Determining Possible Planting Space in the Austin Area

Treecon Solutions

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Produced for

City of Austin Urban Forestry Program

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1. Introduction

1.1 Summary

Treecon has been tasked by the City of Austin to provide the total possible planting space for future trees in the surrounding Austin area. By way of geoprocessing, Treecon has provided a raster output layer that displays the total possible planting space available for the city to plant on. This report has been produced to update the City of Austin on the findings and progress of the project at the time of presentation.

1.2 Purpose Statement

A final report accompanied by a poster with results will be included, as well as a website, presentation slides, and a spreadsheet listing properties available for planting. Final maps will include total possible planting space in the total Austin area watershed, possible planting space in the Eastern Crescent, and the prime Austin owned possible planting space. A spreadsheet including the areas we believe to be the most vital parcels of PPS, weighted by factors will be included as both a .csv, and a shapefile.

1.3 Scope

The study area is bounded by the entirety of Austin's watershed that is displayed in Figure 1 with a focus on the Eastern Crescent denoted here in Figure 2. The study area data is from 2018 sourced from aerial imagery of the watershed. All processes attributable to this project will be initiated and completed during the Spring 2023 semester between February and May of said year. There has been no adjustment to the scope of the project at the time of this report although we did receive updated tree canopy as shown in Figure 3.

