

An Economic Opportunity for Hampton Roads: An Intermodal Park



**Prepared for Virginia Port Authority
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Executive Summary

The Port of Virginia has experienced tremendous growth in containerized cargo in recent years, and the trend is expected to continue. In 2004, The Port handled over 1 million containers and is forecast to handle over 3 million containers per year by 2030. Since much of this cargo is comprised of imports from Asia, there is a significant need for new distribution center space near the Port of Virginia to facilitate the inland movement of import cargo. In fact, it is anticipated that by 2030 an additional 900,000 containers a year will move through distribution facilities.

Due to the tremendous growth potential for import cargo, the Hampton Roads region needs to consider planning for an Intermodal Park – a regional facility where a number of distribution centers would be located along with ancillary businesses related to the movement of import cargo, such as trucking companies, logistics providers, and similar companies.

The opportunity to develop an Intermodal Park allows nearby localities to attract new businesses and the sizable economic benefits that go along with them. These benefits include thousands of additional job opportunities, increased tax revenues, and expanded economic activity. Downstream effects will be measured in the billions of dollars. An Intermodal Park would also minimize negative impacts from increased traffic levels by co-locating distribution centers near one another. Traffic would be isolated to one direct route, and funding could be focused on one transportation corridor rather than multiple corridors.

Based on the forecast for import cargo, the following should be considered in planning an Intermodal Park:

- 900,000 import containers will require between 20 and 60 million square feet of additional distribution center space in the region and employ 9,000 people directly.
- Wages generated from increased distribution center activities will be approximately \$788 million annually from 26,000 new direct, indirect, and induced jobs.
- The regional economic impact (including direct and indirect impacts) associated with increased distribution center activity is estimated to be approximately \$2.7 billion annually.
- The amount of land required for an aggregate Intermodal Park housing roughly 30 of these facilities is approximately 2,000 to 3,500 acres.
- The ideal location for the Intermodal Park would be a site approximately 25 to 35 miles from the marine terminals in Norfolk Harbor with efficient access to major transportation routes.

There are several regional transportation projects that will be complementary to this opportunity: the Route 460 Corridor Study, the new Maersk marine terminal, and the proposed Heartland Corridor rail upgrade. As a result, the timing is particularly good for this opportunity; however, thorough advanced planning is vital. It is imperative to seize the opportunity to develop these functions in an organized manner. Proactive considerations are crucial for the appropriate zoning changes, utility upgrades, and transportation infrastructure improvements required to ensure the success of an Intermodal Park in Hampton Roads.

Introduction

The Hampton Roads region of Southeastern Virginia would be an excellent location for developing an Intermodal Park. *Intermodal Parks* serve as centralized locations for the processing and distribution of import cargo. They are typically located near a cargo point-of-entry, such as a port, and within easy access to extensive and reliable transportation networks. The Port of Virginia is located in Hampton Roads, and there is a strong inland transportation network of highways and railroads in the region, making it an excellent location for an intermodal Park. In addition, The Port has experienced tremendous growth in containerized cargo in recent years: in 2004, over 1 million containers traveled through The Port — and that number is expected to triple by 2030. As a result, the timing is particularly good for this opportunity. An Intermodal Park would also serve to bring new jobs, increased local tax revenues, and expanded economic activity to the region. This report will explain the importance and benefits of an Intermodal Park located in the Hampton Roads region, provide information necessary to planning an Intermodal Park, and highlight the relevance and timing of this opportunity.

Intermodal Park Concept

Containerized cargo moves from its source of origin to its market destination by following a series of transportation steps known as the *supply chain*. One intermediate component of the supply chain is a transfer point called a distribution center. Multiple distribution centers located in the same area make up an Intermodal Park. In order to understand the role of an Intermodal Park, one must first understand the specific role of a distribution center.

What Is a Distribution Center?

From an initial port-of-entry, import containers are typically taken to an inland *distribution center* where import cargo is unpacked to a warehouse, combined with other goods geared toward the specific needs of a given retail destination, and repacked into a domestic container for delivery. For example, a container full of sneakers would arrive from China and travel to a distribution center. Those sneakers would then be repacked into a domestic container along with other items, such as alarm clocks and lawn chairs, for transport to their final market destination – a specific retail store. Exhibit 1 below illustrates the typical movement of imported cargo.



Exhibit 1 – Import Cargo Flow

Distribution Centers in Virginia

There are over 80 distribution centers already operating throughout Virginia. Together, they process over 100,000 containers each year and represent approximately 30 million square feet of warehouse space. Although the average size for an individual facility is currently 350,000 square feet, newly built distribution centers have been getting much larger in order to process increasing amounts of cargo – some have over 1 million square feet of space. Distribution centers are typically located along major transportation links connecting to a port facility in order to minimize the transportation costs associated with moving containers to and from the

facility. A 2004 study¹ conducted by the Virginia Port Authority (VPA) showed that twenty-six distribution centers with a total of 8.7 million square feet of distribution center space are located within 30 miles of a port facility in Virginia. Exhibit 2 below shows the location of some of the distribution centers currently operating in Virginia.

