THE TECHNICAL MANAGERS' MANUAL

Compiled By

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2002

Part of the USATF National Officials Monograph Series on how to officiate. Each monograph covers the various techniques for each officiating assignment. These monographs are intended for more in depth understanding of each job. They are intended for both the novice and seasoned official. They cover the real details of the job and how it should be preformed. They summarize various techniques to accomplish the job. These monographs can be copied and used for officials training only

USATF National Officials Committee Training Monograph Series

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Introduction and Role:

The Technical Manager shall be responsible for ensuring that all the track and field venues are ready for competition. That includes but is not limited to the water jump, hurdles, runways, circles, arcs, sectors, and landing areas for field events, and all equipment are in accordance with the Rules. This will include overview and/or the verification of the calibration of electronic measuring equipment. Obviously the role has both pre-meet and during meet aspects. This role as an official's position is new in USATF meets in 2001 and is slightly different in scope than the definition in IAAF Meets. We have excluded the Weight and Measures official or Implement Inspector official role in the United States since that is already well established. If you do your job right the competition official should have only to officiate.

The Technical Manager is responsible for the planning and the preparation of the field of play, particularly the technical aspects of the sport. One role is to manage or at least overview the activities of the field crews who are responsible for setting up the various track and field venues. This includes, but is in not limited to, the timely movement of the big equipment like the pads, performance boards, standards etc. to and from the venues as well as insuring that set up is technical correct. In some places this is done by a facility maintenance crew, in others technical manager may manage a field crew. But in either case it is technical manager's job to overview these activities to insure that the net result is the compliance of the venue with the appropriate rules being used for the meet. It includes the proper set up of cones and start lines on the track.

To properly do this role it is important that the technical manager be involved in the planning stage of the meet, at least in review of the final venue plan and schedule. Although the technical manager may not be able to impact either, at least the manager will be informed and be able to devote attention to where a problem might be expected. This might include too little time to change from men's to women's water jump configuration, layout of throwing sectors, or layout of cones for an alley start of the 10,000.

Rulebooks:

Always have the current rulebook for the type and level of meet you are officiating. The specifications required are slightly different in some cases, particularly in the high school rulebook. They can be purchased as follows:

(1) National Federation of State High School Associations
11724 NW Plaza Circle
P.O. Box 20626
Kansas City, MO 64195-0626
816-464-5400
www.nfhs.org

Published in 3 volumes at $6.00 each, Rules, Officials and CaseBook. Rulebook is annual and the other two are alternately biannual plus $4 shipping charges.

(2) National Collegiate Athletic Association
P.O. Box 6222
Indianapolis,IN 42606-6222
317-917-6222
www.ncaa.org
Published annual at a cost of $7.

(3) USA Track and Field
USATF Book Order Department
P.O. Box 120
Indianapolis, In 46206
317-638-9550
www.usatf.org

Cost of $12.00 biannually although some updates do occur each year.

(4) International Association of Athletic Federations
17, rue Princess Florentine

BP 359 - MC 98007
Monaco Cede
(377) 93 10 88
Fax (337) 93 15 95 15
www.iaaf.org

This is also available from USATF. Cost of $12 biannually.

Track and Field Facilities

For the technical details concerning track layout and field venues, refer to the IAAF Track and Field Facilities Manual, 1999 Edition which is available from IAAF at a cost of $95 USA and can be ordered from their website. This is a must for the serious technical manager since it details the rational for all venue construction and layouts.

Equipment Usually Available from the Meet Site:

Note if equipment is not available then you need to get it and have a means of controlling it.
Hurdles (80-90 min depending on number of lanes and preferably 10 more than needed)
Steeple Chase Hurdles (4, 5th at water jump)
Standards
- High Jump
- Pole Vault and extensions if needed

Pits
- High Jump
- Pole Vault

Javelin Toe Board
Hammer Circle Insert
Shot Toe Board
Performance Boards (at least one for each field event, preferably 3 for pole vault)
Vertical Jump Bars (at least two per pit)
Photo Finish Equipment
Finishline Stand
FAT Camera Stands
Event Timing Clocks (one per field event and one for finish line)
Brooms (One per runway or circle, 2 at horizontal jumps)
Shovels (Minimum of one per horizontal jump venue)
Rakes (Minimum of one per horizontal jump area and shot area)
Pole Vault Bar Replacers (preferably two sizes, less than 14 feet and 19 feet)
Pole Vault Measurement Bar
Blowers (Minimum of one, more if wet)
Squeegees (Minimum of three, preferably one per field venue and three for track)
Towels (4 per field venue, unless raining)
Horizontal Jump Boards (one practice and preferably two competition boards per runway)
- Plasticine Boards
- Adjustment Screws
- Removal Devices

Socket Set
Crescent Wrenches
Drill and bits
Hammers, claw and sludge
Nails (several sizes)
Screwdrivers
Pliers
Sector Tape and clips (clips for every 10 feet of tape)
Extra track surface for extending runways or covering covers
Glue for track and runway surfaces
Spray paint for sectors and lines
Measuring Tapes (100 m fiberglass and steel for confirming or laying out sectors or lines on track, 3 meter/10 ft combination steel tape for event circles, confirming standard markings for the High Jump and Pole Vault. A 30 m tape for shot is also useful to have.

Golf Cart: Use of an ATV, or Golf Cart is essential to reduce wasted time and to get supplies to the locations. The Technical Manager needs one and each field crew should have one, at least during the pre meet/set up phase.
Radios Need communications with each crew and then with the meet management and officials as a minimum.

GENERAL EQUIPMENT LIST

Equipment		Major		4 Way		Dual	
AIR BLOWERS (GAS POWERED)		3		1			
AWARDS							
BASKETS (CLOTHES)		30		16			
BATONS		10		6		4	
BENCHES ATHLETES		22		6			
BLOCKS		8		8		8	
BLOCKS, AUTOMATIC		16					
BROOMS		8		4		3	
BULL HORNS		3		4		4	
CLOCK FINISHLINE & TRIPOD		3		1		1	
CLOCK, EVENT TIMING		9		1		1	
CONES LARGE			5		3		3
CONES MEDIUM (10 IN)		10		5		5	
CONES SMALL (3 IN)		25		8		8	
COOLING FANS		5					
COPIERS		3		1		1	
CROSS BARS HIGH JUMP		8		2		2	
CROSS BARS POLE VAULT		4		2		2	
DISCUS 1.0 KG	4						
DISCUS 2.0 KG	4						
DISTANCE MARKERS (12M-90M)		24		16			
EVENT PERFORMANCE BOARD NUMBERS		60		20			
EVENT PERFORMANCE BOARDS (4 DIGITS)		11		3			
EVENT PERFORMANCE BOARDS (5 DIGITS)		3		2			
EVENT PERFORMANEC NAME/NUMBER		8		5			
EXTENSION CORDS (50 FT)		6		3		2	
FAX MACHINES		4					
FENCING (TEMPORARY, PLASTIC AND METAL)							
FIELD EVENT RECORDER'S STAND		10		5			
FLAG RED		17		7		2	
FLAG WHITE		17		7		2	
FLAG YELLOW			40		7		4
FLAGS RECORD (SET OF 4 Meet,Stad,Am,World)		5					
FLAGGING (FEET)		2000					
FORMS APPEAL (TOTAL)		25					
FORMS DAILY EVENT		24					
FORMS PKG PER EVENT HOR JUMP OFFICIALS		5		2		2	
FORMS LAP (TOTAL)		20		2		2	
FORMS PROTEST (TOTAL)		36					
FORMS RECORDS (TOTAL)		28		2		2	
FORMS UMPIRE (TOTAL)		100		10			
FORMS PKG PER EVENT VERT JUMP OFFICIALS		4		1		1	
FORMS W&M		100		10			
FORMS PKG PER EVENT WINDGAUGE		2		1		1	
GARBAGE CANS (PER VENUE)		1		1			
HAMMER STRETCHER			2		1		1
HAMMER RING INSERT		2		1		1	
HAMMERS 4.0 KG		3					
Equipment		**Major**		**4 Way**		**Dual**	

HAMMERS 7.26 KG		3		
HIGH JUMP PITS (COMP AND PRAC)		2	1	1
HIGH JUMP STANDARDS		6	2	2
HURDLE BARS/ ATTACHMENTS EXTRA		10	2	
HURDLE CARTS		5	2	
HURDLES		90	80	80
IMPLEMENT CARTS		8	2	2
JAVELIN 600 G	6			
JAVELIN 800 G	6			
JAVELIN BOARDS (W&M)		2	1	1
LAP COUNTERS		2	1	1
LEVELS FOR BARS		2	1	
LYNX FIELD VENUE RECORDERS		10		
MARKERS (WIDE FELT TIP FOR SIGNS)		10	2	2
MEASURING POLE -POLE VAULT		2	1	1
MESSAGE BOARDS (OFFICIALS)/WHITE BOARDS		1		
MEASURING FIELD EVENTS (ELECTRONIC)		9		
MILK CARTON BOX (SHOTS)		4	2	1
PENCILS		60	15	10
PENS		30	5	5
PIT SIDE DISTANCE INDICATORS		3		
PIT LEVELING DEVICE		2		
PLASTIC IMPLEMENT STORAGE BOXES		6	3	2
PLASTICINE				
PLASTICINE BOARD REPLACEMENTS		8	2	2
PLASTICINE TRAYS		6	2	2
PLASTICINE PUTTY KNIFES (VARIOUS SIZES)		6		
PLASTICINE ROLLERS		3		
PLASTICINE TROWELS		3		
PLUMB BOB		3	2	1
POLE VAULT BAR RAISERS (12-14 FT)		6	2	2
POLE VAULT BAR RAISERS (17-19 FT)		6	2	2
POLE VAULT EXTENDORS (2 PER SET)		3	1	1
POLE VAULT PITS (2 COMP/ ONE PRAC)		3	1	1
POLE VAULT STANDARDS		6	2	2
PORTABLE LIGHTING				
POSTER PAPER (VARIOUS SIZES)		5		
PRACTICE THROWING NET (DISCUS/HAMMER)		1		
RAIN ROLLERS		3	3	3
RAKES		6	3	3
RESULTS BOARDS		5	1	1
ROTOTILLER		2	1	
RUNWAY MAKERS (20/SET)		8		
SAFETY PINS (10 PER PERSON AVG.)				
SECTOR FLAGS		6	6	6
SECTOR LINE CLIPS		300		
SHOTS 4 KG		3		
SHOTS 7.26 KG		3		
SHOT RACKS		6	4	2
SHOVELS		4	4	4
SIGN MAKING KIT		2		
SIGNS				
SOUND SYSTEM (CLERKS, STARTERS, OFFICIALS)		9	3	
SPIKE WRENCHES		5	2	
SPIKES (VARIOUS TYPES & SIZES)		50		
Equipment		**Major**	**4 Way**	**Dual**
STARTING BLOCK CART		2	1	1
STARTING BLOCKS (AUTOMATIC)		10		
STARTING BLOCKS (PRACTICE)		8	8	8

STARTER'S LADDER/PLATFORM (100/200)		2		1		1		
STARTERS SHELLS 32,38 (1 per flight plus 10)								
TABLES		28		10		5		
TAPE FIBERGLAS 35M		6		3		3		
TAPE FIBERGLAS 90M		2		2		2		
TAPES 100M STEEL		2		1		1		
TAPES 50 M STEEL		3						
TAPES 8 M STEEL		3		2		2		
TIMERS (DIGITAL DISPLAY)		7		1				
TOE BOARDS (SHOT)		3		1		1		
TOE BOARDS (LJ/TJ, Practice + Comp)	12		3		2			
TOWELS		50		15		5		
TRACK MASTER		2		1		1		
VENUE TENTS		11		3				
VINLY TAPE HOLDERS			12					
VINYL 2" FIELD MARKING TAPE (VAR. COLORS) FT		2350						
WIND GAUGES			4		3			2
WIND SOCKS		6		2		2		

Measurement Equipment:

Measuring equipment must be handled with care and properly stored, maintained and calibrated in order to do the best job. The misuse of equipment is usually the biggest problem and is the result of lack of knowledge or training. Misuse leads to damage which results in inaccuracies even when a competent person is using it.

NOTE: All measurement equipment should be checked at least annually against a known standard. The standard should be traceable to a Bureau of Standards standard. This is true for scales, weights and measurement devices i.e. tapes and calipers. Each year check that the gauges have not been damaged enlarged or incurred weight loss as a result of usage.

Recommended Personal Equipment:

Although much of this may be available at the site, having your own saves time and energy trying to find it when you need it. Likewise you know the condition of the items.

Fiberglass Measuring Tape: 1-100 m. Use for preliminary checks and layout since easier to use than long steel tapes. All verification measurements must be made with steel tape. Proper measurement with a fiberglass tape requires that the tape is stretched tight and straight. Then relax the tension so it is just taut (without lengthening the distance) before recording the reading. It may not be used for record or certification purposes.

Steel Measuring Tapes: 1-8 M and preferably 1-100 M. Now all governing bodies require steel tapes or other scientific measuring devices for record or certification purposes. Use the 8 m for circles and vertical jumps standard checks. Use the 100 m tape for checking the throwing sectors and runway lengths.

Marking Pens and Paint: It is preferable to use spray paint, paint sticks or indelible ink pens. Need white paint plus colored paints for alternate sectors. Paint sticks are easier to use and are available in your local hardware store, stationary store or hobby shop. Spray paint can also be used for large marks but is not a accurate a mark. Fluorescent colors stand out more. Broad Line Deco Color Opaque Waterproof Markers also work well. Some Marks Lots should be available in your kit.

Adhesive and Duct Tape: For putting names on equipment or runways where you don't want permanent marks, laying out multiple horizontal jump take off boards. Use the duct tape as the first layer since it usually sticks better and will hold the adhesive tape together.

Masking Tape: 1” and 2” for markings where don't want permanent markers, To highlight permanent mark locations or notes.

Scotch Tape: for signs, marking things.

Paperwork: Have a current meet schedule so you know which events will occur simultaneously to look for safety implications or interferences.

Level: Used to check level and vertical position of standards.

Calculator: For use in calculating measurements.

Plastic Pipe and Plugs: Use to mark field for sector lines, distance lines and qualifying lines.

Paint: Spray paint for white lines. Spray paint for line indication in field.

Handbook: Keep a copy of this handbook in a folder
Colored Tape: for marking locations on track, 1" and 2"
Tool Box and Bag: For transporting tools for various jobs around the track both before and during the meet.
Sprinkler Flags: For marking locations and laying out sectors.
Other Miscellaneous Equipment: Wet and Dry Towels for Cleaning Venues
Notebook: To do any needed calculations and to record calibration procedure.
Tools: Assortment of screwdrivers sizes and types (flat tipped and philips), a hammer, pliers (needle nose, channel lock and slip joint,), vise grips, ratchet set, square, string, rope, plumb bob, knife, scissors, c clamps, saw, hacksaw, drill and bits to 1/2 inch, extension cords, hex wrenches, adjustable wrenches , putty knife, pry bar, staple gun, wire brush, flashlight.
Fasteners: assortment of nails, nuts and bolts, screws, cable ties, rope. Have extra hex set screws, horizontal jump board adjustment screws.
Surveyor's Scope or Laser Measuring Device: although not mandatory, it is certainly useful for validating marks and sectors as well as levels.

STANDARD TRACK COLORS

Synthetic Tracks(IAAF)

White	All lane lines, all starts and 400 m staggered start, all curved starts, all finish lines.
White w Green	800 m Staggered Start
White w Blue	4x400 Staggered Start
Green	Break Lines
Light Blue	4x400 Relay Zones
Yellow	4x100 Relay Zones
Orange	4x100 Acceleration

Other Hurdle Positions (if needed)

Green	400 m Hurdle	Pink	70 m Hurdle
Blue	110 m Hurdle	Orange	75 m Hurdle
Yellow	100 m Hurdle	Black	80 m Hurdle
Red	Call up Lines	Purple	200 m Hurdle (Men)
		White	200 m Hurdle (Women)

STAGGERS FOR VARIOUS LANE WIDTHS

Lane Width	Stagger, m	1 Turn	2 Turn	3 Turn	4 Turn
30 in	Lane 2*	2.07 m	4.14 m	6.22 m	8.29 m
0.762 m	Others	2.39 m	4.79 m	7.18 m	9.57 m
36 in	Lane 2*	2.55 m	5.10 m	7.66 m	10.21 m
0.914 m	Others	2.87 m	5.74 m	8.62 m	11.49 m
42 in	Lane 2*	3.03 m	6.06 m	9.10 m	12.13 m
1.067 m	Others	3.35 m	6.70 m	10.06 m	13.40 m
48 in	Lane 2*	3.519 m	7.038 m	10.557 m	14.076 m
1.219 m	Others	3.833 m	7.666 m	11.499 m	15.332 m

* Use when there is a 5 cm raised curb to mark the inside of lane 1 otherwise use the other measurement. When a curb, lane 1 is measured differently than the other lanes.

HURDLE SPACING

DON'T SURPRIZE A HURDLER

Everyone loves a hurdle race and here is how you set up the hurdles so you do not surprise the hurdlers.