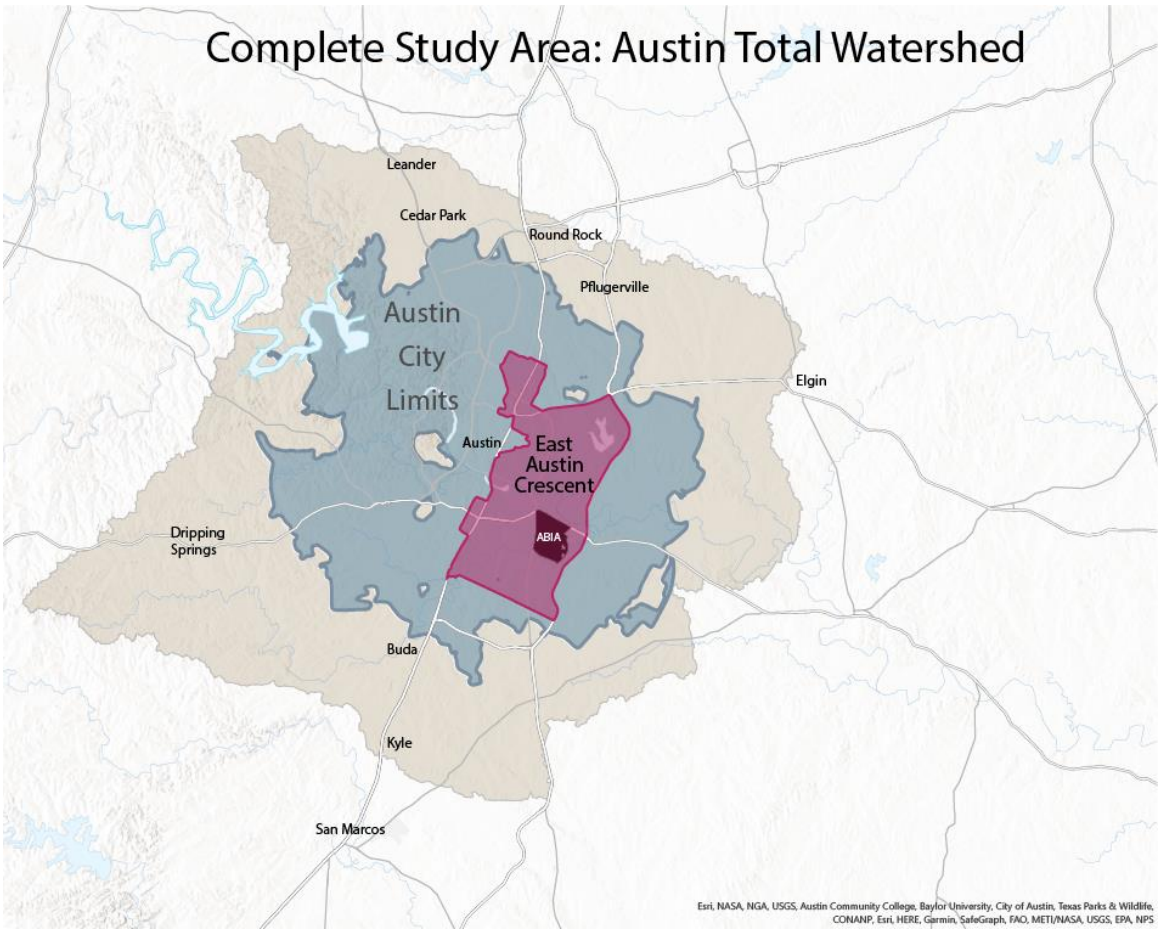

Figure 1. Austin Watershed and Municipality Boundaries.