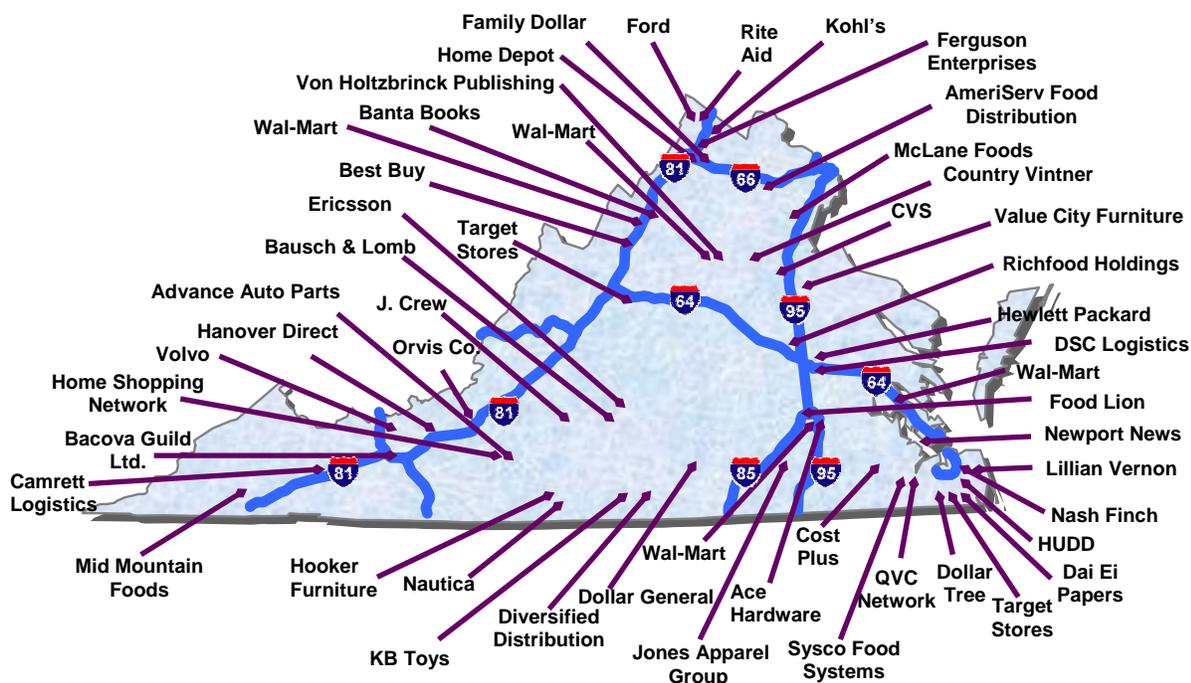


Exhibit 2 – Distribution Centers in Virginia

Intermodal Park Definition

In much the same way as industrial organizations find corporate homes in carefully planned Industrial Parks, an Intermodal Park would house a number of distribution centers together and provide the proper infrastructure for efficient intermodal operations. *Intermodal* refers to the movement and transfer connections of cargo containers that can travel via more than one mode of transportation. In this case, cargo would be transferred from international containers that can travel by ship, rail or road into domestic containers, which can carry larger volumes of cargo.

Benefits of an Intermodal Park

An Intermodal Park is planned and built to cater to the unique nature of intermodal operations. Infrastructure improvements can be justified by the large volumes generated in an entire park, more so than on the volumes generated by a single facility. For example, a single dedicated highway feeder could serve multiple facilities if they are located in close proximity to each other in an Intermodal Park. Such overlap of scope makes intermodal parks enticing, and they attract additional business to the region by providing infrastructure favorable to shippers and retailers. An Intermodal Park would promote economic development in rural areas. The Intermodal Park concept of co-locating dozens of distribution centers together not only takes advantage of the overlapping interests of similar businesses, but it also minimizes any potential drawbacks. An

¹ *International Trade Growth Potential & Distribution Capacity in Virginia*, Virginia Port Authority Department of Business Analysis and Strategy, 2004.

Intermodal Park would also mitigate potential congestion issues since traffic would be concentrated on one road. Available funding could then be focused on the upgrade of this road so it could handle the increased volume.

Cargo Growth Creates Need to Plan Ahead

The Port of Virginia has experienced tremendous cargo growth over the last four years. (Detailed calculations are provided in the “Requirements for an Intermodal Park” section.) As the amount of cargo increases, the amount of distribution center space needed to process this cargo also increases. If new facilities continue to be sited individually, their locations will likely mirror earlier site decisions and be scattered throughout the region. Sporadic growth can lead to additional traffic and congestion on roads that were not intended for heavy industrial use. Also, there would be high start-up costs for each initial development effort. However, with advance planning, it is possible to locate a number of distribution centers near each other in an Intermodal Park in order to capitalize on common needs and goals. Road projects can be planned ahead of time, and large tracts of inexpensive land can be designated for industrial use. Since economies of scale can also be realized for utilities and storm water management, an Intermodal Park can also significantly increase return on initial investment.

Example of Existing Intermodal Park

To help visualize what an Intermodal Park in Southeastern Virginia might entail, consider the “Inland Empire” in Southern California. It is a good example of what can be accomplished with thorough long-range planning and cooperation among multiple stakeholders.

Inland Empire Description

The Inland Empire is comprised of Riverside and San Bernardino Counties and stretches across 27,000-square-miles. It is an industrial, commercial, and residential center located seventy miles inland of the congested coastal areas of Los Angeles and is home to over 3 million residents as well as 1,000 companies with 277 million square feet of industrial space.

Inland Empire - Historic Growth and Scope

The rapid growth of Los Angeles County in the early 20th century pushed people westward toward the Inland Empire region in search of affordable land for both homes and businesses. Since the 1980s, the area has evolved and is now comprised of numerous suburban cities. The Inland Empire has well-developed long-range plans for growth which include policies aimed at enticing businesses to establish operations in the region. The policy options available to Inland Empire municipalities include various tax relief and incentive packages and employee training credits and grants. Inexpensive land relative to Los Angeles and excellent transportation links have made the area a major industrial center with an emphasis on freight distribution from the ports of Los Angeles and Long Beach to inland destinations. Distribution center development is viewed as an important element to the long-term economic growth strategy of the region.

Analogy to Virginia

The proposed Intermodal Park in Southeastern Virginia and Southern California’s Inland Empire both have the advantage of being in a strategic location with strong transportation infrastructure. Although smaller in initial scale and scope, an Intermodal Park in Southeastern Virginia would have the same ability to attract businesses and industries through having a busy port nearby,

excellent access to efficient inland transportation links, a skilled work force, and the foresight to plan ahead for appropriate infrastructure improvements.

Hampton Roads is an Ideal Location

An Intermodal Park is an attractive opportunity for the Hampton Roads region. A strategically located Intermodal Park would not only provide ample opportunities for business development but also provide the potential to ease regional marine terminal and traffic congestion.

Economic Benefits

Locating an Intermodal Park in the Hampton Roads region will create significant economic growth in the form of distribution centers and related businesses. Properly planning for this growth will help minimize any negative impacts on nearby roads and highways. The establishment of an Intermodal Park would:

- Improve the efficiency of the movement of containerized cargo inland,
- Attract new economic activity to the region based on the smooth and efficient flow of cargo, and
- Reduce industrial sprawl and air emissions by decreasing congestion.

