



**Updated Compensatory Mitigation Plan  
Grace Community Church  
Proposed Cathedral Lakes Pond and Mitigation Basins  
USACE File Number: SWG-2013-00680  
April 18, 2018**

## **1.0 INTRODUCTION**

This Updated Compensatory Mitigation Plan is prepared in accordance with the Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (*Final Rule*) issued on April 10, 2008 as detailed in §332.4(c) of the Federal Register (Volume 73 Number 70). This updated plan is necessary due to changing mitigation alternatives, comments from the USACE, and other changes to site development plans. This updated plan is a necessary supplement to the Section 404 Individual Permit Application/Preliminary Jurisdictional Determination Request submitted to the USACE, dated December 22, 2017. As of the date of this report, the data and information herein is meant to supersede all other data and information provided to USACE with regards to impacts and proposed mitigation.

Terracon Consultants, Inc. (Terracon) is presenting this Updated Compensatory Mitigation Plan on behalf of Grace Community Church – Clear Lake, Inc., a Texas Non-Profit Corporation, hereafter referred to as Grace Community Church, for impacts to jurisdictional wetlands associated with the development of Cathedral Lakes, a residential and commercial development project on Grace Community Church property located at the southeast quadrant of Interstate Highway (IH) 45 and Spring Hills Drive, in Spring, Montgomery County, Texas. The development of Cathedral Lakes will involve the unavoidable loss of approximately 40.7-acres of low quality open water habitat (sand mine ponds) while establishing approximately 15.56-acres of high quality open water habitat (Cathedral Lakes pond). As proposed, the Cathedral Lakes pond will be established directly in place of the previously existing sand mine ponds. Further mitigation will include the establishment of two open water habitat basins (mitigation basins), identified as the east and west basin, totaling approximately 10.05-acres of open water habitat and wetlands. The proposed mitigation basins will be established on an adjacent 20-acres tract of undeveloped land directly east of the Grace Community Church property. The combined total established open water habitat will be approximately 25.61-acres, resulting in a net loss of 15.09-acres of low quality open water habitat. *Vicinity Maps* can be seen in *Exhibits 1.0-1.1* in *Appendix A*.

### **1.1 Property Legal Definitions**

The Grace Community Church property is approximately 140-acres and is located at the southeast quadrant of IH 45 and Spring Hills Drive, in Spring, Montgomery County, Texas. The property boundaries are listed in the table below, starting at the upper northeast corner of the property boundary and moving in a clockwise direction.

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**Table 1: Property Definition Coordinates of the Grace Community Church Property**

Point	Latitude*	Longitude*	Point	Latitude*	Longitude*
1	30.12074621	-95.43781203	8	30.11389996	-95.43688508
2	30.12086956	-95.43009933	9	30.11504104	-95.43756247
3	30.11652133	-95.42828108	10	30.11631573	-95.43877464
4	30.11647185	-95.43205573	11	30.11653161	-95.43860826
5	30.11519897	-95.43202797	12	30.11652133	-95.43891724
6	30.11511299	-95.4359106	13	30.1174979	-95.43977289
7	30.11391024	-95.43588683	14	30.11805299	-95.43758624

\*In Decimal Degrees, NAD 1983 Datum

The proposed Cathedral Lakes pond is approximately 15.56-acres and is located within the east central portion of the Grace Community Church property. The pond is an irregular shape with an interior land mass located in its center. The high water mark boundaries of the pond and the interior land mass are listed in the table below, starting at the upper northeast corner of the pond and moving in a clockwise direction.

**Table 2: Property Definition Coordinates of Cathedral Lakes Pond**

Point	Latitude*	Longitude*	Point	Latitude*	Longitude*
1	30.11897558	-95.43781203	34	30.11698467	-95.43159172
2	30.119363	-95.4329982	35	30.11705375	-95.43165827
3	30.11933663	-95.4327592	36	30.11723381	-95.43166855
4	30.11924946	-95.43250631	37	30.1173202	-95.43167348
5	30.11924782	-95.43234279	38	30.11741888	-95.43177045
6	30.11930209	-95.43214884	39	30.11741559	-95.43329446
7	30.1192988	-95.43189975	40	30.11732924	-95.43337527
8	30.11926755	-95.43173242	41	30.11726389	-95.43344978
9	30.11920012	-95.43154228	42	30.11730539	-95.43366392
10	30.11919519	-95.43111446	43	30.11743204	-95.43369376
11	30.11909321	-95.43098136	44	30.11751428	-95.43360344
12	30.11900111	-95.43086156	45	30.11763217	-95.43362386
13	30.11900933	-95.43070565	46	30.11767875	-95.43377932
14	30.11898631	-95.43054403	47	30.11759651	-95.43386013
15	30.11895835	-95.43035008	48	30.11763352	-95.43404077
16	30.11891887	-95.43017515	49	30.1175834	-95.43396275
17	30.11887118	-95.43005345	50	30.11794191	-95.43405503
18	30.11860378	-95.42993409	51	30.11805372	-95.43392634
19	30.11827047	-95.42986981	52	30.11816395	-95.43405978
20	30.11806197	-95.42986331	53	30.11833762	-95.434057
21	30.11792546	-95.42984239	54	30.11857101	-95.43405503
22	30.11773467	-95.42992986	55	30.11880631	-95.4339314
23	30.11756788	-95.42994537	56	30.11894108	-95.43376031
24	30.11743774	-95.42986615	57	30.11891229	-95.43372703

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Point	Latitude*	Longitude*	Point	Latitude*	Longitude*
25	30.11727648	-95.42976076	58	30.11883927	-95.4337053
26	30.11707852	-95.42968317	59	30.11882765	-95.43357197
27	30.11685309	-95.42967317	60	30.11892934	-95.43354245
28	30.11675276	-95.42977394	61	30.11897479	-95.43366238
29	30.11674242	-95.43005213	62	30.11900604	-95.4336909
30	30.11673466	-95.43026071	63	30.11904223	-95.433689
31	30.11676427	-95.43032916	64	30.11920341	-95.43347985
32	30.11676756	-95.43141679	65	30.11930315	-95.43327806
33	30.11686953	-95.43155749			

\*In Decimal Degrees, NAD 1983 Datum

The mitigation basins are approximately 10.05-acres total and are located within the 20-acre tract of land east of the Grace Community Church property. The ordinary high water marks of the mitigation basins are listed in the table below, starting at the upper northeast corner of the west basin moving in a clockwise direction then continuing to the upper northeast corner of the east basin moving in a clockwise direction.

Table 3: Property Definition Coordinates of 20-Acre Tract

Point	Latitude*	Longitude*	Point	Latitude*	Longitude*
1	30.12150121	-95.42979954	3	30.11670451	-95.42979954
2	30.12153699	-95.42785269	4	30.1166686	-95.42785269

\*In Decimal Degrees, NAD 1983 Datum

Table 4: Property Definition Coordinates of East Basin

Point	Latitude*	Longitude*	Point	Latitude*	Longitude*
1	30.12023667	-95.42921743	11	30.1178239	-95.4278076
2	30.12023072	-95.42887835	12	30.1177311	-95.42773621
3	30.11977268	-95.42857497	13	30.11725996	-95.4275756
4	30.11961206	-95.42850359	14	30.11704581	-95.42755418
5	30.11955258	-95.428456	15	30.11678526	-95.42745425
6	30.11932058	-95.42838462	16	30.11673172	-95.4278183
7	30.1192016	-95.42830728	17	30.11715646	-95.42801104
8	30.11883874	-95.42815262	18	30.11769541	-95.42818236
9	30.11861626	-95.42808242	19	30.1187269	-95.4286178
10	30.11810586	-95.42788612	20	30.11915877	-95.42877485

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Table 5: Property Definition Coordinates of West Basin

Point	Latitude*	Longitude*	Point	Latitude*	Longitude*
1	30.12018313	-95.42824304	13	30.11807374	-95.42730077
2	30.12014744	-95.42773621	14	30.11802734	-95.42723653
3	30.11984406	-95.42762914	15	30.11741152	-95.42712719
4	30.11948714	-95.42750778	16	30.11717787	-95.42706877
5	30.11928727	-95.4274364	17	30.11687806	-95.42695099
6	30.11923016	-95.42748637	18	30.11683166	-95.4271116
7	30.11914093	-95.42740428	19	30.11710649	-95.42716871
8	30.11889975	-95.4273669	20	30.11832358	-95.42764698
9	30.11875189	-95.42733289	21	30.1186341	-95.42775763
10	30.11860912	-95.42730791	22	30.11915521	-95.42792895
11	30.11812728	-95.42726151	23	30.11958351	-95.42808956
12	30.11811657	-95.42730077			

\*In Decimal Degrees, NAD 1983 Datum

## 2.0 OBJECTIVES

The client understands that the fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to Waters of the United States (WOUS). The client also understands that mitigation should be environmentally preferable, should have ensured ecological success and sustainability, and should be based on a watershed approach. Further details concerning aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, trends in land use, ecological benefits, and compatibility with adjacent land uses are contained within this updated compensatory mitigation plan.

### 2.1 Method of Compensation

As stated in the *Final Rule*, compensatory mitigation may be performed using the approved methods of restoration, enhancement, establishment, and preservation. Restoration is generally the preferred option since this method provides the greatest likelihood of success and minimizes impacts to potentially important upland resources. However, in this case restoration of the old sand mine ponds would have required a significant amount of hydrological redesign and other improvements to the extent where it was not practical. The next preferred alternative would have been the purchase of mitigation bank credits or in-lieu fee programs since these options usually involve consolidating mitigation projects where they are most ecologically appropriate. However, the proposed Cathedral Lakes project does not qualify for mitigation bank credits because the site is not located within the primary service area of an approved mitigation bank. An approved mitigation bank is within the secondary service area, but the bank does not have any available credits as of March 2018. The Cathedral Lakes project is also not in the service area of an in-lieu fee site. Having exhausted these two options, Grace Community Church attempted to use permittee responsible mitigation (PRM) as part of its most recent mitigation plan. Again, there were no PRM options located within the Spring Creek hydrologic unit (HUC 12040102), however there were two



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PRM options located in the adjacent West Fork San Jacinto River hydrologic unit (HUC 12040101). The first of these two PRM options is managed by Mitigation Solutions. Under their recommendation, 9-acres of restoration would have been required for the open water impacts associated with Cathedral Lakes. The second of these two options is managed by Delta Land Services. Under their recommendation 10.8-acres of high quality bottomland hardwood forests would have been required for the open water impacts associated with Cathedral Lakes. However, at the request of the USACE to keep mitigation on-site, both of these PRM alternatives were abandoned. Therefore, in the interest of providing the most beneficial mitigation available, Grace Community Church has developed plans to establish both the Cathedral Lakes pond and the aforementioned mitigation basins. Doing so will provide for an on-site in kind mitigation.

As discussed in the previously submitted mitigation plan, Grace Community Church has avoided an approximately 11-acres forested portion of their original property. This portion represents one of the last forested areas within the Grace Community Church property that was not cleared by sand mining operations. There is also approximately 3.44-acres of forested wetland within this avoided portion of the property. The avoided area and wetland can be seen in *Exhibit 7.1* and *Exhibit 8.0* in *Appendix A*.

## **2.2 Resource Type & Function**

The Cathedral Lakes pond will be created within the 140-acres Grace Community Church property, establishing 15.56-acres of high quality open water habitat. Since the Cathedral Lakes pond is in the early stages of development, and a final plan has yet to be drafted, Terracon has the ability to make special design requests so as to maximize the potential ecological function of the Cathedral Lakes pond. Additionally, two open water habitat basins will be created within the 20-acres mitigation site, establishing approximately 10.05-acres of high quality open water habitat. A 10-foot wide aquatic plant species shelf will be constructed around the perimeter of each mitigation basin as well as the Cathedral Lakes pond. The Cathedral Lakes pond along with the two mitigation basins and their wetland shelves will provide for a variety of lasting ecological functions including the physical, biological, and chemical needs of the watershed to which they are located. Other ecological functions outlined in the EPA's *Stormwater Wet Pond and Wetland Management Guidebook* (2009) are being considered as well. Descriptions of the improved functions are provided below.

1. Physical – The proposed Cathedral Lakes pond and mitigation basins will provide temporary water storage during regular and extended precipitation events. This will lessen runoff and flood impacts both downstream and within the Spring Creek Watershed. The newly established areas will continue to allow for floodwater routing downstream into Spring Creek. With added native wetland vegetation, the established areas will replace lost water storage capabilities. These areas may also increase the aesthetic value of the property to which they are located, as well as the aesthetic value of the land along their perimeter.

