

## Source information:

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Special thanks to Steve Brady of the UGA Cooperative Extension Service and Valerie Pickard of the Natural Resource Conservation Service for their additions and editing.

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### **“Green Buffers for Urban Noise Reduction “ is a 2003 publication of the Georgia Forestry Commission.**

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# Green Buffers For Urban Noise Reduction



Today's communities are developing at a more rapid pace than at any time in our history. Land is becoming more scarce, developments more dense, lot sizes shrink and we are coming closer to our neighbors and the sounds they create. This increasing proximity to urban sounds and its elevated levels has come to receive the unflattering name of "noise pollution". Indeed, elevated sound levels impact our physical health, stress level, and eventually our very quality of life, much the same way other, more obvious forms of pollution affect us.



Humans have long tried to quiet their surroundings through various means; building walls, planting vegetation, creating fountains to mask noise, and moving to the next county – with limited success. Research has shown that the ability of any one factor to significantly alter the loudness of noise (with the possible exception of moving) to be somewhat limited when compared with tactics employing a multi-faceted approach. Actual noise reductions may achieve diminished noise levels as much as 50% in a well planned effort.



This booklet will discuss the basic landscape tools available to limit the impact of noise and provide guidelines for the best approach for sound reduction efforts. The keys to keep in mind are distance, height, density of the materials used, and affordability.

Maximizing personal distance from the sound source is always the first step. Most loud sounds will dissipate over extended distances. Unfortunately, space in urban environments is limited, so a combination of distance, structures and vegetation will allow the most advantage. Structures



## Plant Materials for Urban Noise Reduction

### Recommended Shrubs

Scientific Name -	Common Name	Height	Spacing	Sun/ Shade	Drainage
<u>Ilex cornuta</u> "Carissa"	Carrisa Holly	3 - 4'	3'	S - Sh	M - D
<u>Ilex cornuta</u> "Rotunda"	Dwarf Chinesee	3 - 4'	3'	S - Sh	M - D
<u>Ilex cornuta</u> "Dwarf Burford"	Dwarf Burford	5 - 8'	5'	S - Sh	M - D
<u>Ilex vomitoria</u> "Nana"	Dwarf Yaupon	3 -5'	4'	S - Sh	M - D
<u>Juniper chinensis</u> "Pfitzeriana"	Pfitzer Juniper	5 - 6'	5'	S	M - D
<u>Myrica cerifera</u> "pumilla"	Dwarf Waxmyrtle	3—5'	5'	S - PS	W - M
<u>Osmanthus x for- tunei</u>	Fortunes Osmanthus	10 - 15'	8'	S	M - D

### Recommended Ornamental Grasses

Scientific Name -	Common Name	Height	Spacing	Sun/ Shade	Drainage
<u>Chasmanthium</u> latifolium	Upland Sea Oats	2-3'	2'	S - Sh	W - M
<u>Cortaderia</u> selloana	Pampas Grass	7 - 7'	5'	S	M - D
<u>Cortaderia</u> selloana "Nana"	Dwarf Pampas Grass	3 - 4'	4'	S	M - D
<u>Miscanthus</u> sinensis "Strictus"	Porcupine Grass	5 - 7'	3'	S	M - D
<u>Miscanthus</u> sinensis "Zebrinus"	Zebra Grass	5 - 7'	3'	S	M - D
<u>Panicum virgatum</u>	Switch Grass	5—7'	3'	S—Sh	M—D

**Key:** S - Sun, P - Part Sun, S - Shade, W - Wet, M - Moist/Well drained, D - Dry

Notes above assume proper tree to site location and proper planting techniques and moderately well drained soils. This list is not intended to be all inclusive but to point to logical

#### Key terms :

- Sound attenuation** - reduction of sound pressure intensity.
- db(A)** - sound pressure measured in decibels (**db**) units with a scale adjusted (**A**) to approximate human hearing.
- Noise source** - device or effect creating unwanted, loud and or unharmonious sound.

