can use a streamlined replacement formula, and  
All other projects use an industry standard valuation formula



## INTENTIONS OF THE ORDINANCE

### **Not all trees are equal**

Fees are computed based on health, location, and species of tree

### **The process should be equitable**

Owner-occupied properties have reduced mitigation requirements,  
Those on financial assistance have all fees waived, and  
Mitigation requirements should not be overly onerous.

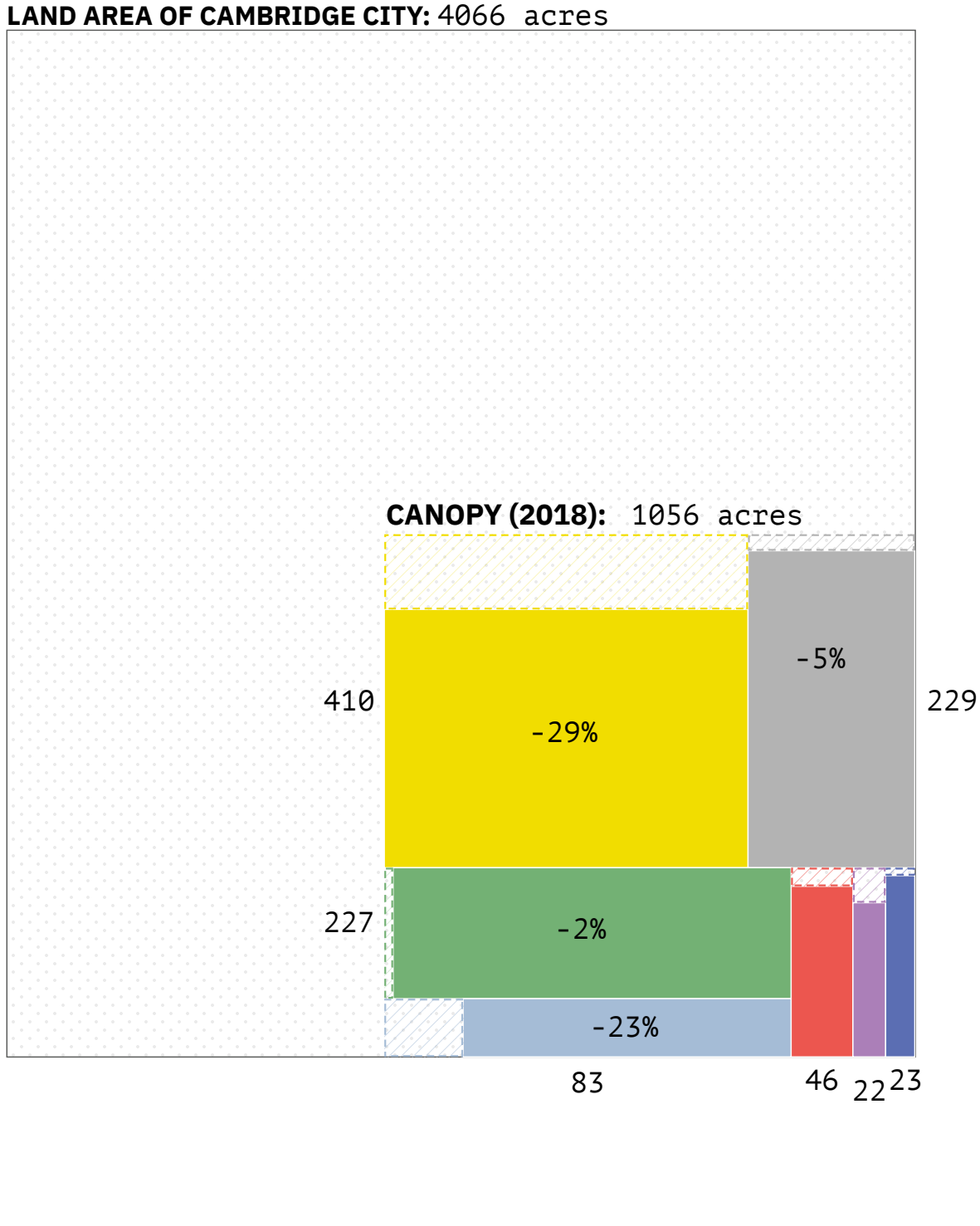
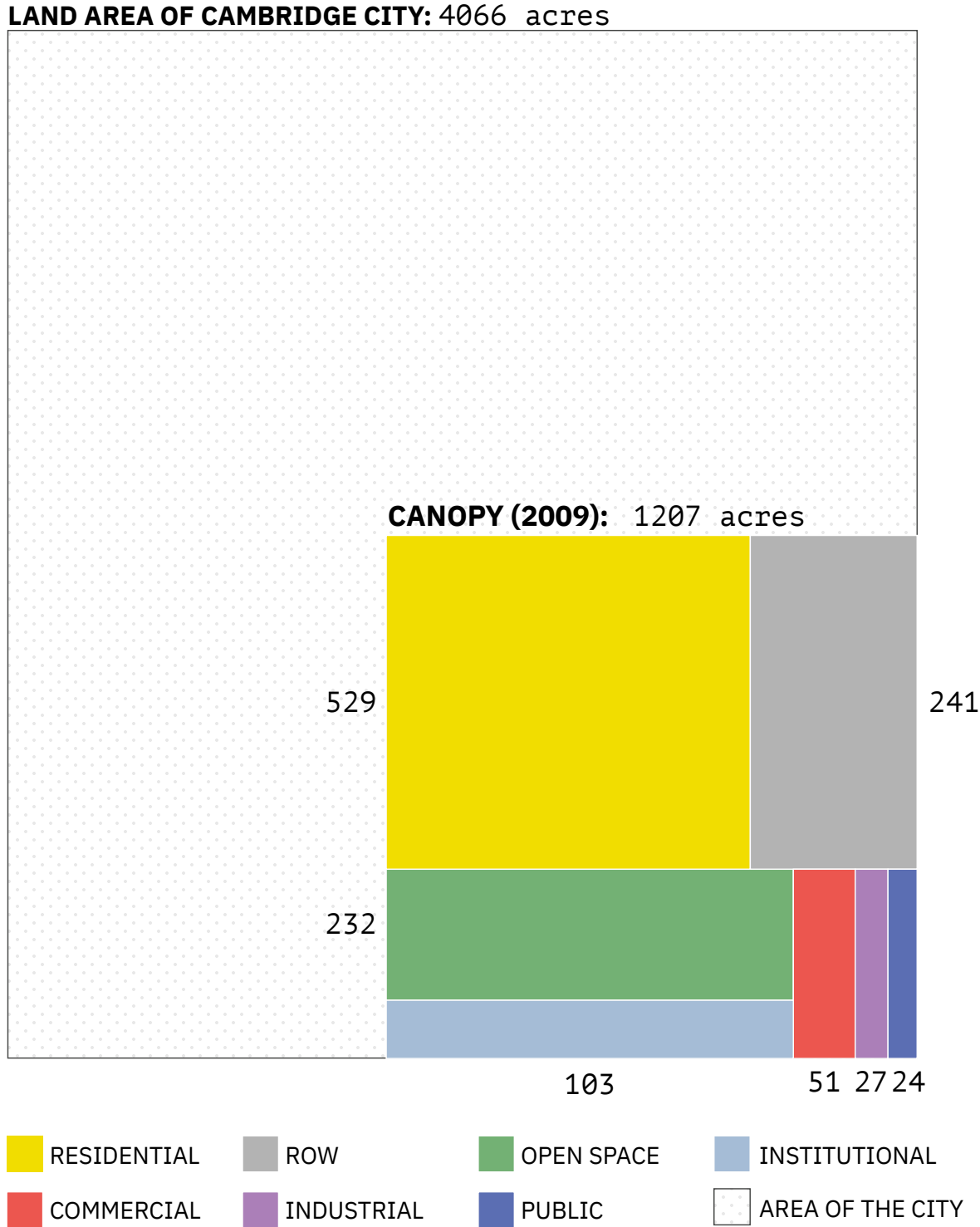
### **Replanting in kind is preferred, but not all sites and project types are equal**

