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Arborist Report

8/10/2023

Main Street Trees

Joplin, MO 64801

Prepared For:
The City of Joplin
By: Lauren Copple
Outer Oaks LLC

1. Summary

The trees located throughout the downtown area within the street and sidewalk right of way “ROW” evaluated within this report exist between 2nd street (north main) and 32nd street (south main). These trees not only provide shade to local businesses but improve the community’s overall beautification therefore a quality urban tree canopy is top priority.

2. Introduction

The purpose of this report is to assess the existing trees contained within the Main Street Tree ROW “MST” and evaluate their impact on the community, create a list of maintenance needs, identify trees needing removed and recommend replacement species or locations.

Assessment will take into consideration the health, condition and structural integrity of the trees and involve the impact of future maintenance, patron safety, and use of this area on the evaluation of these trees.

All conclusions or recommendations are based on site visits and visual tree evaluations from the ground. Any new tree recommendations or replacements will follow the City of Joplin’s authorized tree list.

3.Site Descriptions

Map 1.



Map 1 is a broad map showing the evaluated areas from 2nd street to 32nd street along both sides of main street.

4.Methods

A tree assessment was made on 7/27/2023 to evaluate the health and condition of these trees and to make recommendations on maintenance, removal, and new tree installations.

The assessment information was gathered by a visual inspection from the ground to assess the area around the trunk and roots of the trees. The assessment also included a visual inspection of the canopy, overall structure for defects and to inspect for problems such as pest and diseases. Photographs were taken using a digital camera; no enhancements were made to any photographs used in this report. Assessment did not include soil testing, below surface root inspection, aerial inspection, or any other investigative inspection methods.

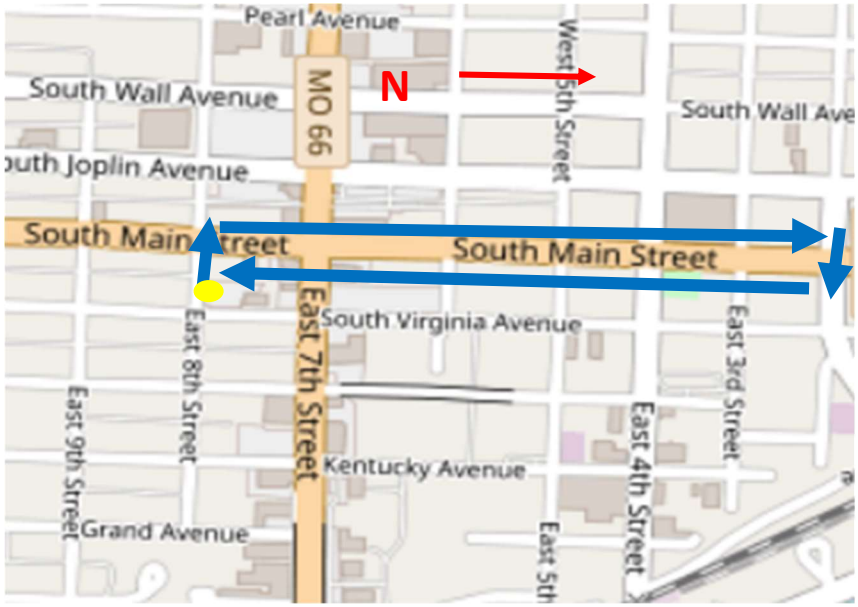
5.Tree Assessment

(No guarantee can be given nor can it be predicted that branch failure or uprooting (windthrow) would not occur as a result of high winds and /or excessive rainfall. A visual assessment can only take into consideration the outward signs of a trees condition. There are many problems that can occur inside a tree that cannot be seen, such as fungal diseases and undetected structural faults such as decay and hollows. Problems can also occur within the root systems due to contaminated soils and root diseases. These issues have not been taken into consideration in this evaluation.)

This evaluation of the main streets trees will be conducted in three groups, the northern portion containing trees from 2nd to 9th street, central section from 15th-26th street, and a southern group from 26th to 32nd street. Trees on both east and west sides of main street will be evaluated before moving to the next section. A map will be provided at the beginning displaying the movements of the tree evaluation.

5.1 North Main Trees

Map 2



The blue arrows featured on map 2 show the direction the evaluation of the main street trees will follow. A single tree at the corner of 8th and main on the eastside is the starting point immediately crossing the street and moving north to 2nd before crossing back to the east side of main and moving south.

The evaluation of a single side (east or west) of trees along main street before moving to the other side will stay consistent, instead of crossing back and forth.

Picture 1



Tree ID: 14670

Bradford/ Callery pear "*Pyrus calleryana"* located on the northeast corner of 8th and main with signs of minimal damage from fire blight present in the foliage. Copper based sprays and specific pruning can be done to reduce the spread of the blight over the dormant season.

Due to the invasive nature of this tree species, its removal recommendations from the Missouri Department of Conservation "MDC", and the current canker defects this tree is a good candidate for removal and replacement.

Picture 2

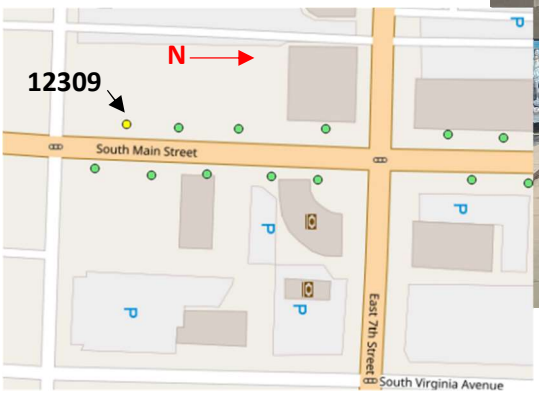


Tree ID: 12309

Pear tree "*Pyrus callerayna"* at the northwest corner of 8th and main street with some yellowing throughout the tree canopy. The discoloration of the leaves can be an indicator of poor soil composition or bacterial problems likely heightened by drought stress.

This tree is recommended for removal and replacement due to its invasive nature, size, and recommendations from the local conservation department.

Map 3



Picture 3



Tree ID: 12310

Callery pear "*Pyrus calleryana"* between the 800 &700 blocks of main street along the western side of the road. Heavy amounts of fire blight present in the canopy, with over 50% of the crown consisting of browned and dead leaves. Late season flowers present as further evidence of overall tree stress.

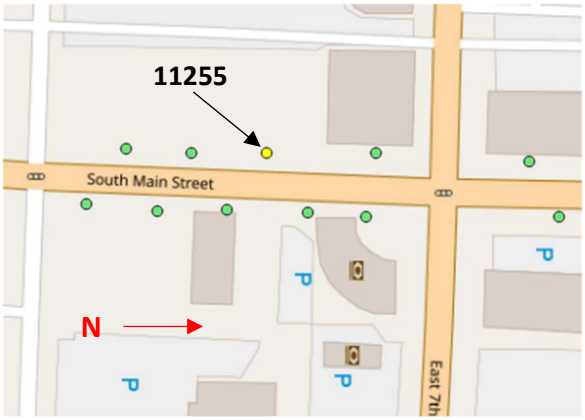
The overall size of the tree, leaning trunk and contaminated canopy make this tree a good candidate for removal in addition to the invasive nature of this species.

Picture 4



Tree ID: 11255

Callery pear "*Pyrus calleryana"* along the west side of main street with I significantly damaged canopy. The effects, of drought, fire blight, and insect presence have put this tree in decline, making it a good candidate for removal.



Map 4

Picture 5



Tree ID: 1254

Callery pear "*Pyrus calleryana"* with heavy amounts of fire blight damage, common to the Rosaceae plant family, throughout the entire canopy. Canker wounds are visible within the main trunk and larger branches making pruning to correct an unrealistic treatment option.

The invasive nature of this tree species in addition to the recommendations from the MDC and city tree board for removal make replacement the best option for this tree space. Utilizing the preselected main street tree recommendations from the JCTB a new tree should be established during the dormant season.

Picture 6

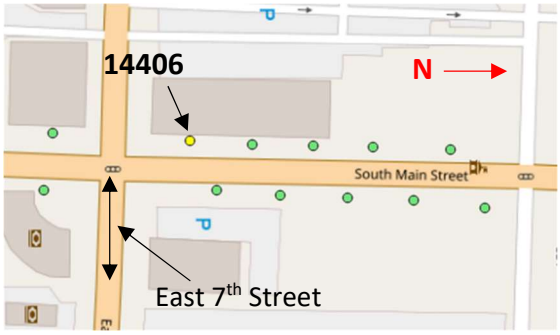


Tree ID 14406

Partially defoliated pear tree "*Pyrus calleryana"* located just north of the 7th and main street intersection along the west side of the road. Blight is present on the remaining leaves giving is a brown/ "crunchy" appearance while the opposite side of the canopy has been defoliated by bag worms "*Thyridopteryx ephemeraeformis"*.

This tree is a good candidate for removal due to insect/ disease presence and the increased cost of treatment as well as the removal recommendations given by the state for this tree species.

