



**US Army Corps  
of Engineers.**

# Public Notice

Public Notice No. 08-52

Date: August 12, 2008

Nashville District

Application No. 2007-02208

Expires: September 12, 2008

Please address comments to: Nashville District Corps of Engineers,  
Regulatory Branch, 3701 Bell Road, Nashville, TN 37214 (Attn: Lisa Morris)

**SUBJECT:** Proposed Deposit of Fill Material into Wetlands  
Adjacent to McClorys Branch and other associated activities,  
Williamson County, Tennessee (Laurel Cove Development, LLC)

**TO ALL CONCERNED:** The application described below is submitted  
for a Department of the Army (DA) Permit pursuant to **Section 404  
of the Clean Water Act (CWA)**. Before a permit can be issued,  
certification must be provided by the Tennessee Department of  
Environment and Conservation (TDEC), Division of Water Pollution  
Control, pursuant to Section 401(a)(1) of the CWA, that  
applicable water quality standards would not be violated.  
The applicant has applied separately for the certification.

**APPLICANT:** Laurel Cove Development, LLC  
6568 Arno Road  
College Grove, TN 37046

**LOCATION:** McClorys Branch (aka McCrory Creek), Williamson  
County, Tennessee. McClorys Branch is a tributary of the Harpeth  
River Mile 104.8, left bank. USGS Map College Grove, Tennessee.  
Lat: 35.810584; Lon: -86.734008.

**DESCRIPTION OF PROPOSED WORK:** As shown on Exhibit B, the  
proposed project includes 1) the filling of 0.867 acres of  
wetland (Wetland 1) to accommodate the alignment for Hole 17 of a  
championship level golf course at the subject location. The work  
also involves the 2) the clearing of approximately 1.6 acres of  
vegetative canopy from Wetland 1; 3) enhancement of an existing  
wetland (Wetland 2) and restoration of historic wetlands that  
have been manipulated for agricultural use; 4) reshaping of  
existing 1.02 acre spring-fed pond; 5) installation of seven  
wooden span golf cart crossings; 6) two road crossings; and  
7) a temporary stream crossing.

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A wetland delineation, submitted with the permit application, describes two wetlands on the property. Wetland 1 is located on the southwestern portion of the site, adjacent to Arno Road, and is 4.787 acres. Wetland 2 is located immediately south of Wetland 1 and is 0.246 acres. Descriptive information regarding the vegetation and conditions of the wetland areas is shown on our web site at: <http://www.lrn.usace.army.mil/cof/notices.htm>, click on proposed activities and PN 08-52 or you may request additional information by contacting Ms. Morris at telephone (615) 369-7504 or the address above.

Proposed impacts to Wetland 1 includes both the 0.867 acres of fill for the creation of a tee box island and the 1.6 acres of tree removal to provide line-of-sight for the golf course hole, leaving 2.179-acres the 4.787-acre Wetland 1 undisturbed and proposed to be preserved through conservation easement. In addition, 3.34 acres of historic wetland would be restored. As shown on Exhibit D, the restoration sites include an area to the west and a smaller area to the south of Wetland 1. Although the removal of trees does not represent the introduction of fill into the wetland, it is considered an impact to the resource value and requires mitigation for the state permit. The restoration plan would provide 2:1 ratio for the fill and 1:1 ratio for the tree removal. In addition, a plan to enhance Wetland 2, 0.246-acres, is proposed.

For additional information regarding the mitigation and monitoring plans and those describing the pond reshaping and golf cart and road crossings, see the more detailed project description on our web site. Overview plans of the proposed work are attached.

The decision whether to issue a permit would be based on an evaluation of the probable impacts including cumulative impacts of the activity on the public interest. That decision would reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the work, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the work would be considered including cumulative effects; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use,

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navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. In addition, the evaluation of the impact of the activity on the public interest would include application of the guidelines promulgated by the Administrator, Environmental Protection Agency, under authority of Section 404(b)(1) of the CWA. A permit would be granted unless the District Engineer determines it would be contrary to the public interest.

The Corps of Engineers is soliciting comments from the public; federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received would be considered by the Corps of Engineers to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment (EA) and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. An EA will be prepared by this office prior to a final decision concerning issuance or denial of the requested permit.

Other federal, state, and/or local approvals may be required for the proposed work.

The National Register of Historic Places has been consulted and no properties listed in or eligible for the National Register are known which would be affected by the proposed work. This review constitutes the full extent of cultural resources investigations unless comment to this notice is received documenting that significant sites or properties exist which may be affected by this work, or that adequately documents that a potential exists for the location of significant sites or properties within the permit area. Copies of this notice are being sent to the State Historic Preservation Officer.