RACE METERS	AGE/DIVISION	NO. OF HURDLES IN RACE	HURDLE HEIGHT	DISTANCE TO FIRST HURDLE	DISTANCE BETWEEN HURDLES	DISTANCE TO FINISH
50	Women	4	33"	13.00 m	8.50 m	11.50 m
50	Men	4	42"	13.72 m	9.14 m	8.86 m
55	Women	5	33"	13.00 m	8.50 m	8.00 m
55	High School Boys	5	39"	13.72 m	9.14 m	4.72 m
55	Men	5	42"	13.72 m	9.14 m	4.72 m
60	Masters Women W60+/Masters Men M80+	5	27"	12.00 m	7.00 m	20.00 m
60	Masters Women W50-W55/Masters Men M70-M75	5	30"	12.00 m	7.00 m	20.00 m
60	Masters Women W40-W45	5	30"	12.00 m	8.00 m	16.00 m
60	Women/Masters Women W30-W35/Masters Men M60-M65	5	33"	13.00 m	8.50 m	13.00 m
60	Masters Men M50-M55	5	36"	13.00 m	8.50 m	13.00 m
60	Masters Men M30-M45	5	39"	13.72 m	9.14 m	9.72 m
60	Men	5	42"	13.72 m	9.14 m	9.72 m
75	High School Girls	7	30"	13.00 m	8.50 m	11.00 m
80	Master Women 60+/Master Men 80+	8	27"	12.00 m	7.00 m	19.00 m
80	Midget Girls & Boys	8	30"	12.00 m	7.50 m	15.50 m
80	Masters Women W50-W59/Master Men M70-M75	8	30"	12.00 m	7.00 m	19.00 m
80	Masters Women W40-W45	8	30"	12.00 m	8.00 m	12.00 m
100	Youth Girls	10	30"	13.00 m	8.00 m	15.00 m
100	Int. Girls/Young Women/Women/Youth Boys/ Masters Women W30-W35/ Master Men M60-M65/High School Girls	10	33"	13.00 m	8.50 m	10.50 m
100	Experimental Women USATF/ Masters Men M50-M55	10	36"	13.00 m	8.50 m	10.50 m
110	Intermediate Boys/Young Men/High School Boys/ Masters Men M30-M45	10	39"	13.72 m	9.14 m	14.02 m
110	Men	10	42"	13.72 m	9.14 m	14.02 m
200	Youth Boys & Youth Girls	5	30"	20.00 m	35.00 m	40.00 m
300	Masters Women 60+/Master Men 70+	7	27"	50.00 m	35.00 m	40.00 m
300	Masters Women W50-W55/Master Men M60-M65	7	30"	50.00 m	35.00 m	40.00 m
300	High School Girls	8	30"	45.00 m	35.00 m	10.00 m
300	High School Boys	8	36"	45.00 m	35.00 m	10.00 m
400	Intermediate Girls/Young Women/Women Masters Women W30-W45	10	30"	45.00 m	35.00 m	40.00 m
400	Masters Men M50-M55	10	33"	45.00 m	35.00 m	40.00 m
400	Intermediate Boys/Young Men/Men/ Masters Men M30-M45	10	36"	45.00 m	35.00 m	40.00 m

NOTE: To find the Start and Finish line for a 200 Intermediate Hurdle and a 300 Intermediate Hurdle race when you know the 400 Intermediate Hurdle markings follow these directions:

- Start with the last hurdle in your race and count back the number of hurdles in the race +1
- Measure back 10 meters from the fist hurdle minus the +1 hurdle
- Remover hurdle 1 minus the + 1 hurdle minus leaving the number of hurdles you want for the race in the first place and now have 45 meter to the first race hurdle.
- Measure from the last hurdle to the finish line and enjoy your race.

LOCATION OF TRACK MARKS: (400-Meter Track)

Mark	Entire Track Distance (meters) From Start	To Finish	Mark	Last 110 Meters Distance (meters) From Start	To Finish
Start/Finish/400/10000	0	400	400H-8/3rd X Zone Start/(Start 110)	290	110
4th X Zone End	10	390	Start 100/3rd X Zone Center	300	100
400H-1	45	355	110H-1	303.72	96.28
440H-2/4th Zone Fly-Start	80	320	3rd X Zone End	310	90
1st X Zone Start	90	310	110H-2	312.86	87.14
Start 300/1500/1st X Zone Center	100	300	100H-1	313	87
1st X Zone End	110	290	300H-6/Start 80	320	80
400H-3	110	285	100H-2	321.5	78.5
300H-1	145	255	110H-3	322	78
400H-4	150	250	400H-9	325	75
300H-2/2nd Zone Fly-Start	180	220	100H-3	330	70
400H-5	185	215	110H-4	331.14	68.86
2nd X Zone Start	190	210	80H-1	332	68
Start 200/3000/5000/2nd X Zone C	200	200	100H-4	338.5	61.5
2nd X Zone End	210	190	80H-2	339.5	60.5
300H-3	215	185	110H-5	340.28	59.72
400H-6	220	180	100H-5/80H-3	347	53
300H-4	250	150	110H-6	349.42	50.58
400H-7	255	145	80H-4	354.5	45.5
3rd Zone Fly Start	280	120	300H-7	355	45
300H-5	285	115	100H-6	355.5	44.5
400H-8 3rd X Zone Start	290	110	110H-7	358.56	41.44
Start 100/3rd X Zone Center	300	100	400H-10	360	40
3rd X Zone End	310	90	80H-5	362	38
300H-6	320	80	100H-7	364	36
400H-9	325	75	110H-8	367.70	32.30
300H-7	355	45	80H-6	369.5	30.5
400H-10	360	40	100H-8	372.5	27.5
4th Zone Fly Start	380	20	110H-9	376.84	23.16
300H-8/4th X Zone Start	390	10	80H-7	377	23
Finish/Start	400	0	4th Fly Start	380	20
			100H-9	381	19
			80H-8	384.5	15.5
			110H-10	385.98	14.02
			100H-10	389.5	10.5
,			300H-8/Start 4th X Zone	390	10
			Finish/Start	400	0

Note: Most lines in track and field are 5 cm wide. The exceptions are the horizontal jump takeoff boards, the shot toe board, the javelin foul arc and the zero indication for the standards on the pole vault.
All boundary lines in track and field are out. Thus it is the front edge (edge nears the fair area or the competitor which is the point of measurement. For example it is the inside of the sector line, which constitutes the sector. It is the edge of the line nearest the competitor that is the measure point. Thus the start line is the edge of the line nearest the competitor and the finish line is the edge nearest the competitor.

STEP BY STEP GUIDE FOR A TECHNICAL MANAGER

This section deals with the order of activities of a Technical Manager each time he or she is scheduled to work a competition. The differences between the rules of the various sanctioning bodies are highlighted when significant. It starts with what must be done before the day of the meet and continues through the day of the meet. Of all the officiating jobs this is the one that requires the most planning and work before a meet.

Lines:

All lines in track and field are generally out of the field of play except the horizontal takeoff boards and the line indicating the outside border of your lane. All lines are 5 cm in width except the horizontal takeoff boards (20 cm), the javelin foul line (7 cm) and shot toe boards (11.2 to 30 cm) and the zero or back of box line in the pole vault (1 cm). Note the edge closest to the competitor is normally considered the actual measurement position. Thus the starting line and the finish line are at the front edge of the line (the edge nearest the competitor).

TRACK EVENTS

BEFORE THE DAY OF THE COMPETITION

1. Verify the existence of a track curb around the whole track.
2. Verify facilities surveyor's report and that it was measured correctly (with or without a curb). Order new one if needed.
3. Verify existence and accuracy of major track markings and colors. See tables.
4. Mark any special race distances or hurdle markings.
5. Check location of lap counters, timers and judges and/or finish line camera(s).
6. Check the location and number of computers and monitors for electronic timing.
7. Verify if all track races can be held while the curb is in. If not determine how many cones will be needed.

ON THE DAY OF THE COMPETITION
BEFORE COMPETITION:

1. Check location of wind gauge for first track event needing it.

DEPLOYMENT OF CONES ON A TRACK WITHOUT OR MISSING CURBING

Cones must be placed such that the edge of the cone is the out of bound point. Thus when curbing is missing the cones should be place at distances not to exceed 4 m from each other. Cones should be a minimum of 20 cm (8 inches) in height. The area where cones are used should also be marked by a 5 cm white line in place of the curbing.

LOCATION OF FINISH LINE CAMERAS

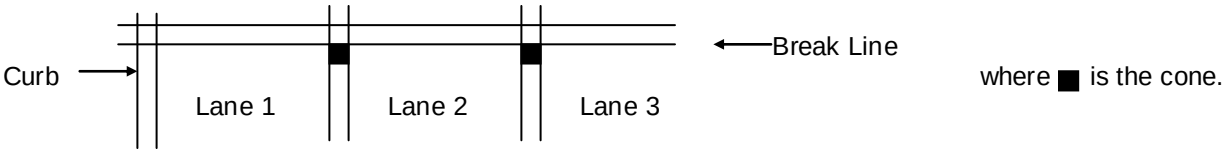
Cameras should be aligned with the front edge of the finish line as much as possible. This is the true finish line. Cameras and or trip devices must be protected so that they don't get hit and misaligned during the meet.

MARKING OF SPLIT WATERFALL STARTS WITH ALLEYS

When there are too many entries to have a single waterfall start then a second alley must be set up. The length is normally till around the first curve, much like the one turn stagger. Cones should be placed on the inside lanes outside line such that they cover the line at a distance of at least every 4 m and preferably closer. They should continue to the break line. (See example for marking the one and three turn staggers below.)

MARKING OF ONE TURN OR THREE TURN STAGGER LINE

Small cones which are 5 cm by 5 cm (2 x2 inch) and nor more than 15 cm (6 inches) high may be used to mark the cut in line. Cones should be placed such that they rest just before the breakline and on the boundary line for the inside lane). Three inch cones are best for this service.



CHECK MARKS FOR RELAYS

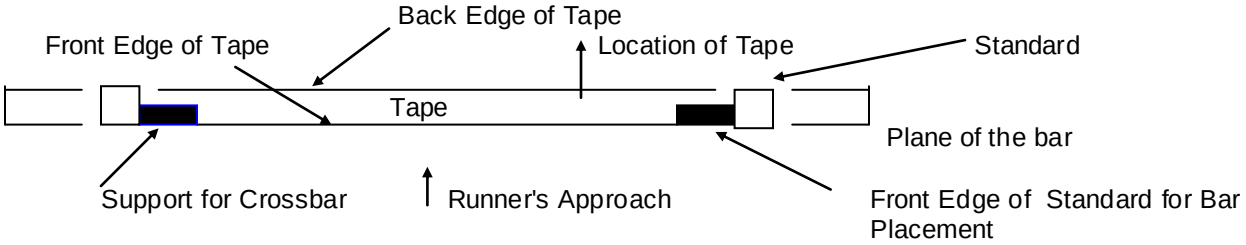
Except in relays runners may not place marks on or along side the track as aids. When all or the first portion of a relay race is being run in lanes, a competitor in USATF and IAAF competition may place one check mark on the track within his own lane. Normally this will be a piece of adhesive tape, which is a maximum of 5cm by 40 cm, of a distinctive color, which will not be confused with other permanent markings. (Note each rulebook has a slight different requirement.)

LOCATION OF WIND GAUGE

The wind gauge should be adjacent to lane 1 and within 2 m of the straightaway. It should be 1.22 m (4 ft.) above the track surface and preferably 50 m from the finish line for the 100,110 and 200 races.

LOCATION OF HIGH JUMP BAR PLANE

USATF and IAAF have defined the front edge of the vertical standard for the high jump to be the foul plane for the high jump. Thus the indicator tape for that plane starts at that line and should be marked under the bar. The line, normally of adhesive tape will run the distance from three meters outside of the one of the standards to three meters beyond the other standard for a total of approximately 10 meters.



CHECKING AND MARKING OF INDOOR TRACKS AFTER INSTALLATION

Since indoor tracks are often put up and taken down each season there is more chance of changes in measurements. As the wood ages and depending on how the track is joined it is almost normal that track distances will change. This is true even of the new aluminum based tracks. Likewise there is always the possibility that the track is not put back together exactly the same way each year or that the sections are tightened differently. Thus is it important that indoor track markings be check each time it is assembled. This must be done either with a certified steel tape or with an electronic device.

HURDLE HEIGHTS and LOCATIONS

Check the hurdle heights for all steeplechase hurdles when they are place on the track. Do the same for the normal hurdles. Use a string to line up hurdles across the track. Note the front edge of the hurdle bar should be directly over the front of the hurdle mark. If you are running youth or masters meet on a collegiate track you will need to layout the appropriate hurdle markings as well as race length. Preferably this is done before the day of the event. See table. The same is true if you are holding an open meet on a high school track. In particular note that there are differences in the 300 m hurdles for high school and masters.

MEASURING TRACKS

If there is a curb: Measure Lane 1at a distance 20 cm out from the edge of the curb.

If there is no permanent curb: Measure Lane 1 at a distance 30 cm out from the edged of the painted white line, which is serving as the curb or edge of the lane. This same distance is used when measuring all other lanes than lane 1.

STEEPLECHASE PIT and HURDLES

Under IAAF and USATF rules the water must be within 2 cm of the top of the pit when the race is begun. Some hurdles need to be moved onto the track after the start of the race depending on the layout. The NCAA specifies the water jump will be the fourth hurdle. Only the NCAA allows a different pit length for men and women. If your meet is using the two make sure the barrier can be easily moved and that it is in the right location for the two events.

FIELD EVENTS

BEFORE THE DAY OF THE COMPETITION:

1. Review any potential safety issues with regard to layout and meet schedule.
2. Verify the facility surveyor's report. Order new one if needed.
3. Verify existence and accuracy of all field sectors and distance markings or indicators including qualifying or record markers.
4. Determine who will layout field, what equipment is available and when it can and needs to be in place.
5. Check status and operating condition of all equipment and bars.
6. Verify circle diameters, depths (falls between 14 and 26 mm using your straight edge), runway widths and lengths. Check that the pull through points are accurately marked. If necessary mark them with paint or with a permanent marking pen so it will last. Verify that all circles and runways are clean and dry and in good repair. Check that the foul lines at on the sides of the circle extend out 0.75 M. The line is wholly in the front half of the circle, i.e. any part of the line is foul. Thus the back of the line is along the centerline of the circle.
7. Put down any additional horizontal jump takeoff boards; i.e. duct tape with adhesive tape over it or painting if allowed. Check the installed boards to see if they need painting, repair or leveling.
8. Check all venue to see if sprinklers or rain will cause flooding, or poor footing for either the athletes or the officials.
9. For the shot check the toe board to make sure it is tightly held in the concrete. For the hammer check, that if it is a dual discus/hammer facility that the ring insert is properly installed.
10. Check the cage opening and position of movable gates for the discus and hammer. If there is to be a hammer event check the gates to make sure they have the required movement in and out. Mark the gates when set for both left and right handed throwers.
11. For USA Track & Field and IAAF it is 6 meters at 5.3 meters out from the center of the circle while for high school and NCAA is 8.3 meters at 4.2 meters out from the center of the circle. The opening is centered for discus and moves right or left of the thrower depending on whether the thrower is left or right handed in the hammer. Check the condition of the cage, the netting. Are there any openings where an implement might escape?
12. Check the layout of the sector or runway to make sure the lines are correctly placed. Measure out to any distance lines so you can let the athletes know their distances. If it is not laid out properly, do it yourself.
13. The sectors vary with rulebook and are summarized in the table below:

Event	USATF/IAAF	NCAA	High School
Shot	34.92°	40°	65.5° (or 40°)
Discus	34.92°	40°	40° (or 60°)
Hammer/Weight	34.92°	40°	N/A
Javelin	28.95°	28.95°	28.95°

Note: the 40 deg sector will be use in IAAF and USATF until Jan. 2003.

The high school shot is 65.5 degrees and the discus is 60 degrees although the Games Committee can chose to use 40 degrees even at non-collegiate facilities. Forty degrees is now generally used in most meets and is mandated in high school if the discus is on the infield (The layout procedure is covered in Appendix C.)

14. Check the length and width of the javelin runway. The runway should be not more than 36.5 meters and not less than 30 meters long and 4 meters wide. Make sure the pull through point is easily identified. Make sure the arc extension lines are there and 0.75 meters long. Note both the High School and NCAA rulebooks are different since they claim the minimum runway is 36.5 m or 120 ft. (See individual throws for more details.)

15. Check the length and width of the horizontal jump runways. In IAAF meets the length should not exceed 45 m from the front of the respective take off boards. If they do make sure there is a 45 m mark. The width should be between 1.22 and 1.25 m. Mark the appropriate wind gauge location. This currently a difference between USATF and IAAF rules.
16. Check the sector, circles, runway and normal walking areas for any tripping hazards or standing water. Remove any markers left on the runways from previous competitions. Check outside the sector for possible interference with other events. If necessary blow off or squeegee the runway or circle.
17. In the long and triple jump check the level of the sand even with the level of the takeoff board. Move and wet sand as appropriate. Measure and mark any temporary boards to be used.
18. In the pole vault make sure that the back of the box or zero point is marked so that the standards can be properly placed. The width of this line is only 1 cm and the zero point is the edge of the line toward the runway. This is a requirement in USATF and IAAF competitions and highly recommended for other facilities. It helps avoid problems with pads or standards moving.

ON THE DAY OF THE COMPETITION

BEFORE COMPETITION:

1. Arrive early, at least an hour before the first event is scheduled. If possible 90 minutes or more is recommended. In a big meet you will probably want to be there at least two hours or more before the athletes will be allowed on to the venues.
2. Check in first with the Head Field Judge or Field Referee to see if there are any special rules, notes for the day or changes in schedule that might impact safety or layout.
3. If you can take the head event official with you when you inspect each venue. That way you won't have it set up differently than he or she would set it up.
4. Check out the final layout of the facilities for safety and accuracy:
   a. Check all circles and runways to see if they are clean, dry and in good repair.
   b. For the shot check the toe board to make sure it is tightly held in the concrete. For the hammer, check that if it is a dual discus/hammer facility that the ring insert is properly installed.
   c. Check the cage opening and position of movable gates for the first event, discus and hammer. For USA Track & Field and IAAF it is 6 meters at 5.3 meters out from the center of the circle while for high school and NCAA is 8.3 meters at 4.2 meters out from the center of the circle. The opening is centered for discus and moves right or left of the thrower depending on whether the thrower is left or right handed in the hammer. Check the condition of the cage, the netting. Are there any openings where an implement might escape?
   d. Check the layout of the sector or runway to make sure the lines are correctly placed. Measure out to any distance lines so you can let the head event know their distances. If it is not laid out properly, fit it yourself. (See 13 above for correct sectors.)
   e. Check the sector, runway and normal walking areas for any tripping hazards or standing water. Remove any markers left on the runways from previous competitions. Check outside the sector for possible interference with other events.
   f. Put down the high jump foul line with tape.
   g. In the long and triple jump check that the level of the sand is even with the level of the takeoff board. Move and wet sand as appropriate. Measure and mark any temporary boards to be used. If you use duct tape as initial layer with adhesive tape on top your temporary boards will last longer. Check the location of or locate the wind gauge. It should be 20 m from the takeoff board and within 2 meters of the runway and 1.22 m (4 ft.) above the competition surface.
   h. Check to make sure you have needed rakes, brooms, tapes, markers, forms, pens, flags, watches, ladders, sector markers, distance markers, performance indicators, record indicators and recorder stand are available. Keep any record, sector or performance markers out of the sector, and pits and off runways.
   i. In the vertical jumps check the standards to make sure they work properly, the markings are accurate and that they are set right. For the high jump, standard bases should be several centimeters in front of the landing pit so there will be no contact. Check the length of the cross bar and the amount of sag. A sag of two centimeters is allowed in the high jump and 3 cm for the pole vault. Check the location of the landing pit, and other padding and adjust as needed. The pole vault pit should be 10-15 cm behind the box. Check that the zero on the standards and the zero line at the back of the box are properly aligned. Check the distance between the bar and the standards at the starting height and the expected winning height to make sure the standards are spaced correctly.