An Intermodal Park will bring economic activity to its surrounding region in the form of new jobs, increased local tax revenues, and upgraded transportation networks. Since containerized cargo throughput in Hampton Roads is expected to triple by 2030, annual throughput at The Port is expected to reach over 3,000,000 containers. A recent Economic Impact Study² for The Port of Virginia estimated that total economic activity from distribution center business would reach \$2.7 billion in an average year, with almost 26,000 new job positions and wages of \$788 million. Assuming much of this economic activity would be located within Hampton Roads; the majority of those benefits would be felt locally, highlighting the potential for tremendous economic growth.

Timing

The timing is right for planning a new Intermodal Park in Hampton Roads now. Containerized cargo growth forecasts indicate a significant increase in the amount of cargo coming in to The Port in the next 10 – 20 years. Local terminal operators – Maersk and the VPA – have plans to accommodate this growth with the construction of new marine terminals as well as the improvement of existing facilities. This cargo will need to be processed in nearby distribution centers, regardless of where they are located. Considering the construction of a centralized Intermodal Park in advance of the coming cargo increases will allow for the coordination of the infrastructure improvements required to ease traffic congestion even as the number of trucks on the road increases. Planning for an Intermodal Park *now* will allow integration with several large-scale regional transportation projects currently in the planning phases.

² *Craney Island Marine Terminal (CIMT) Economic Impact Study*, Moffatt & Nichol, 2004.

Requirements for an Intermodal Park in Hampton Roads

Since the need for an Intermodal Park is driven by containerized cargo, projections for containerized cargo demand can provide a conceptual picture of the park and what its capabilities will need to be.

Cargo Growth Calculations

Over the last ten years, cargo throughput at The Port of Virginia has more than doubled from just over 500,000 containers per year to over 1 million. Ship lines and retailers are taking advantage of The Port's naturally deep water, close proximity to the open ocean, state-of-the-art landside terminal facilities, and convenient access to inland transportation routes. These factors are expected to continue to attract growth – cargo throughput is expected to double again by 2020 and to triple by 2030. Figure 1 shows the forecasted demand for containerized cargo expected for the Hampton Roads region. It is based on unconstrained conditions for the region that assume there will be marine terminal capacity to handle the increased cargo.

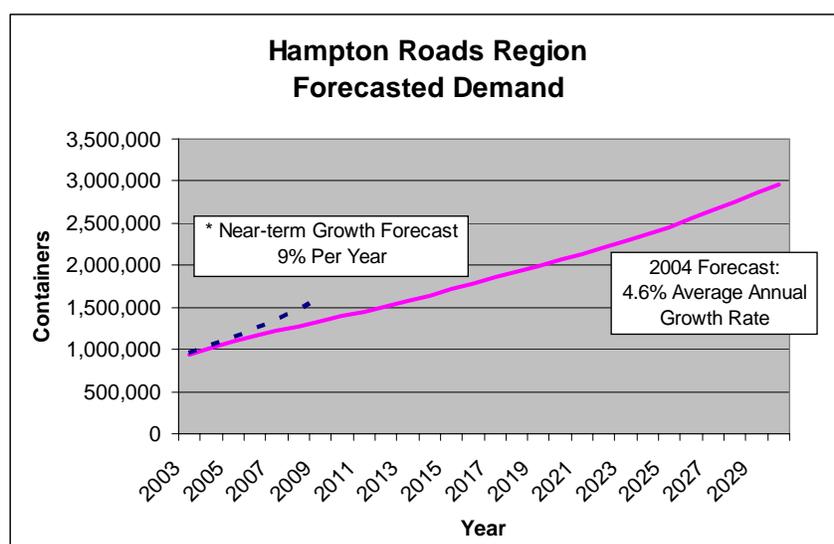


Figure 1
Forecasted Demand for Hampton Roads (2003 - 2030)

Accommodating Increased Cargo

The VPA has a strategic Master Plan to fully accommodate the forecasted growth on the port side through terminal capacity upgrades and the construction of new facilities out to the year 2040. However, there is a need for long-term planning on the inland side. Since imported goods from Asia account for much of the increase in cargo, significant growth will be experienced downstream in the supply chain as well once the containers are on land. In short, there will be increased need for distribution centers near port facilities in order to handle the increase in cargo.

Distribution Center Cargo Forecast

In order to determine the amount of distribution center space required to accommodate future cargo growth, it is important to remember what types of cargo are handled by distribution centers. Distribution centers specifically handle *imported* goods. Approximately 50% of the

cargo handled by The Port of Virginia comes from import operations. In 2030, approximately 60% of this import cargo will require processing at a distribution center and 40% will travel directly to its destination without being sorted at a distribution center. Based on these percentages and the 2030 cargo throughput forecast of almost 3,000,000 containers, it is estimated that distribution center space to accommodate 900,000 containers will be required by 2030. Since 200,000 containers can be handled by existing distribution centers, the number of containers that will need to be handled by new facilities is approximately 700,000.

Distribution Center Space Forecast

To estimate the amount of distribution center space required to handle 700,000 additional containers per year by 2030, consider that a single 1 million square-foot distribution center can handle 12,000 to 30,000 containers per year. With a need to process 700,000 containers, approximately 20 to 60 million square feet of additional distribution center space will be needed in the Hampton Roads region by 2030. These estimates are conservative and account for operational efficiency improvements expected in the future. Additional technology advances (e.g., automated cargo-handling equipment) or extended labor hours (e.g., a third shift of operations) will increase the amount of cargo that can be processed in a warehouse of a given size. The actual number and size of distribution centers that would comprise the 20 to 60 million square feet required will depend on business needs and facility configurations.

Amount of Land Needed

The amount of land needed for an Intermodal Park is dependent on the size of individual facilities as well as the layout of buildings, roads, utilities, etc. The next section provides two sample layouts to help develop a conceptual picture of the park while noting that there are many other layouts that could be chosen depending on particular business needs.

