



ORDINANCE 20-2018

AN ORDINANCE CREATING CHAPTER 1184 AGRICULTURAL BUFFERING AND MITIGATION

WHEREAS, The Village of Johnstown must work to assure and enhance the continuation of agriculture as a major viable production industry in the community through establishing development standards that provide for buffers between agricultural uses and new non-agricultural development; and

WHEREAS, Agricultural buffers are intended to minimize potential conflicts between agricultural and adjacent land uses that result from noise, dust, light, and odor incidental to normal agricultural operations as well as potential conflicts originating from residential and other non-agricultural uses (e.g., domestic pets, insect pests, and invasive weeds); and

WHEREAS, The purpose of these standards is to mitigate the potential for conflict between farming activities and urban uses; and

WHEREAS, The Planning & Zoning Commission voted May 22, 2018 by a 4-0 vote to transmit the draft ordinance to Village Council; and

NOW THEREFORE, be it ordained by the Council of the VILLAGE OF JOHNSTOWN, Licking County, Ohio, as follows:

Section One. Chapter 1184 is hereby adopted as the Agricultural Buffering and Mitigation ordinance of the Village of Johnstown, in the State of Ohio and is attached to this ordinance.

Section Two. It is found and determined that all formal actions of this Council concerning and relating to the adoption of this Ordinance were adopted in an open meeting of this Council and that meetings of any of its committees that resulted in such formal action where meetings open to the public, in compliance with all legal requirements including Section 121.22 of the Ohio Revised Code and the Charter for the VILLAGE OF JOHNSTOWN.

Date of Introduction: June 5, 2018
Public Hearing/Vote: June 19, 2018
Effective Date: July 19, 2018

BY: Block



Mayor Benjamin Lee

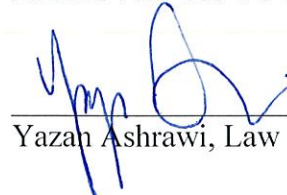


ATTEST TO:



Teresa Monroe, Clerk of Council

APPROVED AS TO FORM:



Yazan Ashrawi, Law Director

CHAPTER 1184

AGRICULTURAL BUFFERING AND MITIGATION

1184.01 Urban/agricultural conflict mitigation.

A. Purpose. The purpose of these standards is to mitigate the potential for conflict between farming activities and urban uses. The mitigation provisions of this chapter seek to achieve the following objectives:

1. Minimize the impacts of urban development on agricultural production activities.
2. Minimize the potential for complaints about agricultural practices and activities.
3. Ensure the continued use of agricultural land for agricultural uses.
4. Minimize potential conflict by developing a well-defined boundary between agricultural and urban uses. The best boundary will be one that minimizes conflict in both directions.

B. Definitions. The following definitions apply only to this chapter:

1. "Agricultural land uses" means the use of land for the cultivation and husbandry of plant and animal products, including agricultural activities permitted on land zoned exclusive farm use (Agriculture).
2. "Mitigation area" means a management zone of varying size, shape, and characteristics between different land uses that uses combinations of mitigation elements to buffer between agricultural land and urban land uses.
3. "Mitigation element" means a physical or legal feature within a mitigation area that mitigates an adverse impact. A mitigation element may consist of vegetation, transportation and utility corridors, natural barriers, deed restrictions, or other natural or manmade features.
4. "Spray drift" means airborne movement of agricultural chemicals onto a non-target area.
5. Urban Receptor, Sensitivity Of.

a. Urban Receptor, Higher-Sensitivity (H).²

i. Residential use.²

ii. Motel, hotel, or hostel.²

iii. Place of worship; public meeting facility.²

iv. Child care center, kindergarten, school, university, or other educational institution.

v. Medical center or hospital.

vi. Public or quasi-public use, such as library, park, etc.

vii. Other similar uses.²

b. Urban Receptor, Lower-Sensitivity (L).

i. Commercial use, except for any defined as higher-sensitivity urban receptor.

ii. Industrial use.²

iii. All other uses not classified here.

C. Description of Impacts Requiring Mitigation.

1. Spray Drift. Principally, spray drift is caused by agricultural chemical use, but can apply to urban use of agrochemicals. Separation between urban and agricultural uses is the preferred tool to mitigate the impact of the spray drift, employing either large setbacks or a combination of smaller setbacks and a tree buffer.

2. Trespass and Vandalism. Trespass and vandalism are often considered by farmers to be the most serious adverse potential impact to agricultural operations in proximity to urban areas. Climb-resistant, trespass-inhibiting fences and/or hedges in the mitigation area are the means of reducing these impacts, as is placing the buffer in individual ownership (such as larger urban lots with strict setback requirements).

3. Odor. Odor is one of the less important agriculture-related adverse impacts. Unless there are site-specific reasons why mitigation of odor is critical (such as the presence of a livestock feed lot), issues with odor are

sufficiently addressed by requiring that owners of new urban development within 1,000 feet of agricultural land receive notice through an explicitly worded deed declaration of the potential adverse impacts to which they will likely be exposed as a result of living within 1,000 feet of agricultural land.

4. Dust, Smoke, and Ash. Like odor, this grouping of potential adverse impacts is one of the least important agriculture-related issues in the region, and, like odor, can be addressed by the use of a deed declaration.