Most standards are bent and may move in or out at higher heights, particularly if the bases are not leveled. If you did the original checks you should have marked the location of the standards and is sure to mark the bottom and front of the cross bar such that there is minim bend over the whole bar. Mark the orientation of any moveable end pieces. Find the low point of the cross bar. Place the bar on the standards and mark the position directly under the low point on the jumping surface directly below the bar using a plumb bob. This makes it easier to make sure that the measurement is the correct one, vertical from the low point.

5. Make sure barriers have been erected to keep everyone but those officiating the field event out of the runway or landing area. Include a safety buffer on either side. If needed talk to meet management to get an additional help or marshals to insure the safe conduct of your event, i.e. safety for athletes, officials, coaches and spectator both within the competition area and or adjacent to it.
6. Make sure all equipment being supplied by the meet is present and in good working order.

HORIZONTAL JUMPS:

The length is unlimited for both horizontal jumps but must be at least 40 meters (130 feet 3 inches) in USA Track & Field and IAAF competitions and less than the maximum of forty-five meters. The minimum distance is 39.63 meters (130 feet) in NCAA and high school competitions. This distance is measured from the scratch line. It should be between 1.22 (4 feet) and 1.25 (4 feet 1/8 inch) meters wide for all except in high school where it can be 42 inches. It should be bordered with white lines 50 mm (2 inches) wide. There is no specification for the material for the runway. But it can only be inclined laterally 1:100 and 1:1000 in the direction of running. High school rules do allow slightly more lateral variation at 2:100.

TAKEOFF BOARD STANDARDS FOR THE TRIPLE JUMP:

The placement of the takeoff board depends on the caliber of the competition. These are the recommended distances from the takeoff board to the start of the pit in the various rulebooks.

	WOMEN	MEN
Intermediate	8M (26 ‘ 3 “)	10M (33 ‘)
Young	8M (26 ‘ 3 “)	10M (33 ‘)
Youth	7M (23 ‘)	7M (23 ‘)
High School	24 ‘	32 ‘
NCAA (min.)	8.53M (28 ‘)	10.97 M (36 ‘)
Recommend	10.97 M (36 ‘)	12.5 M (41 ‘)
USATF/IAAF	10 M (33 ‘)	13.0 m (42 ‘)

The board should be of wood or other suitable rigid material and shall measure 1.21 to 1.22 meters long (4 feet) and 198 to 202 mm (~8 inches) wide and 100 mm deep. High school rules allow a width from 8 to 24 inches. It shall be painted white and level with the runway and therefore the top of the sand in the pit.

There are specifications for the Plasticine board also. In Youth and high school other materials can be used. The angle of t he plasticine boards was changed for 2002. It is now 45 degrees.

TAKEOFF BOARD STANDARDS FOR THE LONG JUMP:

	RECOMMENDED	MAXIMUM
IAAF	1 M	3 M
USATF	1 M	4.5 M
NCAA	1 M	3.66 M (12’)
Youth	1 M	4.5 M
High School	8 FEET - GIRLS 12 FEET-BOYS	

PIT SPECIFICATIONS:

The IAAF and USATF recommended in the long jump that the distance between the take-off board and the end of the landing area shall be at least 10 meters and that the landing area should have a minimum width of 2 meters 75 centimeters and a maximum of 3 meters. In the triple jump the recommended distance is 21 meters.

VERTICAL JUMPS:

Standards in the high jump should not be moved once the competition begins and so their location should be marked so they can be replaced if moved. If they must be moved because of damage to the jumping surface, it should be done only after a round has been completed. There should be at least 10 mm (0.4 in) between the end of the crossbar and the uprights. In the high jump the crossbar holders face each other. The standards should be at least 2 or more centimeters from the pit. There should be a 5 cm tape line from three meters outside of one standard to three meter beyond the other standard. The front edge of the tape should be aligned with the front edge of the portion of the standard that holds the bar.

Standards in the pole vault are moved for each competitor and normally move back as the height goes up since the apex of the jump has to move back as the pole gets longer and the vault higher. The pegs in the pole vault face the pit. The following table indicated the movement allowed under the various governing bodies. Note that the zero mark is considered to be at the vertical plane of the end of the pole planting box. There should be a 1 inch line through the back of the box extending to beyond the standards on either side. The front edge of the line should coincide with the zero line for the standards, i.e. the back of the standards where the pegs terminate. The plus dimension is in the direction of the pit, i.e. past the vertical plane while the minus dimension is in the direction of the runway and therefore, before the vertical plane. It helps if when the pit is out of the way if a line is extended from the back of the box out to where the standard are set.

HIGH SCHOOL	+12 IN TO +30 IN	USATF	0 CM TO + 80 CM
NCAA	+0 CM TO + 80 CM	IAAF	- 40 CM TO + 80 CM
USA Youth	+30 CM TO + 80 CM		

NOTE: 12 inches is approximately 30 cm and 30 inches is 76 cm. 40 cm is 15 3/4 inches and 80 cm is 31 1/2 inches.

Some feel it is never safe to allow the pole vault standards to be places in front of the zero even if allowed by the IAAF rules.

EQUIPMENT SPECIFICATIONS:

Starting in 2003 the peg length will be shortened to 55 mm from 75 mm for USATF and IAAF so it will become necessary to check that the right pegs are being used in the pole vault standards. They remain 1/2 inch or 13 mm in diameter.

The specifications shown below are generally minimums for the pit pads.

HIGH JUMP

	PIT	CROSSBAR	SHAPE
HS	4.80X2.40X0.60M	3.66 TO 4.52M	CIRCULAR, SQUARE, TRIANGULAR
NCAA	4.88X2.44X0.66M	4.00 to 4.04 M	CIRCULAR 25 TO 30 MM
USA T&F	6.00X4.00X0.76M	3.98 TO 4.02M	CIRCULAR 29 TO 31 MM
IAAF	6.00X4.00Mx0.7M	3.98 TO 4.02M	CIRCULAR 29 TO 31 MM

	RUNWAY	LENGTH
HIGH SCHOOL	Semicircle	50 ft. diam
NCAA	150 deg arc	15 to 21.3 M diam
USA T&F		18M to unlimited
IAAF		15 TO 25 M

POLE VAULT

	PIT	CROSS BAR	SHAPE
HS	16X16x1FT	3.66 TO 4.52M	CIRCULAR,

NCAA	4.88X4.88X0.81M	4.48 TO 4.52M	SQUARE, TRIANGULAR CIRCULAR
USATF	7.00X6.00X0.91M	4.48 TO 4.52M	25 TO 30 MM CIRCULAR
IAAF	7.00X6.00X0.8M	4.48 TO 4.52M	29 TO 31 MM CIRCULAR
			29 TO 31 MM

	RUNWAY LENGTH	WIDTH
HIGH SCHOOL	40.0 TO 45.0M	1.07M
NCAA	38.1M TO UNLIMITED	1.22M
USA T&F	45.0M TO UNLIMITED	1.22 TO 1.25M
IAAF	40.0M,45.0M TO UNLIMITED	1.22 TO 1.25M

Note Metal crossbars are no longer allowed in High School or USATF.

Starting in 2003 the end pieces on both bars will need to be semicircular so that the bar can only be replaced one way. All bars should be marked so that they can be replaced the same way each time. Before the bar is marked the bar should be rotated until the maximum deflection down, i.e. its most stable position.

THROWING EVENTS:

WEIGHTS AND MEASURES:

Because the US has an established cadre of Implement Inspectors or Weights and Measures Officials aspect of the IAAF role was excluded from the Technical Manager's purview. But certainly in the planning stages and until the appropriate officials arrive the Technical Manager should overview this area, particularly to insuring that the proper space and location are allocated. For more details about how to be a Weight and Measures Official see The Weights and Measures Handbook, which is part of the Officials Monograph Series or contact George Kleeman at 5104 Alhambra Valley Road, Martinez, Ca 94553-9773, or E mail georgeklee@aol.com. The manual is available for downloading from the Officials page on the USATF website: www.USATF.org.

IMPLEMENT SPECIFICATIONS:

Why do you need to know about this subject? In many meets there may not be an Inspector of Implements available and so you as the technical official will have to enforce the implement requirement rule at least as far as safety is concerned or assure that an adequate supply will be available. You need to know enough to know if the implement at least appears to meet the requirements. Each rulebook has the specifications for the implements that can be used.

CIRCLES/RUNWAYS:

All five of the throwing events start from a circle since the toe board in the javelin is also an arc. The discus, shot hammer and weight are thrown from a circular ring which is bounded by a 1/4 inch iron or steel band, the top of which is sunk flush with the ground outside the ring. The surface of the circle/ring is firm and level and normally concrete although that is not mandatory. The surface is 2 cm plus or minus 6 mm lower than the upper edge of the rim. The inside diameter of the shot, hammer and weight circles are 2.135 meters (7 ft) in diameter and for the discus it is 2.5 meters (8 feet 2 1/2 inches). The rim should be painted white and marked clearly to divide it into the front and back half. Portable rings meeting the specifications are acceptable, but make sure they don't rock. The javelin is thrown from a runway, which is terminated by arc of a circle, 8 meters (26 feet 3 inches) in diameter. The toe board can be made of wood or iron 7 cm wide painted white or a white line of similar width on a synthetic surface. The runway for the javelin should be 4 meters wide inside the foul lines and between 30 meters (98 feet 6 inches) and 36.5 meters (120 feet) in length under USATF and IAAF standards. In contrast both the high school and NCAA rulebooks call for javelin runways with a minimum length of 36.5 m (120 feet).

SET UP: (Sectors and Cage Opening)

The sectors for the discus, hammer, weight and shot are normally the same and are 40 degrees for all high school and NCAA events except for High School which can also use a 65.5 degree sector for the shot and a 60 degree sector for the discus. The same sectors for USATF and IAAF will change to 34.92 degrees starting in 2003. For sector layout see Appendix C. (Note the high school shot sector is measured by extending lines from the center of the circle at the ends of the toe board). The surface of the sector may

consist of cinders, grass or other suitable substance on which the implement will leave a clear mark. The sector for the javelin for all rulebooks is 28.95 degrees which can measured as a isosceles triangle where the base is half the distance out i.e. R/2 where R is the distance from the center point of the arc for the foul board.

The cage opening for the discus, hammer and weight throw is 6 meters for USA Track & Field and IAAF meets and 8.3 meters for the NCAA at a distance of 4.2 meters from the center of the throwing circle. If the cage is equipped with moveable gates they should be set equally distance from the sector lines for the discus and changed for the hammer and weight throw depending on whether the thrower is left or right handed. The moveable gate makes the opening smaller for the hammer. This is to protect the spectators, officials and competitors by restricting errant throws. The intent was to protect the area out to about 180 feet from the circle. When the panels are in place for a right handed thrower, the panel on the left side as you face the impact area should extend inside the sector line by 1.5 meters, if possible. The panel on the right side should be parallel to the sector line, and about 2.85 meters off the line, if possible. The opposite should be the case for the left-handed throwers. To help keep the competition moving assign several of the officials working around the cage to move the gates when needed. Note it is useful to clearly mark the location of both gates before the competition. Note that in setting the gates for the hammer there is always some trial and error. The important thing is safety. All dimensions are approximate and should be conformed with to the extent possible but if safety requires a slightly smaller opening then set the gates closer. The IAAF cage is higher than a NCAA cage. The high school discus cage is squarer with a 20 to 24 foot opening and 20-21'6" deep. The center of the circle is 10 to 10'6" back from the end of the cage.

The legal stop board for the shot is 4 feet long and 4 inches high and 4 1/2 inches wide. Small variations are acceptable. The distance of the chord at the end is 1.15m

If you need to install any of these facilities you can find some information on the Thrower's Page website at www.geocities.com/Colosseum/8682/ and also in the IAAF Track and Field Facilities Manual. The latest edition is 1999. It is available from the IAAF at their website at **www.IAAF.org** under specifications.

APPENDIX A

GUIDELINES FOR CALIBRATION OF ELECTONIC MEASURING DEVICES

The following technical guidelines were prepared for calibration of electronic distance measurements as used at the 1996 Atlanta Olympics. Although such devices are generally only being used at major meets, I expect their use will increase in the years to come.

Pre-Competition Day Activity

1. Appoint a Measurement Official to coordinate with the Measurement Organization doing the actual measurement.
2. The Measurement Organizations appointed to do the measurements at the competition will develop setup and calibration procedures for their measurement devices and provide to the Measurement Official approval.
3. The Measurement Official will inform the appropriate Field Referee of his/her findings.

Pre-Competition Calibration (before each field event competition):

1. The Measurement Organization will perform a pre-competition calibration and setup, i.e. system placement, leveling, centering, checking of zero at the center of the "circle" or the take-off board for the horizontal jumps or the "zero" plane for the vertical jumps.
2. The Measurement Official will observe the Measurement Organization when they perform pre-competition calibration and setup, particularly the zeroing step. That includes measurement optics, observation alignment, and focus through optical portion of the device for each step. The next two steps vary with each venue.

For Throws and Horizontal Jumps:

3. The Measurement Judge will then extend a steel tape with a 10 lb. Pull form a point expected to be the minimum distance in the landing zone in a straight line through the center of the circle or foul line. To ensure accuracy the field mark should have a 10 cm offset.
4. This is repeated for the longest expected distance. The Measurement Official will observe and record these measurements to the nearest mm of output. The measurement official will then make any needed corrections for expansion/contraction of the steel tape using the formula to be given later. The Measurement Official will then compare the results of the tape and the electronic system to the nearest mm. If acceptable, i.e. within 2 mm, the Measurement Official will certify the system in writing for use for that event. For distances over 17 m a temperature correction may be needed since a ten degree centigrade variation from the tape calibration temperature can account for a 2 mm difference.

For the Pole Vault:

3. The Measurement Official and Measurement Organization will define the zero plane at the back of the box(runway surface level around the box).
4. Then check that the uprights are vertical, i.e. 90 degrees and the bar is level. Calibrate the height at 2m (=/-2mm) at the low point of the bar (generally the center). After this calibration, the low point measurement shall be taken at 5m at the "0" position, 5m + 40 position, and 5m –80 position (or range allowed in competition being held). Checking the height at the edge of the standards will also check the levelness of the cross bar at each position. Use a steel tape or calibrated bar to validate the height. The use of a level on the side of the calibration bar helps to make sure the bar is vertical. The Measurement Official will then compare the results of the tape and the electronic system to the nearest mm. If acceptable, i.e. within 2mm of each other, the Measurement Official will certify the system in writing for use for that event. Note: Because of the short distance a temperature correction is usually negligible and therefore not necessary.

For the High Jump:

3. The Measurement Official and the Measurement Organization will define the zero plan (a one-dimensional line under the bar). Then calibrate the standards and level the bar with the high jump bar at 1.5 m to the nearest +/-2 mm at the low point, normally the center.
4. Then do one additional height at a height near the maximum height expected in the competition and compare readings with an alternative calibration bar or tape measurement. Checking the height at the edges of the standards will also check the level of the crossbar at each position. The Measurement

Official will then compare the result of the tape or bar and the electronic system to the nearest mm. If acceptable, i.e. +/- 2 mm, the Measurement Official will certify the system in writing for use for that event. Note: Because of the short distance a temperature correction is usually negligible and therefore not necessary.

5. In each case when the calibration is complete, the Measurement Official should complete the certification paper work (see copy in Appendix). It should be clearly marked as the pre-event certification, keeping the original until the results and the competition records are declared final but give a copy to the Measurement Organization and the Chief Judge of the event before the event starts. The chief Judge will turn in his copy with the event results.
6. Upon completion of the pre event certification, the Measurement Official will leave the venue.

Post Competition calibration (Performed after each field event competition):

7. Following the completion of each event the Measurement Official will return to observe a Post event Calibration of the measurement system to make sure there are no changes in accuracy. The activities and duties are the same as for the pre-competition calibration. For all but the pole vault and high jump only one random field measurement check is needed. For the pole vault the low point at the winning height will be read at the "0" position and the –80 cm position and the bar checked for level. The cross bas should then be lowered to 2 m and the low point measurement made along with the level check. The expected accuracy as before is +/- 2 mm. For the high jump check the winning height and the level and then lower the bar to 1.5 m and recheck the height and level.
8. In each case when the calibration is complete, the Measurement Official should complete the certification paper work (see copy in Appendix),clearly marking it as the post-event certification. The calibrations should be clearly marked so that the pre and post event calibrations are easily distinguished if you don't use the form supplied in the appendix.
9. A copy of the recertification should be given to the Measurement Organization and the originals for both the pre-event and post-event to the Chief Judge of the event. The Chief Judge will turn in the originals with the event results. It is prudent that the Measurement Official also keep a copy of all the paperwork.

Steel Tape Calibration

The following steel tape corrections should be applied when doing calibrations for long throws and records. Normally tapes are standardized at either 20 or 25 degrees centigrade. The correction even at the maximum expected temperature gradient (10 degrees C) will usually make less than 2 mm difference for measurements less than 17 meters (56 ft.). Thus the need to apply generally only to long throws. But it could be important if pre-event calibrations are done in the heat of the day or the cool of the evening and the post event calibration is done under the opposite conditions.

$$\text{Degrees C} = (\text{Degrees F} - 32)/1.8$$

$$\text{Correction in mm} = 0.012 \times L(\text{meters}) \times (T - Tc) \text{ in degrees C}$$

Note: At 100 m and 10 degrees C above or below the calibration temperature, Tc, this correction could be as much as 12 mm or 1.2 cm .

CHECKING OF EQUIPMENT:

The following sections are ordered such that the normal reasons for an implement to fail are checked first so that you minimize time spent on equipment that eventually will not pass. The order is the consensus of some of the most experienced implement qualifiers in the country. If you want to do in a different order fine but get an order and stick to it.

RECOMMENDED ACCURACY IN MEASUREMENTS:

1. As discussed under the scales section on equipment, the Bureau of Standards recommends 0.01%. However, because of cost and because many older scales continue to be used the E&FS committee recommends a minimum of 0.03% for weight.
2. Based on the accuracy for measuring record heights by steel tape and the impact of temperature, plus the

recommended procedures for certifying electronic measurements, the accuracy varies from 0.04% to 0.17% for sector lines in the long throws. The EF&S Committee recommends a minimum standard of 0.1% which translates into 0.1 mm for a 100 mm shot. This means gauges used for implement measurement should be accurate to 1 part in 1000. If they are properly manufactured you should be able to get them to 1/10000.