For One Facility

A series of assumptions and calculations demonstrated that 67 acres of land will be required for a single one-million-square-foot distribution center. Such a facility will require 101 container bays (64 international and 37 domestic), 550 parking spaces (400 international and 150 domestic), and approximately 300 employees over two shifts working five days per week. One container will occupy each bay for one shift. Parking spaces will be provided in order to allow international containers to be parked at the facility for three days and for domestic containers to be parked for two days. A general configuration of access roads was also determined and included in the estimate.

The 67-acre estimate can be verified based on experience with existing distribution centers. Typically, the land required by the actual distribution center facility is roughly equal to the land required for parking. Since a one-million-square-foot building has a footprint of approximately 23 acres, it would follow that another 23 acres of parking area would be required. The facility will also need approximately 5 acres for a storm water pond and 15 acres for maintaining a 100-foot property boundary buffer zone totaling – all of which totals approximately 67 acres.

The layout drawings in Appendix A delineate the configuration of two different sample one-million-square-foot facilities based on the calculations and assumptions outlined above. Example #1 shows all truck bays on the same side of the facility, and Example #2 shows

international container bays on one side of the facility and domestic container bays on the opposite. Distribution centers have been built using both layouts, as well as many others. The owner's operations plan would determine what layout was preferable. These examples were developed solely to demonstrate how much land would be required for a single facility in order to determine parameters for an aggregate Intermodal Park made up of a number of distribution center facilities.

For Aggregate Park

The estimates for an individual facility can be used to approximate dimensions for an aggregate Intermodal Park. Based on the need for 20 to 60 million square feet of distribution center space and the requirement of approximately 67 acres for each one-million-square-foot facility, it is estimated that 2,000 to 3,500 acres of land are needed for an aggregate Intermodal Park. The wide range of this estimate accounts for a mix of facility sizes, operational preferences, and other business decisions of the future tenants. Appendix B shows an example layout for an aggregate Intermodal Park. For conceptual planning purposes, this example shows 30 one-million-square-foot facilities totaling 2,500 acres. It is important to note that the actual number of distribution centers and their respective sizes will vary greatly depending on the business needs of the companies that decide to locate there.

Utility Information

One of the key advantages to planning in advance for the construction of an aggregate Intermodal Park is the economy of scale for utilities that can be achieved when the facilities are located together. For example, one large storm water retention area of 150 acres can serve the entire development instead of numerous, smaller ponds (as shown in the Appendix B example) devoted solely to each individual facility. Furthermore, if sized properly, one large electrical substation and one sanitary sewer main could serve the entire park, thereby saving the cost of installing individual hookups. See Appendix C for further utility planning information.

Location Determination

A variety of factors influence the decision of where to locate an Intermodal Park in the Hampton Roads region. Ideally, there would be space available at the marine terminals so containers could be repacked and sent to their destinations immediately, but that is not possible. Land at or near the marine terminals is either too expensive or simply not available. High cargo volumes suggest keeping the distribution center facilities relatively close to The Port along non-congested highway corridors to facilitate efficient cargo flow between The Port and the inland distribution centers. The optimum location for an Intermodal Park will be outside major urban areas, where low-priced and undeveloped land can be found, yet near efficient access to major transportation routes.

To quantify the optimum distance from The Port in which to locate an Intermodal Park, consider truckers who shuttle containers back and forth from the terminals to the distribution centers – they will want to make as many round-trips, or *turns*, per day as possible. To calculate the number of turns that a trucker can make in a day, it is assumed that a trucker can work a 10-hour day under the new work limit rules. For each visit to the marine terminal, one hour is spent turning in an export box and picking up an import container. Once the trucker reaches the distribution center, 30 minutes is spent dropping off the import box and picking up an empty

container to return to the terminal. A trucker's average speed is assumed to be 30 miles per hour throughout the trip based on average highway speeds, traffic lights, and gate queue times.

Based on the assumptions above, a distance of 10 miles from the marine terminals would allow up to four turns per day, but no large tracts of land are available in that radius. At a distance of 45 miles away, only two turns per day are possible. It is highly undesirable for truckers to make only two turns per day, so 45 miles is too great of a radius. An ideal distance of approximately 25 to 35 miles from the marine terminals allows the truckers to make three turns per day and will provide the best balance of proximity to the port and reasonably priced available land.

Based on these assumptions, there are two areas within Hampton Roads which would be ideal for locating an Intermodal Park – along Route 58 in Suffolk, and along Route 460 in Isle of Wight County. The concentric circles on the map in Appendix D illustrate the distances from Norfolk Harbor, which is the location of most of the marine terminals. Congested urban areas that are not conducive to an Intermodal Park are shown in red, and the hatched areas show the two ideal areas described above.

Traffic Count Estimates

In the year 2030, the projected 700,000 import containers per year which will move by truck to distribution centers at the proposed Intermodal Park can be translated into a number of truck trips per day as follows:

- There are 255 working days in a year, so 2,750 import containers will likely move by truck each day.
- Half of the truckers do one-way work and half drop off/pick up in the same trip, so there will be approximately 4,100 truck trips per day from import containers arriving at the Intermodal Park.
- Domestic containers have 1.5 times the volume of international containers, so there will be approximately 2,700 truck trips per day departing from the Intermodal Park.

In order to create a worst case scenario, it was assumed that all traffic for the Intermodal Park would move along a single road. The increase in truck traffic on these roads was compared with road usage forecasts from the Hampton Roads Crossing Study³ conducted by the Virginia Department of Transportation (VDOT). For example, if the 4,100 truck trips per day that would be arriving at the Intermodal Park were all to use Route 164 in Suffolk, the VDOT Level of Service⁴ for that route would remain unchanged since the forecasted traffic for that route is 64,000 vehicles per day in 2018. Similarly, if the 2,700 truck trips per day departing from the Intermodal Park were all to travel along Route 460 to destinations north and west of Hampton Roads, the Level of Service for that road would also remain unchanged as the forecasted traffic for that route is 32,000 vehicles per day. In summary, locating an Intermodal Park within 25-35 miles of The Port will facilitate traffic into and out of the park without adversely affecting regional traffic congestion.