5. Runoff. Stormwater and irrigation runoff arise from both urban and agricultural uses, and can adversely impact agricultural operations as well as urban health and livability. Impacts may be avoided or significantly reduced by employing erosion-prevention and erosion-control measures during construction, and by an adequate stormwater plan for urban development that takes into account impacts from and on the adjacent agricultural land.

6. Noise. Noise is an impact arising from agricultural operations. This section contains no noise mitigation requirements, but applicants are encouraged to consider community design and construction practices that provide some level of noise mitigation.

1184.02 Application steps.

A. Applicability.

1. The provisions in this section apply to the development permit applications listed below where proposed development abuts land zoned or currently utilized as Agricultural.
 - a. Land division;²
 - b. Planned unit development;²
 - c. Conditional use permit;²
 - d. Site plan and architectural review.
2. A preapplication conference is required for all applications subject to the provisions of this section.
3. Different degrees of mitigation are required of the applicant based on the following factors: the sensitivity of the adjoining urban use to agricultural impacts and the impact being buffered; the intensity of uses on the adjacent Agriculture land.

B. Application – Agricultural Impact Assessment Report. As part of any application for development or use of land which is adjacent to agriculture (refer to subsection D of this section) and where the agricultural mitigation standards in Codified Ordinance 1184.03 apply, an applicant shall supply the planning department with a report entitled “Agricultural Impact Assessment Report” (AIAR). The purpose of the AIAR is to provide the approving authority with sufficient evidence to determine agricultural intensity and to evaluate the applicant’s proposed method of complying with the provisions of this section. The AIAR shall include the following components:

1. Map showing the zoning of land adjacent and within 200 feet of the property proposed for urban development.
2. A description of the type and nature of agricultural uses and farming practices, if any, which presently occur on adjacent lands zoned Agriculture and sources of such information. The information thus required, if applicable, shall include:
 - a. Method of irrigation (if proposed).

- b. Types of agricultural production and practices for the five preceding years.
 - c. Type of agricultural equipment customarily used on the property.
- 3. Detailed information obtained from the Natural Resources Conservation Service (NRCS) concerning soils which occur on adjacent lands zoned Agriculture, and whether the land has access to water for irrigation.
- 4. Wind pattern information.☐
- 5. A description of the measures proposed to comply with the requirements of subsection D of this section and Codified Ordinance 1184.03.☐
- 6. The persons who prepared said report and all persons, agencies, and organizations contacted during preparation of the report.
- 7. All statements shall be documented, sources given as reference, and any other detailed information needed to substantiate conclusions should be provided in the appendices.
- 8. If the applicant is requesting a deviation from the standards of this section, the agricultural impact assessment report shall not be deemed to be complete unless accompanied by the conflict assessment and mitigation study described in Codified Ordinance 1184.04(A)(4).
- 9. A list of acceptable plant type
- 10. A plan and narrative, including best practices and other industry standards, to incorporate existing natural vegetation and trees to the required buffer area.

C. Review Process.

- 1. Using the definitions of these classifications herein and the evidence of the AIAR, the approving authority shall determine:
 - a. Whether the applicant's proposed mitigation plan meets the standards of this section.
- 2. The approving authority shall approve, approve with conditions, or deny the AIAR and its proposals and conclusions.

D. Mitigation Requirements.

1. All mitigation elements will be sited on urban land unless arrangements have been made with the adjacent agricultural land owner to site some or all elements on agricultural land.

2. Mitigation for Agriculture. To minimize or mitigate the potential adverse impacts associated with the proximity of urban and agricultural land uses, the following measures shall be undertaken by the applicant when urban development is proposed adjacent to land which is in agricultural use:

a. Setbacks as illustrated in Codified Ordinance 1184.03(A), Figure 1, either alone or in conjunction with a tree buffer;

b. Tree buffer as illustrated in Codified Ordinance 1184.03(B), Figures 2 and 3, 1184.03(C), Figure 4, and described in Codified Ordinance 1184.03(B)(1) through (6);

c. Screening shrubs (only in conjunction with a tree buffer) as illustrated in Codified Ordinance 1184.03(B), Figure 2, and described in Codified Ordinance 1184.03(D);

d. Trespass-inhibiting hedges/fencing as illustrated in Codified Ordinance 1184.03(B), Figure 2, and described in Codified Ordinance 1184.03(E);

e. Deed Declaration. All urban land proposed for development which lies within 1,000 feet of an Agriculture zoning district boundary shall be subject to a deed declaration that requires the owners and all successors in interest to recognize and accept common, customary and accepted farming practices which may produce noise, dust, odors, and other impacts. The deed declaration shall be in a form approved by the city. After the deed declaration is signed it shall be recorded in the official records of Licking County, and copies shall be mailed to the owners of adjacent agricultural lands zoned Agriculture.

f. Maintenance Program. Land adjacent to an Agriculture zoning district boundary shall be subject to a restrictive covenant that provides that the perpetual maintenance of mitigation-related fencing, the perpetual horticultural care and maintenance of trees,

shrubs, and hedges that are used for mitigation, and the maintenance of other mitigation elements shall be solely the responsibility of the owners, Homeowners Association (HOA) and/or all successors in interest of property subject to the covenant. The covenant shall be in a form approved by the city. After the covenant is signed it will be recorded in the official records of Licking County.

g. Runoff. Measures appropriate to the circumstances present shall be undertaken by the applicant to mitigate adverse impacts which occur from periodic naturally occurring runoff and inadvertent agricultural irrigation runoff.

h. Ownership. All buffer mitigation areas shall be contained within the boundary of a single parcel owned and maintained by the Homeowners Association.

