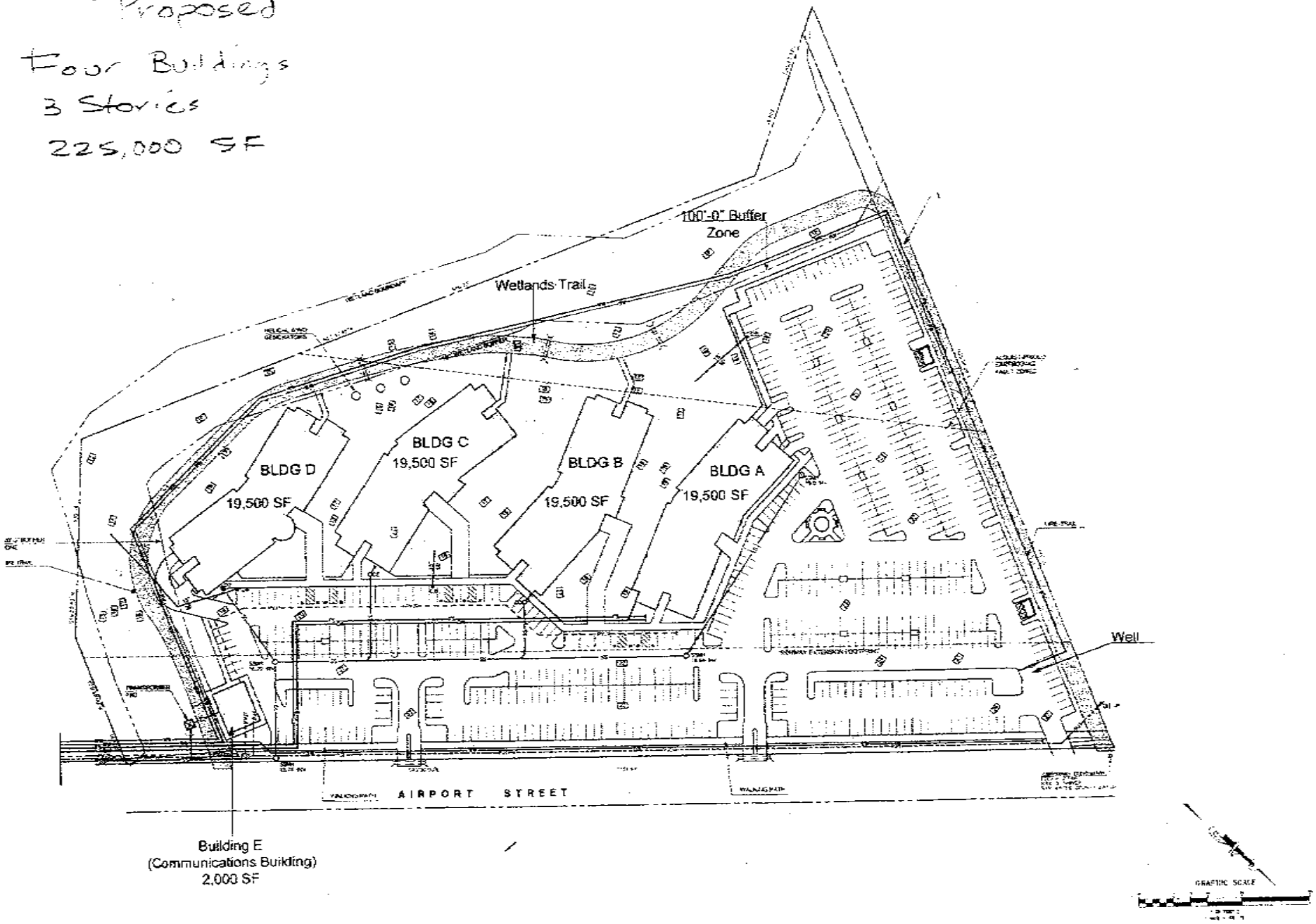
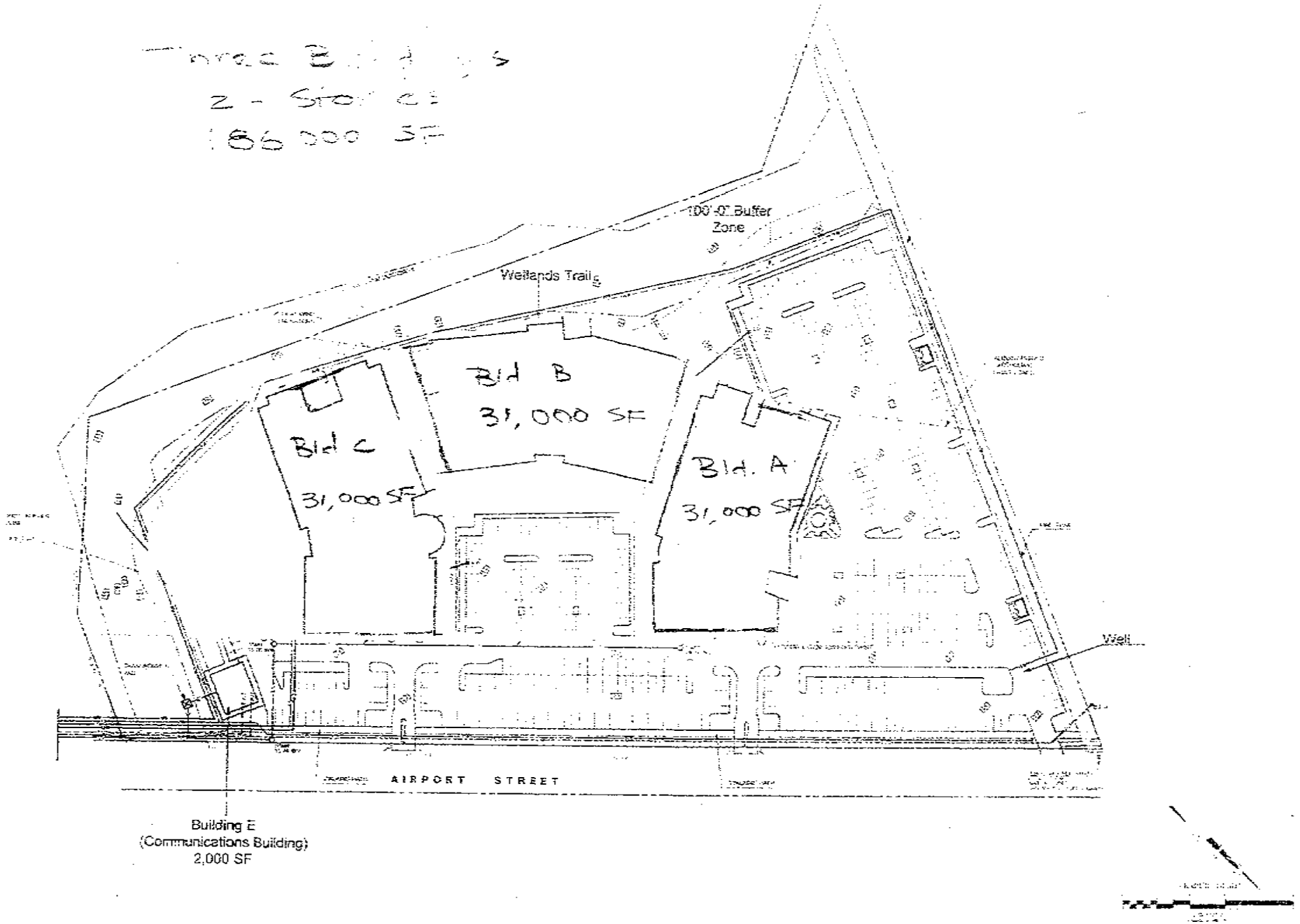
APPENDIX C