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2. **Biological** – The proposed Cathedral Lakes pond and mitigation basins will establish new native plant communities that will serve as habitat for native aquatic and terrestrial wildlife. Existing habitat within the properties to which the pond and mitigation basins will be located have been significantly altered by ongoing construction and grading activities. Therefore, the mitigation areas will result in a net gain of habitat as opposed to a net loss. In considering impacts to the surrounding communities, the designs of the mitigation areas are such that undesirable year-round waterfowl are less likely to use them as permanent habitat. Also, given the location of the mitigation areas and their strict management practices, the threat to human health stemming from the potential for mosquitoes is reduced, and the potential hazard toward children is minimal.
3. **Chemical** – The proposed Cathedral Lakes pond and mitigation basins will remove sediments, heavy metals, man-made chemicals, and other pollutants washed into the system during flood events, which will likely improve downstream water quality. Regular maintenance, monitoring, and subsequent management actions will minimize the possibility of foul, stagnant water forming within the mitigation areas. Such management will also safeguard against the possible buildup of contaminants.

The collective physical, biological, and chemical benefits derived from the Cathedral Lakes pond as well as the mitigation basins will likely maintain and improve the quality and quantity of aquatic resources within the Spring Creek watershed. The new mitigation areas will reverse a development trend for the surrounding area that leans heavily on impermeable surface development and increased surface runoff. Further, the mitigation areas may provide for the continued existence of rare, threatened, and endangered species whose functional habitat is in increasingly short supply. Ultimately, these mitigation efforts may increase the ecological functional capacity of the Spring Creek Watershed well into the future.

### **3.0 SITE SELECTION**

In selecting the mitigation sites, Grace Community Church considered the needs of the watershed, all the available alternatives, and the practicability of accomplishing ecologically self-sustaining aquatic resource establishment within these sites. As stated in the previous section, most of the preferred mitigation alternatives were unavailable. Therefore, an on-site in kind mitigation was the next best alternative. Although there is a relative lack of available land resources in the area suitable for the objectives at hand, Grace Community Church has been able to utilize its own original property as well as its newly purchased adjoining property to establish enhanced ecological systems.

Hydrological conditions, soil characteristics, and other physical and chemical characteristics of both the Cathedral Lakes pond and the mitigation basins are very similar to their pre-existing conditions. They differ only in their improved quality. For example, the Cathedral Lakes pond will be situated directly on top of the old sand mine ponds. Although the new pond will not be equal in area to the old sand mine ponds, the new pond will be enhanced so that

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the same area benefits from the same functions but with less surface area. The mitigation basins will be situated within an upland area undergoing continued construction and grading. Their establishment will provide new and enhanced ecological benefits that are compatible with the area to which they are located. On a macro-level, the two newly established systems will make meaningful contributions to the Spring Creek watershed.

Habitat diversity and connectivity will also be improved. The old sand mine ponds were less functional in terms of suitable habitat than the proposed Cathedral Lakes pond may be. The mitigation basins establish new habitats that previously did not exist, and they extend the range of nearby aquatic species. Neither of these mitigation efforts will isolate wildlife populations. Instead, these mitigation areas will provide suitable habitat for native species, including species of special concern.

The sites for both the Cathedral Lakes pond and the mitigation basins are being designed to incorporate, either in a direct or indirect way, a proposed Montgomery County Spring Creek greenway, thereby making them compatible with adjacent land uses and watershed management plans. Also, in order to ensure there were no foreseeable negative effects to cultural resources within these mitigation sites, and in order to comply with USACE requests, Terracon performed a pedestrian archeological survey on the Grace Community Church property. The report documenting the findings were forwarded to the USACE and the Texas Historical Commission (THC) for concurrence. The USACE transmitted a letter, dated October 3, 2013, to the THC and Terracon stating they have determined the one site identified during the survey is not eligible for inclusion in the National Register of Historic places. The THC transmitted a letter, dated September 26, 2013, to the archeologist and Terracon stating that the project may proceed without further consultation with the THC. A copy of this letter has already been submitted to the USACE staff archeologist.

## **4.0 SITE PROTECTION INSTRUMENT**

Upon obtaining a Department of the Army Permit and upon completion of permitted work on-site, the permittee will file a deed restriction in accordance with the typical deed restriction document used within the USACE Galveston District. The deed restriction will be filed with the County Clerk of Montgomery County upon approval from the USACE. Construction on the project site in jurisdictional areas is anticipated to last approximately 12 months. Due to the construction time length, the permittee will sign and file the deed restriction with the County Clerk within 13 months (within 30 days after construction completion) and will provide a copy of the recorded deed restriction to the USACE within 30 days of filing. The deed restriction will protect the property from development or any other activity contrary to its use as a beneficial use area.

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Grace Community Church or its heirs, assigns, or purchasers shall be responsible for protecting lands contained within the property in perpetuity in accordance with the terms of the deed restriction and this compensatory mitigation plan, unless the lands are transferred or sold to a state or federal resource agency or non-profit conservation organization.

## **5.0 BASELINE INFORMATION**

The Grace Community Church property consists of approximately 140-acres of cleared land at the southeast quadrant of IH-45 and Spring Hills Drive, in Spring, Montgomery County, Texas. The mitigation site consists of approximately 20-acres of undeveloped, mostly cleared woodland located directly to the east of the Grace Community Church property. An understanding of the history of these sites is integral in understanding the positive impacts the proposed mitigation areas will have on the sites and the watershed as a whole.

In 1958, the Grace Community Church property contained B.P. oil and gas well pads. Sometime between 1989 and 1995, the majority of the site was cleared, and in 1996 apparent sand mining activities began. Sometime between 1996 and 2004, four ponds formed on the site as a result of the sand mining operations. In 2009, the Grace Community Church facilities were constructed on a parcel adjacent to the site. Grace Community Church observed illegal dumping and hunting activities being performed on the majority of the site and encountered vandalism and theft to their facilities soon after. In 2010, Grace Community Church purchased the majority of the sand mine site to aid in preventing further illegal dumping and hunting and the sand mining operations were abandoned.

Grace Community Church began facilitating the purchase of additional neighboring properties in conjunction with Montgomery County. This would secure the much needed land on the north side of Spring Creek for the Spring Creek Greenway. In October of 2012, Grace Community Church purchased property along Spring Creek in conjunction with Montgomery County to aid in preventing further illegal dumping and hunting along the Spring Creek corridor, securing the land for the Spring Creek Greenway, and protecting approximately 3.4-acres of forested wetlands. In 2013 Grace Community Church sold Montgomery County 2.5 additional acres to secure public access to Spring Creek Greenway. The forested wetlands and areas along Spring Creek that are owned by Montgomery County are restricted from development.

The 40.7-acres of abandoned sand mining ponds posed serious threats to public health, safety, and welfare, and they were degrading the environment. The barren, eroding ponds were unstable and were degrading water quality. One of the pits had eroded close to the edge of the northern property line and was threatening the integrity of a neighboring commercial building. The side slopes of the other ponds were also eroding resulting in excess sedimentation buildup. The ponds were also filled with illegally dumped items such as refrigerators, cars, washing machines, household trash, and other items. A marijuana farm was found and removed east of the ponds.

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The 20-acre mitigation site was recently purchased by Grace Community Church. All activities that have occurred within the site up to the point of purchase have been the results of actions taken by the previous land owner. It appears that the mitigation site had been mostly cleared relative to its historic condition. Also, activities associated with the channelization of a Montgomery County regulated drainage canal, principally the construction of a man-made berm along the western boundary of the site appear to have altered its natural drainage patterns.

## 5.1 WOUS Delineations

Terracon first performed a preliminary WOUS delineation on a 36-acres portion of the now 140-acres Grace Community Church property in 2012. During the site visit, Terracon personnel observed one 2.63-acres water feature, identified as a freshwater landscaping pond, occurring on the project site. The report for this delineation, dated October 23, 2012, was submitted to the USACE. The site features for this delineation can be found on *Exhibit 7.0* in *Appendix A*.

That same year Terracon performed a separate preliminary WOUS delineation on a 97-acres portion of the now 140-acre Grace Community Church property. During the site visit, Terracon personnel observed one 3.44-acres wetland, identified as a forested wetland, and four ponds, which are the aforementioned sand mine ponds labeled as Pond A, B, C, and D, totaling approximately 40.7-acres. The report for this delineation, dated November 6, 2012, was submitted to the USACE. The site features for this delineation can be found on *Exhibit 7.1* in *Appendix A*.

Terracon performed a preliminary WOUS delineation on the 20-acres mitigation site on two separate occasions. The first delineation was performed December 29, 2016. During the site visit, Terracon personnel did not observe any aquatic features within the mitigation site boundaries. The second delineation was performed on March 27, 2018. During the site visit, Terracon personnel observed two open water features, identified as a 0.07-acre landscape pond and a 0.08-acre blocked drainage swale. Terracon personnel also observed three wetland features, identified as a 0.04-acre fringe wetland, a 0.09-acre temporary construction wetland labeled as Temporary Construction Wetland A, and another 0.47-acre temporary construction wetland labeled as Temporary Construction Wetland B. The report for the 2016 and 2018 delineations, dated April 5, 2018, was not submitted to the USACE. The site features for this delineation can be found in *Exhibit 7.2* in *Appendix A*. The report for this delineation can be found in *Appendix B*.

The U.S. Fish and Wildlife National Wetlands Inventory (NWI) Map does indicate the potential presence of wetlands within both the Grace Community Church property and the mitigation site. However, these features were not found to exist during the aforementioned site delineations. The *National Wetlands Inventory Map* can be seen in *Exhibit 3.0* in *Appendix A*.

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Further information concerning the details of the aquatic features identified on both the Grace Community Church property and the mitigation site are included in the *Preliminary Waters of the U.S. Delineation Reports* included in *Appendix B*. A summary of the observed wetland features is listed in the table below.

Table 6: On-Site Aquatic Features

	<b>Feature Type</b>	<b>Acreage</b>	<b>Latitude, Longitude*</b>	<b>Impacted</b>	<b>Potentially Jurisdictional</b>
Grace Community Church Property	Freshwater Landscaping Pond	2.63	30.116285, -95.437424	No	Yes
	Forested Wetland	3.44	30.114645, -95.434106	No; area avoided	Yes
	Pond A	4.35	30.120236, -95.4333	Yes	Yes
	Pond B	1.25	30.120396, -95.43082	Yes	Yes
	Pond C	18.23	30.118033, -95.433245	Yes	Yes
	Pond D	16.84	30.118076, -95.430417	Yes	Yes
Mitigation Site	Landscape Pond	0.07	30.121215, -95.428128	Yes	No
	Blocked Drainage Swale	0.08	30.120882, -95.429451	Yes	No
	Fringe Wetland	0.04	30.121142, -95.42827	Yes	No
	Temporary Construction Wetland A	0.09	30.119726, -95.428916	Yes	No
	Temporary Construction Wetland B	0.47	30.118521, -95.428152	Yes	No

\*In Decimal Degrees, NAD 1983 Datum

## 5.2 Historic Vegetation and Hydrologic Conditions

Aerial photographs from 1939, 1957, 1989, 1996, 2004, and 2012 were reviewed for the Grace Community Church property. The 1939 aerial photograph appears to show the majority of the site as being a wooded area with a cleared area in the west portion of the site. The 1957 aerial photograph depicts the majority of the site as wooded with a cleared area in the west portion of the site. An unimproved road enters the northeast portion of the site and leads to an apparent water feature located in the central portion of the site. Smaller apparent water



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features are present in the southwest and east portions of the site. A second apparent unimproved road begins in the west portion of the site at IH-45, extends generally east through the south portion of the site, and beyond the site boundaries. Multiple structural facilities are present in the south portion of the site. The site appears to have remained relatively unchanged from 1957 to 1989 and 1996. The 1996 aerial photograph depicts the majority of the site as having been cleared and disturbed in association with apparent sand mining activities. The structural facilities previously identified in the south portion of the site are no longer present on the 1996 aerial photograph. The areas to the south and east of the sand mining area appear to be undeveloped wooded areas. The apparent smaller water features previously present in the southwest and east portions of the site are depicted as being filled. The majority of the northwest and west portions of the site appear to be cleared and disturbed with the presence of an unimproved road leading to the apparent sand mining area. The 2004 aerial photograph shows four ponds which likely formed due to an apparent abandoned sand mining operation. The south portion of the site is depicted as wooded land. The 2012 aerial photograph shows the Grace Community Church facilities and a landscaping water feature located in the west portion of the site. Commercial properties appear to the north of the site on the 2012 aerial photograph. The Grace Community Church property *Aerial Photographs* can be in *Exhibits 6.0 – 6.5 in Appendix A*.