1184.03 Mitigation standards.

A. Illustration of Tree Buffer/Setback Combination Options.

1. Figure 1 illustrates the tree buffer/setback combination options for applicants.
 - a. The “tree” symbol illustrates the number of rows required under each option.
 - b. Minimum setbacks are represented by the “structure” symbol ranged along a linear scale showing distance from the urban/agricultural boundary. Setbacks apply to any structure or property line as defined.
2. The figure does not depict screening shrubs; however, that element is required when a tree-based buffer is used and when the tree species in the first row on the agricultural side will not provide sufficient foliage cover to ground level.
3. Where there is a mix of urban uses, the buffer design shall protect the most sensitive use among them.

B. Tree Buffers.

1. Three-Row Buffer. Depending on the species used, the minimum possible tree buffer width is 100 feet. A 50' setback from buffer/mitigation area is required to property line for a high sensitivity urban receptor and 50' to structures for low sensitivity receptors. The buffer area may be extended to 150 feet with no setback required. The buffer shall be composed of at least two different conifer species.

Figure 1. Illustration of Tree Buffer

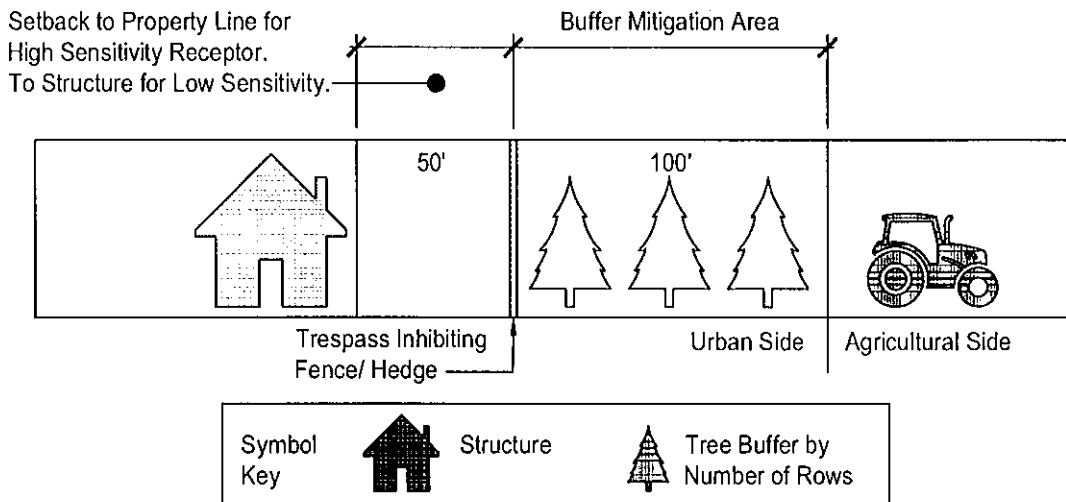
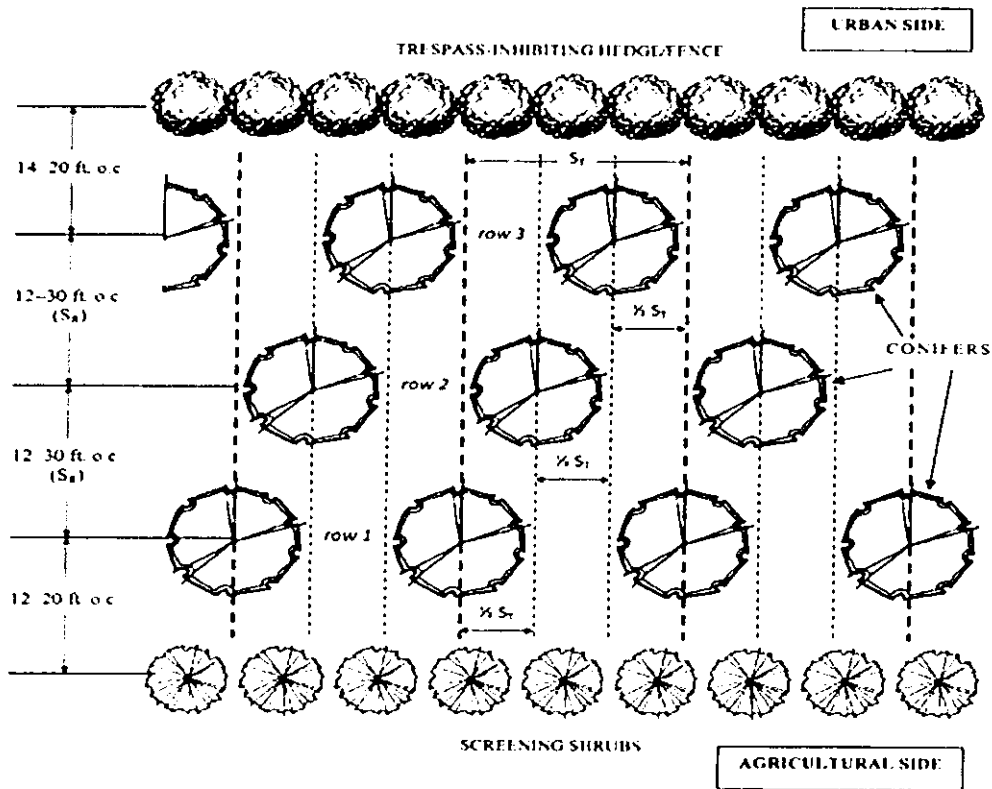