³ *Hampton Roads Crossing Study, Final Environmental Impact Statement*, Federal Highway Administration and the Virginia Department of Transportation, 2001.

⁴ VDOT uses Level of Service (LOS) designations to compare roadway design capacity with actual traffic volume, thereby describing the congestion level of a given roadway.

Complementary Transportation Projects in Hampton Roads

The following large-scale transportation initiatives would complement an Intermodal Park in Hampton Roads. They are also indicative of infrastructure preparations being made to accommodate the tremendous growth in containerized cargo anticipated for Hampton Roads. In fact, these initiatives suggest that the current cargo forecast may even be conservative. The actual cargo growth will most likely exceed the forecasted growth due to the fact that these initiatives will make The Port of Hampton Roads even more attractive to potential customers.

Route 460 Corridor Study

A significant transportation planning effort is also currently underway – the Virginia Department of Transportation (VDOT) has initiated a Route 460 Corridor Planning Group. The stretch of Route 460 between Hampton Roads and Richmond is currently being studied for a potential upgrade to a controlled access facility. Integrating the planning of an Intermodal Park at this time could allow a dedicated access ramp to be easily incorporated into the Route 460 plans. The map in Appendix D illustrates the three candidate build alternatives (CBA) currently under consideration by the Planning Group.

Maersk Terminal to Open

Maersk-Sealand has begun construction on a new 230-acre marine terminal in Hampton Roads, and it has spurred on the construction of required infrastructure upgrades (rail connections, feeder roads) as well. This decision signals the economic promise of the region's deep water access, inexpensive land, and efficient transportation links. The new marine terminal is also expected to lure even more container traffic to Hampton Roads than was previously forecast, and would create excellent synergy between the new terminal and a new Intermodal Park.

Proposed Heartland Corridor

Another current transportation initiative is the proposed Heartland Corridor, which would increase tunnel clearances through the mountains of West Virginia to allow double-stack container trains to travel a more direct route from Hampton Roads to the Midwest. This will cause transportation costs to decrease and rail volumes to increase. As a result of increased rail traffic, the Heartland Corridor project is expected to accelerate the planned improvements for the Route 164/I-664 Median Rail Corridor. This project comprises the relocation of residential rail line to an existing rail corridor in the median of Route 164/I-664, thereby facilitating cargo flow and providing uninterrupted rail connections to multiple rail networks. Although this rail traffic likely would not stop at the Intermodal Park, there are future possibilities if the Intermodal Park was ever expanded to include a rail ramp. In addition, any rail service upgrades are important since future traffic increases for both the port-related and non-port-related sectors will make it increasingly attractive to divert cargo flow away from already congested highways.

Intermodal Container Transfer Facility

A final complementary transportation project to consider is the potential to add a rail ramp to the Intermodal Park at some time in the future. An Intermodal Container Transfer Facility (ICTF) is a rail yard where cargo can be transferred between road and rail modes of transport – this flexibility allows the advantages of rail for inexpensive, long-distance moves to be combined with the flexibility of short-distance truck hauls. An ICTF located in or near the Intermodal Park could provide a very attractive alternative cargo transportation route. Current projections

estimate many nearby roads and highways will already be congested, so the ability to shift freight flow from road to rail will become very important.

Realizing the Opportunity

Assembling the Planning Team

As development of the Intermodal Park moves forward, the chief players will be the economic development agencies associated with localities where the Intermodal Park may potentially be located and the private developers who have expressed interest in the project. These groups would reap most of the benefits from the development of an Intermodal Park in the Hampton Roads region. There will also be many groups interested in providing input to the planning team during the planning and development process: the regional railroads – Norfolk Southern Corporation and CSX; the port authority and local marine terminal operators – VPA, Virginia International Terminals (VIT) and APM-Maersk; and the transportation planning community including VDOT, the statewide freight planning team, the Virginia Department of Rail and Public Transportation (DRPT) and the Hampton Roads Planning District Commission (HRPDC). Close coordination with each of these groups as the concept develops will increase the chances of a successful project and make the planning process more reliable.

Tasking the Planning Team

There are a number of tasks which must be accomplished in the successful planning of an Intermodal Park in Hampton Roads. The two most important tasks to be undertaken in the very near future are as follows:

- Search for available land areas of 2,000 to 3,500 acres within 25 to 35 miles of the marine terminals, though smaller tracts of land may also be acceptable. It is important to keep in mind that this area would become home to 20 to 50 million square feet of distribution center space, and that good transportation access is necessary.
- Closely coordinate with all interested stakeholders in the regional transportation planning process. This will facilitate the initial scope of the park as well as the incorporation of any infrastructure upgrades in the future, such as a dedicated highway interchange and accessible rail access.