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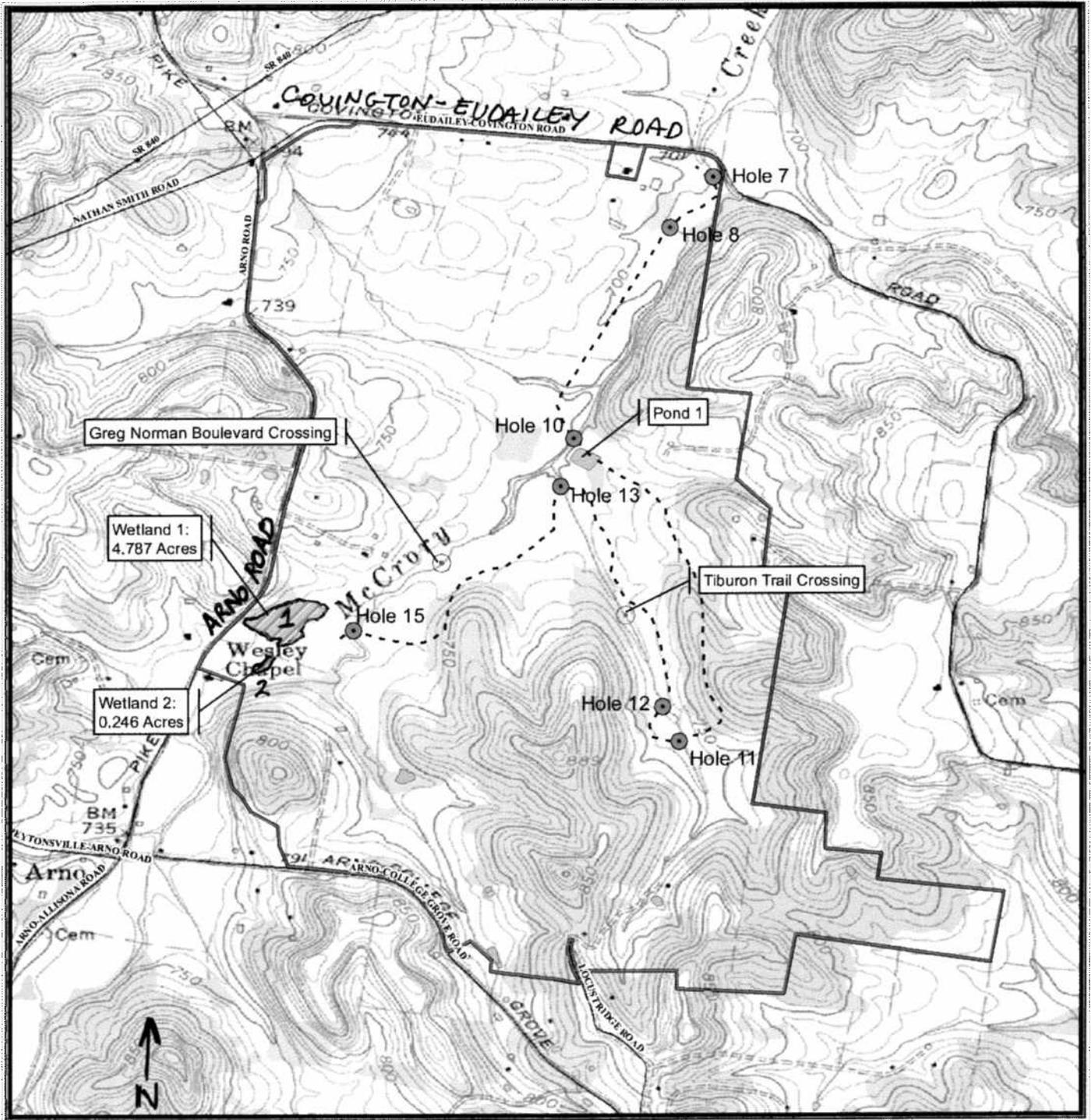
Based on available information, the proposed work will not destroy or endanger any federally-listed threatened or endangered species or their critical habitats, as identified under the Endangered Species Act, and, therefore, initiation of formal consultation procedures with the U.S. Fish and Wildlife Service is not planned at this time.

Other federal, state, and/or local approvals may be required for the proposed work. The state of Tennessee, Department of Environment and Conservation, must issue a water quality certification for the work in accordance with Section 401(a)(1) of the CWA.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for hearings shall state, with particularity, the reasons for holding a hearing. Written statements received in this office on or before September 8, 2008, will become a part of the record and considered in the determination. Responses to this notice should be directed to the Corps of Engineers Regulatory Branch, Attn: Lisa Morris, at 3701 Bell Road, Nashville, TN 37214.

*If you received this notice by mail and wish to view more information, please visit our web site at:  
<http://www.lrn.usace.army.mil/cof/notices.htm>, or contact Ms. Morris at telephone (615) 369-7504 or the address above.*

Figure 2. Location of features addressed in ARAP application within Laurel Cove Development in Williamson County, Tennessee as shown on the College Grove 7.5-minute USGS Topographic Quadrangle.



Source: USGS College Grove 7.5-minute Topographic Quadrangle, BDY Environmental, LLC, Dale & Associates



0 0.375 0.75 Miles

Prepared by:

**BDY** NATURAL SCIENCES CONSULTANTS  
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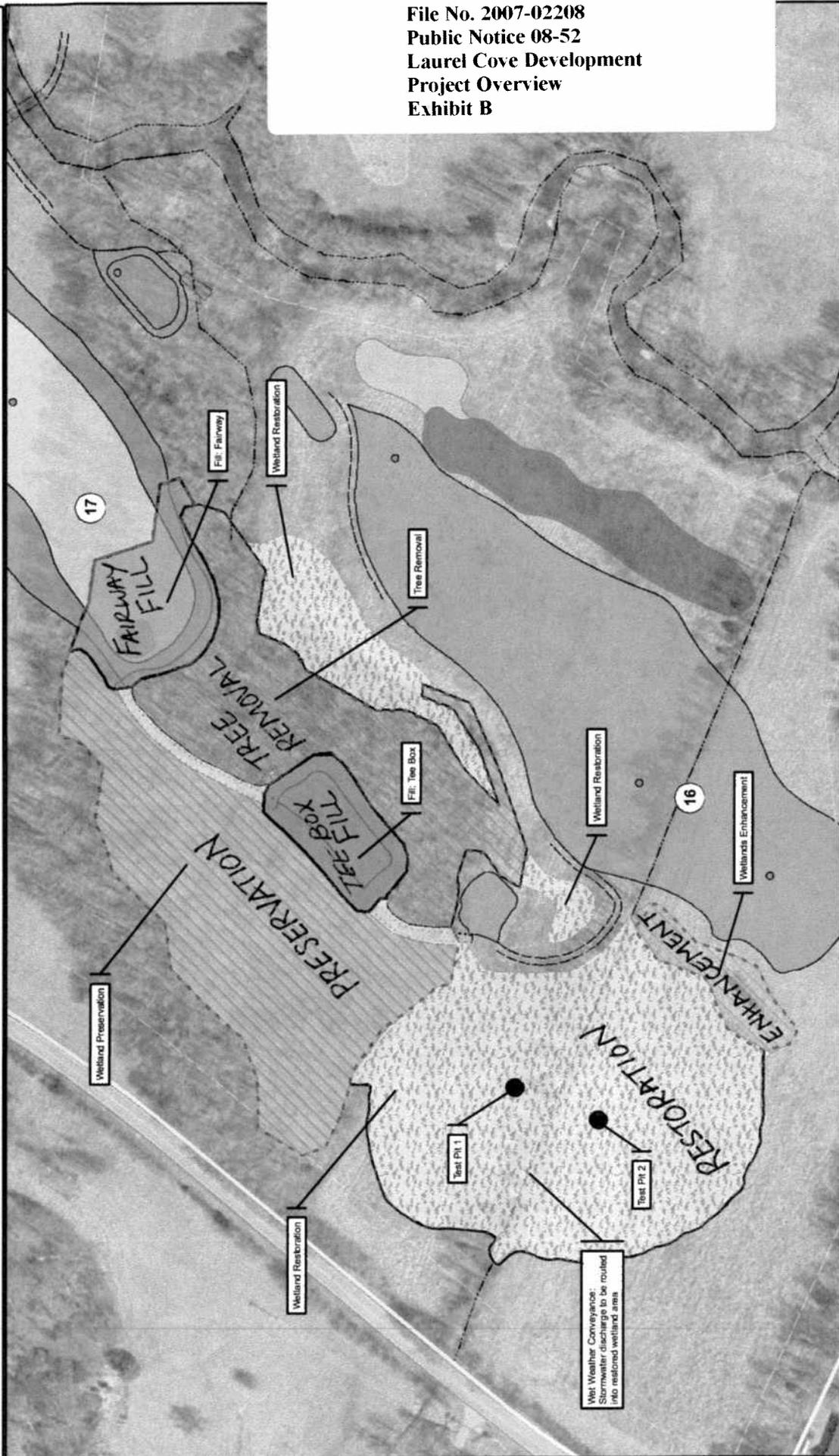
**Legend**

- Property Boundaries
- Delineated Wetlands
- Cart Path
- Ponds
- Road Crossings**
- Cart Path Crossing
- Road Crossing

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**Laurel Cove Development**  
**College Grove USGS Map**  
**Exhibit A**

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 Laurel Cove Development  
 Project Overview  
 Exhibit B

Figure 6. View of proposed impacts and mitigation adjacent to golf course Hole 17 within Laurel Cove Development as shown on a 2006 Williamson County, Tennessee Aerial.



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Prepared for:  
 Laurel Cove Development, LLC

Source:  
 2006 Williamson County, Tennessee Aerial  
 Dale & Associates  
 BDY Environmental, LLC

0 200 400 Feet

**Legend**

- Property Boundary
- Delineated Wetlands

**Wetland Impacts / Mitigation**

- Elevated Cartpath
- Fill
- Preservation
- Tree Removal
- Wetland Enhancement
- Wetland Restoration

### **Narrative description of the scope of the project**

This permit application is for several proposed activities associated with the golf course portion of the Laurel Cove Development in Williamson County, Tennessee. These proposed activities include: 1) introduction of fill materials and the clearing of canopy vegetation within a jurisdictional wetland feature 2) enhancement of an existing wetland feature 3) restoration of historic wetlands that have been manipulated for agricultural use 4) reshaping of existing pond feature 5) installation of seven wooden span golf cart crossings 6) installation of two road crossings and 7) construction of a temporary stream crossing.

The proposed wetland alterations are to accommodate the alignment of golf course Hole 17. This proposed alignment was selected from several design options since it included the least of amount of encroachment and alteration of the delineated wetland feature. Several features were integrated into this design to minimize impacts. These features include the use of elevated islands to serve as tee boxes and the installation of an elevated golf cart path which would accommodate the natural drainages and sheet flows through this area. The orientation of the golf hole through this area and the need for a line of sight to the fairway to the northeast necessitates the removal of a number of canopy trees along the eastern portion of the wetland. Compensatory mitigation would be provided as part of the proposed wetland restoration of historic wetland areas to the south and east where vegetation composition, grade, and hydrology have been altered to better suit agricultural uses.

The integration of this wetland and the restoration activities would not only preserve portions of the wetland and increase the areal extent of the wetland, but would also provide a beneficial ecological and aesthetic amenity to the golf course. In addition, a smaller wetland located to the south would be minimally graded to provide for more consistent hydrology supplied to this feature and planted with native wetland vegetation. Currently, the vegetation composition of this feature is dominated by non-native pasture species such as fescue and there are several elevated upland ridges running along and within the several depressions that comprise this wetland area. The strategic grading and removal of these ridges and the subsequent planting of this area with native wetland species would serve to enhance both the hydrology of the feature and the vegetation composition.