The Ordinance encourages on-site replacement,  
Allows off-site mitigation planting, and  
Makes fees paid to the Tree Fund the most expensive option



# EVERYONE SHOULD BE SUBJECT TO THE ORDINANCE

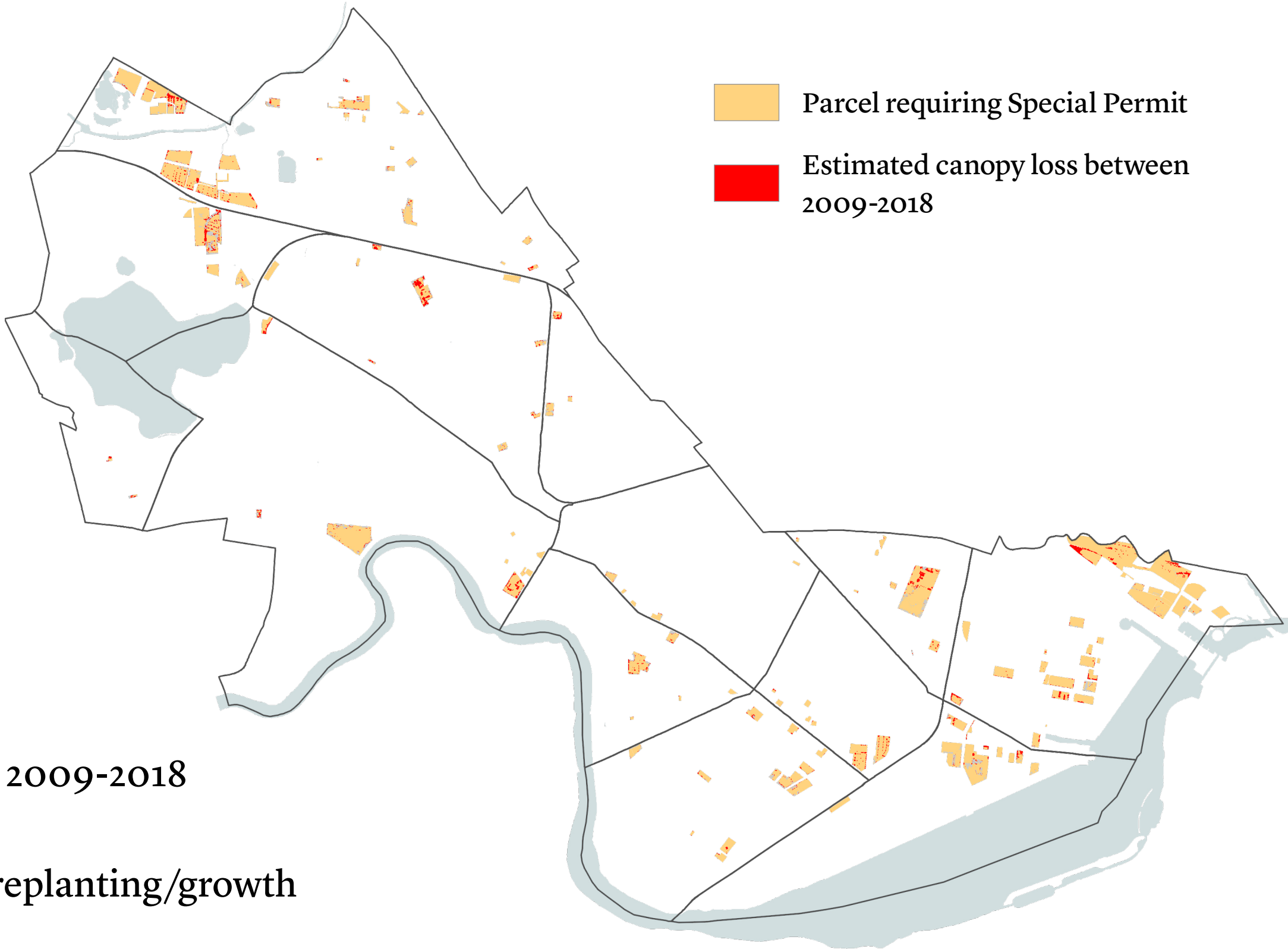
Canopy loss has been largely on residential and institutional properties





# EVERYONE SHOULD BE SUBJECT TO THE ORDINANCE

Special permits for large projects only account for 4.7% percent of canopy loss over the last 10 years



**207 acres** (148 projects)

**20.1 acres** of canopy in 2009

**12.9 acres** (~1,484 trees) removed 2009-2018

**7.8 acres** of net canopy loss after replanting/growth

Source: CUFMP 2018 canopy analysis and City GIS data.



## PROTECT MORE TREES

If the city were to redefine **Significant Trees** to 6” dbh, it would expand the number of trees captured by the ordinance by approximately 49%.



8” DBH OR GREATER



6” DBH OR GREATER

For Example:  
Atlanta; Seattle; Oakland, FL  
Concord, Lexington, and Brookline  
(Massachusetts)



**PROTECT THE LARGEST TREES**

If the city were to add an **Exceptional Trees** category that received additional scrutiny, this could reduce removals of very large, old, or special tree



HERITAGE TREES,  
SEATTLE, WA



JACK LONDON OAK TREE, 100 YEARS OLD  
OAKLAND, CA

Precedents:  
Seattle, Atlanta, Washington DC



## PROTECT THE LARGEST TREES

If the city were to add an **Exceptional Trees** category that received additional scrutiny, this could reduce removals of very large, old, or special tree

Based on field survey extrapolation, an estimated **2,400 trees** in Cambridge would be considered Exceptional Trees

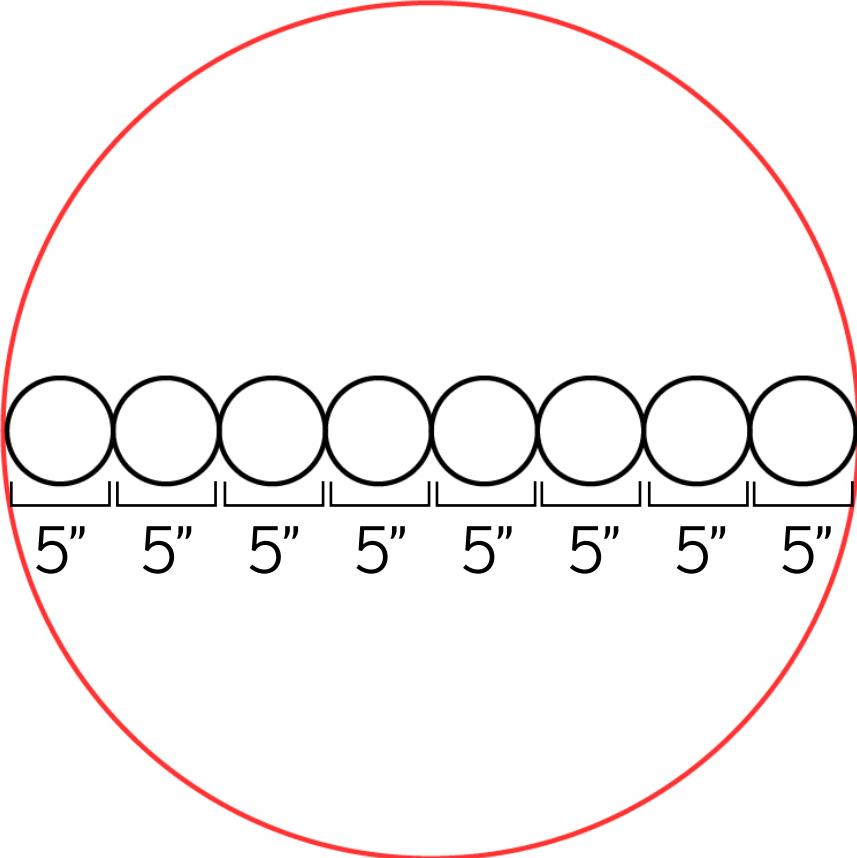
These trees consist of 3% of the tree population, but more than **8% of the total canopy**