Basis for Accuracy Measurements

Type of Measurement	Expected Accuracy	Measurement	%	Parts/ 1000
Pole Vault Electronic	+/- 2 mm	5 m	0.04	0.4
High Jump Electronic	+/- 2 mm	2 m	0.01	1
Discus/Hammer Sector	+/-164 mm	100 m	0.164	1.64
Javelin Sector	+/- 169 mm	100 m	0.169	1.69
Temperature Correction at 10 deg. C difference	+/- 12 mm	100 m	0.012	12
Weight , NBS F	+/- 0.07 g	700 g	0.01	0.1

ELECTRONIC MEASUREMENT SYSTEM CERTIFICATION

This certification complies with the requirements of both USATF Rule 63 and IAAF Rule 136 for calibrating electronic measurement systems which are used in measuring field events.

This is to certify that the Pre and Post Event setup and calibration procedures were conducted and the acceptance criteria of +/- 2 mm was met in accordance with USATF/IAAF Draft technical Guideline AWBW-1 (August 8,1996) and other specified agreements of the competition cited below. This Certification substantively acknowledges the electronic distance measurement system conformance with the requirements of both USATF Rule 63 and IAAF Rule 136 as observed by the designated Measurement Official.

Date: _____ Pre-Event Certification Time: _____
Post-Event Certification Time: _____

Competition/Meet Name: _____
Event: _____ Men's Women's Qualifying Finals (Circle all appropriate)
Start Time of Competition: _____ End Time of Competition: _____
Notes: Certified Steel Tape Identification: _____ Date of Last Calibration: _____

Pre-Event Values: Selected Distances (Heights) (1) _____ Electronic Measurement: _____
(2) _____ _____
(3) _____ _____
Differences: (1) _____ mm (2) _____ mm (3) _____ mm

Temperature Corrective Calculation: Correction in mm =0.012xL(meters)x(T-Tc) in degrees C, where Degrees C= (Degrees F-32)/1.8

Temperature on Field: ____F____C Tape Calibration Temperature: ____F____C Temperature Difference: ____C
Corrections to Measurement (1) _____ mm (2) _____ mm (3) _____ mm

Corrective Measures for Acceptance of Electronic Equipment (explain): _____
_____
_____

_____ _____ _____ _____ _____
Measurement Organization Representative Measurement Official/ Certification No. Chief Event Judge/ Certification No.

Post-Event Values: Selected Distances (Heights) (1) _____ Electronic Measurement: _____
(2) _____ _____
(3) _____ _____
Differences: (1) _____ mm (2) _____ mm (3) _____ mm

Temperature Corrective Calculation: Correction in mm =0.012xL(meters)x(T-Tc) in degrees C, where Degrees C= (Degrees F-32)/1.8

Temperature on Field: ____F____C Tape Calibration Temperature: ____F____C Temperature Difference: ____C
Corrections to Measurement (1) _____ mm (2) _____ mm (3) _____ mm

Corrective Measures for Acceptance of Electronic Equipment (explain): _____
_____
_____

_____ _____ _____ _____ _____
Measurement Organization Representative Measurement Official Certification No. Chief Event Judge Certification No.

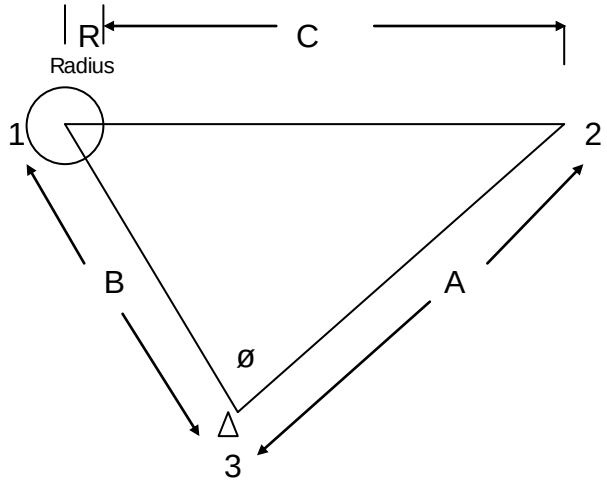
APPENDIX B

IAAF ELECTRONIC MEASUREMENT TECHNIQUES (from the IAAF Track & Field Facilities Manual, 5.2.2)

Distance and Height: The beginning of the 1970s saw the introduction of the measurement of throwing distance by Tachometer, a method long in use in land measurement. This system is faster than by measuring by tape. The accuracy of the measured is +/- 0.005m and of the measured angle +/- 10 angular seconds, which is equivalent to an average error for thrown distances of +/- 0.005 m. A direct measurement of a performance with an electro-optical angle and distance measuring instrument is not possible as the instrument cannot be set up beyond the center of the throwing circle or arc during competition. The throwing distance is, therefore, measured from an eccentric point by means of combined distance and angle measurement. The following drawing gives an example for measurement of a throw distance. Before the start of competition, the base line B (tachometer position to center of the throwing circle) and the direction are measured and, including the radius of the circle, stored. With the aid of an built in microprocessor, the horizontal distance A and the direction to the reflector inserted by the judge at the impact mark left by the implement are measured after each throw. The throwing distance C then is calculated from the stored data in fractions of a second using the following formula:

$$C = (A2+B2-2Ab \cos ø - R)^{1/2}$$

It takes only about 10 seconds from the insertion of the reflector to the automatic indication of the distance on the field boards.

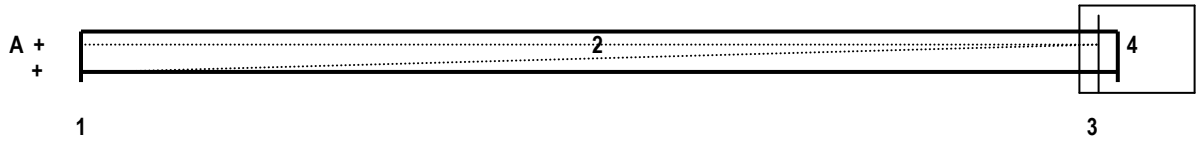


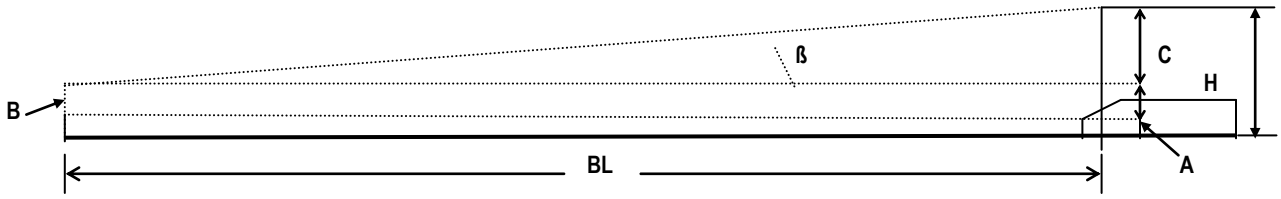
Principle of measuring distance (Example: Shotput)
1 Shot put circle, 2 point of landing, and 3 electronic tachometer

Height: For the control measurement of the height of the crossbar for high jump and pole vault, the tachometer mentioned in above can be employed with sufficient measurement accuracy provided that

- the instrument is set up at least 35 m from the perpendicular beneath the crossbar;
- the instrument's position deviates no more than 2 m from the vertical axis of the runway, and
- when installing the measuring system for the pole vault, it has been checked that the position of the uprights and crossbar coincide with the zero line.

For the pole vault facility it is also essential to ensure that to change the crossbar distance from the zero line {0.80 m or 0.40 m) the slides of the uprights on the ground or the supporting structure of the crossbar displacement of uprights in ground sockets are completely horizontal.





Principle of measuring height

A Top view
B Side view/section
1 electronic tachometer
2 runway
3 pole vault box/zero-line
4 landing mat

For the pole vault for example, the height (H) of the crossbar above the runway level is calculated with the following formula:

H=A+B+C where C = BL tan ß

APPENDIX C

SECTOR MEASUREMENT CHECK PROCEDURE

From the center of the circle or arc measure out an equal distance on the inside of each sector line. Mark each end point then measure between those points. The correct distance is shown in the table in the layout section for different distances from the center of the circle for each degree sector. For the javelin arc, you can get the center of the arc by swing an eight meter arc from each corner of the foul arc back down the runway. Where they intersect is the center of the circle that makes up that arc. It should be back 8 meters and 2 meters in from either side of the runway. The allowed elevation change is 1/1000 in direction of throws for all but the high schools and 1/100 for them. The allowed lateral variation is 1/1000 for USATF and IAAF and 1/100 for NCAA and no specification for high school.

LAYOUT AND DIMENSIONS FOR A THROWING SECTOR

There are five different sectors in use, namely 28.95, 34.92, 40, 60 and 65.5 degrees. Each is laid out the same way. The sector for USATF, IAAF and NCAA will remain the same at 40 deg until Jan. 2003.

Event	USATF/IAAF[1)]	NCAA	High School
Shot	34.92°	40°	40° or 65.5°
Discus	34.92°	40°	40° or 60°
Hammer/Weight	34.92°	40°	N/A
Javelin	28.95°	28.95°	28.95°

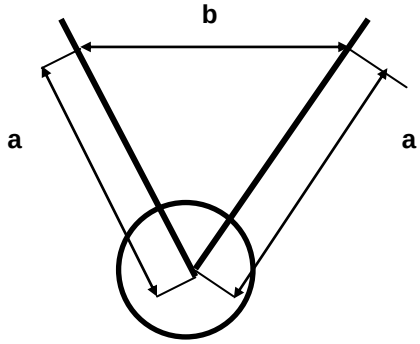
1) Will be 40 degrees until 1/1/2003.

2)

Formulae where a is distance from center of circle or arc to point on inside of sector line and b is the distance from inside of one sector line to the point on the other sector which is also a units from the center of the arc or circle.

Sector	Event	Jurisdiction	Formula
28.95°	Javelin	All	b=0.5*a=a/2
34.92°	All but Javelin	IAAF/USATF	b=0.6*a
40°	Most	NCAA/HS	b=0.68404*a
60°	Allowable	HS	b=a
65.5°*	Shot	HS	b=1.14286*a

*The 65.5 degrees sector is basically a sector line that is extended from the center of the circle at each edge of the toe board.



a= DISTANCE OUT SECTOR LINES
b= DISTANCE BETWEEN SECTOR LINES

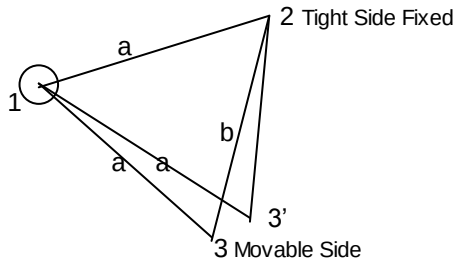
GENERAL SECTOR

Distance b for Various Sectors at Various Distances

a, meters	28.95 deg.	34.92 deg.	40 deg.	60 deg.	65.5 deg.
5.000		3.000	3.420	5.000	5.714
8.000	4.000				
10.000	5.000	6.000	6.840	10.000	11.429
15.000	7.500	9.000	10.261	15.000	17.143
20.000	10.000	12.000	13.681	20.000	22.857
25.000	12.500	15.000	17.101	25.000	28.572
50.000	25.000	30.000	34.202	50.000	
75.000	37.500	45.000	51.303	75.000	
100.000	50.000	60.000	68.404	100.000	

Note: The variability is the relative degree of accuracy expected although it is not in the rules, you should be within 0.1% or 1/1000 of the b dimension. The further out the sector line you measure the more accurate you will be and should be able to be within a centimeter or so. This translates into better than1 in 5000 at 100 meters and 1/1000 at 20 meters in the worst case. Note the allowable downslope in the throwing direction is 1/1000 for all but high school which allows 1/100. The NCAA and High School allow variations in the lateral direction of 1/100 while USATF and IAAF allow only 1/1000 in the lateral direction. NCAA Rule 1.1.1, HS 6.2.14.

EXAMPLE OF LAYOUT PROCEDURE



Line 1-2 = 100.000 m
Line 1-3 = 100.000 m
Line 1-3' = 100.000 m
Line 2-3 = 62.052m
Line 2-3' = 60.000 m

1. Layout the tightest sector line first (shown here as the left one). If neither is tight then just lay out a line from the center of the circle, i.e. point 1 out 100 meters to point 2. Line 1-2.

2. Measure from the inside of the sector line over to the inside of the other sector line with tape and mark as point 3'. This distance should be 60.00 m if 34.92 degree sector, 68.404 m if 40 degrees sector and 100 m if a 60 degree sector and 50 m if a javelin sector (28.95 degrees).

3. Run a line or a second tape from the center at point 1 to point 3' and then measure out 100 m along that line and mark 3". If you have two tapes you can get the point immediately by running one tape out from the center of the circle and one from point 2 at the appropriate length.

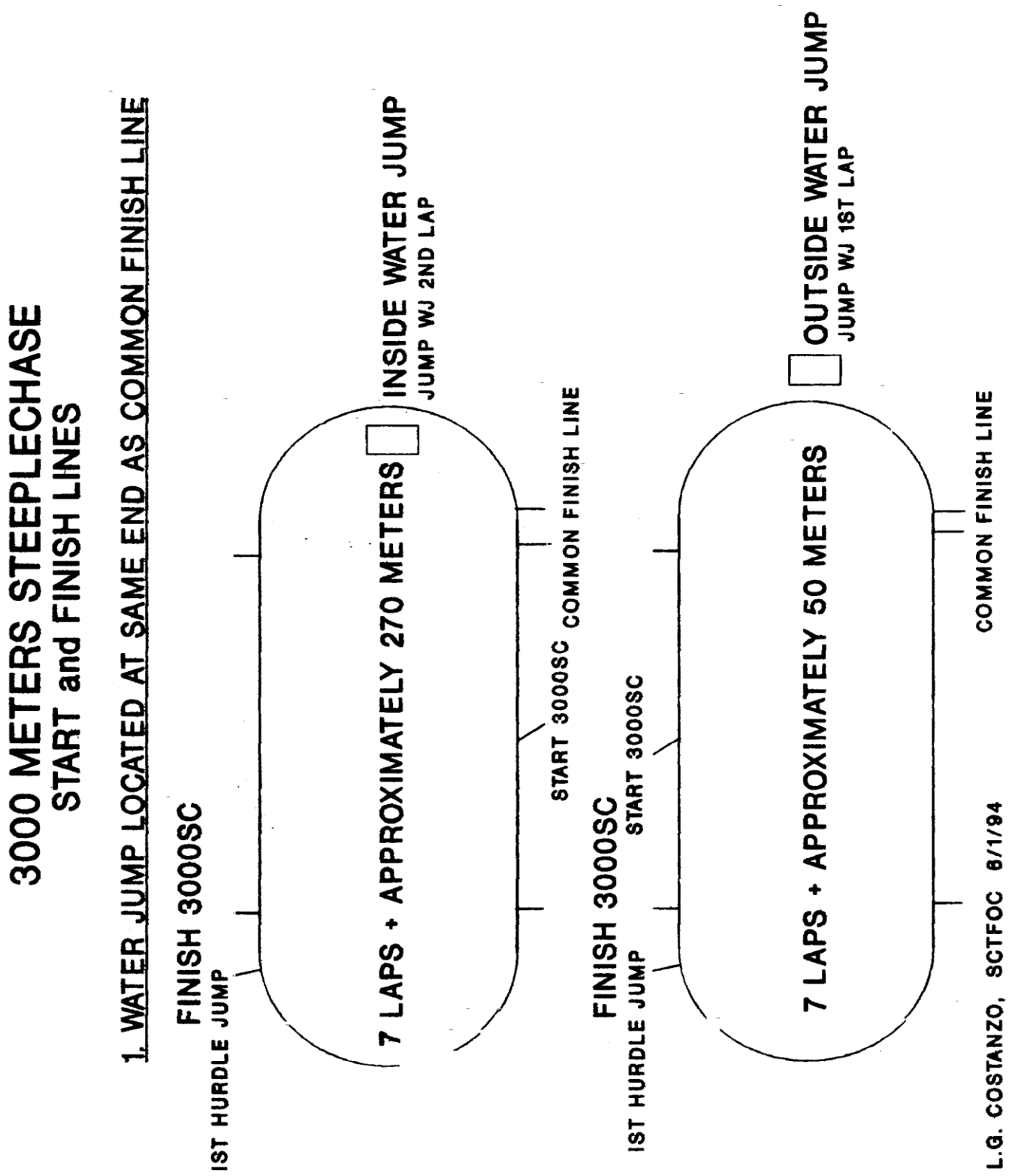
4. If 3' and 3" coincide then you are through.

5. If not then use tapes from 1 to 3 and 2 to 3 until they meet at the appropriate distance. Note point 3 is always 100 m from point 1 in all cases. This is point 3 and is the inside of the other sector line.