The reshaping of an existing pond feature is proposed for the area located between golf course Holes 10 and 13. This is a spring-fed feature and has a natural drainage located along its southern edge that drains into McClory Branch. The proposed reshaping would include the filling of approximately 9,900 square feet along its eastern boundary and extending the feature approximately 10,500 square feet along its northern boundary. During the proposed reshaping, the bottom of the pond would be recontoured to ensure the same lake volume as is currently present. The southern portion of the feature, where the existing overflow structure and drainage are located, would remain untouched and continue to provide the same functions as they currently do. No wetlands would be impacted during this activity since no littoral fringe wetlands present along the margins of this feature due to the depth of water and steepness of confining berms.

The proposed stream crossings include seven spans for golf cart crossings and two road crossings that comprise part of the internal transportation infrastructure within the site. Five of the span golf cart crossings are located along portions of McClory Branch, while the remaining two are located along an unnamed tributary, which originates from the southeastern portion of the site. These cart path crossings would provide both golf cart and pedestrian access to golf course Holes 6 through 15. One of the road crossings serve Greg Norman Boulevard and would be located across a reach of McClory Branch in the western portion of the site. The other road crossing would serve Tiburon Trail and is located along a reach of the unnamed tributary to McClory Branch, which originates from the southeastern portion of the site. As part of the installation of the road crossing for Greg Norman Boulevard, the applicant is proposing to install a temporary construction crossing adjacent to the proposed permanent crossing to provide access for construction equipment and materials to be utilized in the construction of the permanent crossing.

**Narrative description of the existing stream and/or wetland characteristics including, but not limited to, dimensions (e.g., depth, length, average width), substrate and riparian vegetation**

Two wetlands were identified and delineated within this phase of the project. The field delineation was conducted by BDY Environmental, LLC (BDY) following the accepted guidelines established in the 1987 U.S. Army Corps of Engineers (ACOE) Wetland Delineation Manual. Utilizing data on soil characteristics, hydrology, and plant composition, the boundaries of the wetland areas were demarcated with 'Wetland Delineation' flagging and numbered sequentially for surveying purposes. The larger of the two features, Wetland 1, is located in the southwestern portion of the site and is adjacent to Arno Road. Wetland 1 has an areal extent of approximately 4.787 acres as surveyed. This feature was delineated February 18, 2008. The smaller of the two wetlands, Wetland 2, is located immediately to the south of Wetland 1 and has an areal extent of approximately 0.246 acres, as surveyed. The delineated boundaries of Wetland 1 were observed in the field by representatives of the Tennessee Department of Environment and Conservation (TDEC) and ACOE on March 10, 2008. During that site visit, the smaller Wetland 2 was identified. It was delineated by BDY on a subsequent site visit conducted April 2, 2008.

**Wetland 1.** This 4.787-acre wetland area is entirely forested with a canopy layer comprised of trees that appear to be 20-30 years of age. Dominant canopy species include: Shumard's oak, red maple, slippery elm, sycamore, ironwood, box elder, green ash, and yellow chestnut oak. The understory contains several species indicative of hydric conditions such as sedges, rushes, wild rye, and marsh bedstraw. Other common species observed include coralberry, common greenbriar, Japanese honeysuckle, bush honeysuckle, and Nepalese browntop. There appeared to be a shallow water table present throughout much of the area and several wet weather drainages were observed with stagnant to slowly flowing water at the time of the assessment. It is likely that the hydrological sources for supporting this area include a combination of natural springs and sheetflow associated with stormwater runoff. The water within the feature appears to eventually drain to a stream feature that exits from the northeastern corner of the wetland. The majority of the delineated feature lies atop the mapped extent of the Melvin Silt Loam with the exception of a small fringe area along the northern boundary, which lies on the Hampshire-colbert Silt Loam. The Melvin Silt Loam is listed as a hydric soil in Tennessee and consists of a very deep, poorly drained soil formed in silty alluvium on flood plains, while the Hampshire-colbert Silt Loam is *not* listed as a hydric soil Tennessee and consists of a deep, well drained, soil on uplands.

**Wetland 2.** This 0.246-acre wetland area is located south of Wetland 1 in an open field that was historically utilized for agricultural purposes. The vegetation of this area is primarily herbaceous. It has a component of hydrophytic vegetation represented by species such as sedges and creeping jenny. Several small saplings (1-2 feet in height) of species including red maple, and green ash were observed. It appeared that this feature has been significantly degraded by past agriculture uses as there are several elevated ridges running through the feature and the dominant vegetation cover was non-native fescue. This area appeared to possess a shallow water table and was mostly restricted to a small depression within the field. It appeared that the hydrological source for this wetland is attributed to shallow groundwater and stormwater runoff from the adjacent fields. Much of the pasture area is mapped as occurring on the Melvin Silt Loam, which is listed as a hydric soil in Tennessee.

**Additional Wetland Notes.** Based on additional observations of the pastures and information obtained from adjacent landowners, it is likely that large portions of these agricultural pastures historically possessed characteristics associated with wetlands. Nearly all of these areas are mapped as occurring atop the Melvin Silt Loam and some incidental occurrences of hydrophytic species were observed; however, in no observed locations did they represent the dominant vegetation. There is a channelized feature that runs through the middle of the two open pastures. It appeared to encourage expedited conveyance of water from these areas and serve as a dewatering mechanism to discourage saturated conditions. This feature has been assessed and determined to be a wet weather conveyance by TDEC in a letter dated November 16, 2007.