ATTACHMENTS TO COMMENT LETTER 204 FROM BIG WAVE GROUP, SCOTT HOLMES, DATED DECEMBER 23, 2009

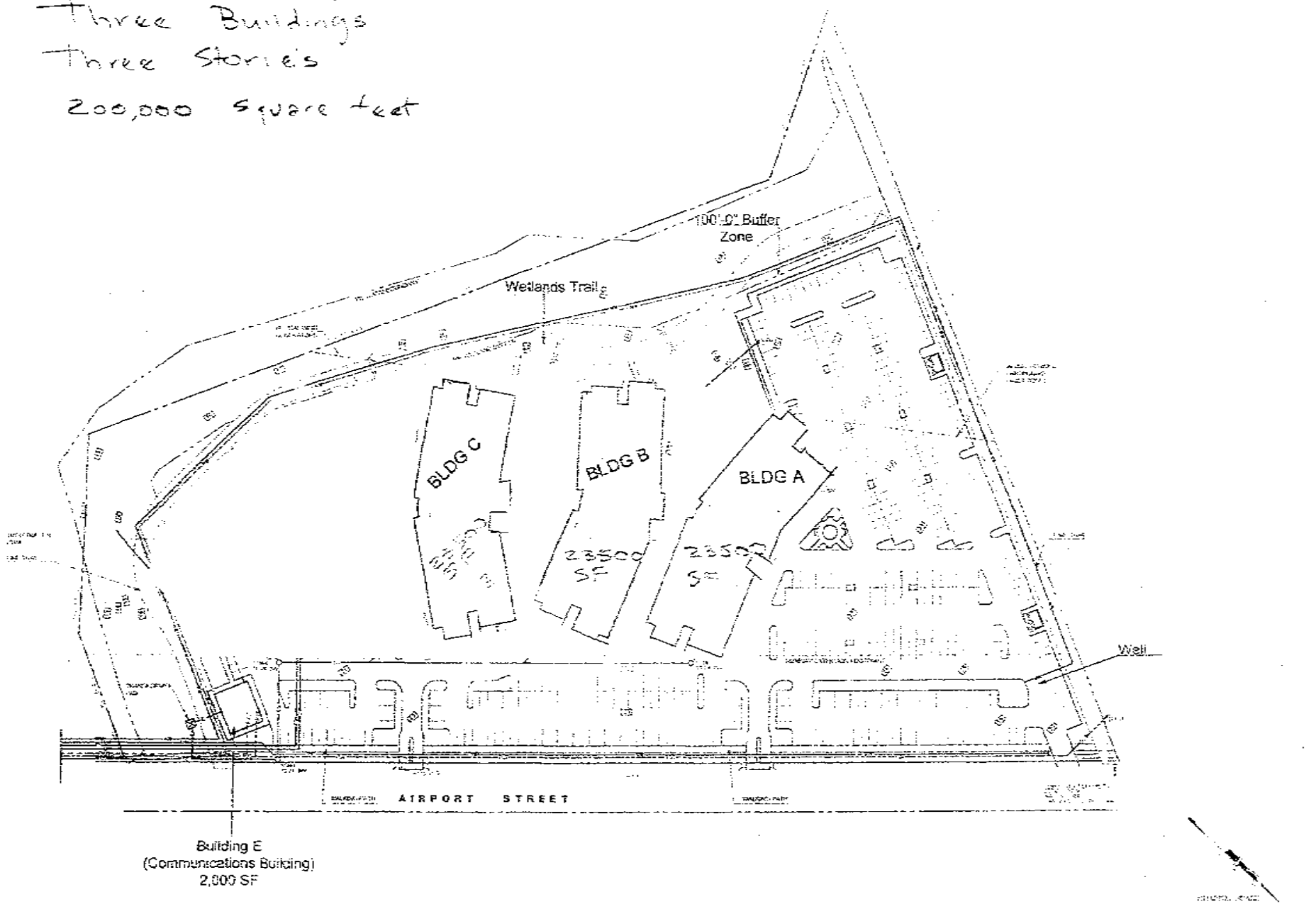
Office Park Options

Proposed
Four Buildings
3 Stories
225,000 SF

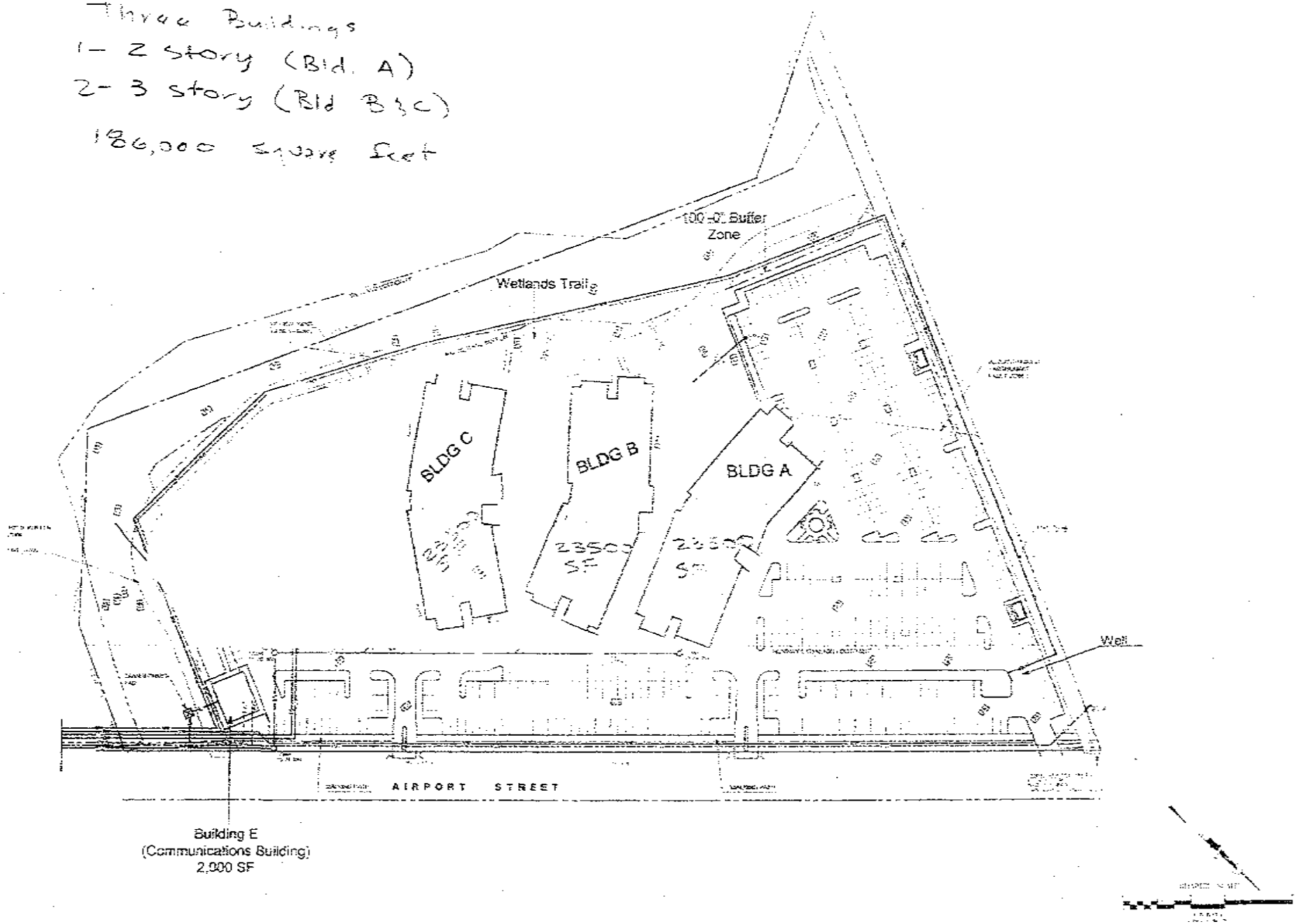



Three Buildings
2 - Stories
186,000 SF
100'-0" Buffer Zone
Wetlands Trail
Bld B
31,000 SF
Bld C
31,000 SF
Bld. A
31,000 SF
Well
AIRPORT STREET
Building E
(Communications Building)
2,000 SF

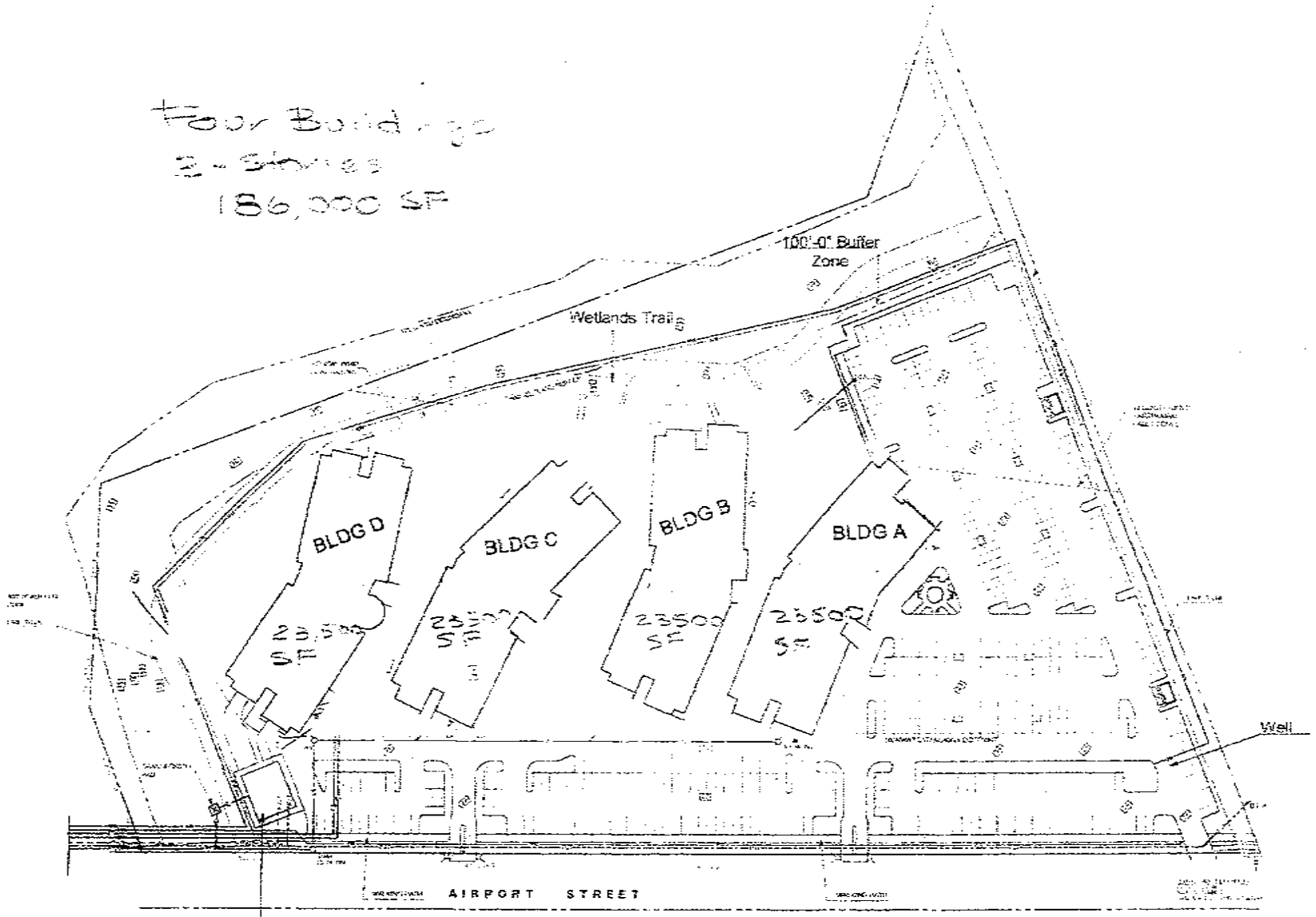
Three Buildings
Three Stories
200,000 square feet



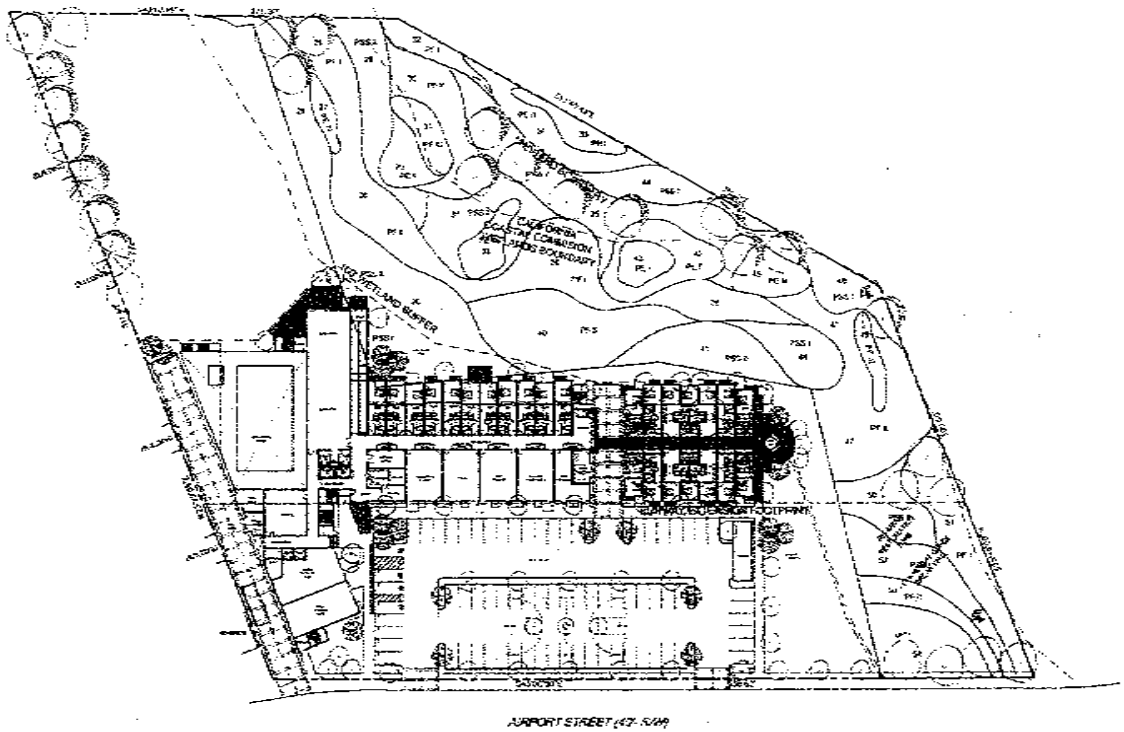
Three Buildings
1- 2 story (Bld. A)
2- 3 story (Bld B&C)
186,000 square feet



Four Buildings
3 - Stories
186,000 SF



Wellness Center Site Plan



1 OVERALL SITE PLAN

KEY NOTES

WR&D

BIG WAVE WELLNESS CENTER

18153

OVERALL SITE PLAN

A100

Trip Estimates for Environmentally Superior Alternative

Project Trip Generation Estimates (Modified Wellness Center and 225,000 sf office)

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Office Park											
General Office	90,000	11.01	991	1.55	123	17	140	1.49	23	111	134
Research & Development	56,250	8.11	456	1.22	57	12	69	1.07	9	51	60
Storage	33,750	3.56	120	0.30	8	2	10	0.32	3	8	11
Light Manufacturing	45,000	3.82	172	0.73	26	7	33	0.73	12	21	33
Wellness Center											
Residential (Units)	57	0	0		0	0					
Storage	10,000	3.56	36	0.30	3	1	4	0.32	1	3	4
Trips			1775		217	39	256		48	194	242

