Engineering Project Proposal
Final Draft

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To replace the archaic system of manually checking the ID and Cleared4 Pass of each individual student, and prevent the long slow-moving lines at campus building entrances, we propose the installation of electronic ID scanner turnstiles at all major campus building entrances. Through the use of a crowd-sourced survey, it has been established that the lack of a proper entrance procedure hinders CCNY's students. 100% of CCNY students believe that campus security and quality of student life would greatly benefit from a faster authentication/identification process, such as ID scanner turnstiles. Like many other sister CUNY schools, CCNY should implement electronic ID scanner turnstiles at major campus building entrances to improve the speed and efficiency of student identification authentication and enhance campus safety by ensuring that only authorized individuals can enter buildings.. Moreover, installing ID scanner turnstiles is a cost-effective solution in the long run, as it eliminates the need for hiring additional security personnel. This solution streamlines the authentication process and enhances campus security.

INTRODUCTION

The CCNY campus spans from 141st Street to 130th st, with students' classes typically within 141st Street and 135th Street, in the North Academic Center, Shepherd Hall, Steinman Hall, and the Marshak Science Building. Despite all of these buildings being very close in proximity, the trip from one class to another can be anywhere from a few minutes to twenty minutes. At all entrances, students are required to show security personnel their campus ID and log into the Cleared4 software to prove they are allowed access on campus and are covid-free. When there is a large volume of students entering the building at once, especially between classes, security personnel reading each student's ID and ensuring the student's Cleared4Pass has the correct name and date, results in lines in front of building entrances that are not only tedious but dangerous.

Due to the attention that security personnel needs to give each student, sometimes people manage to enter the building without providing proper identification. In just this semester, we've already had a documented suspicious person enter the campus buildings without any identification, attempting to advertise and sell tickets to a show in several NAC classrooms. To put an end to situations where people can enter freely because of the security guards' inattentiveness from the sheer volume of students and situations where students are late to class; we want to incorporate a new security measure of card readers that can validate a student's identification and Cleared4 status in one swipe.

The recommended card reader is the Optical Barrier Turnstiles-MT251. Depending on the two approaches provided in the budget section of the proposal, the total cost of installing these turnstiles for the first approach is $10, 368 for the first approach, and $23,637.76 for the second approach. Depending on the allocated operating budget, turnstiles can be traded for card

readers alone, to decrease project costs. This proposal only relates to CCNY security and student life, and does not aim to aid or alter the security at any other CUNY school.

As CCNY students we have experienced firsthand the inadequate security system. In addition to our own experience, through surveys, we have crowdsourced to determine the opinions and satisfaction of current CCNY students and how to improve their experience. This proposal will highlight the shortcomings of our current security measures, elaborate on the options available for card reader security, relate it to current reader systems available in CUNY schools, and provide total costs for all available options.

PROJECT DESCRIPTION

The implementation of card readers or turnstiles at campus entrances will aid in several ways. However, in terms of the card readers available, the card reader we've found to be efficient and cost-effective is the IDTech EasyMag Card Reader. This card reader is the first option in terms of approaches to implementing card reader technology. As the most affordable option, the IDTech EasyMag Card Reader would, for example, be attached to the security staff desks at entrances. The IDTech Card Reader is equipped with an emulator that can be used to keep track of the students entering the building. An emulator picks up the information from a card like a student's Cleared4 access and name, which is then sent to the main access point, likely a computer in an office somewhere in the building, to keep records. As a student enters, they simply swipe their campus ID at the card reader. The card reader will pick up the student's name and Cleared4 status which will then be sent to the access point. Once there it will validate the student's Cleared4 status and light a green light, signaling that the student may enter the building. This process may seem tedious but in actuality, will only take about one second, making this solution very efficient.

The next option in ID card scanners would be to connect the card scanner to a turnstile, similar to those at metro stations. For example, the IDTech EasyMag Card Reader we've chosen can be connected to the Optical Barrier Turnstiles-MT251. The Turnstiles are a great option for entrances that do not have security personnel. In addition, there has been a 40% decrease in security personnel in CCNY since pre-pandemic times. The decrease in security personnel suggests that the availability of security guards at each entrance isn't feasible. By incorporating turnstiles in the upgraded security system, we can reduce the stress on security personnel, and allow for more entrances to be open. CUNY Hunter College, for example, has installed similar turnstiles, like the EZ Lane Swing Arm Optical Turnstile, set at about 10,000 USD. The Optical Barrier Turnstiles-MT251 is a cost-effective option found by our team most similar to the turnstile systems used in other CUNY schools.