Conclusion

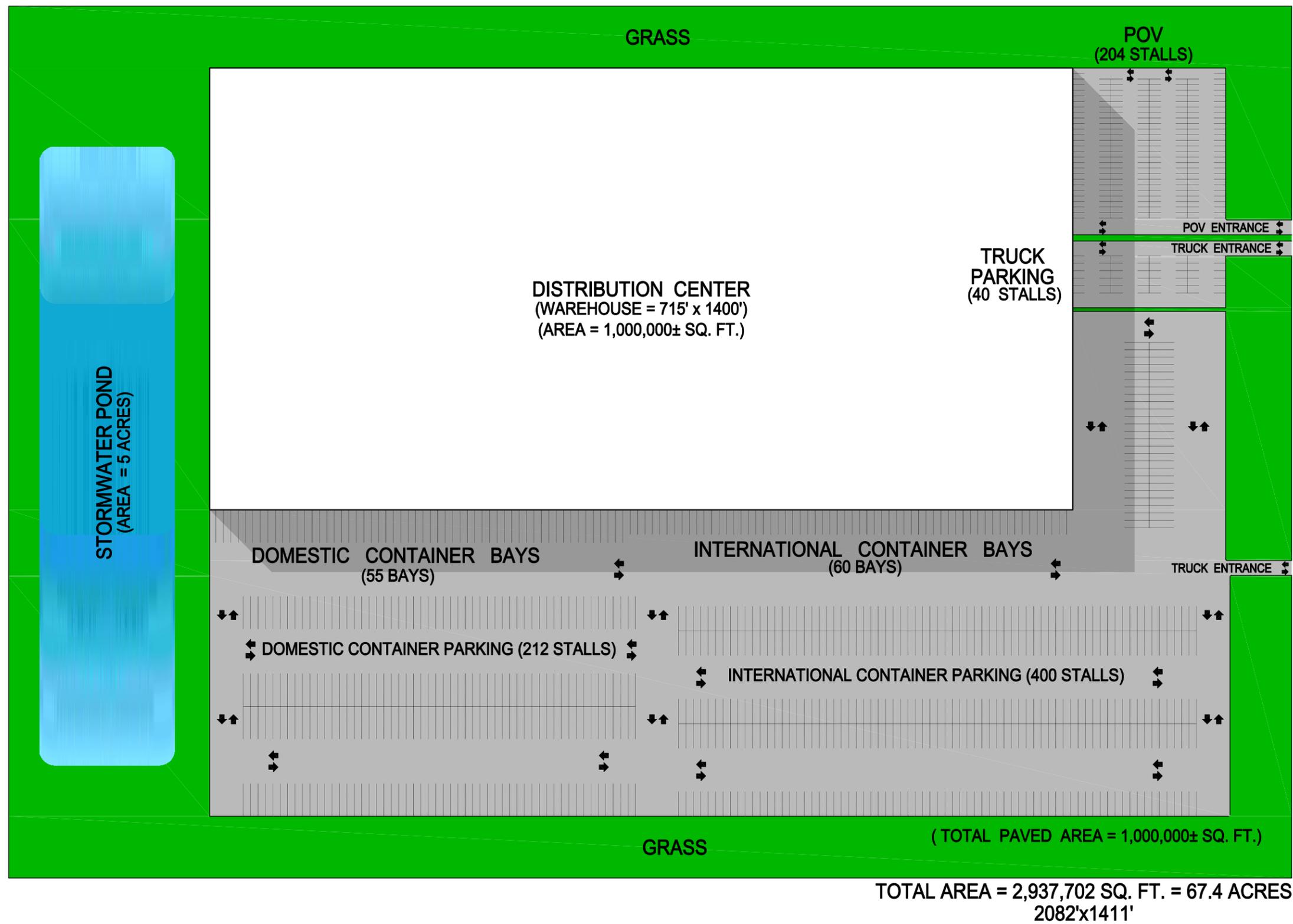
Hampton Roads is an excellent location for a new Intermodal Park. The nearby port provides a consistent source of import cargo containers, and that cargo is expected to increase significantly. By the year 2030, approximately 900,000 containers are projected to move through distribution centers in Hampton Roads annually. This significant increase in volume creates a tremendous need for additional distribution center space in the region. The excellent regional transportation network in Hampton Roads also makes it an ideal location for an Intermodal Park by facilitating the movement of the cargo to its final inland destinations. With advanced transportation planning, the regional road and rail systems could even be improved in such a way as to increase the efficiency of connections to and from the park.

The opportunity to develop an aggregate Intermodal Park also creates significant potential for nearby localities to attract new businesses and the sizable economic benefits that go along with them. The potential economic benefits of an Intermodal Park are significant, and the region would enjoy additional job opportunities and increased tax revenues.

However, in order for the Hampton Roads region to reap the benefits of an Intermodal Park, thorough advance planning is vital. Zoning restrictions as well as utility, road and rail planning must be considered in order to ensure the success of the park. Without zoning restrictions, there may be noise concerns due to incompatible land uses located next to each other. Without utility planning, the benefits of cooperation and economy of scale can not be realized. Without proper transportation planning, there will be no coordinated infrastructure improvements, such as a dedicated interchange along Route 460 or the future option to build a rail yard. Without the increased use of rail transport, highway congestion may cause travel in the region to grind to a halt.

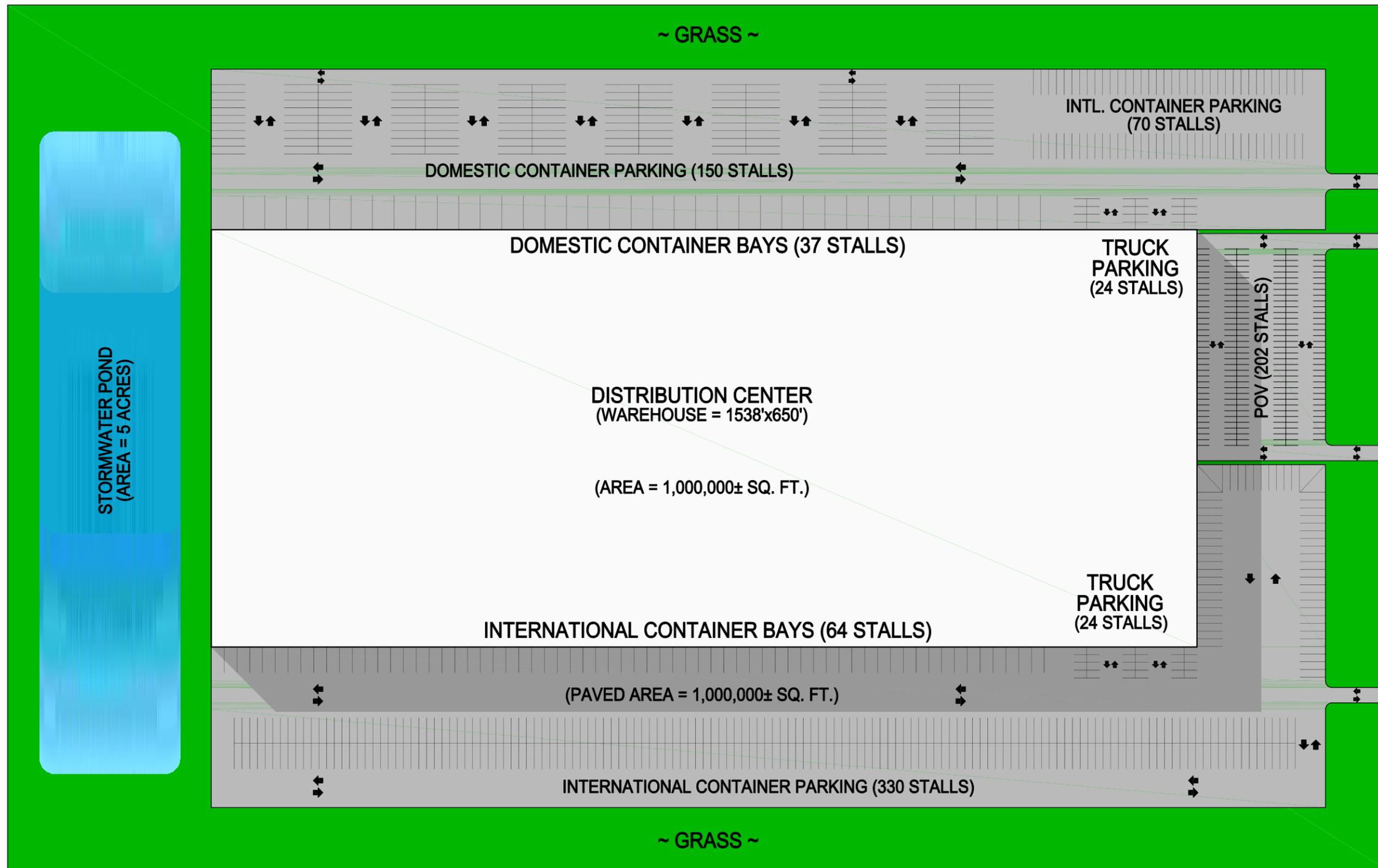
The timing is right for planning a new Intermodal Park in Hampton Roads now.