Project Trip Generation Estimates (Modified Wellness Center and 200,000 ft office)

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Office Park											
General Office	67,000	11.01	738	1.55	104	14	118	1.49	21	100	120
Research & Development	54,250	8.11	440	1.22	66	13	79	1.07	10	58	68
Storage	33,750	3.56	120	0.30	8	2	10	0.32	3	8	11
Light Manufacturing	45,000	3.82	172	0.73	26	7	33	0.73	12	21	33
Wellness Center											
Residential (Units)	57	0	0		0	0					
Storage	10,000	3.56	36	0.30	3	1	4	0.32	1	3	4
Trips			1509		207	37	244		47	190	237

Project Trip Generation Estimates (Modified Wellness Center and 186,000 ft office)

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Office Park											
General Office	51,000	11.01	562	1.55	79	11	90	1.49	16	76	92
Research & Development	50,250	8.11	408	1.22	61	13	74	1.07	9	54	63
Storage	33,750	3.56	120	0.30	8	2	10	0.32	3	8	11
Light Manufacturing	45,000	3.82	172	0.73	26	7	33	0.73	12	21	33
Wellness Center											
Residential (Units)	57	0	0		0	0					
Storage	10,000	3.56	36	0.30	3	1	4	0.32	1	3	4
Trips			1297		177	33	210		41	162	203

Project Trip Generation Estimates (without storage)

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Office Park											
General Office	51,000	11.01	562	1.55	79	11	90	1.49	16	76	92
Research & Development	50,250	8.11	408	1.22	61	13	74	1.07	9	54	63
Light Manufacturing	45,000	3.82	172	0.73	26	7	33	0.73	12	21	33
Wellness Center											
Residential (Units)	57	0	0		0	0					
Trips			1141		166	30	197		37	151	188

Project Cypress Trip Generation Estimates From North

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate (x.29)	Trips	Rate (x.29)	In	Out	Total	Rate (x.29)	In	Out	Total
Office Park											
General Office	67,000	3.219	216	0.45	30	4	34	0.43	6	29	35
Research & Development	50,250	2.3519	118	0.35	18	4	21	0.31	3	16	18
Light Manufacturing	45,000	1.1078	50	0.21	10	3	12	0.21	5	10	15
Wellness Center											
Residential (Units)	57	0	0		0	0					
Trips			384		57	11	68		14	54	68

Trip Generation Estimates, Seal Cove, Pillar Ridge, Commercial on Airport St and Cypress

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Commercial, Airport Street, Cypress											
General Office	10,000	11.01	110	1.55	16	2	18	1.49	3	15	18
Research & Development	5,000	8.11	41	1.22	6	1	7	1.07	1	5	6
Light Manufacturing	15,000	3.82	57	0.73	11	3	14	0.73	6	11	17
Seal Cove Pillar Ridge											
Residential (Units)	420	6.65	2793	0.51	54	214		0.62	260	130	391
Trips			3001		86	221	307		271	161	432

Cypress Est. To North for Seal Cove, Pillar Ridge, Commercial on Airport St and Cypress*

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
		Rate (.29)	Trips	Rate (x.29)	In	Out	Total	Rate (x.29)	In	Out	Total
Commercial (Airport St., Cypress)											
General Office	10,000	3.1929	32	0.45	4	1	5	0.43	1	4	5
Research & Development	5,000	2.3519	12	0.35	2	0	2	0.31	0	2	2
Light Manufacturing	15,000	1.1078	17	0.21	3	1	4	0.21	2	3	5
Seal Cove, Pillar Ridge											
Residential (Units)	420	1.9285	810	0.15	16	62		0.18	76	19	94
Trips			870		25	64	89		78	28	106

*Assuming 29% of Seal Cove Residents Commute North and 29% of Commercial access from the north

Cypress To North for Seal Cove, Pillar Ridge, Commercial on Airport St and Cypress, Big Wave

Use	Size (sf)	Daily		AM Peak Hour				PM Peak Hour			
			Trips		In	Out	Total		In	Out	Total
Big Wave											
Option 1: Project Description	225,000 sf		615		70	14	84		18	60	78
Option 2: Modified Wellness	225,000 sf		515		63	11	74		14	56	70
Option 3: DEIR Env. Sup	186,000 sf		384		57	11	68		14	54	68
Option 4: Alt. D	200,000 sf		436		60	13	70		14	55	69
95%Traffic Diverted to Capistrano											
Option 1			30		4	1	5		1	3	4
Option 2			19		3	1	4		1	3	4
Option 3											
Local			870		25	64	89		78	28	106
Local + Option 1			1485		95	78	173		96	88	184
Local + Option 2			1385		88	75	163		92	84	176
Local + Option 3			1254		82	75	157		92	82	174
Local + Option 4			1306		85	75	159		92	83	175
Local + 5% of Option 1			900		29	65	94		79	32	110
Local +5% of Optron 2			889		28	65	92		79	32	110

Top Soil Addition

Final WSP Basis Design Report

Draft (90%) Basis of Design Report

Riparian & Waters/Wetlands Ecosystem Restoration for Big Wave Wellness Center and Office Park San Mateo County, California

August 4, 2008

Prepared for:

Big Wave LLC
1333 Jones Street
Suite 307
San Francisco, CA 94109

Prepared by:

Ecosystem Science & Natural Resources Management Services
160 Franklin Street, Suite 300
Oakland, CA 94607

DISCLAIMER

WSP Environment & Energy has prepared this basis of design report for use by Big Wave LLC. Waters of the U.S., including wetlands (waters/wetlands) boundaries presented in this report are described in a previous report by WSP (2008a). These waters/wetlands boundaries have been approved by the U.S. Army Corps of Engineers, San Francisco District (File No. 2008-001025; Regulatory Division, U.S. Army Corps of Engineers, San Francisco District, June 5, 2008). Wetland boundaries under California Coastal Commission jurisdiction have not received formal approval.

Lyndon C. Lee **August 4, 2008**

Lyndon C. Lee, Ph.D. Date
Principal Ecologist & Vice President
Ecosystem Science and Natural Resources Management Services
WSP Environment and Energy

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EXECUTIVE SUMMARY

The Big Wave Wellness Center and Office Park Project (hereafter, "Project") consists of the construction of a residential village and an adjacent commercial property/office park complex. The residential village is designed to provide affordable housing and independent living for a developmentally disabled community, and the office park is designed similarly to provide a state-of-the-art "green", LEED-certified working environment. The primary objective of the project is to construct innovative living and work environments that foster independent and meaningful living/work experiences for disabled young adults. The proposed Project also includes restoration of the waters of the U.S., including wetlands (*i.e.*, waters/wetlands) and California Coastal Commission (state) wetlands on the property that are currently used in agricultural production.

This basis of design report outlines a restoration plan for the riparian/wetland ecosystem that encompasses the federal and state waters/wetlands and their buffer that lie within the project area. This 90% restoration design describes a suite of activities that would increase waters/wetlands ecosystem functions, and to develop a native, diverse, and aesthetically pleasing landscape. Best management practices for stormwater treatment are designed to incorporate retention/detention microdepressions (rain gardens) and swales planted with native species.

The riparian/wetland ecosystem restoration plan includes five elements:

1. Earthwork, including mass and fine grading,
2. Installation of large wood,
3. Planting and irrigation,
4. Weed management, and
5. Monitoring and adaptive management.

The riparian/wetland ecosystem restoration design integrates the built environment with natural communities through utilization of native species for landscaping, locally adapted plant stock, and when possible, use of propagules obtained from the Project Site and adjacent landscape. Additionally, the Project design encourages community involvement by offering educational opportunities for village residents in the restoration process as well as via an informal foot path within the restored buffer. If implemented as designed, the riparian/wetland ecosystem will result an increase in the hydrologic, biogeochemical, native plant community, and faunal support/habitat functions of the currently farmed wetlands. A monitoring and adaptive management program will be implemented to ensure success of the restoration efforts.

I. INTRODUCTION

The Big Wave Wellness Center and Office Park Project (hereafter, "Project") consists of the construction of a residential village and an adjacent commercial property/office park complex. The residential village is designed to provide affordable housing and independent living for a developmentally disabled community, and the office park is designed similarly to provide a state-of-the-art "green", LEED-certified working environment. The primary objective of the project is to construct innovative living and work environments that foster independent and meaningful living/work experiences for disabled young adults.

The proposed Project also incorporates a restoration plan for the riparian/wetland ecosystem which for the purposes of this project includes (a) the waters of the U.S., including wetlands (hereafter, waters/wetlands), (b) California Coastal Commission (state) wetlands, and (c) a 100 foot wide buffer around these waters/wetlands. The majority of all three areas is currently are used in agricultural production. For the purposes of this Project, a "riparian/wetland ecosystem" is defined as upland, transitional, and waters/wetland habitats, all of which will be restored in a complex mosaic within a 100 ft buffer adjacent to existing federal and state waters/wetlands. Restoration of the buffer will provide significant benefits to waters/wetlands ecosystem functions, relative to existing conditions, particularly with respect to the native plant and animal communities. Of particular importance is the restoration of potential breeding habitat for the California red-legged frog (*Rana aurora draytonii*) and potential foraging habitat for the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*). The restoration design integrates the built environment with natural communities through utilization of native species for landscaping, locally adapted plant stock, and when possible, use of propagules obtained from the Project Site and adjacent landscape. Additionally, the Project design encourages community involvement by offering educational opportunities for village residents in the restoration process as well as via an informal foot path within the restored buffer.

A. Project Site

The Big Wave Project Site (hereafter, "Project Site") is located in unincorporated San Mateo County, adjacent to Princeton-by-the-Sea, California (Figure 1). The Project Site consists of two agricultural fields totaling 19.5 ac. These fields are separated by a small, county-owned, unnamed intermittent stream that is an extension of San Mateo County's Pillar Point Marsh. As such, it drains directly to the Pacific Ocean, entering the Pacific Ocean via Pillar Point Harbor immediately north of the mouth of Denniston Creek.

The Project Site is bordered to the northeast by the Half Moon Bay Municipal Airport (Figure 2) and to the south by Pillar Point Marsh, a nature reserve that is part of the County of San Mateo Fitzgerald Marine Reserve complex managed by the County's Parks and Recreation Division. A public trailer park is immediately north of the Project Site along Airport Road. Elevations at the Project Site range from 9.0 to 27.7 feet NGVD, although the agricultural fields are generally flat but slope gently to the south and west.

B. Existing Conditions at the Big Wave Project Site

1. Soils and Geomorphic Context

The Project Site is situated on the uplifted Half Moon Bay marine terrace formation within a partially filled coastal basin. The coastal basin consists of Pleistocene coarse-grained, alluvial fan and stream terrace deposits. Underlying sediments include poorly consolidated sand, gravel, and silt comprising the headward-most extent of old alluvial fans (Brabb and Pampeyan 1983). Montara Mountain, a northern spur of the Santa Cruz Mountain sequence of the Outer Coast Ranges, separates this low-lying coastal area from San Francisco Bay to the north and east.

Soils within the Project Site are mapped by the Natural Resources Conservation Service (NRCS, formerly U.S. Department of Agriculture Soil Conservation Service) as Denison clay loam on nearly level slopes (DcA) and Denison clay loam on nearly level slopes that are imperfectly drained (DdA) (NRCS 1961). These soils are derived from granitic alluvium, and have formed on low coastal terraces under the influence of herbaceous vegetation (grass). Denison clay loam soils occur on 0 to 2 percent slopes and the mapping unit has approximately 1 percent hydric inclusions, which typically are found in depressions across the mapping unit. Denison clay loam soils are generally highly fertile. Overall, Denison soils are classified as fine, smectitic (*i.e.*, clay derived from the alteration of the minute glass in volcanic ash, formerly known as bentonite), isomesic (*i.e.*, summer and winter temperatures differ by less than 6°C at 50 cm depth) pachic argixerolls (see Soil Survey Staff 2006).