An adjacent landowner discussed the area with one of the onsite contractors and suggested that an extensive tiling system had been installed within these fields to further enhance the drainage of these areas. No visual evidence of tiles were observed; however, based on the presence of a channelized drainage feature and some areas of soil saturation along the margins of the fields, it is highly possible that this had occurred in the past to encourage drier conditions for the survival of common pasture vegetation for grazing purposes. It was apparent from site observations that these fields had been worked to create a crown, or high ridge, along the central portion of both pasture areas to encourage runoff as well.

The applicant is proposing to restore a significant portion of these pastures into functional wetlands to serve as compensatory mitigation for proposed impacts. To further assess the potential for this site to support wetland conditions, two test pits were excavated along the margins of the two pastures to assess hydrology and soil characteristics. These test pits documented the presence of a shallow water table present within the field and hydric soil conditions persisting below surface a depth of 10-12 inches.

**Pond.** The 1.02-acre pond that is proposed for reshaping is located in the central portion of the site. This feature is roughly rectangular in shape and has been created by constructing a narrow berm along its margins. The vegetation around the pond feature is restricted to common pasture species with the exception of the canopy trees located along the drainage adjacent to the southern edge of the pond. The exact age of the pond is unknown, however, it appears to be well-constructed functional. Due to the steepness of the berms that serve to confine this pond and the consistent water levels present, there were no littoral shelf wetlands observed along the margin of this feature. Water levels appear to remain relatively constant even under dry conditions, suggesting the presence of a natural spring source of hydrology. This theory is further supported by the presence of a small spring located adjacent to the southeastern corner of the pond. This spring had minimal discharge during site visits in Spring 2008 and most water from this spring was directed into an overflow drainage running parallel to the southern edge of the pond. An additional input into this drainage is the water discharged from the overflow structure located along the southern berm that functions primarily during times of elevated precipitation.

**Streams.** The primary stream that runs the entire length of the site from south to north is McClory Branch, which serves as the receiving stream for all other unnamed drainages on the property. Based on numerous site visits conducted by both BDY and Mactec Engineering and Consulting, Inc. (MACTEC) during 2007 and 2008, it was determined that many other perennial or intermittent streams in addition to the mapped blue line features were located within the property (Appendix 5). Subsequently, many of these features have been assessed by TDEC personnel, who have provided formal jurisdictional determinations for several drainages (Appendix 4). Detailed descriptions of the two stream reaches where Conspan® bridge crossings are proposed are included below since minor instream activity would be necessary for their installation.

**McClory Branch at Greg Norman Boulevard Crossing.** The stream reach at this location is approximately 36 feet wide with banks that are approximately 5 to 6 feet in height. Average stream depth through this reach is 12 inches. The predominant substrate through this reach consists of bedrock. Riparian vegetation on the banks in the vicinity of the crossing primarily consists of mature canopy trees underlain with a dense herbaceous layer.

**Unnamed Tributary to Tiburon Trail Crossing.** The stream reach at this location is approximately 10 feet wide with steep banks that are 3-4 feet high. The stream bottom is comprised of compacted clay with scattered loose cobbles. No stream flow was observed, although there were a few small isolated pooled areas near the proposed crossing and some larger pools downstream of the crossing. The riparian canopy is about 10 feet wide on each side of the stream and consists mostly of hackberry and one Eastern red cedar. Common pasture vegetation is located outside of the wooded riparian buffer.

## Description of the proposed stream and wetland alterations

**Wetland Alterations.** Several iterations of the design for Hole 17 were developed and assessed to minimize the areal impact to the jurisdictional wetland and to assess suitability of the intended course layout. These proposed impacts represent the design that was determined to minimize and avoid wetland impacts to maximum extent possible. As a result of this analysis, the introduction of approximately 0.867-acres of fill materials is proposed for the construction of Golf Hole 17. This unavoidable impact is proposed to allow for the construction of a tee box and associated fairway as shown on the detailed site plan included in Appendix 2: Sheet 2. Approximately 1,950 cubic yards of soil materials would be used to construct the elevated tee box and 1,100 cubic yards of material would be used to achieve the finished grade of the designed fairway.

The applicant is also proposing to construct an elevated cart path bridge through the wetland feature. This alternative was selected since it negated the need for the introduction of additional fill materials to create a narrow ridge upon which the cart path would be constructed. This bridge as proposed would extend roughly 300 linear feet and would be roughly 8 feet in width, similar in design to the cart path bridge crossings. The structure would be installed upon wooden piers that would be driven into the wetland at roughly eight foot intervals to provide a foundation upon which the frame and decking would be affixed. The proposed bridge would not only serve to decrease the amount of fill materials, but also provide for the passage of unimpeded sheet flow and continued conveyance of water through the natural drainages that exist within the wetland feature.