Appendix A – Two Sample Facility Layouts



FACILITY LAYOUT - EXAMPLE #1

AN ECONOMIC OPPORTUNITY FOR HAMPTON ROADS: AN INTERMODAL PARK

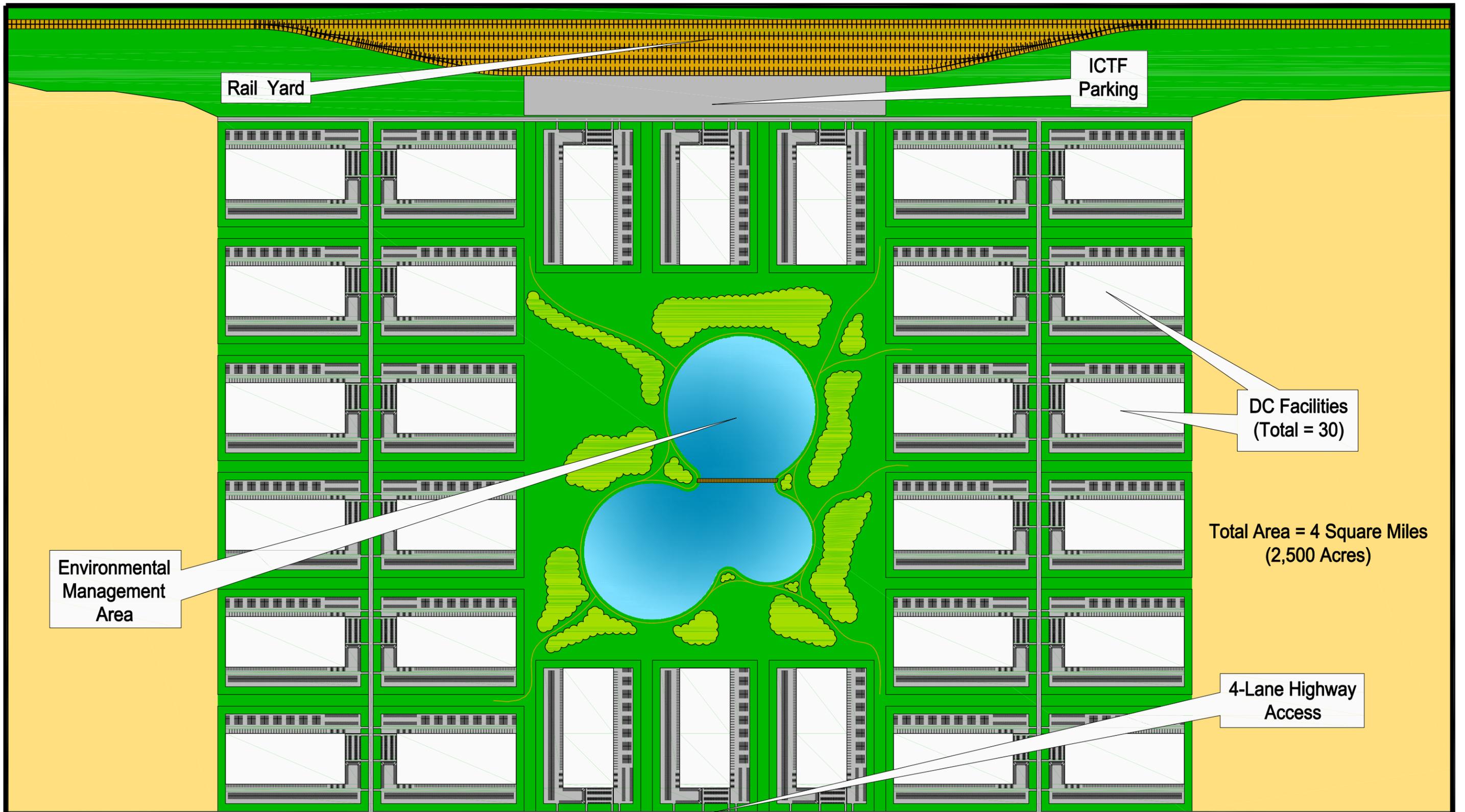


TOTAL AREA = 2,911,950 SQ. FT. = 66.8 ACRES
2157'x1350'

FACILITY LAYOUT - EXAMPLE #2

AN ECONOMIC OPPORTUNITY FOR HAMPTON ROADS: AN INTERMODAL PARK

Appendix B - Sample Park Layout



Rail Yard

ICTF
Parking

DC Facilities
(Total = 30)