2. Climate

The Project Site has a mild Mediterranean type climate maintained by persistent sea breezes. Temperatures rarely exceed 90°F and seldom drop below 32°F. Average daily temperatures (by month) range from 51°F to 59°F (NRCS 2007). Cloud coverage and fog are common during the evening and early morning hours, but typically dissipate during mid-day. Total average annual precipitation is 28 inches (NRCS 2007).

3. Hydrology

Hydrologic inputs to the project site are dominated by precipitation and surface runoff. The majority of surface runoff comes to the Project Site via the Half Moon Bay Airport storm water runoff collection system. Within the airport property, runoff is consolidated in a series of channels, culverts, and pipes leading to a pair of concrete culverts (44" diameter) that run southwest under Airport Street. The 44" culverts form the headward-most extent of a stream reach of an unnamed intermittent tributary that bisects the Project Site. This tributary passes through two culverts under West Point Avenue and connects with the tidally influenced Pillar Point Marsh, eventually flowing into Pillar Point Harbor (WSP 2008a).

4. Plant Communities

The Project Site, consisting of two more or less adjacent agricultural fields, currently is under active cultivation. The site is annually plowed, disked, and planted in one or more rotations; therefore, little to no adventive (uncultivated) vegetation persists or has the opportunity to

colonize across the great majority of the Project Site. In those areas where agricultural clearing had not occurred recently (*e.g.*, along Airport Street verge and in very small, scattered patches within agricultural fields), non-native annual grasses and forbs occur. Dominant species along the main verge include wild oats (*Avena* spp.), bristly oxtongue (*Picris echioides*), and common vetch (*Vicia sativa*).

Along the unnamed intermittent tributary that bisects the property and the southern perimeter of the property adjacent to Pillar Point Marsh, riparian (palustrine scrub shrub) and seasonal freshwater wetland plant communities persist (palustrine persistent and non-persistent emergent) (Cowardin *et al.* 1979). Dominant species within the unnamed drainage include willows (*Salix lasiolepis, S. scouleriana, S. sitchensis*), California blackberry (*Rubus ursinus*), and poison hemlock (*Conium maculatum*). Dominant species along the southern edge of the property included slough sedge (*Carex obnupta*), soft rush (*Juncus effusus*), silverweed (*Potentilla anserina* var. *pacifica*), field mint (*Mentha arvensis*), arroyo willow (*Salix lasiolepis*), and California blackberry. Overall, the vegetation on the proposed project site has been significantly altered and reflects a long history of regular disturbance and agricultural cultivation.

5. Protected Species

No rare plants of conservation concern have been observed on the project site (WSP 2008b). Four rare plant species have been documented by the California Natural Diversity Database (CNDDB) within two miles of the Project Site, but they are unlikely to occur on the Project Site due to lack of suitable habitat.

No rare, threatened or endangered animal species have been observed on the Project Site (WSP 2008b). The WSP field team observed 29 wildlife species on the property during a field survey in early Spring 2008. One species on the watch list of the California Department of Fish and Game, the sharp-shinned hawk, was observed flying above the property. Two special status animal species, *Rana aurora draytonii* (California red legged frog) and *Geothlypis trichas sinuosa* (saltmarsh common yellowthroat) have been recorded in the past on adjacent property (CNDDB 2008). The California red legged frog, including one adult and one sub-adult, were observed in a wetland near the Project Site near West Point Road on May 7, 1999 (CNDDB 2008). The saltmarsh common yellowthroat has been observed near the site in the past; specifically, observations of individuals or breeding pairs were recorded in 1985, 1988, 1989, and 1990, but have not been document since then (CNDDB 2008). During the 2008 field effort, the WSP team observed one common yellowthroat perched in willows in the wetlands adjacent to and to the southwest of the Project Site. These protected species are not expected to occur on the Project Site as no suitable breeding or foraging habitat currently exists.

6. Extent of Jurisdictional Waters/Wetlands and their Buffers

Approximately 0.45 acres of wetlands of "other waters" (Type 3 waters of the U.S.), 0.74 acres (32,180 ft^2) of California Coastal Commission waters/wetlands, and 4.26 acres of buffer are delineated at the Big Wave Project Site (WSP 2008a, Figure 3). The great majority of these waters/wetlands are found along the southern margin of the property. The proposed development will avoid all direct impacts to waters/wetlands and the 100 foot buffer set back.

II. OBJECTIVES

WSP Environment & Energy (WSP) was retained by Big Wave LLC to assist in the restoration of the native coastal ecosystems at the Project Site. The purpose of the restoration effort is to increase the functioning of the native coastal ecosystems at the Project Site. Specifically, in this report, WSP was asked to assist with the following tasks:

1. Prepare a restoration plan for riparian waters/wetland ecosystem within the buffer area of the Project Site.
2. Design a natural landscaping plan of native species for the residential and commercial areas.
3. Assist in the design of natural storm water management/rain garden system using native plant species genetically adapted to the central coast of California.

Sections III, IV and V of this report describe designs developed for the riparian buffer restoration, native landscaping, and natural storm water management, respectively.

III. DRAFT (90%) RIVERINE WETLAND ECOSYSTEM DESIGN

A. Guiding Principles

WSP used the following set of principles to guide design of the riverine/riparian waters/wetland ecosystem restoration:

1. Give due diligence to federal, state and local regulatory requirements.
2. Target no net loss of waters/wetlands area and/or ecosystem functioning.
3. Base the restoration design on attainable regional reference conditions.
4. Aim to restore the native hydrological, biogeochemical, plant community, and faunal support/habitat functioning.
5. Target restoration of riverine ecosystem functions (*e.g.*, through maintaining hydrological connectivity within the landscape and restoring microtopography).
6. Integrate the form and function of the natural and the constructed landscapes.

B. U.S. Army Corps and EPA Guidance on Wetlands Compensatory Mitigation

In April 2008, the U.S. Army Corps of Engineers along with the U.S. Environmental Protection Agency issued new standards to improve wetland restoration and protection policies (Federal Register 2008). The new "wetlands compensatory mitigation standards" were offered to promote the use of best available science, promote innovative approaches to the "no net loss of area and/or function" national policy, and to focus on the results of restoration and protection.

Relevant to the Big Wave Wellness Center and Office Park Project, these new Corps/EPA mitigation standards reaffirm the mitigation sequence of avoid, minimize, and mitigate (compensate). The Big Wave Project is avoiding all impacts to existing waters/wetlands (including both waters of the U.S. and Coastal Commission wetlands) and therefore is in line with the new guidance on mitigation sequencing. As described in this basis of design, the proposed restoration of riparian areas adjacent to waters/wetlands will likely result in expansion of at minimum 5.3 acres of state wetlands.

C. General Description and Design Rationale

The riparian waters/wetlands ecosystem buffer design includes ten plant community types that support approximately 75 native California taxa (Figures 4-10). The community types are based upon the U.S. Fish & Wildlife Service's hierachical classification system (Cowardin *et al.* 1979) of five wetland systems – marine, estuarine, riverine, lacustrine, and palustrine. Only wetlands within the palustrine system are appropriate to the Project Site. As such, three palustrine forest communities, two palustrine scrub-shrub communities, three palustrine (persistent) emergent communities are proposed. Additionally, an upland community that supports native coastal scrub species and similarly a plan for the storm water swales also is included.

A total of 54 polygons at the Wellness Center and Office Park (inclusive) will be restored, representing a total 5.3 acres of riparian and waters/wetlands within the buffer and across the built landscape. Specifically, a total of 1.89 acres of palustrine forest, 2.47 acres of palustrine scrub shrub, 0.51 acres of palustrine emergent wetlands will be restored, in addition to 0.26 acres of upland coastal scrub and 0.18 acres of stormwater wetland swales (Figures 4-10).

In the design process of the riparian buffer along the adjacent waters/wetlands of Wellness Center and Office Park, WSP focused on achieving the highest level of ecosystem functioning possible. Design elements relative to ecosystem function were developed based on site history and landscape context and will be monitored over a minimum of ten years post restoration. Importantly, an increased level of function has to be achieved while also achieving a natural, unbroken, visually attractive transition between the restored ecosystem and the residential/commercial landscape. To achieve this target, WSP relied upon:

1. A reference database and draft hydrogeomorphic guidebook for 3rd and 4th order riverine waters/wetlands of the central California coast (NWSTC 1996) developed to assist in the design, permitting and monitoring of riverine restorations within this reference domain (biogeographic province),
2. Relevant literature, reports, flora documentation, and
3. Cumulative 60+ years of professional experience of the lead WSP scientists working in waters/wetlands ecosystems along the central coast of California.

This 90% restoration design is based upon a suite of activities that would increase waters/wetlands ecosystem functions and develop a native, diverse, and aesthetically pleasing landscape. Elements of the restoration design are focused around five phases of work, including earthwork, (mass and fine grading), installation of large wood, planting and irrigation, weed management, and monitoring and adaptive management.

Our rationale for implementation of each technique is described in the following text.

1. Earthwork

Natural transitions within the landscape will need to be restored as a result of historic land uses and the integration of wild and urban environments. Mass grading can restore landscape hydrologic connectivity creating smooth transitions within and between wetland and upland habitat. In addition, mass grading is extremely effective at removing weeds through eliminating standing biomass and elimination of a viable seed bank in the upper soil horizon(s). Earthwork also decreases competition from well-established weeds and, with standard grading techniques such as ripping and/or disking, helps loft soil, blend top and sub-soil horizons, and prepare a successful planting environment.

Fine grading involves the use of directed time to grade microtopographic features within the riverine and riparian environments. Finish grading also involves the placement of large wood structures, and will thus provide an essential element of an ecosystem (detritus). These wood structures will mimic dead and decomposing features of a woody riparian ecosystem, including

snags (standing dead), decadent/decaying logs, and log jam features of floodplains and fluvial systems, as described in the following paragraph.

2. Installation of large wood and log structures

Prior to agriculture, grazing, clearing, industrial uses, and intense water management in California, large wood was a part of natural ecosystems. Log structures can be placed above and/or below ground. Large wood provides numerous ecosystem functions, for example log structures create roughness (*i.e.*, increase Manning's *n*) that slows water flow and spreads it out to promote maximum contact of water with the floodplain surface. Log structures can be strategically placed in order to deflect flood waters away from civil structures including roadways, bridges, *etc.* Large wood creates hydraulic complexity within a reach through dissipation, focusing, and/or adding complexity to the riverine ecosystem and thereby provide habitat for aquatic invertebrates and vertebrates, including fish. Placement of large wood and log structures creates microtopographic variation with abrupt gradients in site water balance which allows for increased plant diversity and variety of habitat microsites.

3. Planting and Irrigation

Planting will be conducted to maintain fidelity to native plant community structure, function, and composition for the Project Site. A native plant nursery will be established on site for the project to provide nursery stock, to hold for planting, and to generate replacement stock should replacement planting become necessary after the project is completed. Collection of seed will be conducted as close to the project site as possible to ensure reestablishment of a suite of locally adapted native plants. An irrigation system will be installed to increase likelihood for planting success. Restoring native plants also will increase the detrital pool (in this case, primarily quickly decomposing carbon sources) that has been removed due to intensive farming. Native plant community restoration improves hydrologic and biogeochemical functioning on the site and provides habitat for native fauna by offering hiding, resting, escape, breeding, and foraging habitats. Establishment of native plants will lead to relative exclusion of non-native and invasive weeds and will provide vertical and horizontal structure within the landscape.