Aerial photographs from 1989, 1996, 2006, 2010, and 2015, 2016, January 2017, and August 2017 were reviewed for the mitigation site. The 1989 aerial photograph shows the site as undeveloped woodland with a small portion of cleared land along the eastern boundary. Surrounding properties are shown as undeveloped woodland to the north, south, and west, as well as lightly developed property to the east. Spring Creek is shown to the south of the site, as well as what appears to be a drainage canal adjacent to the western boundary. The 1996 aerial photograph shows what appears to be erosional swale features located throughout the site that drain into the previously identified man-made canal west of the site. Spring Creek is shown to the south of the site, undeveloped woodland and streams to the west, undeveloped woodland to the north, and lightly developed property to the east. The 2006, 2010, and 2015 aerial photographs show the site as cleared, lightly developed woodland. The photographs show what appear to be small structures throughout the cleared areas of the site. The previously identified erosional swales appear to have been filled. The drainage canal still flows to the west of the site boundaries. A large detention basin is shown to the west, undeveloped woodland to the north, Spring Creek to the south, and lightly developed woodland to the east. The 2010 photograph shows a paved lot along the eastern boundary of the site. Some of the previously identified structures have been removed. The 2016 aerial photograph does not show signs of construction or grading activities, nor does it show signs of wetlands. The January 2017 aerial photograph shows what appears to be ongoing construction and grading activities. This photograph also shows temporary construction depression that appear to be collecting water. The August 2017 aerial photograph shows conditions during Hurricane Harvey, a record flood event. Flood waters from adjacent aquatic features, in particular the western canal and Spring Creek, do not appear to have extended into the site. The mitigation site *Aerial Photographs* can be in *Exhibits 6.6 – 6.13 in Appendix A*.

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## **5.2 Existing Vegetation and Hydrology Conditions**

### **5.2.1 Vegetation**

The Grace Community Church property consists of very little vegetation outside of landscaping associated with the church facility and the forested portion donated to Montgomery County. A majority of the property is in an ongoing state of construction. Small areas of common bermudagrass (*Cynodon dactylon*), greenbrier (*Smilax bona-nox*), hackberry (*Celtis occidentalis*), and Chinese tallow (*Triadica sebifera*) exist within the site.

The mitigation site consists of loblolly pine (*Pinus taeda*) and water oak (*Quercus nigra*) woodland to the north. This area appears to have been maintained by the previous landowner since there is very little shrub undergrowth. The northern wooded area transitions to a mixed grassland containing southern dewberry (*Rubus trivialis*), cuman ragweed (*Ambrosia psilotachya*), and bahiagrass (*Paspalum notatum*). It is evident that this transition is the result of clearing activities as indicated by large brush piles and a mosaic of bare ground. A small wetland exists within this zone of transition; however, it is likely a temporary construction wetland. Vegetation within this the wetland consists primarily of woodrush flatsedge (*Cyperus entrerianus*). The southern portion of the site consists of mixed grasses ranging from perennial rye (*Lolium perenne*) to giant ragweed (*Ambrosia trifida*) and vassey grass (*Paspalum urvillei*). Another temporary construction wetland exists within this area. It consists mostly of alligator weed (*Alternanthera philoxeroides*) and common rush (*Juncus effusus*). There is a berm along the western edge of the site that consists mostly of upland vegetation ranging from sugarberry (*Celtis laevigata*) to common privet (*Ligustrum vulgare*) and American elm (*Ulmus Americana*).

### **5.2.2 Hydrology**

Both the Grace Community Church property and the mitigation site are located in the Spring Creek watershed. A majority of the Grace Community Church property is within the FEMA regulatory and 100-year floodplain. The northwest portion of this property is located within the FEMA 500-year floodplain. All of the mitigation site is within either the FEMA 100-year floodplain or the regulatory floodway. The *FEMA Floodplain Map* can be seen in *Exhibit 5.0* in *Appendix A*.

Spring Creek is located approximately 600-feet south of the Grace Community Church property and the mitigation site. The floodplain of Spring Creek appears to extend near the southern boundary of both sites; however, site visit observations and aerial photography does not indicate actual flooding within the mitigation site itself. According to the 1982 and 2000 topographic maps, an intermittent stream feature that flowed through the mitigation site was redirected and channelized to the west. The drainage canal is presently located between the Grace Community Church property and the mitigation site. The *Topographic Maps* can be seen in *Exhibit 2.0 – 2.2* in *Appendix A*.

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A man-made berm that runs parallel to the western boundary of the mitigation site and parallel to the eastern boundary of the Grace Community Church property blocks connectivity between the canal and any aquatic feature within either of the project sites. The area typically receives approximately 36-inches of precipitation annually. Site specific soil sampling during the wetland assessment revealed that a majority of the soil in the project sites are sand/loamy sand without hydrologic indicators, except within areas where there were open water or areas where water has collected due to temporary construction wetlands. Hydrology indicators for the aquatic portions of the sites were observed to be saturation and standing water. The general slope of the Grace Community Church property is in a constant state of change due to ongoing construction activities, although it generally slopes toward the south. The general slope of the mitigation site is toward the south; however, due to ongoing construction and grading activities there are areas of increased or decreased elevation where soils have been mechanically removed or deposited. Sheet-flow runoff appears to be the main type of drainage for the both project sites.

### 5.3 Soil Conditions

Data from the soil survey of Montgomery County, Texas, the U.S. Department of Agriculture (USDA) soil data mart, and the Natural Resource Conservation Service (NRCS) web soil survey was reviewed to identify soil types, including hydric soils. Hydric soil is one of the three essential characteristics of a wetland according to the USACE. Data for the soil survey was compiled by the USDA Soil Conservation Service, now known as the Natural Resources Conservation Service (NRCS). The *Montgomery County Soils Map* can be seen in *Exhibit 4.0* in *Appendix A*. The following soil types were identified within the project site on the soil survey map:

- Urban Land (URLX) – this map unit consists of impermeable surfaces associated with urban development.
- Landman fine sand (Ab) – this map unit consists of a moderately well drained natural drainage class and does not contain hydric components. This soil type can be found on stream terraces with convex slopes. The water table depth is present at about 48 to 72-inches, and there is no ponding and no flooding associated with the map unit.
- Alaga fine sand (Ch), 0-5% slopes – this map unit consists of a somewhat excessively drained natural drainage class and does not contain hydric components. This soil type can be found stream terraces with linear slopes. The water table is present at more than 80-inches and there is no frequency of ponding.
- Briley loamy fine sand (Lu), 1-3% slopes – this map unit consists of a well-drained natural drainage class and does contain hydric components. This soil type can be found on interfluvies with convex slopes. The water table depth is present at more than 80-inches and there is no ponding and no flooding associated with the map unit.

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- Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded (HatA) – this map unit consists of a well-drained drainage class and does not contain hydric components. This soil type can be found on flood plains with convex slopes. The water table depth is present at about 44 to 64-inches, and there is frequent flooding and no ponding associated with the map unit.

## 6.0 DETERMINATION OF CREDITS

The functional or condition assessment method used by the USACE Galveston District is the interim hydrogeomorphic (iHGM) approach which assess the ecological function of pre-impact and post-mitigation areas. The *SWG Riverine Herbaceous HGM* will be used as the method of assessment for impacts and improvements. The Riverine iHGM model is used to assess the potential function of wetlands that share a surface hydrologic connection with a riverine system, in this case Spring Creek.

The Riverine iHGM model uses several variables to assess three main functions that best describe and measure wetland health in the region:

1. Physical – Temporary Storage and Detention of Surface Water (TSDS)
2. Biological – Maintenance of Plant and Animal Communities (MPAC)
3. Chemical – Removal and Sequestration of Elements and Compounds (RSEC)

Within each of the three functions, variables are scored to determine the Functional Capacity Index (FCI). These FCIs are used to calculate the Functional Capacity Units (FCU). Tables 7 and 8 illustrate pre-impact FCUs for each of the impacted areas as well post-establishment FCUs for each of the established areas. The scores for each are combined to give an overall Potential Functional Capacity Score, illustrated in Table 9. The completed *iHGM Worksheets* for the impacted and established areas can be seen in *Appendix C*.

### 6.1 Sand Mine Ponds and Cathedral Lakes Pond

Table 7: Sand Mine Ponds & Cathedral Lakes Pond

Functional Capacity Units	Pre-Impact (40.7-Acres)	Post-Establishment (15.56-Acres)	Potential Functional Capacity Impacts or Improvements
TSDS	5.12	3.32	-1.80
MPAC	6.11	4.41	-1.70
RSEC	5.29	3.37	-1.92

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The pre-impact FCUs listed above were determined by calculating the value of the ecological functions provided by the sand mine ponds as they had existed prior to their conversion to upland. As discussed in Section 5.0, the 40.7-acres of ponds were of low quality. The overall acreage of the ponds provides for most of their temporary storage and detention abilities. The lack of vegetative cover along with a lack of substantial fish populations, unclear water, and consistent trespassing and illegal hunting made the sand mine ponds unsuitable habitat. No state or federally listed species were identified during site visits. Also, the illegal dumping and lack of vegetative buffers surrounding the banks of the ponds made for increased levels of pollution and contaminants.

The post-establishment FCUs listed above were determined by calculating the potential ecological functions provided by the Cathedral Lakes pond. The 15.56-acres pond is still in the early design phase of development. Many of the recommendations Terracon makes in this report will be considered in the final design. It is the recommendation of Terracon that the Cathedral Lakes pond be designed in such a way as to match the capacity for water storage and detention as much as possible. This can be achieved by increasing the depth of the proposed pond. However, the depth of the pond should not exceed the photic zone and it should not have a negative effect on overall water temperature or turbidity. A wetland mitigation buffer that is restricted to pedestrian access should be constructed around the perimeter of the pond where feasible. Areas of pedestrian access should be limited to elevated board walks and paved sidewalks so as to minimize the impact on vegetation and soil erosion. Native aquatic and upland trees should be planted within this buffer. Mowing, mulching, and fertilizing should be minimized and carefully monitored so as to limit undesirable plant species growth and pollution in the pond. "No mowing zones" should be established in critical areas. Litter and trash should be skimmed and collected from the pond and its vegetative buffer zones on a regular basis. Terracon recommends that at least a 10-foot wide vegetative shelf be constructed around the inside perimeter of the pond. This shelf should be planted with native aquatic herbaceous vegetation that will provide adequate habitat and forage for aquatic species. These recommendations, as well as any others that may come from Terracon, USACE, or other affiliated parties, have provided the anticipated ecological function used in calculating the above post-establishment FCUs.

## 6.2 Mitigation Site and Mitigation Basins

Table 8: Mitigation Site & Mitigation Basins

Functional Capacity Units	Pre-Impact (0.19-Acres)	Post-Establishment (10.05-Acres)	Potential Functional Capacity Impacts or Improvements
TSDS	0.03	2.49	2.45
MPAC	0.07	4.19	4.12
RSEC	0.04	2.95	2.91

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The pre-impact FCUs listed above were determined by calculating the ecological functions provided by the aquatic features located within the mitigation site, excluding the temporary construction wetlands. Although it is the opinion of Terracon that all of the aquatic features within the mitigation site would be considered non-jurisdictional, their potential functions were accounted for in this mitigation plan so as to provide a comprehensive and detailed accounting for all impacts and improvements. The impacted aquatic features are relatively small, and they appear to be the result of human activity within the site. As such, they lack a substantial amount of mature vegetation usually associated with well-established wetlands. Given their lack of connectivity to any other aquatic feature within or outside of the mitigation site, the on-site aquatic features appear to be dependent upon surface water runoff from precipitation for their hydrologic characteristics. Their size, saturation levels, and relative lack of vegetative cover make them mostly unsuitable as habitat for anything other than small reptiles and amphibians. No state or federally listed species were identified within the mitigation site during site visits.

The post-establishment FCUs listed above were determined by calculating the potential ecological functions provided by the mitigation basins. The 10.05-acres mitigation basins will be substantially larger than the existing isolated aquatic features which will increase their overall capacity for water detention. The cycling of nutrients along the banks of the basins will increase soil infiltration and organic material in the upper soil horizon. A 10-foot wide aquatic vegetation shelf will be constructed along the edge of each of the basins. Native herbs and young woody plants will be planted along these shelves so as to increase high quality, viable habitat for birds, mammals, and a variety of aquatic species. Upland areas will be replanted with native vegetation appropriate for the region. The loading of off-site soils will be kept to a minimum so as to avoid the introduction of invasive plant and animal species. The increased surface area and increased vegetative coverage will substantially increase the potential for toxic element and compound sequestration.