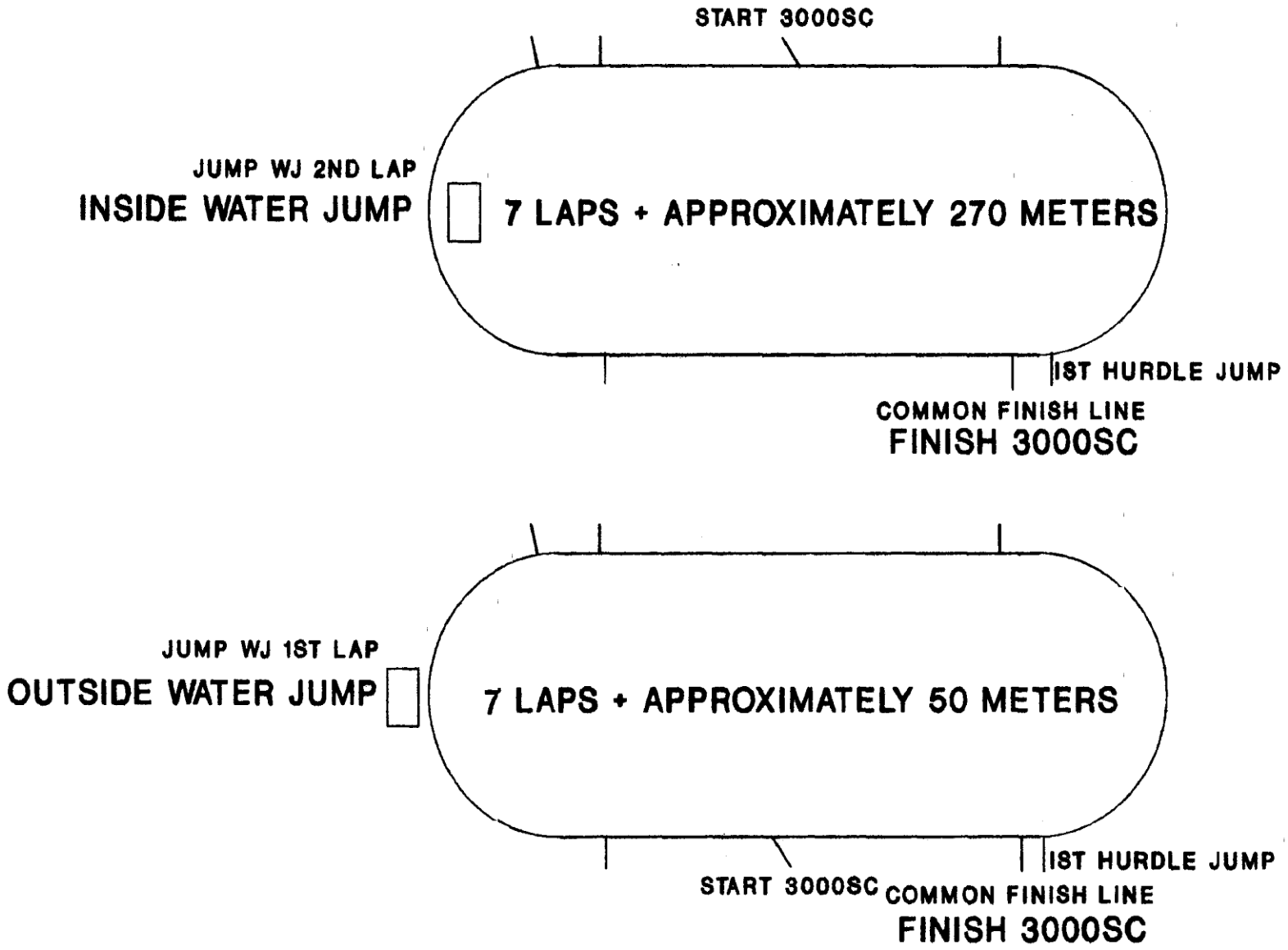
APPENDIX D

January, 2002

Steeplechase Layout Alternatives



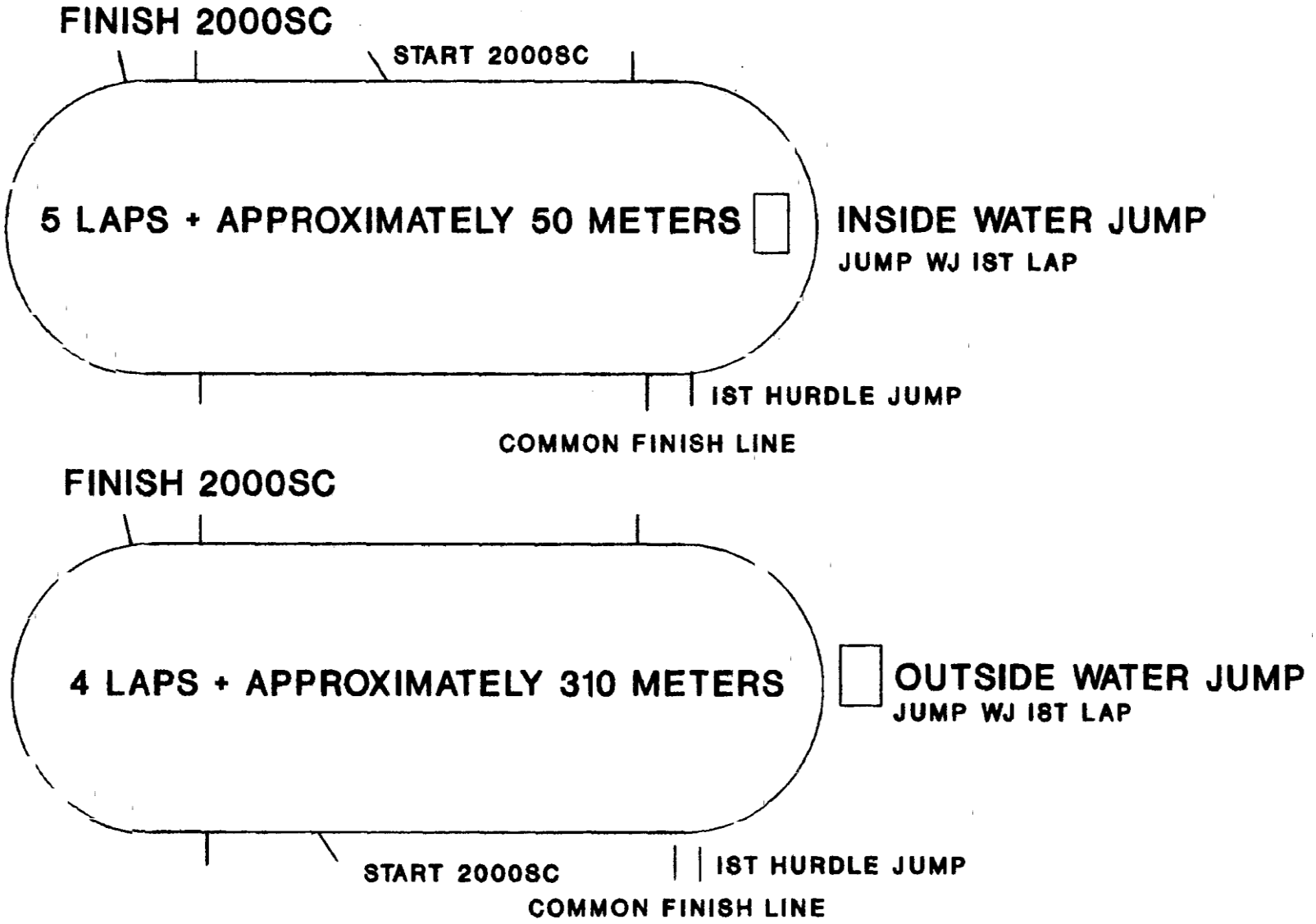
2. WATER JUMP LOCATED AT OPPOSITE END TO COMMON FINISH LINE



L.G. COSTANZO, SCTFOC 6/1/94

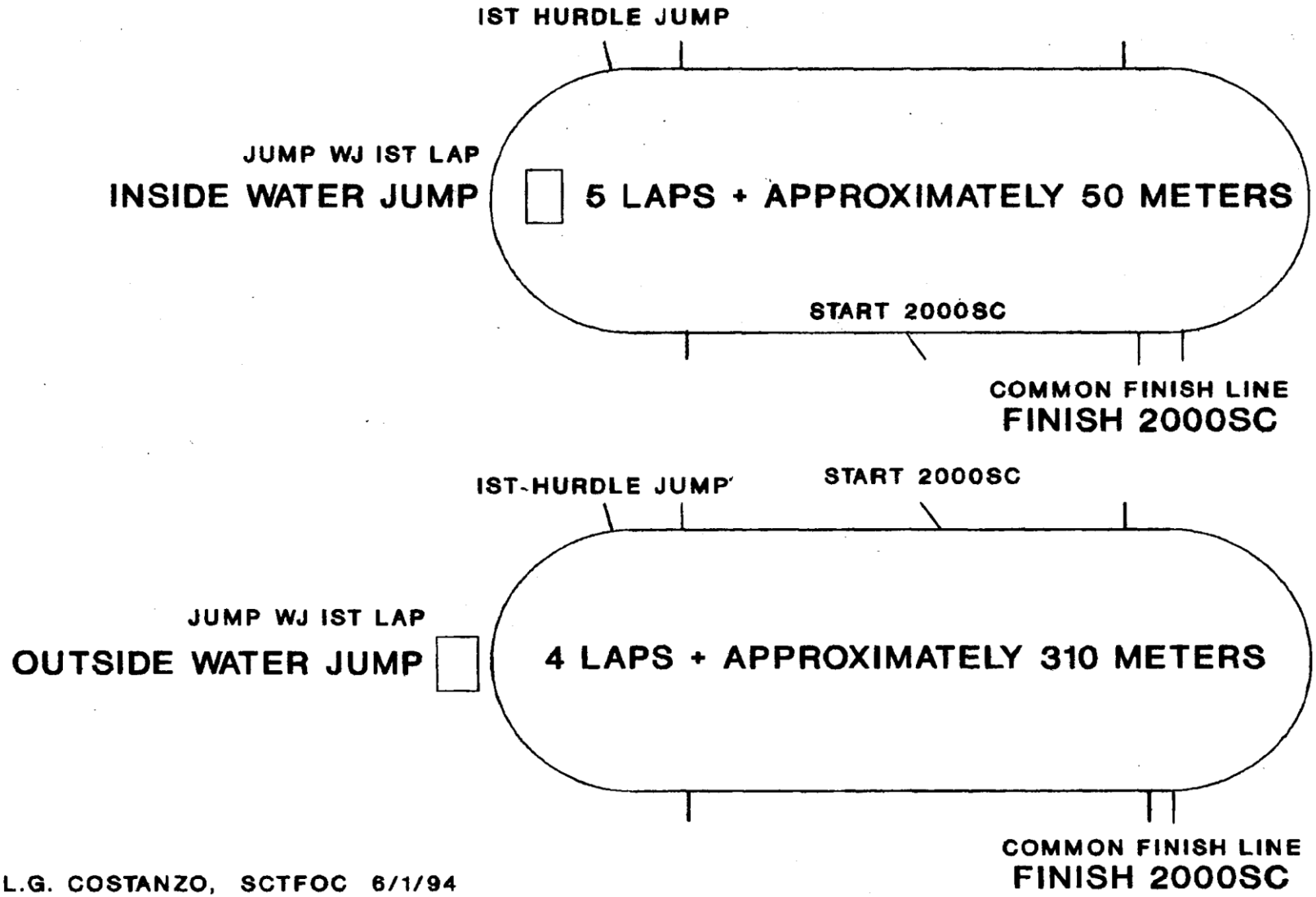
2000 METERS STEEPLE CHASE
START and FINISH LINES

1. WATER JUMP LOCATED AT SAME END AS COMMON FINISH LINE



L.G. COSTANZO, SCTFOC 6/1/94

2. WATERJUMP AT OPPOSITE END OF TO COMMON FINISH LINE



L.G. COSTANZO, SCTFOC 6/1/94

APPENDIX E

Sample Field Crew Manual

Field Manual Used for 2000 Olympic Trials

TABLE OF CONTENTS

Introduction:
Your role is a critical one for the success of the meet. There are two field crews. One made up of athletes to move the big stuff like the pads, boards etc. and one to make the technical set up. Between the two groups it is our intent is that your job is to have each venue prepared in such a way that the event warm-up can start within 5 minutes of when the officials arrive on site. That means not only will you make sure that all the equipment needed for an event is there but also that the necessary adjustments have been done so that competition officials will only need to officiate. This is being done for several reasons. First we want to minimize the number of people on the field of play. We will be on TV much of the meet. We want to be on time. Consequently it is your job to convert the track and field venues over from the previous day's configuration to today's configuration before the start of any events whenever possible. When there is a need for a change in sectors during the meet, it will be the technical field crews' job to accomplish that in an efficient manner. We should have enough equipment so that much of each venue for a day can be preset. However, there are situations where the whole venue may have to be set up during the meet. In addition to the officials assigned to this duty, there will be a number of college athletes who can help with moving pits, benches and other equipment. These will be under the direction of Ed Miller for the jumps and Don Babbitt for the Throws. Ed Miller and Harry Mara will coordinate the multievents. The technical crew will be under Bob Springer except the last day when it will be under David Katz. Venues not being used will be cleared as much as practical. High jump and pole vault pits will be removed following a session if they will not be used during the next session. Following each event there will need to be a combined field crew to clean up the area and drop the net on the cage. Small portable equipment not being used later in the day should be removed when it won't interfere with other events going on. It should be returned to storage, which is located on the warm-up track. Large items such as pads, steeplechase hurdles etc. will be stored on the grass area near the official area and the management trailers just north of the west stands.

Since we will be on TV most of the time, work on the field needs to be well thought out, organized and presented so that we look like we know what we are doing. Toward that end I have developed this manual to pass along some of my thoughts and the planning that has gone into the location of equipment at each venue. Equipment location is critical since meet management and TV have approved the venue layouts so that camera angles won't be impacted.

Venue Layout Maps:
There is a venue map, and equipment checklist as well as layout requirements for each field event in subsequent sections. These are the same drawings that were in the Officials Manual. Some changes may be needed because of overlapping events such as on the first day for the heptathlon shot. The athlete benches will need to be moved into the grass because of the overlap in schedule with the men's pole vault warm-up period.

The general equipment at each venue includes:
1. Chairs for Officials to sit during competition whenever possible. (You need only make sure there are enough chairs piled up for each venue, you need not place them for the most part.)
2. Finishlynx Field Event display board
3. 2-8 person benches for athletes
4. Athlete Tent for those events in the afternoon
5. Drink Coolers for water and electrolyte
6. Garbage Can
7. Countdown Clock
8. Necessary Measuring Tapes

In addition there is specialized equipment needed for each event which is listed on the checklist in the individual venue sections.

Photograph Areas:
Each venue will have a marked off area approximately 200 square feet as a safe area for photographers. Some of this will be done with adhesive tape and some with sector tape. This will help marshals to control those on the field of play and let the media know where they can be at each site. There will be 24 photographers allowed on the field of play at any one time.

Venue Set Up Schedule

Day 1 - Friday, July 14 Warm-up Track Opens at 10 a.m.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
High Jump Women Qualifying	Thurs.	Friday	0930	0930	1405	1130	East and West Pits South End		
High Jump Heptathlon			1315	1405	1745	1515	East and West Pits South End		No changes
Long Jump Men Disabled Final		Friday	1400	1400	1720	1600	East Pit		
Shot Put Men Qualifying	Friday	Friday	None		1730	1615	East and West Pits North End		After pull qualifying distance
Shot Put Heptathlon		Friday	None	1730	1900	1750	East and West Pits North End		New distance markers, move benches for PV
Hammer Women Qualifying	Friday	Friday	1630	1630	2050	1830	South End		Remove qualifying distance
Long Jump Women Qualifying			1615	1720	2015	1900	East and West Pits		Wind direction set which pits, preferably south, change board on east side
Pole Vault Men Qualifying	Thurs.	Friday	1700	1700	2120	1815	North and South Runways		Use East pit location is possible since shot overlap
Men's and Women's 10,000		Friday	None	2020	2220	2035	Track (200 M)		Set up water station in about lane 4. at the 200 m mark.

Day 2 - Saturday, July 15 Warm-up Track Opens at 12 noon.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Hammer Women Finals	Sat.	Saturday	1200	1200	1535	1400	South End		
Long Jump Heptathlon		Saturday	1230	1230	1545	1430	East and West Pits		Wind direction set which pits, preferably south
Shot Put Men Final	Sat.	Saturday	None	1315	1650	1515	West Pit North End		Change distance lines
Javelin Heptathlon	Sat.	Saturday	1500	1530	1930	1700	South End Runway		Sector after hammer
Long Jump Men Qualifying			1515	1545	1830	1715	East and West Pits		Wind direction set which pits change boards

Day 3 - Sunday, July 16 Warm-Up Track Opens at 6:30 a.m.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Javelin Women Qualifying	Sunday	Sunday	0700	0700	1110	0900	South End Runway		Add qualifying line and change distance lines
Pole Vault Men Final	Sat.	Sunday	0730	0730	1405	0930	South Runway, North End		Use east pit if possible.
High Jump Women Final	Sat.	Sunday	0915	0915	1420	1115	West Pit South End		

Venue Set Up Schedule

Long Jump Women Final		Sunday	0930	0930	1305	1130	East Pit		
Women Discus Qualifying	Sunday	Sunday	1000	1105	1420	1200	North End		Have 55 minutes for lines, after Javelin.

Day 4 - Monday, July 17 Warm-Up Track Opens at 2:00 p.m.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Javelin Men Qualifying	Monday	Monday	1330	1330	1750	1530	South End Runway		Pull Qualifying line
Javelin Women Final		Monday	1615	1750	1950	1815	South End Runway		Change Distance Lines
Steeple Chase Water		Monday	None	1800	1830	1850	North End		Fill Water Pit
Steeple Chase Water Barrier		Monday	None	1913	2020	1935	North End		Move Barrier and pull insert
Long Jump Men Final			1700	1700	2035	1900	East Pit		Wind direction set which pit
Women Discus Final	Monday	Monday	1810	1845	2145	2010	North End		Less than 25 minutes for sector switch.

Day 5 - Thursday, July 20 Warm-Up Track Opens at 1:30 p.m.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Hammer Men Qualifying	Thurs.	Thursday	1350	1350	1810	1550	South End		
Long Jump Decathlon		Thursday	1415	1415	1730	1615	East and West Runways		Wind direction set which pit, preferred south
Shot Put Decathlon	Thurs.	Thursday	None	1530	1845	1730	East and West Pits, North End		
High Jump Decathlon	Thurs.	Thursday	1640	1810	2150	1840	East and West Pits, South End		Pits must be out before Hammer. Remove pits after
Shot Put Women Qualifying	Thurs.		None	1845	2010	1900	East and West Pits, North End		Change Distance markers
Triple Jump Women Qualifying		Thursday	1715	1730	2025	1915	East and West Runways		Wind direction set which pit, preferred south, New board
Javelin Men Final	Thurs.	Thursday	1815	1815	2150	2015	South End Runway		Change sector after Hammer

Day 6 - Friday, July 21 Warm-Up Track Opens at 11:00 a.m.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Pole Vault Women Qualifying	Friday	Friday	1030	1030	1605	1230	North and South Runways, North End		Use East pits if possible
High Jump Men's Qualifying	Thurs.	Friday	1100	1100	1605	1300	East and West Pits South End		
Discus Decathlon	Friday	Friday	1215	1235	1635	1415	North End		Over lap PV

Venue Set Up Schedule

Pole Vault Decathlon	Friday	Friday	1330	Over Lap	1930	1530	North & South Runways, North End		Same Women Qualifying, North and then South Dec
Hammer Men Final	Friday	Friday	1535	1635	1910	1735	South End		Have an hour after Discus for sector change
Triple Jump Men Qualifying		Friday	1630	1630	1945	1830	East and West Pits		Wind direction set which pits, preferably south
Javelin Decathlon	Friday	Friday	1630	Over Lap	2040	1830	South End Runway		May have not time after Hammer for sector
Shot Put Women Final	Friday	Friday	None	1745	2120	1945	West Pit, North End		Have 2 plus hours after Pole Vault for rest. Watch Javelin

Day 7 - Saturday, July 22 Warm-Up Track Opens at 6:30 a.m.