Figure 2. Three-Row Tree Buffer



2. Row Spacing and Offset. The purpose of the row-by-row offset is to mitigate the effect of individual tree mortality and to compensate for the individual differences between trees.

a. Three-Row Buffer.

i. Offset. Set off the second row by one third the spacing distance of trees (S_T) in the first row; set off the third row by another third. Refer to Figure 2 for clarification.

ii. Spacing of Rows. The distance between rows will be determined using the following formula, where SR is the spacing distance between rows, D₁ is the widest foliage diameter of the tree species in one row when it reaches a height of 30 feet, and D₂ is the widest foliage diameter of the tree species in the next row when it reaches a height of 30 feet:

$$SR = 0.5(D_1 + D_2) + 4$$

3. Tree Spacing within Rows. Tree spacing within a row is based on the

greatest foliar diameter of a given tree species when it reaches a height of 30 feet. Coniferous trees vary from narrow pyramidal forms (e.g., Atlas cedar) to broad pyramidal forms (e.g., Norway spruce), so the following table contains calculation methods for each.

Table 1. Calculation of Tree Spacing within Rows for Narrow- and Broad-Diameter Trees

	Narrow ST =	Broad ST =
single-species row	1.25D	1.1D
two-species row	$0.625(D1 + D2)$	$0.55(D1 + D2)$

D = Typical foliar diameter of a tree species when 30 feet tall. The diameter is measured at the widest extent of a pyramidal conifer.

ST = Tree spacing within rows; calculated as a multiple of tree diameter.

Note: When planting more than two species in a row, use the two species with the widest diameters to calculate spacing.

5. Minimum Tree Height at Planting. Five to six feet, balled and burlapped.

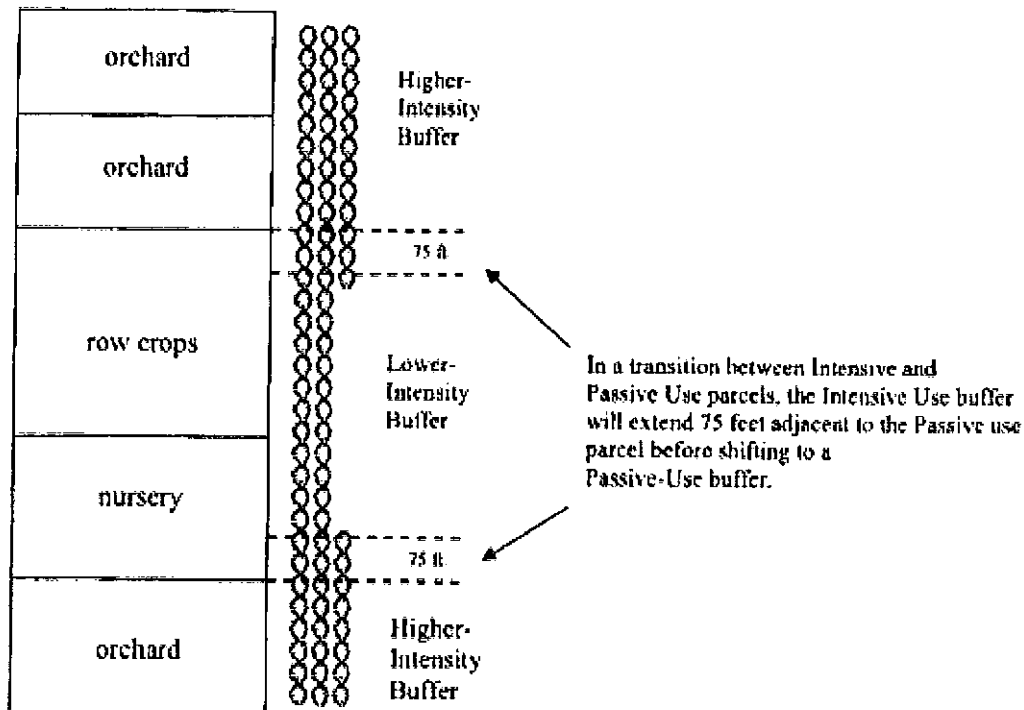
6. Permitted Tree Species.

a. Applicants may use any species of conifer trees provided they are resistant to or will not harbor agriculturally harmful insects or diseases.

b. A list of recommended species is available in Appendix I

C. Transitions between Buffers of Different Intensity. The principal purpose of the tree buffer is to mitigate spray drift; spray height is the primary factor in determining whether a higher- or lower-intensity buffer is required. To lessen the amount of spray being carried past a transition between the two types of buffer, the applicant will extend the buffer 75 feet beyond the end of the higher-intensity buffer, as shown in Figure 4.