On average, it takes about **80 years** to grow a 30” dbh tree

**VALUE TREES MORE ACCURATELY**

Current approach — Trunk diameter formula

40" diameter = (8) 5" Trees



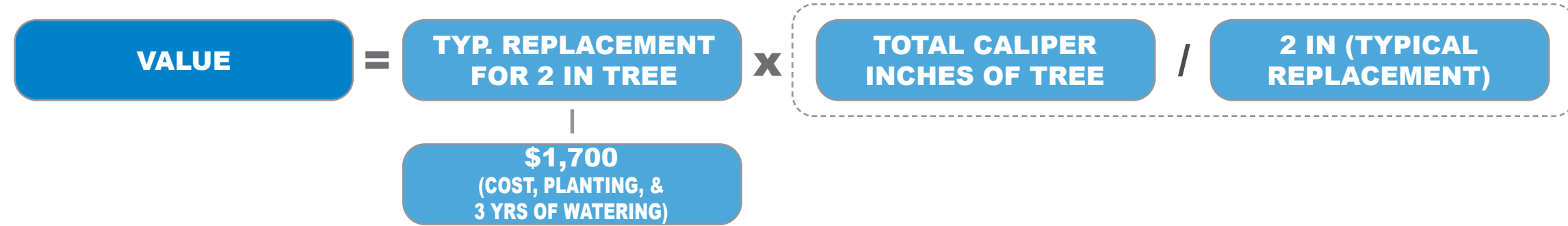
Replacing trees by  
“caliper inch”



# VALUE TREES MORE ACCURATELY

Current approach — Trunk diameter formula for a 36” Pin Oak

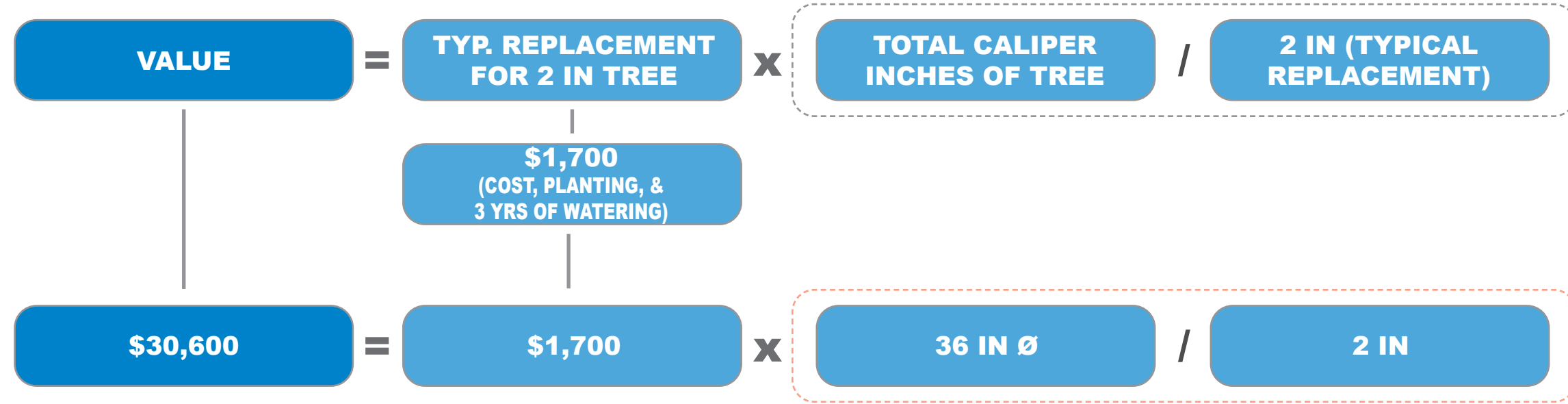
## TYPICAL CALIPER REPLACEMENT VALUE



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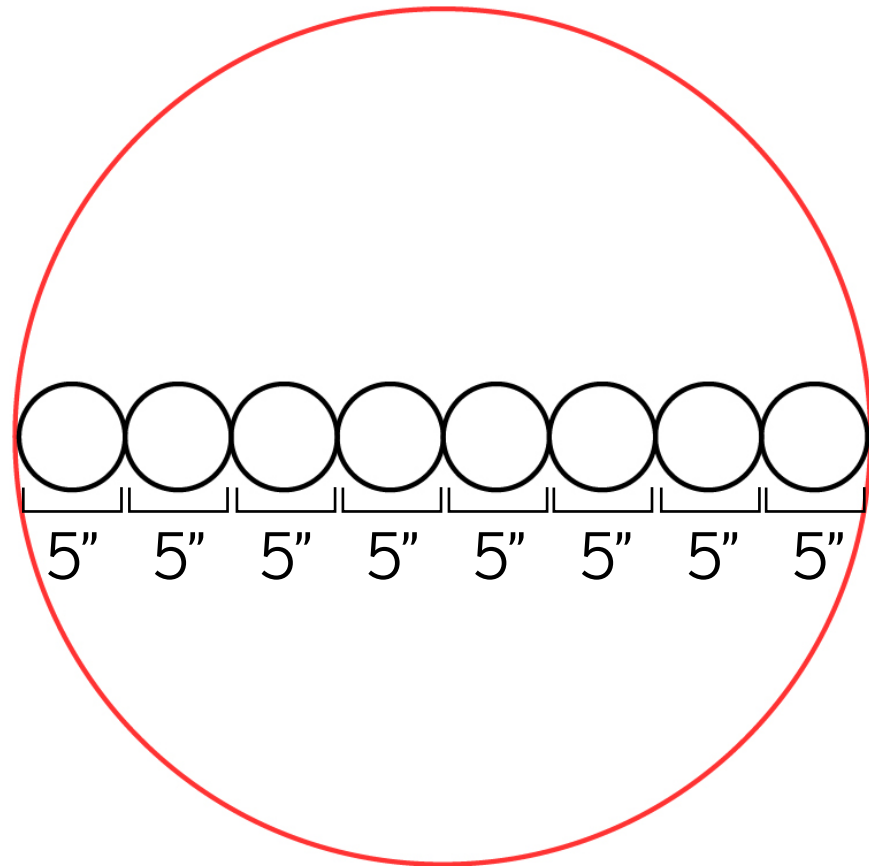




