

APPENDIX L: PROFESSIONAL ENGINEER TRAINING PROGRAM REVIEW FULL REPORT



Florida Department of Transportation

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Professional Engineer Training Program Review

BACKGROUND

The Secretary charged District Secretary Wolfe to form a team to review and make recommendations on the Professional Engineer Training (PET) Program. Sec. Wolfe appointed Bob Crim to lead the team while Sec. Wolfe served in the role of Senior Manager Champion. The additional team members are Tom Byron, Chief Engineer; Irene Cabral, Personnel Resource Management Officer; Chris Smith, Director of Development, D-1; Nick Tsengas, Director of Operations, D-2; Phillip Gainer, Director of Operations, D-3; Courtney Drummond, Director of Operations, D-4; Frank O’Dea, Director of Development, D-5; Debora Rivera, Director of Operations, D-6 and Debbie Hunt, Director of Development, D-7.

The team was charged with reviewing the PET Program and making recommendations on the need and objectives of a PET program, and make recommendation on the structure and duration of the program. The team had a clean slate for evaluating the PET program: there were no expectations to continue or eliminate the program and no expectations to change the program should it be continued. The team was free to make any recommendations regarding the need for the program, its structure and duration, salary adjustments, and number of positions.

The team undertook a two step approach to evaluating the program. First- address the issue of whether the PET program is worthwhile and needed. Second- evaluate the structure, duration and other issues related to a PET program if there is agreement to continue some form of program.

RECOMMENDATION ON THE CONTINUATION OF A PET PROGRAM

The recommendation of the team is to continue the PET program for graduate engineers. This recommendation is based on an evaluation of information regarding the past performance of the current program in meeting the objective of providing a career path and broad, practical experience in the field of transportation engineering for engineering graduates to obtain licensure as a Professional Engineer and advance into management and leadership roles in the agency.

An evaluation of the current program revealed the following.

Some form of a training program for engineers has been in place since the mid to late 1970's. The program in its current form as a four year Professional Engineer Training Program has been in place more than 20 years. The program has been one of, if not the primary, source for hiring graduate engineers into the department to begin a career in transportation engineering. Many of those hires obtain their PE licenses and continue their careers with the department.

A review of data on past PET hiring and the current positions held by former PET program participants resulted in these findings.

- The department fills about 65 to 75 vacant PE positions each year and hires about 15 to 20 PET each year based on PET average hiring rates over the past 10 years. PET hires completing the program provide potential candidates to fill approximately 25% of the department's PE vacancies on an annual basis (see tables 1 and 2).
- The PET average hiring rate over the past ten years is about 3% of the PE positions (see table 2).
- Approximately one third of the department's PE positions are currently occupied by participants of the PET program (see table 3).
- Former PET program participants occupy just over 40% of the management and leadership positions in the department. These positions are defined as the managers of the engineering related offices under the Director's of Operations and Transportation Development and their first level direct reports (see tables 3 and 4).
- Former PET program participants occupy approximately 45% of the positions classified as a PE supervisor position (see table 3).

The preponderance of former PET's in PE positions may be expected given the long established existence of the program. However, the findings support the effectiveness of a PET program as a way to recruit engineers into the agency, retain and advance them in their careers. Obviously, the program is not the only way to bring PE's, managers and leaders into the agency, but the statistics support the value and contribution of the program in facilitating succession planning and the development of future leaders and managers in the Department.

Many state DOT's and engineering organizations have some form of training program to recruit and develop an engineering staff. The FDOT program has clearly been effective over the years and there is nothing to indicate the program should not continue as a tool to bring engineers into the agency. The continuation of a training program for transportation engineers does not imply that the program is the only way to recruit and develop engineering and leadership staff for the agency. Furthermore, a PET program may provide some early career advantages, much like any other training opportunities afforded employees on a limited basis. The solution is not to eliminate the training program because it is not available to everyone, rather to evaluate how to restructure the training program and target it to the right personnel.