Map 5



Picture 7



Tree ID: 14405

Japanese tree lilac "*Syringa reticulata"* with heavy amounts of bag worms present and 0 foliage remaining. Quality branch structure and flexibility is present throughout the remaining branches. Limb highlighted with a yellow arrow contains a wound from rubbing on the cage provided around the trunk.



Lower limbs should be pruned to avoid damage from periods of wind, or from the general public utilizing the sidewalks. If possible, cages should be avoided until the tree has reached a height where damage will not be caused to lower limbs or trunk areas.

Picture 8





Tree ID: 13830

Japanese lilac tree "*Syringa reticulata"* along the west side of main street just north of the 7th street intersection. Majority of the canopy is intact, however bagworm presence is sigificant and will add potiental stress to this young street tree.

Manual removal of bagworm cases is the recommended treatment due to the trees overall size and location of this tree. Utilizing a 5 gallon bucket of water with dawn dish soap to catch the caterpillers while being removed by hand will provide sufficient insect control.

Picture 9

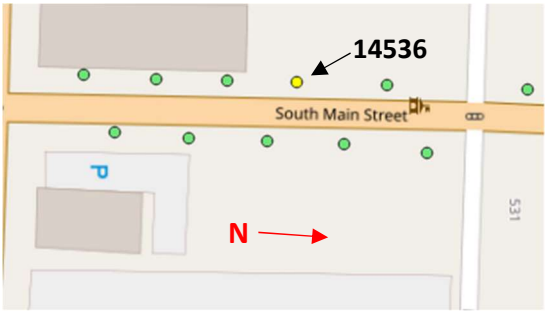


Tree ID: 14536

Callery pear "*Pyrus calleryana"* along the west side of main street midway between the 600 & 700 block. This tree is expanding beyond the ornamental "cage" that exists around all the trees along main street. The majority of the pear trees evaluated in this report show signs of fire blight in addition to defoliation and or insect damage, however tree 14536 shows minimal defect at this time.

Removal is recommended for this tree as it is expanding through the cage reducing future reliability in addition to its invasive nature.

Map 6



Picture 10

Tree ID: 12536

Callery pear "*Pyrus calleryana"* near city hall with a heavy amount of canopy decline. Signs of fire blight is present on the remaining folliage while the overall decline is due to the presence of bagworms throughtout the crown.

The cost of treatment to eliminate the insect presence and reduce the effects of fire blight out weighs the potential benefits of this tree, making it a good candidate for removal. Consider the main street tree planting recommendations from the approved city tree list when considering a replacment for this space.



Picture 11



Tree ID: 14370

Japanese tree lilac "*Syringa reticulata"* near the intersection of 6th street and main street along the west side of the road. The planting depth of this tree is of good quality with a top layer of mulch added beneath the protective grate. Wounds present in the area highlighted in yellow from rubbing the ornamental cage during events of wind.

Defoliation is a result of the presence of bagworms throughout the canopy. Quality branch flexibility and bud vigor present making hand picking of the cases, the recommended method to prevent further spread.

Picture 12



Tree ID: 15478

Callery (Bradford) pear "*Pyrus calleryana"* with dieback present in the upper portions of the canopy. The overall branch structure within the canopy is poor with limited space remaining for the trunk to expand inside the ornamental cage. Fire blight and bagworms are also present causing defoliation and crown decline.

This tree is recommended for removal and replacement.

Map 7



Picture 13



Tree ID: 15432

Callery pear "*Pyrus calleryana"* midway through the 500-600 blocks of main street. This tree is a good candidate for removal due to its overall size and invasive/ unreliable nature, however there is minimal canopy damage from insect or disease and appears to be full with quality foliage color.

The business owner directly adjacent to tree 15432 has requested the reduction/ removal of this tree to improve curb appeal.

The replacement with a snowshoe crab apple or Japanese tree lilac would improve the overall aesthetics of the downtown area and that of the adjacent business owner.

Picture 14



Tree ID: 14540

A newly planted ornamental crab apple "*Malus spp."* (installed within the last 3 years) near the intersection of 5th and main street. Tree has been planted too high leaving an exposed upper root system, which can lead to additional stress and tree decline. Remove the cage and tree grate to evaluate if additional soil medium can be added to prevent future root decline. Add a top layer of soil or mulch if space allows to the top of the root flare, avoid overfilling or applying additional materials on the trunk.

Insect damage has lead to the overall defoliation of the tree canopy, however quality branch flexibility is present and new growth has began from terminal buds. Continue to monitor this tree through the next growing season and watering through times of drought.





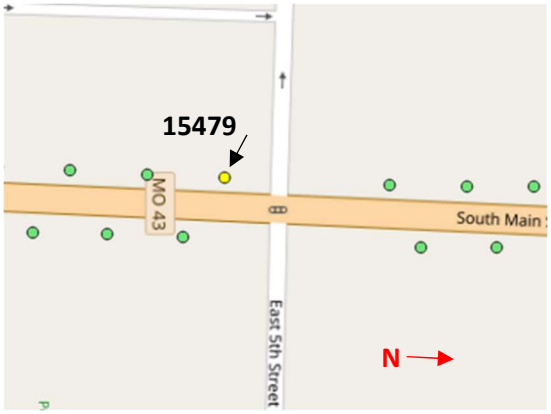
Picture 15

Tree ID: 15479

Crab apple "*Malus spp.*" Located at the northwest corner of 5th and main. Poor planting practices are evident in this young tree. The application of the ornamental cage has damaged the lower limbs creating additional stress as the tree attempts to collar over the wounds. Presence of bagworms has defoliated the canopy in its entirety, with new growth emerging from quality terminal buds.

Hand picking/ removing bagworm cases is recommended for a tree this size, while continuing to monitor branch flexibility canopy health.

Map 8



Picture 16

Tree ID: 10972

Crab apple tree "*Malus spp.*" newly planted along the west side of main street with over 90% of the canopy defoliated by bagworms. Good bud vigor is present throughout the crown with branch flexibility. Monitoring and regular inspections of this tree is recommended to assess the damage caused by insects, and current drought conditions.





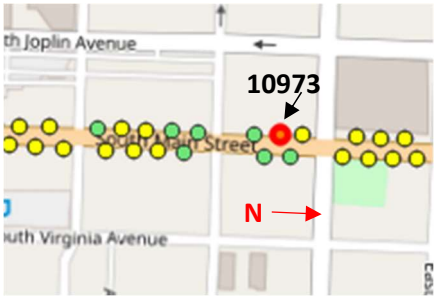
Picture 17



Tree ID: 10973

Callery pear "*Pyrus calleryana"* mid-way between the 400-500 blocks along the west side of main street. This tree is recommended for removal due to its invasive nature and unreliability with a tendency to "bust out" or become easily damaged during storms. Tree 10973 has become oversized for the allowed space and is extended towards the adjacent building making pruning to proper laterals difficult and unbalanced. Replacement with a Japanese tree lilac or snowshoe crab apple is recommended during the fall season.

Map 9



Picture 18

Tree ID 110974

Callery pear "*Pyrus calleryana"* outside the previous Joplin public library near the corner of 5th and main street. This tree shows signs of heavy fire blight effects and previous storm damage. Tree 110974 is recommended for removal due to the extended cost of treatment for blight recovery, invasive nature, and large wound along the east side. Replace with a Japanese tree lilac to improve species variety in this area.





Picture 19



Tree ID: 441043

Small newly planted white flowering crab apple "*Malus spp.*" adjacent to the old Joplin public library building. Poor planting practices were utilized during installation and heavy damage left by the ornamental cage application. The tree is recommended for replacement due to lack of branch flexibility and large wounds present on all lower limbs caused by the ornamental cage.

Consider not reapplying the ornamental cage upon replacement until the lower limbs extend over the highest points and/or proper pruning can be completed reducing the likelihood of damage.

Picture 20



Tree ID: 14367

Callery pear "*Pyrus calleryana*" along the west side of main street near the 3rd street intersection. Shoots emerging from the grate, brown out in the canopy, and insect evidence are all indicators of overall tree decline.

Tree is recommended for removal and replacement with one of the 3 tree species listed on the approved main street tree alternative list.

Map 10



Picture 21



Tree ID: 12545

Large Callery pear "*Pyrus calleryana"* growing against a building along the west side of main street. Tree has become too large for the allotted space and is growing through the ornamental cage. Although this trees' canopy appears to be full with minimal discoloration in comparison to other callery pear trees along main street, bagworms are present throughout the crown and overall defoliation has begun.

This tree is recommended for removal and replacement with a white flowering crab apple or Japanese tree lilac.

Picture 22



Tree ID: 13084

Crab apple tree "*Malus spp."* newly installed within the last 5 years along the west side of main street. Majority of the canopy has been lost to the impact of bagworms and current drought situation. The installation of the ornamental cage around this young tree has created wounds along the lower limbs featured in picture 22.1.



Consider not adding the ornamental cage on future new tree installations until the lower limbs extend over the highest point of the metal.