4. Weed Management Strategy

Several aggressive, non-native plant species are present at or near the Project Site, including Himalayan blackberry (*Rubus discolor*) and German ivy (*Delairea odorata*). Invasive weed species not only degrade the plant community functions, but also threaten the success of a restoration project. Therefore, an integrated weed/pest management strategy should be developed and implemented in tandem with the restoration project. The weed management strategy begins with control of existing weeds adjacent to the restoration area through hand pulling, approved localized chemical application, and/or mowing. Installing native plants species with rapid growth rates and/or at high densities will help to quickly develop a canopy which excludes weed recruitment. Continued maintenance including hand weeding and replanting of plants which suffer mortality should be conducted following restoration.

5. Maintenance, Monitoring and Adaptive Management

To ensure that restoration is a success and that appropriate adaptive management/contingency measures are used, the Project Site will be monitored following restoration for a minimum of 5 years. Project targets and standards articulated in the monitoring plan will be established at the beginning of the restoration project and based on the assessment of the path that will achieve stated goals. The monitoring design will include methods to quantify and document each project target and standard and will identify criteria for success. Monitoring protocols will include some combination of photo points, topographic surveys, soil profiles, invertebrate surveys, and/or assessment of vegetation cover and composition. In case project standards and/or success criteria are not met, an adaptive management strategy with contingency measures will be included as part of the monitoring plan. In the event of failure to achieve a project standard, recommended contingency measure(s) will be outlined (*e.g.*, weeding, grading, planting) and implemented as soon as possible.

D. Construction Sequencing

The various tasks associated with the Project Site restoration plan are described in general terms in the following text, which will be used to guide the development of construction plans and specifications.

1. Earthwork (mass and finish grading)

a) Grade to create a smooth transition to the surrounding landscape
b) Grade surrounding landscape to increase rugosity in the surrounding landscape. Rugosity is a measure of small-scale variations and complexity or surface roughness. Increased rugosity offers a relatively more diverse array of sites for planting.
c) Using directed time, construct and link microtopographic depressions and small scale swales, rain gardens, and storm water features.

2. Log Structures

Large wood on and within the active channel and on the adjacent floodplain and associated stream terraces is an integral structural variable of fluvial systems, and an equally important link for plant and animal support ecosystem functions. As such, large wood structures will be construeted across the wetland/riparian buffer.

a) Using directed time, install large wood structures as articulated in the planting plan and other construction documents. These structures shall consist of single logs or piles of log on and beneath final grade (Figure 11).

3. Planting and Irrigation

a) Through mass grading remove all existing weeds and where possible, seed source in the upper 6 inches of soil.
b) Lay out (*i.e.*, stake) planting plan as designed (see Figure 4, 5, 8-10)

c) Install native nursery stock according to planting plan using a suite of plant community types suited to microsite conditions and with fidelity to reference system conditions (Figure 6).
d) Mulch entire planted and seeded areas with minimum 4" lift of sterile (weed-free) straw
e) Install temporary irrigation system. Following grading activities, install a temporary irrigation system to provide irrigation water to all planted areas across the wetland and riparian buffer. A temporary irrigation plan will be designed prior to project implementation.

4. Weed Control

After initial establishment of restored riparian/wetland ecosystem area and functioning, management of weeds/invasive species will become a high priority. Implementation of weed management must address (i) re-emergence of weeds from onsite seed banks, (ii) establishment of existing populations of weeds that were not removed in the initial clearing effort, and (iii) colonization of restored area from offsite exotic seeds sources. Weed control efforts should be adapted with an integrated program which includes mowing, hand weeding, and re-planting or interplanting additional plants as necessary. Weed control will be required as part of the monitoring, maintenance and adaptive management activities.

5. Monitoring Maintenance and Adaptive Management

a) Assume a ten year monitoring interval with monitoring reports completed at Year 0 (baseline), 1, 2, 5, and 10.
b) Conduct two site visits per monitoring year, wet and dry season. During each visit, characterize the site through the collection of site data referencing project standards including hydrologic, biogeochemical, plant community and faunal support/habitat functions.
c) Prepare annual monitoring report due by December 15 each monitoring year. Based on observations, recommend any necessary maintenance and/or adaptive management measures.
d) Implement maintenance and adaptive management measures, including weeding, as necessary.

E. Sediment and Erosion Control

Restoration construction should be initiated and completed during the dry season (May to November). All construction activities must adhere to the project-specific Storm Water Pollution and Prevention Plan (SWPPP) and associated Temporary Erosion and Sediment Control (TESC) plan, both of which must be prepared and submitted by the Big Wave LLC or its consultants to the regulatory community prior to project implementation.

The first step will be to install sediment and erosion control measures according to the SWPPP and TESC. Upon completion of earthwork and log structure installation (*e.g.*, creating

microdepressions, creating windthrow mounds, installing log jams, *etc.*), temporary irrigation must be installed to ensure successful post-construction planting. In addition, Big Wave Group or its consultants may be required to prepare and submit a water quality monitoring plan to regulatory agencies, as part of the monitoring agreement with regulatory agencies.

F. Proposed Design Success Criteria

Specific project standards and associated success criteria (*i.e.*, field indicators/measurements) have been developed for this riparian/wetland ecosystem restoration project. The proposed restoration design places emphasis on the following four project targets.

Project Target 1: ***Increase waters/wetlands habitat patch size for native wetland and riparian animal species typical of the central California coast.***

Project Standard: Success Criteria

1. Increase Patch Size: One hundred percent coverage by native plant communities in the 100 foot buffer.

Project Target 2: ***Establish and maintain diverse native plant communities, with nursery stock genetically adapted to the restored wetland and riparian ecosystem restoration project site.***

Project Standard: Success Criteria

1. Percent cover of native tree species in riparian forest communities: Greater than or equal to 95%.
2. Percent cover of native shrub species in riparian forest and scrub-shrub communities: Greater than or equal to 40% and less than or equal to 75%.
3. Percent cover of native shrub species in riparian scrub-shrub communities: Greater than or equal to 95%.
4. Percent cover of native forbs, graminoids, ferns, and fern allies in palustrine persistent and non-persistent emergent community types: Greater than or equal to 80%.
5. Percent cover of native forbs, graminoids, ferns, and fern allies in forest and scrub shrub communities: Greater than or equal to 20% and less than or equal to 75%.
6. Percent of native species cover in each stratum: Greater than or equal to 85%.
7. Vigor of planted stock: Greater than or equal to 80% survival.

Project Target 3: ***Increase microtopographic complexity (i.e., microdepressions, windthrow mounds) within the restored riparian and waters/wetlands ecosystem restoration project site***

Project Standard: Success Criteria

1. Structural features: Large wood (windthrow mounds) remain structurally stable.
2. Microtopographic roughness: Constructed microtopotraphic features remain intact.

Project Target 4: ***Increase the faunal support/habitat function for native species within the restored riparian and waters/wetlands ecosystem restoration project site***

Project Standard: Success Criteria

1. *Vegetative strata*: Forest communities- three or more strata (*i.e.*, trees, shrubs, herbs, with sapling/seedling and/or vines as additional stratum); Scrub-shrub communities - greater than or equal to two strata (*i.e.*, shrubs, herbs, with sapling/seedling and/or vines as additional stratum)
2. *Faunal diversity*: Restoration site continues to attract a diversity of native wildlife
3. *Canopy cover*: Greater than 80% cover by two or three strata in forest and scrub-shrub communities.

G. Expected Changes in Ecosystem Functions Following Restoration

The proposed riparian/wetland ecosystem restoration plan is expected to result in the increase in ecosystem functioning as considered by four types of wetland functions: (1) hydrologic, (2) biogeochemical, (3) plant community, and (4) faunal support/habitat functions. Comparisons between current (existing) conditions on the site and wetland conditions expected five years after restoration were assessed using best professional judgment. It should be noted that the riparian restoration will result in an increase of approximately 5.3 acres of wetlands under jurisdiction of the California Coastal Commission, but is not expected to add any increase in federal jurisdiction.

Factors affecting the ability of the wetlands at the Project Site to perform ecosystem functions include, but are not limited to (1) degradation from historical land use, (2) intensity of cropping practices, (3) historic modifications to hydrologic features of the site, (4) non-native species, and (5) urbanization in surrounding landscape.

1. Hydrologic Functions

Energy Dissipation. Energy dissipation is defined as *the transformation and/or reduction of the kinetic energy of water as a function of the roughness of the landscape and channel morphology, and vegetation.*

Existing conditions at the Project Site do not allow for significant energy dissipation because the site is cleared and farmed. However, installation of large wood, establishment of complex microtopography, and a diverse plant community including trees will promote an increase in this function.

Surface & Subsurface Storage of Water. Surface & Subsurface Storage of Water is defined as *the presence of soil and/or geologic materials within the creek ecosystem, including the hyporheic zone, that have physical characteristics suitable for detention, retention, and transmission of water.*

The Project Site currently is leveled and degraded by agricultural activities. However, this wetland function is recoverable with the proposed restoration through establishment of sinuous storm water swales hydrologically linked to microtopographic depressions, installation of large wood above and below ground, and development of a native plant community with complex vertical structure.

Landscape Hydrologic Connections. Landscape Hydrologic Connections is defined as *the maintenance of the natural hydraulic connectivity among source areas of surface and subsurface flow to riverine waters/wetlands and other downgradient waters/wetlands.*

This hydrologic function at the Project Site is degraded due to ditching associated with road construction both upstream and downstream and the agricultural activities on the property. The down gradient connection is culverted under and interrupted by West Point Avenue. This function is only modestly recoverable with the proposed wetland and riparian ecosystem restoration.

2. Biogeochemical Functions

Cycling of Elements & Compounds. Cycling of Elements & Compounds is defined as *the short- and long-term transformation of elements and compounds through abiotic and biotic processes that convert chemical species (e.g., nutrients and metals) from one form, or valence, to another.*

The Project Site is not functioning at a high level in its existing conditions because the original slope wetlands and associated hyporheic zone have been filled, drained, and degraded by agricultural activities. However, this function is recoverable with the proposed restoration due to increased microtopographic variation, installation of large wood, and establishment of a diverse native plant community.

Removal of Imported Elements & Compounds. Removal of Imported Elements & Compounds is defined as *the removal of imported nutrients, contaminants, and other elements and compounds in surface and groundwater.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled and degraded as a result of agriculture and road building activities. This function is recoverable with the proposed restoration.

Retention and Detention of Particulates. Retention and Detention of Particulates is defined as *the deposition and retention of inorganic and organic particulates (>0.45μm) from the water column, primarily through physical processes.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration.

Organic Matter Export. Organic Matter Export is defined as *the export of dissolved and particulate organic carbon from a wetland.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled and degraded as a result of agriculture and road building activities. This function is recoverable with the proposed restoration.

3. Plant Functions

Characteristic Native Plant Communities. Characteristic Plant Communities is defined as *the physical characteristics and ecological processes that maintain the indigenous living plant biomass.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration. The Project Site should be expected to achieve a reference condition after a period of time that exceeds the expected five-year monitoring program.

Characteristic Detrital Biomass. Characteristic Detrital Biomass is defined as *the process of production, accumulation, and dispersal of dead plant biomass of all sizes.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration and will likely achieve reference standard functioning after ten years or more, i.e., after the conclusion of the anticipated five-year monitoring program.

4. Faunal Support Habitat Functions

Spatial Structure of Habitat. Spatial Structure of Habitat is defined as *the capacity of waters/ wetlands to support animal populations and guilds through the heterogeneity of structure of vegetative communities.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration and will likely achieve reference standard functioning after ten years or more, *i.e.*, after the conclusion of the anticipated five-year monitoring program.