Implementing a security card reader in our school community will allow for more efficient travel from one building to another because students will just have to swipe their ID card to enter the building rather than waiting for a security guard to look at both ID and Cleared4, especially during the school rush hour. As well as making trips more efficient, this will create a safer environment for the school because it limits the number of unintentional slip-ins which can lead to the endangerment of many students.

Our team believes that the Optical Barrier Turnstiles-MT251 is the safest choice for card readers. It stops the individual from entering completely if they do not have proper identification, and negates the need for extra security at each entrance, allowing security to go to areas which are not guarded. However, installing a turnstile in every campus building entrance is not feasible due to the existing structure of campus buildings. For example, the Marshak Science Building has a main entrance consisting of small doorways, where turnstiles couldn't be installed unless

we decide to renovate the entrance entirely. In entrances where a turnstile is impractical, installing the IDTech EasyMag Card Reader alone would allow for quick entry processes. Having only the card reader installed without the turnstile does have its limitations, in that security personnel are required at the entrance to prevent the entry of those who do not have proper identification or Cleared4 access. Thus, before installing card readers, the entrances of each building will have to be checked to determine if it is possible. However, the installation of the turnstiles themselves should not exceed 3 days for both approaches, making the turnstiles a great option still. In addition, many CUNYs have adopted this card reader system, meaning CUNY has the resources and practice in implementing such a system in its universities.

BUDGET

According to the Report on the Fiscal 2024 Preliminary Plan of the Fiscal 2023 Mayor's Management Report for the City University of New York, the proposed budget for the 2024 fiscal year is $1.28 billion, $120 million less than the adopted (starting) budget of the 2023 fiscal year. In this report, we see a budget increase for Hunter Campus Schools set at more than 2 million dollars alone, more than the funding increase for community and senior colleges combined. In fact, senior colleges such as CCNY, are receiving no additional funding.

The main source of savings proposed in this report is the Program to Eliminate the Gap (PEG). PEG is a program implemented to remove the vacancies within the CUNY system, 156 positions annually.

By removing vacant positions, the CUNY system saves $4.8 million. Relative to the overall budget for senior colleges of $35 million, this $4.8 million is a sizable amount. Given that currently, there is a hiring freeze on CUNY campuses, and a large amount is saved due to PEG, a small percentage of the money saved through the PEG can be used to greatly enhance the

safety and quality of on-campus life at CCNY. In addition, 89% of the proposed removed vacant positions, are non-pedagogical staff, which include security staff. Currently, the security staff at CCNY is 60% that of the pre-pandemic population (New York Post). The decrease in security staff puts the university in an even more vulnerable position, which can be aided by turnstile scanners preventing non-CUNY faculty/students from entering the campus buildings.

Taking into account the scanners mentioned in the earlier sections, the three scanners reviewed by our team were the IDTech EasyMag Card Reader, the Optical Barrier Turnstiles-MT251, and the EZ Lane Swing Arm Optical Turnstile (most similar to those used in other CUNY schools).

Depending on the operating budget allowed to us, there are two approaches we've devised.

I. High Volume Buildings

Based on the student survey completed, the buildings with the highest volume, which students believe would benefit the most from the efficiency of ID scanners are the North Academic Center, Marshak Science Building, Shepherd Hall, and Steinman Hall.