Event	Set Up Pads /Lines	Set Up Rest	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Discus Men Qualifying	Saturday	Saturday	0715	0715	1115	0915	North End		
Triple Jump Women Final		Saturday	0745	0745	1120	0945	East Pit		Wind direction set which pits
Long Jump Adidas		Saturday	0920	1110	1230	1120	East and West Pits		Wind direction set which pits, change boards
Shot Put Adidas	Saturday	Saturday	None	1055	1400	1255	East and West Pits North End		At end pull East Pit lines for Javelin
Turbo Jav Adidas	**Saturday**	Saturday	None	1115	1500	1355	North and South Runways		No time between shot and Javelin. Set North early.

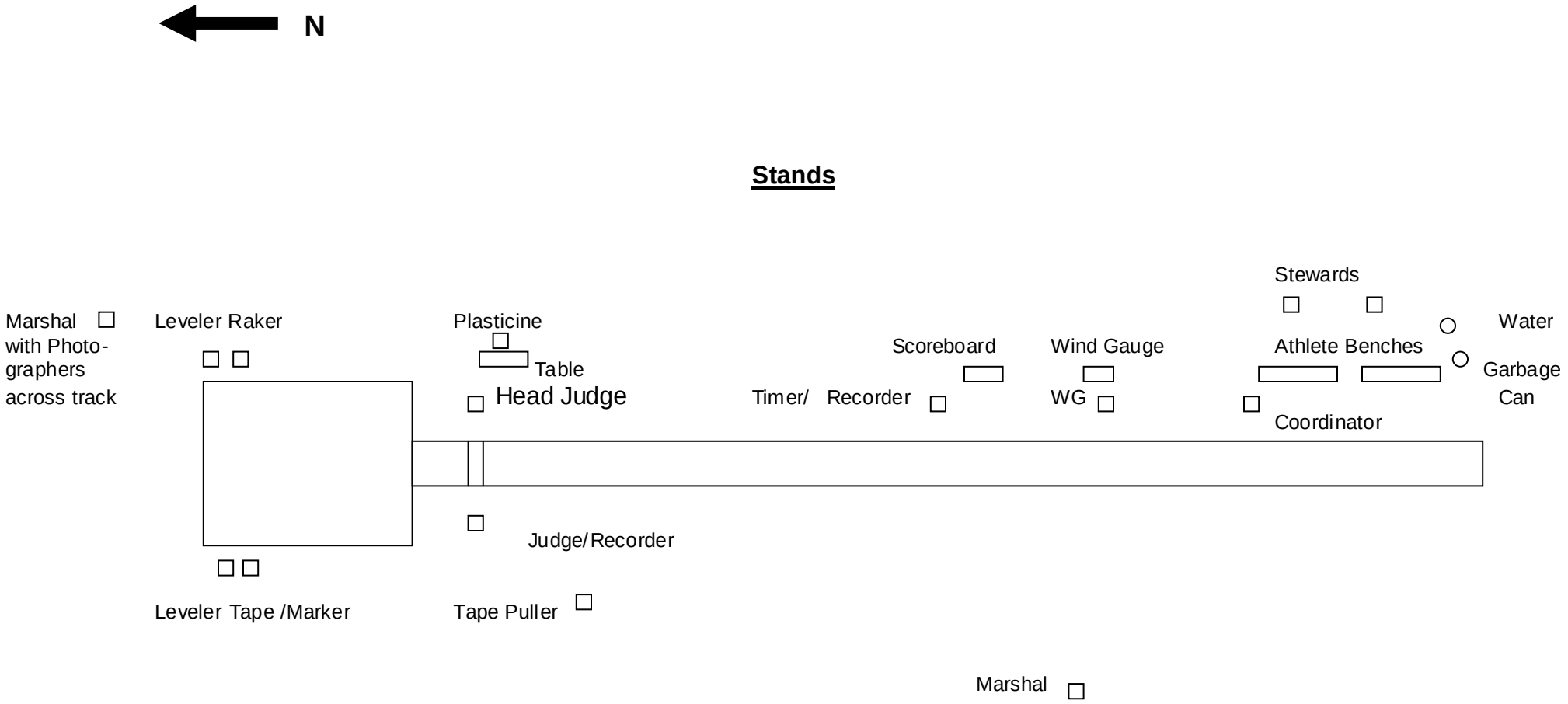
Day 8 - Sunday, July 23 Warm-Up Track Opens at 11:00 a.m.

Event	Set Up Pads /Lines	**Set Up Rest**	Site Determination*	Start Time	Take Down Time	Athletes Arrive	Location	Coordinator & Crew	Comments
Pole Vault Women Final	Saturday	Sunday	1030	1030	1605	1230	South Runway, North End		Use East Pit if possible
High Jump Men Final	Sunday	Sunday	1230	1230	1735	1430	West Pit South End		
Triple Jump Men Final		Sunday	1300	1300	1635	1500	East Pit		
Discus Men Final	Sunday	Sunday	1315	1315	1650	1515	South End		Pole Vault and Discus Interference

***There is no choice for shot. Expect no choice for high jump, hammer, javelin or discus unless extreme conditions. Only choice should be pole vault and horizontal jumps. Times indicated are decision times, two hours before athletes are due at venues.

Horizontal Jumps

Note: Shown for north pits. For south pits use mirror image. Use trackside runway for finals. Most of the crew is positions on East Side of runways for safety reasons.



2 Marshals
2 Stewards
1 Raker
9 Horizontal Jump Officials
1 Wind Gauge Official

Horizontal Jumps

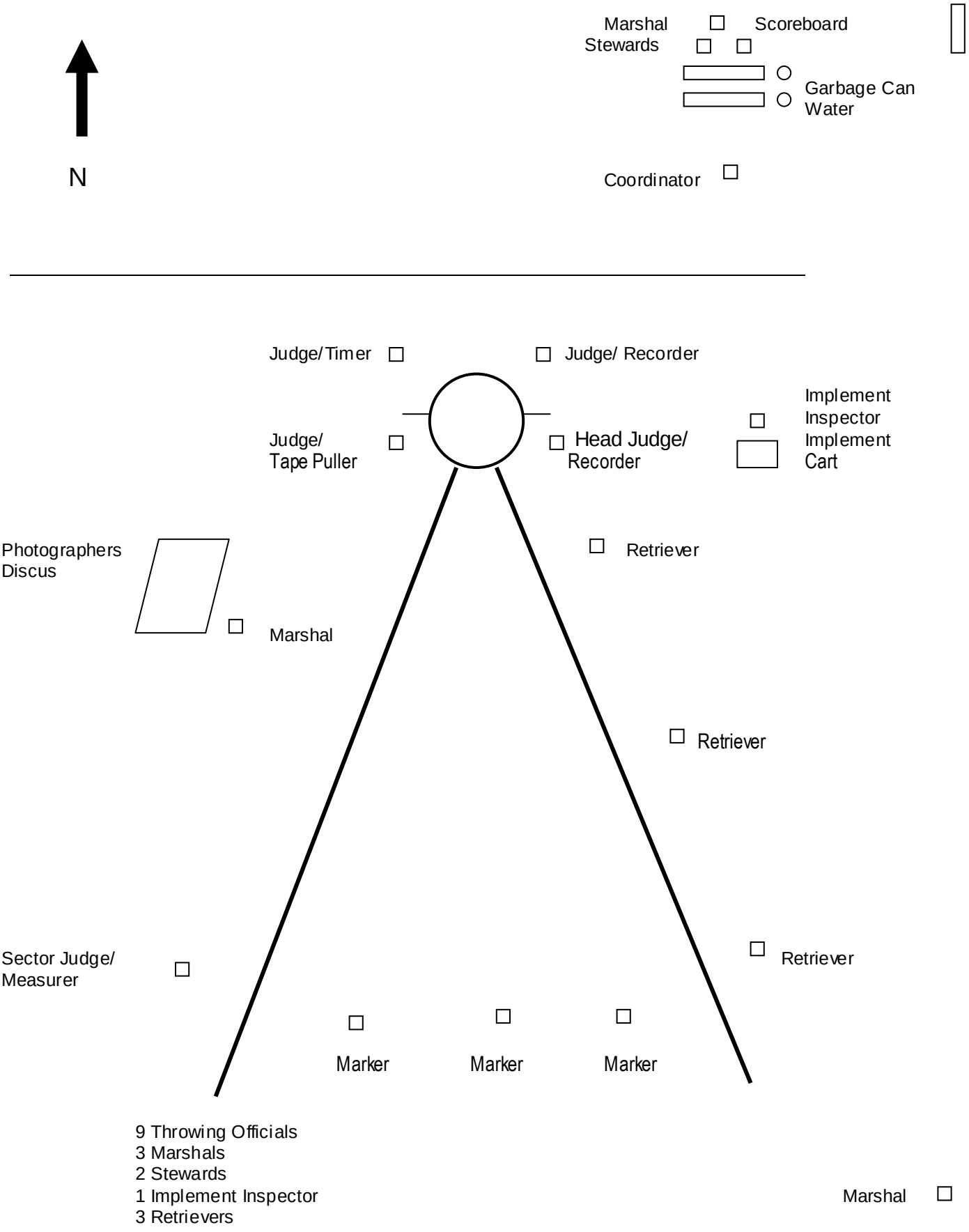
Horizontal Jump Venue: There are two parallel runways on the East Side. Each has a pit on both ends. I expect we will be using the south pits for the most part. You will need to confirm this before preparing the area. This decision will be made about 2 hours before the event as indicated on the set up schedule.. Interference for these events will come from each other. We will use the east runway when there is only one event for safety reasons. The other interference can come from either the hammer or the discus. There will be a fence along much of the runway to protect the athletes and officials from errant implements.

Once you know which pits will be used you will need to wet them down and turn them and place the proper take off board for warm-up. Use one of the used boards for the warm-up. Note new boards will be used at the start of each competition proper. There should be at least two plasticine boards (made up) for each runway. There should be only one board in a runway at a time. Note the warm-up board and the two new boards (competition plus spare) will each need to be adjusted to properly fit the location. Make sure the board can be removed without having to use a wrench for easy replacement if there is a need during the competition.

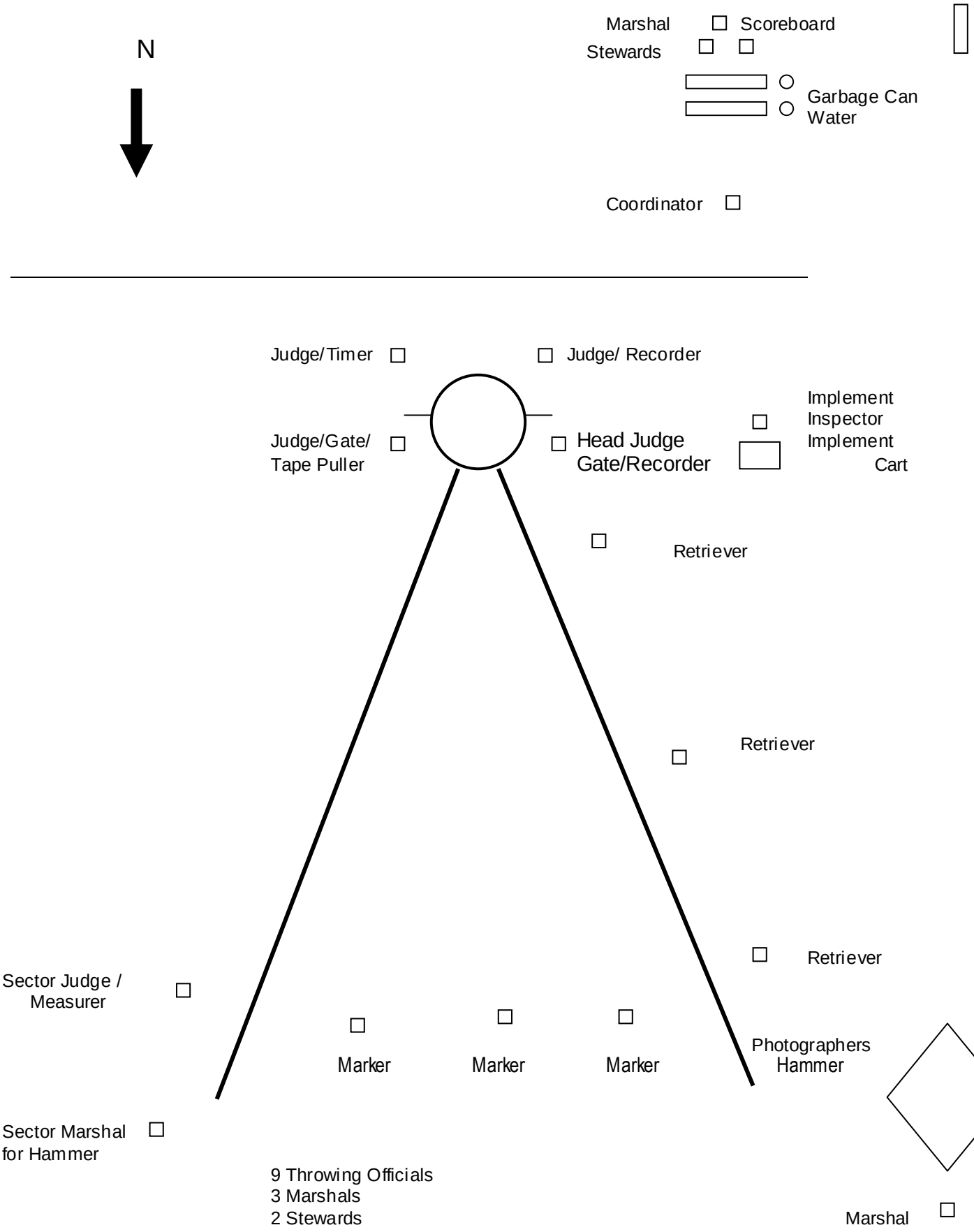
Horizontal Jumps Equipment Check List (each Venue)

	By Technical Group	By Miller Athlete Staff	By Officials
2 Rakes	Put Out		
2 Brooms	Put Out		
2 Shovels	Put Out		
15 Chairs		Put Out	
1 Leveler		Put Out	
1 Warm-up Board (used)		Put Out	
2 New Competition Boards		Put Out	
2 Plasticine Boards		Put Out	
1 Plasticine Board Table		Put Out	
1 Roller	Put Out		
2 Putty Knives	Put Out		
1 Block Plasticine	Put Out		
1 50 M Tape	Put Out		
1 Electronic Scoreboard		Put Out	
1 Countdown Clock		Put Out	
2 Board Removers	Put Out		
1 Wind Indicator	Put Out		
2 Drink Containers (Water + Electrolyte)			
1 Garbage Can			
2 Athlete benches (seat 8)		Put Out	
1 Tent (if after 11am & before 6 p.m.)		Put Out	
1 Wind Gauge (By Jennings)			
1 Yellow Flag			
1 Red Flag			
1 White Flag			
1 Crescent Wrench			
2 Distance Boards(one set each for LJ and TJ)		Put Out	
1 Screwdriver			

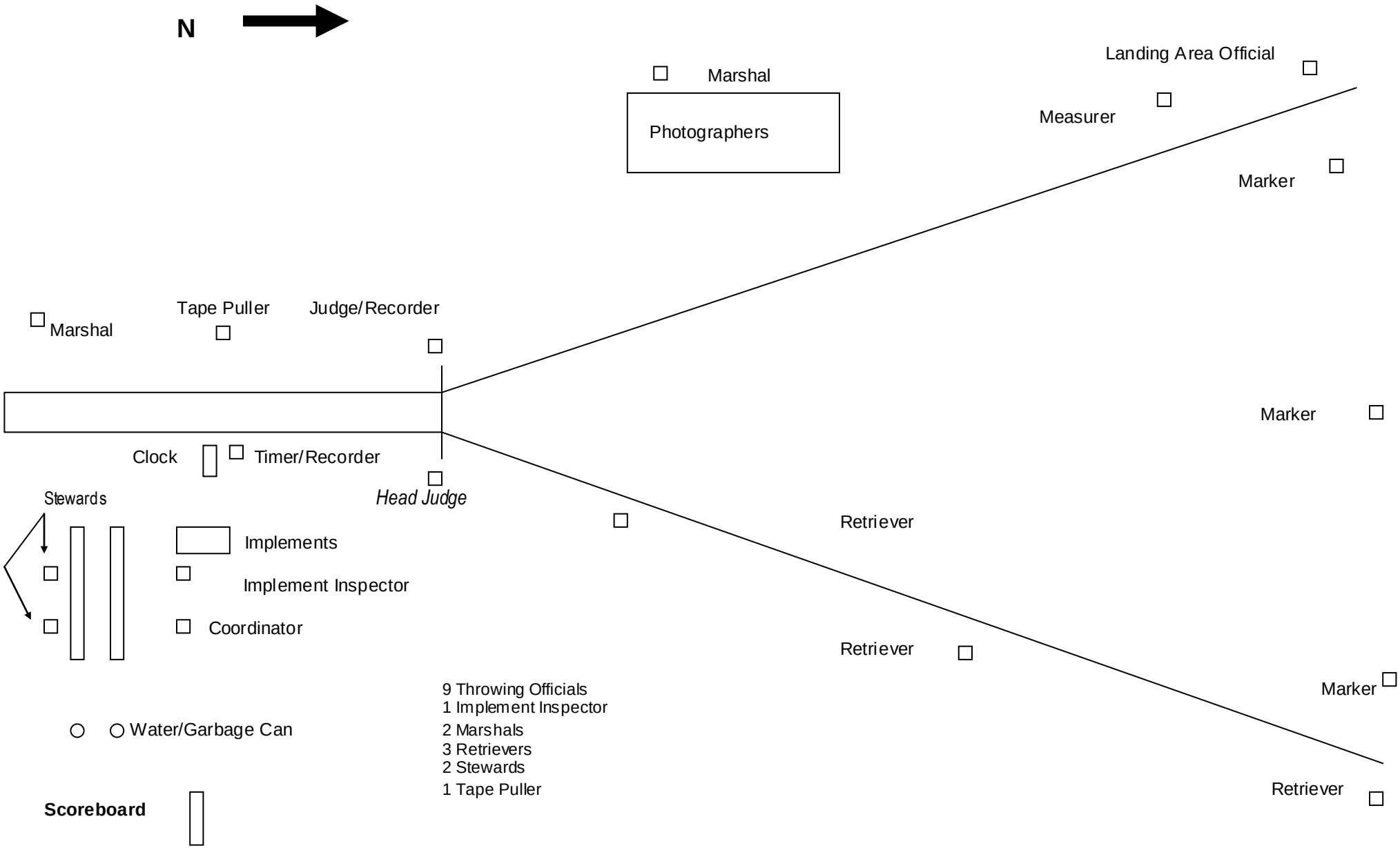
Discus


Marshal
Stewards
Scoreboard
Garbage Can
Water
N
Coordinator
Judge/Timer
Judge/ Recorder
Implement
Inspector
Implement
Cart
Judge/
Tape Puller
Head Judge/
Recorder
Photographers
Discus
Retriever
Marshal
Retriever
Retriever
Sector Judge/
Measurer
Marker
Marker
Marker
9 Throwing Officials
3 Marshals
2 Stewards
1 Implement Inspector
3 Retrievers
Marshal