### 6.3 Overall Potential Functional Capacity Improvements

Table 9: Overall Potential Functional Capacity Improvements

<b>Functional Capacity Units</b>	<b>Overall Potential Functional Capacity Improvements</b>
TSDS	0.65
MPAC	2.42
RSEC	0.99

The overall potential FCUs listed above are a running total of the FCU improvements from both the established Cathedral Lakes pond and the established mitigation basins. The combined FCUs of these two areas will provide for an overall increase in ecological functional capacity for the watershed, which satisfies the mitigation ratio requirements found in the *Final Rule*.



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## **7.0 MITIGATION WORK PLAN**

### **7.1 Hydrology Enhancement**

The hydrology within the proposed deed restriction area will be enhanced by creating riparian areas around the lake, restoring natural surface topography as necessary and restoring vegetation. Controlling the erosion, establishing vegetation, and establishing riparian areas will enhance the water quality within the area.

### **7.2 Plant Community Enhancement**

The plant communities within the proposed deed restriction area will be enhanced by planting the natural area with herbaceous wetland vegetation seeds and 105 tree seedlings and creating a buffer around the lake. Herbaceous species targeted for enhancement include, but are not limited to wet meadow mix, switchgrass, big bluestem, and wildflower seed mix. Tree species targeted for enhancement include, but are not limited to bur oak, pecan, lace bark elm, and cypress. Other areas will be graded and planted with grasses for erosion control. Management activities will be implemented to monitor and control invasive, noxious or nuisance species such as Chinese tallow.

## **8.0 MAINTENANCE PLAN**

Both the Cathedral Lakes project area and the mitigation site will be monitored by Terracon and will be maintained by Grace Community Church. Through contractual agreement with Grace Community Church, Terracon will continue to evaluate, restore, enhance, preserve, and maintain habitats in accordance with this mitigation plan as well as the provisions in the EPA *Stormwater Wet Pond and Wetland Management Guidebook* (2009). Special consideration will be made for excess pollutants that may be contained to within the ponds, excess buildup of plant and trash debris, and the potential for these contaminants and pollutants to overflow during large rain events. Personnel will also monitor for invasive species and nuisance wildlife. The frequency of inspections will closely match the recommended schedule outlined in the EPA publication.

The USACE – Galveston District agrees to provide appropriate oversight in carrying out provisions of this plan. They also agree to review and provide comments on all project plans, annual monitoring reports, contingency plans, and necessary permits for the mitigation area. The USACE – Galveston District will review and confirm reports on evaluation of success criteria.

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## **9.0 ECOLOGICAL PERFORMANCE STANDARDS**

### **9.1 Initial Success Criteria**

Ground surface elevations must be conducive to the enhancement and support of hydrophytic vegetation. Alterations of the natural topography that have affected the duration and extent of surface water have been removed or otherwise rendered ineffective.

A minimum of 75 (70%) planted seedlings and saplings must survive through the end of the first spring following the planting (Year 1). Those surviving seedlings must be representative both in species composition and percentage. This criterion will apply to initial plantings, as well as, any subsequent replanting that may be necessary to meet this requirement.

### **9.2 Interim Success Criteria**

A minimum of 75 (70%) planted seedlings and saplings must be present at the end of the second year following successful attainment of the one-year survivorship criteria (Year 3). Trees established through natural recruitment may be included in this tally. Exotic and/or invasive species may not be included in this tally.

A minimum of 75 (70%) planted seedlings and saplings must be present at the end of the fourth year following successful attainment of the one-year survivorship criteria (Year 5). Trees established through natural recruitment may be included in this tally. Exotic and/or invasive species may not be included in this tally. By Year 5, four years following successful attainment of the one-year survivorship criteria, the both the Cathedral Lakes site and the mitigation site will be virtually free of exotic/invasive vegetation (less than 5% cover).

## **10.0 MONITORING AND REPORTS**

### **10.1 Monitoring**

Terracon agrees to perform all work necessary to monitor the site to demonstrate compliance with the success criteria established in Section 9. Terracon will monitor the site twice a year, once in the fall and once in the spring, for years one and two. Terracon will continue to monitor once a year in the spring for years three, four, and five. Terracon will monitor for achievement of the interim success criteria using established monitoring protocols. Terracon will collect data on the number and species of planted and naturally occurring plants to ensure successful establishment of a hydrophytic plant community. Terracon will also collect data on hydrologic conditions as necessary. Monitoring events will document, recommend, and propose invasive species control methods as necessary.

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**10.2 Reports**

An as-built report will be submitted to the USACE Galveston District within 60 days following completion of all the work required to enhance the special aquatic sites. The as-built report will describe in detail the work performed and provide a numbered list of species planted. No deviation from the mitigation work plan described above may occur without prior approval from the USACE. The as-built report will include a discussion of coordination with the USACE, a description of any deviations, and an explanation thereof.

Terracon will submit reports document monitoring events to the USACE Galveston District by July 1 of each year following a monitoring event. The monitoring report will include data sufficient for comparison to the performance standards found in Section 7. Terracon will also include discussion of all activities that took place at the site. At a minimum, the monitoring reports will also include the following:

- Digital photographs taken throughout the deed restriction area to document site conditions.
- A description of the general conditions of the seedlings, including the number of individual surviving seedlings throughout both sites. The reports will also include discussion of potential causes for mortality, if any.
- A description of the degree and distribution of any exotic/invasive species, as well as necessary control efforts information.
- A discussion of hydrologic conditions throughout both sites.
- A description of wildlife usage throughout both sites.
- Any additional information required and requested by the USACE.

**11.0 LONG-TERM MANAGEMENT PLAN**

To ensure the long-term sustainability of the Cathedral Lakes pond and the mitigation basins, Grace Community Church and Terracon will perform maintenance and management of the site for a period of 5 years. It is anticipated that these activities will be minimal as the project is anticipated to be self-sustaining. Management activities should be limited to minor replanting, invasive species control, and boundary maintenance. Grace Community Church will be the initial designated Long-Term Steward charged with long-term management and maintenance once the permitted success criteria are attained.

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## **12.0 ADAPTIVE MANAGEMENT PLAN**

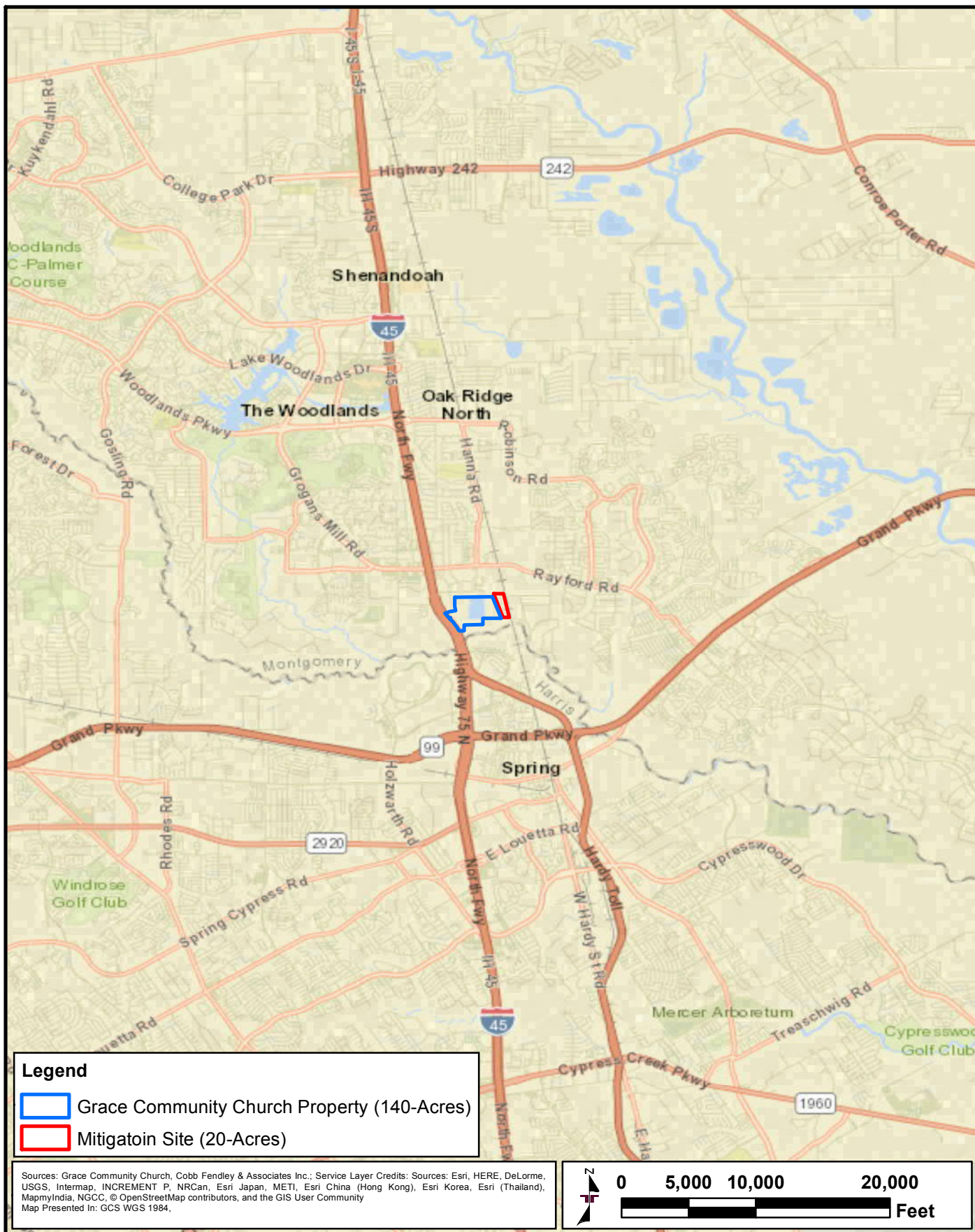
An adaptive management plan will be implemented in the event monitoring reveals certain success criteria have not been met. However, the project is anticipated to be self-sustaining. In the event of a deficiency, Terracon shall provide notice to the USACE. The notice will include an explanation for the deficiency and will outline measures that will guide decisions for revising the compensatory mitigation plan as necessary. The compensatory mitigation plan calls for replanting of species as necessary in order to meet the success criteria.

## **13.0 FINANCIAL ASSURANCES**

The site will be managed and maintained by Grace Community Church. Grace Community Church will be the designated long-term steward charged with long-term management and maintenance responsibility. No other specific financial assurances are necessary for this type of mitigation project as similar-type projects have exhibited success.