Table 1:

PET Program Hiring and Retention 2012 to 2003												
	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	10 Yr. Total	Percent
D-1	2	0	3	4	1	2	3	3	1	4	23	11.9%
D-2	2	0	2	4	4	2	4	6	3	5	32	16.5%
D-3	0	0	2	2	4	1	3	2	5	3	22	11.3%
D-4	3	4	4	4	7	3	8	3	6	6	48	24.7%
D-5	1	2	0	1	5	1	5	2	3	4	24	12.4%
D-6	0	4	0	2	3	3	2	2	2	6	24	12.4%
D-7	3	0	1	0	2	0	1	1	3	2	13	6.7%
CO/SMO	1	1	1	0	0	1	0	0	0	4	8	4.1%
Total	12	11	13	17	26	13	26	19	23	34	194	100.0%
Still Employed	12	10	12	15	22	11	20	12	12	13	139	
Retention	100%	91%	92%	88%	85%	85%	77%	63%	52%	38%	72%	

Table 2: FDOT PE Positions and PET Hiring History (12/2012 data)

	2012 PE Positions	Vacant PE Positions	% Vacant PE Positions	10 Year Total PET's Hired	Avg. No. PET's Hired per Year	PET's Hired Each Year as Percent of PE Positions	Percent of PET's Available to fill Positions Each Year
D-1	52	11	21.2%	23	2.3	4.4%	20.9%
D-2	101	10	9.9%	32	3.2	3.2%	32.0%
D-3	61	9	14.8%	22	2.2	3.6%	24.4%
D-4	119	15	12.6%	48	4.8	4.0%	32.0%
D-5	84	11	13.1%	24	2.4	2.9%	21.8%
D-6	73	4	5.5%	24	2.4	3.3%	60.0%
D-7	48	4	8.3%	13	1.3	2.7%	32.5%
CO/SMO	116	9	7.8%	8	0.8	0.7%	8.9%
Total	654	73	11.2%	194	19.4	3.0%	26.6%

Table 3: Former PET Program Participants in PE and Leadership Positions (12/2012 data)

	2012 PE Positions	PE Positions filled by Former PET's	Percent of PE Positions filled by Former PET's	Leadership Positions	Leadership Positions filled by Former PET's	Percent of Leadership Positions filled by Former PET's	2012 PE Supervisor Positions Class codes 4669 4672 4673	Supervisor Positions filled by Former PET's	Percent of Supervisor Positions filled by Former PET's
D-1	52	17	32.7%	24	13	54.2%	17	6	35.3%
D-2	101	46	45.5%	30	14	46.7%	32	19	59.4%
D-3	61	36	59.0%	29	17	58.6%	22	13	59.1%
D-4	119	36	30.3%	31	10	32.3%	36	14	38.9%
D-5	84	23	27.4%	36	14	38.9%	27	9	33.3%
D-6	73	27	37.0%	23	11	47.8%	18	6	33.3%
D-7	48	9	18.8%	34	9	26.5%	13	3	23.1%
CO/SMO	116	30	25.9%	40	14	35.0%	10	6	60.0%
Total	654	224	34.3%	247	102	41.3%	175	76	43.4%

Table 4: Breakdown of Leadership Positions (12/2012 data)