Habitat Interspersion & Connectivity. Habitat Interspersion & Connectivity is defined as *the capacity of waters/wetlands to permit aquatic, semi-aquatic, and terrestrial organisms to enter and leave a riverine ecosystem via large, contiguous plant communities to meet life history requirements.*

The Project Site currently is functioning at a low level because the original characteristic physical complexity of an associated riparian community is not present nor is it juxtaposed in a mosaic of coastal scrub, sage scrub, perennial grasslands, vernal swales, and depressions characteristic of the central Coast Ranges. This function is recoverable with the proposed restoration, and possible reference standard functioning after ten years or more, largely through the restoration of the riverine vegetative structure and adjacent plant communities.

Distribution & Abundance of Vertebrates. Distribution & Abundance of Vertebrates is defined as *the capacity of waters/wetlands to maintain characteristic density and spatial distribution of vertebrates (aquatic, semi-aquatic and terrestrial).*

The Project Site currently is functioning at a low level because the original characteristic physical complexity of an associated riparian community is not present nor is it juxtaposed in a mosaic of perennial grasslands, vernal swales and depressions characteristic of the central Coast Ranges. This function is recoverable with the proposed restoration, and possible reference standard functioning after ten years or more, largely through the restoration of the wetland and riparian vegetative structure and adjacent plant communities.

Distribution & Abundance of Invertebrates. Distribution & Abundance of Invertebrates is defined as *the capacity of waters/ wetlands to maintain the density and spatial distribution of invertebrates (aquatic, semi-aquatic and terrestrial).*

The Project Site currently is functioning at a low level because the original characteristic physical complexity of an associated riparian community is not present nor is it juxtaposed in a mosaic of coastal scrub, sage scrub, perennial grasslands, vernal swales and depressions characteristic of the central Coast Ranges. This function is recoverable with the proposed restoration, and possible reference standard functioning after ten years or more, largely through the restoration of the wetland and riparian vegetative structure and adjacent plant communities.

VII. BEST MANAGEMENT PRACTICES FOR STORMWATER TREATMENT

San Mateo County (County) has established best management procedures for the treatment of storm water because federal and state laws require municipalities to reduce pollution to waters of the United States by storm waters. According to the San Mateo County's website (http://www.flowstobay.org/p2business/bestmanagementpractices.html), cities within the County are governed under the *San Mateo Countywide Water Pollution Prevent Program* as part of the City/County Associate of Governments of San Mateo County. As such, the County has published procedures, guidelines, *etc.* to reduce and prevent pollution to the adjacent waters. The storm water treatment system proposed for the Big Wave Project incorporates the County's overall approach and practices for storm water management.

Design features for storm water pollution prevention by the Project include separate storm water retention and detention ponds for relatively dirty storm water (*e.g.*, water from parking lots) and relatively clean water (*e.g.*, roof water runoff). Separate water delivery systems for clean and dirty storm water will be constructed at each of the developments (*i.e.*, office park and wellness center). Comparatively dirty storm water will be filtered through a series of grit removal, oil/water separators, and then directed to a retention/detention "rain gardens" (Figures 8 and 9) within the riparian restoration zone. Stormwater will flow through a swale prior to overland flow into the existing wetlands. Similarly, clean storm water will be directed to a separate series of retention/detention microdepressions (rain gardens) via a similar storm water swales (Figure 10). A portion of the clean storm water will be directed to an infiltration basin (one at each development) to recharge ground water. In short, the bioswale/microdepression system will serve to improve water quality in the adjacent existing waters/wetlands ecosystems by treating storm water in a series of treatments as described above.

VIII. CONCLUSIONS

As presented in this *90% Design Report*, the Big Wave Wellness Center and Office Park Project consists of the construction of a residential village and an adjacent commercial property/office park complex. The proposed wetland and riparian ecosystem restoration project also includes restoration of the waters of the U.S., including wetlands, California Coastal Commission wetlands that currently exist as agricultural land. Specifically the Project will restore a complex mosaic within a 100 ft buffer adjacent to existing federal and state waters/wetlands to provide significant benefits to waters/wetlands ecosystem functions, particularly the native plant and animal communities relative to existing conditions. A total of ten plant community types, primarily native forest, scrub shrub, and perennial sedge/rush meadows, composed over approximately 75 native plant species arrayed in 54 planting polygons represent the riparian/wetland ecosystem restoration design. Of particular importance is the restoration of potential breeding habitat for the California red-legged frog, and potential foraging habitat for the San Francisco garter snake, two native vertebrates not known to utilize the Project Site, but which may be able to establish viable populations as a result of the restoration effort.

If implemented as designed, the riparian/wetland ecosystem will result an increase in the hydrologic, biogeochemical, native plant community, and faunal support/habitat functions of the currently farmed wetlands. Equally importantly, the project represents a state-of-the art integration of the natural and built environments through the restoration of the immediate landscape immediately surrounding the Office Park and Wellness Center, and through the utilization of native species for landscaping, locally adapted plant stock, and propagules obtained from the Project Site and adjacent landscape.

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X. FIGURES

Figure 1. The Project Site is located along the central coast of California south of San Francisco and east of the city of Santa Cruz (Map Reference: http://cwp.resources.ca.gov)

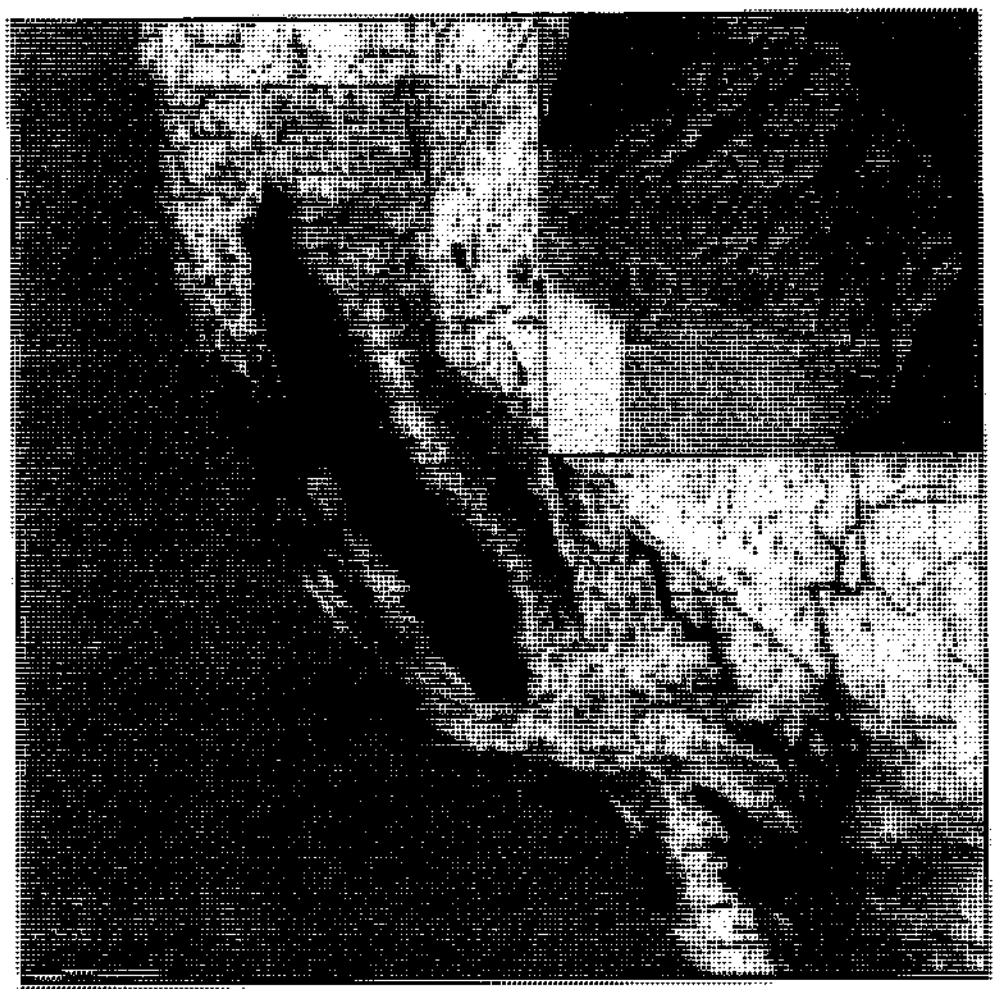
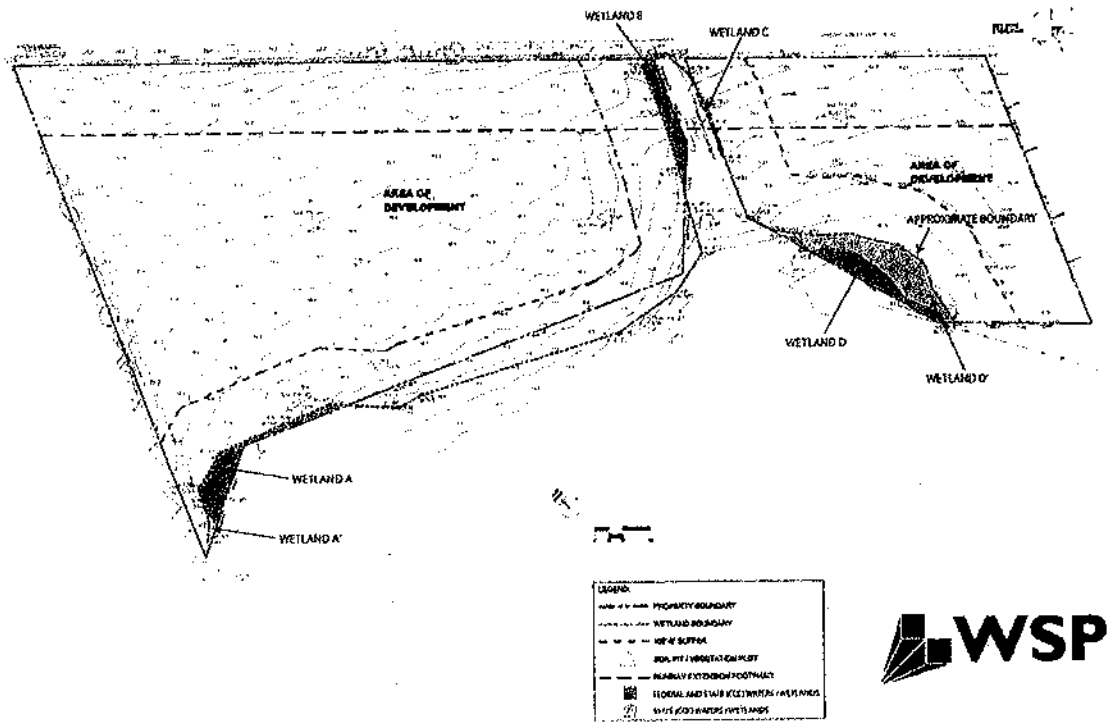
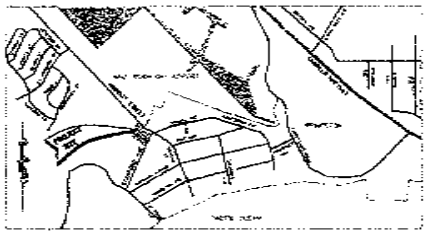


Figure 2. Approximate location of the Big Wave Project Site in unincorporated San Mateo County, California.

Figure 3. Geographic extent of waters of the U.S., including wetlands consistent with definitions provided at 33 CFR 328.3(a)(1-8), and of wetlands as defined by the California Coastal Act (Public Resources Code Division 20 California Coastal Act Section 30121).