# **APPENDIX A**

## **Exhibits**



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Consulting Engineers and Scientists

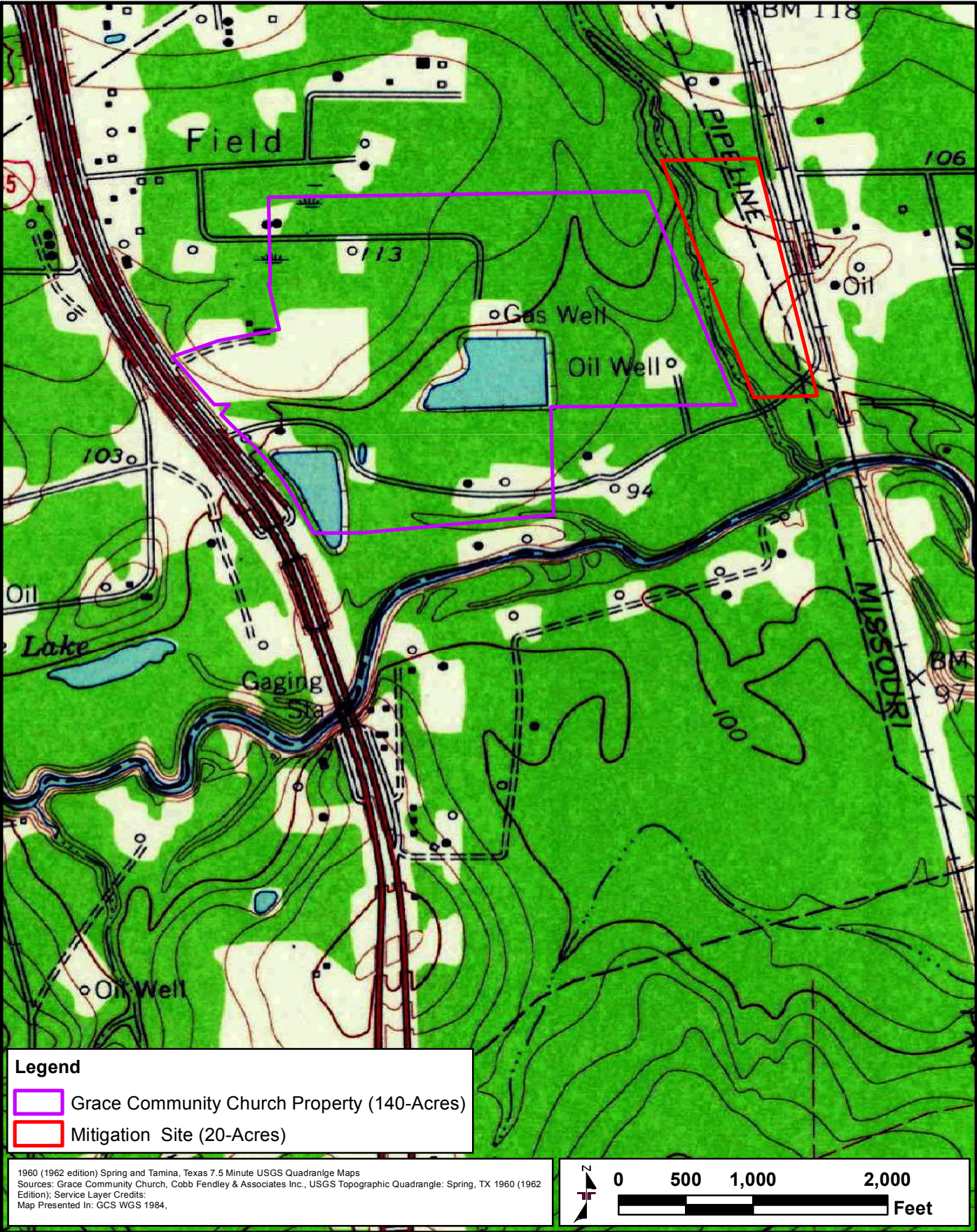
Terracon Project No. 92127577

Vicinity Map

Updated Compensatory Mitigation Plan  
Grace Community Church  
Spring, Montgomery County, Texas

Exhibit
1.1





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**Legend**

Grace Community Church Property (140-Acres)

Mitigation Site (20-Acres)

1960 (1962 edition) Spring and Tamina, Texas 7.5 Minute USGS Quadrangle Maps  
Sources: Grace Community Church, Cobb Fendley & Associates Inc., USGS Topographic Quadrangle: Spring, TX 1960 (1962 Edition); Service Layer Credits:  
Map Presented In: GCS WGS 1984,

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Terracon

Consulting Engineers and Scientists

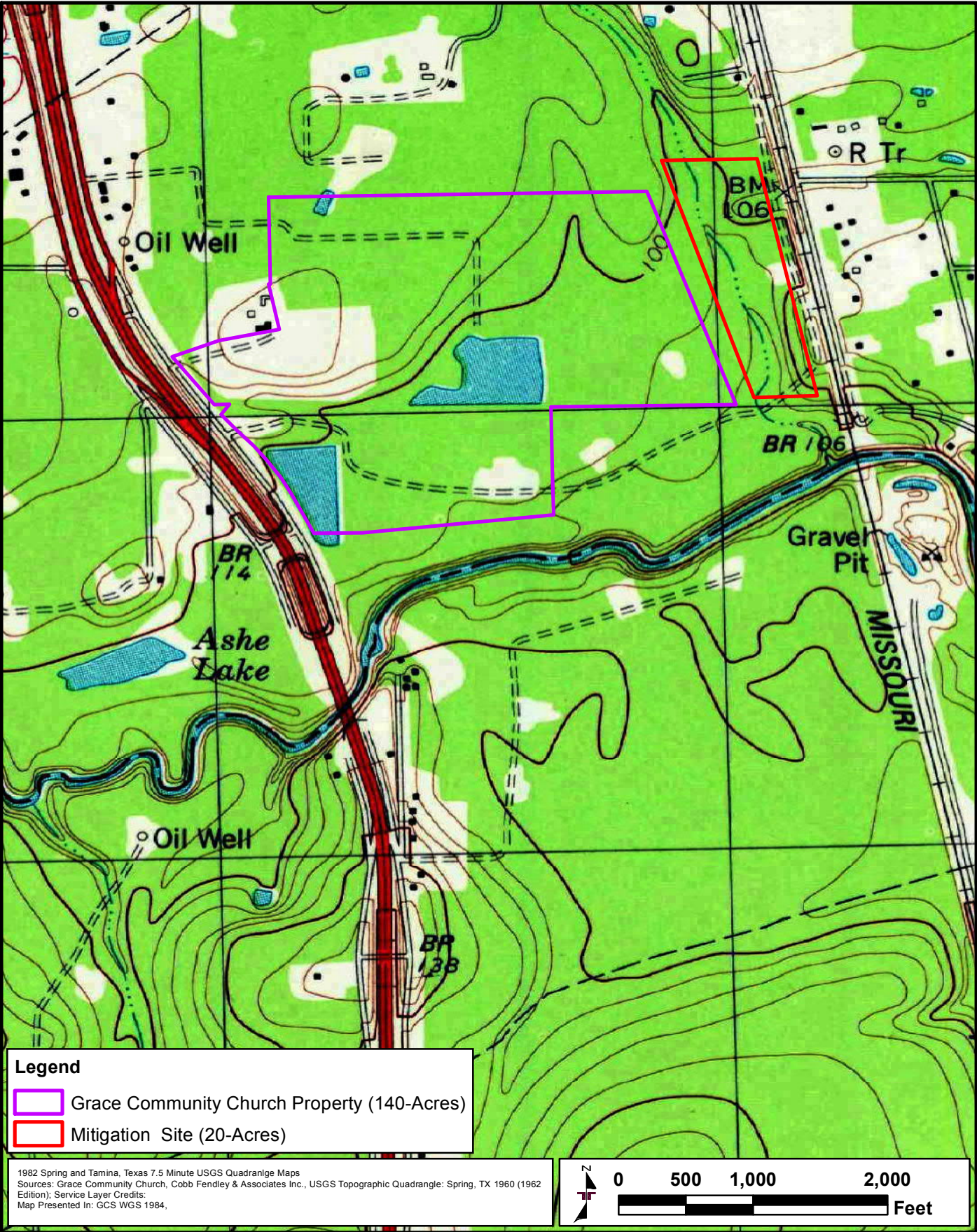
Terracon Project No. 92127577

1960 Topographic Map (1962 Edition)

Updated Compensatory Mitigation Plan  
Grace Community Church  
Spring, Montgomery County, Texas

Exhibit
2.0





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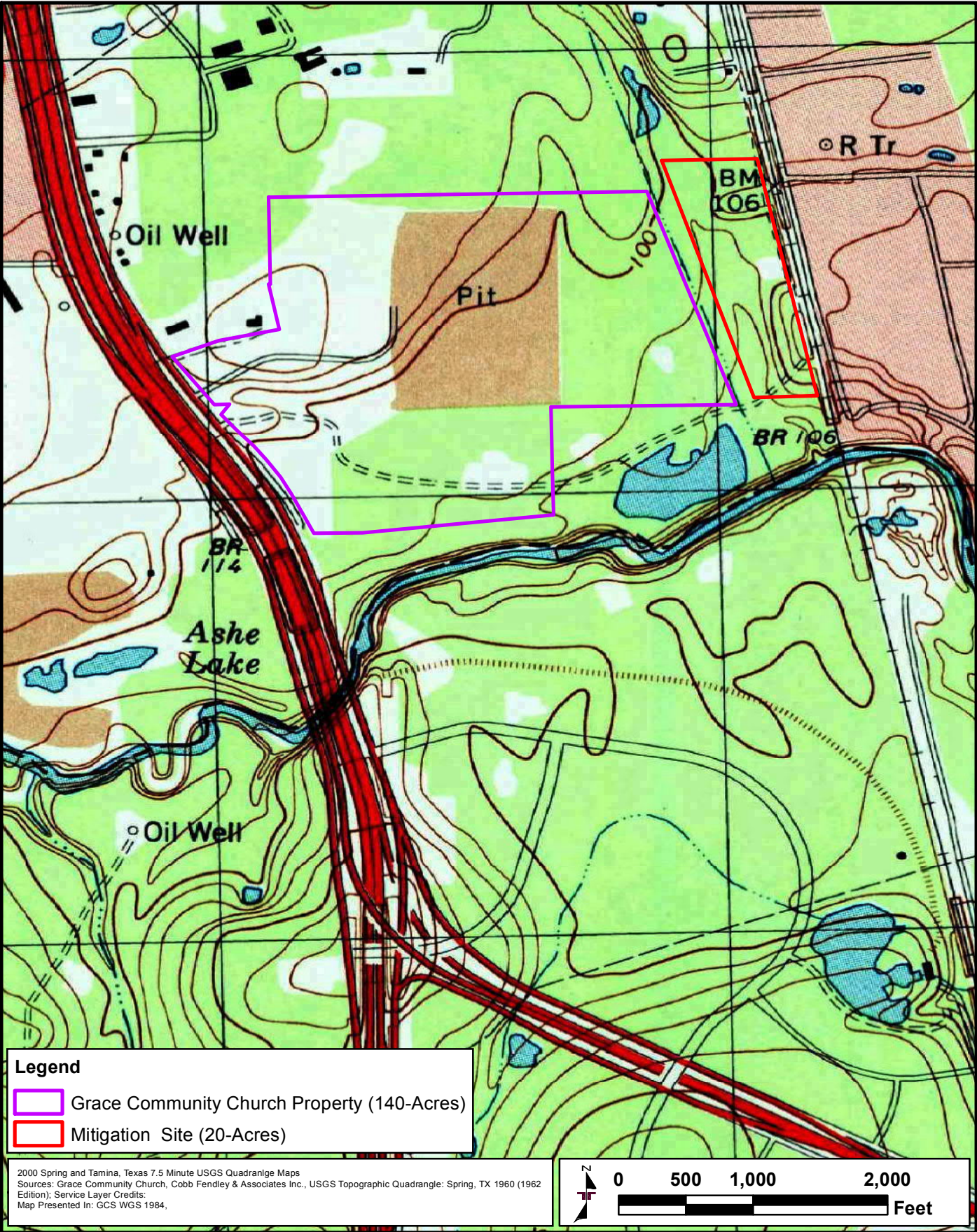
Terracon Project No. 92127577

1982 Topographic Map

Updated Compensatory Mitigation Plan  
Grace Community Church  
Spring, Montgomery County, Texas

Exhibit
2.1





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DATE:	04-18-2018

**Terracon**  
 Consulting Engineers and Scientists  
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2000 Topographic Map  
 Updated Compensatory Mitigation Plan  
 Grace Community Church  
 Spring, Montgomery County, Texas

Exhibit
2.2





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DATE:	04-18-2018



Consulting Engineers and Scientists

Terracon Project No. 92127577

National Wetlands Inventory Map

Updated Compensatory Mitigation Plan  
Grace Community Church  
The Woodlands, Montgomery County, Texas

Exhibit
3.0

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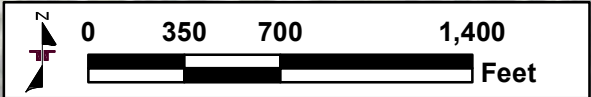


**Legend**

Grace Community Church Property (140-Acres)