Picture 23



Tree ID: 13276

Callery pear "*Pyrus calleryana"* near the intersection of 2nd and main street along the east side of the road. Previous storm damage has left a medium sized wound along the west side of the tree in addition to signs of early fire blight within remaining foliage. The sight of limb failure shows signs of included bark and weak branch attachment typical to this species. Removal and replacement is recommended with an approved tree from the main street tree list.

Map 11



Picture 24

Tree ID: 11758

Medium sized callery pear tree "*Pyrus calleryana"* with a canopy damaged by previous storm, small hanger removed at inspection. Foliage is in decline as a result from fire blight and the presence of bag worms.

Replacement is recommended for this tree due to its invasive nature and increased expense to treat the insect/ disease. Consider utilizing species variety when replacing trees in this area.



Picture 25



Tree ID: 14539

Large callery pear tree "*Pyrus calleryana"* midway between the 200-300 block of main street along the east side of the road. This tree has become oversized and off center in the alloted space, moving the ground grate featured in picture 25.1.

The area highlighted in yellow indicates an area of previous storm damage where a large limb has failed and fallen into main street. This tree is recommended for removal and replacement with a tree from the main street ROW approved tree list due to its unreliabilty and invasive nature.

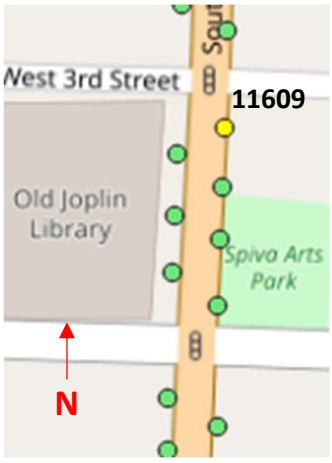
Picture 26



Tree ID: 11609

Callery pear tree "*Pyrus calleryana"* in decline with shoots coming from the soil surface/ root system and fire blight on more then 75% of the canopy. The unreliable poor structured multi-stem trunk in addition to signs of stress make this tree a good candidate for removal and replacement with an approved "understory" flowering tree from the approved main street tree list.

Map 12



Picture 27



Tree ID: 14369

Japanese tree lilac "*Syringa reticulata"* in overall poor condition with a significant trunk lean causing wounds from the ornamental cage. This tree is recommended for removal and replacement with the same species.

Consider avoiding reapplication of ornamental cages until tree is established and lower limbs extend beyond the highest point of the cage.

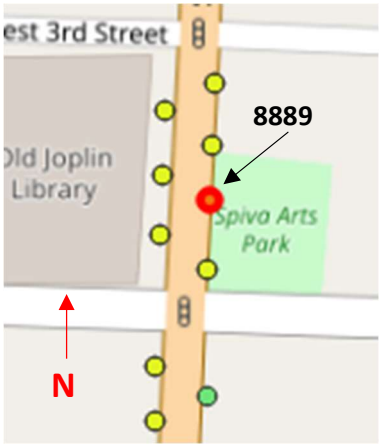
Picture 28



Tree ID: 8889

Large callery pear "*Pyrus calleryana"* with previous storm damage present in the lower portion of the canopy crown. Minimal blight present throughout the canopy however dieback is present in the upper portion. This tree is a good candidate for removal due to its invasive nature, and over all tree health decline.

Map 13



Picture 29



Tree ID: 8888

Callery pear tree "*Pyrus calleryana"* in decline along the northeast corner of 4th and main street. Extensive die back, poor structure and fire blight present throughout the canopy crown.

Picture 29.1 features a crack at the tree base in line with the lead indicated by the yellow arro which contains the majority of die back.

This Bradford or Callery pear is a good candidate for removal and replacement to increase reliability and improve the aesthetics of the downtown area.

Picture 30



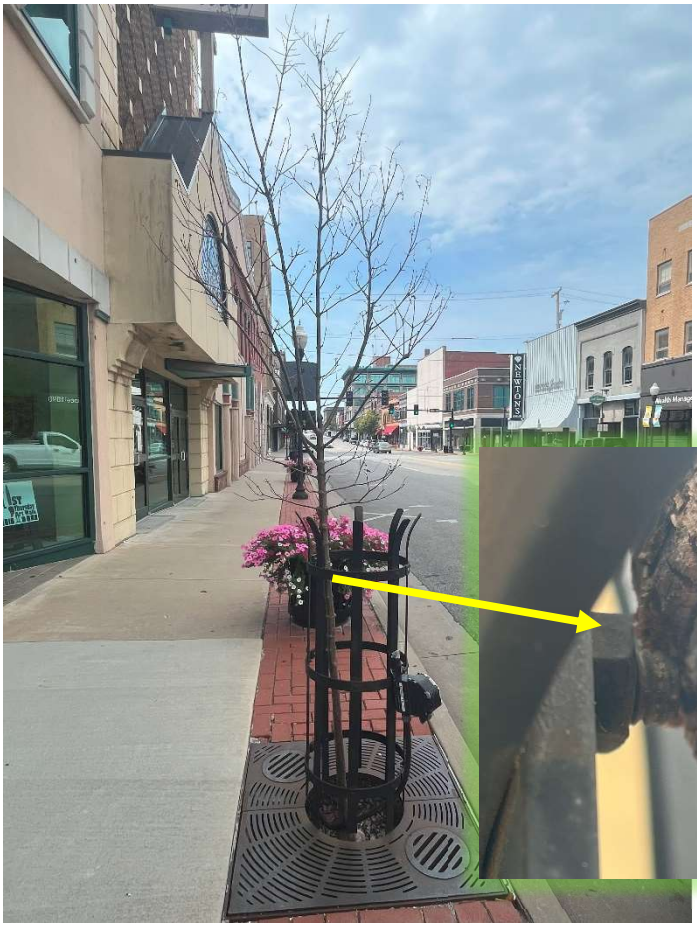
Tree ID: 12503

Japanese tree lilac "*Syringa reticulata"* nearly installed along the east side of main street. This tree has been slightly defoliated by bagworms, but hand picking the current cases is recommended for insect control. Monitor lower limbs for potential wounds caused by the ornamental cage and prune when necessary. Add top soil or mulch material to the tree base to protect the upper root system from damage/ frost.

Map 14



Picture 31



Tree ID: 12502

Small crab apple "*Malus spp.*" with a trunk lean due to improper planting/ lack of young tree training steaks. Lean has caused damage from the ornamental cage which has begun to collar, however periods of wind are causing the tree to move and continue damaging the trunk.

Steak tree pulling it to the west away from the ornamental cage, and continue to water/ monitor this tree.

Picture 32



Tree ID: 12501

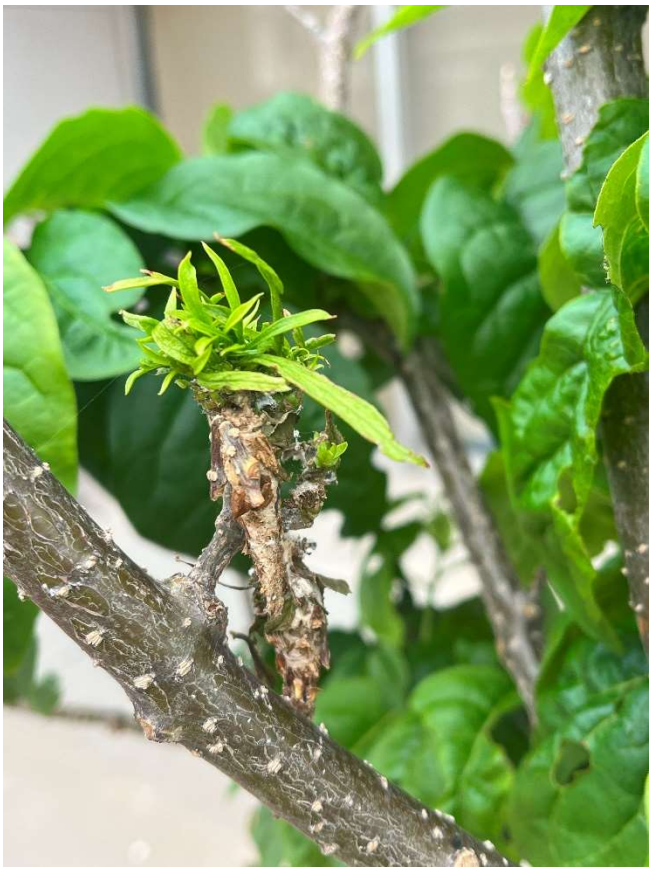
Japanese lilac tree "*Syringa reticulata*" with a broken central leader and heavily damaged lower limbs. This tree is recommended for removal and replacement due to overall poor structure and lack of central leader.

Avoid cage application until the lower limbs extend beyond the highest point of the ornamental cage.

Map 15



Picture 33



Tree ID: 12884

Crab apple tree "*Malus spp.*" at the southeast corner of 5th and main street. Bagworms are present as featured in picture 33 but can be removed by hand at this stage with success.

The ornamental cage is not attached well and has created small wounds on the undersides of the lowest branches. Cage should be secured to prevent further limb/ trunk damage.