Figure 4. Buffer Overlapping for Transition Areas



D. Screening Shrubs.

1. Screening shrubs are used only in conjunction with tree buffers.
2. If the first row of trees on the agricultural side of the tree buffer does not have foliage down to ground level, install screening shrubs to provide sufficient foliage cover to close the gap. If the first row of trees on the agricultural side of the buffer provides foliage down to ground level, then screening shrubs are not required.
3. The mature height of the shrubs shall be 125 percent of the anticipated ground-to-foliage bare space of the average mature specimen of tree species.
4. Permitted Screening Shrubs.
 - a. Applicants may use any species of screening shrubs provided they are resistant to or will not harbor agriculturally harmful insects or diseases.
 - b. A list of recommended species is available in the regional plan, Appendix III, available at the village of Johnstown zoning

departments.

E. Trespass-Inhibiting Hedges and Fences.

1. Hedges and fences may be used separately or in combination to inhibit trespass onto agricultural land.

2. Hedge Standards.

a. Spacing and Number of Rows. One or more rows, whichever is sufficient to create an eight-foot- wide buffer at maturity.

b. Spacing within Rows. As appropriate to eliminate gaps within three years of planting.

c. Overall Height.

i. No less than three (3) gallon if being used solely as a trespass inhibitor.

ii. If doubling as screening shrubbery, the hedge needs to cover any bare space between the ground and the lowest branches of trees in the central portion. Mature height shall be 125 percent of anticipated ground-to-foliage bare space of average mature specimen of tree species being screened.

d. Permitted Trespass-Inhibiting Species. Applicants may use any species of trespass-inhibiting hedges provided they are resistant to or will not harbor agriculturally harmful insects or diseases. A list of recommended species is available in the regional plan, Appendix I, available at the village of Johnstown zoning departments.

3. Fence Standards. a. Minimum fence height: six feet. b. Fences shall be climb resistant. c. Install gates only when necessary for maintenance of the mitigation area.

F. Other Design Requirements.

1. Road Placement. It is always preferable to not bisect buffers with roads due to the wind-funneling effect they create. If a road is unavoidable, it should be as narrow as possible, not straight, and should not be oriented to the prevailing wind. It should be noted that even a road with an acceptable orientation and design will permit some degree of increased

spray drift to pass through the buffer area, and will also pose a greater risk of trespass

1184.04 Deviations.

A. Deviations from Provisions.

1. A proposed mitigation design that deviates from the provisions may be approved by the Planning & Zoning Commission as described in this section.

2. A mitigation design may not be considered as a deviation if existing elements consistent with the purpose of the buffer are incorporated, as described below:

a. For mitigation without tree buffers the requirements of linear distance can be achieved by elements such as the following:

i. Manmade or natural features such as infrastructure rights-of-way, roads, watercourses, wetlands, rock outcrops, forested areas, and steep slopes;

ii. Nonfarmable areas of the agricultural land being buffered (including yards, storage areas, roads, and all structures) unless such land is used for animal husbandry.

iii. Publicly owned land without consistent present or projected public use (as determined by the public entity owner);

iv. An easement on agricultural land purchased by the applicant;

v. Other open areas (except undeveloped rural residential, commercial, or industrial parcels) that are considered appropriate to the purpose of the buffer.

b. For mitigation with tree buffers the approving authority may allow the requirements to be partially or fully satisfied by existing areas of trees and shrubs, as long as their mitigation effect is essentially the same as that intended by the requirements in Codified Ordinance 1184.03. If the characteristics of the existing vegetation do not meet the requirements in Codified Ordinance

1184.03, and cannot substitute in full or in part for an adequate tree buffer, then the area can either be incorporated into the design at half its mitigation value (for example, a 20-foot-wide riparian area would be calculated as 10 feet of tree buffer) or it can be left out of the tree buffer and be calculated at its original width (20 feet of existing vegetation would be considered as 20 feet of bare land).

3. When an applicant proposes a mitigation design that deviates from the minimum standards in this section, the applicant is responsible for the preparation of a conflict assessment and mitigation study (CAMS).

4. Conflict Assessment and Mitigation Study (CAMS).

a. The CAMS shall:

i. Determine the present and likely future agricultural land uses, practices, and activities with the potential to cause adverse impacts to adjacent urban development. This determination shall be based on factors such as soil type; topography; parcel size, shape, and location; infrastructure; microclimatic conditions; regional agricultural practices and crops; and the farming history of the adjacent agricultural land and surrounding similar parcels.

ii. Determine how the proposed urban development would likely impact the management and operation of nearby agricultural lands. All owners of Agriculture-zoned land within 1,000 feet of the land proposed for development shall be asked for an interview, and the findings of those interviews will be included in the CAMS.

iii. Identify the land uses, practices, and activities that may cause adverse impacts and the extent of the impacts, from both the urban use as well as from the agricultural land. It shall also quantify the impacts, where possible, in terms of frequency and duration of activities to determine the impacts. As part of this evaluation, the CAMS shall consider the likely future uses determined in subsection (A)(4)(a)(i) of this section. The buffering mechanisms that are proposed shall be sufficient to accommodate these potential future uses. The current financial viability of a particular crop will not be considered an important limiting factor in

determining potential future use.

iv. Propose a set of buffering measures that will achieve acceptable buffering outcomes, which may include, but are not limited to, the siting of residences, size and geometry of lots, separation distances, communal open space, vegetation, natural landscape features, acoustic features, and so forth.

v. Propose the means by which the proposed buffering measures will be monitored and maintained. This includes responsibility for implementing and maintaining specific features of the buffer areas to ensure continued effectiveness. Acknowledgment of the authority responsible for ensuring compliance with any agreement will be plainly cited.

vi. Establish a timeline for the development that establishes when the buffer will be installed.