In addition to the introduction of fill materials, the applicant is proposing to strategically remove canopy vegetation located within the line-of-sight from the tee boxes to the fairway located to the north. The removal of vegetation would be restricted to only the above ground biomass as the stumps and below-ground root systems would remain intact to discourage mixing of the soils and inadvertent filling of additional wetland acreage. The removal of canopy vegetation as currently proposed is restricted to 1.602 acres based on design drawings. The actual areal extent of tree removal is only approximated at this time and would likely be less than the identified 1.602 acres. Since the strategic clearing would only encompass an area that would ensure a clear line-of-sight to the fairway, it is difficult to determine the exact numbers of trees or area that would need to be removed at this time, therefore this value was purposely overestimated. The applicant ensures that this activity would be done in such a manner to preserve as many trees as possible as the canopy not only provides shade to the wetland area, but also serves as a beneficial aesthetic amenity to the course layout.

Overall a significant portion of the 4.787-acre wetland would remain undisturbed as a result of the designed golf hole alignment. The portion of the wetland, measuring 2.179 acres, located to the north of the golf hole would remain entirely undisturbed as this area would be preserved. The existing wetland substrate within the area proposed for canopy removal would only experience minor substrate disturbance during the removal of the felled timber. Care would be taken to ensure that soil mixing does not occur during these activities, as the use of tracked machinery would be minimized during this process. The belowground biomass, root systems, of the canopy trees would remain in place and the existing herbaceous vegetation consisting primarily of hydrophytic species would serve as the groundcover throughout this area. Strategic planting of several species of native wetland shrubs exhibiting low stature would occur throughout this cleared area to provide shade to the understory, promote diversity, and to afford some protection against rapid evaporation of moisture from the wetland area. Overall only the areas where fill materials are proposed, 0.867 acres, would be significantly impacted by the proposed wetland alterations.

**Wetland Enhancement.** Wetland enhancement activities are proposed for Wetland 2, the 0.246-acre area, located to the south of the larger Wetland 1. These enhancement activities would consist of minor grading to create a feature possessing a more consistent depth and hydrological source. This area currently consists of small depressions possessing emergent wetland characteristics interspersed with several slightly elevated ridges

supporting vegetation more typically found in upland habitats. While standing water is sometimes present within the small depressions, drier conditions are present along the elevated ridges. As a result of past agricultural activities this entire feature is dominated by the non-native graminoid, fescue, with hydrophytic species located primarily within the depressions. The inclusion of some ridges within the wetland delineation is primarily attributed to the presence of seedlings of hydrophytic woody species.

The proposed recontouring of this feature would result in an elongated depression area with an inner contour of 717 feet that gradually rises to 718 feet along its outer margin. The current bottom elevation of the existing depressions is roughly 717 feet, so the proposed plan would incorporate those features and increase the areal extent of the emergent area. As illustrated on the proposed grading plan, this feature would then be incorporated into the larger wetland restoration that is proposed for the areas to the west and north. Post grading, the area would then be planted on 24-inch centers with plugs of native herbaceous wetland vegetation. The species to be utilized for the revegetation of this area and the wetland restoration area would be further detailed in the description of proposed mitigation.

**Pond Reshaping.** The applicant is proposing to reshape the 1.02-acre pond located adjacent to proposed golf course Holes 10 and 13. This activity would result in the filling of approximately 9,900 square feet of the northeastern portion of the pond while increasing its size approximately 10,500 square feet along the northern portion of the feature. This would result in a pond that is more triangular in shape than the current feature and is roughly 600 square feet larger in area. The volume of the proposed pond configuration would be equal to or slightly more than the volume of the existing pond feature, as the existing berm elevations would be maintained and the square footage would be only minimally increased.

This pond is considered a connected jurisdictional feature since it overflows into intermittent/perennial stream feature running parallel to its southern berm and is fed by a spring source located at its southeastern corner. The southern portion of the pond where the existing overflow and spring input are located would remain untouched and continue to provide the same functions as they currently do during construction. No wetlands would be impacted during this activity since there are no littoral fringe wetlands present along the margins of this feature due to the depth of water and steepness of the confining berms.

**Temporary Road Crossing.** The temporary road crossing on McClory Branch associated with the construction of Greg Norman Boulevard would be constructed according to the TDEC BMP for a temporary road crossing. It would be necessary to remove the trees and clear the banks of vegetation to install this crossing and the Greg Norman Boulevard crossing nearby. Excavation of the stream banks and bottom to install the temporary crossing would not be necessary. The temporary crossing would consist of eight 30-inch corrugated metal pipes installed on the stream bottom to convey base flow. Clean rip rap would be placed on top of the pipes to bring the crossing slightly above the elevation of the banks on each side. Additional rip rap would be installed on the banks at the approach to the crossing to ensure a smooth transition. Gravel, which tends to wash off these types of crossings during use, would not be placed on top of the rip rap. At the termination of construction activities this temporary crossing would be removed and the banks would be stabilized with vegetation and matting where applicable.

**Permanent Road Crossings. Greg Normal Boulevard.** This crossing is proposed for the main channel of McClory Branch adjacent to the temporary stream crossing. This permanent crossing would consist of approximately 163 feet of 62' X 9' precast Conspan® structure resting on 1'6" footers. The culvert would have wing walls at the inlet (9' at 60° and 16' at 30°) and outlet (16' at 30° and 9' at 60°) of the structure. The stream at this location is approximately 36 feet wide. The stream and road both are in a bend at this location, resulting in the longer length. Due to the meandering stream alignment, it may not be possible install the structure footers 5 feet from top of bank in all locations. These distances would vary based on stream characteristics; however they would always be

outside of the toe of the slope. Once the footings have been set, the structure would be placed on top of the footers in sections. The top of the structure would receive approximately 5 feet of fill to accommodate the roadbed and provide cover for the utilities that be installed along the length of the structure.