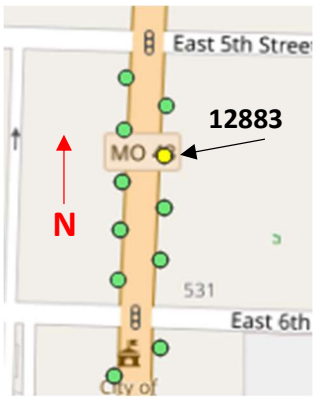
Soil or poor mulch should be added to the surface to prevent root damage or frost in the winter months.

Tree ID: 12883

Callery pear "*Pyrus calleryana*" in fair condition along the east side of main street extending over the adjacent business awning. Some bag worms are present within the canopy which shows signs of die back and overall decline.

This tree is a good candidate for removal and replacement along with all the other callery pears in this area due to the species overall unreliability and invasive nature.

Map 16



Picture 34



Picture 35



Tree ID: 12882

Callery pear "*Pyrus calleryana"* with a partially defoliated tree canopy midway between the 400-500 blocks of main street. Both fire blight and heavy bagworm presence has been discovered within the canopy crown and should be replaced with a pyramid/ columnar type tree species to allow clearance.

Picture 36



Tree ID: 13783

Large unbalanced pear tree "*Pyrus calleryana"* along the eastern side of main street. Despite clearance pruning for the local business periods of wind are allowing the upper canopy to move and make contact with the building structure/ windows.

Canopy decline is due to the presence of bagworms, early fire blight signs on leaves, previous drought conditions and overall species unreliability.

Removal and replacement is recommended with a species from the approved city main street ROW list.

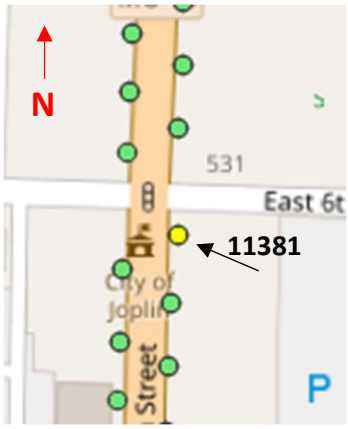
Picture 37



Tree ID: 11381

Callery pear "*Pyrus calleryana"* in fair condition at the southeast corner of 6th and main street. There is limited decline in the canopy or insects present in this tree, however removal is still recommended due to invasive nature and natural tendency to "bust out" or lose entire large limbs in periods of increased weather making it unreliable for citizens utilizing main street.

Map 17



Picture 38

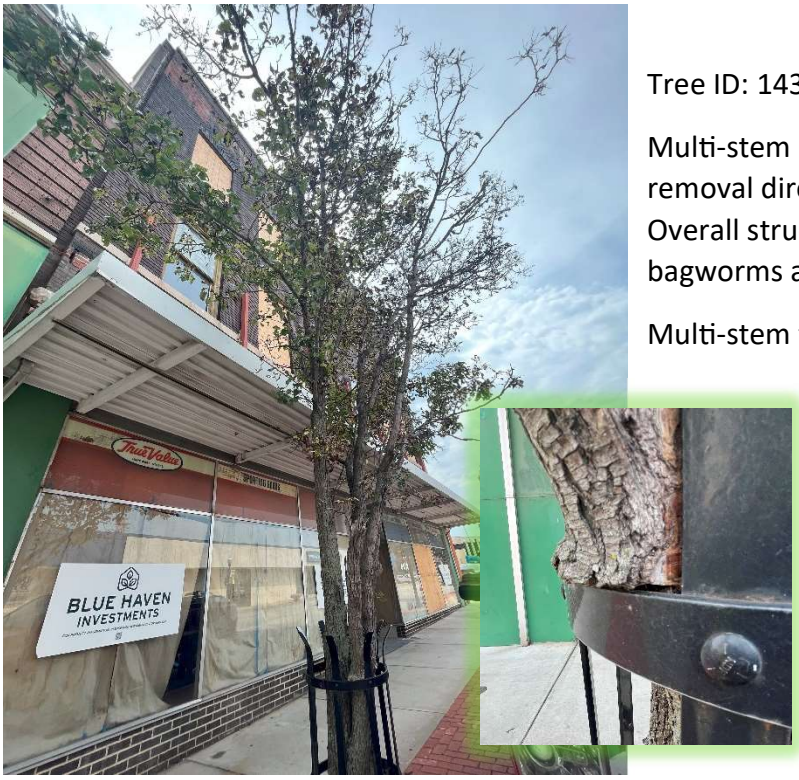


Tree ID: 12535

Callery pear "*Pyrus calleryana"* with significant canopy die back along the east side of main street. Large amount of bag worms causing the defoliation with heavy evidence of fire blight present in the remaining foliage.

Removal and replacement is recommended utilizing the approved species from the main street right of way tree list.

Picture 39



Tree ID: 14327

Multi-stem Callery pear "*Pyrus calleryana"* recommended for removal directly adjacent to the previous True Value store. Overall structure is poor in addition to defoliation from bagworms and current growth into the ornamental cage.

Multi-stem trees should be avoided in areas utilizing a decorative cages to prevent tree health decline.

Picture 40

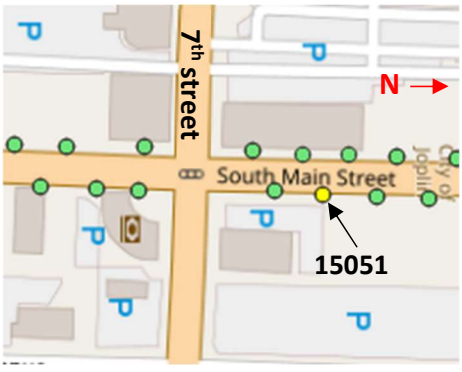


Tree ID: 15051

Medium sized Callery pear "*Pyrus calleryana"* with poor structure near the intersection of 7th and main street. The area highlighted in yellow is a large lead with included bark likely to fail in events of severe weather. Failure will cause limb to most likely land in the adjacent parking lot.

Some evidence of fire blight damage is present within the canopy but no bag worms have been observed at this time.

Map 18



Picture 41



Tree ID: 11555

Callery pear "*Pyrus calleryana"* at the northeast corner of 7th and main street with multiple leaders growing within the ornamental cage. Canopy is showing signs of poor soil conditions and overall drought stress with early yellowing foliage. Fire blight appears to be present along the outer edges of the remaining leaves.

Remove and replace this tree with a Japanese tree lilac "*Syringa reticulata"* or snow shoe crab apple "*Malus spp."*

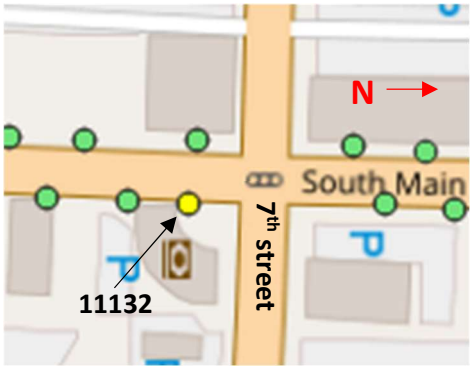
Picture 42

Tree ID: 11132

Full Callery pear "*Pyrus calleryana"* at the southeast corner of 7th and main street. Minimal die back is present in the upper portions of the canopy with little to no insect or disease present upon visual inspection. Canopy raise is recommended at minimum to allow clearance for patrons utilizing the sidewalks, however removal is the best option due to this species overall invasive nature and unreliability.



Map 19



Picture 43



Tree ID: 14734

Callery pear "*Pyrus calleryana"* along the east side of main street between the 700-800 blocks. This tree has a slight lean putting the trunk off center with damage to the lower limbs and potentially significant trunk wounds.

Due to the species being prone to failure and its overall invasive nature it is recommended for removal. Replacement with a Japanese tree lilac or white flowering is recommended for this space, promoting similar flowering styles/ colors while creating variety.

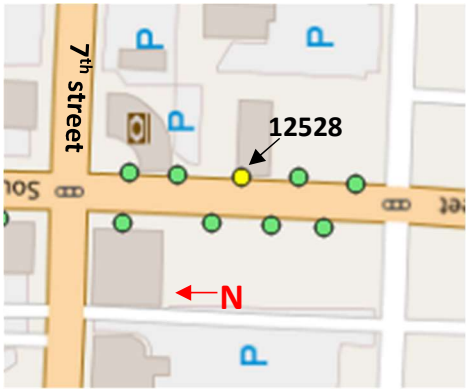
Picture 44



Tree ID: 12528

Large Callery pear tree "*Pyrus calleryana"* midway between the 700 & 800 blocks of main street along the east side. Large wound, likely from previous storm damage, present along the street side (west) of the tree prone to failure with minimal disturbance. Removal and replacement with an approved tree from the main street row tree list will improve reliability, beautification and the overall urban canopy within the City of Joplin.