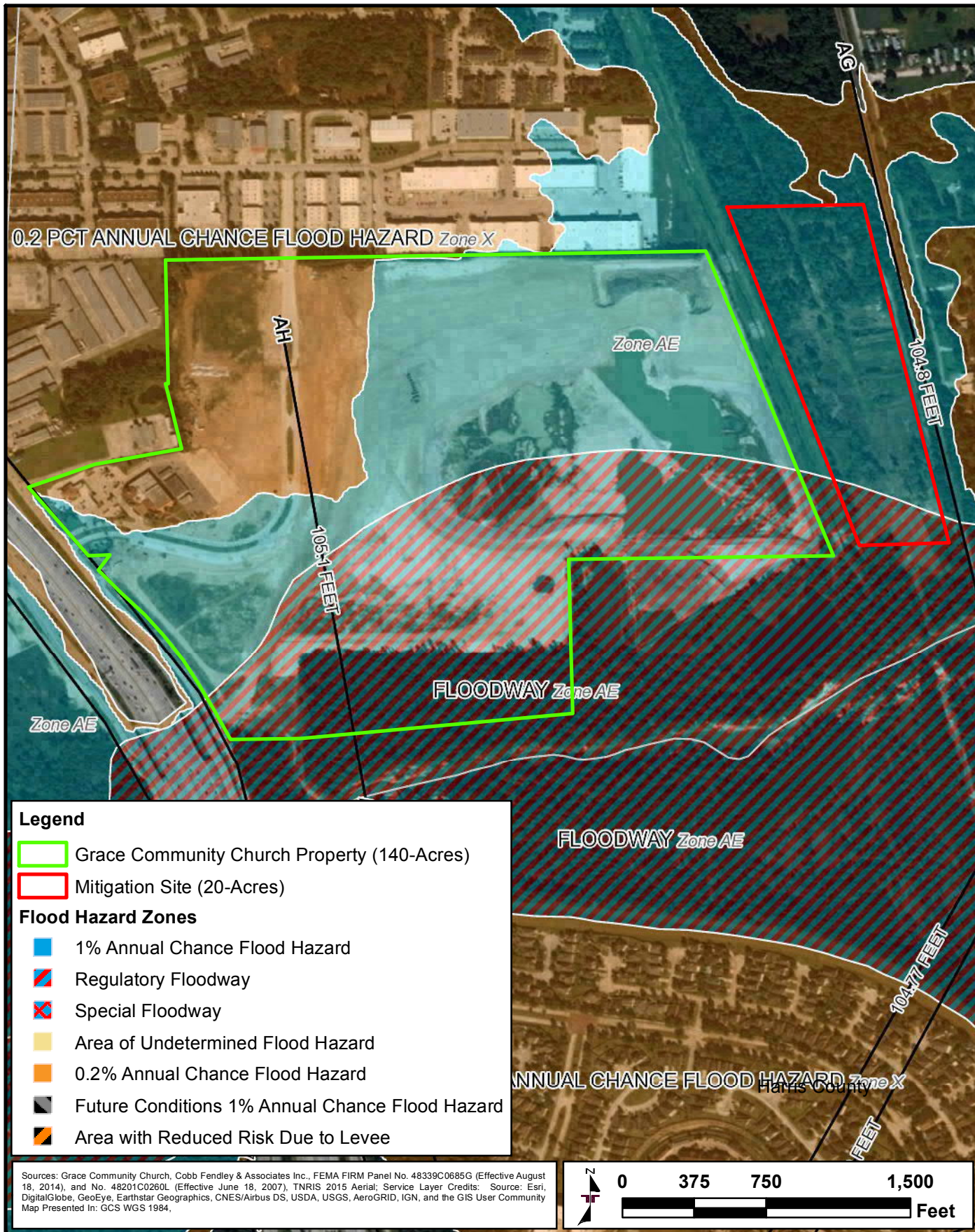
Mitigation Site (20-Acres)

Sources: Grace Community Church, Cobb Fendley & Associates Inc., USDA, NRCS, SSURGO, Soil Data Mart; Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Map Presented In: GCS WGS 1984.



DRAWN BY:	CG	 <p><b>Terracon</b> Consulting Engineers and Scientists</p>	Montgomery County Soils Map	Exhibit
CHECKED BY:	GH		Updated Compensatory Mitigation Plan	4.0
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DATE:	04-17-2018		The Woodlands, Montgomery County, Texas	
Terracon Project No. 92127577				

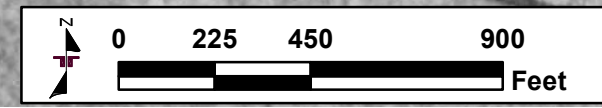
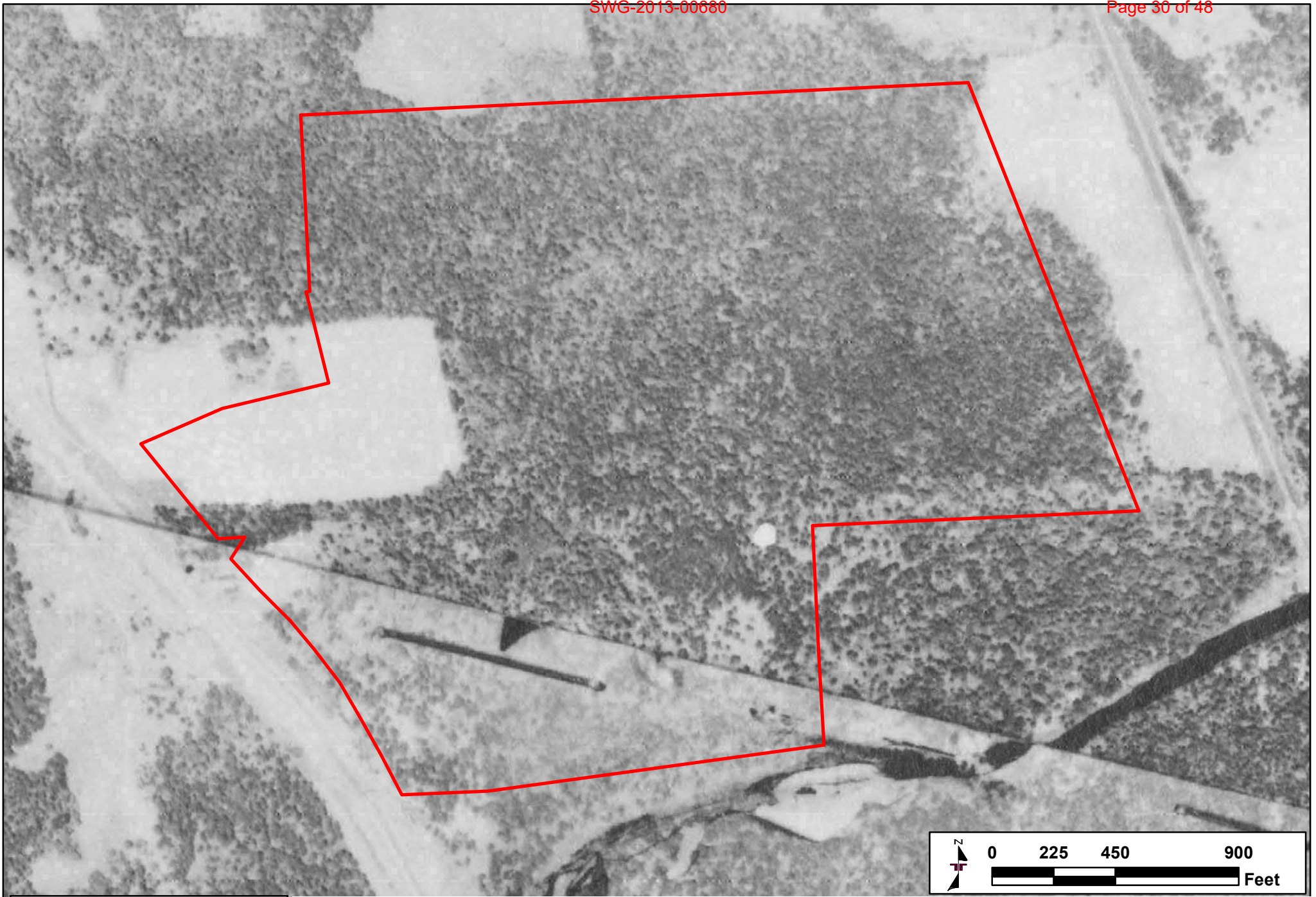




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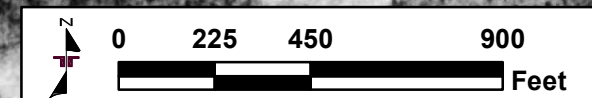
DRAWN BY:	CG	 Consulting Engineers and Scientists Terracon Project No. 92127577	FEMA Floodplain Map	Exhibit  5.0
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GIS SCALE:	1" = 700 feet		Grace Community Church	
DATE:	04-17-2018		The Woodlands, Montgomery County, Texas	





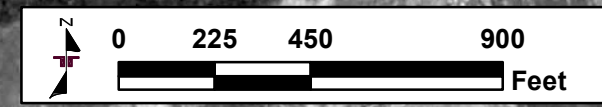
<b>Legend</b>  Grace Community Church Property (140-Acres)	DRAWN BY CHECKED BY SCALE DATE	CG GH 1 in: 450 ft 10/12/2012	 Terracon Project No. 92127577	1939 Aerial Photograph Updated Compensatory Mitigation Plan Grace Community Church Spring, Montgomery County, Texas	Figure 6.0
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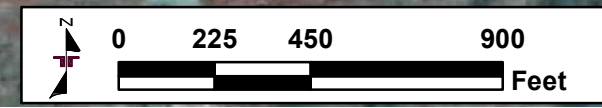
<p><b>Legend</b></p> <p><span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px; vertical-align: middle;"></span> Grace Community Church Property (140-Acres)</p>	<p>DRAWN BY</p> <p>CHECKED BY</p> <p>SCALE</p> <p>DATE</p>	<p>CG</p> <p>GH</p> <p>1 in: 450 ft</p> <p>10/12/2012</p>	<p><b>Terracon</b> Consulting Engineers &amp; Scientists</p> <p>Terracon Project No. 92127577</p>	<p>1957 Aerial Photograph</p> <p>Updated Compensatory Mitigation Plan Grace Community Church Spring, Montgomery County, Texas</p>	<p>Figure</p> <p>6.1</p>
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<p><b>Legend</b></p> <p><span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px; vertical-align: middle;"></span> Grace Community Church Property (140-Acres)</p>	<p>DRAWN BY</p> <p>CHECKED BY</p> <p>SCALE</p> <p>DATE</p>	<p>CG</p> <p>GH</p> <p>1 in: 450 ft</p> <p>10/12/2012</p>	<p><b>Terracon</b> Consulting Engineers &amp; Scientists</p> <p>Terracon Project No. 92127577</p>	<p>1989 Aerial Photograph</p> <p>Updated Compensatory Mitigation Plan Grace Community Church Spring, Montgomery County, Texas</p>	<p>Figure</p> <p>6.2</p>
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**Legend**

Grace Community Church Property (140-Acres)