**Tiburon Trail.** This crossing is proposed for an unnamed tributary to McClory Branch. It would be necessary to remove the trees and clear the banks of vegetation to install the proposed crossing. This crossing would consist of approximately 89 feet of 14' X 3' precast Conspan® structure resting on 15" footings. The culvert would have wing walls at the inlet (14' at 45° and 10' at 45°) and outlet (10' at 45° and 16' at 15°). The stream in this location is approximately 10 feet wide. This structure would serve as a bottomless culvert, leaving a natural substrate. Once the footings have been set, the structure would be placed on top of the footers in sections. The area above the structure would receive slightly more than 4 feet of fill to accommodate the roadbed and provide cover for the utilities that would be installed along the length of the structure.

**Golf Cart Crossings.** A total of seven golf cart bridge crossings are proposed as part of this application. The cart paths throughout the site on the upland areas would be approximately eight feet wide and made of concrete with concrete curbs. Where required, the golf cart paths would have catch basins that drain to 12"-8" ADS pipe, which are directed to the fairways. The golf cart bridges are also roughly 8 feet wide and would be constructed of wood and placed by a crane and secured at each bank with concrete piers. Typical schematics for these bridges are included in Appendix 6. Excavation to install pilings would occur outside of 5 feet from top of bank to minimize disturbance to the creek. Golf course irrigation pipes would be suspended off of the bottom of the bridge. A detailed location for each of the golf cart bridge crossings and the streams they cross is included in Table 1.

**Table 1. Detailed overview of locations for proposed golf cart crossings of McClory Branch and unnamed tributaries to McClory Branch.**

HOLE	STREAM	DESCRIPTION OF LOCATION
7	McClory Branch	North side of hole 7 near Eudailey Covington Rd. to access tee boxes for 8
8	McClory Branch	East side of hole 8 crossing to access fairways from tee boxes
10	McClory Branch	North side of hole 10 for access
11	UT to McClory Branch	South of hole 11 for access to tee boxes for 12
12	same UT to McClory Branch	East of 12 <sup>th</sup> tees to access fairway
13	same UT to McClory Branch	West of hole 13 heading to hole 14
15	McClory Branch	West of hole 15 headed to 16

**Detailed discussion of the proposed mitigation**

**Pond Reshaping.** Mitigation is not being offered for the proposed reshaping of the pond. The proposed reshaping activities proposed for the pond would result in no net loss of surface area or volume compared to the existing feature. The jurisdictional stream and springs identified in the southern portion of the feature would not be impacted during the construction and would remain intact and provide the same ecological benefit post construction. No littoral shelf wetlands were identified along the margins of this feature therefore there would be no impacts to wetlands associated with this proposed activity.

**Golf Cart Crossings.** Mitigation is not being offered for the construction of the golf cart crossings. These seven crossings are bottomless structures that would span the streams and not result in any impacts to the stream resources. No instream excavation would be necessary for their construction as the footers would be placed outside of the top of bank. As a result of the eight foot width and flooring comprised of wood, no significant shading of the stream substrate would occur. The applicant has received direction from Water Pollution Control authorities from the central and field office regarding the exclusion of the golf cart path crossings from the mitigation total. The linear footage of the crossings, at least at this point in the project, does not exceed *de minimis* conditions and would be conditioned as specified in the General Permit for the Construction and Removal of Minor Road Crossings.

**Road Crossings.** Mitigation is not currently being offered in this application for the construction of these span crossings. The two crossings proposed for Greg Norman Boulevard and Tiburon Trail are bottomless structures and potential impacts have been significantly minimized with the types of structures selected. The cumulative width of these two crossings is 76 linear feet, 14 linear feet on an unnamed tributary to McClory Branch and 62 linear feet on McClory Branch. This is well below the threshold of 200 linear feet on a single stream that is covered by General Permit for the Construction and Removal of Minor Road Crossings. Additionally, the integration of the utilities into the road bed atop the Conspan® structures negates the need for future trenching and instream disturbances.

**Wetland Mitigation.** Identified impacts to Wetland 1 include 1.6 acres of canopy tree removal along a line-of-sight for the golf course hole and 0.867 acres of fill for the creation of a tee box "island". The applicant is proposing to mitigate these impacts by restoring approximately 3.7 acres of historic wetlands. The acreage of wetland restoration required to mitigate for the proposed impacts is calculated to be approximately 3.34 acres (Table 2). Calculation of this total is assuming that the restoration of the wetland would provide mitigation at a 2:1 ratio for the fill and at a 1:1 ratio for the tree removal. Although the removal of trees does not represent the introduction of fill into the wetland feature it is still considered an impact to the resource value and a precedence exists for mitigation at a 1:1 ratio within the state. Assuming that this calculation is accepted by the regulatory agencies, the proposed plan provides for an additional 0.36 acres of restoration credits above what is necessary to mitigate for the impacts. This additional acreage can serve to offset any areas that may not meet the defined success criteria for restoration outlined in the proposed monitoring plan.