Map 20



Picture 45

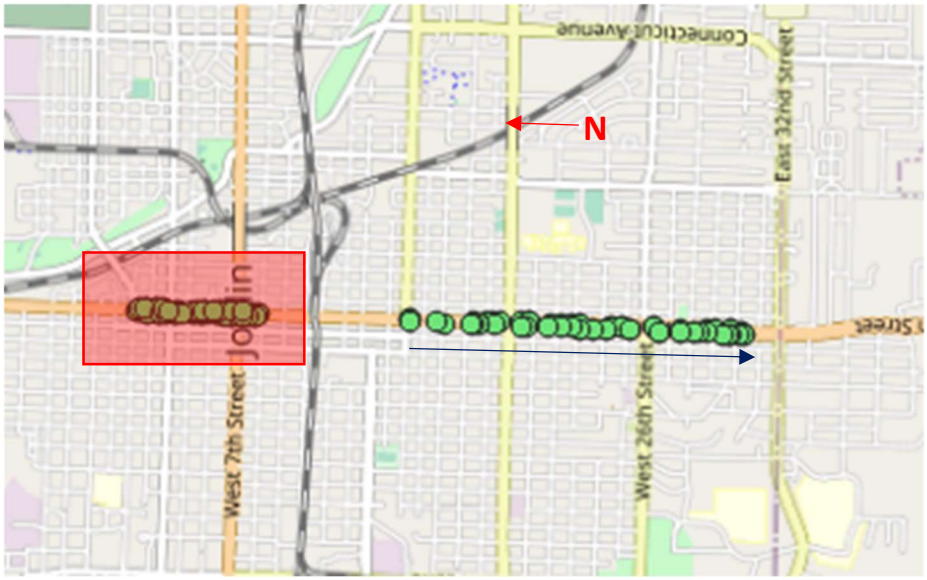


Tree ID: 12529

Small Callery pear "*Pyrus calleryana"* in fair condition near the intersection of 8th and main street. This tree has overall poor structure and signs of early fire blight throughout the crown.

This small tree is a good candidate for removal due to its invasive nature, poor structure and unreliability.

Map 21

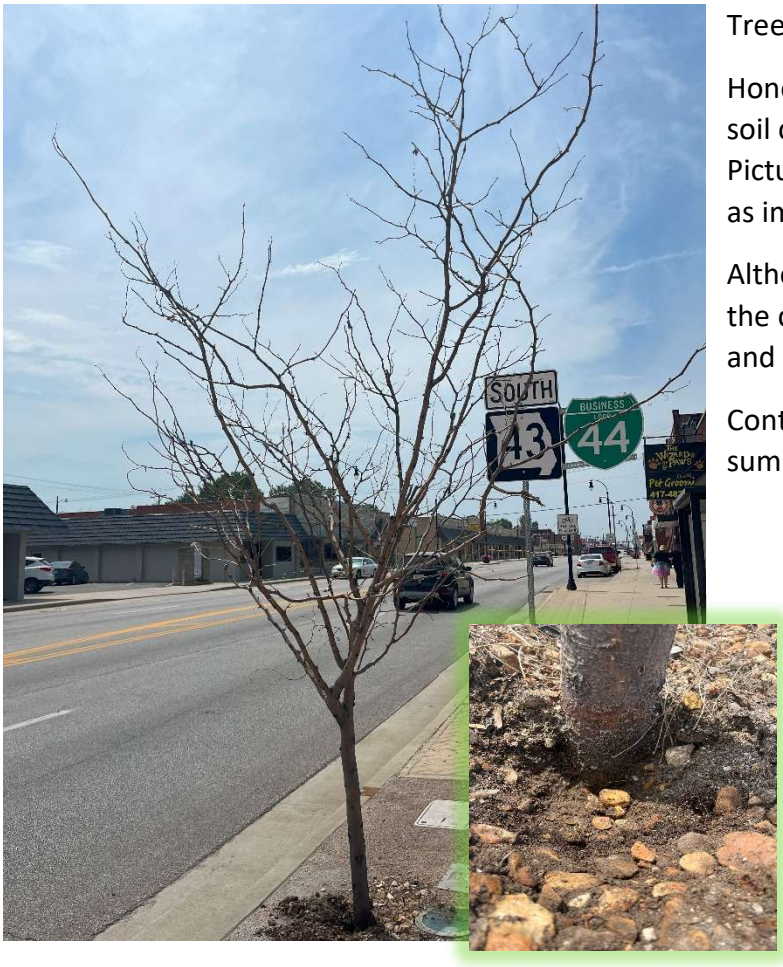


Map 21 shows the area evaluated in section 5.1 of this arborist report, which is highlighted in red. The blue arrow shows the direction the tree evaluation will continue.

5.2 North Central Main Street Trees

The trees that are evaluated in the 5.2 North Central Main Street trees section begins at the southwest corner of 15th and main street moving south until reaching 20th street then crossing to the east side of the road moving north from 20th to 15th.

Picture 46



Tree ID: 14677

Honey locust tree "*Gleditsia triacanthos"* with poor soil conditions and no foliage present in the crown. Picture 46.1 shows the poor planting medium as well as improper planting depth.

Although there is no foliage currently present within the canopy crown there is quality terminal bud vigor and branch structure throughout.

Continue to monitor this tree and water through the summer months, reevaluating in the following spring.

Map 22



Picture 47



Tree ID: 14678

Honey locust tree "*Gleditisa tricanthos"* along the west side of main street near the 15th stree intersection. This tree shows signs of bag worms within the defoliated canopy, however quality branch flexibility is present with vigorus terminal buds. A large limb has been broken off which is featured in picture 47.1

This tree is recommended for extedned watering, added soil ammendements, and regularly scheduled evalutations to monitor the overall tree health.

Removal should be considered if tree health conitnues to decline.

Picture 48



Tree ID: 14679

Small locust tree "*Gleditsia triacanthos"* along the west side of main street with a small wound near the base likely from installation or pedestrian damage. Canopy crown was previously defoliated but new leaflets are emerging from vigorous terminal buds.

This tree has been planted at the proper depth and branch flexibility is strong, continue to monitor the overall tree health and water through the seasons of potential drought.

Map 23



Picture 49



Tree ID: 14680

Locust tree "*Gleditsia tricanthos"* in fair condition near the southwest corner of 18th and main street. This tree shows positive growth with new leaflets emerging from healthy stems, however poor tree taper is present at the soil surface. Continue to monitor this tree and add soil ammendments while conitnuing to water through periods of drought.

Consider removing a portion of the soil and replacing it with quality topsoil with bio char/ soil amendments to improve the growth mediums.

Picture 50

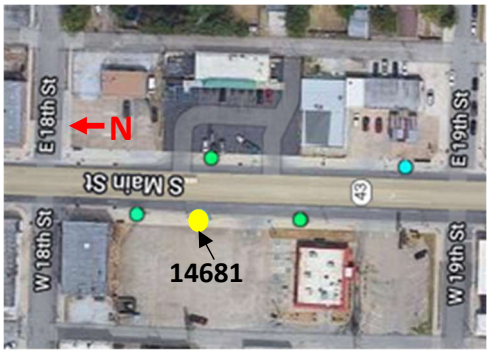


Tree ID: 14681

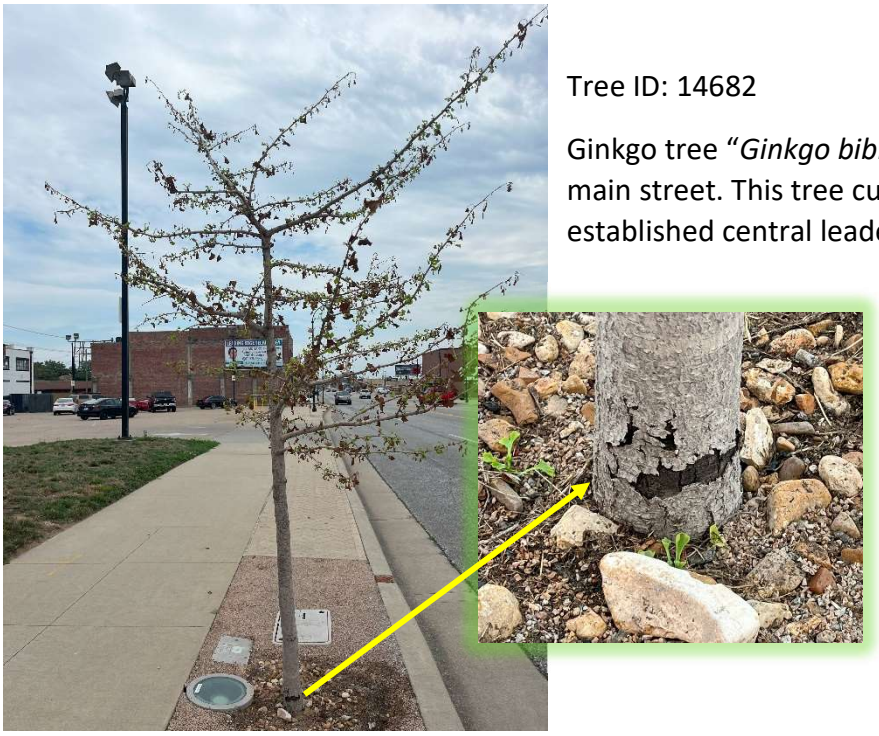
Small ginkgo "*Ginkgo biblia"* midway between the 1800-1900 blocks of main street along the west side of the street. This tree shows signs of drought/ heat stress in the foliage, however new growth is emerging from healthy flexible branching. Check planting depth for upper root system and consider adding soil nutrients to benefit overall tree health.