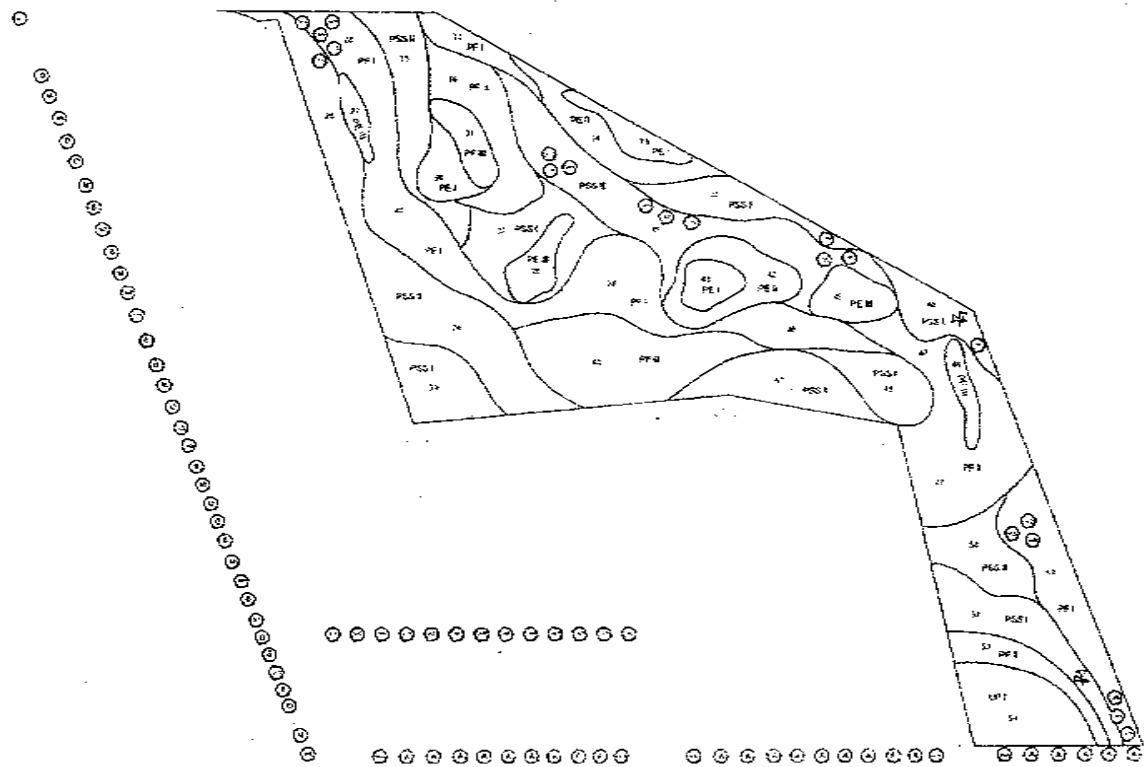




LOCATION MAP

UTILITY NOTE

GENERAL NOTES



GRAPHIC SCALE

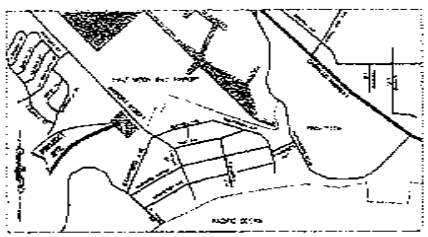
FIGURE 4

MACLEOD AND ASSOCIATES

WSP

DRAFT PLANTING PLAN

P-2



LOCATION MAP

GENERAL NOTES:

UTILITY NOTE:

WETLAND / RIPARIAN PLANTING PLAN

UPS	Upland - Coastal Scrub (17)	PEM	Palustrine Emergent - Rush Meadow (3, 5, 8)
PF	Palustrine Forest - Arroyo Willow Riparian Forest (11, 15)	PEM	Palustrine Emergent - Reed Canary (21, 22, 24, 25)
PF	Palustrine Forest - Live Oak Riparian Forest (9, 11, 16)	SWS	Stormwater Swale (19, 20, 21)
PF	Palustrine Forest - Rain Garden (15)		Valuation Specimens
PSS	Palustrine Scrub-Shrub - Mixed Willow Scrub-Shrub (2, 7, 15)		Viewpoints
PSS	Palustrine Scrub-Shrub - Arroyo Willow Scrub-Shrub (10, 12)		Planting Polygon
PEM	Palustrine Emergent - Sedge Meadow (4, 8, 18)		

LANDSCAPING PLAN

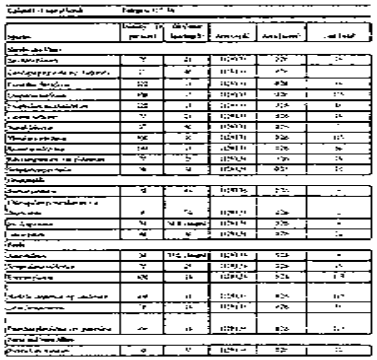
	Live Oak
	Manzanita
	California Buckeye
	Big Leaf Maple
	Red Alder / Leopard Plum / Santa Barbara Sedge / Elk Clover Mix

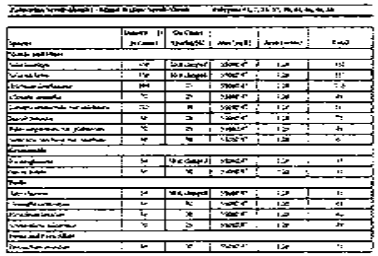
GRAPHIC SCALE

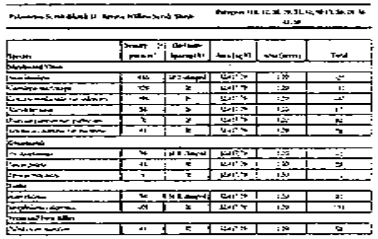
FIGURE 5

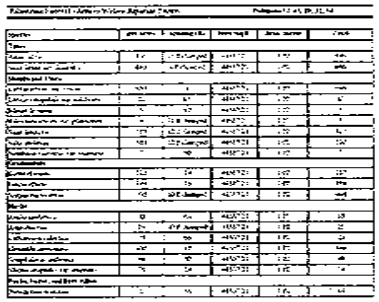
DRAFT PLANTING PLAN

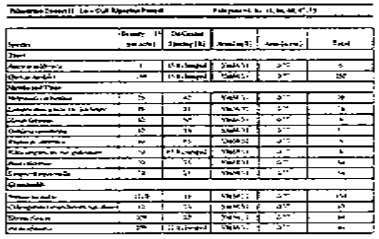
P-1

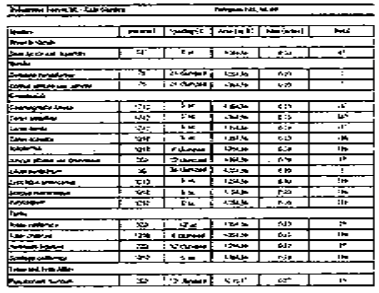


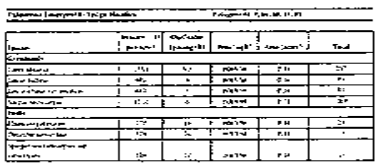


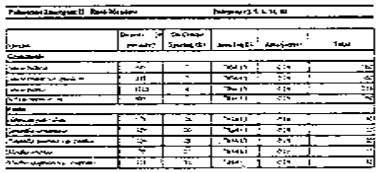


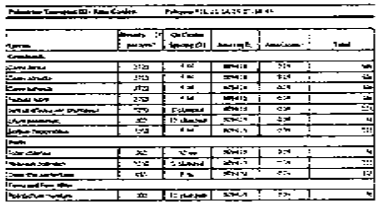


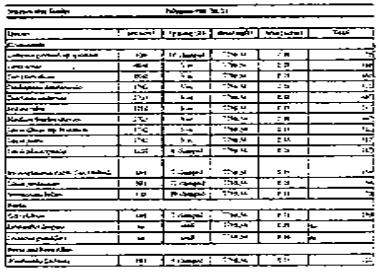












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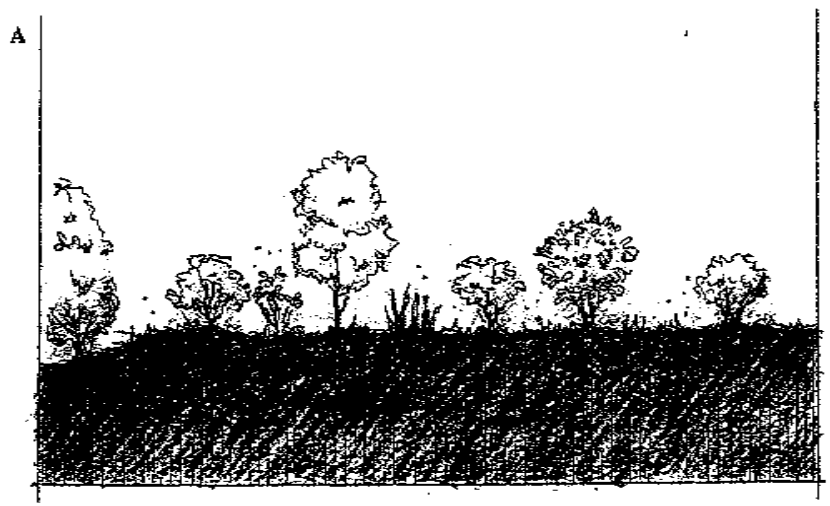
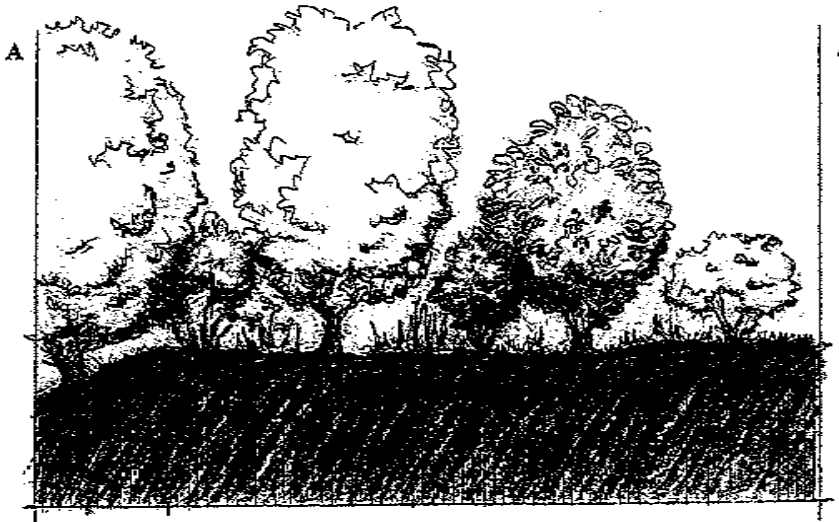
DRAFT PLANTING PLAN