District 1			Total #	Former PET	District 2			Total #	Former PET
District Secretary			1	0	District Secretary			1	0
Director of Transportation Development			1	0	Director of Transportation Development			1	1
District Design Engineer			1	1	District Design Engineer			1	1
PE Direct reports to DDE			4	4	PE Direct reports to DDE			4	1
District ISD Manager			1	0	District ISD Manager			1	0
PE Direct reports to ISD Mng			2	2	PE Direct reports to ISD Mng			1	0
District Program Manager			1	0	District Program Manager			1	0
PE Direct reports to Prog Mng			1	0	Urban Transp. Develop. Manager			1	1
PE Direct reports to UTDM					PE Direct reports to UTDM			1	1
Director of Transportation Operations			Vacant	Vacant	Director of Transportation Operations			1	1
District Construction Engineer			1	1	District Construction Engineer			1	1
PE Direct reports to DCE			3	1	PE Direct reports to DCE			5	2
District Maintenance Engineer			1	0	District Maintenance Engineer			1	0
PE Direct reports to DME			2	2	PE Direct reports to DME			4	2
District Traffic Operations Engineer			1	0	District Traffic Operations Engineer			1	0
PE Direct reports to DTOE			1	0	PE Direct reports to DTOE			2	1
District Materials Engineers			1	1	District Materials Engineers			1	1
PE Direct reports to DMRE			2	1	PE Direct reports to DMRE			2	1
			24	13				30	14
District 3			Total #	Former PET	District 4			Total #	Former PET
District Secretary			1	1	District Secretary			1	0
Director of Transportation Development			1	1	Director of Transportation Development			1	0
District Design Engineer			1	1	District Design Engineer			1	0
PE Direct reports to DDE			4	1	PE Direct reports to DDE			5	2
District ISD Manager			1	1	District ISD Manager			1	0
PE Direct reports to ISD Mng			3	0	PE Direct reports to ISD Mng			2	2
District Program Manager			1	1	District Program Manager			1	1
PE Direct reports to Prog Mng			1	0	PE Direct reports to Prog Mng			3	2
Director of Transportation Operations			1	1	Director of Transportation Operations			1	0
District Construction Engineer			1	0	District Construction Engineer			1	0
PE Direct reports to DCE			7	4	PE Direct reports to DCE			5	1
District Maintenance Engineer			1	1	District Maintenance Engineer			1	0
PE Direct reports to DME			1	1	PE Direct reports to DME			3	1
District Traffic Operations Engineer			1	1	District Traffic Operations Engineer			1	0
PE Direct reports to DTOE			2	1	PE Direct reports to DTOE			3	1
District Materials Engineers			1	1	District Materials Engineers			1	0
PE Direct reports to DMRE			1	1	PE Direct reports to DMRE				
			29	17				31	10

Table 4 continued: Breakdown of Leadership Positions

District 5			Total #	Former PET	District 6			Total #	Former PET
District Secretary			1	0	District Secretary			1	1
Director of Transportation Development			1	1	Director of Transportation Development			1	1
District Design Engineer			1	0	District Design Engineer			1	1
PE Direct reports to DDE			4	2	PE Direct reports to DDE			5	2
District ISD Manager			1	0	District PLEMO Manager			1	0
PE Direct reports to ISD Mng			3	1	PE Direct reports to ISD Mng				
District Program Manager			1	1	District Program Manager			1	0
PE Direct reports to Prog Mng			3	1	PE Direct reports to Prog Mng				
Director of Transportation Operations			1	0	Director of Transportation Operations			1	0
District Construction Engineer			1	0	District Construction Engineer			1	0
PE Direct reports to DCE			6	3	PE Direct reports to DCE			4	2
District Maintenance Engineer			1	1	District Maintenance Engineer			1	1
PE Direct reports to DME			6	3	PE Direct reports to DME			5	2
District Traffic Operations Engineer			1	0	District Traffic Operations Engineer			1	1
PE Direct reports to DTOE			3	1	PE Direct reports to DTOE				
District Materials Engineers			Vacant	0	District Materials Engineers				
PE Direct reports to DMRE			2	0	PE Direct reports to DMRE				
			36	14				23	11
District 7			Total #	Former PET	Central Office			Total #	Former PET
District Secretary			1	0	Chief Engineer			1	0
Director of Transportation Development			1	0	Office of Design			1	0
District Design Engineer			1	0	Engineering/CADD Systems Office			2	1
PE Direct reports to DDE			7	3	Structures Design Office			4	1
District ISD Manager			1	1	Roadway Design Office			6	3
PE Direct reports to ISD Mng			6	0	Production Support Office			2	1
District Program Manager			1	0	Specifications and Estimates Office			5	1
PE Direct reports to Prog Mng					Office of Construction			4	2
Director of Transportation Operations			1	1	Office of Maintenance			4	2
District Construction Engineer			1	1	Traffic Operations Office			4	0
PE Direct reports to DCE			4	2	State Materials Office			5	3
District Maintenance Engineer			1	0	Safety Office			2	0
PE Direct reports to DME			6	1				40	14
District Traffic Operations Engineer			1	0					
PE Direct reports to DTOE			2	0					
			34	9					

Note: Numbers in red are "estimates" based on a review of available information to complete some of the lower leadership levels.