# Plant Materials for Urban Noise Reduction

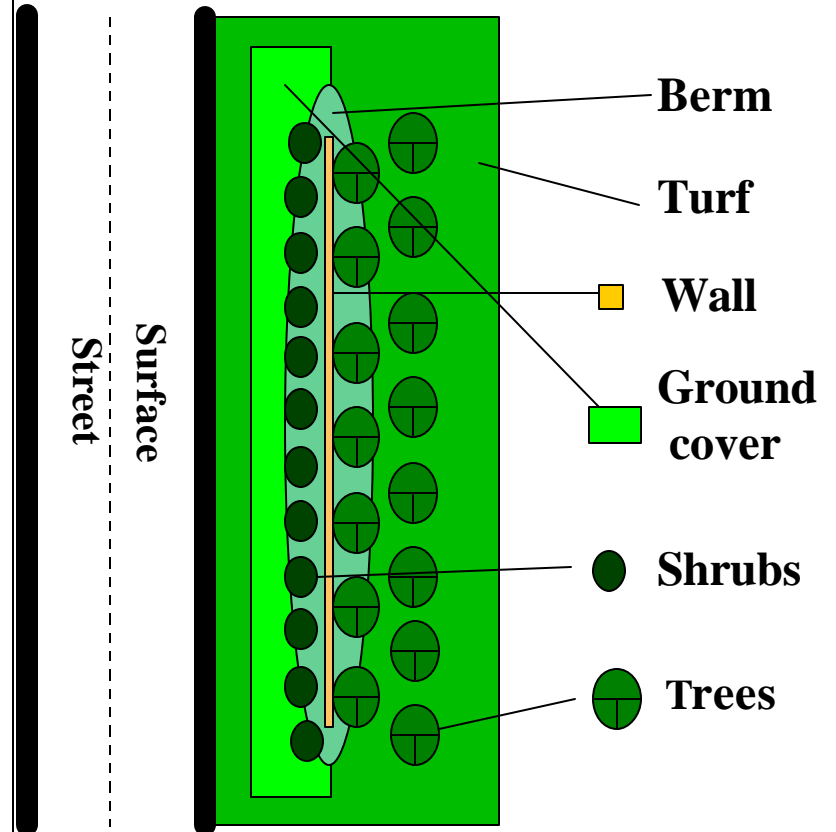
## Recommended Overstory Trees

Scientific Name -	Common Name	Height	Spacing	Sun/Shade	Drainage
<u>Cedrus atlantica</u>	Atlas Cedar	40-60'	30'	S - PS	M - D
<u>Cedrus deodara</u>	Deodar Cedar	40-60'	30'	S - PS	M - D
<u>Cryptomeria japonica</u> -	Japanese Cryptomeria	50-70'	40'	S	M
<u>Cupressus rizonica</u>	Arizona Cypress	30-40'	20'	S	D
<u>Cunninghamia lanceolata</u> -	Common Chinafir	50-70'	30'	S - PS	M
<u>Cupressocyparis eylandii</u> -	Leyland Cypress	60-70'	15'	S	M - D
<u>Juniperus virginiana</u> -	Eastern Red Cedar	40-60'	25'	S	D
<u>Magnolia virginiana</u> -	Sweetbay Magnolia	15-25'	20'	S - PS	M - D
<u>Magnolia grandiflora</u> -	Southern Magnolia	60-80'	50'	S - PS	M - D
<u>Metasequoia glyptostroboides</u>	Dawn Redwood	70-100'	40'	S	M
<u>Pinus strobus</u> -	White Pine	60-80'	40'	S - PS	M - D
<u>Pinus taeda</u> -	Loblolly Pine	60-80'	25'	S	D
<u>Pinus virginiana</u> -	Virginia Pine	40-60'	25'	S	D
<u>Thuja occidentalis</u>	Arborvitae	40-60'	15'	S	M

## Recommended Understory Trees

Scientific Name -	Common Name	Height	Spacing	Sun/Shade	Drainage
<u>Ilex x attenuata</u> -	Savannah Holly	15-30'	15'	S - PS	M - D
<u>Ilex cassine</u> -	Dahoon Holly	20-30'	15'	S - PS	M
<u>Ilex x Nellie R. Stevens</u> -	Nellie R. Stevens Holly	15-35'	15'	S	M - D
<u>Ilex x opaca</u> -	American Holly	20-40'	15'	S	M - D
<u>Ilex vomitoria</u> -	Yaupon Holly	15-20'	10'	S	W - M - D
<u>Myrica cerifera</u> -	Waxmyrtle	10-20'	15'	S - PS	W - M
<u>Prunus caroliniana</u>	Carolina Cherrylaurel	20-30'	15'	S - PS	M - D

(walls and berms) and vegetation (grass, shrubs and trees) are the remaining available tools at hand. The idea is to absorb, deflect, and muffle as much sound as close to the source as possible. For most of us that point would be the property line. Below is an integrated sample project plan employing all the these tools.

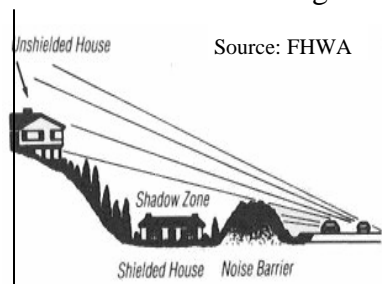


## Materials:

- ?? Berms – Earthen berms help to absorb noise from low elevation sound sources. They should be constructed to be least 3 feet wide for every 1 foot in height and be vegetated with appropriate grasses or shrubs.
- ?? Walls – Sound barrier walls reflect and deflect noise. They may be constructed of stone, concrete, wood or recycled structural materials. The more dense the materials the better their ability to affect the sound. Also the closer the wall to the sound source the more the sound will be impacted. Often times, a short wall close to the source will provide the same impact a much larger structure farther from the sound source. Usually a wall height that screens the source from view is sufficient. Also, each meter of wall height increase above line of sight, attenuates sound by as much as an additional 1.5 db(A).
- ?? Vegetation – Plant materials help attenuate sound and “calm” the noise. Some plant materials are better at performing this function than others. Efficient trees and shrubs have thick waxy leaves, dense evergreen foliage and maintain their branches to the ground. Always be sure to properly install plant materials according to University of Georgia Extension Service or Georgia Forestry Commission guidelines.

## Design:

Noise reduction in urban environments is a matter of “getting in the way” of the sound with the “right materials”. A significant amount of the perceived sound attenuation is a function of the sound source being “out of sight”. This may require different strategies for different types of



situations i.e. a second story window will require a different screen type than those on the first floor patio. Remember home surfaces (walls and cement) also reflect sound and may serve to accentuate noise problems if not screened.

## Procedure:

Determine the source of the noise and the area to be screened. Heavy traffic noise will likely require a scheme similar to the detail shown on page 3. This requires a minimum of dense shrubs, a solid wall (wood, stone, or recycled material), and two rows of evergreen trees. Should traffic noise be of a lighter nature, a berm and shrubs may be sufficient. This effort should take place as close to the sound source or curb as possible. Sometimes a low wall and shrub planting will suffice. Make sure the shrub planting is designed to allow foliage to touch so as to provide a continuous layer of foliage. Tree plantings should be two staggered rows (where space allows) to provide visual screening of the sound source. Remember to allow for the growth of the trees and shrubs over time and don't crowd them too close together. Adjust your planting plan to allow for plant growth to screen more noise over time.

### Noise Source



### Planting Design