# VALUE TREES MORE ACCURATELY

Proposed approach — Trunk Area Formula

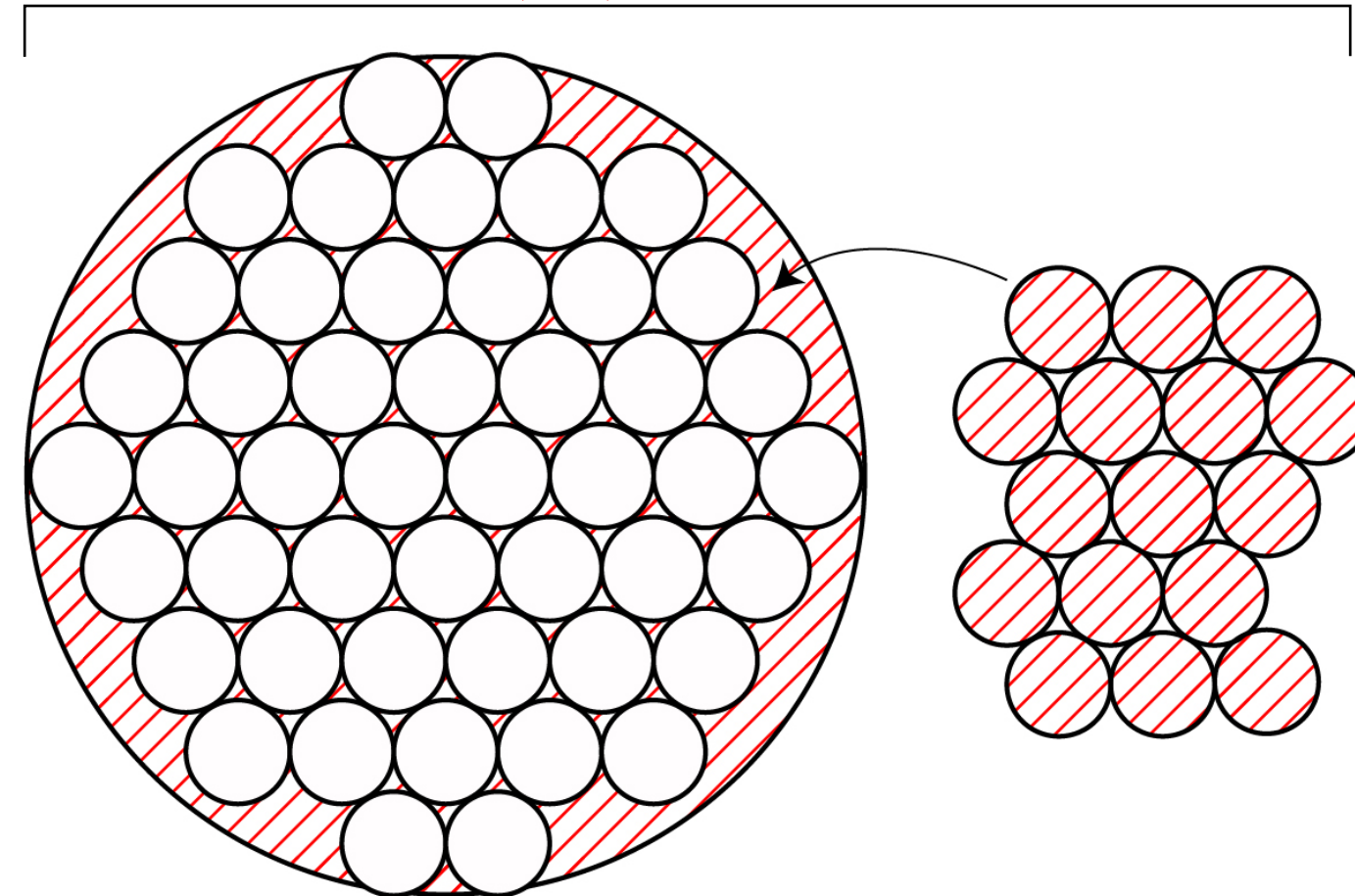
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Replacing trees by  
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(64) 5" Trees



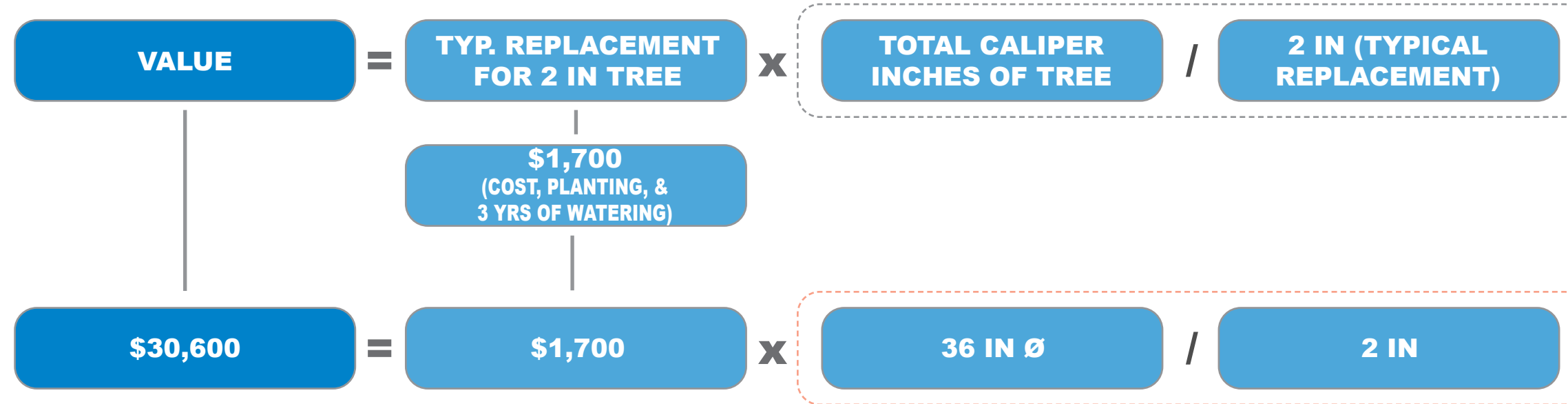
Replacing trees by  
“trunk area”\*

\*total area to be multiplied by the factors which would reduce mitigation

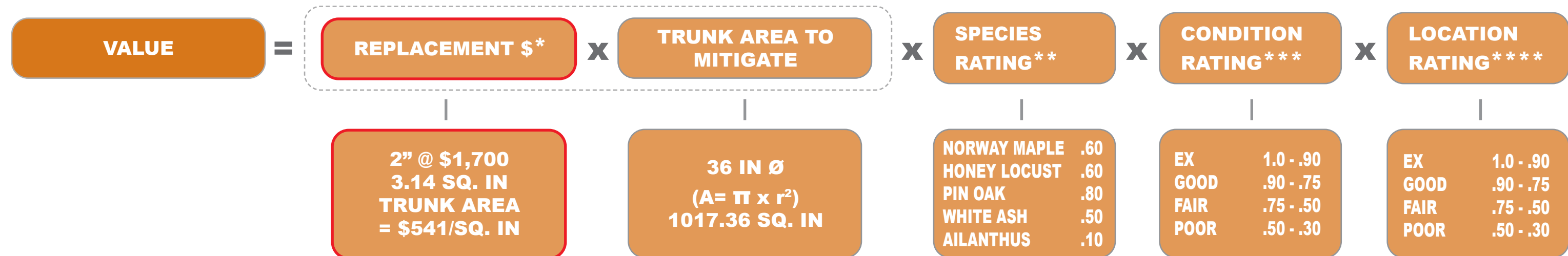
# VALUE TREES MORE ACCURATELY

Proposed approach — Trunk Area Formula using a 36” Pin Oak in good condition with a good location rating as an example

## TYPICAL CALIPER REPLACEMENT VALUE



## WEIGHTED TRUNK AREA REPLACEMENT VALUE



\*This value is still under discussion as to whether it is appropriate

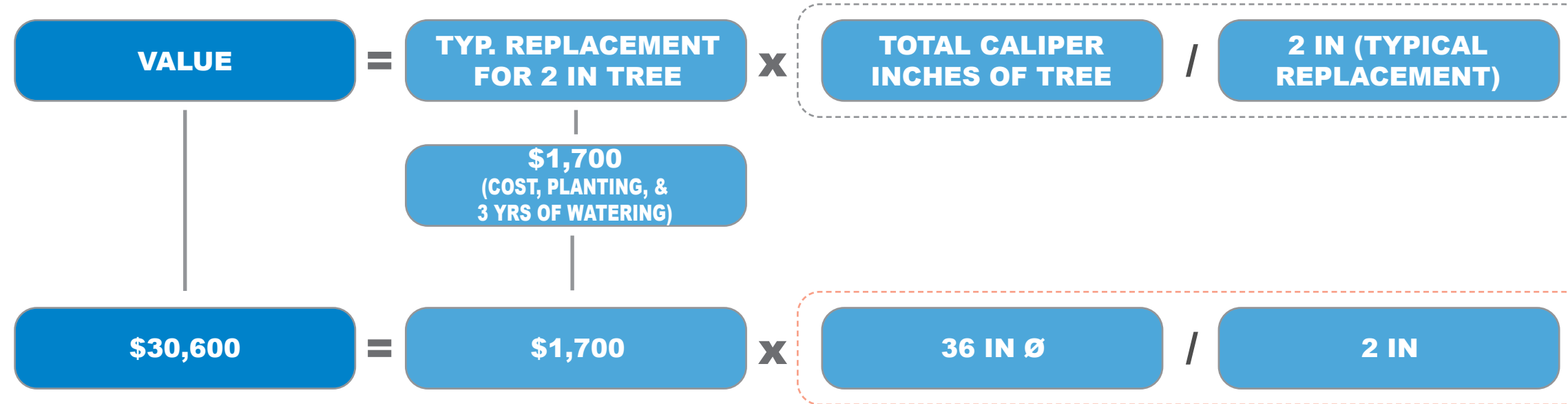
\*\*Source: New England ISA, Tree Species Rating Guide, 2nd Edition  
 \*\*\* ISA Trunk Formula Method from Guide for Plant Appraisal, 10th Edition, Council of Tree and Landscape Appraisers  
 \*\*\*\* Adapted from Urban Tree Health – A Practical and Precise Estimation Method, Jerry Bond, 2012.