RECOMMENDATION ON PET PROGRAM CHANGES OR UPDATES

A sub-team was established to make recommendations on changes to the current program. The team was comprised of both current PET's and recent participants of the program currently in supervisory or management positions to make recommendations on the expectations of the training program by graduating engineers and the content and duration of a program to meet department needs for training and retaining engineers for the agency.

This sub-team was charged with evaluating and providing recommendations on any restructuring of the program, changes in phase durations- both the Engineer-in-Training phase (first 2 years) and the Senior Engineer phase (second 2 years). This team reviewed the current program described in PET program procedure (Topic No. 010-000-050-h) and provided recommendations regarding trainee evaluations, phase examinations, salary increases, and mentoring benefits.

Summary of major recommendations on changes to the current PET Program

- Reduce rotational portion of Engineer in Training (EIT) phase from 18 months to 12-15 months.
- Have two specialty phases instead of one.
- Discontinue phase exams.

Major Recommendations

- **Reduce rotational portion of Engineer In Training (EIT) phase from 18 months to 12-15 months.**

Currently the PET program consists of two separate components. The EIT component is made up of an 18 month rotational phase throughout the various departments within the Department, followed by a six month specialty phase in one of the departments. The second component is the 2 year senior phase, where the trainee continues to gain more experience in a particular area before becoming eligible to sit for the P.E. exam.

The PET Program procedure has a recommended time frame for each phase; however each district has modified this schedule based on organizational and situational differences. The experience of each trainee in each department varies greatly depending on many different factors, including the length of the rotation, the type of work assignments given, and the trainee's interest in the area. Due to the nature and short duration of some of the phases, there may not be an opportunity for the trainee to produce meaningful work.

One of the items the task team asked the sub-team to evaluate was the addition of contractual obligation or employment commitment for future trainees. It was inferred that upper management was concerned about losing the training cost associated with a trainee that may leave during or soon after completion of the program. In analyzing the training cost associated with the program, the real cost is not tuition or formal training, but lost productivity of the position while the trainee rotates through their EIT phase. In an effort to minimize this risk to the Department, the team discussed

reducing the length of the rotational phase or reducing the number of phases to just the core functions of the Department (Construction, Maintenance, Design and Traffic Operations). This would allow the trainee to begin to participate in more responsible and meaningful work sooner and reduce the Department's training cost.

Overwhelmingly the group valued the rotational time spent in the program. The rotational phase allows the trainee to establish how the Department works. Most importantly it also teaches the trainee who to go to, when issues arise with other departments. The relationships built during the EIT phase are an invaluable asset to a former trainee when they begin to manage projects. They have a distinct advantage to non-PET managers as they have a better understanding of the organization. With this in mind, the four phase suggestion was not supported by the group. What was agreed upon was that some of the minor phases may have too much time allotted and can lead to unproductive use of the trainee's and Department's time.

While the majority of the group supported some reduction in phase length, the difficulty lies in determining the duration of the rotational phase. There was not a clear consensus regarding how to reduce and reschedule the rotational phase. Some were in favor of a 12 month rotational length, while others supported a longer, 15 month schedule. It also must be noted that some districts were also in favor of a no change or a continuation of the 18 month schedule. The team recommends further study to determine the optimal rotational phase length. We further recommend that any change in the rotational phase should be done via pilot project where a select few trainees are slotted in a 12 and 15 month phase. This will allow the program coordinators to evaluate the effectiveness of the different rotational durations.

- **Add an additional six month specialty phase to EIT phase.**

The current PET program includes a six month specialty phase that follows the completion of the rotational phase. This phase is generally selected by the trainee, but in some cases district needs may limit the choice of the trainee. The purpose of the specialty phase is to introduce the trainee to more responsible engineering work. This allows the trainee to evaluate their interest in their chosen phase and gives them the opportunity to change their senior phase, if desired.