DRAWN BY	CG
CHECKED BY	GH
SCALE	1 in: 450 ft
DATE	10/12/2012

DRAWN BY	CG
CHECKED BY	GH
SCALE	1 in: 450 ft
DATE	10/12/2012

**Terracon**  
Consulting Engineers & Scientists

Terracon Project No. 92127577

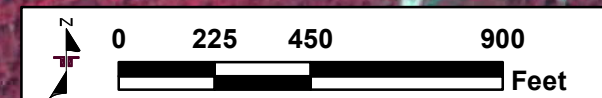
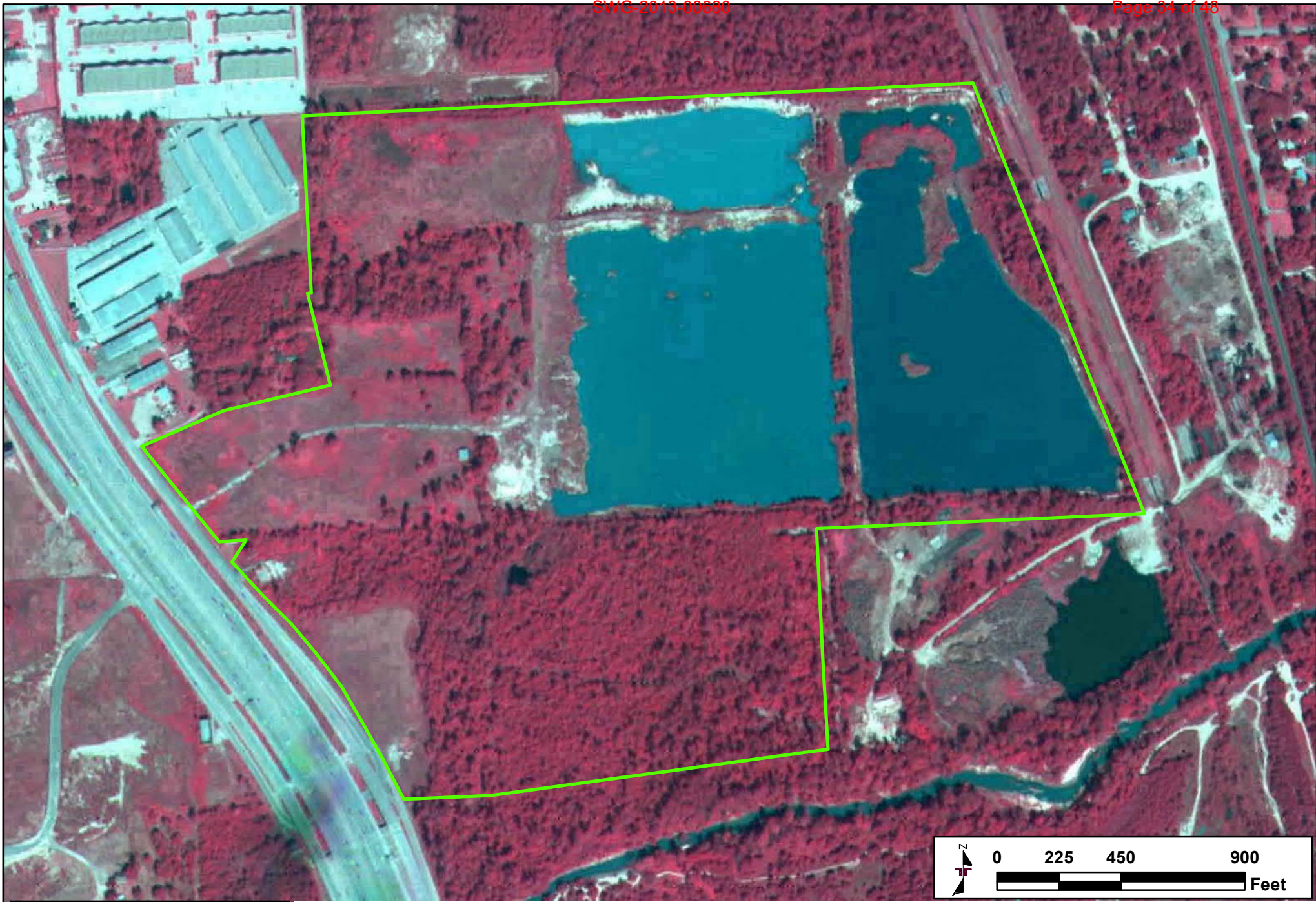
1996 Aerial Photograph

Updated Compensatory Mitigation Plan  
Grace Community Church  
Spring, Montgomery County, Texas

Figure

6.3





**Legend**

Grace Community Church Property (140-Acres)

DRAWN BY	CG
CHECKED BY	GH
SCALE	1 in: 450 ft
DATE	10/12/2012

CG
GH
1 in: 450 ft
10/12/2012

**Terracon**  
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Terracon Project No. 92127577

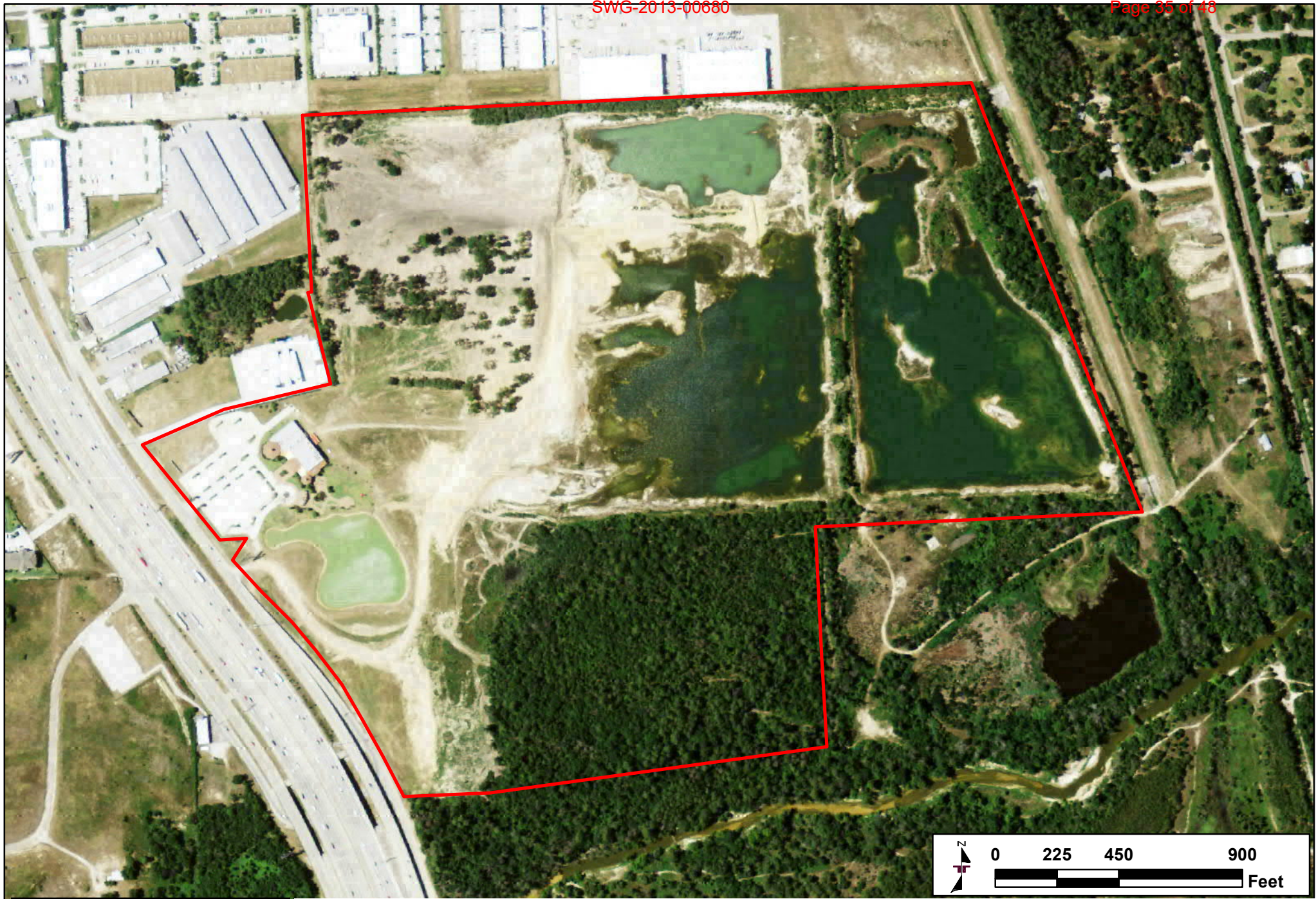
2004 Aerial Photograph


Updated Compensatory Mitigation Plan  
Grace Community Church  
Spring, Montgomery County, Texas

Figure

6.4





<b>Legend</b>	
	Grace Community Church Property (140-Acres)

DRAWN BY
CHECKED BY
SCALE
DATE

CG
GH
1 in: 450 ft
10/12/2012

 <b>Terracon</b> Consulting Engineers & Scientists	Terracon Project No. 92127577
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2012 Aerial Photograph
Updated Compensatory Mitigation Plan
Grace Community Church
Spring, Montgomery County, Texas

Figure
6.5

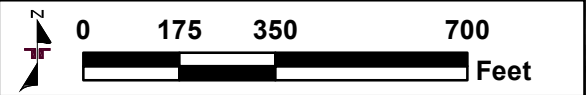




**Legend**

 Mitigation Site (20-Acres)

1989 Aerial Photograph courtesy of Texas Natural Resource Information System (TNRIS)  
Sources: Grace Community Church, Cobb Fendley & Associates Inc., Google Earth 1989 Aerial; Service Layer Credits:  
Map Presented In: GCS WGS 1984,



DRAWN BY:	CG	 Consulting Engineers and Scientists Terracon Project No. 92127577	1989 Aerial Photograph	Exhibit
CHECKED BY:	GH		Updated Compensatory Mitigation Plan Grace Community Church The Woodlands, Montgomery County, Texas	6.6
GIS SCALE:	1 " = 350 feet			
DATE:	04-17-2018			

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DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

<b>Terracon</b> Consulting Engineers and Scientists
Terracon Project No. 92127577

1996 Aerial Photograph
Updated Compensatory Mitigation Plan Grace Community Church The Woodlands, Montgomery County, Texas

Exhibit
6.7



N:\GIS\_Data\Natural Resources\Projects\92127577\Project Mxds\Updated Mitigation Plan\92127577 - Exhibit 6.8 Mitigation Site.mxd, Revised: 04-17-2018, 9:44:34 AM



DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

**Terracon**  
Consulting Engineers and Scientists

Terracon Project No. 92127577

2006 Aerial Photograph

Updated Compensatory Mitigation Plan  
Grace Community Church  
The Woodlands, Montgomery County, Texas

Exhibit
6.8





N:\GIS\_Data\Natural Resources\Projects\92127577\Project Mxds\Updated Mitigation Plan\92127577 - Exhibit 6.9 Mitigation Site.mxd, Revised: 04-17-2018, 9:45:16 AM

DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

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Terracon Project No. 92127577

2010 Aerial Photograph

Updated Compensatory Mitigation Plan  
Grace Community Church  
The Woodlands, Montgomery County, Texas

Exhibit
6.9





N:\GIS\_Data\Natural Resources\Projects\92127577\Project Mxd\Updated Mitigation Plan\92127577 - Exhibit 6.10 Mitigation Site.mxd, Revised: 04-17-2018, 9:45:47 AM

DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

Terracon

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Terracon Project No. 92127577

2015 Aerial Photograph
Updated Compensatory Mitigation Plan
Grace Community Church
The Woodlands, Montgomery County, Texas

Exhibit
6.10





N:\GIS\_Data\Natural Resources\Projects\92127577\Project Mxds\Updated Mitigation Plan\92127577 - Exhibit 6.11 Mitigation Site.mxd, Revised: 04-17-2018, 9:40:16 AM

DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

**Terracon**  
Consulting Engineers and Scientists

Terracon Project No. 92127577

2016 Aerial Photograph
Updated Compensatory Mitigation Plan Grace Community Church The Woodlands, Montgomery County, Texas

Exhibit
6.11

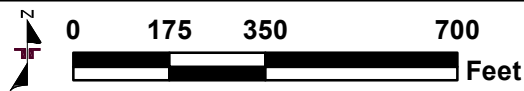




**Legend**

Mitigation Site (20-Acres)

2017 Aerial Photograph courtesy of Google Earth  
Sources: Grace Community Church, Cobb Fendley & Associates Inc., TNRS 2015 Aerial; Service Layer Credits:  
Map Presented In: GCS WGS 1984,



DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

**Terracon**  
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Terracon Project No. 92127577

January 2017 Aerial Photograph

Updated Compensatory Mitigation Plan  
Grace Community Church  
The Woodlands, Montgomery County, Texas

Exhibit
6.12

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DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 350 feet
DATE:	04-17-2018