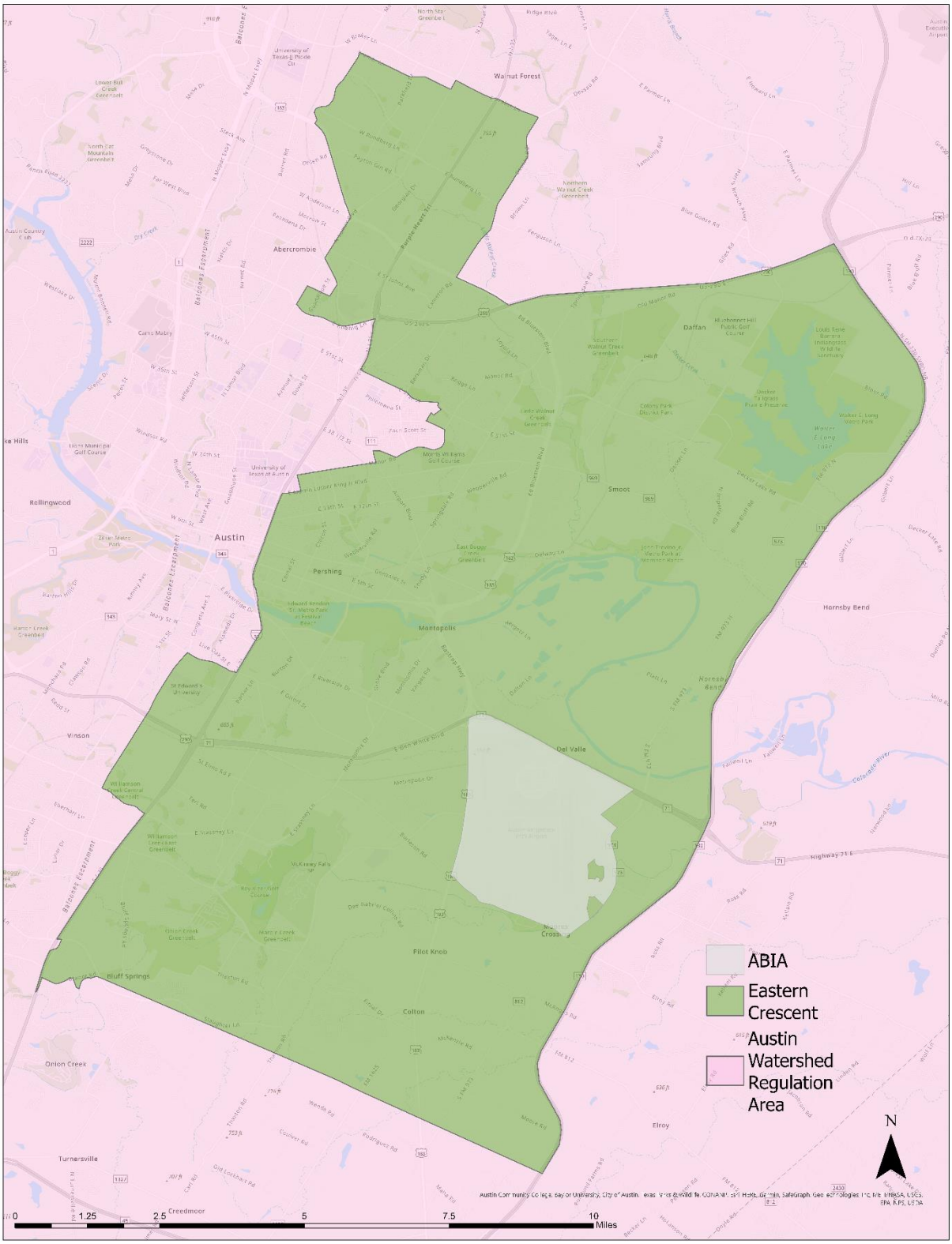

Figure 2. Eastern Crescent Boundaries

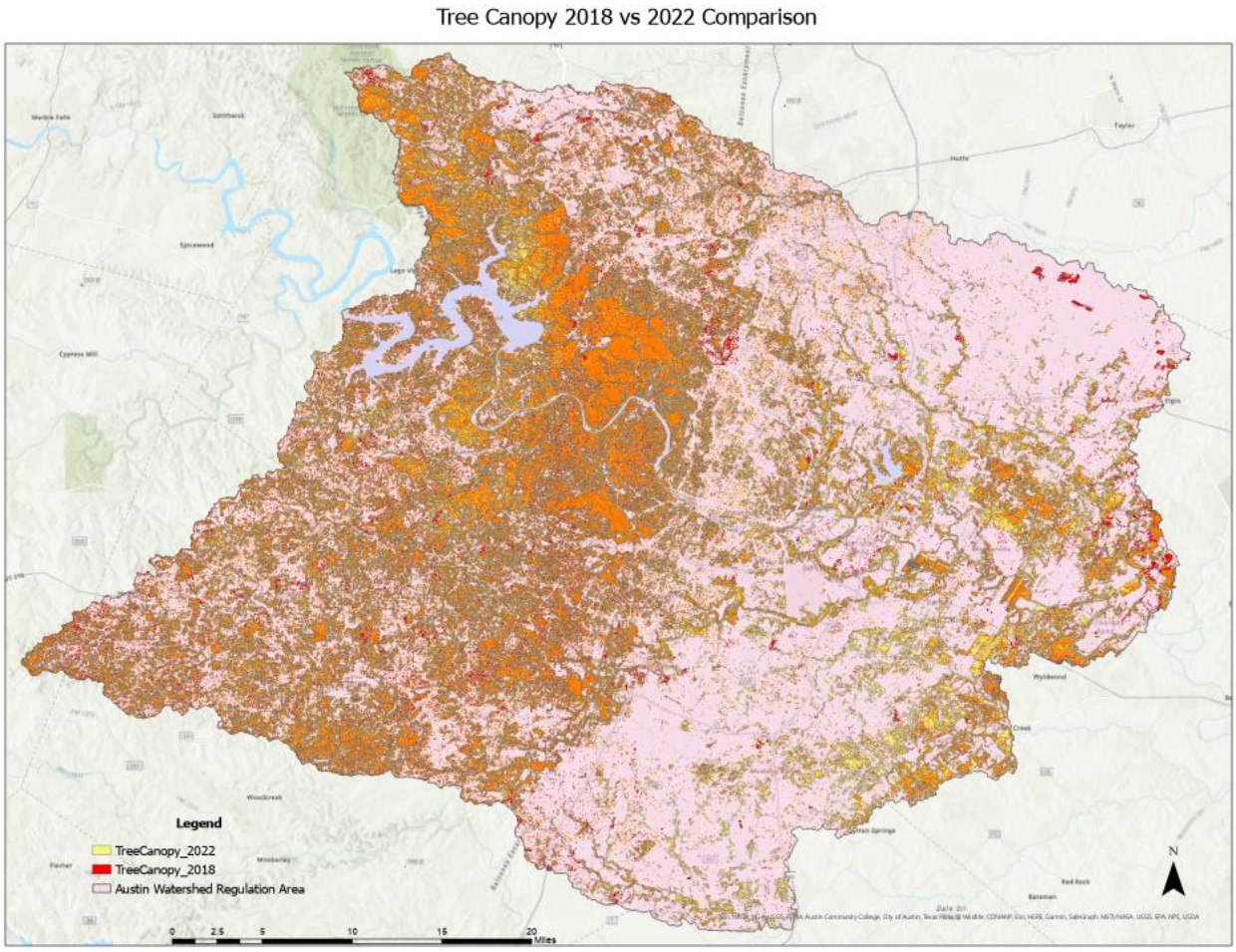

Figure 3. Tree Canopy 2018 vs 2022 Comparison

2. Tasks

2.1 Completed Work

We have gathered all the data needed to complete the project. The total possible planting space has been computed into a raster layer at a cell size of 10, or 10 feet by 10 feet. This layer will serve as the main feature for the rest of the project's analysis. Attempts to produce a vector layer has been thus far fruitless and so a cell size 1 raster will be attempted while running the analysis in parallel from which any analysis we conduct on the cell size 10 raster PPS will be conducted upon the size 1 raster once complete. What has been computed is the percentage of possible planting space. The full watershed regulation area is 1,534.10 square miles. The total possible planting space calculated from the cell size 10 raster is 728 square miles. The 2022 tree canopy area is 557 square miles with a current percent tree canopy of 36%.