The group discussed adding an optional additional specialty phase to make up the 3-6 month reduction of the rotational phase. This would allow the trainee to choose two different specialties that could aid in their professional development and assist in making a more informed decision on what senior phase to choose. This would allow a trainee to be a well-rounded engineer and gain new perspectives outside their chosen specialty. The Department's cost to implement this change is negligible, since typically specialty phases are project driven and include more productive work assignments. The recommendation of the group is to utilize the following amended schedules:

- EIT Phase 12-15 months
- Specialty phase I 6 month
- Specialty phase II 6 months
- Senior phase 24-21 months

- **Discontinuation of Phase Exams**

The group was in support of discontinuing the phase exams. The majority felt that the material covered on the exam often was not pertinent to the material covered during the phase rotations. In addition the tests were not helpful in the preparation for the P.E. exam. In polling the group, no examples of any trainee failing an exam more than once could be cited. Since the exams do not effectively measure trainee performance, and offer no P.E. exam preparation, we recommend eliminating all phase exams from the program.

Other Recommendations:

- **Utilize the EPS system to rate trainees.**

The group discussed utilizing the EPS system to complete some of the ratings that are done on hard copy forms. In the spirit of CPR², the group supported having the trainees utilize the current EPS system or the new system slated to replace EPS. Since all other employees outside of the PET program are subject to the EPS system, familiarizing the trainee to the rating system will aid in their progression into management. The group felt that each phase supervisor should continue to use the phase review forms and existing procedure for phase ratings. The PET program coordinator would collect the various phase ratings for the review period and incorporate them into an EPS rating for the trainee, in lieu of the Professional Engineer Training Program Trainee Rating form for the 6, 12, and 18 month evaluations.

- **Compilation of trainee material statewide via SharePoint site.**

The group felt it would be helpful to compile a database of different trainee material being used throughout the state. D7 was tasked with compiling phase projects, materials, and other trainee related material being used in each district and placing it all on a SharePoint site. The site has been set up at:

<http://fdotsharepoint.dot.state.fl.us/sites/Officeofdesign/ProSup/PETTraining/Shared%20Documents/PE%20Trainee%20Mock%20Projects> All PET program coordinators should be granted access to add new sample projects and share ideas and lessons learned. The information should be open to view by all Department personnel.

- **Statewide PET Program coordinators to meet periodically**

One benefit to our statewide group's meeting was the sharing of ideas and experience across district lines. Since our Tallahassee phase most of us haven't had the opportunity to meet as a group of trainees. We enjoyed the discussion and learned that each district has some different approaches on how to implement the program. We feel the Program Coordinators statewide should meet at least annually. It may be beneficial to include the program directors as their schedules allow. This sharing of ideas will allow the program to become more effective and help achieve our CPR² goals.

- **Assistance with P.E. exam preparation.**

The group was also in favor of the Department providing assistance with P.E. exam preparation since the primary goal of the program is to develop professional engineers. This assistance can take many forms including compiling departmental training material or reimbursement of P.E. preparatory class

tuition after successfully completing the exam. Reimbursement may be 100% or partial and could be funded through the training budget. The group felt this would help further develop the current trainees and enhance the effectiveness of the program. It also could be used as an additional recruitment tool for prospective trainees.

- **Continue the mentoring program.**

A majority of the districts use the mentoring program and feels it is beneficial to trainee development. We recommend continuing the program and encourage the districts underutilizing the program to move forward with its implementation. We feel the current mentoring procedures are adequate and further formalization of the program may lead to loss of the program's effectiveness as mentors would be bogged down with forms and other requirements.

- **Continue pay incentives.**

The group briefly discussed the program's pay incentive component. There was no support for eliminating the pay incentives, because most felt that not having the ability to grant pay increases would place the Department at a hiring disadvantage if the economy improves.

- **Update phase checklists.**

The central office PET program procedure contains a checklist for each major phase that identifies which topics are to be covered. The procedure outlines that these checklists should be signed by the trainee and phase supervisor. However, each district does not use the checklists consistently. Many of the checklists are outdated and do not conform to current organizational structure or group functionality. The team recommended that these checklists be updated.

- **Other Hiring Practices.**

In an effort to reduce the Department's risk associated with the training duration, the team discussed requiring trainees to make commitments to remain with the Department for a specified term. Aside from the perceived difficulty in enforcing a commitment of this type, the group also felt that this would potentially deter prospective hires, and place the Department at a hiring disadvantage when the economy improves.