**Terracon**  
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Terracon Project No. 92127577

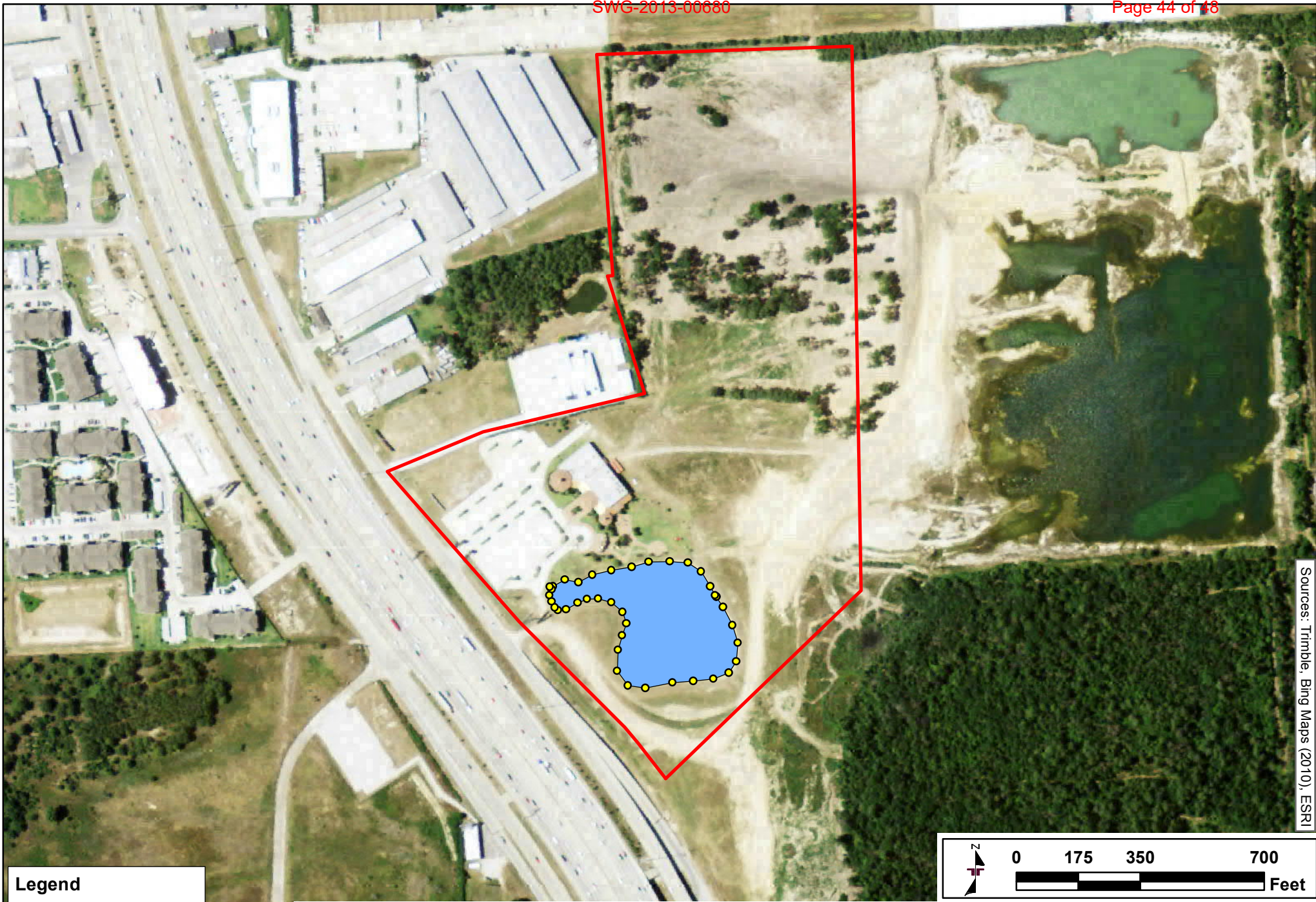
August 2017 Aerial Photograph

Updated Compensatory Mitigation Plan  
Grace Community Church  
The Woodlands, Montgomery County, Texas

Exhibit
6.13

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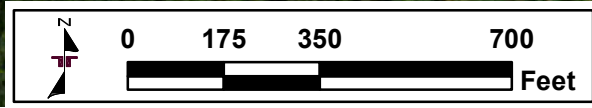





Sources: Trimble, Bing Maps (2010), ESRI

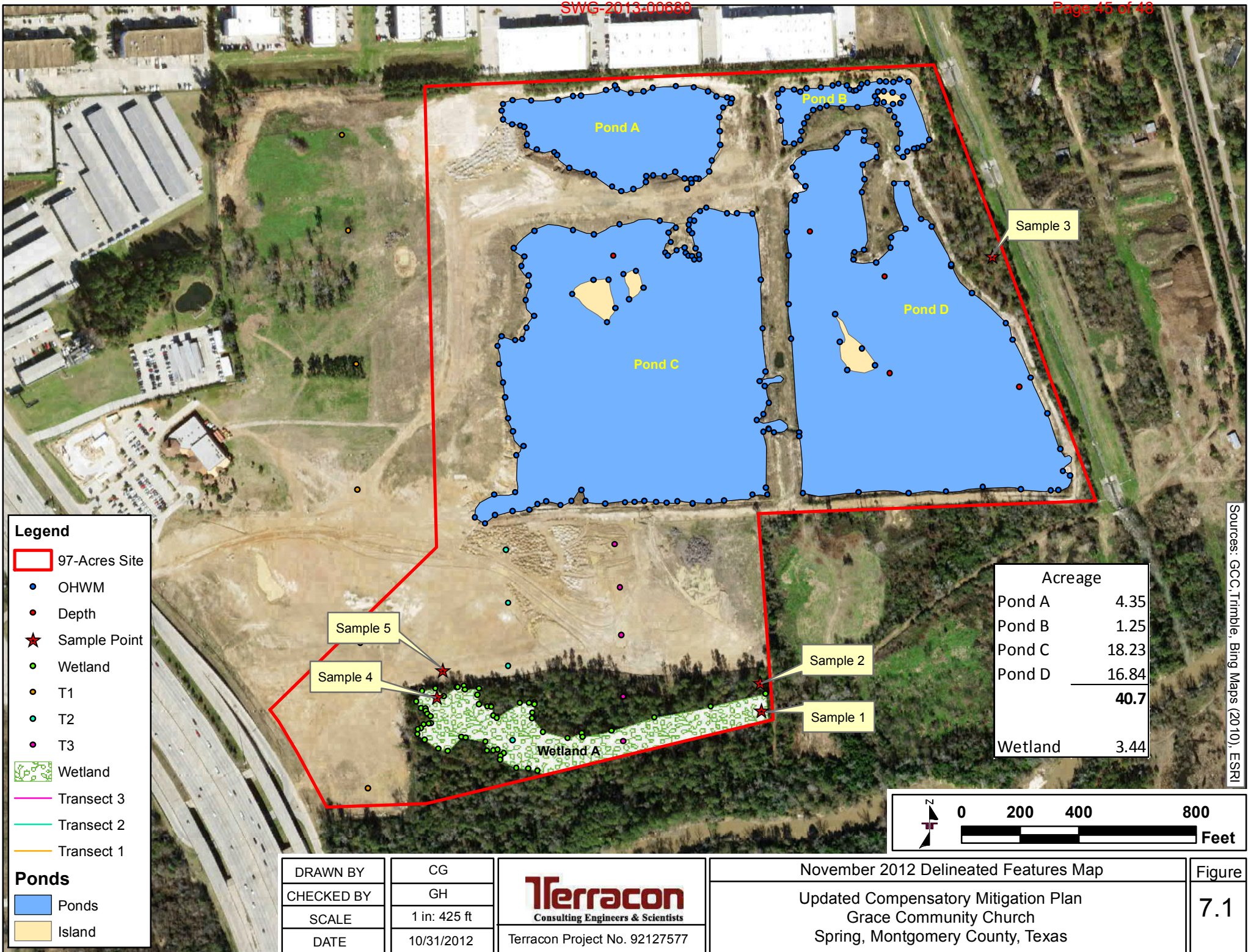
**Legend**

- 36-Acres Site
- Landscape Pond
- OHWM



DRAWN BY	CG	 Terracon Project No. 92127577	October 2012 Delineated Features Map	Figure
CHECKED BY	GH		Updated Compensatory Mitigation Plan	7.0
SCALE	1 in: 350 ft		Grace Community Church	
DATE	10/11/2012		Spring, Montgomery County, Texas	





Sources: GCC, Trimble, Bing Maps (2010), ESRI

DRAWN BY	CG
CHECKED BY	GH
SCALE	1 in: 425 ft
DATE	10/31/2012

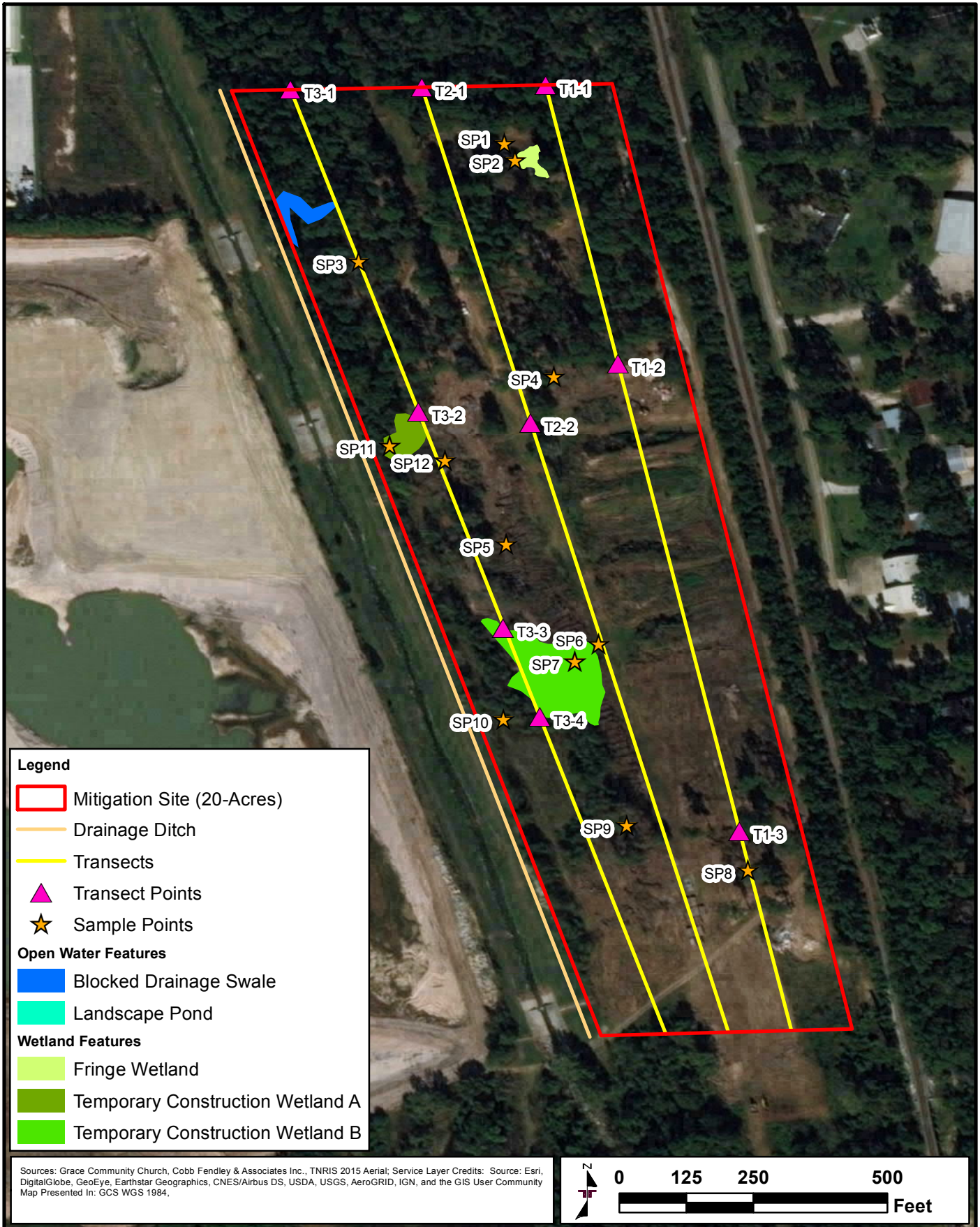
CG
GH
1 in: 425 ft
10/31/2012

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Consulting Engineers & Scientists  
Terracon Project No. 92127577

November 2012 Delineated Features Map
Updated Compensatory Mitigation Plan Grace Community Church Spring, Montgomery County, Texas

Figure
7.1





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DRAWN BY:	CG	 Consulting Engineers and Scientists	March 2018 Delineated Features Map	Exhibit
CHECKED BY:	GH		Updated Compensatory Mitigation Plan	7.2
GIS SCALE:	1" = 250 feet		Grace Community Church	
DATE:	04-17-2018		The Woodlands, Montgomery County, Texas	
Terracon Project No. 92127577				



DIAGRAM IS FOR GENERAL LOCATION ONLY AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES



### Legend

- Grace Community Church Property (140-Acres)
- Cathedral Lakes Pond (15.56-Acres)
- Avoided Area (11-Acres)

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
Map Presented In: GCS WGS 1984, WGS 1984 Web Mercator Auxiliary Sphere



Project Mngr:	GH	Project No:	92127577
Drawn By:	CG	Scale:	1" = 800'
Checked By:	GH	Report:	Exhibit
Approved By:	GH	Date:	04-18-2018

**Terracon**  
Consulting Engineers and Scientists  
11555 CLAY ROAD, SUITE 100 HOUSTON, TX 77043  
PH: (713) 690-8989 FAX: (713) 690-8787

Cathedral Lakes Pond
Updated Compensatory Mitigation Plan Grace Community Church Spring, Montgomery County, Texas

EXHIBIT
8.0



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DRAWN BY:	CG
CHECKED BY:	GH
GIS SCALE:	1 " = 300 feet
DATE:	04-19-2018

**Terracon**  
Consulting Engineers and Scientists

Terracon Project No. 92127577

Mitigation Basins

Updated Compensatory Mitigation Plan  
Grace Community Church  
Spring, Montgomery County, Texas

Exhibit
8.1