The natural "slow growing" tendency of this species means it will recover from defects and adapt better then other species.

Map 24



Picture 51



Tree ID: 14682

Ginkgo tree "*Ginkgo biblia"* near the northwest corner of 19th and main street. This tree currently has poor structure with no established central leader, continue to monitor this tree and make the necessary pruning cuts. Small wound present at the base of the tree highlighted in picture 51.1. A portion of the remaining foliage shows signs of drought stress, with new leaves emerging from healthy buds.

Picture 52



Tree ID: 14683

Locust tree "*Gleditsia triacanthos"* specifically chosen to fit within the allotted right of way space. This tree is in fair condition with some foliage missing due to bagworms, it is recommended to treat with a low volume foliar spray early in the life cycle if infestation persists.

Continue to water and add soil nutrients throughout the summer months and if drought conditions persist until trees are well established and thriving on their own.

Map 25



Picture 53



Tree ID: 14684

Chinese or lacebark elm "*Ulmus parvifloria"* located at the northeast corner of the 20th and main street intersection in fair condition. Foliage shows early yellowing most likely caused by poor soil composition. Replacement of the upper soil layers with quality top soil and the addition of amendments is recommended to improve the overall tree health. Continue to water through the summer months and working to improve soil composition.

Map 26



Picture 54



Tree ID: 14685

Chinese elm "*Ulmus parvifloria"* along the west side of main street just north of 20th street. Some yellowing is present within the foliage reflecting the need for soil nutrient improvements and additional watering. Minimal insect damage can be seen in the lower portions of the canopy crown but requires no treatment at this time. Water approximately 25 gallons of water per week through the summer months or periods of drought.

Note: some bark shedding is present however some bark shedding is normal for this species.

Picture 56



Tree ID: 14686

Kentucky coffee tree "*Gymnocladus dioicus"* near the intersection of 19th and main street with a small wound along the street side. Currently this trees overall structure is in fair condition with competing leaders present. Due to the age of this tree pruning to select is not recommended at this time however continue to monitor the trees natural branch tendency to promote its own leader.

Map 27



Picture 57



Tree ID: 14687

Ginkgo tree "*Ginkgo biblia"* near the intersection of 18th and main street with damage in multiple places along the trunk. Slow growing species such as this one will have a better chance of recovering from wounds present. Overall structure is poor-fair with no central leader present leaving branches susceptible to failure.

Consider replacement with a higher quality nursery stock and perform young tree training to implement tree healthy and longevity.

Picture 58



Tree ID: 14688

Dead standing ginkgo "*Ginkgo biblia"* at the southeast corner of 15th and main street. Poor planting depth and soil composition within the street box has lead to overall tree decline in addition to recent drought conditions.

Map 28



This concludes the tree evaluation within the north central main street tree section contained between 1500 and 2000 blocks of main street.

5.3 South Central Main Street Trees

The south central main street trees will evaluate the trees on either side of main street from 20th to 26th beginning with the west side of 20th, moving south until reaching 26th, then north evaluating the trees along the east side of main street.

Map 29



Picture 59



Tree ID: 14689

Locust tree "*Gleditsia triacanthos"* directly adjacent to an awning near the southwest corner of 20th and main street. This tree species has been developed for "ROW" areas and to grow within limited canopy space, however there is limited space for trunk expansion in the future.

In circumstances such as this where the adjacent business has a large extending awning consider exchanging the tree box for a large flower planter.

It would be in the best interest of the trees longevity, Joplins urban tree canopy and would greatly benefit the community to extend the "tree box" following the yellow arrow to where the current X parking space is located. This would allow a larger tree to expand and provide true benefits to business owners and citizens.

Picture 60



Tree ID: 14690

Locust tree "*Gleditsia triacanthos"* along the west side of main street just south of the 20th street intersection. Some damage is present along the trunk with a poor root flare present at the soil surface. Although there is no foliage present within the canopy crown at this time, quality branch flexibility and bud vigor exist throughout. Upon limited inspection the upper portion of the growth medium the soil composition is in poor condition.

Map 30



Picture 61



Tree ID: 14691

Kentucky coffee tree "*Gymnocladus dioicus"* in fair condition mid-way between 21st and 22nd street along the west side of main street. This tree has been planted poorly and a large amount of rocks have accumulated around the tree base adding stress via temperature increase.

Remove upper portions of rock/ soil and replace with quality top soil plus amendments to improve the growth medium and reduce heat stress.

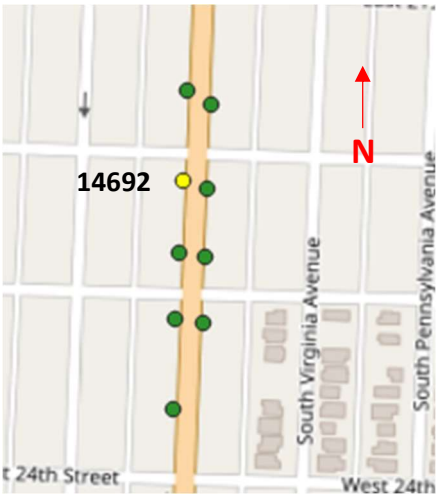
Picture 62



Tree ID: 14692

Locust tree "*Gleditsia triacanthos"* in fair condition along the west side of main street. This tree has a broken limb likely from pedestrian traffic and bagworm cases present within the defoliated canopy crown. Add quality top soil and soil amendments that promote nutrient uptake and water retention. Continue to monitor this tree and water during summer months or periods of extended drought.

Map 31



Picture 63



Tree ID: 14693

Locust tree "*Gleditsia triacanthos"* near the intersection of 23rd and main street. Soil medium is consistent with the newly installed trees extending from 15th to 32nd and main street. Removal of the upper portions of the soil/ rocks and replacement with quality top soil plus amendments to increase the nutrient uptake is recommended.

Continue to water street trees throughout summer months and in periods of drought.

Picture 64



Tree ID: 14694

A column (columnar) shaped English oak "*Quercus robur"* near the intersection of east 23rd and main street. This tree has excessive amounts of scale present throughout the canopy crown and poor soil medium for growth. Removal and replacement is recommended for this space, however a columnar type tree is not necessary due to the lack of an adjacent building providing ample space for canopy growth.

Map 32



Picture 65



Tree ID: 14695

Dead standing Kentucky coffee tree "*Gymnocladus dioicus"* near the northwest corner of 23rd and main street. Large mechanical wound at the base and poor soil composition present preventing quality tree health. Replace tree with a larger species from the main street sidewalk approved list while making necessary soil amendments to promote top quality tree health.

Picture 66



Tree ID: 14696

English oak "*Quercus robur"* with a large wound and splitting bark throughout the entire trunk. Bag worms present throughout the canopy with no foliage remaining. Upon replacement of this tree, better quality soil and amendments should be considered. Nursery stock selection and proper planting techniques should be top priority when installing a replacement tree.

Map 33



Picture 67



Tree ID: 14697

Fastigiata golden rain tree "*Koeireutaria paniculata"* specifically developed to maintain a column/ pyramid shape near 26th and main street. This tree has significant die back in the upper portions of the canopy. Poorly chosen nursery stock with limited nutrients within the soil in addition to recent drought condition has lead to overall tree decline.

Replacement tree can have a full expanding canopy with the allowed space and adjacent parking lot.

Picture 68



Tree ID: 14968

English oak "*Quercus robur"* located just north of the intersection at 25th and main street. Bagworms and scale present throughout the canopy making the limbs brittle. Upon base inspection; root flare appears to be planted to deep with a significant amount of rocks present in the upper portions of the soil.

Replacement is recommended, canopy size/ shape is not a factor in replacement selection at this time.

Map 34



Picture 69



Tree ID: 14699

Dead standing English oak "*Quercus robur"* with damage along the trunk base and bagworms present in the canopy. Poor planting and soil composition has contributed to overall tree decline. Replacement tree is recommended with no limitations of canopy size/ shape.

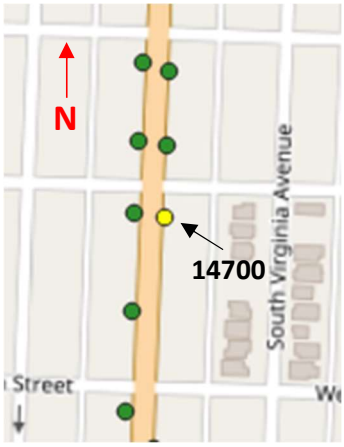
Picture 70



Tree ID: 14700

English oak tree "*Quercus robur"* in sever decline with little to no branch flexibility. Poor planting, low quality soil medium, and extended periods of drought have lead to the decline of this tree. Replacement tree is recommended with the addition of soil amendments and regularly scheduled watering.