5. Any approval of a deviation does not create a precedent for any subsequent requests for deviations from the standards of this section.

APPENDIX I – LIST OF ACCEPTABLE TREES

URBAN TREES FOR CENTRAL OHIO

Lisa M. Bowers Regional Urban Forester ODNR - Ohio Division of Forestry

SIZES AND DESCRIPTIONS MAY VARY DEPENDING ON SITE PLACEMENT! ***Trees listed below are generally acceptable for planting throughout a site.***

However, not all trees listed below may be suitable as street trees.

Alternatives to those listed below may be acceptable pending recommendation by a Landscape Architect licensed in the State of Ohio or similar professional, as well as review by the Johnstown Planning Commission.

SMALL TREES – Mature height under 30', suitable under utility wires **Adams**

Crabapple – Malus 'Adams'

Height: 25'; habit - dense rounded; fall color – orange-red; fruit – red, persistent.

Adirondack Crabapple – Malus 'Adirondack'

Height: 10'; habit – V shaped upright; fruit – orange-red persistent; flowers – red buds, white flowers with red tinge.

Centurion Crabapple – Malus 'Centurion'

Height: 20' – 25'; fruit – cherry-red 1/2"; habit - upright; fall foliage: green; flowers – rose-red.

Excalibur Crabapple – Malus 'Excalibur'

Height: 8'; fruit – tiny golden yellow; habit – upright dwarf; flowers – red buds open to white.

Harvest Gold Crabapple – Malus 'Harvest Gold'

Height: 20' - 25'; fruit – golden, 1/2"; habit – upright; flowers - white; fruit persists into spring.

Madonna Crabapple – Malus 'Madonna'

Height: 16' – 20'; fruit – red; habit – compact, upright; flowers – white, double.

Prairifire Crabapple – Malus 'Prairifire'

Height: 20'; habit – upright spreading, foliage – reddish-green and yellow in the fall; flowers – coral red; fruit – dark red.

Red Jewel Crabapple – Malus 'Red Jewel'

Height: 15'; habit- mounded spreading form; fruit – cherry red 1/2" persist to April, foliage – excellent dark green; flowers – white.

Corneliancherry Dogwood – *Cornus mas* Height: 20' - 30'; habit- rounded; flowers- yellow, March.

Thornless Cockspur Hawthorn – *Crataegus crugalli*

Height: 15' – 20'; habit – globose , dense branches; flowers – white in clusters; fruit – 1/2" red persistent, used for wildlife; foliage gray green, purple/red in fall.

Winter King Green Hawthorn - *Crataegus viridis* 'Winter King'

Height: 20' - 25'; habit – rounded, fall color – purple to red; flowers – white cluster; fruit – red and persisting.

Lavalle Hawthorn – *Crataegus x lavellei*

Height: 15' - 30', habit – oval to round; flowers – white clusters; fall color – bronzy to coppery red; fruit – red that persist into the winter.

Ohio Pioneer Dotted Hawthorn – *Crataegus punctata* var. *inermis* 'Ohio Pioneer'

Height: 20' - 25'; fruit; dark brick-red; habit - rounded; fall foliage – grayish/green; flowers - white clusters; thornless.

Vaughn Hawthorn – *Crataegus phaenopyrum* x *Crataegus crugalli* 'Vaughn' Height: 15' - 20'; fruit – glossy, orange-red, 3/8"; habit – rounded; fall foliage – grayish-green; flowers – white.

Washington Hawthorn – *Crataegus phaenopyrum*

Height: 25' - 30'; fruit – bright glossy red; shape – oval rounded; fall foliage – orange to scarlet to purplish, thorns.

Ivory Silk Tree Lilac - *Syringa reticulata* 'Ivory Silk'

Height: 20' – 30'; shape – rounded; fruit – clusters of capsules; fall foliage – green; flowers – 6-10" white panicles; attractive flowers in early July, flowers at a young age.

Amur Maackia – *Maackia amurensis*

Height: 20' - 30', shape- rounded, fruit – pod, flower – 4-6" white racemes June – July.

Amur Maple - *Acer ginnala*

Height: 15' – 20'; shape - globose to ovate; foliage – green to red/orange in fall.

Paperbark Maple – *Acer griseum*

Height: 20' - 30'; shape – upright oval to rounded; fall color – russet red to red; exfoliating bark makes this tree interesting.

Tartarian Maple – *Acer tataricum*

Height: 15' - 20' sometimes 30'; shape – rounded; fall color – yellow, red to reddish brown.

Serviceberry species – *Amelanchier* species

Height: 25' – 30'; fruit – red, birds love them; shape – oval, upright; foliage – orange/red in fall; flowers – white clusters.