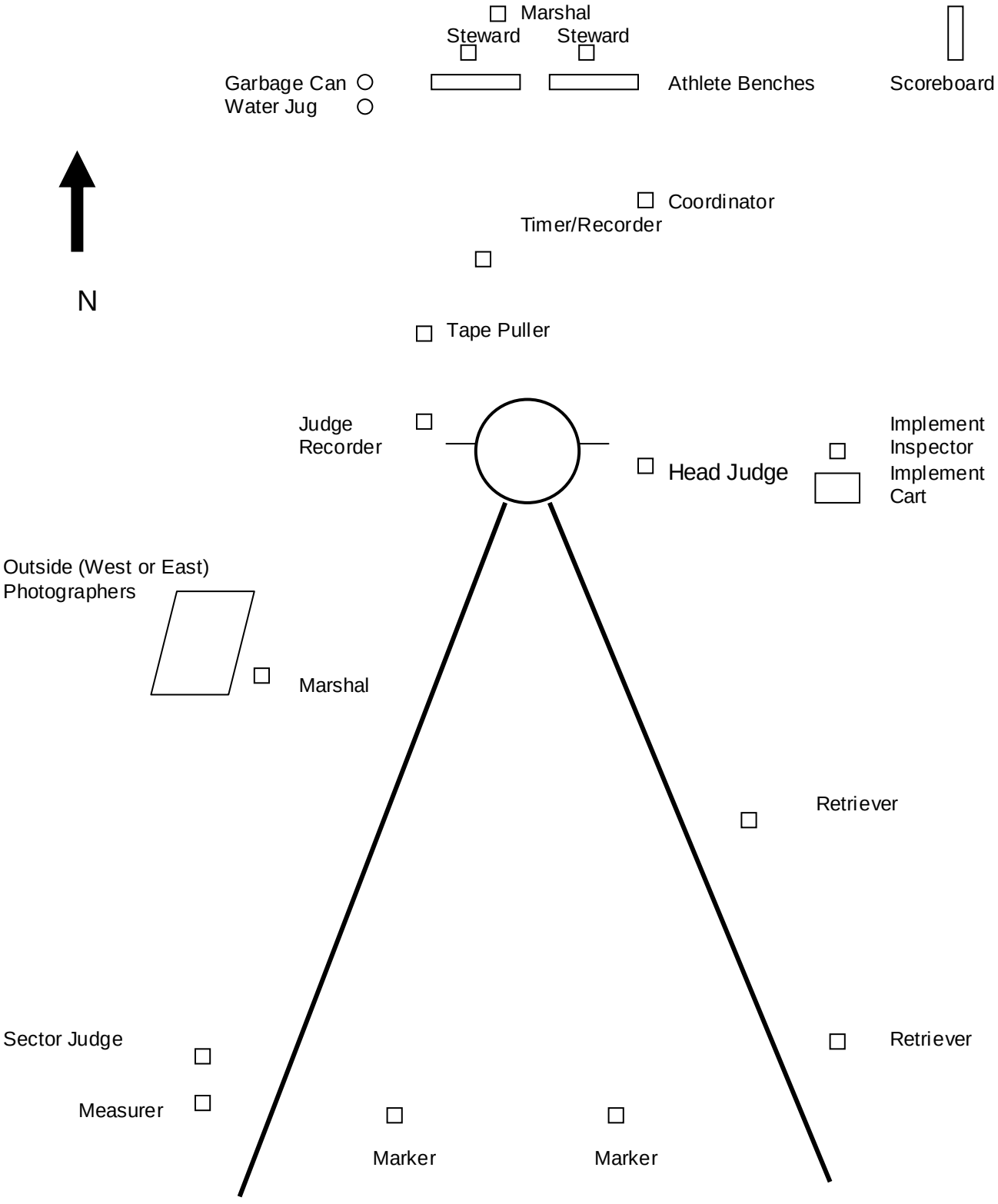
Hammer


N
Marshal
Scoreboard
Stewards
Garbage Can
Water
Coordinator
Judge/Timer
Judge/ Recorder
Implement
Inspector
Implement
Cart
Judge/Gate/
Tape Puller
Head Judge
Gate/Recorder
Retriever
Retriever
Retriever
Sector Judge /
Measurer
Marker
Marker
Marker
Photographers
Hammer
Sector Marshal
for Hammer
9 Throwing Officials
3 Marshals
2 Stewards
1 Implement Inspector
3 Retrievers
Marshal

Javelin

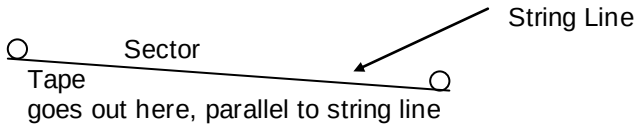

N
Marshal
Photographers
Landing Area Official
Measurer
Marker
Marker
Marshal
Tape Puller
Judge/Recorder
Clock
Timer/Recorder
Head Judge
Stewards
Implements
Implement Inspector
Coordinator
Retriever
Retriever
Marker
Retriever
Water/Garbage Can
9 Throwing Officials
1 Implement Inspector
2 Marshals
3 Retrievers
2 Stewards
1 Tape Puller
Scoreboard

Shot



9 Throwing Officials
2 Marshals
2 Stewards
1 Implement Inspector
2 Retrievers

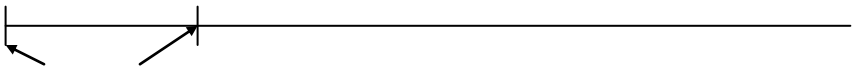
Throwing Venues:
The location of each sector line and distance line are pre-marked so all you need to do is install the tape next to those marks. All marks are in the sector on the sector side of the tape, i.e. tape outside the lines. In any case if you place the sector side of the tape on the outer edge of the painted line you will have installed the line correctly. Alternatively or if the paint is gone, you can stretch a string line which was used to paint the lines. Phil Watkins is familiar with this since he helped me put them in. The string line goes to the outside of the sticks and the inner sector line side of the tape goes next to the string line. There is a 6-inch sleeve of ¾ inch plastic pipe, which marks the edge of the sector line. Each is marked with paint and a pink flag. These have been surveyed.



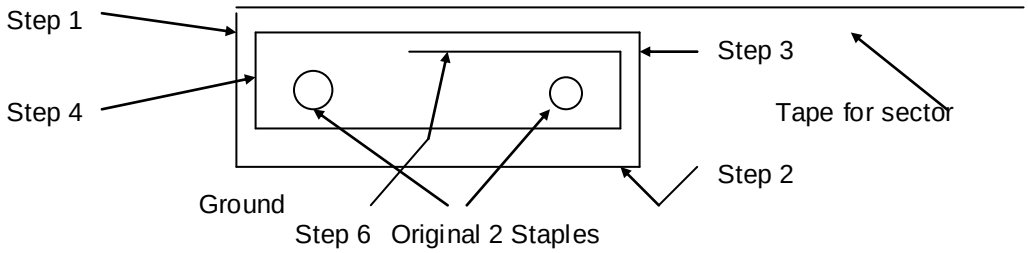
There are between 4 and 8 additional sleeves along the right sector line as you face the sector for record flags. Each is marked for which record. We will mark the World (W), American (A), Olympic Trials(T), and stadium(S) records for each open throwing event. Multievent event records will not be marked. Don't put any flags out for multievents. Because I expect several of the stadium and meet records to be broken, you will need to move those flags out for the finals it that occurs. That means you will need to pull the sleeve and reinstall it. Phil Watkins knows what to do.

The following explanation for installing the sector and distance indicating tapes will make more sense once it is demonstrated to you. When installing field tape I have found that the best way to lay sector tape lines is to first secure one end of the line and then stretch the tape along either a string or painted line so that the tape is taut. This means once you reach the end of the sector stretch the tape out at least another 5 or 6 feet. While doing this make sure someone is standing on the anchored end so that you don't pull out these anchors. Making sure that the tape is taut is critical so that it remains straight during the competition and doesn't become a tripping hazard.

I have found that each end is best anchored by overlapping the tape through several wire retainers so that the tape pulls back on itself.



Step 1: Push two staples in ground about 2 to 3 feet apart on thew outside of the string line or on top of the paint. Push them in so there is about an inch between the ground and the top of the staple.
Step 2: Lay tape over the top of both staples and then take the end and enough tape to go back and forth 3 time. Feed the tape through the staple between the ground and the top of the staple. Note the top piece is still over the top of this piece and both staples.. (See diagram below)
Step 3: Go through the second staple and around and under the upper tape on top of the staples from step 2.
Step 4. Bring the tape back around the first staple so that it is inside the first tape you wrapped. Run it to the second staple again. Make sure there is at least a foot of more of overlap at this point. As you tighten it this will disappear.
Step 5. Tighten the tape so it is snug around the staples. Done best by holding the end and tightening each loop as you go.
Step 6. Push the staples all the way in so the tape is now tightening against itself. This overlapping action keeps the tape from pulling out when you put the necessary tension on it to keep it taut. Make sure the end of the tape comes back at least a foot from the last staple it was feed through.
Step 7 If you want you can then add a third staple in the middle between the original two over the whole wrap and just before the end of this tail and a fourth one about 6 inches past the outgoing staple.



This method results in a sector line one continuous line without any loose ends on top. Use the same technique at the far end of the tape after you stretch it to put it under considerable tension by pulling it 5 or 6 feet beyond the end. Then and only then do you put any staples in along the sector line. This makes sure your sector lines are straight. These should be installed about every 30 feet or 10 steps. It helps if you are consistent with putting in these intermediate staples because it makes them easier to find when you need to remove them to remove the tape. If you do it this way then your sector lines will be straight and won't be tripping hazards. Essentially the same techniques are used for securing both ends of the distance lines. The only difference is that once you have anchored one end you make short straight-line segments to approximate a curved line. The length of these segments will vary a little with the distance out you are from the center of the circle. A good rule of thumb is about 10-15 foot segments. You need three people to do these lines properly. One needs to stand on the end of each segment as you move across the field. One needs to stretch the tape and the third needs to put in the staples. So once you have the end secured, one person stands on the fourth staple. The tape puller go to the first mark out about 5-6 paces and pulls the tape very taut. The stapler places a staple at between 3 and 5 paces. The stapler then stands on staple until the third person comes over to replace him. The tape puller moves out another 5-6 paces and stretches the tape and the process is repeated until you get to the other end. Note when anchoring the distance tapes do not include the sector tapes in the wrap since it tends to distort the sector lines. This process is repeated for each of the three distance markers. Do not wrap the distance tapes around the sector tape because that will just distort the sector lines. It is best to keep them independent so that you can pull one up or tighten it without disturbing the other.

Throwing Sector Lines:
White tape will be used for all sector line and distance lines. Colored tape will be used only for the qualifying distance line. There is enough tape so that each venue has its own tape. Please do not use one at a different venue. Each tape is measured to fit. Sector tapes are for the longest distance required for each venue. When the whole length is not needed leave it rolled up or overlapped at the end in the field. Since the hammer ring is skewed relative to the D apron, the tapes begin at an equidistant from the center of the circle not from the Mondo.
The following table summarizes what lines in meters that will be on the field for each event. Note for some events held on the same day there will be a change in the distance lines. When a qualifying line is being used eliminate the closest other distance line so the field doesn't look cluttered (men's vs. women's),

Throwing Event Layouts — Distances in Feet

Event	Sex	Days	Qualifying	Sector Lines	Line 1	Line 2	Line 3	Line 4
Shot	Men	1Q,2	20.00	75	60	65	70	
	Women	5Q,6F	17.00	70	55	60	65	
	Dec	5		70	45	55	60	65
	Hept	1		60	35	40	45	
	Boys	7		45	20	25	30	
	Girls	7		35	15	20	25	
Discus	Men	7Q,8F	64.50	250	200	220	240	
	Women	3Q,4F	58.00	240	180	200	220	
	Dec	6			140	160	180	200

Throws

Event	Sex	Days	Qualifying	Sector Lines	Line 1	Line 2	Line 3	Line 4
Javelin	Men	4Q,5F	75.00	300	240	260	280	300
	Women	3Q,4F	53.00	220	160	180	200	
	Dec	6		250	180	200	220	240
	Hept	2		160	100	120	140	
	Boys	7		120	60	80	100	
	Girls	7		100	40	60	80	
Hammer	Men	5Q,6F	71.00	290	220	240	260	280
	Women	1Q,2F	63.50	260	200	220	240	

Shot Put Venue: There are two parallel throwing areas on the grass at the north D ring. There will be interference at times from the pole vaulters on the south runway. On Day 1 will need to modify layout because of expected event overlap. You will have to set up athlete areas in grass. Fill holes following each competition. There will be a mixture of soil and sand to be used.

Discus Venue: There is only one ring on the northwest side although the hammer ring could be used as a backup. On Day 3 there will be some interference between pole vault on the south runway and discus. The same will occur on Day 6 during the Decathlon discus and Day 8 for the men's Discus. On Day 3 and 4 the Discus sector will have to be laid out during the meet following the completion of the javelin.

Javelin Venue: There are two runways but because of interference only the south runway will be used except for Day 7 for the Turbo Jav. On Days 2, 5 and 6 the Javelin sector will have to be laid out during the meet after the hammer competition has been completed.

Hammer Venue: There is only one ring on the southeast side although the discus ring could be used as a backup. On Day 6 the hammer sector will have to be laid out during the meet after the Decathlon discus. Fill holes following each competition.

Note all sector lines will have to be pulled up each night so that the grass can be cut and watered. Thus each throwing venue will have to be set each day.

Record Flag Distances (Meters)

Record for	Discus	Hammer	Javelin	Shot	Flag	Comments
World Men	74.08	86.74	98.84	23.12	Yes	
American Men	72.34	82.52	87.12	23.12	Yes	
Olympic A Standard	63.50	75.50	82.00	19.70		
Trials Meet Men	71.16	80.12	81.86	21.81	Yes	These may change during meet.
Stadium Men	63.31	75.21	Unknown	21.36	Yes	These will change during meet.
World Women	76.80	76.07	67.09	22.63	Yes	
American Women	66.10	70.17	58.90	20.18	Yes	New hammer record 7/1,new Jav.
Olympic A Standard	61.00	65.00	60.00	18.30		
Trials Meet Women	67.58	59.06	New	19.15	Yes	These may change during meet.
Stadium Women	63.50	68.55	50.20	18.62	Yes	These will change during meet.

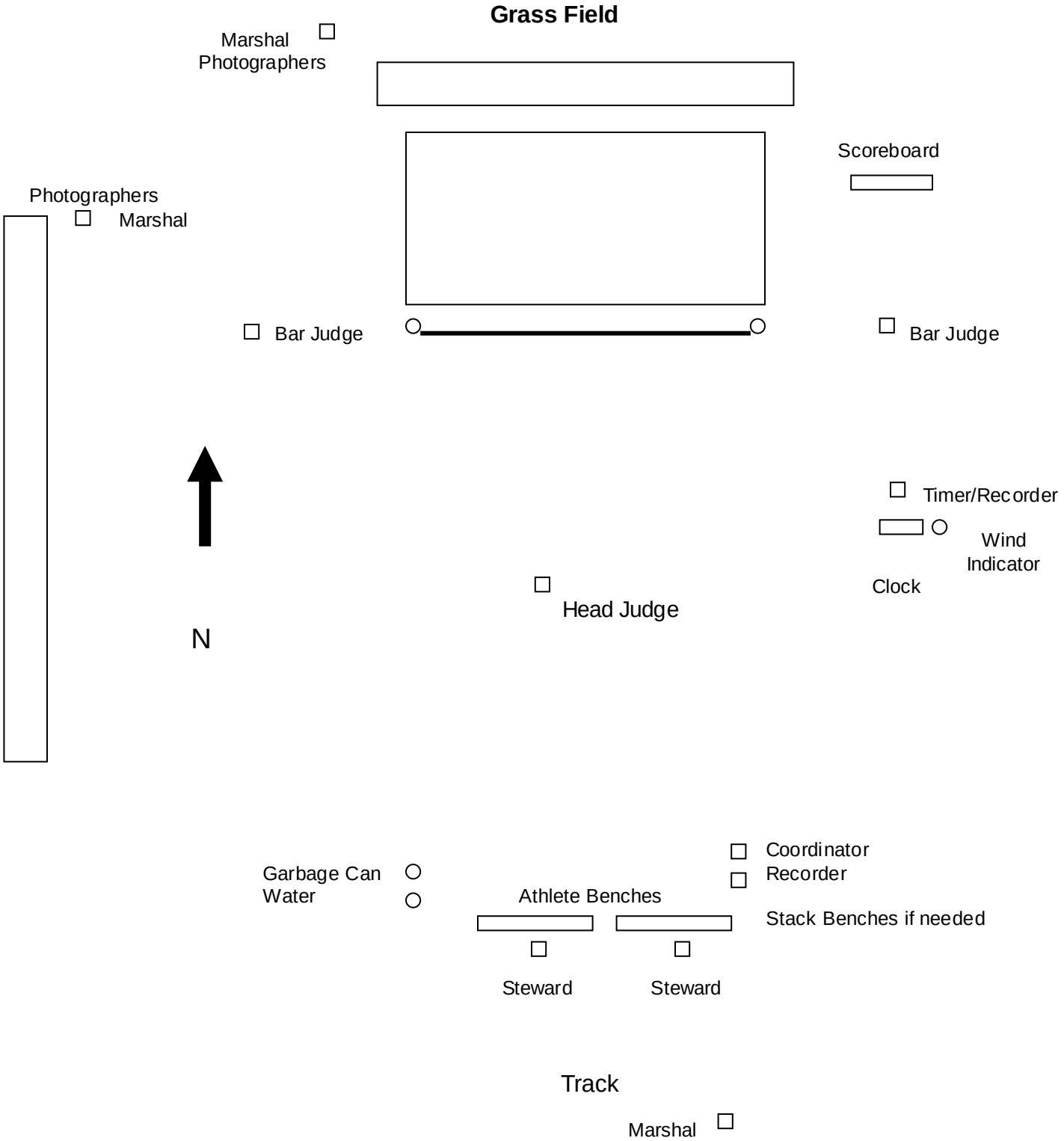
* This is record with old javelin so not marked.
Record flag positions may need to be changed after qualifying rounds and before finals.