**Table 2. Calculated compensatory mitigation for proposed wetland impacts within the Laurel Cove Development.**

Impact	Acres	Ratio	Total
Wetland Fill	0.867	2:1	1.734
Tree Clearing	1.602	1:1	1.602
		<b>Total</b>	<b>3.34</b>

This area currently exists as agricultural pasture however several site characteristics indicate this area historically supported wetlands within the floodplains of an unnamed tributary to McClory Branch. The mapped soils throughout this area are comprised of the Melvin Silt Loam, a listed hydric soil type. Additionally, an adjacent landowner suggested that the area had been tilled years ago to encourage drainage and there is evidence that the fields have been crowned to encourage drainage as well. It is likely that the channelized drainage, which was determined to be a wet weather conveyance, bisecting the two pastures was excavated to serve as a direct conveyance of water from the area. The excavation of two test pits to assess soils and hydrology for the proposed restoration site confirmed the presence of a shallow water table and that soils possessing hydric characteristics are present beginning at depths of 10-12 inches. The current vegetation composition established in these fields is comprised predominately of non-native graminoids, common old-field type pasture species, and occasional sedges and rushes that tend to be restricted to depressions.

The proposed restoration plan would incorporate a large area to the west and a smaller area immediately to the south of Wetland 1. As part of this plan, the proposed enhancement of the smaller Wetland 2 would be integrated into this restoration area. The plan was developed based on the baseline data regarding the depth of the water table and presence of hydric soils extrapolated from the test pits. The plan calls for recontouring of the area to lower the elevation of high ridges and creating a wet meadow-type habitat with occasional pockets of emergent vegetation. The strategic construction of berms along the margin of the area would serve to contain water that is conveyed into the area from the channelized drainage that would be plugged, filled and graded into a broad swale within the wetland. This would provide for an additional hydrological input, supplementing the naturally occurring groundwater, for the area during and immediately following storm events as it conveys runoff from the adjacent property across Arno Road. The largest portion of the restored wetland would be contiguous with the southern boundary of Wetland 1 and there would be a hydrological connection to a small peninsula-like extension of restored wetland to the east via a culvert installed beneath a cart path berm.

Upon achieving final grade, the wetland area would be planted with native herbaceous wetland species (Table 3). The species listed are not definitive, however they represent plants that are native to the local area and are commonly available via nursery stock or other sources. The applicant is proposing to utilize 3-4 inch plugs of the herbaceous species planted on 24-inch centers in natural groupings to obtain immediate coverage. No one species would be represented in greater than 25% dominance at the time of planting. A small number of wetland shrubs and trees would also be incorporated into the restoration area primarily along the margins, adjacent to Wetland 1, and in natural clusters in the central portion of the area. Since the intent of this restoration is to provide for a wet meadow/emergent habitat, the density of trees is expected to be lower than a forested wetland.

Proposed monitoring plan for the wetland mitigation site. The mitigation area would be monitored once annually for a period of three years to ensure that the proposed restoration activities have succeeded in restoring wetland characteristics. This monitoring would initiate one year following completion of construction and planting activities. The monitoring protocol for performing this assessment would focus on the three criteria utilized for the delineation of wetland areas, which are hydrology, soils, and vegetation composition. Additionally, fixed photographic stations would be identified for documentation of site characteristics over time and incidental wildlife assessments would be conducted.

The hydrology of the site would be documented utilizing three automated water level recorders that would measure the depth of the water table once daily in strategic locations within the wetland. These data would be downloaded twice annually and summarized graphically to assess the hydrological attributes of the site. The vegetation composition and soil characteristics would be assessed utilizing five transects that would extend for 200 linear feet. These transects would occur on an east/west axis and extend equally spaced from the southern boundary of the wetland to the north. Four randomly placed one meter square plots would be assessed along each of these transects for vegetation composition and soil characteristics. All species present within the plot would be identified and recorded and a 12-inch plug of soil would be extracted and assessed for the presence of hydric characteristics such as low chroma color, mottling, and oxidized rhizospheres.

The hydrological restoration would be deemed successful when the water table remains within 12-inches of the soil surface for fifteen consecutive days during the growing season. The vegetation identified within the plots would have to be represented by greater than 60% dominance of species listed as either FAC or above in the National List of Plant Species that Occur in Wetlands. The success criteria for soils would be less definitive than the others due to the prolonged time it takes for the development of hydric soils; however the soils must show that they are trending towards exhibiting more obvious hydric characteristics. Annual monitoring reports summarizing the collected data would be prepared and submitted to both TDEC and ACOE by October 31<sup>st</sup> of each year. The

restored wetland would be located in designated open space adjacent to the golf course and visibly marked along its perimeter with detailed signage indicating its protected status. To ensure the long term protection of the area a land use deed restriction would be placed on the area to prevent future encroachments or impacts.

Table 3. List of potential wetland species to be planted in restored wetland within Laurel Cove Development compensatory mitigation plan.

Scientific Name	Common Name
<i>Asclepias incarnata</i>	swamp milkweed
<i>Carex frankii</i>	Frank's sedge
<i>Carex intumescens</i>	green bladder sedge
<i>Carex lurida</i>	shallow sedge
<i>Carex vulpinoidea</i>	fox sedge
<i>Eleocharis obtusa</i>	blunt spikerush
<i>Helianthus angustifolius</i>	narrow-leaf sunflower
<i>Juncus biflorus</i>	bog rush
<i>Juncus effusus</i>	common rush
<i>Juncus tenuis</i>	slender rush
<i>Leeria oryzoides</i>	rice cutgrass
<i>Ludwigia palustris</i>	marsh seedbox
<i>Scirpus atrovirens</i>	green bulrush
<b>Shrubs and Trees</b>	
Scientific Name	Common Name
<i>Acer rubrum</i>	red maple
<i>Alnus serrulata</i>	alder
<i>Betula nigra</i>	river birch
<i>Cephalanthus occidentalis</i>	button bush
<i>Cornus amomum</i>	silky dogwood