Map 35



Picture 71



Tree ID: 14701

Kentucky coffee tree "*Gymnocladus dioicus"* in good condition on the northeast corner of east 23rd and main street. Monitor young tree development and add quality topsoil to the existing box. Continue to water this tree through the summer months or periods of drought.

Trees such as the Kentucky coffee tree have developed a course bark young, early in its growth which makes it more resistant to radiating heat damage and a quality choice as a street tree.

Picture 72

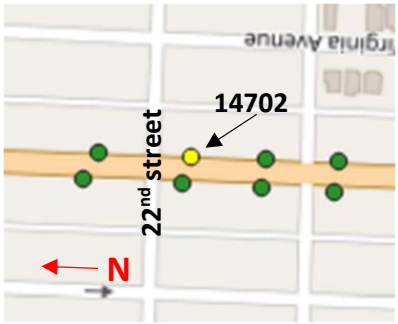


Tree ID: 14702

Chinese /lacebark elm "*Ulmus parviflora"* in good condition with some foliage loss due to bag worms. Portions of the canopy crown have yellowing throughout due to poor soil conditions and heat damage.

Removal of the top layer of rock/ soil is recommended and replacement with quality topsoil top improve growth conditions/ encourage canopy growth.

Map 36



Picture 73

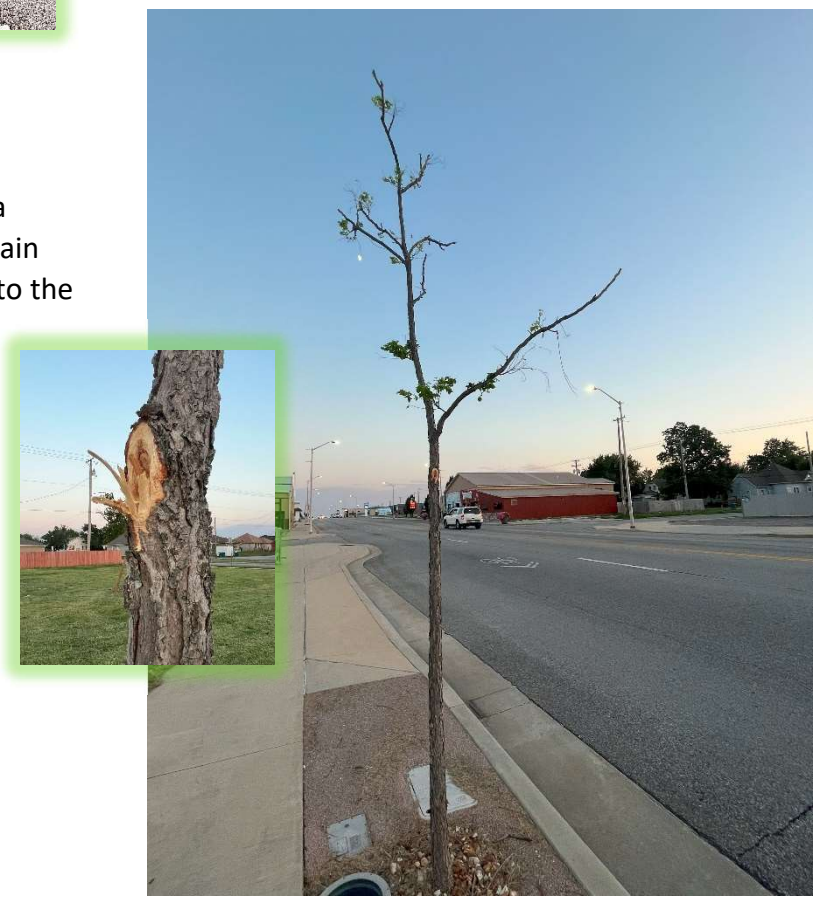


Tree ID: 14703

Chinese/ Lace bark elm "*Ulmus parviflora"* with a healthy canopy just north of the intersection of 22nd and main street. Some cracks are present on the lower trunk which should be regularly inspected while monitoring for evidence of decline in the canopy.

Continue to water this tree through the summer months or during periods of extended high temperatures. Consider adding higher quality top soil without causing excessive damage to the

Picture 74



Tree ID: 14704

Kentucky coffee tree "*Gymnocladus dioicus"* with a significant limb broken off along the east side of main street. Due to the broken branch collar and stress to the natural collaring area wound is likely to collar unsuccessfully leaving this tree open to insect and disease. This tree is recommended for removal and replacement with the same species to promote species variety and canopy expansion where allowed.

Map 37



Picture 75



Tree ID: 14705

Chinese elm "*Ulmus parviflora"* in overall good condition near the intersection of 20th and main street along the east side. Some bagworms are present within the canopy, but infestation is minimal. Monitor growth and overall tree health while continuing to water throughout the summer months/ periods of drought.

Consider removing upper portions of the current growth medium (causing minimal damage to absorbing roots) and replacing it with quality topsoil to improve nutrient uptake.

This concludes the evaluation of the South Central Main Street Trees extending from 20th to 26th street.

5.4 South Main Street Trees

The South Main Street Trees section will evaluate the trees between 26th street and 32nd street along the east and west sides of main. Evaluation will begin at the southwest corner of 26th and main street, proceeding south until reaching 32nd, crossing to the east side of main street and moving north.

Map 38



Picture 76



Tree ID: 14706

Japanese pagoda "*Sophora japonica"* on the southwest corner of 26th and main street. Tree is dead standing and should be replaced with a tree regardless to canopy spread, due to ample space allowed.

Complete soil improvements before installing a replacement tree and continue to water bi weekly for the first two years, and upon periods of extended heat/ drought.

Picture 77



Tree ID: 14707

Dead standing golden rain tree "*Koeireutaria paniculata"* midway between the 27th and 28th street along the west side of main. Replacement with a columnar/ pyramidal type tree species due to limited space near adjacent buildings.

Upon replacement add topsoil and root stimulators in addition to new tree install while watering biweekly the first two years.

Map 39



Picture 78



Tree ID: 14708

Ginkgo tree "*Ginkgo biblia"* with a large wound present along the west side of main street in poor condition. Wound has developed a healthy collar and due to the slow growing nature of this species tree has the potential to recover fully. However a replacement tree should be considered with the extended amounts/ duration of stress a street tree can endure early on in development.

Replacement with the same species will continue to promote species variety and no canopy expatiation conflicts exists.

Picture 79



Tree ID: 14709

Medium sized ginkgo tree "*Ginkgo biblia"* with a large superficial wound along the trunk, located on the west side of main street. Wound penetrates minimal center wood and a healthy collar has developed therefore replacement is not recommended at this time.

Map 40



Picture 80



Tree ID: 14710

Ginkgo tree "*Ginkgo biblia"* with brown foliage covering more then 90% of the canopy crown. New foliage has begun to emerge from healthy, vigorous buds throughout and quality branch flexibility is present.

Note: the landscape cloth indicated by the red arrow around the base is tight and possibly a contributing factor of water/ nutrient uptake.

Continue to water this tree over the next growing season, and through extended periods of drought/ consistent high temperatures.

Picture 81



Tree ID: 14711

Japanese pagoda "*Sophora japonica"* with significant die back present within the canopy. This tree is located within a "green space" type right of way box south of the 29th street intersection along the west side of main street.
Replacement tree is recommended due to base damage and improper planting techniques at installation.

A columnar type tree is not necessary in this area due to ample space for canopy expansion, consider a tree providing more shade to surrounding parking lots and street sides.

Map 41



Picture 82



Tree ID: 14712

Golden rain tree "*Koeireutaria paniculata"* recommended for replacement due to canopy die back and heavy insect damage along the west side of main street.

replacement with a similar species that can be pruned for clearance for citizens utilizing the sidewalk is recommended.

Consider a flowering tree such as a crab apple "*Malus sp"* or Japanese tree lilac "*Syringa reticulata"* to increase beautification in this region of main street.

Picture 83



Tree ID: 14713

Dead standing golden rain tree "*Koeireutaria paniculata"* just north of the 30th and main street intersection. Upon replacement consider improving the soil composition and applying a water schedule through summer months and times of drought. Consider a medium sized flowering tree to improve the overall aesthetics to this section of the main street trees. The canopy size is not a factor due to the lack of adjacent buildings.