Throws Equipment Check List (each Venue)

	By Technical Group	By Babbitt Athlete Staff	By Officials
1 30 M Tape (Shot)			
1 100 M Tape (other Throws)			
15 Chairs		Put Out	
1 Electronic Scoreboard		Put Out	
1 Countdown Clock		Put Out	
1 Wind Indicator			
2 Drink Containers (Water + Electrolyte)			
1 Garbage Can			
2 Athlete benches (seat 8)		Put Out	
1 Tent (if after 11am & before 6 p.m.)		Put Out	
1 Yellow Flag			
2 Red Flag			
2 White Flag			
1 Hammer Ring Insert (for Hammer only)		Do	
Put up Cage Netting for Hammer and Discus		Do	
Hammer Fencing along 50-M area		Do	
Discus Fencing along LJ/TJ Runway		Do	
8 Boards for Shot Stop		When Needed	
1 Chalk Holder for Shot and Discus			
1 World Record Flag	Put Out		
1 American Record Flag	Put Out		
1 Meet Record Flag	Put Out		
1 Stadium Record Flag	Put Out		
1 Qualifying Mark Tape (see Throws Lines)	Put Out		
Staples	Put Out		
3 Distance Markers for Distance Lines		Put Out	
2 Sector Tapes	Put Out		
3 Distance Tapes (see Throws Lines)	Put Out		

High Jump

(Second Pit is Mirror Image)



6 Vertical Jump Officials
2 Marshals
2 Stewards

High Jump

High Jump Venue: There will be two high jump pits located on the south D ring. These should be set to give equal room for both. On Day 1 they will be set up and ready to go. The east pit will be moved over after competition to make room for the hammer set up. On Day 5 after the hammer the east pit may have to be adjusted. The hammer should be the only interference except near the end when track events may start. Thus all equipment must be kept on D area.

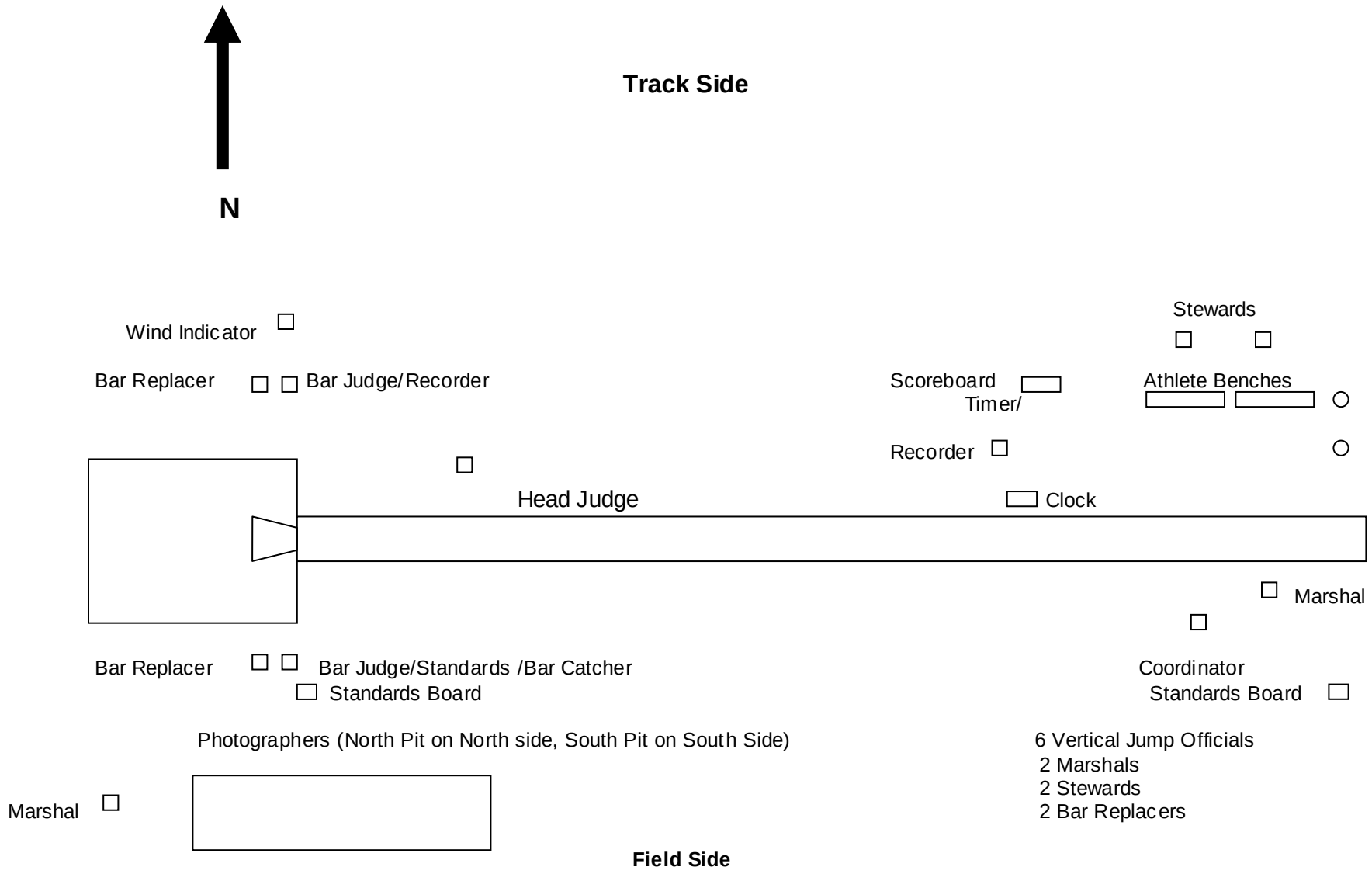
- All tape or markings from previous events should be removed.
- Set up the pits so that the back of them is just on the grass.
- Set up the standards so they are a few inches in front of the pads. Check to make sure the standards are vertical and the bases level. Validate that the height read on the standards corresponds to the actual height. Block the standards so this is the case. Run the standards up and down from 1.5 meters to 2.5 meters to make sure the bar fits properly at all heights. Mark the location of the standards with tape on all four sides. Make sure there is no more than 2 cm on either end on the average.
- Remove the curbing from the track in the area where the athletes will be jumping. Most of the time there will not be a track event but toward the end they may be starting so curbing may have to be put in and removed or cones placed for longer races. A member of the field crew should do this. Note the outer edge of the cones should be on the edge of the line, which defines lane 1's inner boundary.

High Jump Equipment Check List (each venue)

	By Technical Group	By Miller Athlete Staff	By Officials
Pad		Put Out	
2 standards	Locate	Put Out	
2 bars		Put Out	
1 Electronic Scoreboard		Put Out	
1 Countdown Clock		Put Out	
1 Wind Indicator			
1 ladder (men only)		Put Out	
1 5 M steel tape			
1 30 M tape			
10 Chairs		Put Out	
1 Performance Board for Height		Put Out	
2 Drink Containers (Water + Electrolyte)			
1 Garbage Can			
2 Athlete benches (seat 8)		Put Out	
1 Tent (if after 11a.m. & before 6 p.m.)		Put Out	
1 Yellow Flag			
1 Red Flag			
1 White Flag			

Pole Vault

Note: Mirror image if using east pits. Will use longer runway on south side for finals.



Pole Vault

Pole Vault Venue: There are two runways running east and west on the north D ring. They have vaulting boxes at both ends. We expect the prevailing wind will be such that we will use the boxes at the east end during the meet. The main interference will come from the shot rings, which are very close to the south runway. There is some overlap of the heptathlon shot on Day 1 during warm-ups. There will be limited time between the end of Decathlon Pole Vault and warm ups for the Women's shot put. But it shouldn't pose a problem.

- All tape or markings from previous events should be removed.
- Set up the pits so that the distance from the box to the pit is approximately 10 to 15 cm on all sides.
- Set up the pole vault standards and zero the tapes on the pole vault pads. CSUS has marked each Pole Vault runway with the zero point for the standards. Please make sure the back of the standards is at the front of the line indicating the zero point when you set up the pits. Check to make sure the standards are vertical and the bases level. Validate that the height read on the standards corresponds to the actual height. Block the standards so this is the case. Run the standards up and down from 3.5 meters to 5 meters to make sure the bar fits properly at all heights.
- Place an "A" frame and a Christmas tree for poles at each runway, which will be in use.
- Place a performance board for indicating standards settings at the pit as indicated on the diagram and at the end of the runway where the flight coordinator will be located.
- Make sure to bring out two bar raisers and one measuring bar per runway.
- Make sure to have two pole vault bars for each pit. Each bar should be tested and marked to indicate the bottom of the bar. The top of the bar should be chosen by checking the deflection of the bar. The top is that side which has the least deflection. Adjust the end pieces accordingly and then mark the bar and end pieces to make sure that it is replaced the same way each time.
- Place the countdown clock and scoreboard about half way down the runway.

Pole Vault Equipment Check List (each Venue)

	By Technical Group	By Miller Athlete Staff	By Officials
Pad	**Adjust**	**Put Out**	
2 standards	Adjust	Put Out	
2 Bars	Mark	Put Out	
2 Bar Raisers		Put Out	
1 Electronic Scoreboard		Put Out	
1 Countdown Clock		Put Out	
2 A Frames for Pole Bags		Put Out	
1 Christmas Tree for Poles		Put Out	
1 Wind Indicator	Put Out		
1 7.5 M steel tape			
1 50 M tape			
12 Chairs		Put Out	
1Performance Board for Height		Put Out	
2 Performance Boards for Standards		Put Out	
2 Drink Containers (Water + Electrolyte)			
1 Garbage Can			
2 Athlete benches (seat 8)		Put Out	
1 Tent (if after 11am & before 6 p.m.)		Put Out	
1 Yellow Flag			
1 Red Flag			
1 White Flag			
1 Chalk Holder		Put Out	

Other Venues

Steeple Chase Water Barrier (on north end of track): On Monday, Day 4, we will run the Women's steeplechase followed by the Men's qualifying rounds. Following the Women's race at about 1914 or so we will need to remove the Women's insert at the water barrier and to move the barrier. The barrier is held by 6 bolts that have to be removed. Then the barrier repositioned back about a foot and rebolted. Since the Men's first race is scheduled at 1945 we have about a half-hour to get the job done. It will take a crew of four people. Two to remove and replace bolts and two to move the barrier and steady it while the work is done. Those people need to be at the barrier with tools when the last woman is over the barrier for the last time.

Water Jump Steeplechase Hurdle

	By Technical Group	By Miller Staff	By Officials
1 Insert for Women		Pull out	
2 Socket Wrenches and Move	Yes		
4 extra bolts	Yes		

10 Km Water Station

	By Technical Group	By Miller Staff	By Officials
750 cups per race		Put out	
15 cases of water		Put Out	
1 Table		Put Out	
2 Garbage Cans		Put Out	
8 Garage Bags		Put Out	

Medical staff will hand out water at station.

Venue Use Schedule by Day

Venue	Friday 1	Saturday 2	Sunday 3	Monday 4	Thursday 5	Friday 6	Saturday 7	Sunday 8
LJ E	350-530, **650-810**	220-345, **505-630**	1125-105	655-835	410-530		1120-1230	
LJ W	**650-810**	220-345, **505-630**			410-530		1120-1230	
TJ E					715-820	610-740	940-1120	255-435
TJ W					715-820	610-740		
HJ E	1120-200, 310-545				640-950	1255-405		
HJ W	1120-200, 310-545		1110-220		640-950	1255-405		225-535
PV N	615-915					1225-405, 325-620		
PV S	615-915		925-205			1225-405, 430-730		1225-405
Shot E	410-525, 540-655				525-645, 655-810		1255-200	
Shot W	410-525, 540-655	305-450			525-645, 655-810	740-920	1255-200	
Discus			1155-220	805-945		210-435	910-1115	310-450
Hammer	620-845	150-335			345-610	530-710		
Javelin S		450-730	855-1110	325-550, 610-750	810-950	625-840	155-300	
Javelin N							155-300	

Bold says change venue or boards
Underline change lines

No time for Discus **10 min on TJ to LJ**
Dec shot 10 min

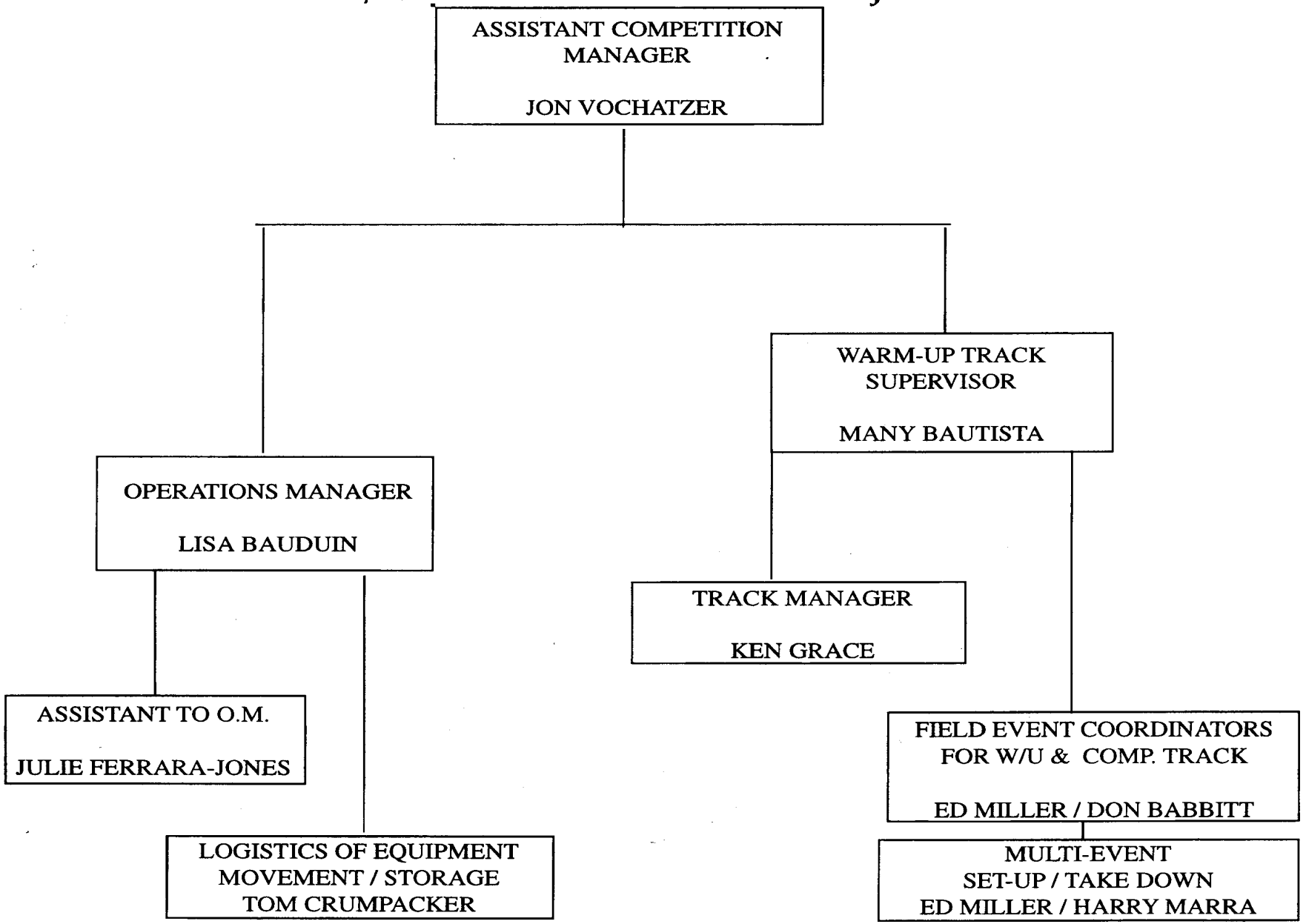
Technical Field Crew Assignments

Last	First	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Name	Name	**Friday, 7/14**	**Saturday, 7/15**	**Sunday, 7/16**	**Monday, 7/17**	**Thursday,7/20**	**Friday 7/21**	**Saturday, 7/22**	**Sunday 7/23**
Beeman	Roger		Field Crew	Field Crew	Field Crew	Field Crew	Field Crew		
Cochran	Dick	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew
DuBois	John			Field Crew		Field Crew	Field Crew		
Flanik	James				Field Crew		Field Crew		
Growdon	Martin						Field Crew		
Hawkes	Bill	Field Crew	Field Crew					Field Crew	Field Crew
Katz	David	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew Hd
Miller	Dave						Field Crew		
Nikula	George	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew
Pomo	Andy	Field Crew		Field Crew		Field Crew	Field Crew		Field Crew
Seebeck	Skip		Field Crew					Field Crew	Field Crew
Springer	Robert	Field Crew Hd	Field Crew Hd	Field Crew Hd	Field Crew Hd	Field Crew Hd	Field Crew Hd	Field Crew Hd	Off
Waldron	James	Field Crew	Field Crew		Field Crew	Field Crew	Field Crew	Field Crew	Field Crew
Watkins	Phillip	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Field Crew	Off	Off

Athlete Field Crew Assignments

Position	Jump Crew	Multievent Crew	Throws Crew
Head	Ed Miller	Ed Miller & Harry Mara	Don Babbitt

2000 OLYMPIC TRIALS
WARM-UP / COMPETITION FACILITY JOB TITLES



Sacramento State Stadium