Red Bud – *Cercis Canadensis*

Height: 20' – 25'; flowers – dark pink, early before foliage, fruit – small pod; shape - irregular; fall color – sometimes yellow. 'Alba' white flower selection. Naturally grows as an understory tree, site carefully.

Blackhaw Viburnum – *Viburnum prunifolium*

Height: 12' - 15'; shape – rounded; flowers – white clusters in May; fruit – blueish black and eatable.

Nannyberry Viburnum – *Viburnum lentago*

Height: 18' possibly 30'; shape – upright, open; flowers – white clusters in May; fruit – blueish black, winter food for birds **MEDIUM TREES** – Mature size being 30'-60'.

Black Alder – *Alnus glutinosa*

Height – 40' - 60'; shape – pyramidal when young then irregular; fruit – woody strobile; adaptable, does well in wet or dry sites, full sun or partial shade, nitrogen fixer.

Autumnalis Higan Cherry – *Prunus subhirtella* variety *Autumnalis*

Height: 20' - 40'; flowers – semi-double pink; habit – oval upright; Higan cherry are the most cold, heat and stress tolerant of the cherry group.

Jackii Crabapple – *Malus 'Jackii'*

Height: 30' - 40'; fruit – maroon 1/2"; shape - upright and rounded; foliage – glossy green, yellow in the fall.

Lacebark or Chinese Elm - *Ulmus parvifolia*

Height: 50'; fruit – whitish, winged $\frac{1}{4}$ "; shape – rounded; fall foliage – yellow to wine.

Goldenraintree – Koelreutaria paniculata

Height: 25' - 40'; shape - globose; flower – yellow June-July; foliage – blue/green leaflets, yellow in fall; fruit – bladder like papery green capsules turning brown.

American Hornbeam – Ostrya virginiana

Height: 30' - 40'; shape conical to globose with age; foliage – green, yellow in fall; flowers – catkins; fruit nutlets in bunches, Prefers some protection, understory tree.

European Hornbeam – Carpinus betulus

Height: 35' - 40'; shape – conical becoming ovate, wide spreading; foliage – green-yellow in fall; flowers – catkins with bracts; fruit – leafy cluster with nutlets.

Upright European Hornbeam - Carpinus betulus 'Fastigiata'

Height: 30' – 40'; shape – upright oval dense; fall color – yellowish. Grown for its dense upright habit.

Red Horsechestnut – Aesculus x carnea

Height- 30' - 40'; shape – round to broad-rounded; flowers- rose red 6-8" panicles.

'Briotii' – flowers deeper red and larger. **Crimean Linden – Tilia x euchlora**

Height – 40' - 60' and half that in spread; fall color – possibly yellow-green.

Legend American Linden – Tilia americana 'Wendell'

Height: 50'; shape – broadly conical; foliage – dark green; flowers – pale yellow, attracts bees; fruit – $\frac{1}{2}$ " nutlets.

Littleleaf Linden – Tilia cordata

Height: 45' – 65'; fruit – tan globes $\frac{1}{4}$ "; shape – compact, pyramid; 'Corinthian', 'Greenspire', 'Glenleven'- cultivars. **Hedge Maple – Acer campestre**

Height – 25' - 45'; shape – rounded; fall color – yellow; can tolerate alkaline soils.

'Queen Elizabeth'-cultivar Celebration Maple – Acer x freemanii 'Celebration'

Height: 45'; fruit – seedless; shape – upright, oval; fall foliage - orange-red; flowers – greenish-yellow.

Norwegian Sunset Maple – Acer truncatum x Acer platanoides 'Norwegian Sunset'

Height; 35' – 45'; fruit – winged, $1\frac{1}{2}$ "; shape – upright oval; fall foliage – orange-red; flowers - greenish-yellow.

Pacific Sunset Maple – *Acer truncatum* x *Acer platanoides* ‘Pacific Sunset’ Height: 30’- 40’; fruit – winged, 1 1/2”; shape – upright, rounded; fall foliage – red; flowers – greenish yellow.

Sawtooth Oak – *Quercus acutissima* Height: 40’- 50’; fruit – acorn; shape – rounded.

Hardy Rubber Tree – *Eucommia ulmoides*

Height: 40’ – 60’; rounded to broad spreading; foliage – green-yellow/green in fall; flower dioecious - not showy; fruit – 1 1/2” capsule; lustrous dark green foliage, slow grower.

LARGE TREES – Mature size being 60+ feet.

Baldcypress – *Taxodium distichum*

Height: 50’ - 70’; habit – pyramidal; foliage – yellow-green in the spring, linear lanceolate, orange to pink to soft brown in the fall; a deciduous conifer that adapts well to wet or dry sites, landscape tree mostly, but also used as street trees.

River Birch - *Betula nigra*

Height: 40’- 70’, habit – oval maturing to rounded; fall color – yellow and has handsome exfoliating bark.

Kentucky Coffeetree – *Gymnocladus dioicus*

Height: 55’– 75’; foliage – blue-green leaflets, yellow in fall; flowers – green or yellow-white clusters; fruit – 4” to 10” reddish brown pods on females.

American Elms - Improved - *Ulmus americana*: ‘Valley Forge’, ‘Princeton’, ‘New Harmony’

Height: 60’- 80’, medium to fast growing; shows tolerance to Dutch Elm disease.