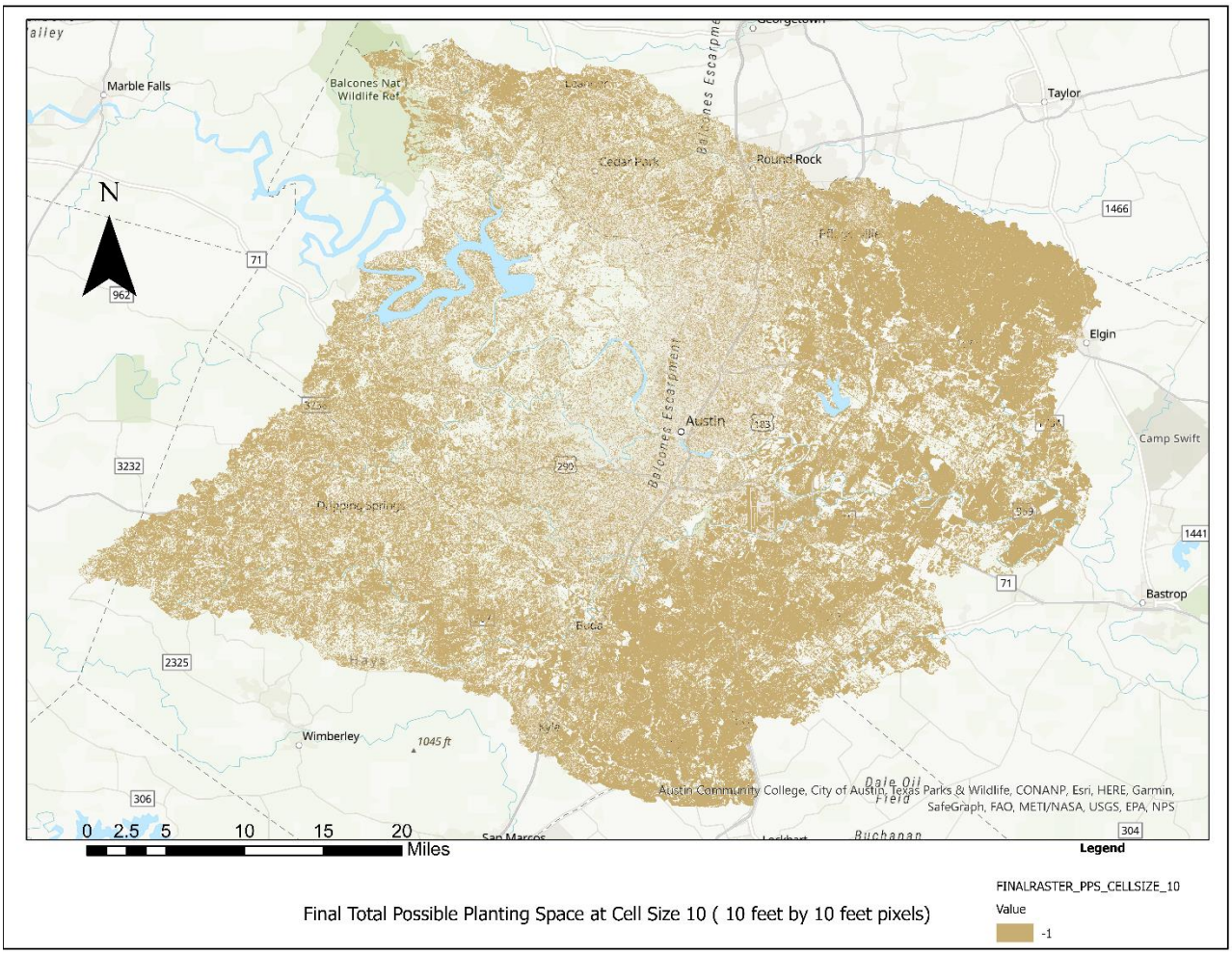

Figure 4. Total Possible Planting Space for Austin Watershed

2.2 Present Work

Classification analysis has been initiated by way of using attributes from the Impervious Layer feature and applying spatial constraints to the raster PPS layer. The cell size 1 raster is being computed and will likely be completed after 9 days of computation time. The team is still attempting to identify a vector possible planting space layer, but this has now become a tertiary concern due to the large amount of time it has taken to produce the planting space layer due to tool failures and errors.

2.3 Scheduled Work

What remains to be done is to prepare features that isolate the raster surface to both the East Austin Crescent as well as City of Austin owned parcels. At the moment, the cell size 10 raster will be utilized for further analysis on the project, but a cell size 1 raster will still be attempted.

Following this, the weighted suitability analysis of the possible planting space with different factors such as urban heat island severity, climate equity by zip code, available space in regard to other trees and ecological suitability will be applied to the raster surface. This will help provide a deliverable that identifies the best places for immediate actionable planting space by different needs and outcomes. A web map may be created featuring this data.

Lastly if time permits, the team will attempt to rectify the accuracy of the final public parcel planting space by using a LiDAR point cloud to further constrain what truly can be planted.

2.4 Problems

We have attempted to combine all non-plantable space (ABIA, Impervious surface, and surface water) and subtract it from the complete study area of the Austin Watershed Regulation Area. All attempts to reduce the watershed study area to only a vector total possible planting space feature have been met with numerous errors. It is suspected that there may be a datum error regarding the provided Impervious Layer 2021 feature that produces topological errors in all of the geoprocessing tools attempted. For this reason, a raster output data surface will be the focus of the remainder of the project unless a timely vector output can be finalized within the next few days. At the moment the raster surface is computed to cell size 10 at or 10 feet by 10 feet, and precision and accuracy has been lost due to this. The team believes that this error is not significant enough to prevent the final deliverables from being provided to the client, however the team is attempting to bring that accuracy to a cell size 1 pixel in the raster output to reduce the error as much as possible.

3. Timeline

The team is now slightly behind due to the large amount of processing time to get the first and most important output of the Total possible planting space. The sheer amount of data has forced long geoprocessing times that have only now just been completed at reduced accuracy and precision as mentioned before. The team believes that the hardest and most time-consuming process has been completed and is confident that the remaining tasks will be executed timely and efficiently. Provided below is the updated timetable to represent the remaining tasks at this point of the project.

Table. 1 Updated Timeline

Phase	Item	Date
Introduction and Outline	Collect data	Jan 29 to Feb 19
	Research	Jan 29 to Feb 19
Proposal	Proposal Presentation	Feb 22
	Proposal Paper	Feb 22
Analysis	*Geoprocessing*	*Feb 22 to Mar 20*
	Design Progress Report	Mar 22
	Finalize progress reports	Mar 27
Assessment	Progress Report Presentation	Mar 29
Analysis continued	Complete Classification	Mar 29
	Initiate suitability weights	Apr 3
	Complete Cell Size 1 Raster	Apr 5
	Begin Production of Spreadsheet	Apr 11
	Rectify best parcels with LiDAR	Apr 18
Final	Finalize all deliverables	Apr 25
	Final Paper	Apr 25
	Final Presentation	May 1

4. Conclusion

So far, the project is on track. The inability to produce a vector dataset of the possible planting space has been a setback but the raster output layer should provide similar results for the original intended analysis. Moving forward the team is confident that at the very least, the cell size 10 raster will provide sufficient final deliverables, but we are hopeful to end with a cell size 1 raster to reduce overall error. The toughest aspect of the project being the preprocessing of the data is now behind us. Now analysis of the planting space feature can be conducted over the next three weeks and the team is confident that the final deliverables will be completed on time.

5. Participation

Griffin Moore – Conclusion, Figure 1

Joseph Van Smirren – Timetable and Timeline, Table 1

Ashley Perez – Introduction (Summary, Scope, Purpose), Figure 2, Figure 3

Thomas Shively – Tasks (Completed, Scheduled, Present work/ Problems), Figure 4