FIGURE 6

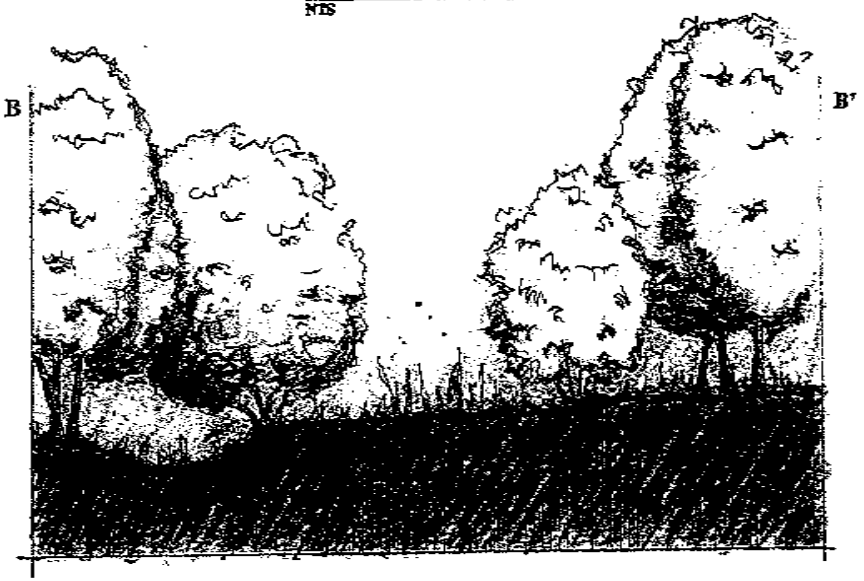


SECTION (0 years)
NTS

SECTION (0 years)
NTS



SECTION (10 years)
NTS



SECTION (10 years)
NTS

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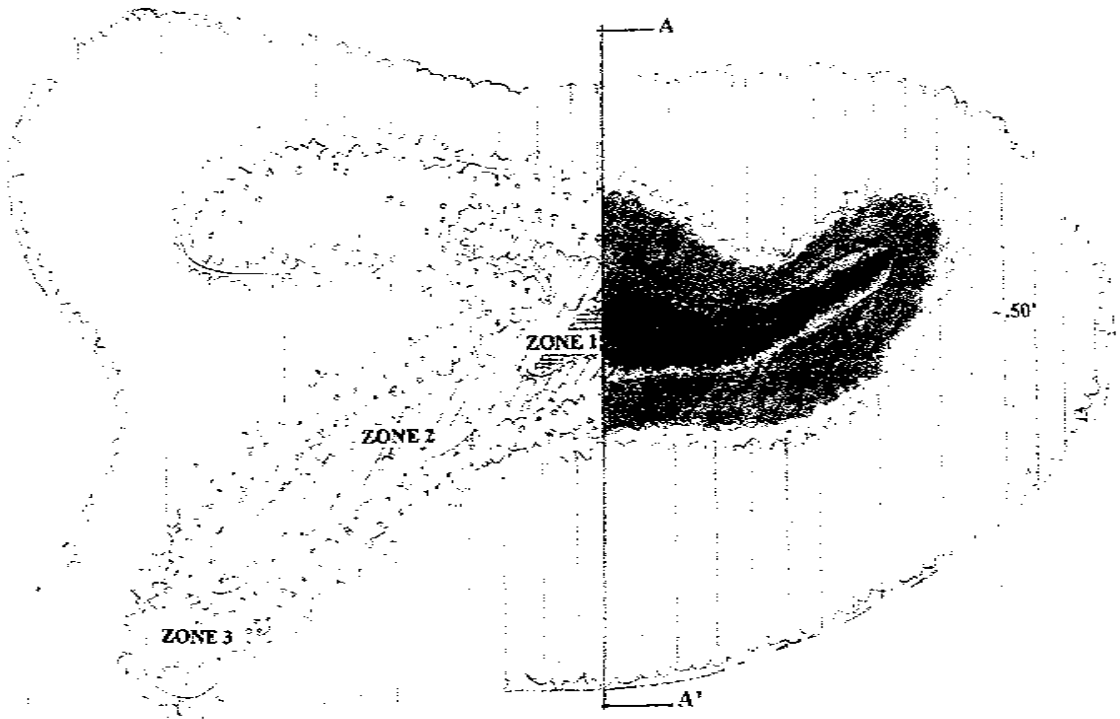
PROJECT TITLE:
Big Water

SHEET TITLE:
Buffer Restoration
Wetland Center Section

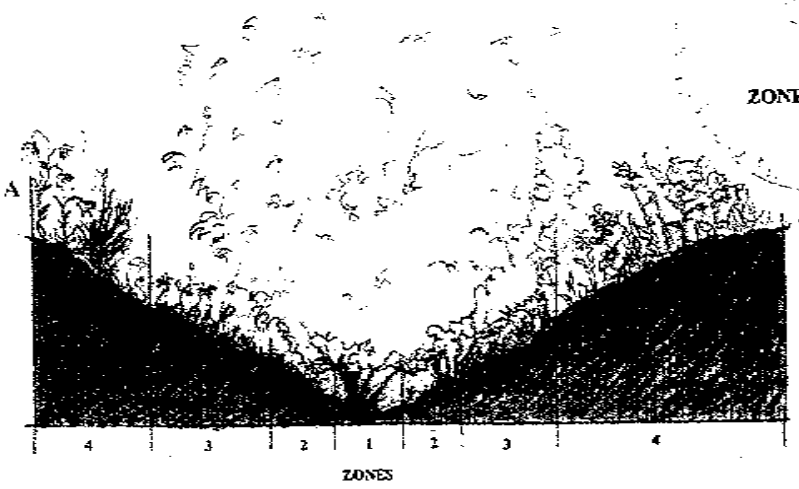
REVISIONS:

Date:
Designer:
Drawn By: PMD
Checked:
Scale:

SHEET:
FIGURE 7



PLAN
NTS



SECTION
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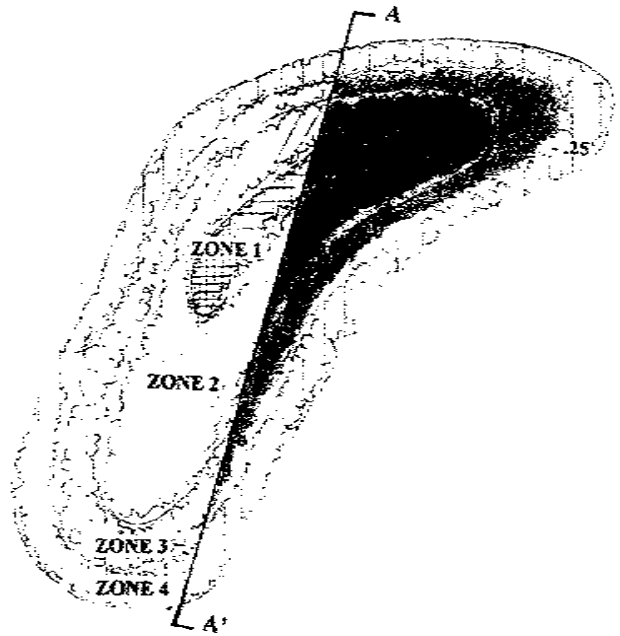
Big Wave Office Park

SHEET TITLE:
Stormwater S/D Basin- Large

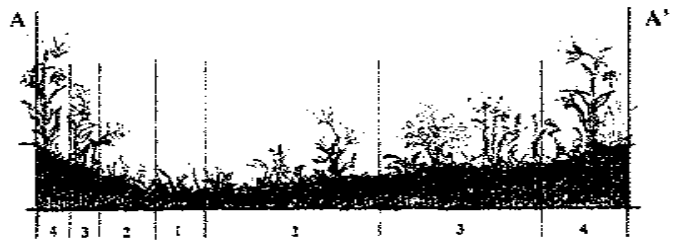
REVISIONS:
3 / 18 / 08

Date: 3 / 14 / 08
Designer:
Drawn By: FMB
Checked:

SHEET:
FIGURE 8



PLAN
NTS



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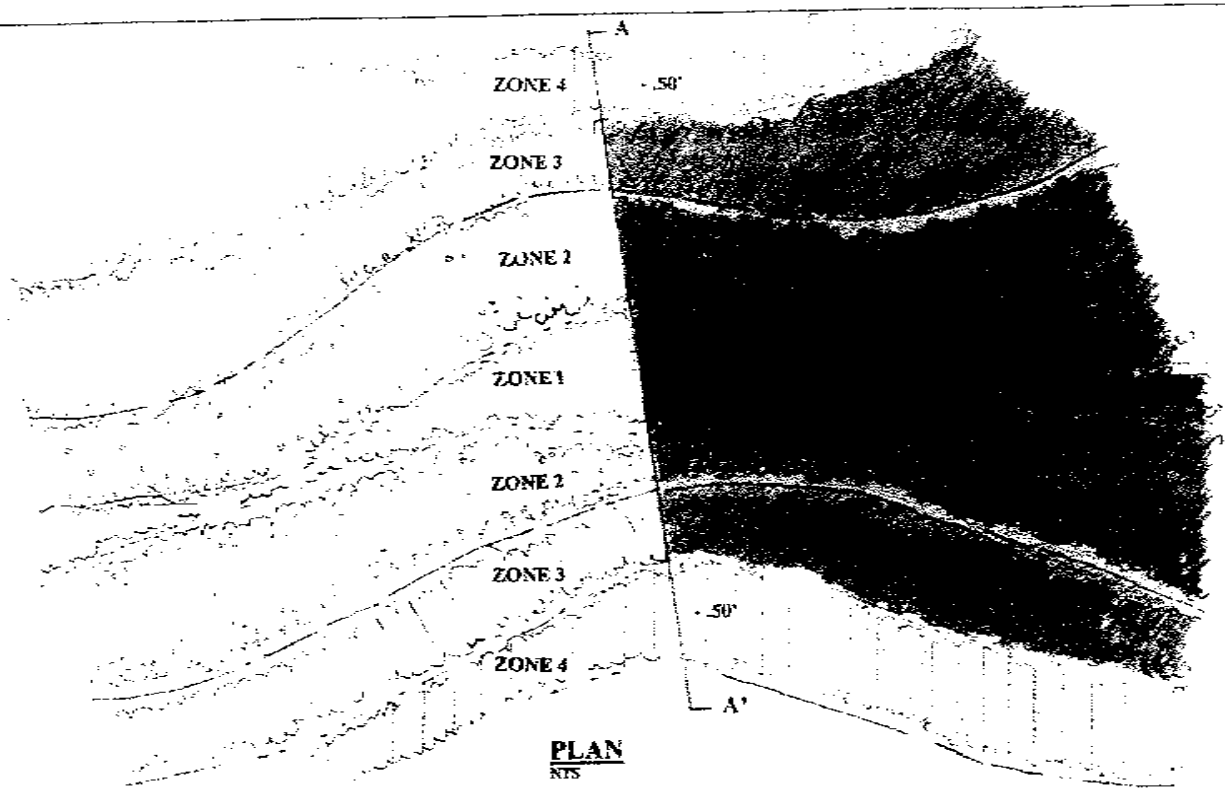
Big Water Office Park

SHEET TITLE:
Stormwater R/D Basin Study

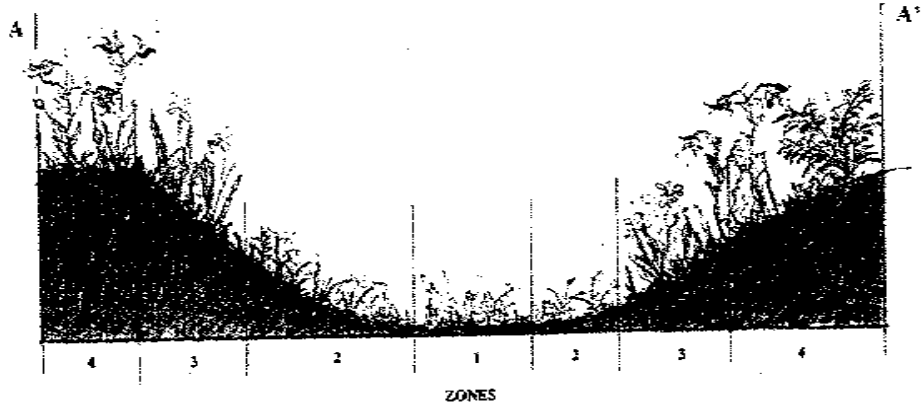
REVISIONS:
3 / 18 / 08

Date: 3 / 14 / 08
Designer:
Drawn By: FMD
Checked:

SHEET:
FIGURE 9



PLAN
NTS



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WSP

PROJECT TITLE:
Big Wave Office Park

SHEET TITLE:
Stormwater Swales

REVISIONS:
3 / 18 / 08

Date:
Designer:
Drawn By: FMD
Checked:

SHEET:
FIGURE 10

Figure 11. Typicals for installation of above and below ground wood.