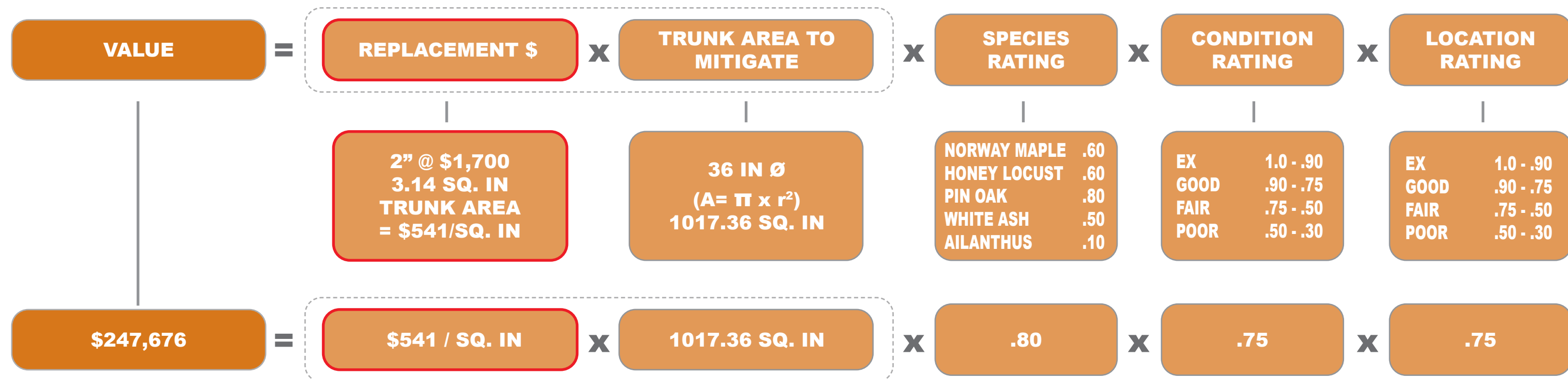
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## TYPICAL CALIPER REPLACEMENT VALUE



## WEIGHTED TRUNK AREA REPLACEMENT VALUE



## ENSURE EQUITABLE APPLICATION

Tree protection measures should not disproportionately impact low-income residents. To ensure costs of tree removal are equitable:

- Maintain a residential exemption (fee reduction) for tree removal on private properties that are owner-occupied
- Waive fees for those on Federal assistance
- Provide replacement trees at no cost for those on Federal assistance

## ENCOURAGE REPLANTING

Forests are dynamic ecosystems and loss and growth are part of their natural processes. To take the long view of forests and to encourage new tree planting:

For general voluntary removals:

- Encourage replanting on site by making tree planting much less costly than paying fees
- Create a Tree Trust to support the City's tree canopy operations including planting and maintenance programs

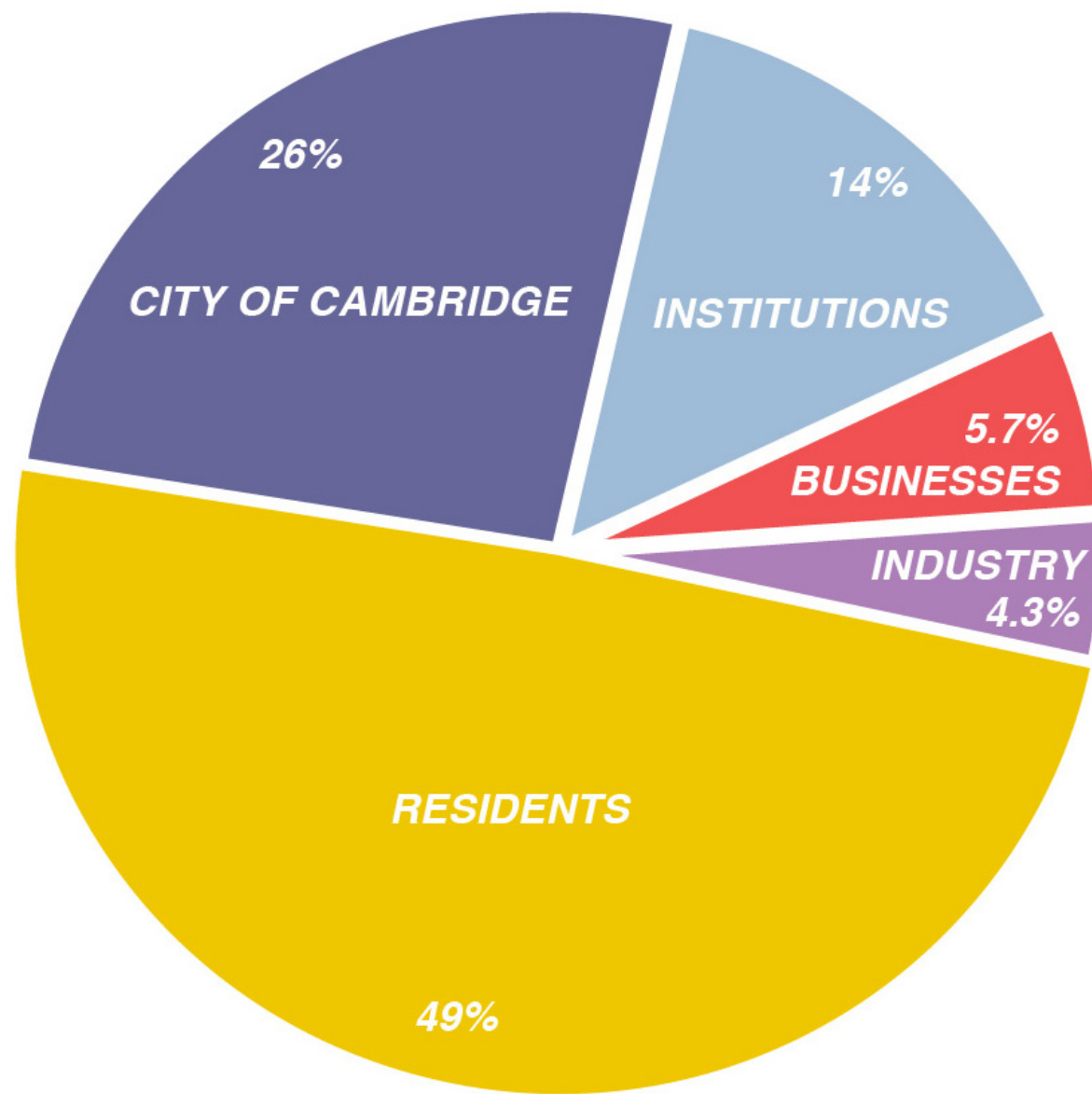
For special permits:

- Encourage replanting on site by making tree planting much less costly than paying fees
- Allow mitigation through tree planting offsite