Ginkgo (male only) - *Ginkgo biloba*

Height: 50’– 80’; shape – irregular; foliage – fan shaped yellow in fall; fruit – none on males; *wide* unless upright selection is chosen distinctive and historical interest. Male cultivars; ‘Autumn Gold’, ‘Fairmont’, ‘Lakeview’, ‘Mayfield’, ‘Palo Alto’, ‘Princeton Sentry’, ‘Sinclair’

Honeylocust species (Thornless only) - *Gleditsia triacanthos* var. *inermis*

height: 40’ – 70’; shape – ovate; foliage – green/yellow in fall; flowers – inconspicuous; fruit – long brown pods; lacy appearance, casts light shade easy to clean up in fall.

Horsechestnut – *Aesculus hippocastanum*

Height: 50'-75'+; shape – upright oval to rounded; flowers- yellowish 5-12" terminal panicles; foliage – early to leaf out, yellowish brown in fall; fruit – spiny dehiscent.

Silver Linden - *Tilia tomentosa*

Height: 50' – 70'; shape – conical to ovate; foliage – green with silver underside, yellow in the fall; flowers – yellowish-white, fragrant; fruit - 1/3" nutlet; attractive and tolerates heat and drought better than most lindens. '**Sterling**' – cultivar

Cucumbertree Magnolia - *Magnolia acuminata*

Height: 50' - 80'; shape- broad rounded; flower- perfect, greenish yellow- May; native to Ohio.

Black Maple – *Acer nigrum*

Height: 60' - 75'; shape – ovate; fall color - yellow; flowers – yellow/green before leaves appear; fruit – 1" samara.

Sugar Maple species – *Acer saccharum*

Height: 60'- 75'+; fruit – winged, 1-1 3/4"; shape – oval to rounded; fall foliage – orange, red; flowers – yellow green. '**Commemoration**', '**Green Mountain**' – cultivars.

Bur Oak – *Quercus macrocarpa*

Height: 70' – 90'; shape – ovate; foliage - 5-8" fiddle shape rounded lobes, yellow brown in fall; flowers – inconspicuous; fruit acorns; durable wide range of soils, massive, more tolerant of city conditions than most Oaks.

Chinkapin Oak – *Quercus muehlenbergii*

Height: 50'- 70'+;; shape – open rounded crown, wide spreading with age, fall color- yellow to orangish brown; will grow in alkaline soils.

English Oak – *Quercus robur*

Height: 60' - 80'; shape ovate to globose; foliage 3- 5" lobes, brown in fall; flowers – inconspicuous; tolerant of drought and resistant to some limited root space, upright forms also available. '**Skymaster**' – cultivar - height: 50' – 60'; shape – pyramidal; fall foliage – green.

Northern Red Oak – *Quercus rubra*

Height: 60' – 80'; fruit – acorn; shape – ovate, open; fall foliage – bright reddish, golden brown; flowers – inconspicuous.

Pin Oak – *Quercus palustris*

Height: 55' - 75'; shape – conical to ovate; foliage – 3 –6' lobes, bronze in fall; flowers – inconspicuous; fruit – acorns.

Scarlet Oak –*Quercus coccinea*

Height: 70' - 75' by 40' - 50' in width, fall color – scarlet to russet red. May develop chlorosis problems in certain sites.

Shingle Oak – *Quercus imbricaria*

Height: 40' – 60'; shape – conical to globose; foliage - 3' – 6" laurel like leaves, green, yellow/brown to russet red in fall; fruit acorns; attractive and tolerant to city conditions, leaves persist into winter and can be used for screening.

Shumard Oak – *Quercus shumardi*

Height: 60' – 80'; fruit – acorn; shape – broad, rounded; fall foliage – reddish-brown; flowers – inconspicuous.

Swamp White Oak - *Quercus bicolor*

Height: 60' – 80'; shape – ovate; foliage - 4" – 8" lobes, yellow brown in fall; flowers – inconspicuous.

Japanese Pagodatree – *Sophora japonica*

Height: 50' - 75'; shape – upright spreading; flowers – creamy white panicles July-August, fruit – pod, fall color – occasional yellow.

London Planetree – *Platanus x acerifolia*

Height: 70' - 100'; shape – pyramidal in youth, open wide spreading with age; bark – olive green to creamy, exfoliating.

Dawn Redwood – *Metasequois glyptostroboides*

Height: 65' - 100'; shape - conical; foliage – deciduous needles, yellow to orange/brown in fall; flowers – inconspicuous; fruit – 1" pendulous cones.

Sweetgum – *Liquidambar styraciflua*

Height: 60' - 75'; fruit – horned balls, 1-1 1/2"; shape - pyramidal; fall foliage – green, yellow, scarlet and purple; star shaped leaves, best if planted in the spring.

Tuliptree - *Liriodendron tulipifera*

Height: 70' - 90', shape – oval-rounded; foliage- golden yellow to yellow in fall; flowers- tulip like- greenish yellow petal with orangish interior- beautiful flower.

Black Tupelo or Black Gum – *Nyssa sylvatica*

Height: 40' – 70'; shape conical; foliage – glossy dark green, yellow/orange and scarlet in fall; flowers – inconspicuous; fruit – 1/2" blue, eaten by birds and mammals.