Map 42



Picture 84

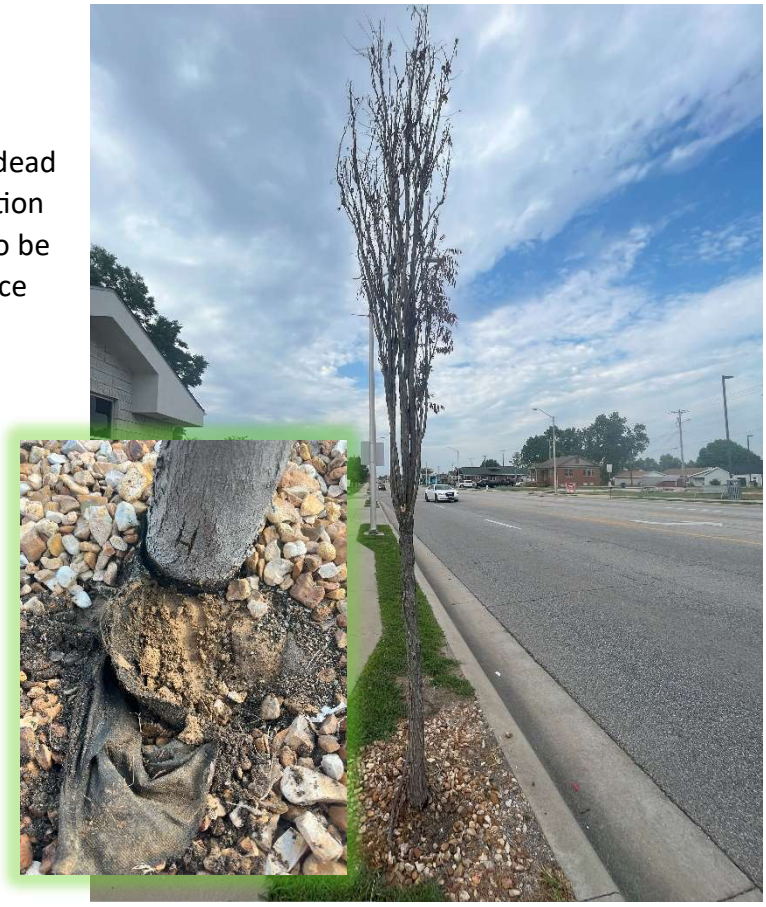


Tree ID: 14714

Medium sized Japanese pagoda "*Koelreuteria paniculata"* recommended for removal and replacement with a tree promoting a naturally spreading canopy. Perform soil improvements upon replacement and perform scheduled watering throughout extended periods of heat/ drought.

Avoid applying rocks as a weed barrier in future street tree plantings. This section of south main street lacks large buildings or shade trees to reduce the amount of heat stress young trees endure. Rocks and other flat smooth surfaces add to the amount of heat reflecting from the street in addition to the direct light causing unneeded stress.

Picture 85



Tree ID: 14715

Japanese pagoda tree "*Sophora japonica"* standing dead along the west side of main street near the intersection of 31st and main street. Landscaping cloth appears to be tightly wrapped around the trunk near the soil surface potentially limiting both nutrient uptake and root development.

Replacement tree is not required to have a limited canopy spread due to ample space available. Provide adequate space between trunk and any type of underground weed barrier to prevent future decline.

Picture 86



Tree ID: 14716

Golden rain tree "*Koeireutaria paniculata"* with a significant amount of wounds present along the trunk. This tree was installed using poor planting practices along the east side of main street and should be replaced with a tree that has quality canopy spread to provide shade to adjacent parking and street areas.

Upon new tree installation place the top root area near the soil surface to promote nutrient uptake and reduce moisture build up along the trunk.

Map 43



Picture 87



Tree ID: 14717

Heavily damaged golden rain tree "*Koeireutaria paniculata"* along the east side of main, within a green space type planting box. The west side of the tree featured in picture 87.1 shows the amount of damage along the street side, likely from heat/ mechanical sources. This damage occurs in the center wood and will continue to decline. Replacement is recommended for this space with a species from the approved city tree list/ main street right of way list.

Picture 88

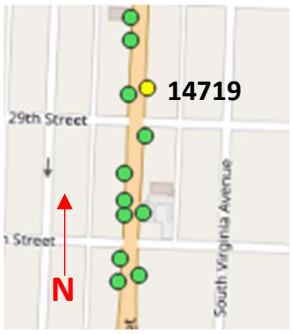


Tree ID: 14719

Ginkgo tree "*Ginkgo biblia"* just north of the 29th and main street intersection along the east side of main. Although the majority of the canopy is "browned out" new growth is emerging from vigorous buds with quality branch flexibility throughout the crown. There is little to no damage along the trunk and a quality trunk flare exists at the soil surface.

Continue to water this tree through the summer months/ during periods of drought while monitoring for further canopy crown damage.

Map 44



Picture 89



Tree ID: 14720

Golden rain tree "*Koeireutaria paniculata"* in fair condition mid-way between 27th and 28th street along the east side of main street. This tree shows minimal signs of dieback in the upper portions of the canopy and some yellowing along the edges of the leaves as a potential indication of poor soil composition.

Continue to water this tree while monitoring for further indications of decline. Consider adding soil amendments to increase nutrient uptake while causing minimal damage to the root system.

Picture 90



Tree ID14721

Golden rain tree "*Koeireutaria paniculata"* in severe decline near the intersection of 26th and main street. Heavy amounts of damage along the entire trunk and significant decline within the canopy. Several broken limbs remain within the crown aiding in the development of insect/ disease problems.

Replace tree, if possible moving the tree to the center of the allotted box allowing ample distance from the street/ driveway of the adjacent parking lot.

Healthy thick collar has developed over some of the trunk damage, however damage is extensive and causing stress to a developing street tree.

Map 45



6.0 Conclusion

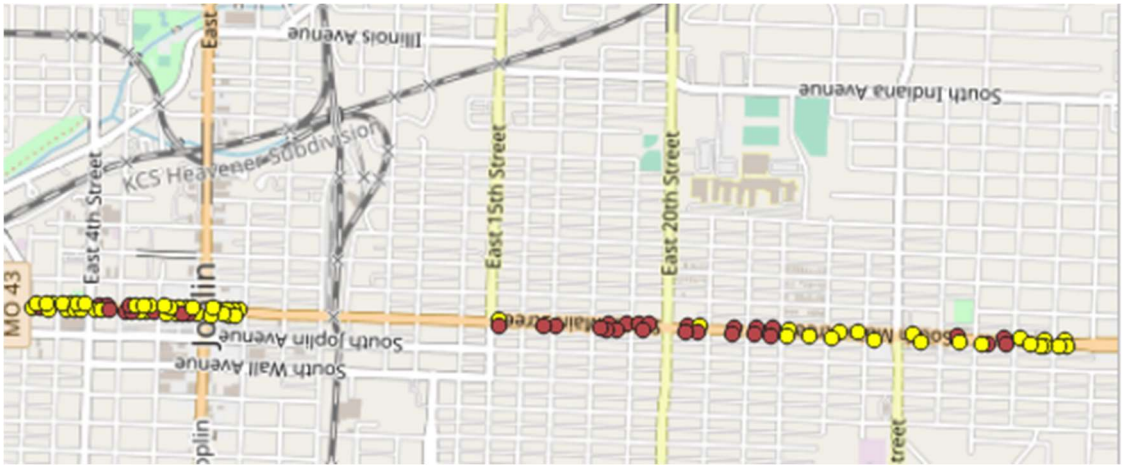
The trees along either side of main street between 2nd and 32nd street are in overall fair condition with several maintenance and removal recommendations at this time. It is recommended to remove the Callery/ Bradford pears "*Pyrus calleryana"* between 2nd and 8th streets due to their invasive nature, recommendations for replacement from the Missouri Department of Conservation and the city tree board, as well as the lack of reliability this tree species offers once it matures. Ornamental pear trees experience large limb failure upon periods of storm including ice, heavy amounts of rain, and excessive wind gusts. The allotted space for these right of way street trees means large limb failure could result in damage to parked cars or adjacent businesses.

The newly established trees, installed within the last 5 years, between 2nd and 32nd street should be watered throughout the summer months or periods of extreme heat until well established. Consider adding soil amendments to improve nutrient uptake and soil composition, increasing growth rate and improving downtown beautification. Young trees with a height below 8ft experiencing impact from bagworms should be picked/ removed by hand to reduce stress and cost of pesticide applications. Ornamental cages that exist around the trees in this section of main street should be removed or left off young trees until the lower limbs extend beyond the highest cage point reducing the likely hood for damage.

The trees extending south from 15th to 32nd are in need of soil amendments, scheduled watering, pruning, and/ or replacement. This area has a higher temperature at the street level than that of north main from previous tornado damage. There are little to no large trees or buildings to provide a reprieve from the direct/ reflecting heat onto young, newly established trees adding to the amount of stress street trees endure. By improving the soil composition and eliminating the rock mulch at the base the likelihood for tree success is increased.

Proper planting techniques and improved soil composition should be considered when establishing any new tree throughout the city. Newly established street trees need 25 gallons of water per week at minimum through the first 1-5 growing seasons or during periods of extended high temperatures/ drought. Soil composition should be of high quality upon installation to assist in nutrient uptake, water retention, and root system protection.

Map 46



Map 46 indicates the trees recommended for removal with yellow circles and monitoring/ watering & soil improvements with a red circle. Considered surrounding buildings and parking lot areas upon new tree selection/ planting.