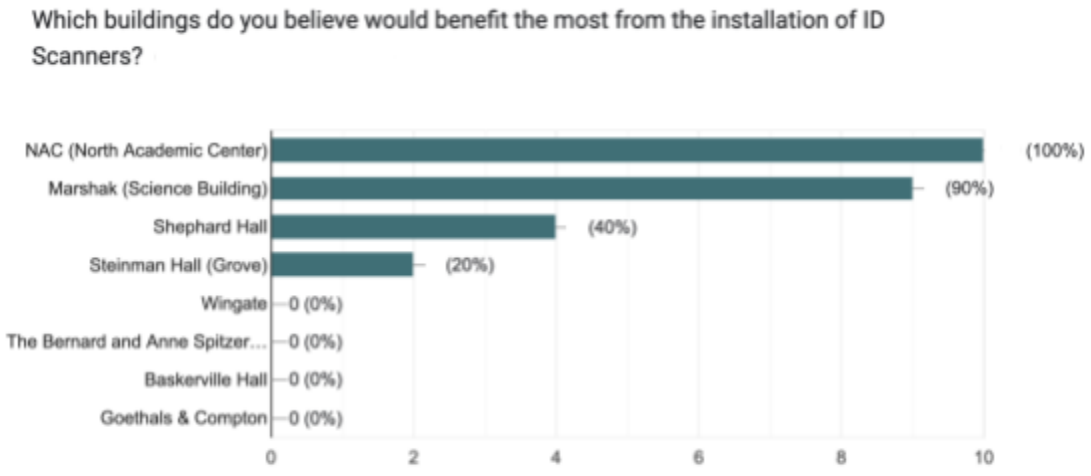

Figure 1: Shows percentage of students voting for which buildings to install identification card readers as a safety measure.

Each building has a different number of entrances that students use frequently. The cost of placing the different ID scanners at the main entrances of the aforementioned buildings has been calculated (Table I). The cost of using each kind of card reader for high-volume buildings is shown in Figure 2. The total cost of using the IDTech EasyMag Card Reader, the Optical Barrier Turnstiles-MT251, and the EZ Lane Swing Arm Optical Turnstile in all of the frequently used entrances of high-volume buildings are $805, $9800, and $70,000, respectively. The installation of even the most expensive card reader option, the EZ Lane Swing Arm Optical Turnstile, is less than 1.5% of the saved money from the PEG.

Table I: Cost for Scanners at Buildings Voted to Most Benefit from ID Scanners by CCNY Students

Buildings	Entrances	# of Readers Needed	IDTech EasyMag Card Reader (115)	Optical Barrier Turnstile- MT251 (1400)	EZ Lane Swing Arm Optical Turnstile (~10,000)
North Academic Center	3	3	345	4200	30000
Marshak	2	2	230	2800	20000
Shepard Hall	1	1	115	1400	10000
Steinman Hall	1	1	115	1400	10000
		Total Cost	805	9800	70000
		Percentage of PEG Savings	0.016770833	0.204166667	1.458333333

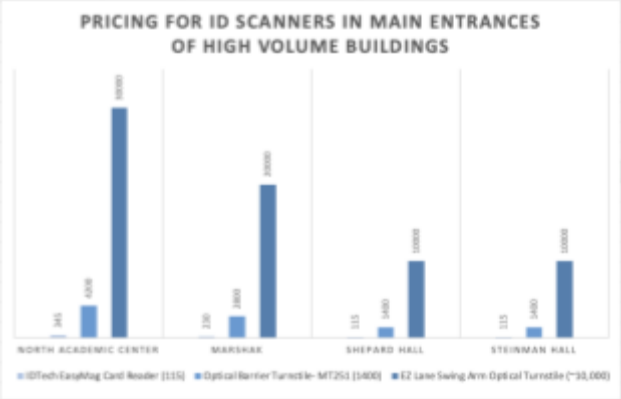

Figure 2: Costs of installing each type of card reader in the main entrances of the high volume buildings.

II. All Campus Buildings

If we were to install one of each scanner at the main entrance of each of the 24 campus buildings, discluding the Towers dormitory, the cost for the IDTech EasyMag Card Reader, the Optical Barrier Turnstiles-MT251, and the EZ Lane Swing Arm Optical Turnstile are $1,610,

$19,600, $140,000, respectively. With the most expensive option, we've still not surpassed 3% of the money saved from the PEG.

Table II: Cost for Scanner at Main Entrance of All Campus Buildings			
ID Scanner	IDTech EasyMag Card Reader (115)	Optical Barrier Turnstile- MT251 (1400)	EZ Lane Swing Arm Optical Turnstile (~10,000)
Total Cost	1610	19600	140000
Percentage of PEG Savings	0.033541667	0.408333333	2.916666667

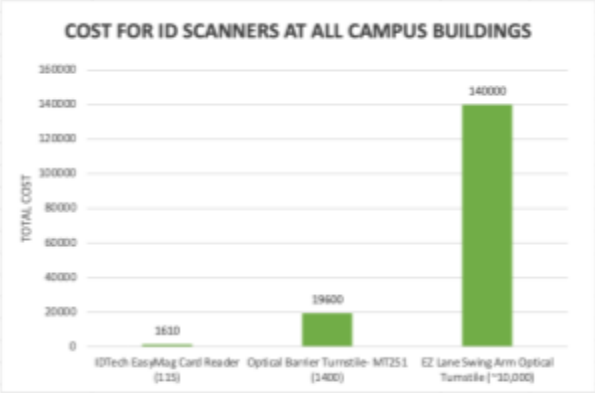

Figure 3: Total cost for installing each scanner at the main entrance of each of the campus buildings.