Total Area = 4 Square Miles
(2,500 Acres)

Environmental
Management
Area

4-Lane Highway
Access

PARK LAYOUT EXAMPLE

AN ECONOMIC OPPORTUNITY FOR HAMPTON ROADS: AN INTERMODAL PARK

Appendix C - Utility Planning

Utility Planning

For utility planning purposes, a scenario to address a single one-million-square-foot facility was developed and then expanded to consider an entire Intermodal Park of 30 such facilities as shown in the example. Summary conclusions are as follows:

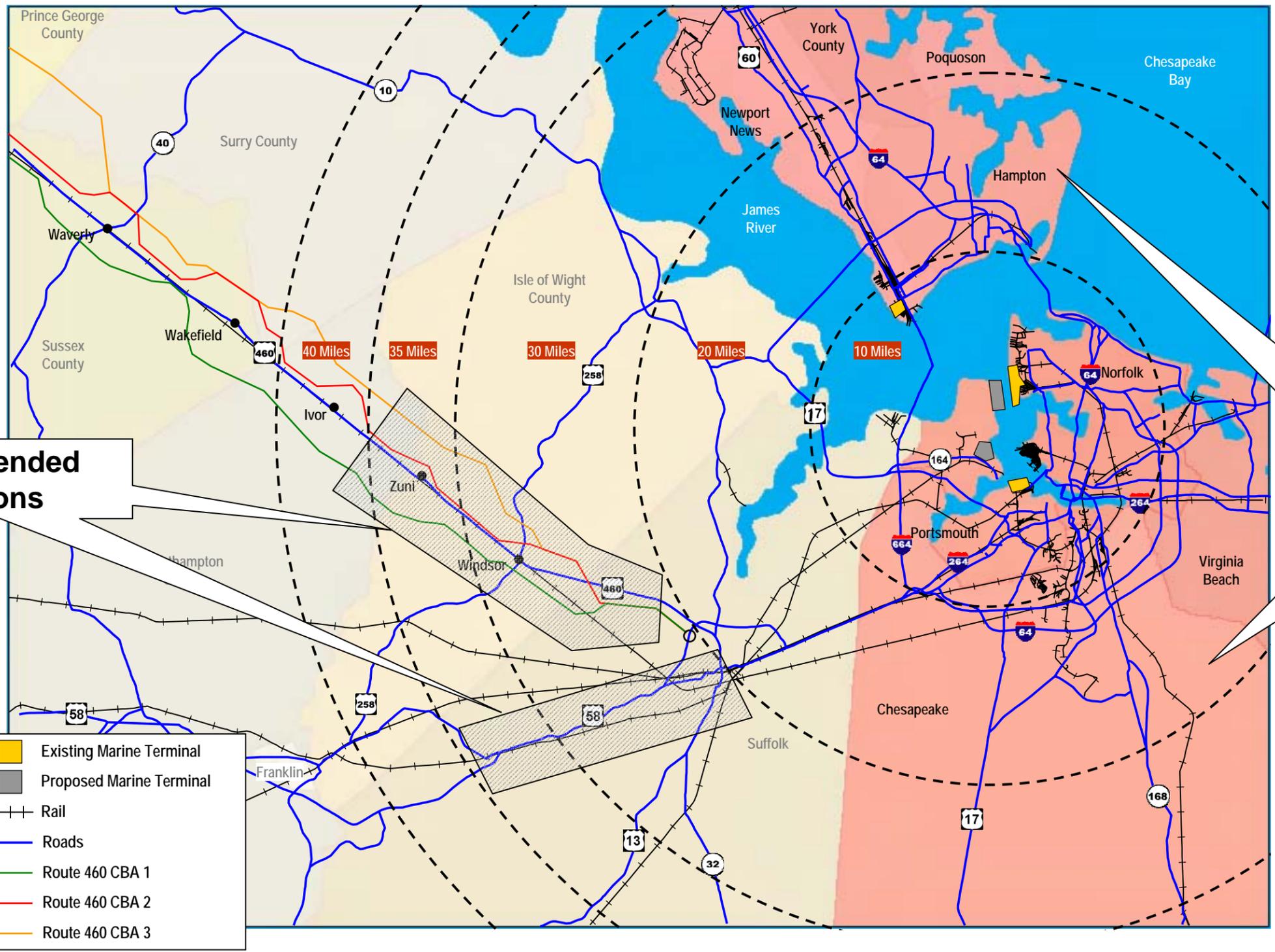
Single Facility

- 300 employees
- 9000 gallons per day water use,
- 9000 gallons per day sanitary sewer service, and
- 1875 kW of electricity for such purposes as HVAC, lighting, and automated systems. This electrical demand can be expected to reach 1,200,000 kWh/month.
- Add for special requirements: for example, if refrigeration is required, an additional 10 kW will be necessary for each reefer slot. A facility with 50 reefer slots will require an additional 500 kW of power for a total of 2375 kW.

Aggregate Park

- 9000 employees
- A system of 14" and 16" lines would distribute water throughout the industrial park, and 12" lines would supply each distribution center. A maximum flow rate of 6000 gallons per minute for fire flow will need to be delivered to an individual facility.
- An estimated 300,000 to 700,000 gallons of water per day will be used, depending on actual development decisions, business needs, future expansion options, and design assumptions.
- An elevated storage volume of 1.5 million gallons will be required for the park for seasonal variations in normal water demand, emergency storage, and for fire-suppression.
- A substation would be needed to serve the park for the estimated demand of 56 MW of delivery capability and 36,000 MWh/month of usage.
- A sanitary sewer system consisting of 8" and 12" PVC piping would collect roughly 300,000 to 700,000 gallons in a single day in a 15" or larger gravity pipe.

Appendix D – Recommended Park Locations



Recommended Locations

Congested Areas Shown in Red

- Existing Marine Terminal
- Proposed Marine Terminal
- Rail
- Roads
- Route 460 CBA 1
- Route 460 CBA 2
- Route 460 CBA 3

RECOMMENDED LOCATIONS
AN ECONOMIC OPPORTUNITY FOR HAMPTON ROADS: AN INTERMODAL PARK