# ENCOURAGE REPLANTING ON PRIVATE PROPERTY

Develop strategies to direct Tree Fund to additional uses

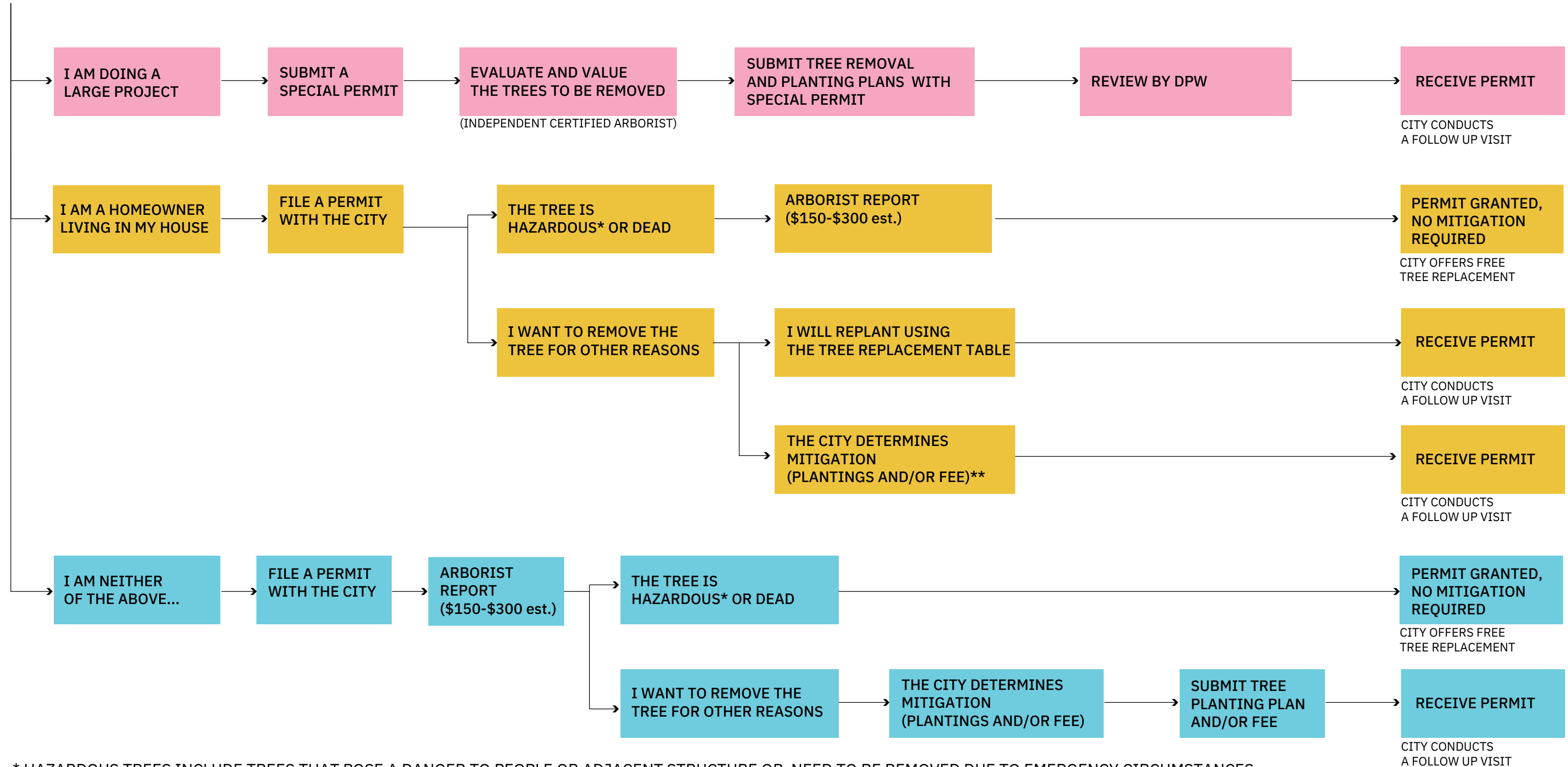


PLANTABLE AREAS BY STAKEHOLDERS



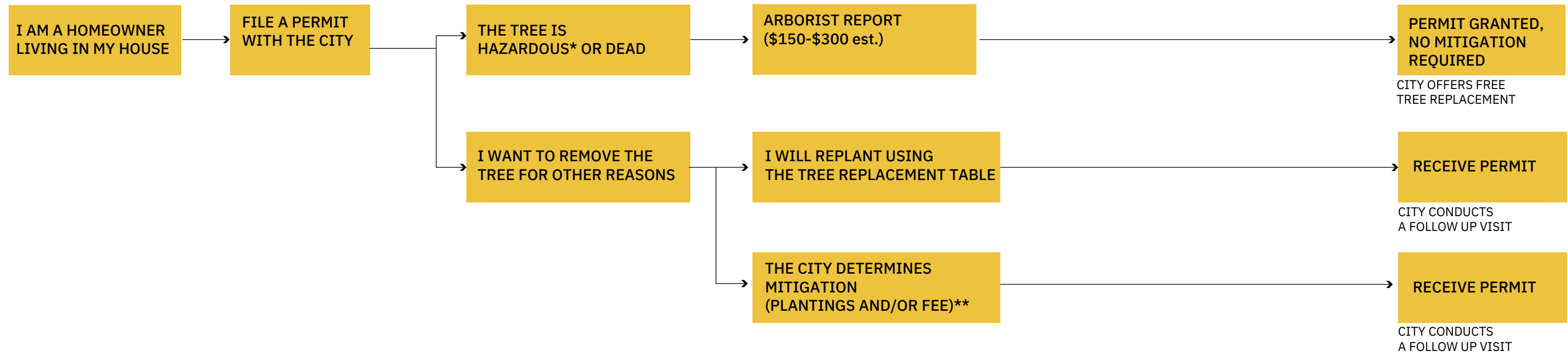


# I WANT TO REMOVE A TREE 6" DBH OR MORE



\* HAZARDOUS TREES INCLUDE TREES THAT POSE A DANGER TO PEOPLE OR ADJACENT STRUCTURE OR NEED TO BE REMOVED DUE TO EMERGENCY CIRCUMSTANCES.

\*\* THOSE ON FEDERAL ASSISTANCE ARE OFFERED FREE REPLACEMENT TREES THROUGH THE TREE TRUST AND/OR DO NOT NEED TO PAY A FEE



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Exemption Credits	Owner Occupied Residence	For Fee: 0.3 for exceptional trees and 0.15 for all other trees For Planting: 0.2 for exceptional trees and 0.1 for all other trees
	Federal Assistance	No fee applied



## HOMEOWNER EXAMPLE

Remove <30" tree and replant on site

DRAFT VERSION OF A SIMPLIFIED TREE REPLACEMENT TABLE

DBH of Voluntarily Removed Tree	# of 2" trees to be replanted
6" to <14"	1
14" to <18"	2
18" to <21"	3
21" to <23"	4
23" to <26"	5
26" to <28"	6
28" to <30"	7
30" or greater	Use Trunk Area Formula with Residential Exception

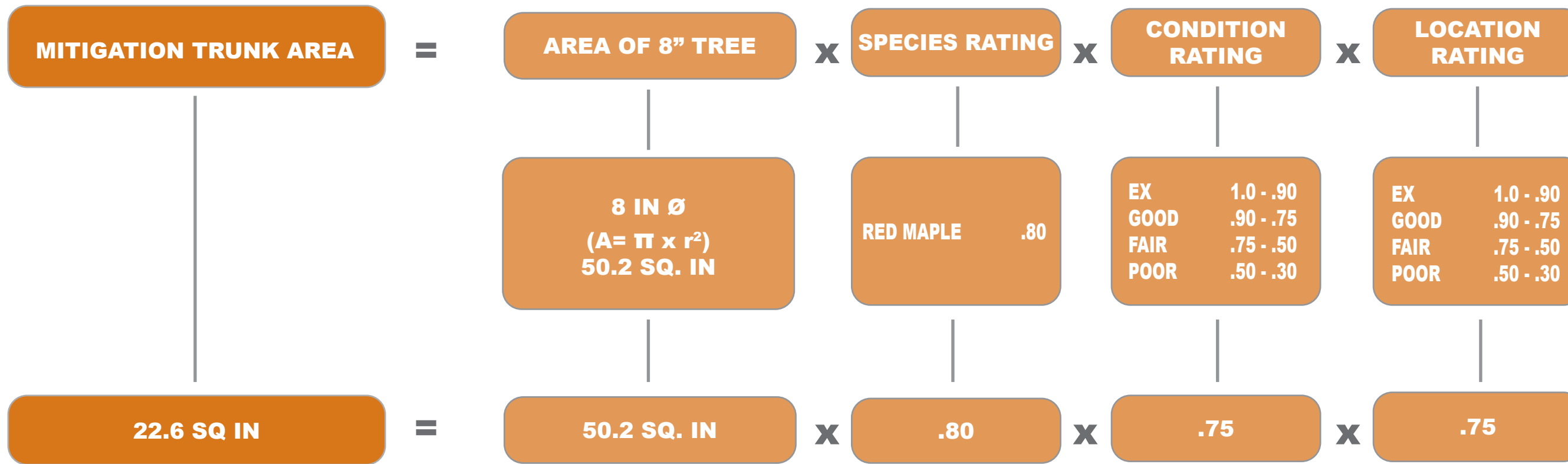
### CONCERNS:

Overvalues low rated species, e.g. Ailanthus

Potentially penalizes small lots with less plantable space

# HOMEOWNER EXAMPLE

Remove a 8" Red Maple in good condition with a good location rating



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## HOMEOWNER EXEMPTIONS\*

## TRUNK AREA MITIGATION

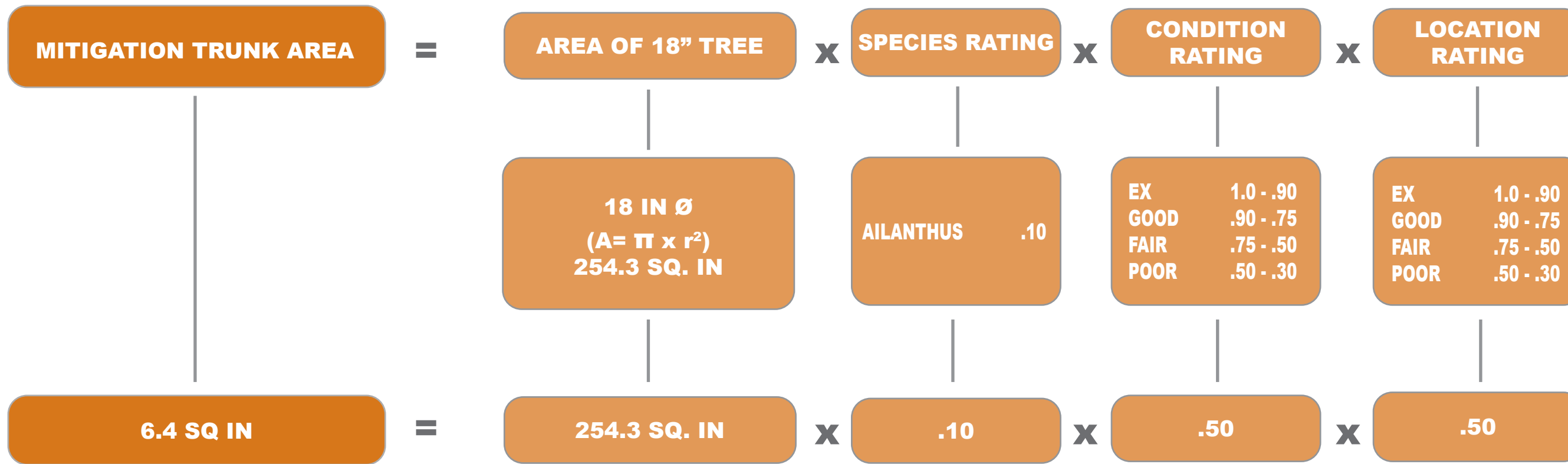


\*Homeowner exemption percentages are still under discussion  
Those on federal assistance do not need to pay a fee



# HOMEOWNER EXAMPLE

Remove a 18" Ailanthus in fair condition with a fair location rating



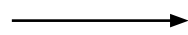
# HOMEOWNER EXAMPLE

Remove a 18" Ailanthus in fair condition with a fair location rating

## HOMEOWNER EXEMPTIONS\*

## TRUNK AREA MITIGATION

**PAY INTO TREE FUND  
20% OF TRUNK AREA**



**6.4 Q IN**

**X**

**20%**

**X**

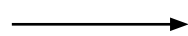
(TRUNK AREA VALUE  
OF 2" REPLACEMENT  
TREES @ \$1700 EACH)

**\$541 SQ / IN**

**=**

**\$693**

**PLANT ON SITE  
10% OF TRUNK AREA**



**6.4 SQ IN**

**X**

**10%**

**/**

AREA OF A 2" TREE

**3.14 SQ IN**

**=**

NUMBER OF 2" TREES

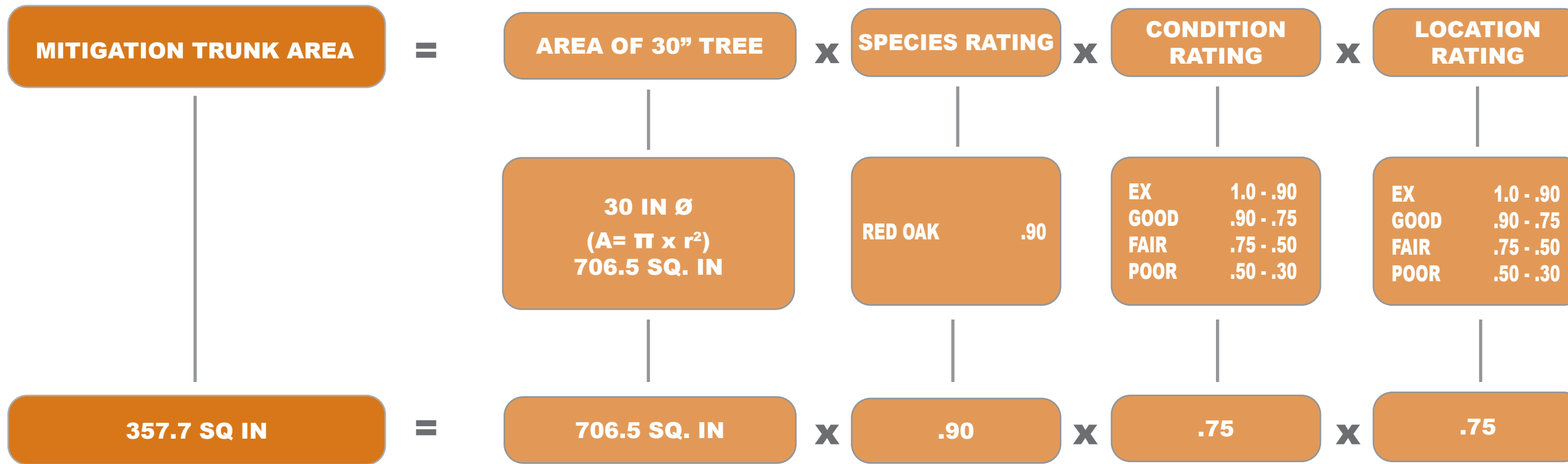
**1**

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# HOMEOWNER EXAMPLE - EXCEPTIONAL TREE

Remove a 30" Red Oak in good condition with a good location rating



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## HOMEOWNER EXEMPTIONS FOR EXCEPTIONAL TREE\*

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# HOMEOWNER EXAMPLE - EXCEPTIONAL TREE

Remove a 30" Red Oak in good condition with a good location rating

## HOMEOWNER EXEMPTIONS FOR EXCEPTIONAL TREE

## TRUNK AREA MITIGATION

**PAY INTO TREE FUND 30% OF TRUNK AREA** → **357.7 SQ IN** × **30%** × **\$541 SQ / IN** = **\$58,054**

(TRUNK AREA VALUE OF 2" REPLACEMENT TREES @ \$1700 EACH)

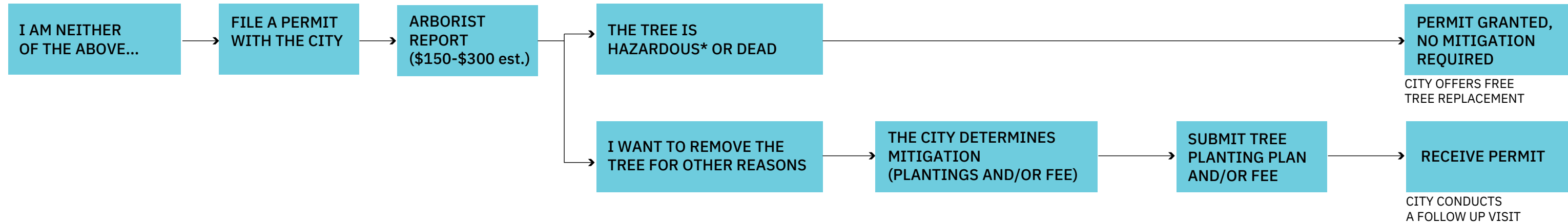
**PLANT ON SITE 15% OF TRUNK AREA** → **357.7 SQ IN** × **15%** / **3.14 SQ IN** = **17**

AREA OF A 2" TREE      NUMBER OF 2" TREES

What is the tree fund payment if THREE 2" trees are planted on site?