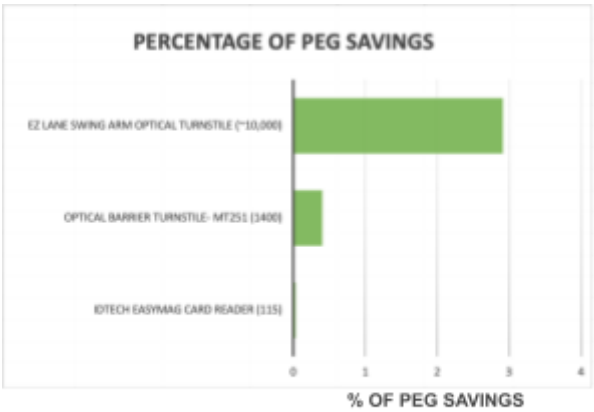

Figure 4: Percentage of PEG Savings used for approach II

INSTALLATION TIMELINE AND BUDGET

Turnstile installation generally takes about one day. For the first approach, the installation of the IDTech EasyMag Card Reader does not require any construction. If preferred, the card reader can be drilled into the security desk, which should not take more than one hour and one construction worker. For the first approach of only installing card readers in high-volume buildings, installing IDTech EasyMag Card Readers would need about 7 hours total, 8-9 with lunch and taking into account the time of travel between buildings. However, for the most cost-effective option, the university can avoid paying the lunch hour as is required by labor laws for an 8+ hour work day, by hiring two construction workers working 4-5 hours each, instead of one worker working 8-9 hours. The average hourly wage for a construction worker in NYC is $21.03 (ZipRecruiter). At this rate, the installation of a card reader alone would cost about

168.24 - 189.27 USD for one worker, or $168.24 for two workers. For the second approach of installing a card reader in each of the 24 campus buildings, a total of 24 card readers would be installed. The most effective plan would be to install the card readers in as little time as possible to avoid disturbing campus operations. We can have 3 workers at a 9-hour work day to complete this in three days. 9 hour work days would mean that the university is required to pay for the workers' lunch hours. This would be a total cost of $567.81

The installation of the Optical Barrier Turnstiles-MT251 and the EZ Lane Swing Arm Optical Turnstile should take about one work day (Kwant) and one worker. Since the first approach is installing a total of 7 card readers, if turnstiles are used, the timeline should take about seven work days and one worker at a total installation cost of $1,177.68. The second approach of adding card readers at the main entrance of each building would mean a total of 24 turnstiles which would take 24 full work days. To decrease the disruption to campus life, this can be done in three days with 8 workers working each day for 8 hours. This is a total installation cost of $4,037.76 for the second approach.

Table III: Total Costs for All Approaches and Card Readers

	APPROACH TWO			
Card Reader	Card Reader Cost (in USD)	Installation (in USD)	Total Costs (in USD)	PEG Savings Percentage
IDTech EasyMag Card Reader	805	168.24 - 189.27	973.24 - 994.27	0.02%
Optical Barrier Turnstile- MT251	9,800	567.81	10,368	0.20%
EZ Lane Swing Arm Optical Turnstile	70,000	567.81	70,568	1.50%
	APPROACH ONE			
IDTech EasyMag Card Reader	1610	1,177.68	2,787.68	0.05%
Optical Barrier Turnstile- MT251	19,600	4,037.76	23,637.76	0.50%
EZ Lane Swing Arm Optical Turnstile	140,000	4,037.76	144,037.76	~ 3.0%

CONCLUSION

The students at CCNY deserve to learn in a safe environment and to have a better quality of life. The current safety measures are not adequate considering the student body has remained

the same, yet the security staff is now understaffed. With understaffed security, large student traffic, and an ineffectual ID system, an overhaul of our procedures for identification and security would greatly benefit City College. The several approaches in our proposal are not only cost-effective but use a nearly minuscule percentage of the money CUNY saved through the PEG program this past year alone. The proposed turnstiles would also allow students to enter the building in a smooth and timely manner, preventing major foot traffic during busy hours and allowing students to get to class on time. In the worst-case scenario, they could also help prevent potentially dangerous individuals from entering the campus. With these factors in mind, we believe our proposal would be a worthwhile investment for City College, at a relatively low financial cost.

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