The group discussed several recruitment alternatives. The first was requiring trainees to obtain their EIT prior to their hire date as a condition of eligibility for the program. The group consensus was that requiring the EIT would not be the best solution, but each district should have the flexibility to utilize it as a secondary screening tool. In addition, the group also discussed hiring trainees for a specific position in lieu of the trainee choosing their specialty phase. Many districts have found this approach useful in certain situations, and the group felt that each district should continue to be able to utilize this approach, where appropriate.

RECOMMENDATION ON NUMBER OF HIRES IN PET PROGRAM

There are currently 72 PET positions in the Department. These positions are divided between Engineer in Training positions (4654) and Senior Engineer Trainee (4655). See the following table for the distribution between Districts.

Comparison of PET Positions to PE Positions								
	2012 PE Positions	Vacant PE Positions at 10% rate	Current No. of EIT Positions 4654	Current No. of SET Positions 4655	Avg. No. PET's per Year Available to fill PE Position	Percent of PET's Available to fill Positions Each Year	No. of PET Graduates needed per year to fill 25% Vacancies	No. of PET Graduates needed per year to fill 50% Vacancies
D-1	52	5.2	4	4	2	38.5%	1.3	2.6
D-2	101	10.1	2	7	2.25	22.3%	2.525	5.05
D-3	61	6.1	2	6	2	32.8%	1.525	3.05
D-4	119	11.9	9	10	4.75	39.9%	2.975	5.95
D-5	84	8.4	3	5	2	23.8%	2.1	4.2
D-6	73	7.3	6	4	2.5	34.2%	1.825	3.65
D-7	48	4.8	3	4	1.75	36.5%	1.2	2.4
CO/SMO	116	11.6	3	0	0.75	6.5%	2.9	5.8
Total	654	65.4	32	40	18	27.5%	16.35	32.7

There is some reclassification between these positions as trainees move from an EIT to a SET. With this level, the current position classification allows hiring of 16 to 18 PET's each year. This is fairly close to the ten year average of 19.4 PET's per year. This hiring rate, or program size, will supply PET graduates for about 25% of the average PE vacancies expected each year. This is based on full retention of PET's through the program.

The size of the program should be related to the number of PE positions and the turnover rate. If the PE turnover rate is 10% and the desire is to have PET graduates available to fill 25% of those vacancies, then the PET program would have to produce graduates at a rate of 2.5% of the PE positions. If the desire is to have PET graduates available to fill 50% of those vacancies, then the PET program would have to produce graduates at a rate of 5% of the PE positions. These percentages would slide up or down in relationship to the turnover rate.

If the upper range for the number of PET's available to fill vacant PE positions is 50%, then there would need to be about 33 program graduates each year. This would double the size of the program with 132 positions: 66 EIT's (33 hires/year for two year phase) and 66 SET's.

The recommendation is the PET program should not be any smaller than the current level in terms of total positions allocated to the program. To continue hiring 16 PET's each year the minimum size of the program is 64 positions: 32 EIT's (16 hires/year for two year phase) and 32 SET's. The hiring for the past few years has been below this level. If PE turnover increases, there may be a need to increase PET hiring.

The recommended statewide hiring level for the PET program ranges from 16 to 33 PET hires per year. This is a wide range; with the hiring level based on PE turnover rates and the expected level of PET's available to fill PE management and leadership positions. This is further complicated by the varying number of PE positions in each District and the Central Office and the fact the Central Office does not traditionally hire PET's. The below table show the recommended hiring levels for the program to recruit, retain and advance engineers into management and leadership roles in the Department.

PET Hiring Recommendations				
	2012 PE Positions	Average No. PET's Hires per Year (minimum)	Average No. PET's Hires per Year (maximum)	Average No. PET's Hires for Past 10 Years
D-1	52	2	4	2.3
D-2	101	3	6	3.2
D-3	61	2	4	2.2
D-4	119	3	6	4.8
D-5	84	2	4	2.4
D-6	73	2	4	2.4
D-7	48	2	4	1.3
CO/SMO	116	0	1	0.8
Total	654	16	33	19.4