**357.7 SQ IN** — **TRUNK AREA (2 @ 3") ON SITE INCENTIVE** **14.1 SQ IN** / **.15** × **\$541 SQ / IN** × **30%** = **\$42,799**

TRUNK AREA FOR MITIGATION    MINUS    TRUNK AREA OF REPLACEMENT TREES WITH ON SITE INCENTIVE

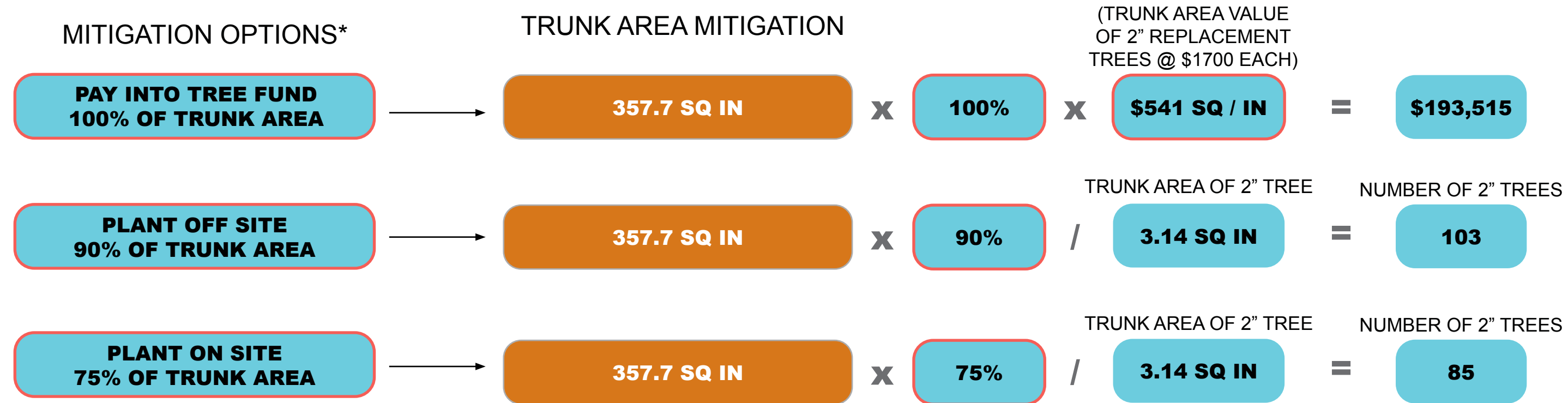


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Mitigation Credits	On site	.75
	Off site	.9
	Fee/Tree Fund Payment	\$541/SQ IN (typical cost of replacement tree installed)

# NON-HOMEOWNER EXAMPLE

Remove a 30" Red Oak in good condition with a good location rating

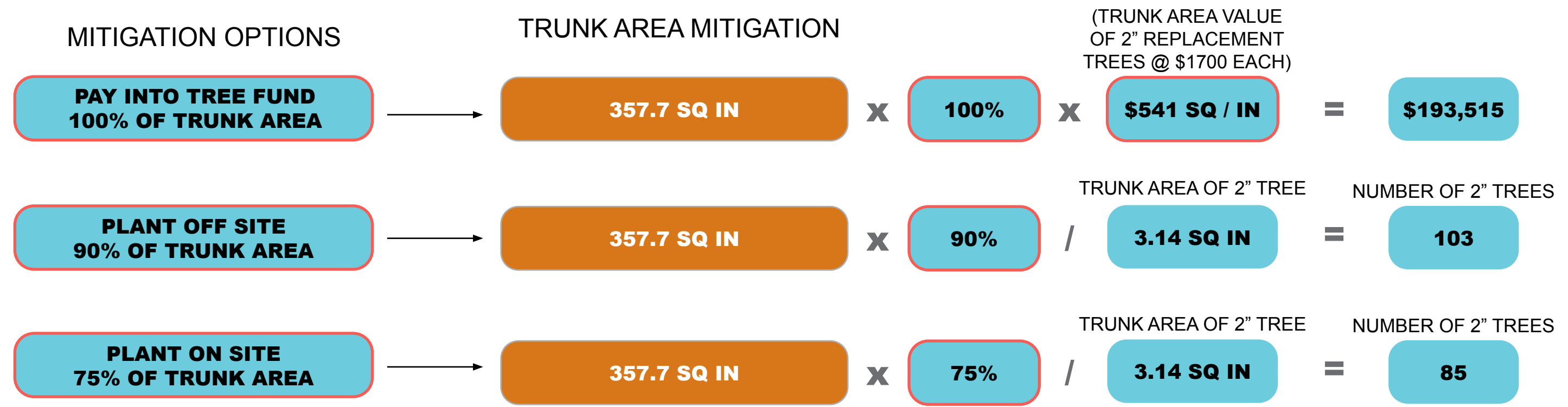


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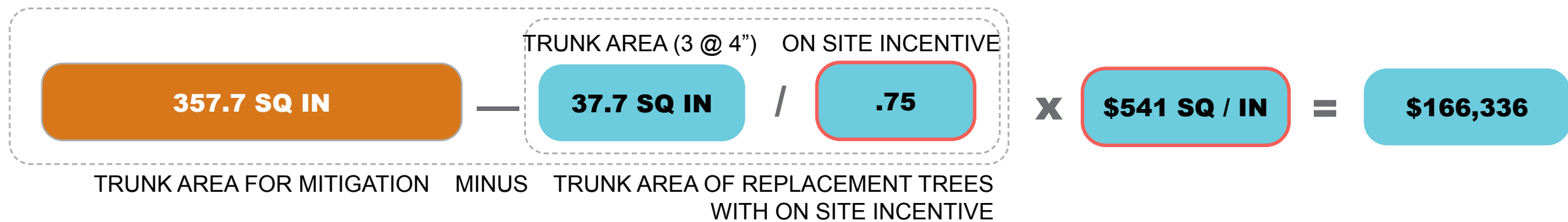


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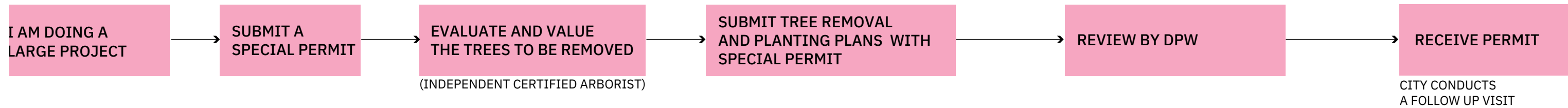
What is the tree fund payment if three 4" trees are planted on site?



# CREATE A SIMPLE PROCESS: SPECIAL PERMITS

DRAFT FOR DISCUSSION

Mitigation same as the non-homeowner but administered through the special permit process



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# PUBLIC COMMENT

[www.cambridgema.gov/ufmp](http://www.cambridgema.gov/ufmp)

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